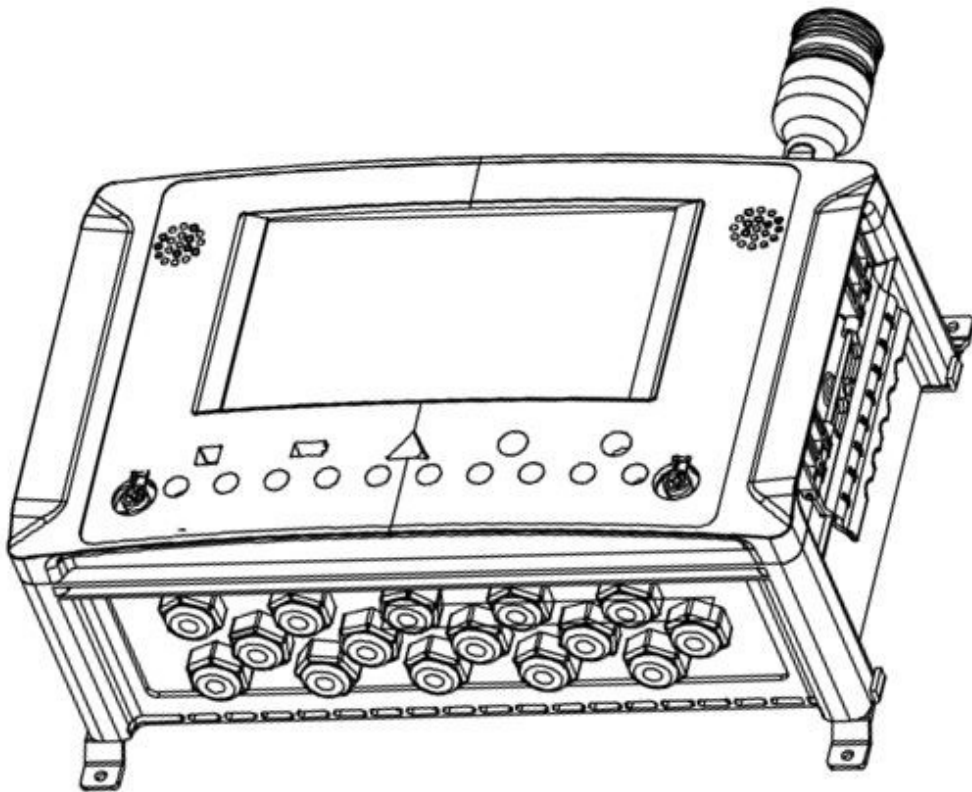


# ASC-100

## INSTRUCTION MANUAL

---



Instruction

***Please read this Manual carefully for correct use of the Product.***

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## **We truly thank you for choosing us.**

GASTRON is a professional manufacture of gas detector & gas monitoring systems. With the best quality and great convenience of use, our products have been praised by a lot of clients. We are always making our best efforts to help them find the products they want easily and develop gas detectors which meet their needs. GASTRON can take care of all your concerns about gas detection. We will take all of the responsibilities and accomplish the highest client satisfaction.

This Manual describes the operating method and brief maintenance procedures of ASC-100. Read carefully and keep it properly for future reference.

If you find any problem during the use of the Product, feel free to contact us in one of the following ways:

- Address: (Bugok-dong), 23, Gunpocheomdansaneop 1-ro, Gunpo-si, Gyeonggi-do
- TEL: 031-490-0800
- Fax: 031-490-0801
- **URL:** [www.gastron.com](http://www.gastron.com)
- **e-mail:** [gastron@gastron.com](mailto:gastron@gastron.com)

This Manual is subject to changes without prior notice for the improvements of product performances and user convenience.

Instruction

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## Instruction

## 1. Overview

ASC-100 is a digital alarm receiver connected with industrial and commercial gas detectors. The base unit is able to support mA analogue input/output channels (up to 10 channels). With an expansion unit, the number of channels can be increased up to 20. In addition to mA input/output, up to 20 channels are provided per unit to control diverse outputs such as visual/audible signals and solenoid valves. The integrated User Configurable Map View feature allows a user to monitor a local detector's location and status intuitively. The adoption of 10.1-inch wide-viewing angle LCD and MSDS viewer features enables easy handling of MSDS documents which should be kept in a toxic gas disaster-prone area.

The features of the Product are as follows:

- Gas detector monitoring (up to 10 channels) (4-20mA detection, DC 24V)
- 10 additional channels with an expansion unit (able to monitor up to 20 channels in total)
- Relay, 4-20mA input/output; module constructed individually
- 10.1" TFT LCD and multilingual
- Data & Event log
- Material Safety Data Sheet (MSDS) Viewer on gas detection
- High-output buzzer and voice alarm
- Diverse external interfaces such as TCP/IP and MODBUS



[Figure 1. ASC-100]

Performance degradation can take place temporarily in the features not related with gas detection depending on operating circumstances.

Instruction

## 2. Label Position and Descriptions

### 2.1. Alarm and Caution



**Warning**

Even after the power is cut off, residual voltage can cause an electric shock. Wait a while and then resume the operation.



**Warning**

Even after the power supply is disconnected, the high current can still flow through the equipment. An electric shock can result in bodily injury or death.



**Warning**

Incorrect grounding may result in system malfunction or failure. Ensure that protective grounding is properly done according to the Manual.



**Warning**

There is a risk of explosion.

[Figure 2. Warning Label]

### 2.2. I/O Modules and Quick Guide Labels

ROM									
ROM									
CH9	CH10								
CH7	CH8								
CH5	CH6								
CH3	CH4								
CH1	CH2								
NC									
COM									
NO									
<p>Safety Controller(ASC-100) Module</p> <p><input checked="" type="checkbox"/> ROM <input type="checkbox"/> BAM <input type="checkbox"/> AOM <input type="checkbox"/> PAM</p> <p>GASTRON MADE IN KOREA</p>									

BAM												
BAM	CAN	ExtRST	FAULT	ALARM2	ALARM1	PWR SW						
L	H	-RST+	NC	COM	NO	NC	COM	NO	NC	COM	NO	
<p>Safety Controller(ASC-100) Module</p> <p><input type="checkbox"/> ROM <input checked="" type="checkbox"/> BAM <input type="checkbox"/> AOM <input type="checkbox"/> PAM</p> <p>GASTRON MADE IN KOREA</p>												

AOM									
AOM									
CH5	CH4	CH3	CH2	CH1					
GND	mA	GND	mA	GND	mA	GND	mA	GND	mA
<p>Safety Controller(ASC-100) Module</p> <p><input type="checkbox"/> ROM <input type="checkbox"/> BAM <input checked="" type="checkbox"/> AOM <input type="checkbox"/> PAM</p> <p>GASTRON MADE IN KOREA</p>									

PAM														
PAM														
CH5	CH4	CH3	CH2	CH1										
GND	mA	PWR	GND	mA	PWR	GND	mA	PWR	GND	mA	PWR	GND	mA	PWR
<p>Safety Controller(ASC-100) Module</p> <p><input type="checkbox"/> ROM <input type="checkbox"/> BAM <input type="checkbox"/> AOM <input checked="" type="checkbox"/> PAM</p> <p>GASTRON MADE IN KOREA</p>														

[Figure 3. I/O Module Label]



Instruction

<p><b>주의 사항</b></p> <ol style="list-style-type: none"> <li>장비의 매뉴얼을 읽고 충분히 이해 후 장치를 사용할 것.</li> <li>설치 전 사용 전압 및 기기의 설정 전압 확인 후 전원 스위치를 ON 할 것.</li> <li>전원 스위치 OFF 후 케이블 결선 추가/제거/교체 작업할 것.</li> <li>전원 스위치 OFF 후 내부 모듈의 추가/제거/교체 작업할 것.</li> <li>예비 배터리의 장착된 경우 배터리의 전원 스위치 OFF 후 케이블 결선/제거/교체 작업할 것.</li> <li>예비 배터리의 장착된 경우 배터리의 전원 스위치 OFF 후 내부 모듈 추가/제거/교체 작업할 것.</li> <li>누수 등의 영향이 있는 곳에서 사용하지 말 것.</li> <li>시험 및 점검, 교정은 허가받은 관리 담당자 및 제조자 이외에는 절대 조작을 금함.</li> <li>수신부 및 감지부는 허가받은 관리 담당자 및 제조자 이외에는 절대 조작을 금함.</li> </ol>	<p><b>DETECTOR CONNECTION</b></p>
<p><b>AC WIRING</b></p> <p><b>DC WIRING</b></p>	<p><b>MAIN UNIT &amp; EXPANSION UNIT CONNECTION</b></p>

[Figure 4. Quick Guide Label]

**GASTRON Aegis Safety Controller**

P/N :  
S/N :

Power :  AC Type(110/220V, 50~60Hz, Max 150W)  
 DC Type(18~32V, Max 150W)

Temp : -10°C to +55°C, Ingress Protection : IP65

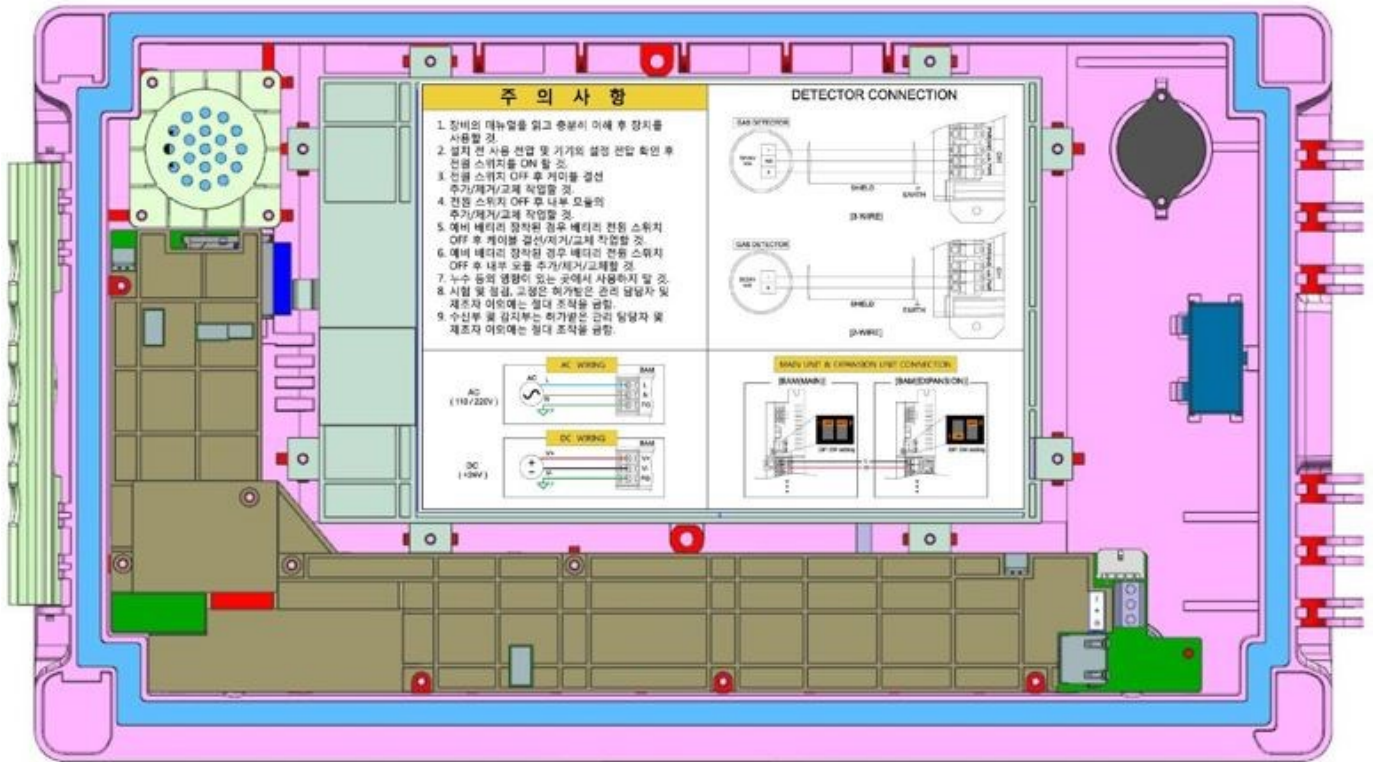
**CAUTION / ATTENTION**  
For safety reasons, this equipment should only be operated by qualified personnel.

안전을 위해 해당 장비는 자격을 갖춘 사람만 조작해야 하며, 조작 전에 매뉴얼을 반드시 숙지 해야 합니다.

Manufactured by : Gastron.Co.,Ltd  
23, Gunpocheomdansaneop 1-ro, Gunpo-si  
Gyeonggi-do, 15881, Rep. of KOREA

[Figure 5. Certification Label]

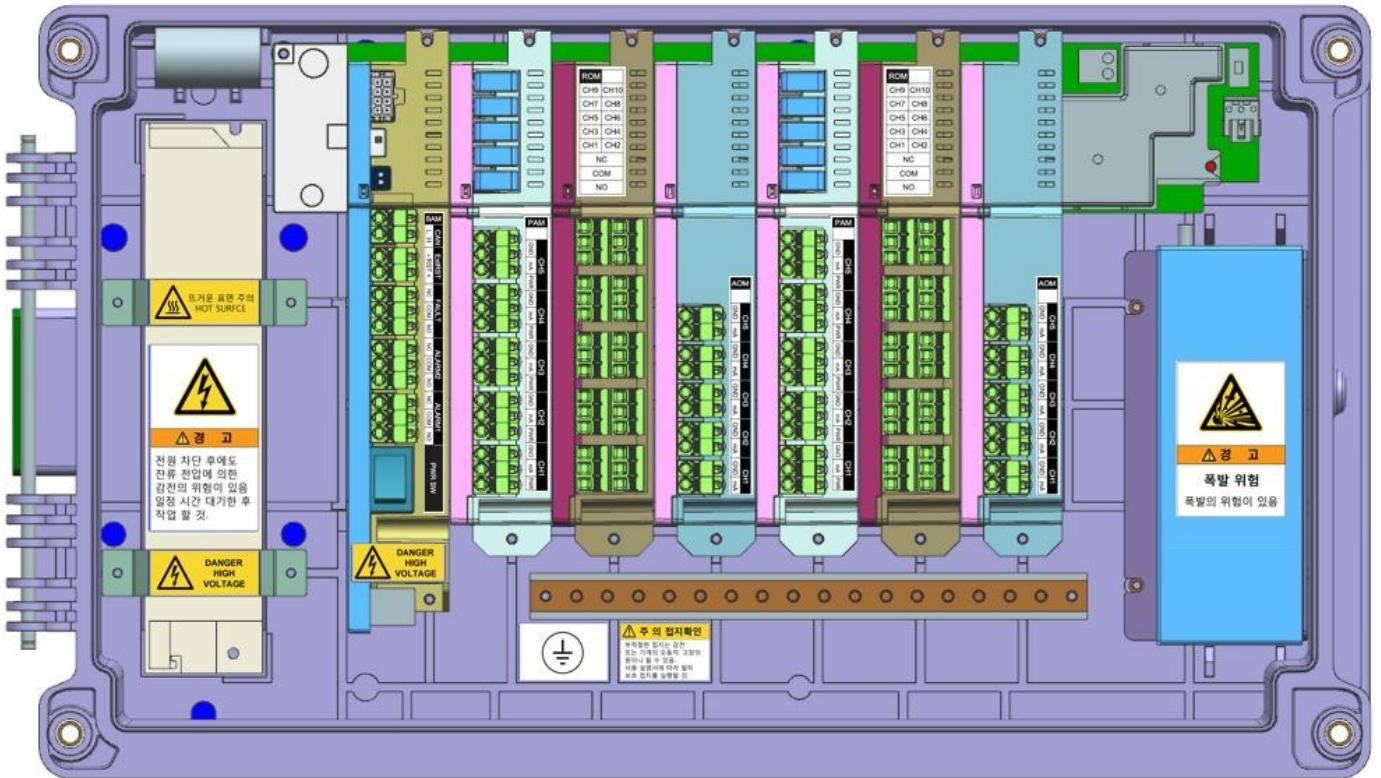
2.3. Inner Label Position



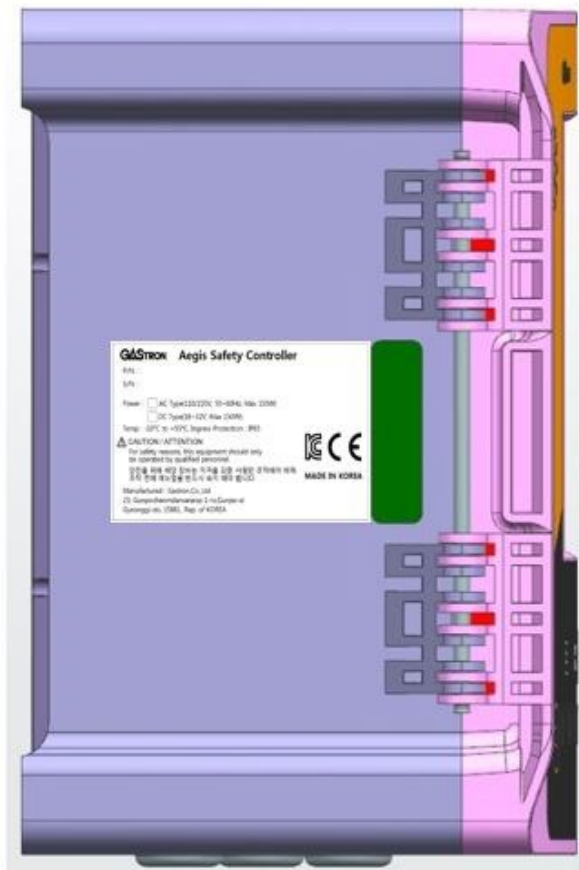
[Figure 6. Inner Quick Guide Label Positions]



Instruction

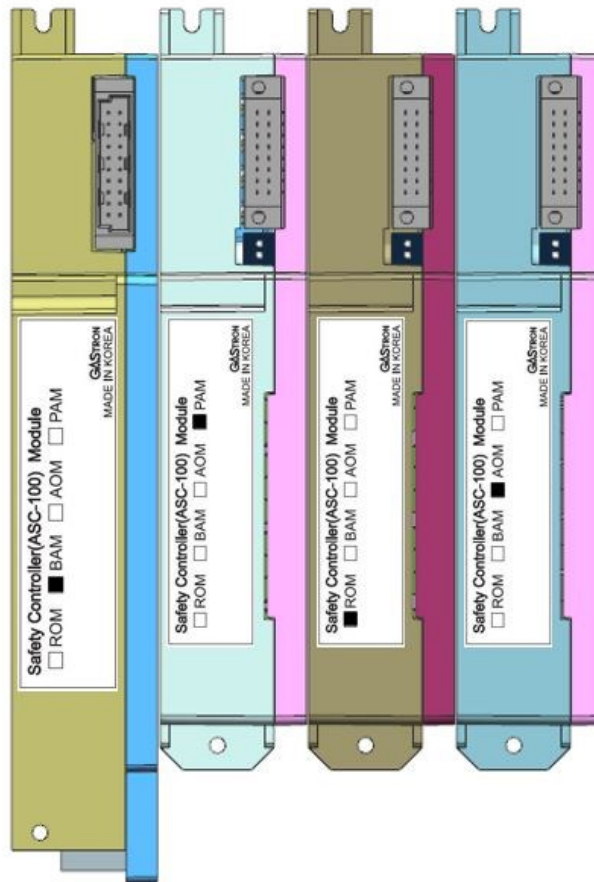


[Figure 7. Inner Label Positions]



[Figure 8. Certification Label Position]

Instruction



[Figure 9. I/O Module Label Positions]

Instruction

### 3. System Specifications

#### 3.1. General

[Table 1. General Specifications]

Items	Specification	Description
Product Name	AEGIS Safety Controller(ASC)-100	-
Dimensions (W x H x D / mm)	446 x 250 x 164 (outer warning lights NOT included)	-
Multichannel 4-20mA Input & 24V Power Settings	Up to 10 channels with 2 PAMs (5 channels per module)	Up to 20 channels with an expansion unit
Channel Relay (SPDT) Settings	Up to 20 channels with 2 ROMs (10 channels per module)	Up to 40 channels with an expansion unit
Common I/O	Alarm 1, Alarm 2, Fault, Remote Reset	-
Display and Input Devices	10.1 in full color TFT with resistive touchscreen, all alarm, system status LED, I/Och communication status LED (normal, abnormal)	Language: Korean, Chinese, English
External Interface	TCP/IP, MODBUS (RS-485)	Option
Auxiliary Storage Device	SD Card	-
Main Storage Device	Micro SD	-
Sound Device	Buzzer: 90dB @ 1m (Warning sound) Speaker: 80dB @ 1m (Voice / melody)	-
Backup Battery (6S2P-5200)	21.78V, 5,100mAh (111 Watt)	-

#### 3.2. Environments

[Table 2. Environmental Specifications]

Items	Specification	Description
IP Grade	IP65	-
Operating Temperature	-10°C to +55°C	-
Operating Humidity	5 to 95%	-

#### 3.3. Power

[Table 3. Power Specifications]

ITEMS	SPECIFICATION	Description
Power (AC)	AC 110/240V 50 – 60 Hz ± 6% / Max 150W	Auto Selectable
Power (DC)	DC 18 - 32V(Normal DC 24V) / Max 150W	0.4A continuous current per channel enabled
Power Supply per Channel	24V / 1A Limit / Over Latch-Off (Up to 24W per channel and 120W for all 5 channels)	-
Relay Contact	5 A @ 250VAC / 5A @ 30VDC	-
Analog Input	0-24mA (Fault, Measurement, OVER)	-
Analog Output	0-24mA / Isolation per channel	-

Instruction

## 4. System Configuration and Descriptions

### 4.1. I/O Module Construction and Descriptions

[Table 4. I/O Module Construction]

Items	Description
Main Unit	A base unit of the receiver in a gas detector; able to construct up to 6 internal I/O modules; able to cover 10 gas detectors in linked with an expansion unit; controllable up to 20 channels
Expansion Unit	Able to control up to 10 channels without TFT screen configuration after linkage with a main unit
CTM	Controls all modules of the receiver in a gas detector; executes data processing & display and alarm function
STM	Displays product status and channel conditions in LED
SMPS	Input power AC/DC SMPS for main/expansion unit (DC24V, 6.5A/150W)
BAM	Controls power and processes the data between the bottom modules connected to the back plane and CTM
PAM	Supplies power to the detector and receives and handles 4-20mA; able to receive up to 5 channels
ROM	Executes relay actuation according to internal setting conditions; controls outer warning lights and external devices; able to cover up to 10 channels
AOM	Generates mA entered with PAM; able to cover up to 5 channels
Backup battery	Able to keep the system ON for nearly 30 minutes at power outage with standby power (DC21.78V, 5.1A/111W)

### 4.2. I/O Module Specifications

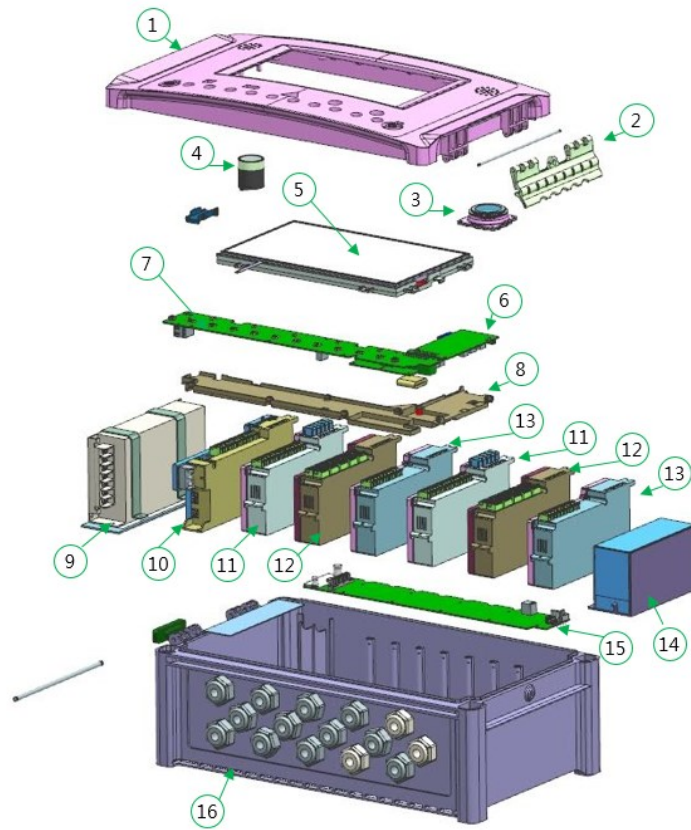
[Table 5. I/O Module Specifications]

Items	Specification	Description
Base Module (BAM)	Function	Internal module control, connection with an expansion unit
	Common I/O	External Remote Input 1ch
	Common Relay	Alarm Relay 2ch, Fault Relay 1ch
Power & Analog Module (PAM)	Function	Detector power supply, 2/3-wire, 5-channel 4-20mA input
	Power	24W per channel, up to 120W for all 5 channels
	mA Input Range	0-22mA (Max 24mA)
Relay Out Module (ROM)	Function	10-channel, 3-terminal relay (NC, COM, NO), ENERGIZER / DE-ENERGIZER mode
	Relay Spec	5A @ 250VAC / 5A @ 30VDC
Analog Out Module (AOM)	Function	Individual isolation, 5-channel mA output
	mA Out Range	0-22mA (Max 24mA)
Control & Status Module (CTM, STM)	Function	TFT drive (GUI), data processing, module control
	Ext Interface	TCP/IP, RS485 MODBUS(Option)
	LED	5-channel system status, 10-channel channel status LED
Back Plane Module (BPM)	Function	Internal unit power, signal line construction, battery charge circuit

## 5. Components and Descriptions

### 5.1. Product Architecture

Instruction



[Figure 10. Product Architecture]

[Table 6. Product Architecture Descriptions]

No	Name	Descriptions
1	Top Cover Case	Front cover
2	Hook Handle	Acryl designed to install/remove the cover
3	Speaker Module	-
4	Buzzer Assy	-
5	LCD	10.1-inch touch TFT
6	CTM Module Cover	To protect the CTM board
7	STM Module Cover	To protect the STM board
8	CTM, STM Module	-
9	AC/DC SMPS	24V,6.5A / 150W
10	Base Module (BAM) and Protective Cover	-
11	Power & mA In Module (PAM) and Protective Cover	-
12	Relay Out Module (ROM) and Protective Cover	-
13	mA Out Module (AOM) and Protective Cover	-
14	Backup Battery Pack	21.78V,5.1A / 111W
15	Back Plane Module	-
16	Enclosure	Body (top, bottom)

## 5.2. External Components and Descriptions



Instruction



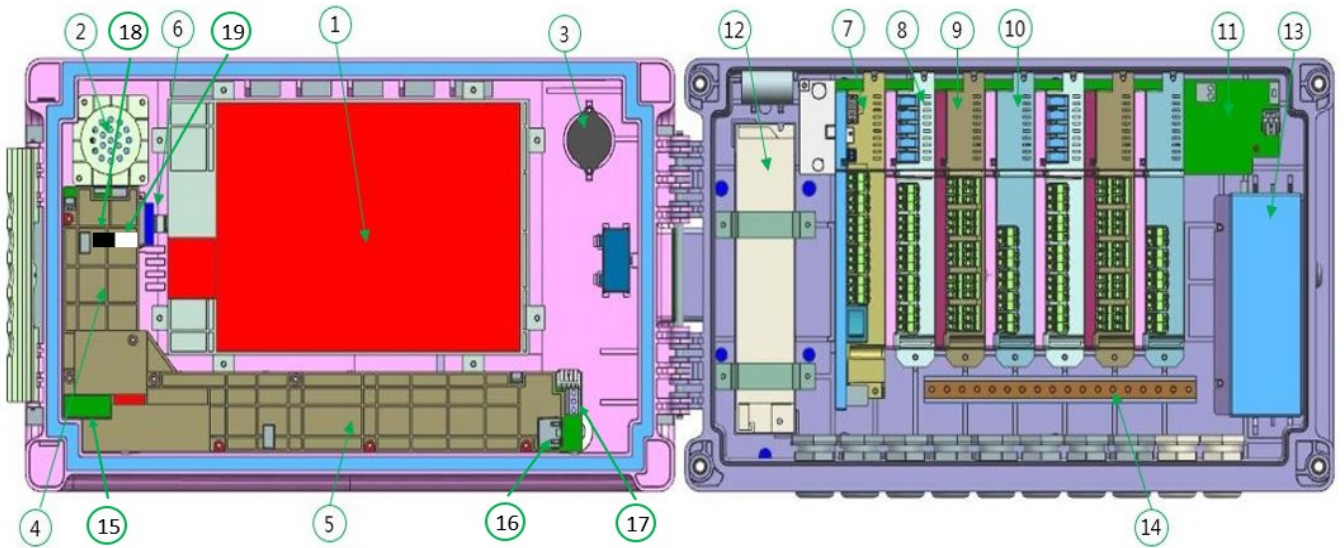
[Figure 11. ASC-100 Cover Components]

[Table 7. ASC-100 Cover Components]

No	Name	Descriptions
1	Touch TFT (1024x600)	10,1" full color TFT / monitoring display screen
2	Buzzer Output Unit	Piezo Buzzer 90 dB @ 1m / warning sound
3	Speaker Output Unit	80 dB @ 1m / voice, melody
4	Power LED (External Power Display)	External power supply status (green)
5	Battery LED (Backup Battery Status Display)	Internal BAT power supply status (green)
6	Alarm LED	All alarm status (red)
7	Fault LED (Fault Display)	Fault status after internal diagnosis (yellow)
8	Status LED (Normal Status Display)	System operation status (green)
9	10 Channel Status	Channel status (1-10 channel(s)) (Green: Normal, Yellow: 1 <sup>st</sup> alarm, Red: 2 <sup>nd</sup> alarm)
10	Audio Alarm Mute Button	Stops alarm
11	Reset Button	Latch off / returns back to the measurement mode (reset)
12	Hook Handle	Acryl designed to install/remove the cover

### 5.3. Internal Components and Descriptions

Instruction



[Figure 12. Internal Layout]

[Table 8. Internal Components]

No	Name	Descriptions
1	Touch TFT	10.1" full color TFT / monitoring display screen
2	Speaker Module	80 dB @ 1m / voice, melody
3	Buzzer	Piezo Buzzer 90 dB @ 1m / warning sound
4	CTM	Control module
5	STM	Status module (LED indicator)
6	SD Card Socket	SD card slot
7	BAM	Base module (I/O control module)
8	PAM	Power & mA input module (CH Active USB included)
9	ROM	Relay output module
10	AOM	Analog output module
11	BPM	Back plane module (BAM) and I/O module connection board
12	AC/DC SMPS	AC 110/220V input, DC24V, 6.5A (150W)
13	Backup Battery Pack	21.78V / 5.1A (111W)
14	Earth Bar	Field GND
15	D-SUB Port	Config D-SUB port disabled
16	Ethernet Port	10/100 Ethernet port
17	MODBUS Port	RS-485 MODBUS port
18	J-TAG Download Port	J-TAG download port disabled
19	Debug Port	Debug port disabled



Instruction

### 5.4. External Components and Descriptions (Expansion Unit)



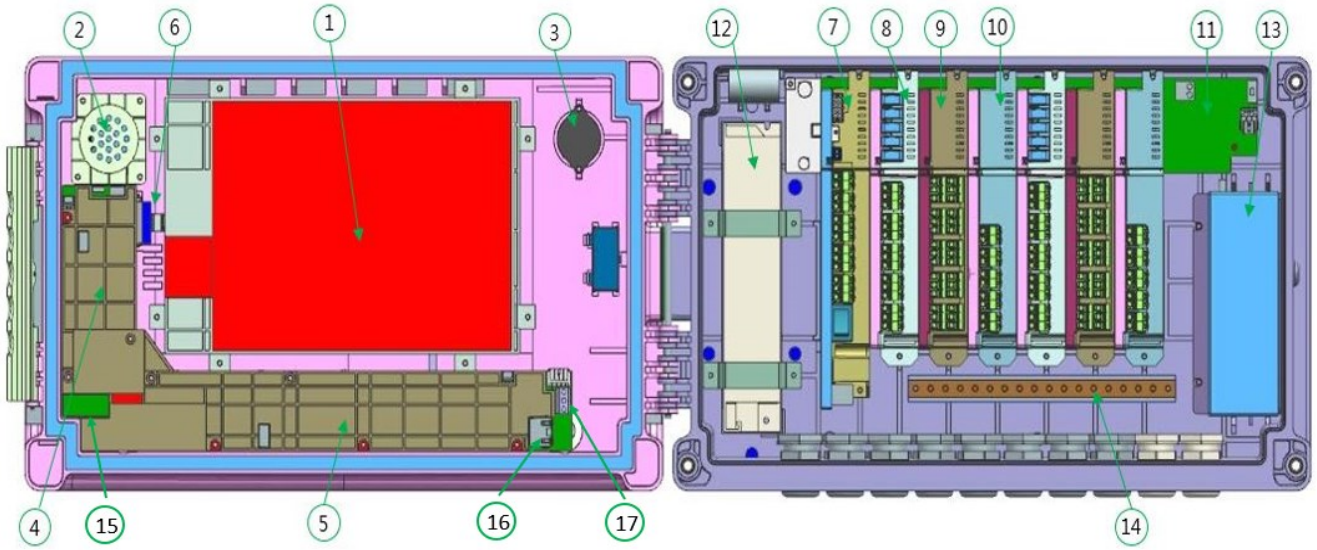
[Figure 13. Expansion Cover Components]

[Table 9. External Components of Expansion Unit]

No	Name	Descriptions
1	Power LED (Power Display)	External power supply status (green)
2	Battery LED (Backup Battery Operating Status Display)	Internal BAT power supply status (green)
3	10-Channel Status	Status of 11-20 channels (Green: Normal, Yellow: 1 <sup>st</sup> alarm, Red: 2 <sup>nd</sup> alarm)
4	Alarm LED	All alarm status (red)
5	Fault LED (Fault Display)	Fault status after internal diagnosis (yellow)
6	Status LED (Normal Status Display)	System operation status (green)

### 5.5. Internal Components and Descriptions (Expansion Unit)

Instruction



[Figure 14. Internal Layout of Expansion Unit]

[Table 10. Internal Components of Expansion Unit]

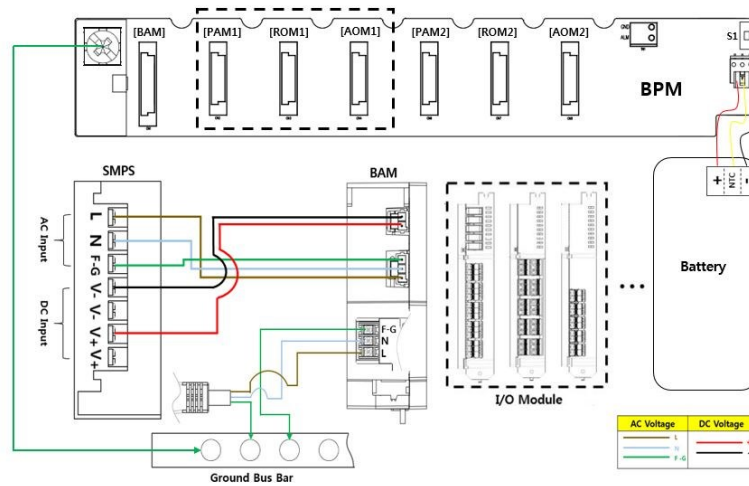
No	Name	Descriptions
1	Touch TFT	No touchscreen
2	Speaker Module	No speaker module
3	Buzzer	No buzzer
4	CTM	No CTM
5	STM	Status Module (LED indicator)
6	SD Card Socket	No SD card slot
7	BAM	Base module (I/O module control module)
8	PAM	Power & mA input module (ch-active USB included)
9	ROM	Relay output module
10	AOM	Analog output module
11	BPM	Back plane module (BAM) and I/O module connection board
12	AC/DC SMPS	AC 110/240V input, DC24V, 6.5A (150W)
13	Backup Battery Pack	21.78V / 5.1A (111W)
14	Earth Bar	Field GND
15	D-SUB Port	Config D-SUB port disabled
16	Ethernet Port	10/100 Ethernet port
17	MODBUS Port	RS-485 MODBUS port

## 6. Installation

### 6.1. System Power and Signal Construction

- BAM and I/O modules are constructed as illustrated in the figure below, and the I/O is able to construct up to 6 channels.

Instruction

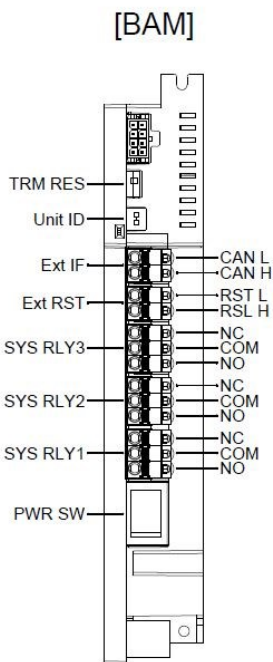


[Figure 15. System Power Connection Diagram]

- Battery is available as a backup. S1 switch is turned ON/OFF to operate the system.
- The communication between I/O modules is comprised of circuits without separate wiring.

### 6.2. BAM Terminal

- The CAN communication-connecting cable should have shield cables with CVVS or 1.5sq CVVSB or higher.



[Figure 16. BAM Terminal Construction Diagram]

[Table 11. BAM Terminal Configuration]

Module	Terminal Configuration	Description
BAM	CAN L	A communication terminal connected to an expansion unit at channel expansion
	CAN H	
	ExtRST -	External reset control terminal
	ExtRST +	
	Fault RELAY NC	Fault status output relay
	Fault RELAY COM	
	Fault RELAY NO	
	2 <sup>nd</sup> Warning RELAY NC	2 <sup>nd</sup> alarm output relay
	2 <sup>nd</sup> Warning RELAY COM	
	2 <sup>nd</sup> Warning RELAY NO	
	1 <sup>st</sup> Warning RELAY NC	1 <sup>st</sup> alarm output relay
	1 <sup>st</sup> Warning RELAY COM	
1 <sup>st</sup> Warning RELAY NO		

#### 6.2.1. Expansion Link Connection

Instruction

- Check if main and expansion units are matched in terms of the version of firmware.
- CAN Cable: 24AWG shielded twisted pair cable (less than 5 meters)
- The connection layout is as follows:

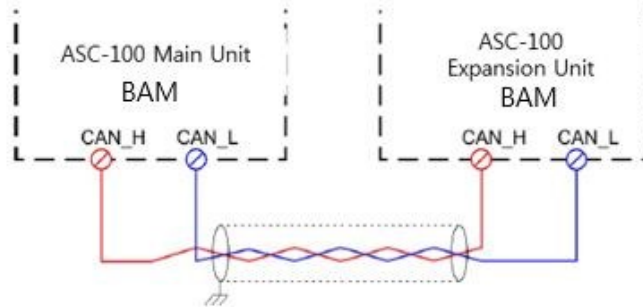


Figure 17. Connecting Main Unit to Expansion Unit

**Note: Apply power to the expansion unit and then main unit for interactive communication.**



Module Label	Terminal Configuration	Descriptions
CAN	CAN_H	Connects main and expansion units
	CAN_L	

[Table 12. Expansion Link Terminal Configuration]

6.2.2. How to Operate ASC-100 DIP Switch

- ASC-100 can be controlled with BAM’s DIP switch for communication between main and expansion units and operated as follows:

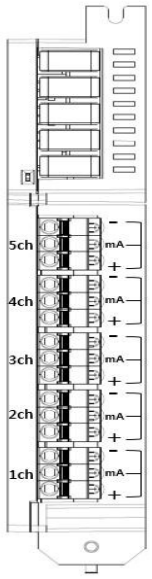
[Table 13. BAM DIP Switch Setting]

Connection of Main and Expansion Units		Main Unit Alone
Main Unit	Expansion Unit	Main Unit
Channels 1&2 <b>Off</b>	Channel 1 <b>On</b> , Channel 2 <b>Off</b>	Channels 1&2 <b>Off</b>

6.3. PAM Terminal Configuration

[Table 14. PAM Terminal Components]

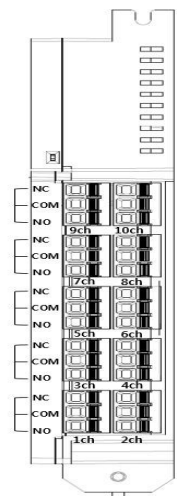
Instruction



Module	Terminal Configuration	Description
PAM	Detector Power -	Power supply to the detector and 4-20mA signal input (1ch)
	Detector 4-20mA Input	
	Detector Power +	
	Detector Power -	Power supply to the detector and 4-20mA signal input (2ch)
	Detector 4-20mA Input	
	Detector Power +	
	Detector Power -	Power supply to the detector and 4-20mA signal input (3ch)
	Detector 4-20mA Input	
	Detector Power +	
	Detector Power -	Power supply to the detector and 4-20mA signal input (4ch)
	Detector 4-20mA Input	
	Detector Power +	
	Detector Power -	Power supply to the detector and 4-20mA signal input (5ch)
	Detector 4-20mA Input	
	Detector Power +	

**[Figure 18. PAM Terminal Layout]**

### 6.4. ROM Terminal Configuration



**[Figure 19. ROM Terminal Layout]**

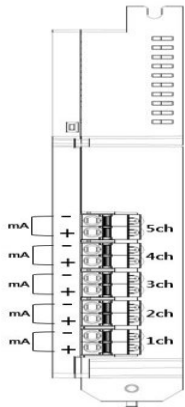
**[Table 15. ROM Terminal Configuration]**

Module	Terminal Configuration	Description
ROM	Alarm RELAY NC	1 <sup>st</sup> alarm, 2 <sup>nd</sup> alarm, fault status output relay (1ch, 2ch)
	Alarm RELAY COM	
	Alarm RELAY NO	
	Alarm RELAY NC	1 <sup>st</sup> alarm, 2 <sup>nd</sup> alarm, fault status output relay (3ch, 4ch)
	Alarm RELAY COM	
	Alarm RELAY NO	
	Alarm RELAY NC	1 <sup>st</sup> alarm, 2 <sup>nd</sup> alarm, fault status output relay (5ch, 6ch)
	Alarm RELAY COM	
	Alarm RELAY NO	
	Alarm RELAY NC	1 <sup>st</sup> alarm, 2 <sup>nd</sup> alarm, fault status output relay (7ch, 8ch)
	Alarm RELAY COM	
	Alarm RELAY NO	
	Alarm RELAY NC	1 <sup>st</sup> alarm, 2 <sup>nd</sup> alarm, fault status output relay (9ch, 10ch)
	Alarm RELAY COM	
	Alarm RELAY NO	

Instruction

### 6.5. AOM Terminal Configuration

[Table 16. AOM Terminal Configuration]



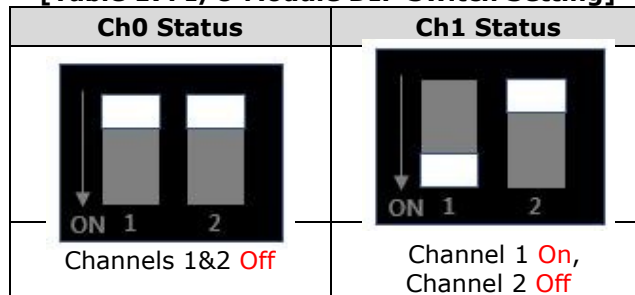
[Figure 20. AOM Terminal Layout]

Module	Terminal Configuration	Description
AOM	Output 4-20mA -	4-20mA output (ch1)
	Output 4-20mA +	
	Output 4-20mA -	4-20mA output (ch2)
	Output 4-20mA +	
	Output 4-20mA -	4-20mA output (ch3)
	Output 4-20mA +	
	Output 4-20mA -	4-20mA output (ch4)
	Output 4-20mA +	
	Output 4-20mA -	4-20mA output (ch5)
	Output 4-20mA +	

#### 6.5.1. How to Operate I/O Module DIP Switch

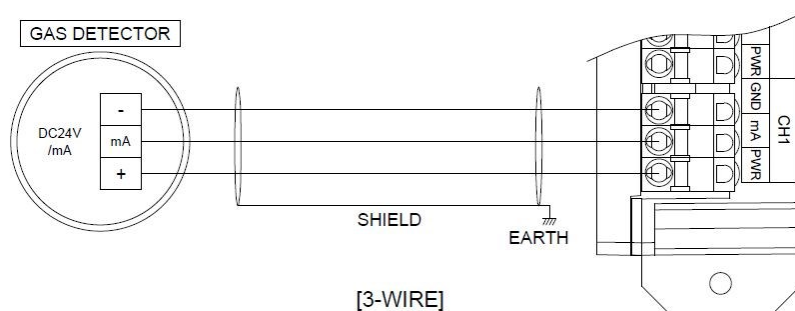
- To set ch0 or ch1 of ASC-100 I/O modules, the following settings are required.
- The DIP switches of I/O modules are positioned at the bottom of the connector connected to the BPM.

[Table 17. I/O Module DIP Switch Setting]



### 6.6. How to Connect 3-wire Gas Detector

- If a gas detector’s power and 4-20mA output are configured in 3 wires (V+, mA, V-), it is connected to the PAM as illustrated below:
- For a connection cable, a shield cable with CVVS or CVVSB 1.5sq or higher should be used.



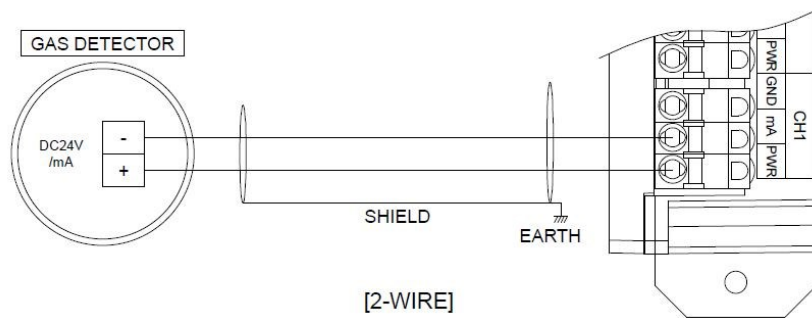
[Figure 21. 3-wire Gas Detector Connection]



Instruction

### 6.7. How to Connect 2-wire Gas Detector

- If a gas detector’s power and 4-20mA output are configured in 2 wires (V+, mA), it is connected to the PAM as illustrated below:
- For a connection cable, a shield cable with CVVS or CVVSB 1.5sq or higher should be used.

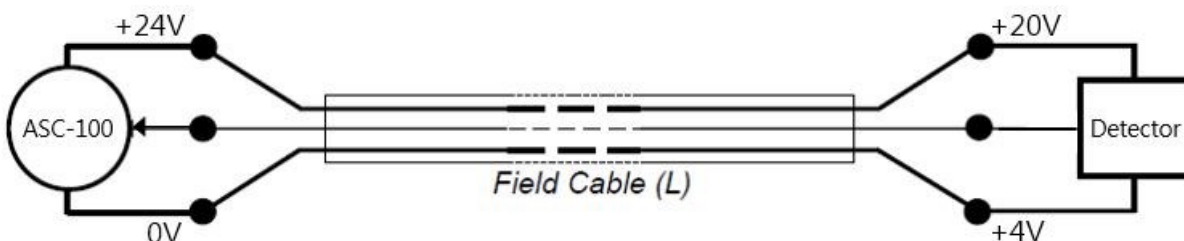


[Figure 22. 2-wire Gas Detector Connection]

### 6.8. Cable Length

#### 6.8.1. Cable Length (IMAX)

- The maximum length between the detector and ASC-100 is decided by wire specifications.
- Maximum installation length =  $V_{MAXDROP} \div I_{MAX} \div WIRER/m \div 2$ 
  - ✓  $V_{MAXDROP}$ : Maximum voltage drop in loop (= Power supply voltage – Min. operating voltage)
  - ✓  $I_{MAX}$ : Max. current of ASC-100
  - ✓  $WIRER/m$ : The resistance of the wire (ohms/meter value available in wire manufacturer’s specification data sheet)
- An example of the installation length using 16AWG 24V power supply is as follows:
  - ✓ ASC-100 minimum operating voltage = 18 Vdc
  - ✓  $V_{MAXDROP} = 24 - 18 = 6V$
  - ✓  $I_{MAX} = 1A(1000mA)$
  - ✓  $6 \div 1 \div 0.01318 \div 2 = 227.617m \div 228m$



[Figure 23. Maximum Cable Distance]

- The power cable installation length by cable classification is as follows:

[Table 18. Maximum Power Cable Distance]

AWG	mm <sup>2</sup>	Copper Resistance (ohms/m)	Meters	Feet
12	3.31	0.00521	575	1886

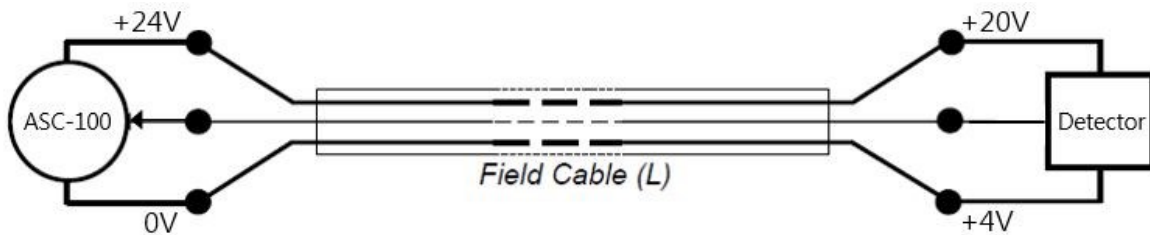


Instruction

14	2.08	0.00828	362	1187
16	1.31	0.01318	228	748
18	0.82	0.02095	143	469
20	0.518	0.0333	90	295

**6.8.2. Cable Length (ICON)**

- The maximum length between the detector and ASC-100 is decided by wire specifications.
- Maximum installation length =  $V_{MAXDROP} \div ICON \div WIRER/m \div 2$ 
  - ✓  $V_{MAXDROP}$ : Maximum voltage drop in loop (= Power supply voltage – Min. operating voltage)
  - ✓  $ICON$ : Continuous current of ASC-100
  - ✓  $WIRER/m$ : The resistance of the wire (ohms/meter value available in wire manufacturer’s specification data sheet)
- An example of the installation length using 16AWG 24V power supply is as follows:
  - ✓ ASC-100 minimum operating voltage = 18 Vdc
  - ✓  $V_{MAXDROP} = 24 - 18 = 6V$
  - ✓  $ICON = 0.4A(400mA)$
  - ✓  $6 \div 0.4 \div 0.01318 \div 2 = 569.044m \approx 569m$



[Figure 24. Maximum Cable Distance]

- The power cable installation length by cable classification is as follows:

[Table 19. Maximum Power Cable Distance]

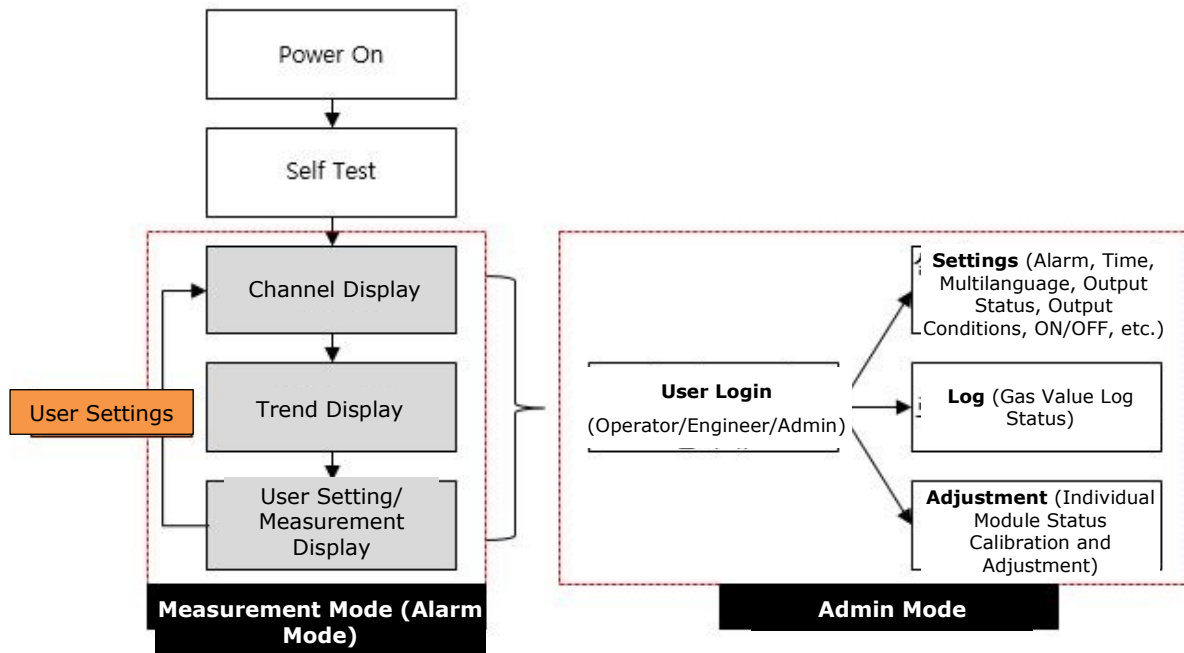
AWG	mm <sup>2</sup>	Copper Resistance (ohms/m)	Meters	Feet
12	3.31	0.00521	1439	4721
14	2.08	0.00828	905	2969
16	1.31	0.01318	569	1866
18	0.82	0.02095	358	1174
20	0.518	0.0333	225	738

**7. Display Layout and Operation Method**

**7.1. Program Function Configuration**

- ▷ The programs are configured as follows. All motions can be controlled by a touchscreen, and numbers can be entered through a virtual keyboard.

Instruction



[Figure 25. Program Layout]

- To keep operations stable, all F/W is configured based on RTOS.
- In terms of detector channel settings, channel-active USB should be inserted into the PAM.
- All F/W in the equipment can be updated from the CTM, using an SD card.

### 7.2. Booting

▷ Once the power is ON, the Diagnosis Mode is enabled. In nearly 10 seconds, a booting process is completed.

[Table 20. Diagnosis List]

No	Diagnosis List
1	Communication status between external CAN and internal CAN
2	I/O module installation and F/W version
3	Internal and external SD card memory
4	System memory EEPROM
5	Default settings
6	Map load

### 7.3. Main Screen Configuration (1-10ch)

▷ A gas detection status can be checked through a 10ch monitoring screen, and the details are as follows:

Instruction



[Figure 26. Main Page (1-10ch)]

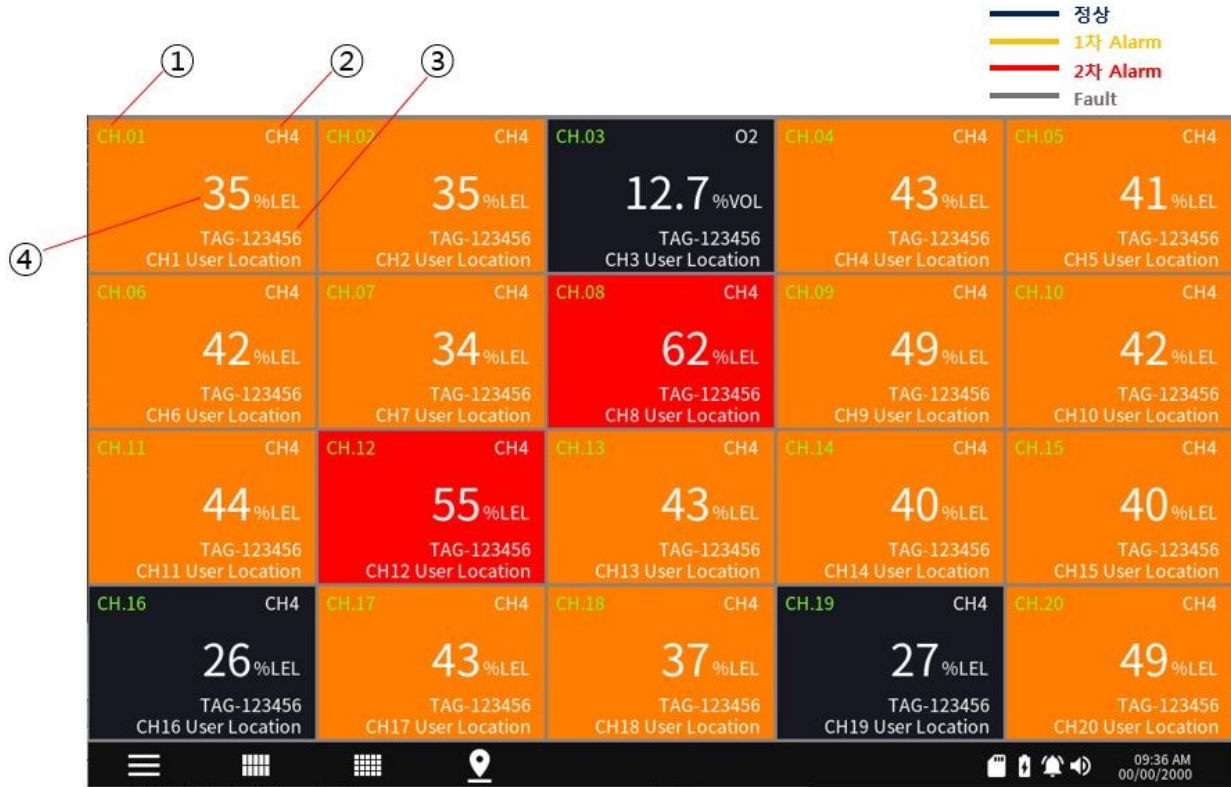
[Table 21. Main Page Configuration]

No	Function	Description
1	<b>CH.01</b>	• Able to check the allocated channels (ch.1 – ch.10)
2	<b>CH4</b>	• Displays the name of the detected gas
3	<b>Fault</b>	• A yellow light is turned ON when fault is detected (black and white if nothing is detected)
4	<b>2nd Alarm</b>	• A red light is turned ON at the 2 <sup>nd</sup> alarm (black and white if nothing is alarmed)
5	<b>1st Alarm</b>	• An orange light is turned ON at the 1st alarm (black and white if nothing is alarmed)
6	<b>TAG-123456</b>	• Able to check the tag name of the set detector
7		• Displayed in graph according to the detected level (classified by the status display color)
8	<b>17 %LEL</b>	• Able to check measured value (unit: ppm, ppb, %VOL, %LEL, mA)
9		• If the icon is touched, a monitoring page in Figure 26 appears.
10		• If the icon is touched, a monitoring page in Figure 27 appears.
11		• If the icon is touched, a map page in Figure 30 appears.

Instruction

### 7.4. Main Screen Configuration (1-20ch)

▷ A gas detection status can be checked through a 20ch monitoring screen, and the details are as follows:



[Figure 27. Main Page (1-20ch)]

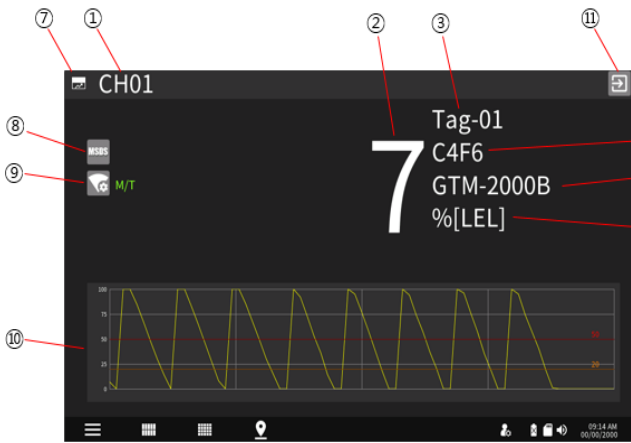
[Table 22. Main Page Configuration]

No	Function	Description
1	CH.01	• Able to check the allocated channels (ch.1 - ch.20)
2	CH4	• Displays the name of the set detected gas
3	TAG-123456	• Able to check the tag name of the set detector
4	35 %LEL	• Able to check measured value (unit: ppm, ppb, %VOL, %LEL, mA)

### 7.5. Single Screen Configuration

▷ This is a feature designed to examine the details on each channel status. If each channel is touched on the main screen, the following page appears, and the details are as follows:

Instruction



[Figure 28. Single Screen Layout]



[Figure 29. MSDS]

[Table 23. Single Page Configuration]

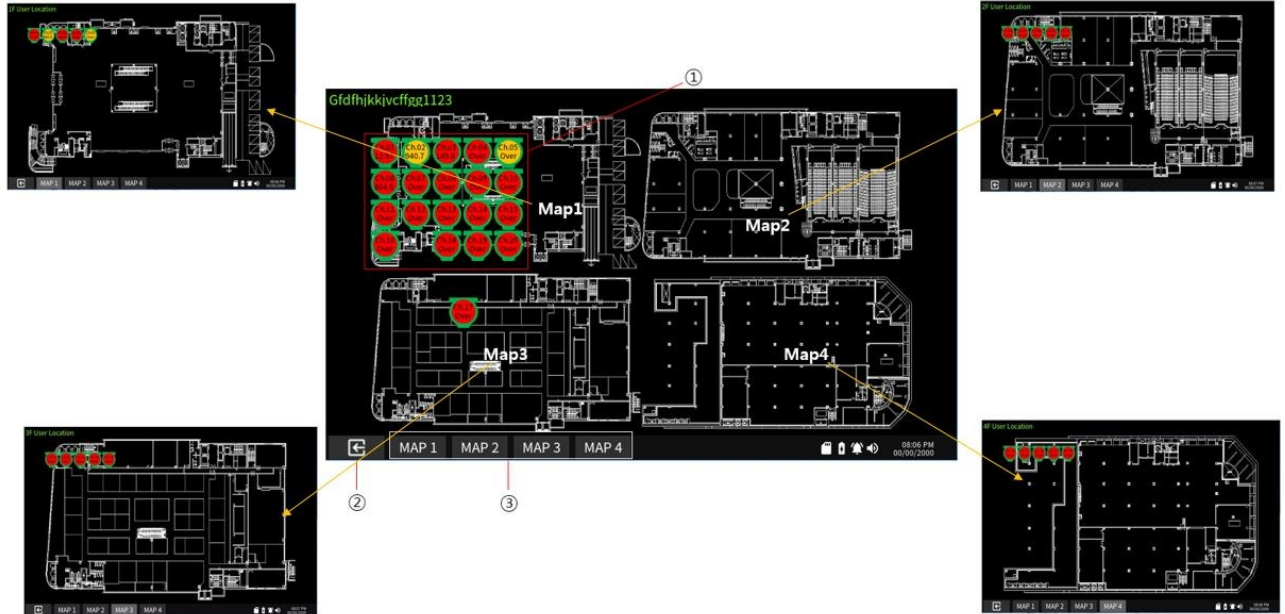
No	Function	Description
1	CH01	<ul style="list-style-type: none"> <li>Able to check the allocated channels</li> </ul>
2	7	<ul style="list-style-type: none"> <li>Able to check measured value (unit: ppm, ppb, VOL, LEL, mA)</li> </ul>
3	Tag-01	<ul style="list-style-type: none"> <li>Able to check the tag name of the set detector</li> </ul>
4	C4F6	<ul style="list-style-type: none"> <li>Displays the name of the set detected gas</li> </ul>
5	GTM-2000B	<ul style="list-style-type: none"> <li>Displays the name of the detector</li> </ul>
6	%[LEL]	<ul style="list-style-type: none"> <li>Displays the unit of the measurement</li> </ul>
8	MSDS	<ul style="list-style-type: none"> <li>A button used to go to the GAS MSDS VIEW page (the MSDS resolution should not exceed 830-1100)</li> </ul>
9	M/T	<ul style="list-style-type: none"> <li>Standby Mode (Standby Mode can be set by the admin or person with higher authority)</li> </ul>
10	Trend Graph	<ul style="list-style-type: none"> <li>Able to check a trend in real time</li> </ul>
11	Back Button	<ul style="list-style-type: none"> <li>A button used to return back to the previous page</li> </ul>
12	MSDS Document	<ul style="list-style-type: none"> <li>MSDS document view</li> </ul>
13	Left Arrow	<ul style="list-style-type: none"> <li>A button used to move back to the previous page</li> </ul>
14	Right Arrow	<ul style="list-style-type: none"> <li>A button used to move to the next page</li> </ul>
15	1/8	<ul style="list-style-type: none"> <li>Displays current page / full page</li> </ul>

Instruction

### 7.6. MAP Page Configuration

▷ Able to view full map status and MAP(1-4) site which reveals detector positions

※ **NOTICE: The MAP resolution should not exceed 880x530 (JPG).**



[Figure 30. MAP Page Layout]

[Table 24. MAP Page Configuration]


No	Function	Description
1		<ul style="list-style-type: none"> <li>As a detector status icon, it displays a channel name on top and gas detection values at the bottom.</li> </ul>
2		<ul style="list-style-type: none"> <li>A button used to move back to the previous page</li> </ul>
3		<ul style="list-style-type: none"> <li>This MAP site shift button allows a user to check a detector location by touching the tab to check each map.</li> </ul>

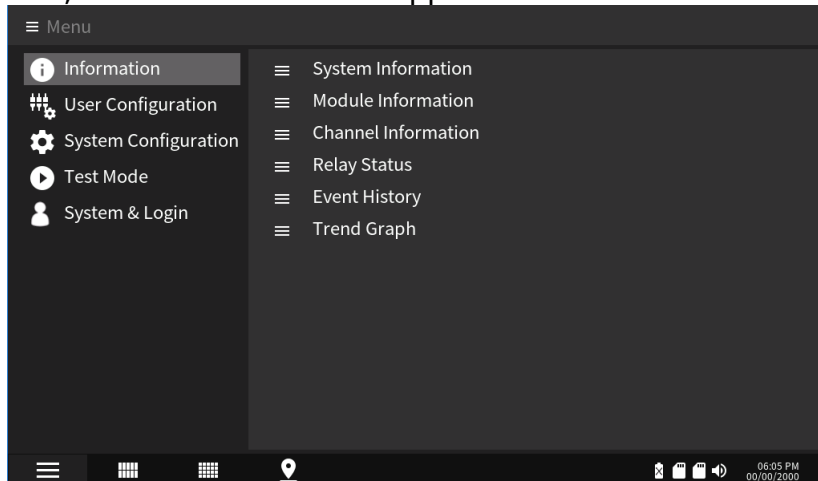


Instruction

## 8. Menu Setting and Status

### 8.1. Information Page

▷ Touch [  ] at the left bottom and move to the Menu Setting page. Once an items is touched, detailed information appears.



[Figure 31. Information Page Layout]

#### 8.1.1. System Information Page



[Figure 32. System Information Page Layout]

[Table 25. System Information Functions]

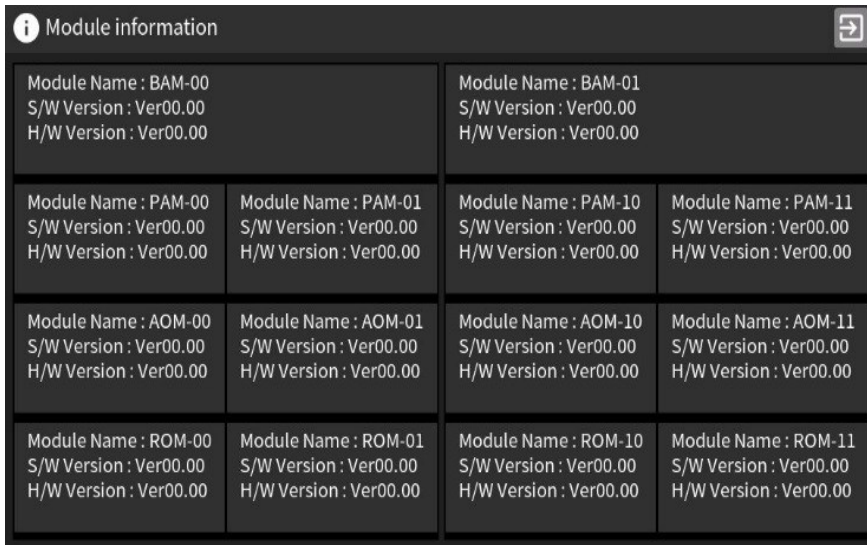
No	Function	Description
1	Model Name : ASC - 100	<ul style="list-style-type: none"> <li>Checks the model name</li> </ul>
2	S/W Version : 00.04 H/W Version : 00.00	<ul style="list-style-type: none"> <li>Checks the software and hardware versions of the CTM</li> </ul>
3	Channel : 00	<ul style="list-style-type: none"> <li>Checks the number of PAM channels</li> </ul>
4	Memory : 1024 KBytes SD Card : 1024 KBytes	<ul style="list-style-type: none"> <li>Checks the capacity and remaining space of internal SD card (memory) (unit: bytes)</li> <li>Checks the capacity and remaining space of external SD card (memory) (unit: bytes)</li> </ul>
5	Battery (M) : 0.0V, 0% Battery (E) : 0.0V, 0%	<ul style="list-style-type: none"> <li>Battery (M): Displays the voltage status of main unit backup battery</li> </ul>



Instruction

		<ul style="list-style-type: none"> <li>and checks remaining space (unit: %)</li> <li>Battery (E): Displays the voltage status of expansion unit backup battery and checks remaining space (unit: %)</li> </ul>
--	--	--

8.1.2. Module Information Page Configuration



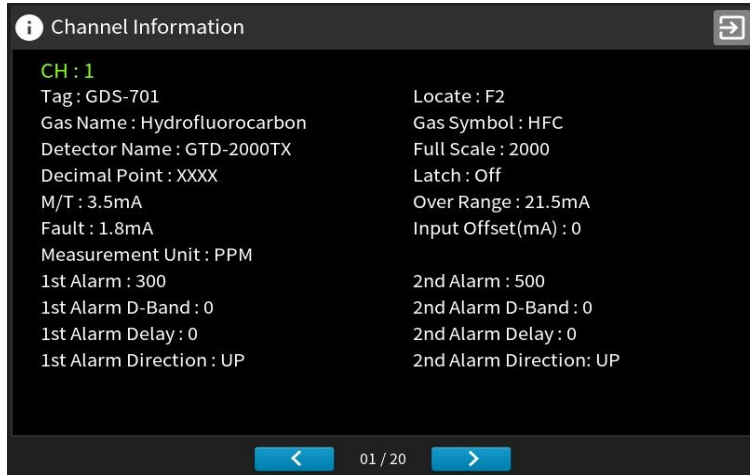
[Figure 33. Module Information Page Layout]

[Table 26. Module Information Functions]

No	Function	Description								
1	<table border="1"> <tr> <td colspan="2">Module Name : BAM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ①</td> </tr> <tr> <td>Module Name : PAM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ②</td> <td>Module Name : PAM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ③</td> </tr> <tr> <td>Module Name : AOM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ④</td> <td>Module Name : AOM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑤</td> </tr> <tr> <td>Module Name : ROM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑥</td> <td>Module Name : ROM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑦</td> </tr> </table>	Module Name : BAM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ①		Module Name : PAM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ②	Module Name : PAM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ③	Module Name : AOM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ④	Module Name : AOM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑤	Module Name : ROM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑥	Module Name : ROM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑦	<ul style="list-style-type: none"> <li>Able to check the hardware and software versions of the main unit</li> <li>① Checks the hardware and software versions of BAM</li> <li>② Checks the hardware and software versions of PAM00</li> <li>③ Checks the hardware and software versions of PAM01</li> <li>④ Checks the hardware and software versions of AOM00</li> <li>⑤ Checks the hardware and software versions of AOM01</li> <li>⑥ Checks the hardware and software versions of ROM00</li> <li>⑦ Checks the hardware and software versions of ROM01</li> </ul>
Module Name : BAM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ①										
Module Name : PAM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ②	Module Name : PAM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ③									
Module Name : AOM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ④	Module Name : AOM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑤									
Module Name : ROM-00 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑥	Module Name : ROM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑦									
2	<table border="1"> <tr> <td colspan="2">Module Name : BAM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ①</td> </tr> <tr> <td>Module Name : PAM-10 S/W Version : Ver00.00 H/W Version : Ver00.00 ②</td> <td>Module Name : PAM-11 S/W Version : Ver00.00 H/W Version : Ver00.00 ③</td> </tr> <tr> <td>Module Name : AOM-10 S/W Version : Ver00.00 H/W Version : Ver00.00 ④</td> <td>Module Name : AOM-11 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑤</td> </tr> <tr> <td>Module Name : ROM-10 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑥</td> <td>Module Name : ROM-11 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑦</td> </tr> </table>	Module Name : BAM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ①		Module Name : PAM-10 S/W Version : Ver00.00 H/W Version : Ver00.00 ②	Module Name : PAM-11 S/W Version : Ver00.00 H/W Version : Ver00.00 ③	Module Name : AOM-10 S/W Version : Ver00.00 H/W Version : Ver00.00 ④	Module Name : AOM-11 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑤	Module Name : ROM-10 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑥	Module Name : ROM-11 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑦	<ul style="list-style-type: none"> <li>Able to check the hardware and software versions of the expansion unit (same as above)</li> </ul>
Module Name : BAM-01 S/W Version : Ver00.00 H/W Version : Ver00.00 ①										
Module Name : PAM-10 S/W Version : Ver00.00 H/W Version : Ver00.00 ②	Module Name : PAM-11 S/W Version : Ver00.00 H/W Version : Ver00.00 ③									
Module Name : AOM-10 S/W Version : Ver00.00 H/W Version : Ver00.00 ④	Module Name : AOM-11 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑤									
Module Name : ROM-10 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑥	Module Name : ROM-11 S/W Version : Ver00.00 H/W Version : Ver00.00 ⑦									

8.1.3. Channel Information Page Configuration

Instruction



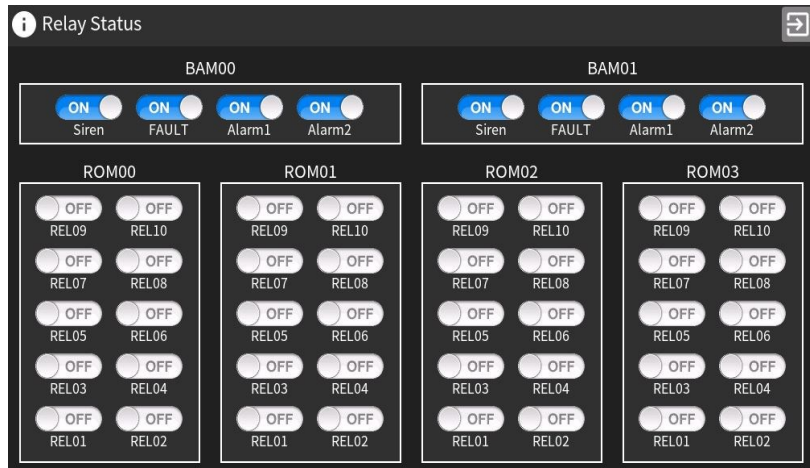
[Figure 34. Channel Information Page Layout]

[Table 27. Channel Information Functions]

No	Function	Description
1	<p><b>CH : 1</b> ①</p> <p>Tag : GDS-701 ②</p> <p>Gas Name : Hydrofluorocarbon ③</p> <p>Detector Name : GTD-2000TX ④</p> <p>Decimal Point : XXXX ⑤</p> <p>M/T : 3.5mA ⑥</p> <p>Fault : 1.8mA ⑦</p> <p>Measurement Unit : PPM ⑧</p> <p>1st Alarm : 300 ⑨</p> <p>1st Alarm D-Band : 0 ⑩</p> <p>1st Alarm Delay : 0 ⑪</p> <p>1st Alarm Direction : UP ⑫</p>	<p>① Channel name</p> <p>② Channel tag name</p> <p>③ Gas name</p> <p>④ Detector name</p> <p>⑤ Decimal point setting status (unit: decimal point)</p> <p>⑥ M/T setting value (unit: mA)</p> <p>⑦ Fault setting value (unit: mA)</p> <p>⑧ Measurement unit setting status</p> <p>⑨ 1<sup>st</sup> alarm setting value</p> <p>⑩ 1<sup>st</sup> alarm D-band setting value</p> <p>⑪ 1<sup>st</sup> alarm delay setting value</p> <p>⑫ 1<sup>st</sup> alarm direction setting status (up/down)</p>
2	<p>Locate : F2 ①</p> <p>Gas Symbol : HFC ②</p> <p>Full Scale : 2000 ③</p> <p>Latch : Off ④</p> <p>Over Range : 21.5mA ⑤</p> <p>Input Offset(mA) : 0 ⑥</p> <p>2nd Alarm : 500 ⑦</p> <p>2nd Alarm D-Band : 0 ⑧</p> <p>2nd Alarm Delay : 0 ⑨</p> <p>2nd Alarm Direction: UP ⑩</p>	<p>① Detector location</p> <p>② Gas Chemistry symbol</p> <p>③ Full scale setting value</p> <p>④ Latch settings status (ON/OFF)</p> <p>⑤ Over range setting value (unit: mA)</p> <p>⑥ Input offset setting value (unit: mA)</p> <p>⑦ 2<sup>nd</sup> alarm setting value</p> <p>⑧ 2<sup>nd</sup> alarm D-band setting valve</p> <p>⑨ 2<sup>nd</sup> alarm delay setting value</p> <p>⑩ 2<sup>nd</sup> alarm direction setting status (up/down)</p>


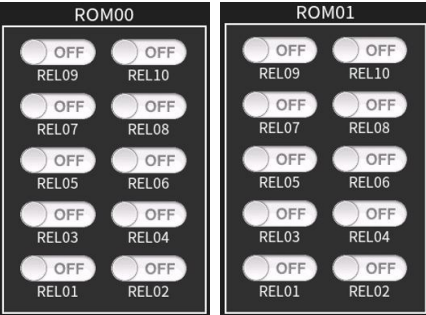


8.1.4. Relay Status Page Configuration

Instruction



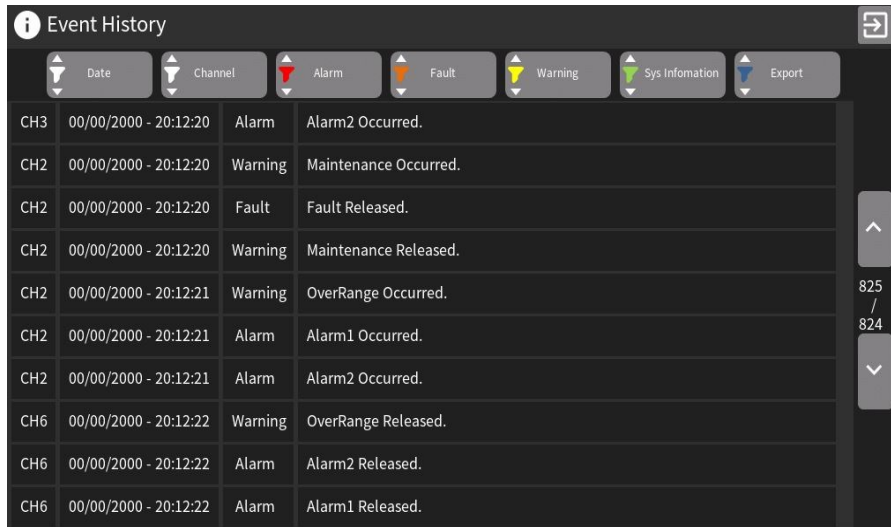
[Figure 35. Relay Status Page Layout]

[Table 28. Relay Status Functions]

No	Function	Description
1		<ul style="list-style-type: none"> <li>Siren, FAULT, Alarm1 and Alarm2 Relay ON/OFF status of BAM00</li> </ul>
2		<ul style="list-style-type: none"> <li>Relay ON/OFF status of ROM00 and ROM01</li> </ul>
3		<ul style="list-style-type: none"> <li>Siren, FAULT, Alarm1 and Alarm2 Relay ON/OFF status of BAM01</li> </ul>
4		<ul style="list-style-type: none"> <li>Relay ON/OFF status of ROM02 and ROM03</li> </ul>

8.1.5. Event History Page Configuration

Instruction

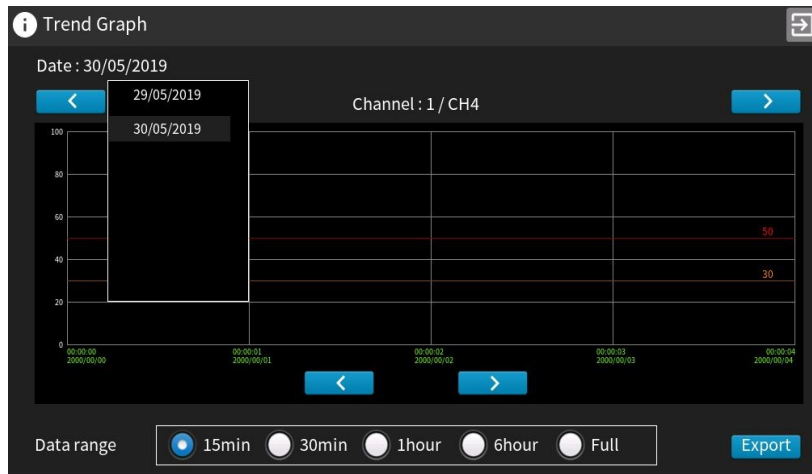


[Figure 36. Event History Page Layout]

[Table 29. Event History Functions]

No	Function	Description
1		<ul style="list-style-type: none"> <li>A feature designed to check log data only in the category; able to select a category and check log data</li> </ul>
2		<ul style="list-style-type: none"> <li>A feature designed to store log data</li> <li>Created in the internal SD card if EXPORT is clicked (file format: CSV)</li> </ul>
3		<ul style="list-style-type: none"> <li>Able to check the history of log data</li> <li>Channel → Date → Issues (E.g.: Alarm, Fault, etc.) → Details</li> </ul>

8.1.6. Trend Graph Page Configuration

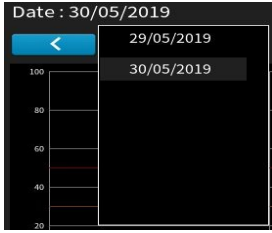






[Figure 37. Trend Graph Page Layout]

[Table 30. Trend Graph Functions]

No	Function	Description
----	----------	-------------

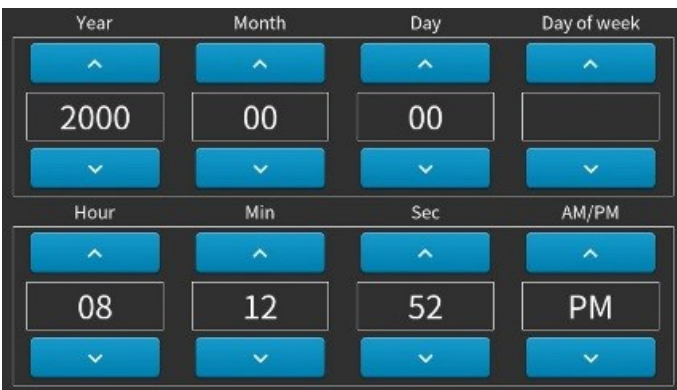
Instruction

1		<ul style="list-style-type: none"> <li>• Date: Once Date/Month/Year is clicked, the date category in Trend Graph appears. If the category is selected, the Trend Graph shows up.</li> </ul>
2		<ul style="list-style-type: none"> <li>• A feature designed to check the trend graph for each channel; able to select a channel, using right and left arrow keys</li> </ul>
3		<ul style="list-style-type: none"> <li>• This feature is to display current gas concentration in graph. X-axis represents time while Y-axis refers to gas detection values.</li> </ul>
4		<ul style="list-style-type: none"> <li>• This feature is to set a range of data storage.</li> <li>• Data storage range: 15min, 30min, 1hr, 6hr, 24hr (Full)</li> </ul>
5		<ul style="list-style-type: none"> <li>• A feature designed to save log data</li> <li>• Generated in the external SD card if the EXPORT is clicked (file format: CSV)</li> </ul>

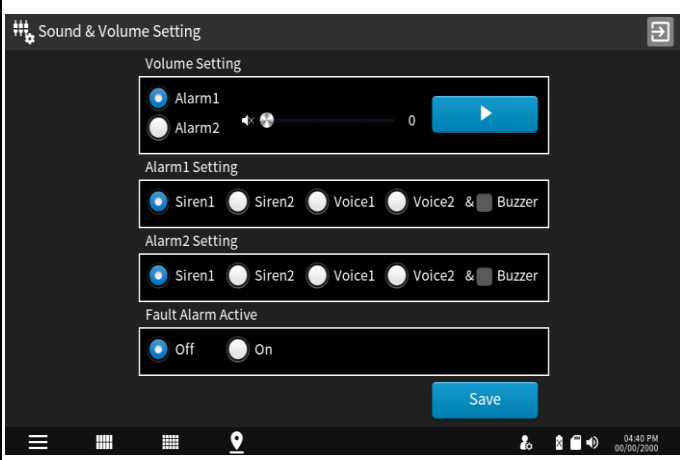

8.2. User Configuration Page

- ▷ To change user configuration settings, it is required to log in with Operator or Service authority.  
<See 8.5.1 Login.>

[Table 31. User Configuration Method]

No	Function	Description
1		<ul style="list-style-type: none"> <li>• Able to adjust date and time settings</li> </ul>

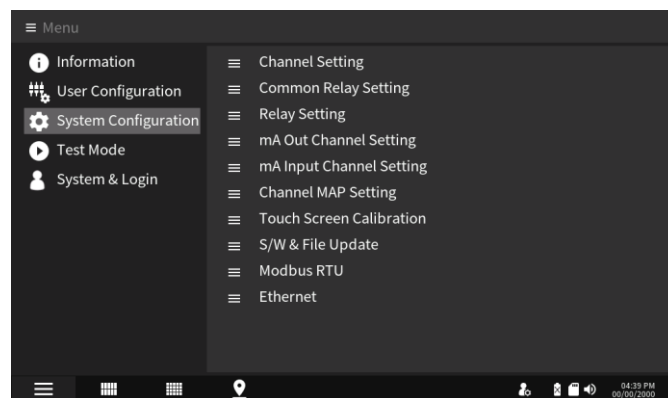
Instruction

<p>2</p>		<ul style="list-style-type: none"> <li>• Able to adjust Alarm1 and Alarm2 sound and sound volume settings (Volume range: 0-100) → <b>Fault Alarm Active</b></li> <li>• An alarm goes off when FAULT occurs in each channel. It can be controlled through ON/OFF.</li> </ul>
<p>3</p>		<ul style="list-style-type: none"> <li>• Able to adjust brightness (range: 0-100)</li> </ul>

**Note:** Ensure to touch [SAVE] after the adjustment.

### 8.3. System Configuration Page

- ▷ To change system configuration settings, it is required to log in with Operator or Service authority.  
< See 8.5.1 Login.>

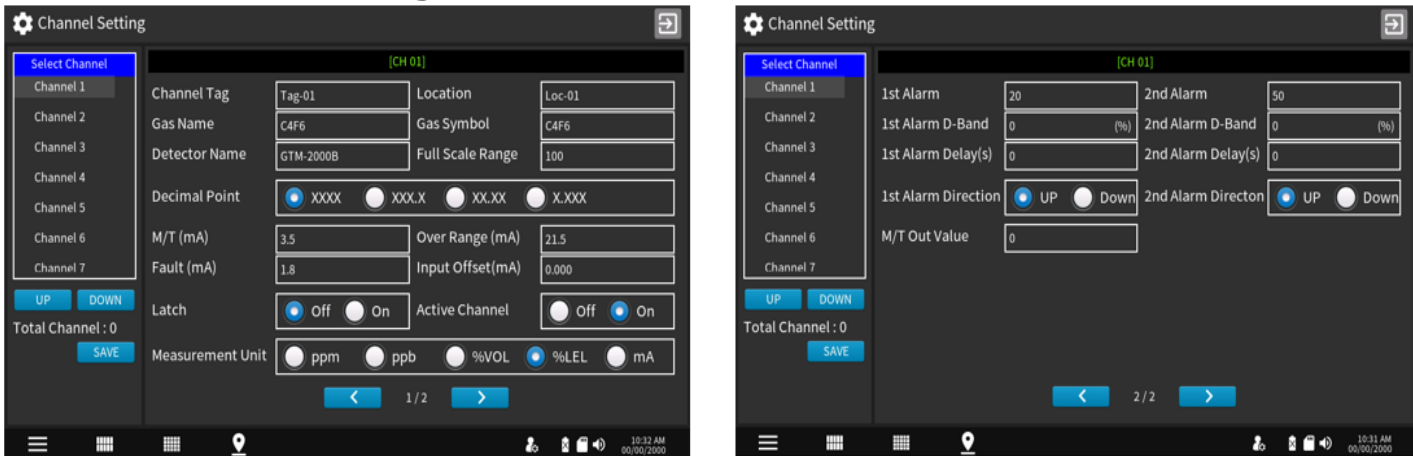


**[Figure 38. System Configuration Page Layout]**



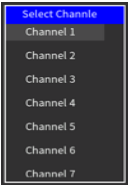


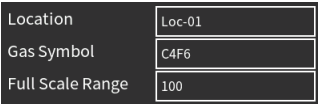





Instruction

8.3.1. Channel Setting











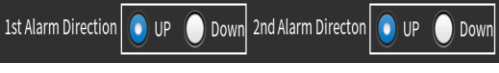
[Figure 39. Channel Setting Page Layout]

[Table 32. Channel Settings]

	<ul style="list-style-type: none"> <li>• Select a channel for channel setting.</li> <li>• It is able to select using the  buttons. For a quick movement, scroll up or down.</li> </ul>
	<ul style="list-style-type: none"> <li>• Enter a channel tag name.</li> <li>• Enter the gas name.</li> <li>• Enter the detector name.</li> <li>➤ If a box on the right side is selected, a virtual keyboard appears. Then, enter the value.</li> </ul>
	<ul style="list-style-type: none"> <li>• Set the detector position.</li> <li>• Enter the chemistry symbol. For this, an MSDS file (e.g. - parent folder: MSDS, child folder: CH4) should exist in the external memory. The MSDS filename extension should be JPG (resolution: below 830x1100).</li> <li>• It is able to set a full-scale range depending on the measurement range. Set the decimal point and check its range. Then, enter the values (unit: decimal point).</li> <li>➤ If a box on the right side is selected, a virtual keyboard appears. Then, enter the value.</li> </ul>
	<ul style="list-style-type: none"> <li>• The decimal point is used when adjustment is needed according to the measurement range. When setting the decimal point position, select the tab on the left side of the decimal point (: Not Select, : Select).</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature to set the maintenance range (unit: mA)</li> <li>➤ If a box on the right side is selected, a virtual keyboard appears. Then, enter the value.</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature to set the fault range (unit: mA)</li> <li>➤ If a box on the right side is selected, a virtual keyboard appears. Then, enter the value.</li> </ul>



Instruction

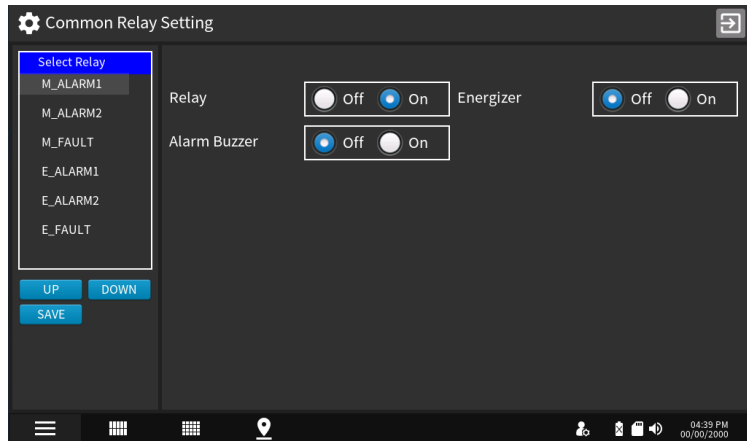
	<ul style="list-style-type: none"> <li>• Able to set maximum mA input range (Up to 24mA)</li> <li>➤ If a box on the right side is selected, a virtual keyboard appears. Then, enter the value.</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature designed to compensate an mA measurement error which occurs depending on the length of the detector-connecting wire (unit: mA)</li> <li>➤ If a box on the right side is selected, a virtual keyboard appears. Then, enter the value.</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature which keeps displaying the highest value despite a drop in gas values when the set alarm value is reached; able to operate by touching ON/OFF tab</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature designed to enable/disable a channel; able to operate by touching ON/OFF tab</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature designed to select a gas measurement unit; required to touch the tab</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature designed to set Alarm1 and Alarm2 values</li> <li>➤ If a box on the right side is selected, a virtual keyboard appears. Then, enter the value.</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature designed to set dead band values of alarm1 and alarm2; alarm1 and alarm2 are enabled at a dead band set value or higher while they are disabled at below the set value</li> <li>• If the concentration level reaches around the alarm set value, an alarm is turned ON and OFF continuously. To solve this issue, a hysteresis value is provided. The default value is '0'. E.g.) With 20% LEL alarm set value and 2% dead band, an alarm goes off at 22% and is disabled at 18% LEL.</li> <li>➤ If a box on the right side is selected, a virtual keyboard appears. Then, enter the value.</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature designed to set the time until the alarm goes off after the gas reaches the set value in terms of the delay time of alarm1 and alarm2 (unit: Sec.)</li> <li>➤ If a box on the right side is selected, a virtual keyboard appears. Then, enter the value.</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature designed to set an alarm direction; UP is enabled when equal to or greater than the set value while DOWN is enabled when smaller than the set value; able to set by touching UP/DOWN tab</li> </ul>

Instruction

<p>M/T Out Value <input type="text" value="0"/></p>	<ul style="list-style-type: none"> <li>m/t out value: AOM output value setting at STANDBY mode (input unit is set according to the preset measurement unit)</li> </ul>
---	--

**8.3.2. Common Relay Setting**

- ▷ This feature designed to set BAM Common Relay (Alarm1, Alarm2, Fault or Alarm Buzzer) output can be set as follows:



[Figure 40. Channel Setting Page Layout]

[Table 33. Common Relay Settings]

	<ul style="list-style-type: none"> <li>Select Relay to set Common Relay.                      M_ALARM1: Main BAM ALARM1 Relay.                      M_ALARM2: Main BAM ALARM2 Relay.                      M_FAULT: Main BAM FAULT Relay.                      E_ALARM1: Expansion BAM ALARM1 Relay.                      E_ALARM2: Expansion BAM ALARM2 Relay.                      E_FAULT: Expansion BAM FAULT Relay.</li> </ul>
<p>Relay <input type="radio"/> Off <input checked="" type="radio"/> On</p>	<ul style="list-style-type: none"> <li>A feature designed to turn the relay ON/OFF; required to touch the tab</li> </ul>
<p>Energizer <input checked="" type="radio"/> Off <input type="radio"/> On</p>	<ul style="list-style-type: none"> <li>A feature designed to turn ON/OFF Energizer; required to touch the ON/OFF tab</li> </ul>
<p>Alarm Buzzer <input checked="" type="radio"/> Off <input type="radio"/> On</p>	<p>A feature designed to turn ON/OFF Alarm Buzzer in the selected relay; required to touch ON/OFF tab; if the Alarm Buzzer is ON, the Relay is available for Alarm Buzzer ONLY</p>

**TIPS: Energized Mode**

<Relay Energized Mode>

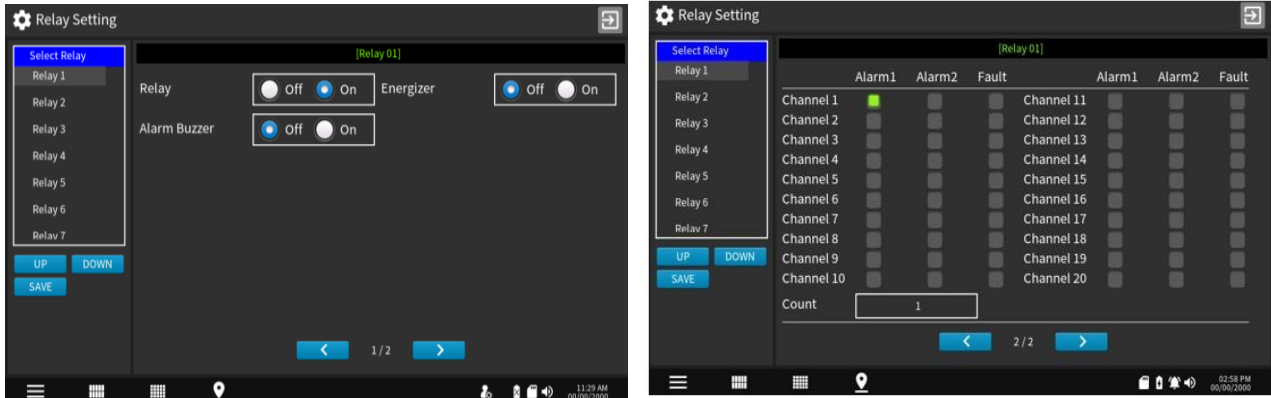
- If the main power is turned ON, the Normal Open turns into Normal Close while Normal Close becomes Normal Open.

<Relay De-Energized Mode>

- Basic relay actions

Instruction

8.3.3. Relay Setting



[Figure 41. Relay Setting Page Layout]

[Table 34. Relay Settings]

	<ul style="list-style-type: none"> <li>• Select a channel for channel setting .</li> <li>• It is able to select using the <b>UP</b> <b>DOWN</b> buttons. For a quick movement, scroll up or down.</li> </ul> <p><b>TIPS:</b> Able to select 1-20 channel(s) by scrolling up and down (up to 40 channels if an expansion unit is connected)</p>
	<ul style="list-style-type: none"> <li>• A feature designed to turn ON/OFF the relay; required to touch the tab</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature designed to turn ON/OFF Alarm Buzzer in the selected relay; required to touch ON/OFF tab; if the Alarm Buzzer is ON, the Relay is available for Alarm Buzzer ONLY</li> </ul>
	<ul style="list-style-type: none"> <li>• A feature designed to turn ON/OFF Energizer; required to touch the ON/OFF tab</li> </ul>
	<ul style="list-style-type: none"> <li>• Able to set Relay Group at a user's will; if the box tab is touched to enable or disable Alarm1, Alarm2 or Fault on each channel,  is enabled. This feature is executed in two calculation methods is operated as follows:             <ol style="list-style-type: none"> <li><b>1. OR Operation:</b> If an alarm goes off in the active items among Alarm1, Alarm2 and Fault, the Relay is executed according to OR operation.</li> <li><b>2. AND Operation:</b> If an alarm goes off in the active items among the channels, the Relay is executed according to AND operation.</li> <li><b>3. Count Setting:</b> It is executed under AND operation. Provided that multiple channels are enabled, if the count is set to '1', the relay is executed when an alarm goes off even in just one channel.</li> </ol> </li> </ul>

Ex) Relay Setting (Relay2 Grouping)

Instruction

- Relay2 output setting if Alarm2 goes off in at least three channels among the channel(s) 1-10

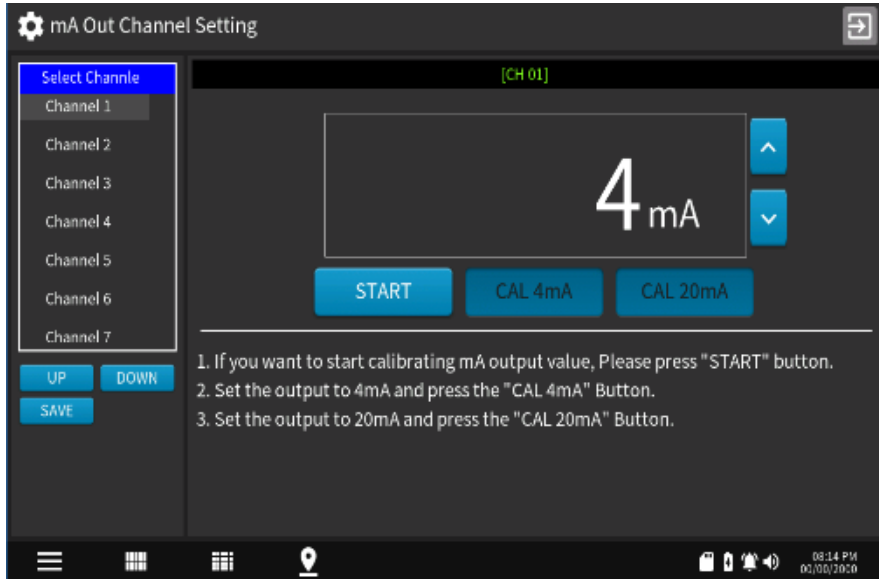
Select Relay	Alarm1	Alarm2	Fault	Alarm1	Alarm2	Fault
Relay 1	Channel 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 11	<input type="checkbox"/>	<input type="checkbox"/>
<b>Relay 2</b>	Channel 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 12	<input type="checkbox"/>	<input type="checkbox"/>
Relay 3	Channel 3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 13	<input type="checkbox"/>	<input type="checkbox"/>
Relay 4	Channel 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 14	<input type="checkbox"/>	<input type="checkbox"/>
Relay 5	Channel 5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 15	<input type="checkbox"/>	<input type="checkbox"/>
Relay 6	Channel 6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 16	<input type="checkbox"/>	<input type="checkbox"/>
Relay 7	Channel 7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 17	<input type="checkbox"/>	<input type="checkbox"/>
	Channel 8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 18	<input type="checkbox"/>	<input type="checkbox"/>
	Channel 9	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 19	<input type="checkbox"/>	<input type="checkbox"/>
	Channel 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 20	<input type="checkbox"/>	<input type="checkbox"/>
	Count	3				

- Relay output setting if at least one alarm goes off in the channels (ch.1-5)

Select Relay	Alarm1	Alarm2	Fault	Alarm1	Alarm2	Fault
Relay 1	Channel 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 11	<input type="checkbox"/>	<input type="checkbox"/>
<b>Relay 2</b>	Channel 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 12	<input type="checkbox"/>	<input type="checkbox"/>
Relay 3	Channel 3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 13	<input type="checkbox"/>	<input type="checkbox"/>
Relay 4	Channel 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 14	<input type="checkbox"/>	<input type="checkbox"/>
Relay 5	Channel 5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Channel 15	<input type="checkbox"/>	<input type="checkbox"/>
Relay 6	Channel 6	<input type="checkbox"/>	<input type="checkbox"/>	Channel 16	<input type="checkbox"/>	<input type="checkbox"/>
Relay 7	Channel 7	<input type="checkbox"/>	<input type="checkbox"/>	Channel 17	<input type="checkbox"/>	<input type="checkbox"/>
	Channel 8	<input type="checkbox"/>	<input type="checkbox"/>	Channel 18	<input type="checkbox"/>	<input type="checkbox"/>
	Channel 9	<input type="checkbox"/>	<input type="checkbox"/>	Channel 19	<input type="checkbox"/>	<input type="checkbox"/>
	Channel 10	<input type="checkbox"/>	<input type="checkbox"/>	Channel 20	<input type="checkbox"/>	<input type="checkbox"/>
	Count	1				

### 8.3.4. mA Output Calibration

Instruction



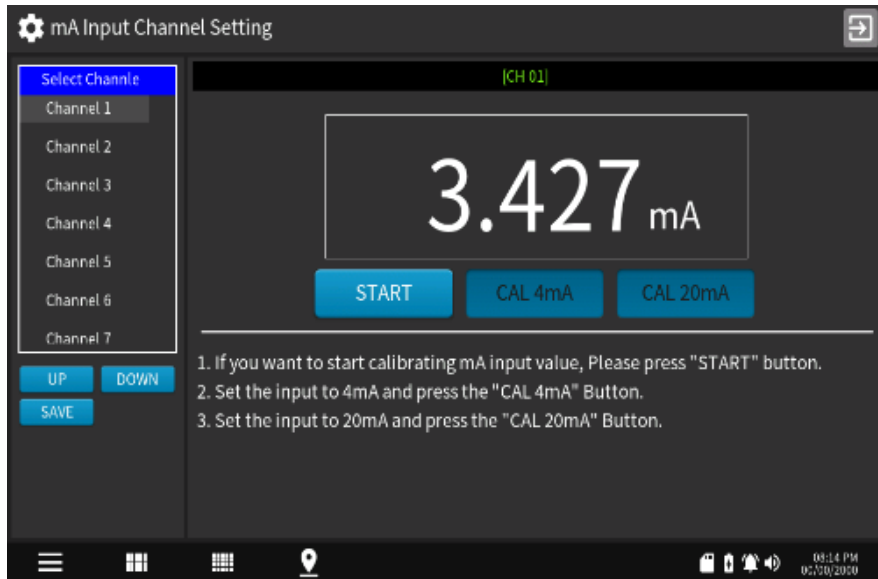
[Figure 42. mA Input Calibration Page Layout]

[Table 35. mA Output Calibration]

	<ul style="list-style-type: none"> <li>• Select a channel for channel setting.</li> <li>• It is able to select using the  buttons. For a quick movement, scroll up or down.</li> </ul>
	<ol style="list-style-type: none"> <li>1. Select a channel and touch [  ].</li> <li>2. If 4mA is normally measured, touch [  ].</li> <li>3. If 20mA is normally measured, touch [  ].</li> </ol> <p>Tips: After completing the settings, touch [  ].</p>

8.3.5. mA Input Calibration

Instruction



[Figure 43. mA Input Calibration Page Layout]

[Table 36. mA Input Calibration]

	<ul style="list-style-type: none"> <li>• Select a channel for channel setting.</li> <li>• It is able to select using the <b>UP</b> <b>DOWN</b> buttons. For a quick movement, scroll up or down.</li> </ul>
	<ol style="list-style-type: none"> <li>1. Select a channel and touch [ <b>START</b> ].</li> <li>2. Enter 4mA and touch [ <b>CAL 4mA</b> ].</li> <li>3. Enter 20mA and touch [ <b>CAL 20mA</b> ].</li> </ol> <p>TIPS: Once the calibration is done, touch [ <b>SAVE</b> ].</p>

8.3.6. Channel MAP Setting

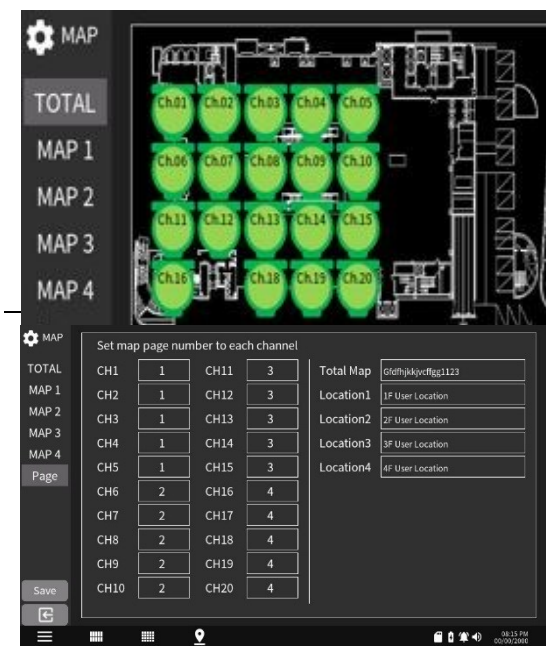


[Figure 44. Channel MAP Setting Layout]

[Table 37. Channel MAP Settings]



Instruction



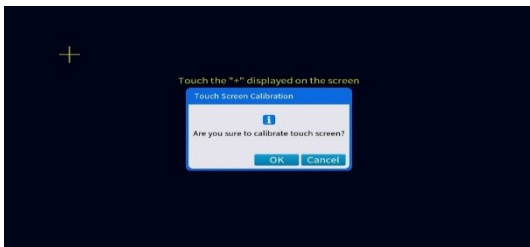
- If CHANNEL MAP SETTING is touched, the TOTAL MAP page appears. If each detector icon is scrolled to the wanted place, it is relocated accordingly.
- Select 'MAP 1 MAP 2 MAP 3 MAP 4' on the left top and change the detector position individually as described above.

- Once 'Page' at the center on the left picture is touched, the Setting page appears. Then, it is able to adjust MAP position (1-4) in each channel.
  - Able to change the total map name and location (1-4)
- ※ **After the settings, touch [ Save ].**

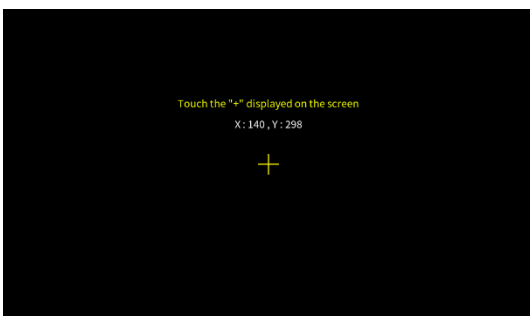
8.3.7. Touchscreen Calibration

<NOTICE> Be cautious that if the touchscreen is calibrated in an incorrect way, it may not be usable.

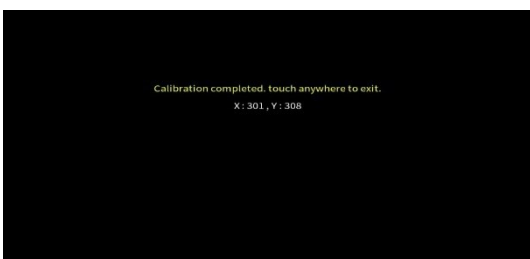
[Table 38. Touchscreen Calibration]



- If touchscreen Calibration is executed, a confirmation message pops up. If 'OK' is touched, calibration begins.



- Calibration Procedures
  1. A cross symbol appears at the left top. Touch it.
  2. A cross symbol appears at the center. Touch it.
  3. A cross symbol appears at the right bottom. Touch it.



- X- and Y-coordinates appear on the screen. Check if the touch points are matched with the coordinates. Touch 5 times in total.

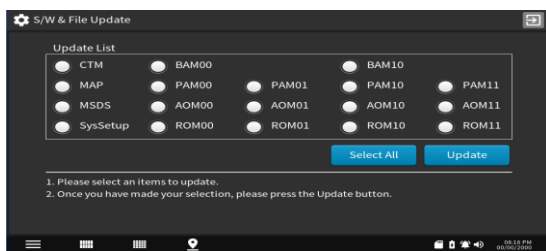
Instruction



- If all operations are done, touch [SAVE] and finish the calibration process.

### 8.3.8. Software & File Update

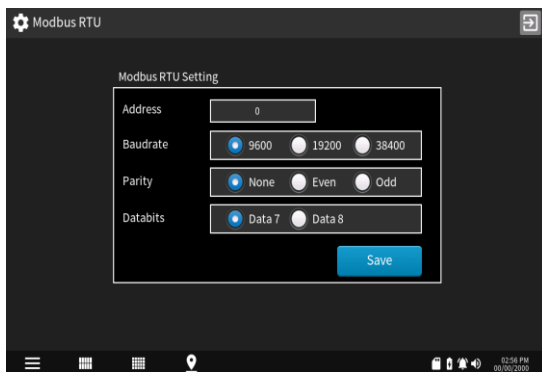
[Table 39. Software & File Update]



- Touch  on the left side of the update item and have it enabled. Then, if  is touched, the system automatically enters Booting Mode, and update begins in nearly 4 seconds.
- For all updates, touch .

### 8.3.9. Modbus RTU

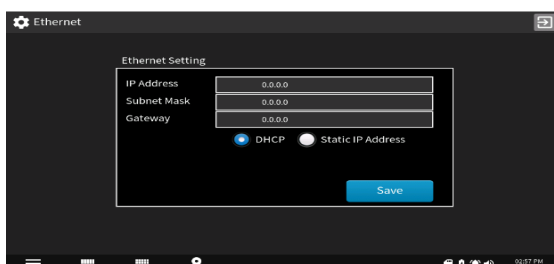
[Table 40. Modbus RTU Settings]



- Address: If a box on the right side of the Address is touched, a virtual keyboard appears. Then, enter the address.
- Baud Rate: Select 9600, 19200 or 38400.
- Parity: Select None, Even or Odd.
- Data bits: Select Data7 or Data8.

### 8.3.10. Ethernet

[Table 41. Ethernet Settings]

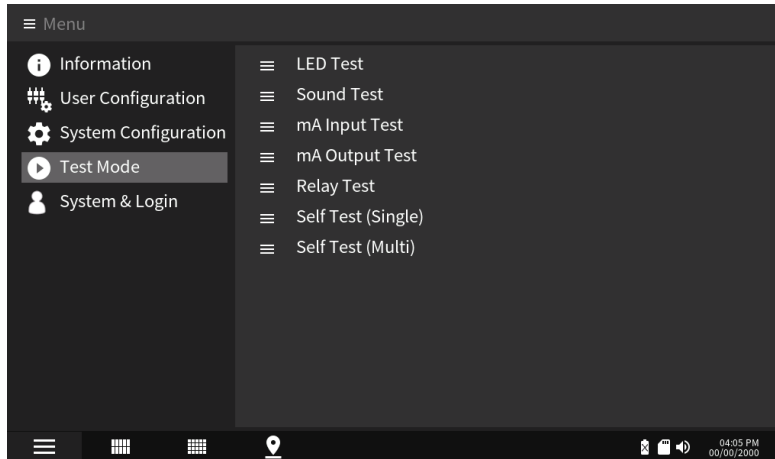


- If a box on the right side of each item is touched, a virtual keyboard appears. Then, enter the value.
- Select either DHCP or Static IP Address.

Instruction

### 8.4. Test Mode Selection

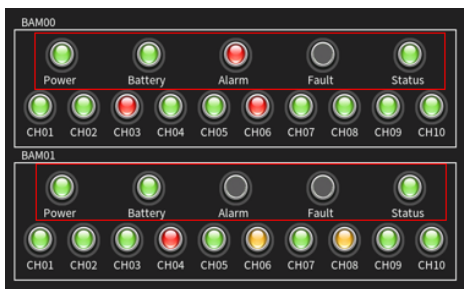
- ▶ To use System Test Mode, it is required to log in with Operator or Service authority.  
 <See 8.5.1 Login.>



[Figure 45. Test Mode Menu Layout]

#### 8.4.1. LED Test

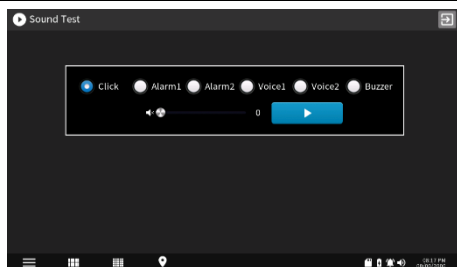
[Table 42. LED Testing]



- The BAM0 box at the top represents a main unit while the BAM1 at the bottom refers to an expansion unit. This feature is designed to check if LED in each item is normal or abnormal.
- Touch '●' in each item and examine if LED functions normally.
- LED TESTING
  - ▶ In the beginning, the buttons are inactive. Whenever touched, they turn Green → Yellow → Red in order.
  - ※ The system LED in a red box is not available in Test Mode.

#### 8.4.2. SOUND Test

[Table 43. Sound Testing]

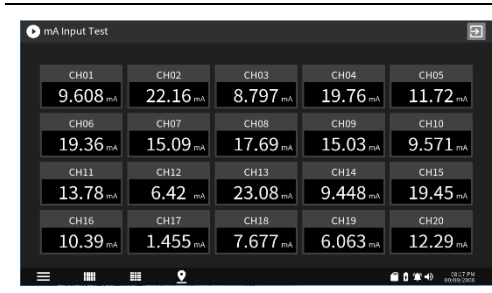


- Touch and enable '●' on the left side of the item. If '▶' is touched, sound changes according to the item.
- For volume adjustment, scroll '◀▶' by 0-100.

#### 8.4.3. mA Input Test

[Table 44. mA Input Testing]

Instruction



- Able to check mA input values in each channel on a realtime basis; a feature designed to check if they are normal

### 8.4.4. mA Output Test

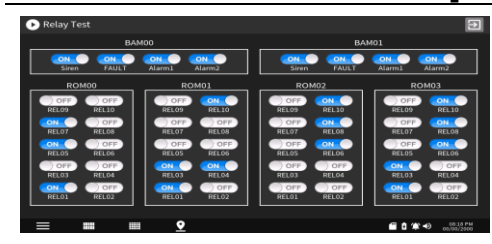
[Table 45. mA Output Testing]



- If '0 mA' at the bottom is touched, a virtual keyboard appears. Once the value is set, the set current value is generated.

### 8.4.5. Relay Test

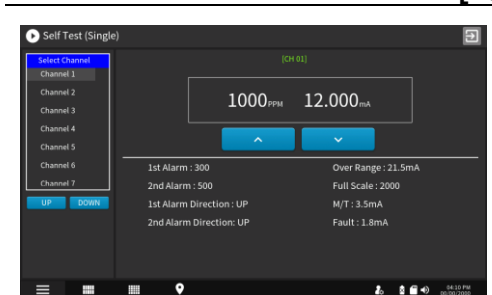
[Table 46. Relay Testing]



- Able to check if the Relay is operated by touching 'OFF ON' at the top of the Relay channel

### 8.4.6. Self-Test (Single)

[Table 47. Self-Testing]



- Able to check if the set values on each channel are normally operated easily; a test is performed, using the 'UP' 'DOWN' tabs

### 8.4.7. Self-Test (Multi)

Once a channel is touched, a virtual keyboard pops up. If the value is entered, it is able to test if the system functions normally with the virtual input value. Unlike

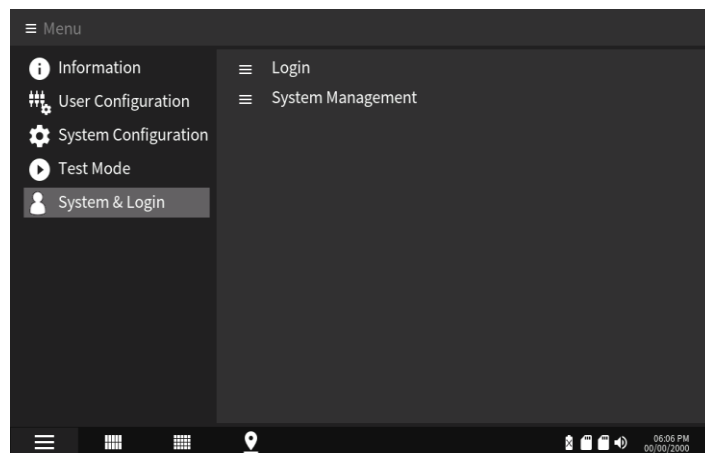
Instruction



Self-Test (Single), multi-channels can be set for testing.

### 8.5. System & Login Configuration

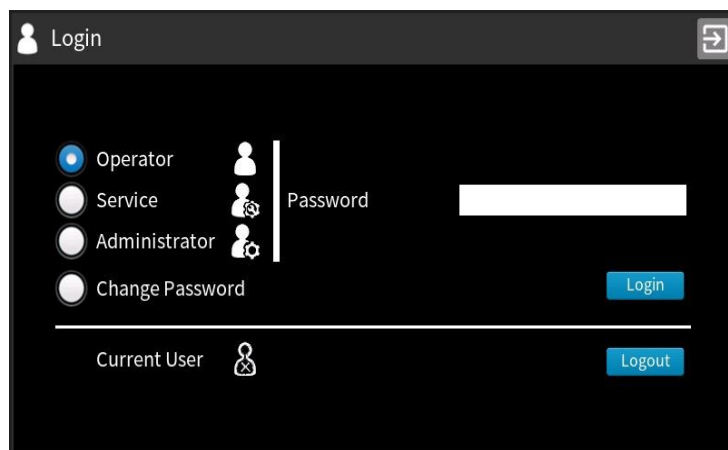
▷ This feature controls menu items and access according to the level of user authority in operating ASC-100. The allowed access level differs depending on user mode.



[Figure 46. System & Login Menu Layout]




#### 8.5.1. Login

▷ To enter User Mode, it is required to go through the login procedure. The details are as follows:

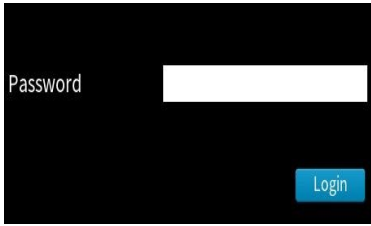
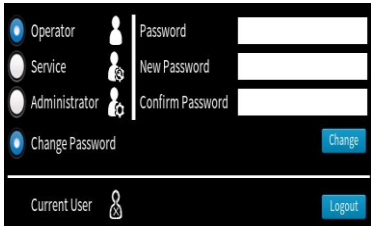

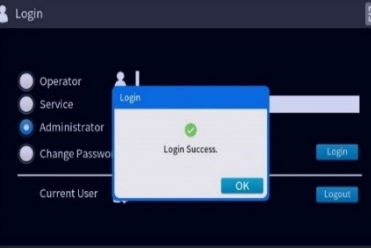


[Figure 47. Login Page Layout]

[Table 48. Login]

No	Function	Description
1	 Operator  Service  Administrator	<ul style="list-style-type: none"> <li>Displays each user's login types and icons accordingly; each user's access level is as follows:</li> </ul>


Instruction

		<ul style="list-style-type: none"> <li>➤ Operator: Access allowed for Information and User Configuration menus only</li> <li>➤ Service: All accesses allowed, except System Configuration menu</li> <li>➤ Administrator: Command and access in all menus allowed</li> </ul>
2		<ul style="list-style-type: none"> <li>• To log in, a password should be entered. The default password is '0000'.</li> <li>➤ To enter a password, touch the white tab on the right side of the password. Then, a virtual keyboard pops up. Enter your password and touch the LOGIN button at the right bottom.</li> </ul>
3		<ul style="list-style-type: none"> <li>• This feature is designed to change the default password. After entering the current password, enter a new password into the New Password box and Confirm Password box. Then, touch the CHANGE button.</li> <li>➤ To enter a password, touch the white tab on the right side of the password. Then, a virtual keyboard pops up. Enter your password and touch the CHANGE button at the right bottom.</li> </ul>
4		<ul style="list-style-type: none"> <li>• If the password is incorrect, "Invalid or Wrong Password" message pops up, and login fails.</li> </ul>
5		<ul style="list-style-type: none"> <li>• If logged in successfully, "Login Success" appears.</li> </ul>

8.5.2. Active Access Status Icon



▷ The icons below representing current login status appear at the bottom of the main page.

[Table 49. Login Status Icons]

Icon	Description
	Operator has logged in.



Instruction

	Service Engineer has logged in.
	Administrator has logged in.

**8.5.3. System Management**

- ▷ For system management, it is required to log in with Administrator authority.  
<Refer to 8.5.1 Login.>



[Figure 48. System Management Page Layout]

[Table 50. Relay Testing]

<p>Idle Time (min) <input type="text" value="10"/></p>	<ul style="list-style-type: none"> <li>This feature is designed to set the length of time for the LCD display to be turned off automatically when the system remains unused.</li> <li>▷ Touch the white tab on the right side of Idle Time. If a virtual keyboard pops up. Then, set the time (unit: min.).</li> </ul> <p><b>Note: 0-600 min. in time-setting range</b></p>
<p>Logout Time(min) <input type="text" value="5"/></p>	<ul style="list-style-type: none"> <li>This feature is designed to set the length of time for a user to be logged out automatically when the system remains unused after login.</li> <li>▷ Touch the white tab on the right side of Logout. If a virtual keyboard pops up, set the time (unit: min.).</li> </ul> <p><b>Note: 0-600 min. in time-setting range</b></p>
<p>Event History Log <input type="button" value="Init..."/></p>	<ul style="list-style-type: none"> <li>Able to reset the event history by touching the <input type="button" value="Init..."/> button</li> </ul>
<p>Trend Log <input type="button" value="Init..."/></p>	<ul style="list-style-type: none"> <li>Able to reset the trend log by touching the <input type="button" value="Init..."/> button</li> </ul>

## Instruction

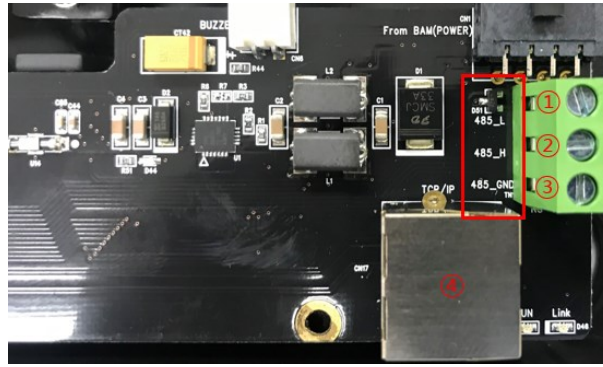
**Note: Once all settings are done, ensure to touch the  button to complete the process.**

## 9. Modbus RTU and TCP Interfaces

### 9.1. MODBUS RS-485

- The ASC-100 Modbus interface offers environments in which communication with external PC is enabled. It can be connected through a separate module (MODBUS).

Instruction



[Figure 49. RS-485 and TCP/IP Terminal Configuration]

Module Label	Terminal Sequence	Configuration
RS-485	①	L
	②	H
	③	GND
TCP/IP	④	RJ-45

9.1.1. Interface Setting

- Data Format: RTU
- Address: Address input
- Baud rate: 9600 bps
- Data bits: 8bits
- Stop bits: 1bits
- Parity: None / even / odd
- Slave address settings: Separately configured by channel
- For more information, refer to [www.modbus.org](http://www.modbus.org).

9.1.2. MODBUS RS-485 Register Map

[Table 51. Measurement Gas Concentration (Integers) RS-485 Address Configuration]

Category	Ch.	Address	Bits	Description
Measured gas concentration	Ch1	30001	BIT15-0	Gas measurements value(integers)
Measured gas concentration	Ch2	30002	BIT15-0	Same as above
Measured gas concentration	Ch3	30003	BIT15-0	Same as above
Measured gas concentration	Ch4	30004	BIT15-0	Same as above
Measured gas concentration	Ch5	30005	BIT15-0	Same as above
Measured gas concentration	Ch6	30006	BIT15-0	Same as above
Measured gas concentration	Ch7	30007	BIT15-0	Same as above
Measured gas concentration	Ch8	30008	BIT15-0	Same as above
Measured gas concentration	Ch9	30009	BIT15-0	Same as above
Measured gas concentration	Ch10	30010	BIT15-0	Same as above
Measured gas concentration	Ch11	30011	BIT15-0	Same as above
Measured gas concentration	Ch12	30012	BIT15-0	Same as above
Measured gas	Ch13	30013	BIT15-0	Same as above

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concentration					
Measured gas concentration		Ch14	30014	BIT15-0	Same as above
Measured gas concentration		Ch15	30015	BIT15-0	Same as above
Measured gas concentration		Ch16	30016	BIT15-0	Same as above
Measured gas concentration		Ch17	30017	BIT15-0	Same as above
Measured gas concentration		Ch18	30018	BIT15-0	Same as above
Measured gas concentration		Ch19	30019	BIT15-0	Same as above
Measured gas concentration		Ch20	30020	BIT15-0	Same as above

**[Table 52. RS-485 Address (Function 4) Configuration]**

Category	Ch.	Address	Bits	Description
Decimal Point & Unit	Ch1	30021	BIT15-8	0: ppm
				1: ppb
				2: %VOL
				3: %LEL
			BIT7-0	4: mA
				0: 0 Point
				1: 1 Point
				2: 2 Points
	Ch2	30022	BIT15-8	3: 3 Points
				0: ppm
				1: ppb
				2: %VOL
			BIT7-0	3: %LEL
				4: mA
				0: 0 Point
				1: 1 Point
	Ch3	30023	BIT15-8	2: 2 Points
				3: %LEL
				4: mA
				0: ppm
			BIT7-0	1: ppb
				2: %VOL
				3: 3 Points
				0: 0 Point
Ch4	30024	BIT15-8	1: 1 Point	
			2: 2 Points	
			3: 3 Points	
			0: ppm	
		BIT7-0	1: ppb	
			2: %VOL	
			3: %LEL	
			4: mA	
...	...	Same as above	Same as above	
Ch20	30040	BIT15-8	0: 0 Point	
			1: 1 Point	
			2: 2 Points	
			3: 3 Points	
		BIT7-0	0: ppm	
			1: ppb	
			2: %VOL	
			3: %LEL	
Real-number Gas	Ch1	30041	BIT31-0	Float(32BIT)
	Ch2	30043	BIT31-0	

Instruction

Measurements Value	Ch3	30045	BIT31-0	
	Ch4	30047	BIT31-0	
	...	...	Same as above	
	Ch20	30079	BIT31-0	
Alarm Status	Ch1	30081.0	BIT0	Alarm1
		30081.1	BIT1	Alarm2
		30081.2	BIT2	FAULT
		30081.3	BIT3	Maintenance
		30081.4	BIT4	Standby
		30081.5 - 30081.15	BIT15-4	Preliminary data
	Ch2	30082.0	BIT0	Alarm1
		30082.1	BIT1	Alarm2
		30082.2	BIT2	FAULT
		30082.3	BIT3	Maintenance
		30082.4	BIT4	Standby
		30082.5 - 30082.15	BIT15-4	Preliminary data
	Ch3	30083.0	BIT0	Alarm1
		30083.1	BIT1	Alarm2
		30083.2	BIT2	FAULT
		30083.3	BIT3	Maintenance
		30083.4	BIT4	Standby
		30083.5 - 30083.15	BIT15-4	Preliminary data
	Ch4	30084.0	BIT0	Alarm1
		30084.1	BIT1	Alarm2
		30084.2	BIT2	FAULT
		30084.3	BIT3	Maintenance
		30084.4	BIT4	Standby
		30084.5 - 30084.15	BIT15-4	Preliminary data
	...	...	Same as above	Same as above
	Ch20	30100.0	BIT0	Alarm1
		30100.1	BIT1	Alarm2
		30100.2	BIT2	FAULT
		30100.3	BIT3	Maintenance
		30100.4	BIT4	Standby
		30100.5 - 30100.15	BIT15-4	Preliminary data
	Battery Low	-	30101.0	0BIT
Heart Beat	-	30102	BIT15-0	1-100 sec. infinite loop

**[Table 53. RS-485 Address (Function 2) Configuration]**

Category	Ch.	Address	Bits	Description
Alarm Status	Ch1	10001	BIT15-0	Alarm1
		10002		Alarm2
		10003		FAULT
		10004		Maintenance
		10005		Standby
		10006 - 10008		Preliminary data
	Ch2	10009	BIT15-0	Alarm1
		10010		Alarm2
		10011		FAULT
		10012		Maintenance
		10013		Standby
		10014 - 10016		Preliminary data
	Ch3	10017	BIT15-0	Alarm1
		10018		Alarm2
		10019		FAULT
		10020		Maintenance
		10021		Standby
		10022 - 10024		Preliminary data
	Ch4	10025	BIT15-0	Alarm1
		10026		Alarm2
10027		FAULT		

Instruction

		10028		Maintenance	
		10029		Standby	
		10030 - 10032		Preliminary data	
	...	...	...	Same as above	
	Ch20		10153	BIT15-0	Alarm1
			10154		Alarm2
			10155		FAULT
			10156		Maintenance
			10157		Standby
			10158 - 10160		Preliminary data

**[Table 54. RS-485 Address (Function 3) Configuration]**

Category	Ch.	Address	Bits	Description
1 <sup>st</sup> Alarm Setting	Ch1	40001	BIT31-0	Float(32BIT)
	Ch2	40003	BIT31-0	Float(32BIT)
	Ch3	40005	BIT31-0	Float(32BIT)
	Ch4	40007	BIT31-0	Float(32BIT)
	...	...	Same as above	Same as above
	Ch20	40039	Same as above	Same as above
2 <sup>nd</sup> Alarm Setting	Ch1	40041	BIT31-0	Float(32BIT)
	Ch2	40043	BIT31-0	Float(32BIT)
	Ch3	40045	BIT31-0	Float(32BIT)
	Ch4	40047	BIT31-0	Float(32BIT)
	...	...	Same as above	Same as above
	Ch20	40079	Same as above	Same as above

**[Table 55. RS-485 Address (Function 1) Configuration]**

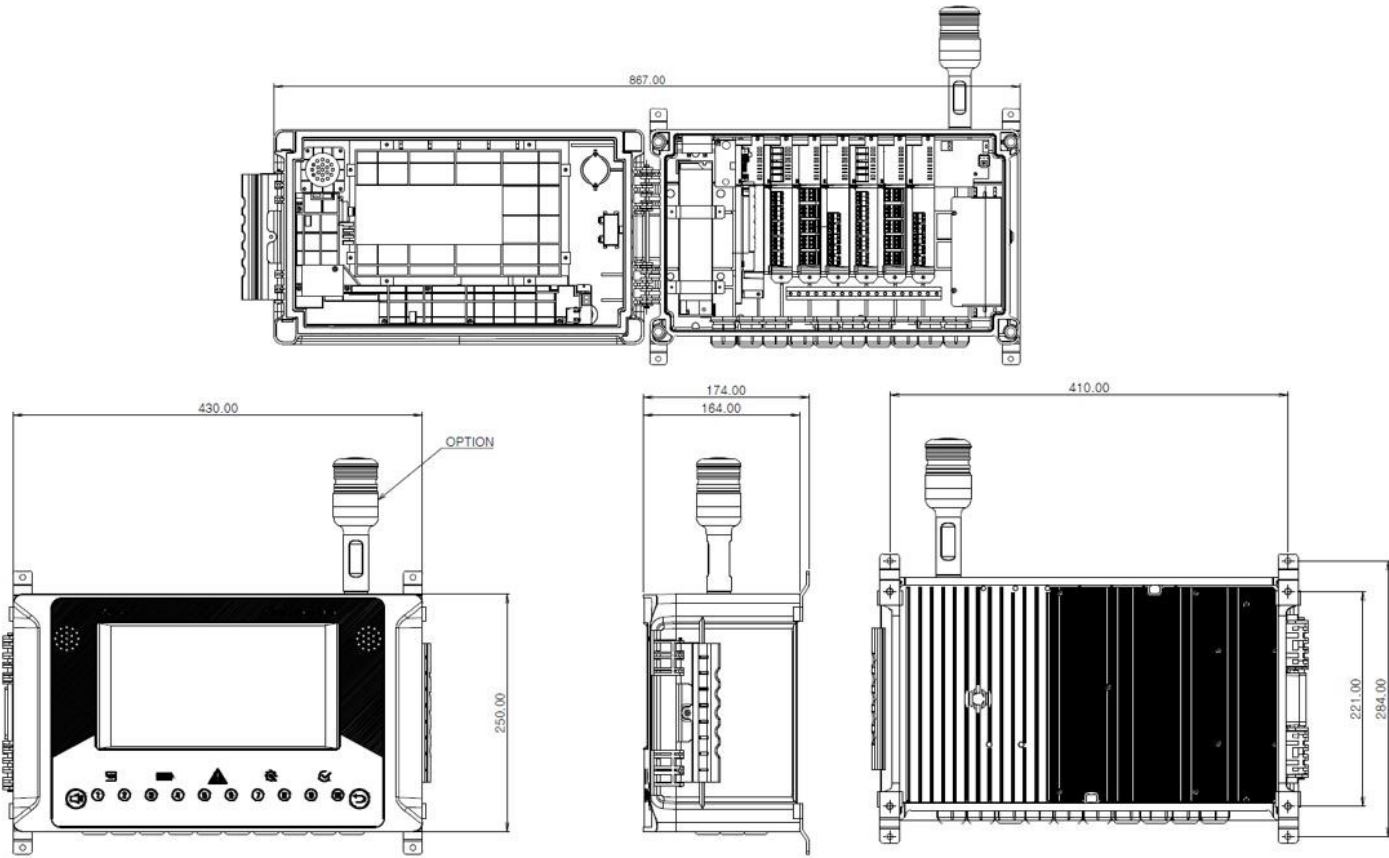
Category	Address	Bits
Buzzer Stop	1	BIT1
Reset	2	BIT1



Instruction

# 10. Outline Drawings and Dimensions

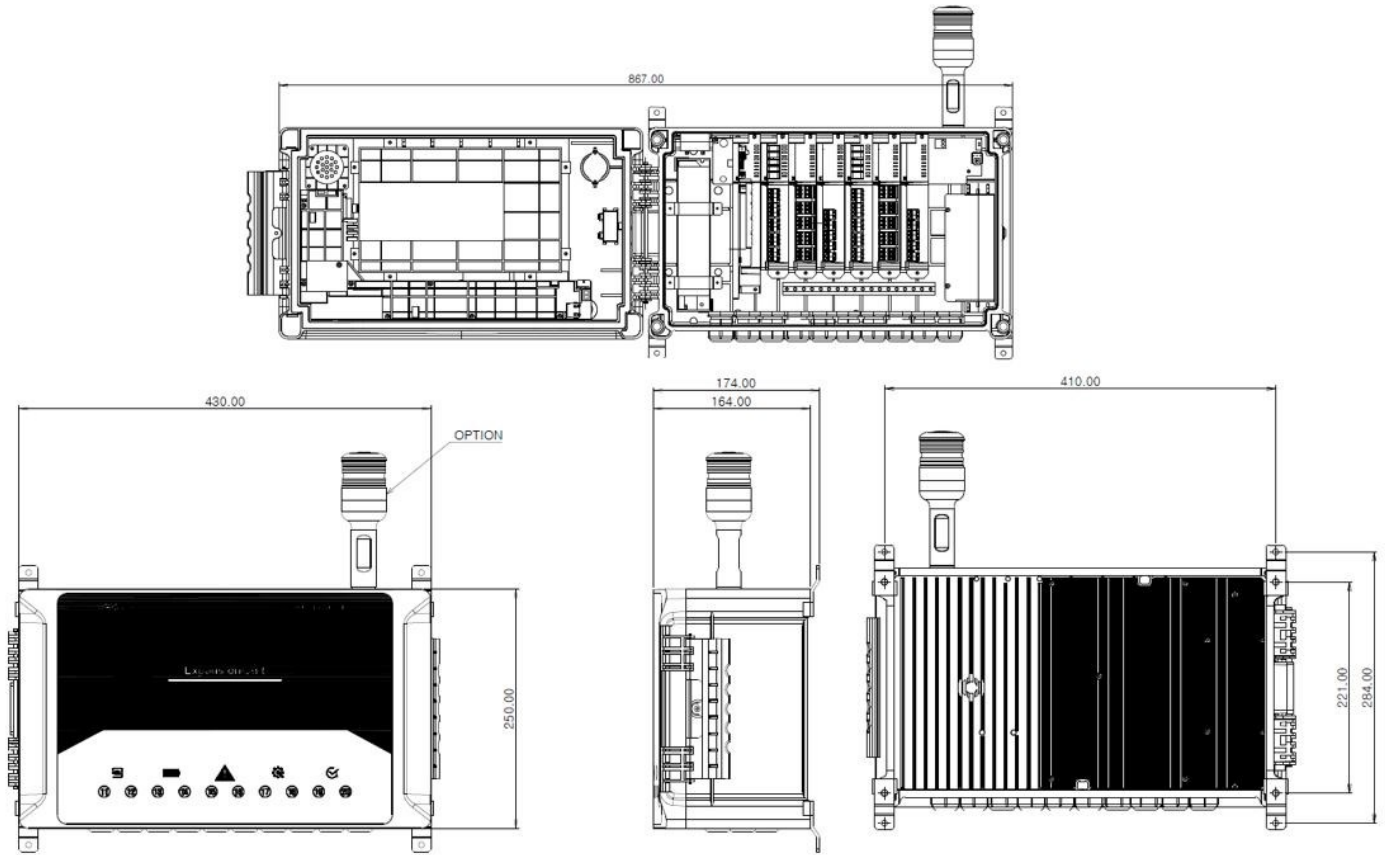
## 10.1. ASC-100 (Main)



[Figure 50. ASC-100 (Main Unit)]

Instruction

10.2. ASC-100 (Expansion)

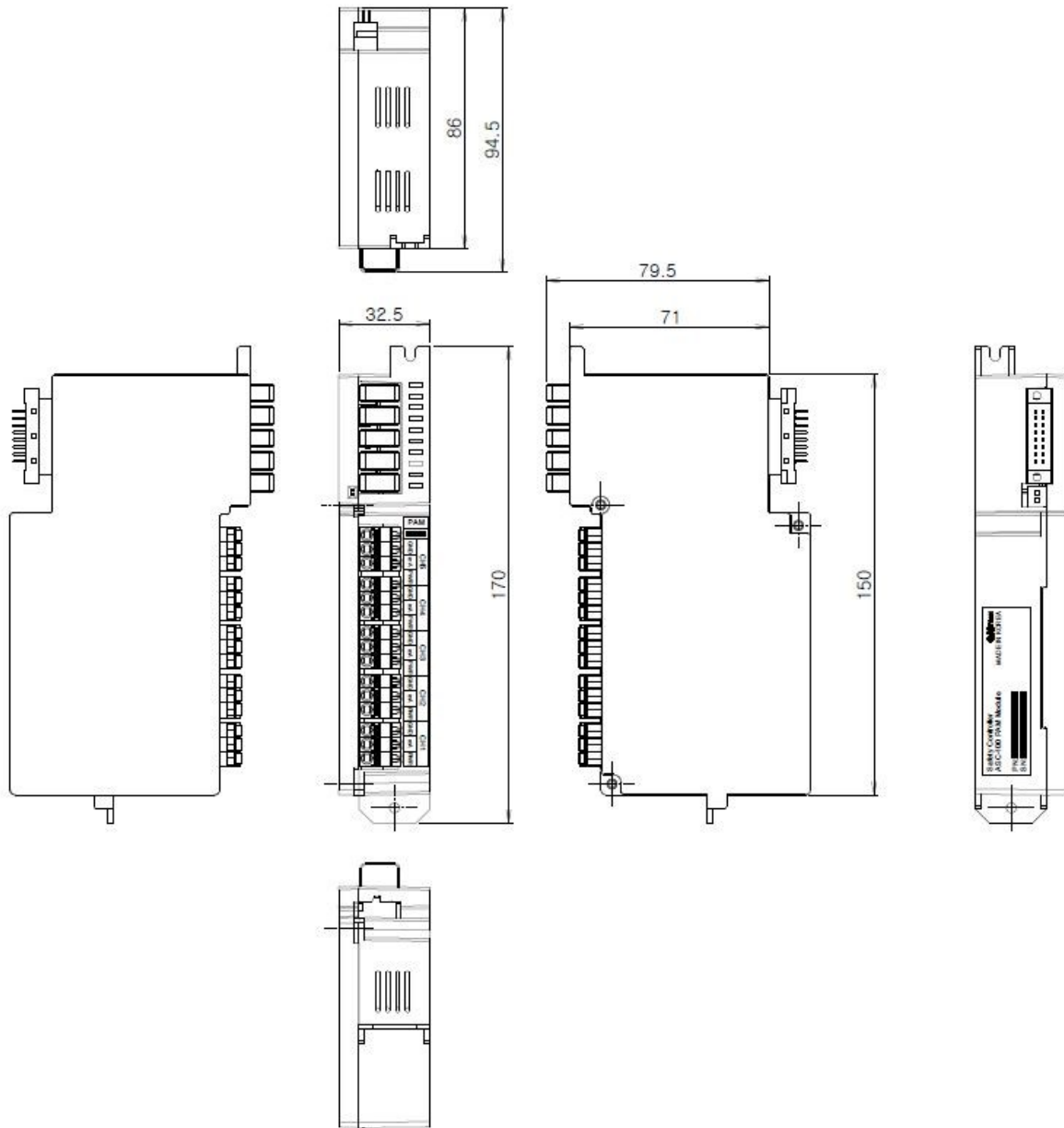


[Figure 51. ASC-100 (Expansion)]



Instruction

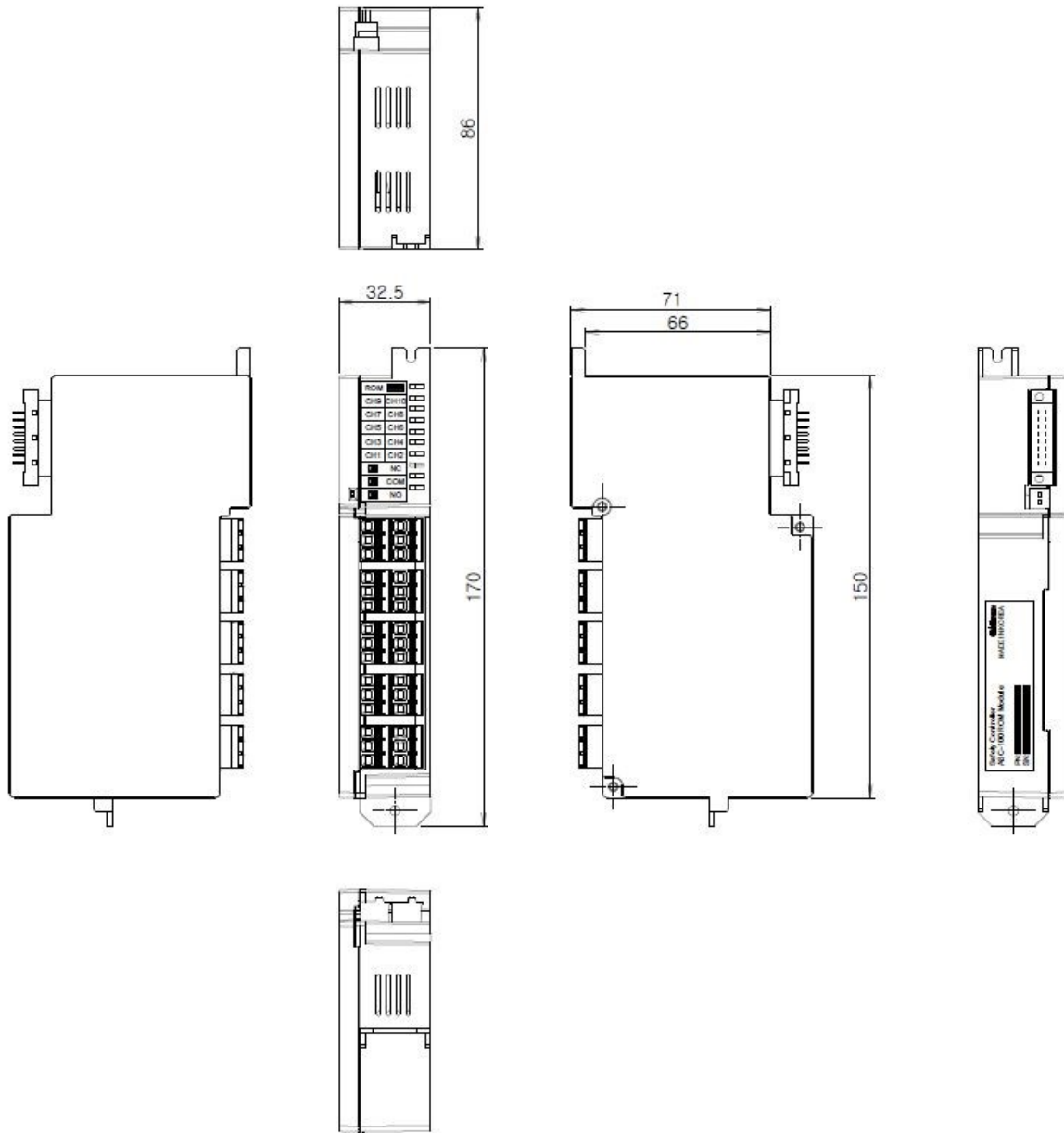
### 10.4. I/O Module (PAM)



[Figure 53. PAM]

Instruction

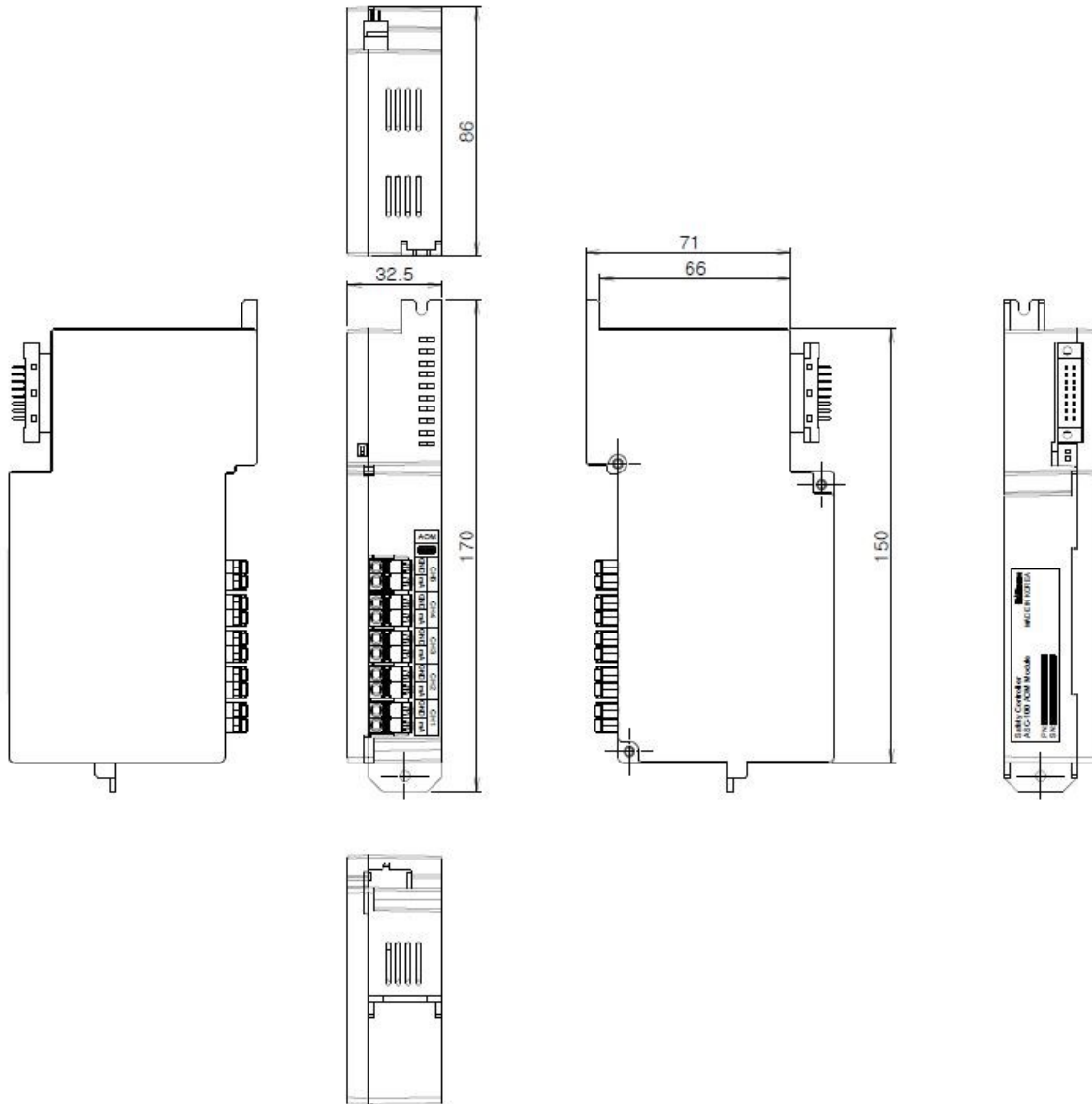
### 10.5. I/O Module (ROM)



[Figure 54. ROM]

Instruction

10.6. I/O Module (AOM)



[Figure 55. AOM]

11. Revision History

Version	Contents	Date
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## Instruction

0.0	Manual issued	Apr. 19, 2019
0.1	Function(s) added	Oct. 29, 2019
0.2	Function(s) added	Nov. 14, 2019
0.3	Function(s) added; self-test (multi)	Nov. 22, 2019
0.4	Function(s) added; STANDBY Mode, etc.	Dec. 6, 2019