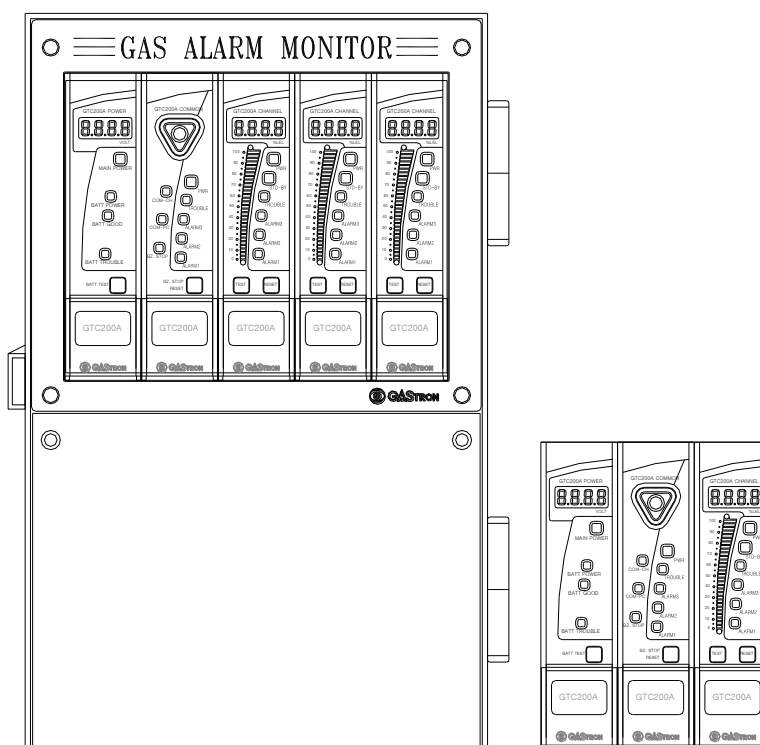# GASTRON

Human Technology & Future

INSTRUCTION MANUAL

MODEL : GTC-200A

For proper use, please read this manual carefully!

We much appreciate your wise purchase of GASTRON products

Gastron, a world-renowned company for manufacturing gas detectors and gas monitoring devices exclusively, has enjoyed a great reputation from numerous consumers and customers in and out of Korea for its superb quality and convenience in use. We, at Gastron, have always strived and will further endeavor to let our consumers gain an easy access to our products at all times. Furthermore, we are proud to let you know that Gastron has exerted ourselves to ceaselessly develop and research for gas detectors catering to customers' satisfaction. Our customers are now invited to solve all the problems and dissatisfaction related to gas detectors by using our Gastron products. Our customers are warranted to receive contentment with our Gastron gas detectors at all times and at any place.

The following operating manual serves to explain an installation method, an operating method, a simple maintenance method and other useful guidelines regarding the toxic gas leakage detector "GTC-200A" . We trust that this manual will be of good use whenever there are any questions or inquiries during usage of the detector. You are encouraged to carefully read and make good use of the operating manual by safekeeping and referring to the same at your every need.

As always, we once again appreciate your patronage of our products and should you have any inconveniences or problems on our products, kindly contact us at the following address during use to receive prompt attention and necessary measures.

Note

- **You are kindly requested to get your gas detector inspected and calibrated at least once within a three-month period using calibration gas according to the type of gas in order to ensure an exact operation of the gas alarm, and to receive a periodic inspection including one or more calibration inspections for each six-month period under the provision of relevant Industrial Safety and Sanitary Act promulgated by the Korea Labor Ministry.**

- **No periodic inspections and calibrations may be a cause of erroneous operation of the gas detector due to aged sensor unit.**

- **The disintegration or disassembly of the gas detector needs a person who has a technical expertise on the gas alarm.**

- **You are kindly invited to call our technical department or write to our e-mail address or web site for inspection and calibration of gas detectors or alarms.**

C o n t e n t s

1. Introduction

GTC-200A Series has a high performance A/D converter and micro-processor so that it has various functions built-in. GTC-200A Series is centralized, that is, composed of one common alarm unit and several multi-channel control units. Each multi-channel control unit is connected to its sensing part.

GTC-200A is encapsulated in DIN type case. There are two product types - Panel mount type and Wall mount type.

GTC-200A has FND digital display (PV value) function and 3 colors LED bar graphic display (PV & alarm set value) function, it also has three instant alarm (1st H/L, 2nd H/L, and 3rd H/L) and trouble alarm.

2. Features

GTC-200A Series produces audible (buzzer) and visual (alarm LED and bar graphic LED flashing) warnings in case of instant alarm and trouble alarm. If an alarm occurs, this product can hold a Max. PV value holding.

GTC-200A series enables remote control for alarm cancellation. Our product can carry out synchronous control functions because it has an output signal of the alarm (SPDT contact).

GTC-200A series offers two outputs; Isolation type RS-485 signal (Option) is provided for a monitoring system from common unit, the other is a measurement output (4-20mA, DC) from channel control unit.

Since GTC-200A series is composed of the state of art parts, it has stability and credibility. It can be expanded as large as its maximum (up to 64 channels)

3. Specifications

3-1. Power Unit (Option)

	Power Unit	
1	Input power	DC. 24V
2	Output power	DC. 24V (Aux. power : DC. 27V / 300mA)
3	Output power display	FND Digital Display
4	Main power display	Green LED
5	Aux. power display	Green LED
6	Aux. power monitoring	Red LED
7	Aux. power test	Aux. power test S/W
8	Aux. power	Ni-Cd Battery 24V / 600mA(under 6 channels)

3-2. Common Unit

	Common Alarm Unit	
1	Input type	RS-485
2	Input check interval	100ms
3	Alarm type	Audible(Buzzer) & Visible (LED)
4	Alarm reset	Manual (Reset Switch)
5	Control input	Remote Reset– Buzzer stop/reset
6	Measuring output	Isolation RS-485 (Option)
7	Alarm output	Buzzer - STDT Relay Dry contact Signal Output
		Fault Alarm- STDT Relay Dry contact Signal Output
		1st Alarm - STDT Relay Dry contact Signal Output
		2nd Alarm - STDT Relay Dry contact Signal Output
		3rd Alarm - STDT Relay Dry contact Signal Output
		* Relay Dry contact capacity : AC125V 10A
8	Operating Power	DC 24V

3-3. Channel Unit

Channel Control Unit		
1	Input type	4-20mA.DC / Full Scale
2	Measurement display	0.000 to 9999 Digital (settable by user)
3	Measurement Accuracy	FND Digital –bigger one between ±1% Full Scale or 1 Digit
		LED Bar --- bigger one between ±1% Full Scale or 1 Digit
4	Input check interval	100 ms
5	Alarm setting	3 stage Alarm (settable by user)
6	Alarm setting display	3 Color Bar Graphic (Green/Red/Yellow LED)
7	Alarm display	LED Bar Graphic
8	Alarm reset	Manual (Common Unit)
9	Self diagnosis	Test Switch & Reset Switch
10	Control In/out	RS-485
11	Measurement Output	4-20mA.DC / Full Scale
12	Alarm Output	Fault Alarm - STDT Relay Dry contact Signal Output
		Alarm 1 STDT Relay Dry contact Signal Output
		Alarm 2 STDT Relay Dry contact Signal Output
		Alarm 3 STDT Relay Dry contact Signal Output
		* Relay Dry contact capacity : AC125V 10A
13	Operating Power	DC 24V

3-4. Wall Mount Type

Wall Mount Type		
1	Input Power	AC 110V/220V 50/60Hz (default: AC220V 50/60Hz)
2	Applicable SMPS capacity by Channel quantities	Channel	Capacity
		3(4) Channel	24V 1.5A (24V 1.5A)
		5(6) Channel	24V 2.1A (24V 2.1A)
		7(8) Channel	24V 2.1A (24V 3.5A)
		9(10) Channel	24V 3.5A (24V 3.5A)
	**( ): quantities and capacity when there is no Power Unit		

4. Part's names and major functions

4-1. Configuration of Power unit
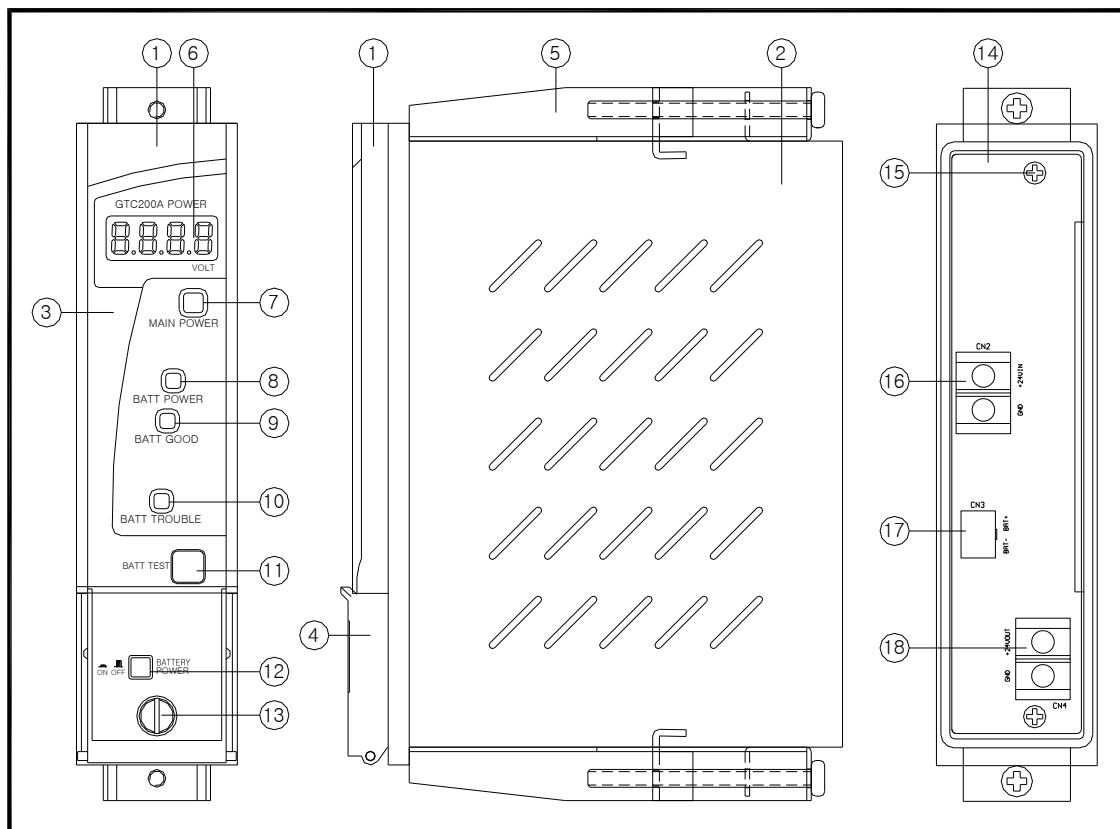
No.	DESCRIPTION	No.	DESCRIPTION
1	FRONT COVER CASE	10	BAT. POWER TROUBLE LED
2	MAIN BODY CASE	11	BAT. POWER TEST KEY
3	ACRYLIC	12	BAT. POWER ON/OFF SWITCH
4	FRONT SUB COVER	13	FRONT COVER SCREW
5	MAIN BODY FIXED BRACKET	14	TERMINAL PCB
6	MAIN/BAT. POWER DISPLAY	15	TERMINAL PCB SCREW
7	MAIN POWER LED	16	DC INPUT CONNECTOR
8	BAT. POWER LED	17	BATTERY CONNECTOT
9	BAT. POWER GOOD LED	18	DC OUTPUT CONNECTOR

4-1-1.   MAIN/BAT. POWER DISPLAY
Display voltage of main and Aux. power.
This is also one for Common Unit and Channel Unit.

4-1-2.   MAIN POWER LED
This LED is turned on when using AC Power, and turned off in case of using Battery

4-1-3.   BAT. POWER LED
This LED is turned on when using battery power

4-1-4. BAT. POWER GOOD LED

If battery voltage is above 18V when connecting with battery, this LED is turned on.

4-1-5. BAT. POWER TROUBLE LED

If battery voltage is below 18V when connecting with battery, this LED is turned on. This LED is flickering if there is no connection with Battery.

4-1-6. BAT. POWER TEST KEY

This S/W is for testing operation of Battery. When pressing this S/W, battery power is applied and operates gas detection system. Also voltage of battery is displayed on FND.

4-1-7. BAT POWER ON/OFF SWITCH

This is battery power on/off S/W.

Note)When the products is released the batter switch should be off. After turning on main power the battery power should be turned on.

4-2. Configuration of Common unit

Panel Mount Type   Wall Mount Type
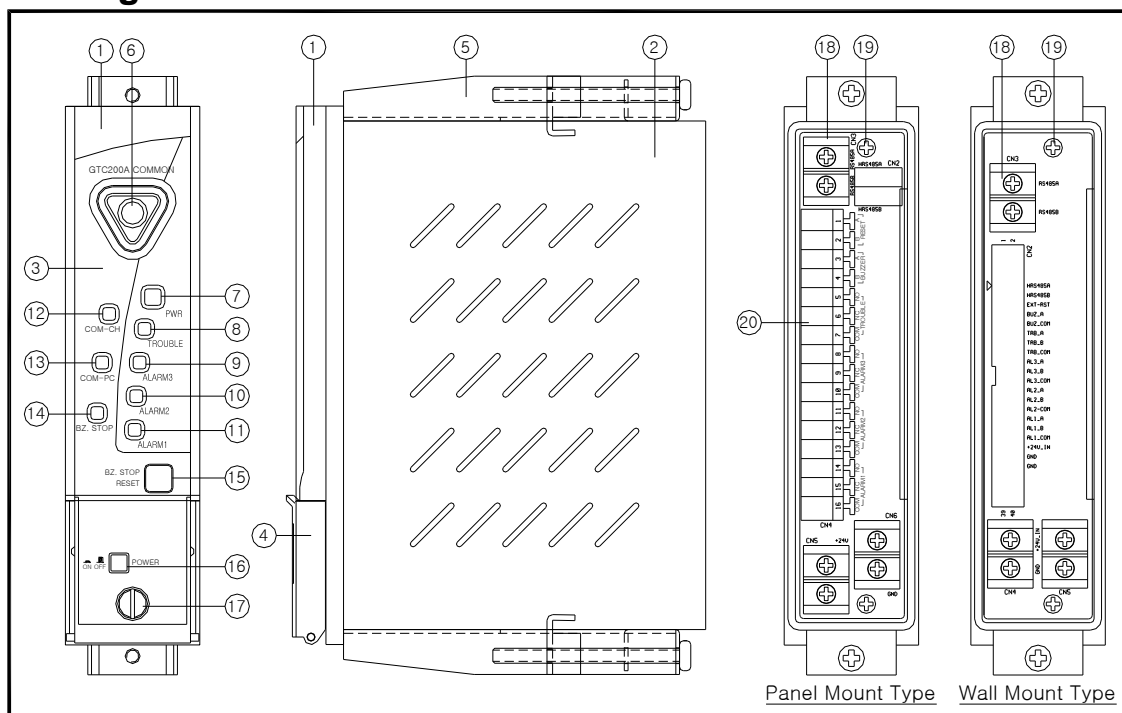
No.	DESCRIPTION	No.	DESCRIPTION
1	FRONT COVER CASE	11	ALARM-1 LED
2	MAIN BODY CASE	12	COMMUNICATION LED (CHANNEL)
3	ACRYLIC	13	COMMUNICATION LED (PC)
4	FRONT SUB COVER	14	BUZZER STOP LED
5	MAIN BODY FIXED BRACKET	15	BUZZER STOP/RESET KEY
6	BUZZER	16	POWER ON/OFF SWITCH
7	POWER LED	17	FRONT COVER SCREW
8	TROUBLE LED	18	TERMINAL PCB
9	ALARM-3 LED	19	TERMINAL PCB SCREW
10	ALARM-2 LED	20	CONNECTOR

4-2-1. Buzzer
Buzzer sounds when trouble or alarm occurs from each channel unit.

4-2-2. Power LED
When power is applied from Common Unit, power LED turns on.

4-2-3. Trouble LED
If trouble occurs from each channel unit, Trouble LED turns on.
Ex) In case of bad wiring with gas detector or other trouble

4-2-4.   1st Alarm LED (Alarm 1 LED)

Alarm 1 LED is on when first alarm occurs on each channel unit.
If the value reaches at 1st alarm value during test of each channel unit, Alarm 1 LED is on.

4-2-5.   2nd Alarm LED (Alarm 2 LED)

Alarm 2 LED is on when second alarm occurs on each channel unit. If the value reaches at 2nd alarm value during test of each channel unit, Alarm 2 LED is on.

4-3-6.   3rd Alarm LED (Alarm 3 LED)

Alarm 3 LED is on when third alarm occurs on each channel unit. If the value reaches at 3rd alarm value during test of each channel unit, Alarm 3 LED is on.

4-2-7. Channel communication LED (COM-CH LED)

If Common Unit normally communicates with whole Channel Units set on common unit, this COM-CH LED is turning on continuously. If there is some channel units having no communication with common unit, this COM-CH LED is flickering.
(If number of channel unit is set as under 1 on Common Unit, the LED is flickering with 0.5 second interval)

4-2-8. PC communication LED (COM-PC LED) (Option)

If Common Unit normally receives communication data from PC, this COM-PC LED is off after turned on once.
(If number of common unit address is set as under 1 on Common Unit, the LED is flickering with 0.5 second interval.)

4-2-9. Buzzer Stop LED (BZ-STOP LED)

Buzzer stop s/w is used for stopping buzzer sound in case of alarm at each channel unit and buzzer stop LED is also on. In case of pushing buzzer stop s/w again on common or channel unit, buzzer stop LED is off. (This LED is activated only when set alarm type as "Hold" on Channel Unit)
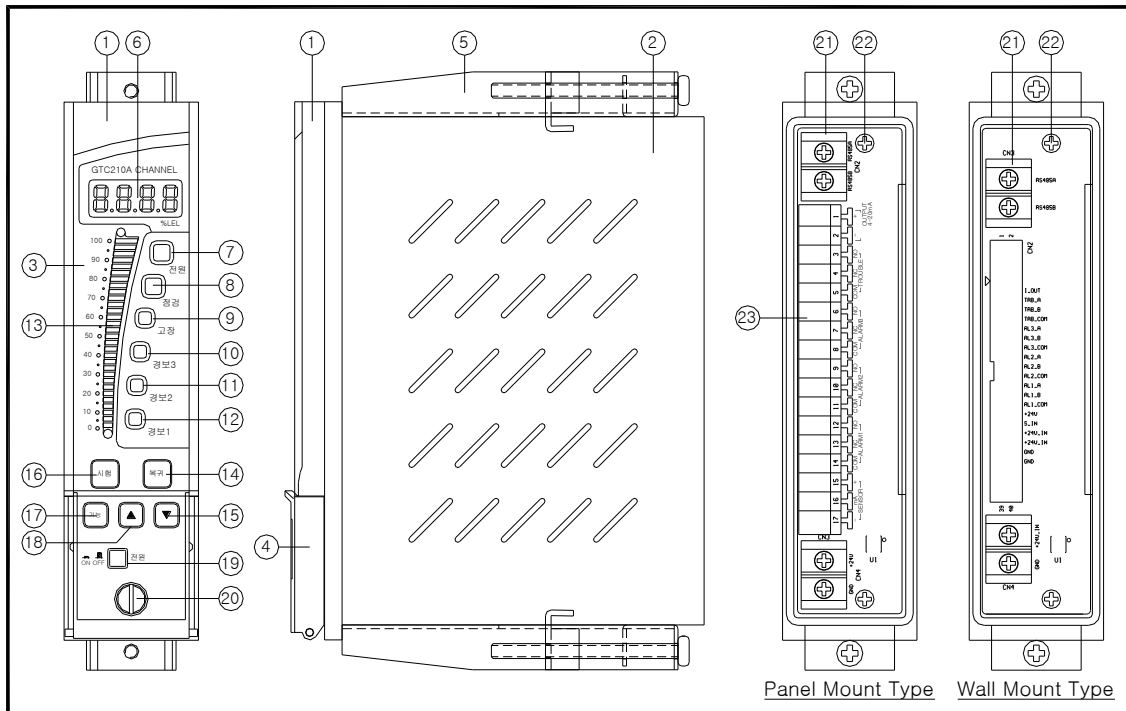
4-2-10. Buzzer Stop & Reset Key

This key is used for stop & reset of buzzer on alarm at each Channel Unit.
- Push once .... Buzzer sound stops and BZ-STOP LED is on.
- Push twice .... BZ-STOP LED is off and performs Reset function.

4-2-11. Main Power ON / OFF Switch

This is Power On/Off switch of Common Unit.

4-3. Configuration of Channel unit

Panel Mount Type   Wall Mount Type

No.	DESCRIPTION	No.	DESCRIPTION
1	FRONT COVER CASE	13	3 COLOR BAR GRAPHIC LED
2	MAIN BODY CASE	14	RESET KEY
3	ACRYLIC	15	DOWN KEY
4	FRONT SUB COVER	16	TEST KEY
5	MAIN BODY FIXED BRACKET	17	FUNCTION KEY
6	FND DISPLAY	18	UP KEY
7	POWER LED	19	POWER ON/OFF SWITCH
8	STANDBY LED	20	FRONT COVER SCREW
9	TROUBLE LED	21	TERMINAL PCB
10	ALARM-3 LED	22	TERMINAL PCB SCREW
11	ALARM-2 LED	23	CONNECTOR
12	ALARM-1 LED		

4-3-1. Measurement density display (FND Digital Display)

Continuously displays measurement value of corresponding detector connected with each channel unit, and displays user setting value with flickering when doing Test function.

4-3-2. Power LED

This Power LED is on when power is applied to channel unit.

4-3-3. Stand-by LED

This STD-BY LED is flickering when checking gas detector.

4-3-4. Trouble LED

This trouble LED is flickering in case of trouble on Channel Unit and/or gas detector.
Ex) * bad connection with gas detector or other trouble

4-3-5.　1st Alarm LED (Alarm 1 LED)

Alarm 1 LED is on when first alarm occurs on channel unit. If the value reaches at1st alarm value during test of channel unit, Alarm 1 LED is on

4-3-6.　2nd Alarm LED (Alarm 2 LED)

Alarm 2 LED is on when second alarm occurs on channel unit. If the value reaches at 2nd alarm value during test of channel unit, Alarm 2 LED is on

4-3-7.　3rd Alarm LED (Alarm 3 LED)

Alarm 3 LED is on when third alarm occurs on channel unit. If the value reaches at 3rd alarm value during test of channel unit, Alarm 3 LED is on.

4-3-8. 3 Color Bar Graphic LED

3 Color Bar Graphic LED displays the measured value and alarm setting value continuously like FND display

- When the measured value is lower than 1st alarm, the LED color is green.

- When the measured value is lower than 2nd alarm, the LED color is orange

- When the measured value is lower than 3rd alarm, the LED color is red.

If measured value is higher than alarm setting value, bar graphic is being held at the maximum value and is flickering with the alarm

4-3-9. Test Key

If pressing Test Switch, channel unit goes into self- diagnosis mode.
- Measurement display FND is flickering and user can check alarm function on channel unit and common unit by changing flickering measurement value with ▲ or ▼ key
- By pressing reset key on each channel unit once, self diagnosis mode is cancelled.

4-3-10. Reset Key

This key is used for canceling of alarm, self test and/or program setting of Channel Unit.

4-3-11. Func. Key

Function Key is used for switching or selecting mode when setting of alarm value, alarm type, alarm dead band and/or alarm delay time.

4-3-12. ▲ ▼ Key (UP/DOWN KEY)

After selecting each mode by Func Key, desired value will be chosen by "▲", "▼" Key. Furthermore, the value change will be accelerated by keeping "▲", "▼" Key press if user need to change a lot of numbers at one time.

4-4. Configuration of Wall Mount Type panel
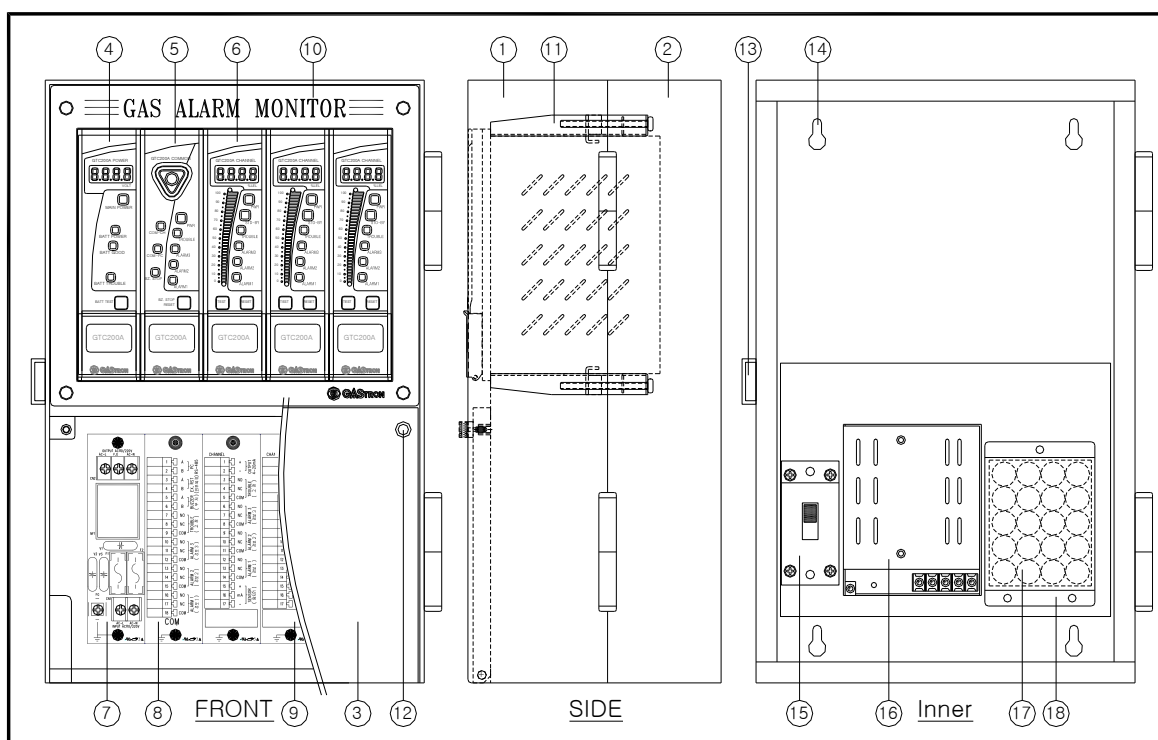
No.	DESCRIPTION	No.	DESCRIPTION
1	WALL MOUNT CASE FRONT	10	NAME PLATE
2	WALL MOUNT CASE REAR	11	DIN CASE FIXED BRACKET
3	WALL MOUNT CASE COVER	12	CASE COVER SCREW
4	POWER UNIT (Option)	13	FRONT CASE FIXED HOOK
5	COMMON UNIT	14	WALL MOUNT FIXED HOLE
6	CHANNEL UNIT	15	MCCB (Molded Case Circuit breaket)
7	MOTHER BOARD FILTER PCB (Option)	16	POWER SUPPLY
8	MOTHER BOARD COMMON PCB	17	BATTERY (Option)
9	MOTHER BOARD CHANNEL PCB	18	BATTERY COVER (Option)

4-4-1. Power Unit (Option)
This unit is only for Battery and supplied as Option item.

4-4-2. Mother Board Filter PCB (Option)
This PCB is supplied when using Power Unit and protects circuit from electromagnetic wave, Noise and Surge.

4-4-3. Mother Board Common PCB
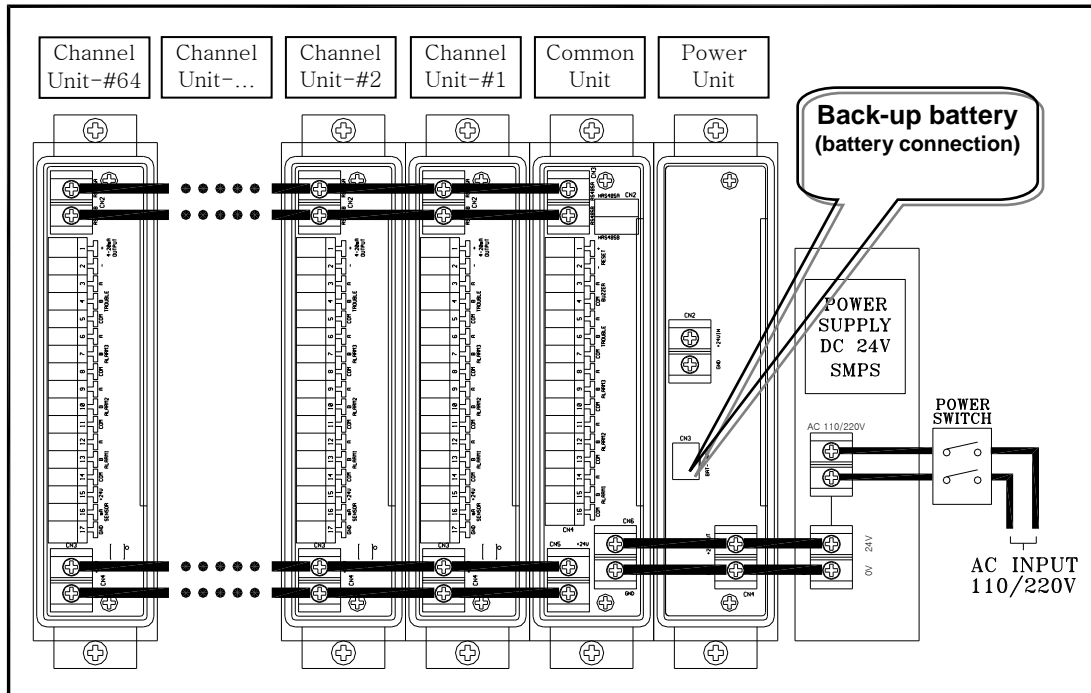Provides relay contact output terminals for buzzer, trouble and alarms.

4-4-4. Mother Board Channel PCB
Provides terminals for relay contact output, 4~20mA output and connection with gas detector.
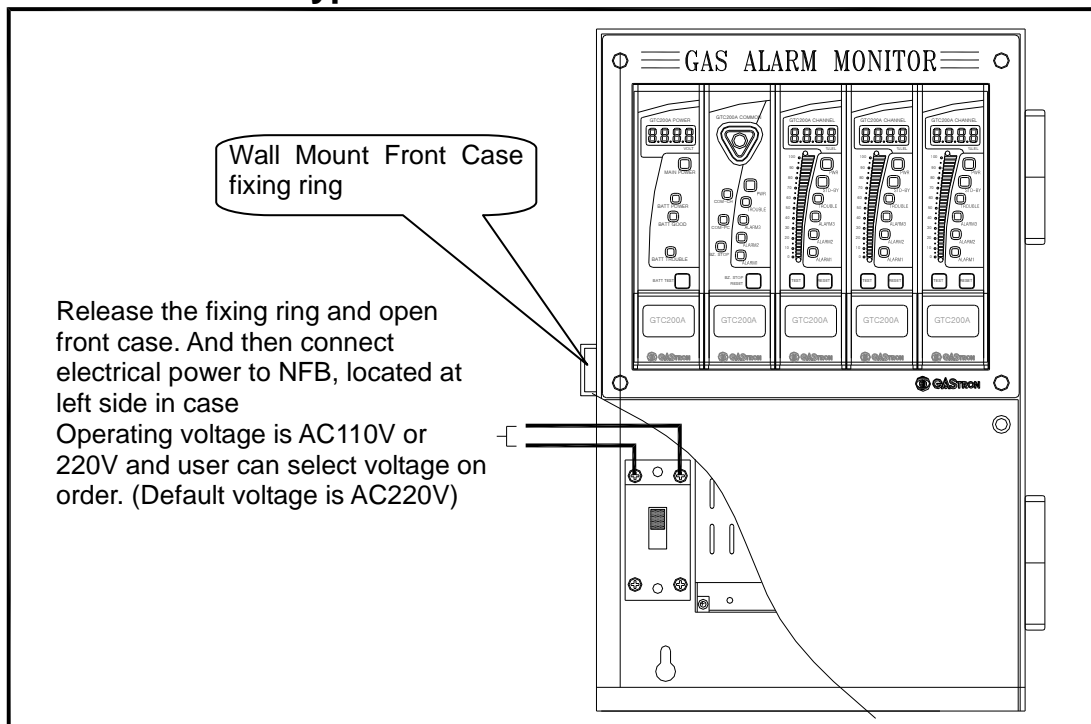
5. Terminal wiring diagram
5-1. POWER CONNECTION
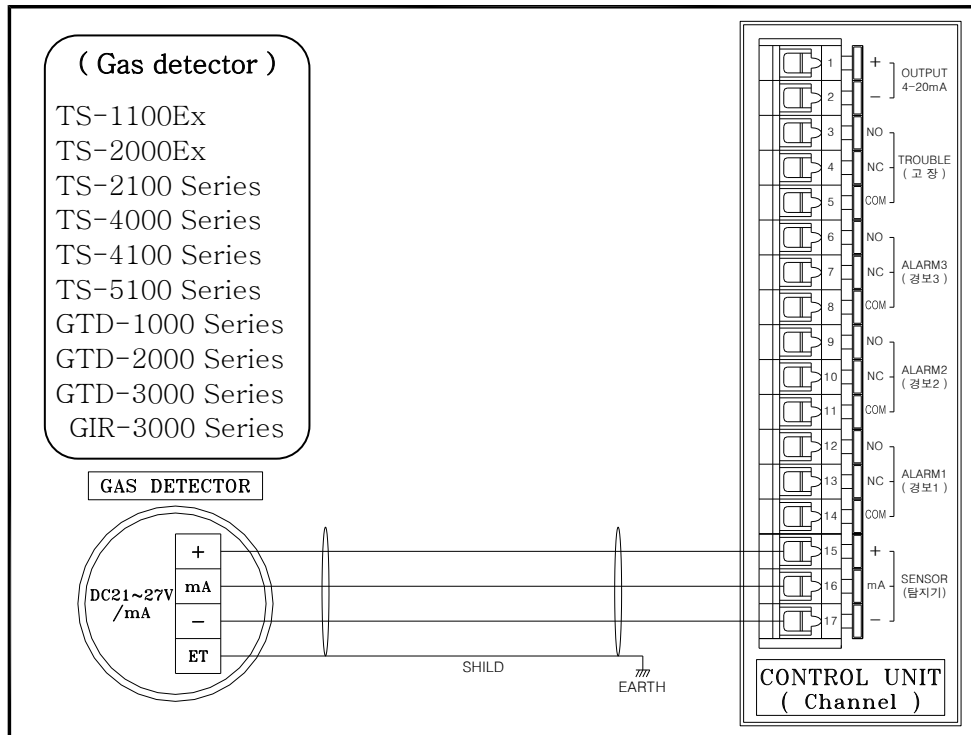### 5-1-1. Panel Mount Type

*. Power Unit is supplied only when using Battery. In case of no Power Unit, DC power (24V) is directly connected from Power Supply to connector (CN6) of common unit. (Power Unit is an option item.)

5-1-2. Wall Mount Type

Wall Mount Front Case fixing ring

Release the fixing ring and open front case. And then connect electrical power to NFB, located at left side in case
Operating voltage is AC110V or 220V and user can select voltage on order. (Default voltage is AC220V)
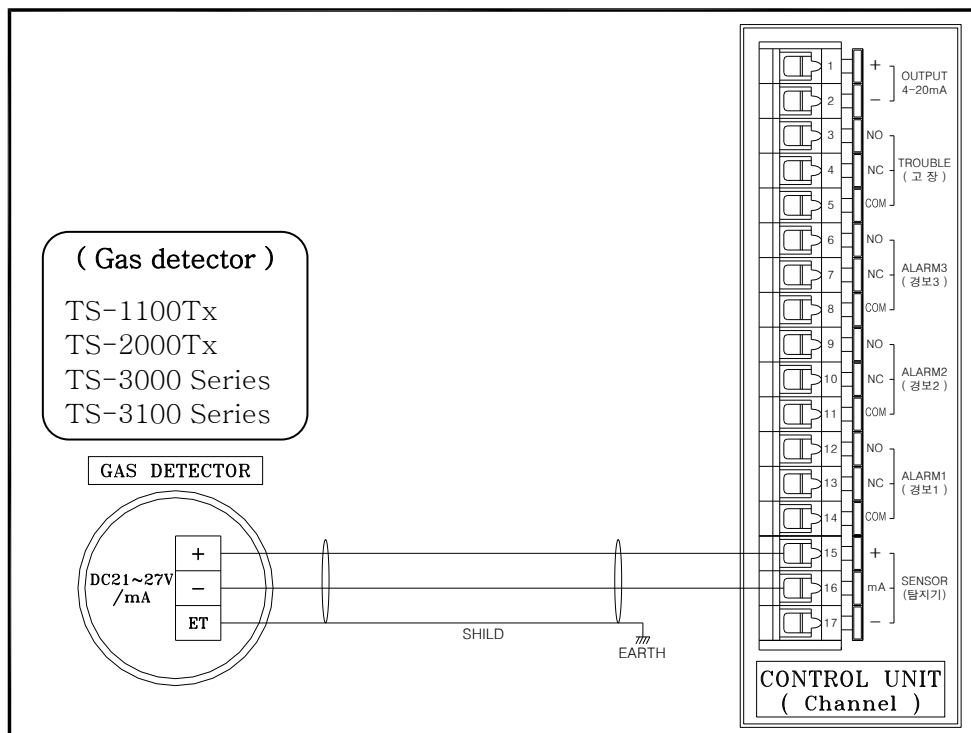
5-2. Gas Detector connection diagram (3Wire type)

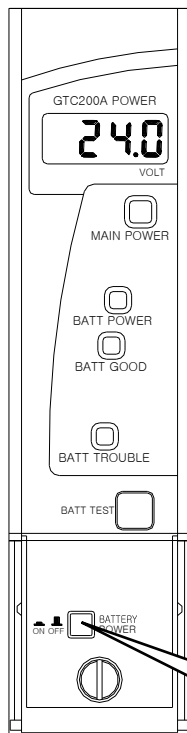*Note) Please use CVVS or CVVSB 1.5sq↑ Shield Cable!*

5-3. Gas Detector connection diagram (2Wire type)

Note) Please use CVVS or CVVSB 1.5sq↑ Shield Cable!

6. How to use

6-1. How to operate Power Unit

GTC200A POWER

24.0

VOLT

MAIN POWER

BATT POWER

BATT GOOD

BATT TROUBLE

BATT TEST

ON OFF   BATTERY POWER

-. Voltage of main power is displayed on FND Digital Display.

-. If battery test key was pressed, the power is changed to Aux. power (battery) and voltage of battery is displayed on FND Digital Display.

-. If a back-up battery is not connected, battery trouble LED is blinking (0.5 second interval).

-. If a back-up battery voltage is above 18V,the back-up battery power is normal LED is on. Otherwise, battery trouble LED is on.

Note) this unit is off when shipment.

Please turn on Aux. power switch after turned on main power.

Back-up battery switch

6-2. How to operate Common Unit

6-2-1. Buzzer alarm
-. gives short intermittent sound when receiving trouble signal from Channel Unit
-. gives long intermittent sound when receiving alarm signal from Channel Unit.

6-2-2. Trouble/alarm LED
-.These LEDs are turned on when receiving trouble or alarm signal from Channel Unit
   Alarm LED is flickering during alarm time.

6-2-3. Communication LED
-.COM-CH LED represents communication status between Common Unit and Channel Unit. This LED is turned on at first communication (0.1 sec) with each channel unit and turned off. If Common Unit can normally communicate with whole pre-set channel units, this LED is continuously turning on. (Channel Unit Access time: 0.1)
-.COM-PC LED is turned on once and immediately turned off when Common Unit receives normally communication data from PC.
-. If SW1 (channel unit number) and SW2 (common unit address) are set under 1 in common unit, COM-CH and COM-PC LEDs are flickering (0.5sec interval)

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6-2-4. Buzzer Stop LED (BZ-STOP LED)

-. This LED is on when buzzer stops by pressing buzzer stop key in case of alarm from Channel Unit (This LED is activated only when alarm type is set as Hold in Channel Unit)
-. This LED is off when pressing buzzer stop key once again in Common or Channel Unit.

6-2-5. Buzzer Stop & Reset Key

- In case of trouble or alarm on each channel unit, this key is used for stopping buzzer and resetting
- Push once .... Buzzer sound stops and BZ-STOP LED is on.
- Push twice .... BZ-STOP LED is off and performs Reset function.

6-2-6. RS485 MODBUS communication Data

6-2-6-1. RS-485 communication Format
- Baudrate : 9600BPS
- Stop bit   : 1 Stop
- Parity   : Even parity

6-2-6-2. Gas density value (Analog input)

No	Function name	Address	Other
1	Channel-1 unit gas density value	30001	Channel address is increased by 1 for each channel unit.
2	Channel-2 unit gas density value	30002	
3	Channel-3 unit gas density value	30xxx	

6-2-6-3. Channel unit status Bit Data(Digital input contact reading Data)

Channel Unit No	Function name	Address	Other
Channel-1 Unit	Alarm1 status Data	10001	8Bit is assigned for each channel unit
	Alarm2 status Data	10002	
	Alarm3 status Data	10003	
	Trouble status Data	10004	
	Test status Data	10005	
	Spare Data	10006~10008	
Channel-2 Unit	Alarm1 status Data	10009	8Bit is assigned for each channel unit
	Alarm2 status Data	10010	
	Alarm3 status Data	10011	
	Trouble status Data	10012	
	Test status Data	10013	
	Spare Data	10014~10016	
Channel-n Unit	Status Data	10001+((n-1)*8) ~ 10001+(((n-1)*8)+8)	

# 6-3. How to operate channel unit

6-3-1. Check of wiring

- Check wirings to operation power, gas detector, common unit and channel unit with reference to Terminal wiring diagram (Section 5).
  * Power supply is AC110/220V, 50/60Hz. (Please make sure to check power type before turning on power)

6-3-2. Power ON

-.Turn power on after checking voltage of power supply.
-.Check power LED turned on at common unit and channel units.
-.Check "SELF" on FND at channel units.

6-3-3. Display of gas density
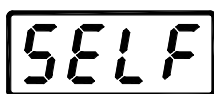
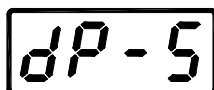|	
`SELF`	-.After power on of Channel Unit, "SELF" on FND at channel unit is flickering about 15 seconds and the channel unit goes into measurement mode. If the unit or gas detector has trouble, trouble signal occurs at this time.
`0`	-.Channel unit displays gas density received from gas detector as number type on FND digital display. -.Gas density is also displayed with 3 Color Bar Graphic LED 　　Under 1st Alarm density: Green color 　　Above 1st Alarm and under 2nd Alarm density: Orange color 　　Above 2nd Alarm density: Red color.

`Undr`
 	
`OUEr`
	-. If there is no connection with gas detector or trouble at gas detector, channel unit displays "Undr" with flickering (0.5 sec interval).
	-. Trouble LED Lamp is also turned on.
	-. Lowest round LED at 3 Color Bar Graphic LED is turned on with Red color.
	-. If current value received from gas detector is 10% higher than predetermined High scale value, "OuEr" is displayed with flickering (0.5 sec interval).
	-. Highest round LED at 3 Color Bar Graphic LED is turned on with Red color.

-.If gas density is higher than alarm setting value, corresponding alarm is activated after Alarm holding time.
-.Alarm LED Lamp is flickering (0.5 sec interval) during alarm holding time and turned on after Alarm holding time.
-.Alarm Relay is ON after Alarm holding time.
-.If Alarm Latch Type is "on" mode, Alarm status and gas density value is held at maximum value when alarm is activated. Gas density value held is not automatically reset when real gas density is decreased below alarm setting value and only can be reset by "Reset" key.
-.If Alarm Latch Type is "off" mode, Alarm is reset according to change of measured gas density.

6-3-4. Program Data setting

`0`	-. Push "▲", "▼" at the same time for over 2 seconds in gas density display mode and goes into program data setting mode. (During program setting mode, automatically return to density display mode if there is no key input for 10 seconds.)
`dP-S`	-. Firstly, "dP-S" (decimal point setting) is displayed. -. Press "Func" key to go into decimal point setting mode. -. If pressing "RESET" key, returns to density display mode.

`100` `1.00` `10.0`	-. By pressing "▲" or "▼", decimal point can be changed in 3 types. -. Press "FUNC" key when desired decimal point is displayed to set the point and go to next item -. If pressing "RESET" key, returns to density display mode.
`H-SL`	-. High Scale (Maximum display value of gas density) is displayed as "H-SL" -. Press "Func" key to go into High scale setting mode -. If pressing "RESET" key, returns to density display mode. -. High Scale value was set when shipping from factory according to domestic law
`100`	-. High Scale value can be changed according to measuring range with "▲" or "▼"(increase or decrease). -. If desired High scale value is displayed, press "FUNC" key to set the value as High Scale and go to next item. -. If pressing "RESET" key, returns to density display mode -. This scale is set as same as detection range of gas detector at the factory. Ex) when set Range as 100 4 mA.DC input .... 0 Display 20 mA.DC input .... 100 Display
`SAd`	-. SAD (compensating error from gas detector) setting message is displayed as "SAd ". -. Press "Func" key to go into SAD value setting mode. -. If pressing "RESET" key, returns to density display mode
`0` `- 1`	-. When pressing "▲" or "▼" key, SAD value is increased or decreased (in case of negative number, "-" sign is added and displayed. -. If desired SAD value is displayed, press "FUNC" key to set the value as SAD and go to next item. -. If pressing "RESET" key, returns to density display mode ex) In case of setting SAD as 2 : if output error from gas detector is -2, the display will be -2. In this case, User should compensate 2 (SAD setting value) to display 0 on FND.
`CHno`	-. Channel Number setting message (setting recognition number of each channel unit) is displayed as "CHno ". -. Press "Func" key to go into Channel Number setting mode.. -. If pressing "RESET" key, returns to density display mode
`1`	-. Common unit can check operation status of each channel unit with channel number and this mode is to input each number (address) of channel unit. When pressing "▲" or "▼" key, address no. of channel unit will be increased or decreased. -. If desired address number is displayed, press "FUNC" key to set the value as Address NO. and go to next item (Alarm Reset Type function). -. If pressing "RESET" key, returns to density display mode **-. If Channel No. was not inputted, Channel Unit and Common Unit can not communicate with each other.** **-. Please make sure to assign different number to Channel units.**

6-3-5. Alarm Data setting

-. Push "Func" for over 2 seconds in gas density display mode and go into alarm data setting mode.
-. (During alarm data setting mode, automatically return to density display

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mode if there is no key input for 10 seconds.)

LACH

-.Function to set Alarm Latch Type "LACH" is displayed.
-.Press "Func" to go into Alarm Latch Type setting mode.
-.If pressing "RESET" key, returns to density display mode

on

oFF

-.This step is for changing Alarm Reset Type. " on" and " oFF" are changed in turns when pressing "▲"or "▼" key.
-.If desired Alarm Latch Type is displayed, press "FUNC" key to set the value as Alarm Latch Type and go to next item.
-.If pressing "RESET" key, returns to density display mode
-. There are two kinds of Alarm Latch Type (" on" and " oFF")
 OFF mode is to automatically reset Alarm and ON mode is to reset alarm manually.

AL - 1

-. Alarm1 value setting function ("AL-1") is displayed.
-. Press "Func" key to go into Alarm1 value setting mode.
-.If pressing "RESET" key, returns to density display mode

15

-.This mode is to change Alarm1 setting value (up to High Scale value) Alarm 1 value is increased or decreased by pressing "▲" or "▼" key.
-. If desired Alarm1 value is displayed, press "FUNC" to set the value as Alarm1 and go to next item.
-.If pressing "RESET" key, returns to density display mode
-.Alarm Level was set when shipment according to density designated on domestic law.

1H

1L

-. This mode is to set moving direction of Alarm1
 "1H " or "1L " is displayed in turns when pressing "▲" or "▼" key.
-."1H " mode is to activate alarm when value is equal and bigger than alarm 1 setting value and "1L " mode is to activate alarm when value is equal and smaller than alarm 1 setting value.
-. If desired mode is displayed, press "FUNC" to set mode and go to next item.
-.If pressing "RESET" key, returns to density display mode
-.Alarm Type was set at shipment (combustible: 1H & 2H & 3H / Oxygen: 3H & 2H & 1L / Toxic: 1H & 2H & 3H Type).

1H 0

1L 0

-.This mode is to set alarm 1 dead band value and the value is increased or decreased by pressing "▲" or "▼" key.
-. When Alarm1 is in "1H ", alarm 1 is activated above the value (Alarm value plus Dead band value) and is deactivated below the value (Alarm value minus Dead band value).
-. When Alarm1 is in "1L ", alarm 1 is activated below the value (Alarm value minus Dead band value) and is deactivated above the value (Alarm value plus Dead band value)
-. If desired alarm1 dead band value is displayed, press "FUNC" to set the value and go to next item.
-.If pressing "RESET" key, returns to density display mode
-. This function is to give hysteresis value to remove frequent alarm on/off around alarm setting value (this value is zero when shipment).
 Ex) If alarm setting value is 20%LEL and Dead Band is 2%LEL, alarm is activated at 22%LEL and deactivated at 18%LEL.

AL 1t

-.Alarm1 delay time setting function ("AL1t") is displayed.
-.Press "Func" key to go into alarm1 delay time setting mode.
-.If pressing "RESET" key, returns to density display mode

1

-. This function is to prevent malfunction by external shock or noise and change of alarm1 delay time is increased or decreased by pressing "▲" or "▼" key
-. If desired alarm1 delay time is displayed, press "FUNC" key to set alarm1

delay time and go to next item

-.If pressing "RESET" key, returns to density display mode

Ex) alarm setting value is 20% LEL and delay time is 5 seconds, alarm is only activated when gas density is above than alarm setting value for over 5 seconds and no alarm is activated when gas density fall under alarm setting value within 5 seconds

$A1rL$

-.Alarm1 relay output setting function ("A1rl") is displayed.
-. Press "Func" key to go into Alarm1 relay output setting mode.
-.If pressing "RESET" key, returns to density display mode

on

oFF

-. This mode is to change Alarm1 relay output and output type is changed in turns ("on" and "oFF") when pressing "▲" or "▼" key.
-. If desired Alarm1 relay output type is displayed, press "FUNC" to set the type and go t onext item.
-.If pressing "RESET" key, returns to density display mode
-. There are two kinds of Alarm1 relay output modes ("on" and " oFF")
oFF mode is to deactivate relay output and oN mode is to activate output.

$A1bL$

-. Alarm1 Blink ("A1bL") is displayed
This function is to set that alarm1 relay output is continuously on/off (1 sec interval) during operation of buzzer
-. Press "Func" key to go into Alarm1 Blink output setting mode.
-. If pressing "RESET" key, returns to density display mode

on

oFF

-. This mode is to change Alarm1 Blink output type and "on" and "off" is changed in turns when pressing "▲" or "▼" key.
-. If desired Alarm1 Blink output type is displayed, press "FUNC" key to set the type and go to next item.
-.If pressing "RESET" key, returns to density display mode
-. Alarm1 Blink output types are " on" and " oFF".
oFF type is to deactivate Alarm1 Blink output and oN type is to activate Alarm1 Blink output.(this output is activated only when Alarm1 relay output type is "on")

$AL-2$

-.Alarm2 value setting function ("AL-2") is displayed.
-. Press "Func" key and go into Alarm2 setting mode.
-.If pressing "RESET" key, returns to density display mode

20

-. This function is to change Alarm2 setting value (up to High Scale value) Alarm 2 value is increased or decreased by pressing "▲" or "▼" key
-. If desired Alarm2 value is displayed, press "FUNC" to set the value as Alarm1 and go to next item
-.If pressing "RESET" key, returns to density display mode
-. Alarm Level was set when shipment according to density designated on domestic law

$2H$

$2L$

-. This mode is to set moving direction of Alarm2
"2H " or "2L " is displayed in turns when pressing "▲" or ▼" key.
-."2H " mode is to activate alarm when value is equal and bigger than alarm 2 setting value and "2L " mode is to activate alarm when value is equal and smaller than alarm 2 setting value.
-. If desired mode is displayed, press "FUNC" to set mode and go to next item.
-. If pressing "RESET" key, returns to density display mode
-. Alarm Type was set at shipment (combustible: 1H & 2H & 3H / Oxygen: 3H & 2H & 1L / Toxic: 1H & 2H & 3H Type).

$2H\ 0$

-. This mode is to set alarm2 dead band value and the value is increased or decreased by pressing "▲" or ▼" key.
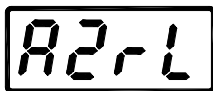-. When Alarm2 is in "2H ", alarm2 is activated above the value (Alarm value

`2L  0`

plus Dead band value) and is deactivated below the value (Alarm value minus Dead band value).

-. When Alarm2 is in "2L", alarm2 is activated below the value (Alarm value minus Dead band value) and is deactivated above the value (Alarm value plus Dead band value)

-. If desired alarm2 dead band value is displayed, press "FUNC" to set the value and go to next item.

-.If pressing "RESET" key, returns to density display mode

-. This function is to give hysteresis value to remove frequent alarm on/off around alarm setting value (this value is zero when shipment).

Ex) If alarm setting value is 20%LEL and Dead Band is 2%LEL, alarm is activated at 22%LEL and deactivated at 18%LEL.

`AL2t`

-. Alarm2 delay time setting function ("AL2t") is displayed.
-. Press "Func" key to go into alarm2 delay time setting mode
-.If pressing "RESET" key, returns to density display mode

`1`

-. This function is to prevent malfunction by external shock or noise and change of alarm2 delay time is increased or decreased by pressing "▲" or "▼" key

-. If desired alarm2 delay time is displayed, press "FUNC" key to set alarm2 delay time and go to next item

-.If pressing "RESET" key, returns to density display mode

Ex) alarm setting value is 20% LEL and delay time is 5 seconds, alarm is only activated when gas density is above than alarm setting value for over 5 seconds and no alarm is activated when gas density fall under alarm setting value within 5 seconds

.

`A2rL`

-. Alarm2 relay output setting function ("A2Ct") is displayed.
-. Press "Func" key to go into Alarm2 relay output setting mode.
-. If pressing "RESET" key, returns to density display mode
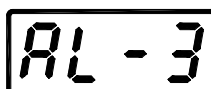
`on`

`oFF`

-. This mode is to change Alarm2 relay output and output type is changed in turns ("on" and "oFF") when pressing "▲" or "▼" key.

-. If desired Alarm2 relay output type is displayed, press "FUNC" to set the type and go to next item.

-.If pressing "RESET" key, returns to density display mode

-. There are two kinds of Alarm2 relay output modes ("on" and " oFF")
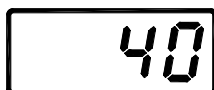oFF mode is to deactivate relay output and oN mode is to activate output..

`A2bL`

-. Alarm2 Blink ("A2bL") is displayed
This function is to set that alarm1 relay output is continuously on/off (1 sec interval) during operation of buzzer

-. Press "Func" key to go into Alarm2 Blink output setting mode.
-.If pressing "RESET" key, returns to density display mode

`on`

`oFF`

-. This mode is to change Alarm2 Blink output type and "on" and "off" is changed in turns when pressing "▲" or "▼" key.

-. If desired Alarm2 Blink output type is displayed, press "FUNC" key to set the type and go to next item.

-.If pressing "RESET" key, returns to density display mode

-. Alarm2 Blink output types are " on" and " oFF".
oFF type is to deactivate Alarm2 Blink output and oN type is to activate Alarm2 Blink output.(this output is activated only when Alarm2 relay output type is "on")
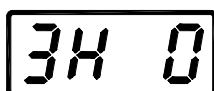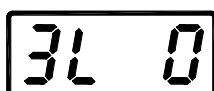
`AL - 3`

-. Alarm3 value setting function ("AL-3") is displayed.
-. Press "Func" key and go into Alarm3 settingmode.
-.If pressing "RESET" key, returns to density display mode

40

-. This function is to change Alarm3 setting value (up to High Scale value)
 Alarm 3 value is increased or decreased by pressing "▲" or "▼" key
-. If desired Alarm3 value is displayed, press "FUNC" to set the value as
 Alarm1 and go to next item
-.If pressing "RESET" key, returns to density display mode
-. Alarm Level was set when shipment according to density designated on
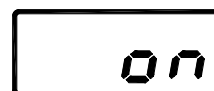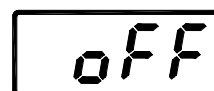 domestic law

3H

3L

-. This mode is to set moving direction of Alarm3
 "3H " or "3L " is displayed in turns when pressing "▲" or ▼" key.
-."3H " mode is to activate alarm when value is equal and bigger than alarm3
 setting value and "3L " mode is to activate alarm when value is equal and
 smaller than alarm 3setting value.
-. If desired mode is displayed, press "FUNC" to set mode and go to next
 item.
-. If pressing "RESET" key, returns to density display mode
-. Alarm Type was set at shipment (combustible: 1H & 2H & 3H / Oxygen: 3H
 & 2H & 1L / Toxic: 1H & 2H & 3H Type).

3H 0

3L 0

-. This mode is to set alarm3 dead band value and the value is increased or
 decreased by pressing "▲" or ▼" key.
-. When Alarm3 is in "3H ", alarm3 is activated above the value (Alarm value
 plus Dead band value) and is deactivated below the value (Alarm value
 minus Dead band value).
-. When Alarm3 is in "3L", alarm3 is activated below the value (Alarm value
 minus Dead band value) and is deactivated above the value (Alarm value
 plus Dead band value)
-. If desired alarm3 dead band value is displayed, press "FUNC" to set the
 value and go to next item.
-.If pressing "RESET" key, returns to density display mode
-. This function is to give hysteresis value to remove frequent alarm on/off
 around alarm setting value (this value is zero when shipment).
 Ex) If alarm setting value is 20%LEL and Dead Band is 2%LEL, alarm is
 activated at 22%LEL and deactivated at 18%LEL.

AL3t

-. Alarm3 delay time setting function ("AL3t") is displayed.
-. Press "Func" key to go into alarm3 delay time setting mode
-.If pressing "RESET" key, returns to density display mode

1

-. This function is to prevent malfunction by external shock or noise and
 change of alarm3 delay time is increased or decreased by pressing "▲" or
 "▼" key
- If desired alarm3 delay time is displayed, press "FUNC" key to set alarm3
 delay time and go to next item
-.If pressing "RESET" key, returns to density display mode
Ex) alarm setting value is 20% LEL and delay time is 5 seconds, alarm is
 only activated when gas density is above than alarm setting value for
 over 5 seconds and no alarm is activated when gas density fall under
alarm setting value within 5 seconds

A3rL

-. Alarm3 relay output setting function ("A3rL") is displayed.
-. Press "Func" key to go into Alarm3 relay output setting mode.
-.If pressing "RESET" key, returns to density display mode

on

oFF

-. This mode is to change Alarm3 relay output and output type is changed in
 turns ("on" and "oFF") when pressing "▲" or "▼" key.
-. If desired Alarm3 relay output type is displayed, press "FUNC" to set the
 type and go to next item.
-.If pressing "RESET" key, returns to density display mode
-. There are two kinds of Alarm3 relay output modes ("on" and " oFF")

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oFF mode is to deactivate relay output and oN mode is to activate output.

A3bL

-. Alarm2 Blink ("A3bL") is displayed
   This function is to set that alarm1 relay output is continuously on/off (1 sec interval) during operation of buzzer
- Press "Func" key to go into Alarm3 Blink output setting mode.
-.If pressing "RESET" key, returns to density display mode

on

oFF

-. This mode is to change Alarm3 Blink output type and "on" and "off" is changed in turns when pressing "▲" or "▼" key.
-. If desired Alarm3 Blink output type is displayed, press "FUNC" key to set the type and go to next item.
-.If pressing "RESET" key, returns to density display mode
-. Alarm3 Blink output types are " on" and " oFF".
   oFF type is to deactivate Alarm3 Blink output and oN type is to activate Alarm3 Blink output.(this output is activated only when Alarm3 relay output type is "on")

End

-. The completion message "End" is displayed for 2 seconds and return to density display mode.

6-3-6. Maintenance setting

SELF

-. After power "ON", press "Test" and "Reset" keys at the same time when "SELF" is flickering and go into maintenance setting mode.
-. Please make sure to press "Reset" key in maintenance mode, in order to return to density display mode.

- In -

-oUt

-. This mode is to select functions to set current input and output values, and "-In-" or "-oUt" are displayed when pressing "▲" or "▼" key.
-. If desired mode is displayed, press "func" to go into selected mode.
-."-In-" mode is to set current input value and "-oUt" mode is to set current output value
-.If pressing "RESET" key, returns to density display mode

IA20

-. This mode is to select "-In-" and to set 20mA (input current) and message is shown as "IA20".
-. Press "Func" key to go into number display mode (input current).
-.If pressing "RESET" key, returns to density display mode

800

-. This mode is to display current (20mA) inputted to (mA) terminal.
-. If displayed value is stable and press "Func" key to set the value and go to next item.
-.If pressing "RESET" key, returns to density display mode

oA04

-. This mode is to select "-Out" and to set 4mA, and the message is shown as "A-04".
-. Connect Ampere meter to 4~20mA Output terminal.
   Press "▲" or ▼" key to show 4mA in Ampere meter and push "Func" key to set output current and go to next item.
-.If pressing "RESET" key, returns to density display mode

oA20

-.This mode is to set 20mA output current and message is shown as "A-20".
-. Connect Ampere meter to 4~20mA Output terminal.
   Press "▲" or "▼" key to show 20mA in Ampere meter and push "Func" key to set output current and go to next item
-.If pressing "RESET" key, returns to density display mode

```
End
```

-. The completion message "End" is displayed for 2 seconds and return to density display mode.

6-3-7. Test function display

```
0
```

-. Press "Test" key over 2 seconds in gas density display mode and go into Test mode.
-. (During Test mode, automatically return to density display mode if there is no key input for 30 minutes.)

```
0
```

-. Gas density display is flickering during Test mode and this mode is to perform test without gas injection to sensor of gas detector. User can set desired gas density with "▲" or ▼" key and alarm is normally activated with inputted density by user.
-. Press "Func" key over 2 seconds and go into FND/LED/Bar LED Test mode.
-.If pressing "RESET" key, returns to density display mode

```
0103
```

-. This mode is for FND/LED/Bar LED Test and 4 digits number and 8888 are displayed in turns on FND (0.5 second interval)
 4 digits number represents PC address of common unit (SW1) and channel number (SW2).
-.3 Color Bar Graphic LED shows green, orange and red color in turns and each function LED is also flickering (0.5 second interval)
-. Press "Func" to go into next mode.
-.If pressing "RESET" key, returns to density display mode

```
1
```

-. This mode is to check channel unit normally communicated with Common unit and normal channel unit number is displayed in turns (0.5 second interval)
-. If some channel number is missing, this channel units can not communicate with Common unit
-. Press "Func" key and returns to gas density test mode.
-.If pressing "RESET" key, returns to density display mode

6-3-8. Stand-by mode

```
0
```

-. Press "▼(Standby)" key over 2 seconds in gas density display status and go into Stand-by mode.
-. Please make sure to press "▼(Standby)" key on channel unit during stand-by mode, in order to return to density display mode.

-.During Stand-by mode, STD-BY LED is flickering and every function is normal except trouble/alarm relay output of Common unit & Channel unit
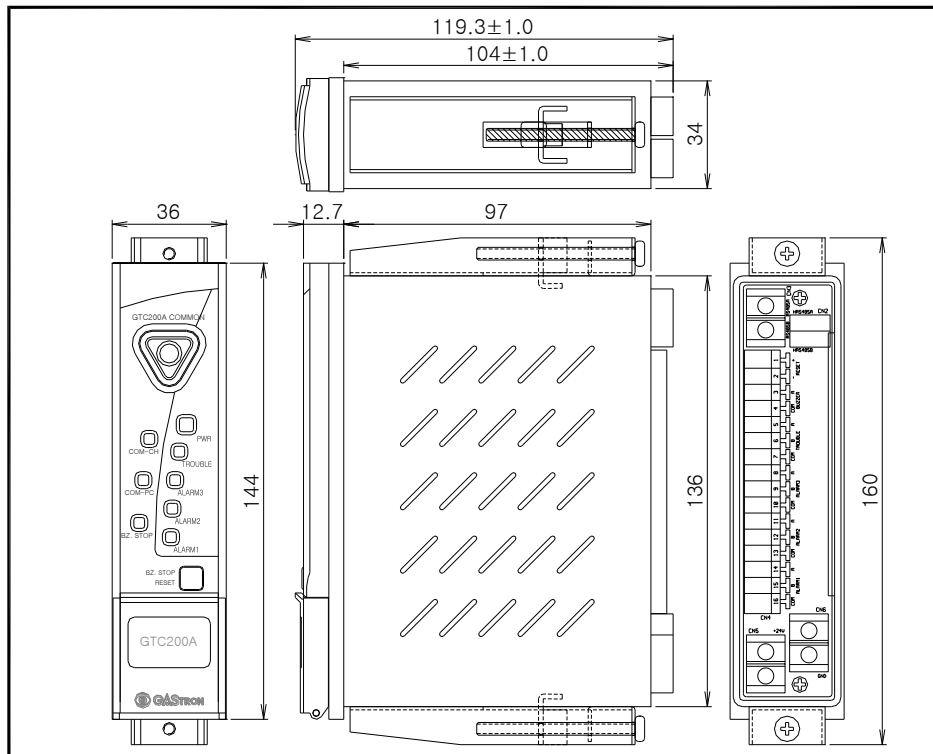-. Press "▼(Standby)" key to return to gas density display mode.

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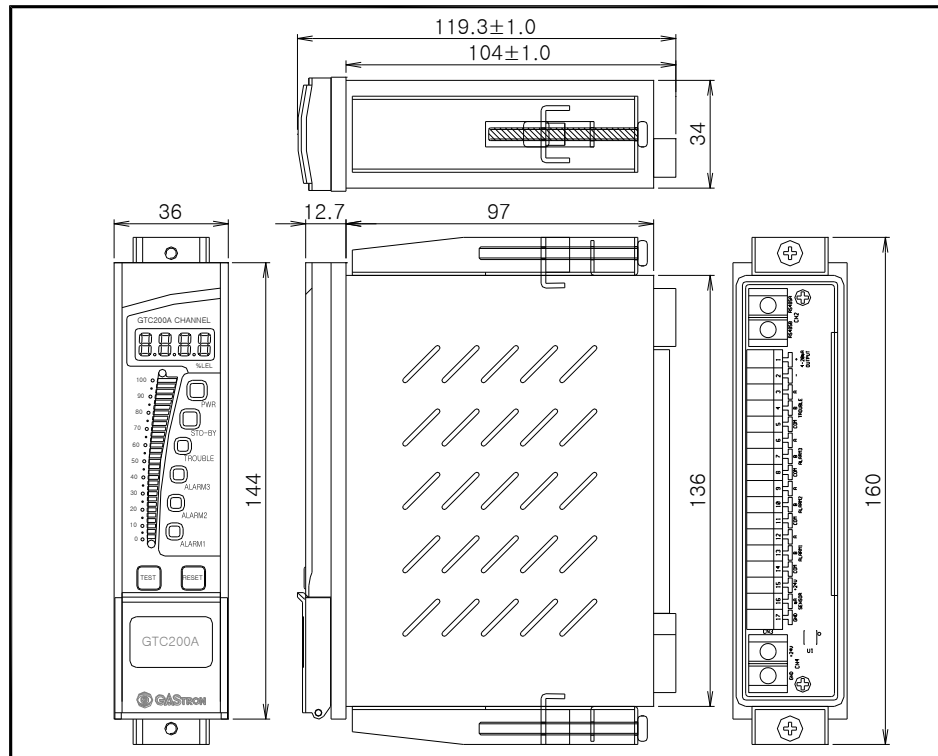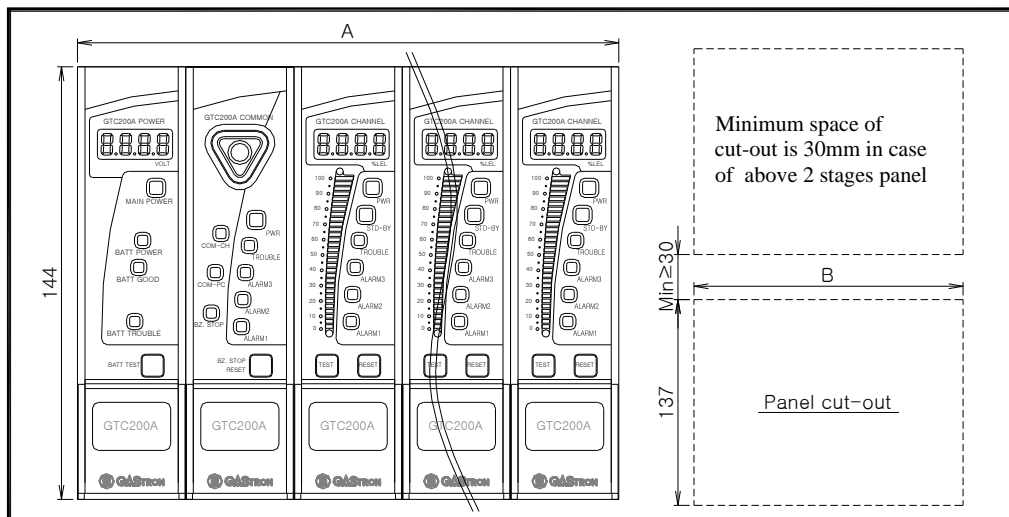# 7. External Drawings and Dimensions

7-1. Dimension for each unit

7-1-1. Power Unit
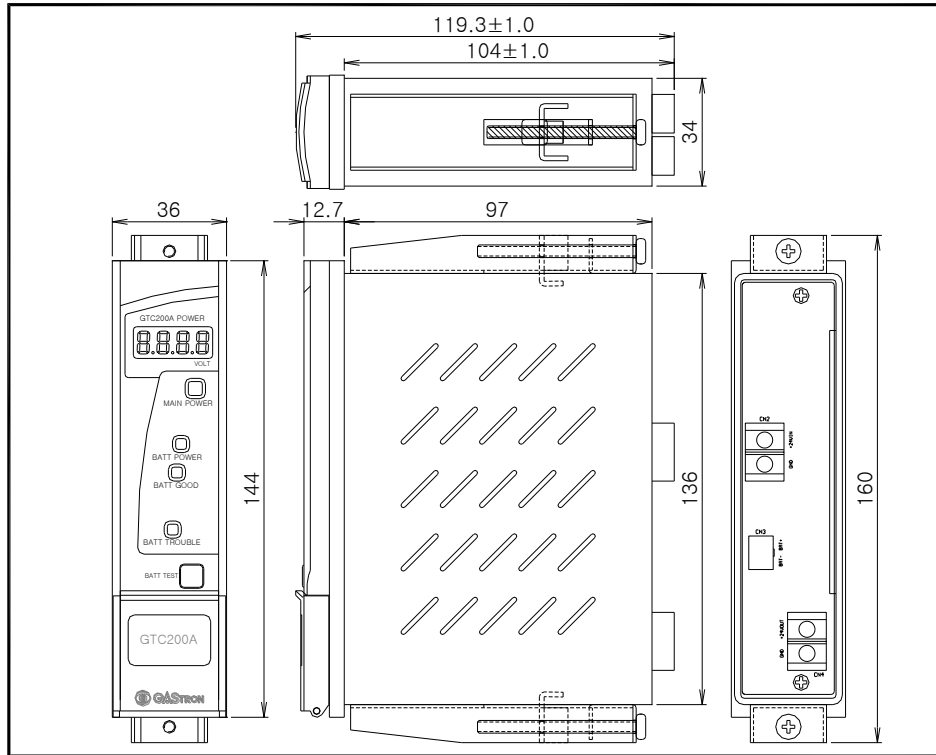
7-1-2. Common Unit

7-1-3. Channel Unit


7-2. Panel Mount Type Dimension and Panel cut-out Size

CHANNEL	A(mm)	B(mm)	CHANNEL	A(mm)	B(mm)
1 Channel	108	107	6 Channel	288	287
2 Channel	144	143	7 Channel	324	323
3 Channel	180	179	8 Channel	360	359
4 Channel	216	215	9 Channel	396	395
5 Channel	252	251	10 Channel	432	431

-. The power unit is option item. If the power unit is used the width of power unit (36mm) shall be subtracted.

Ex) If an user needs 5 channel units without the power the size of A is 216mm (252mm-36mm) and the size of B is 215mm (251mm-36mm).
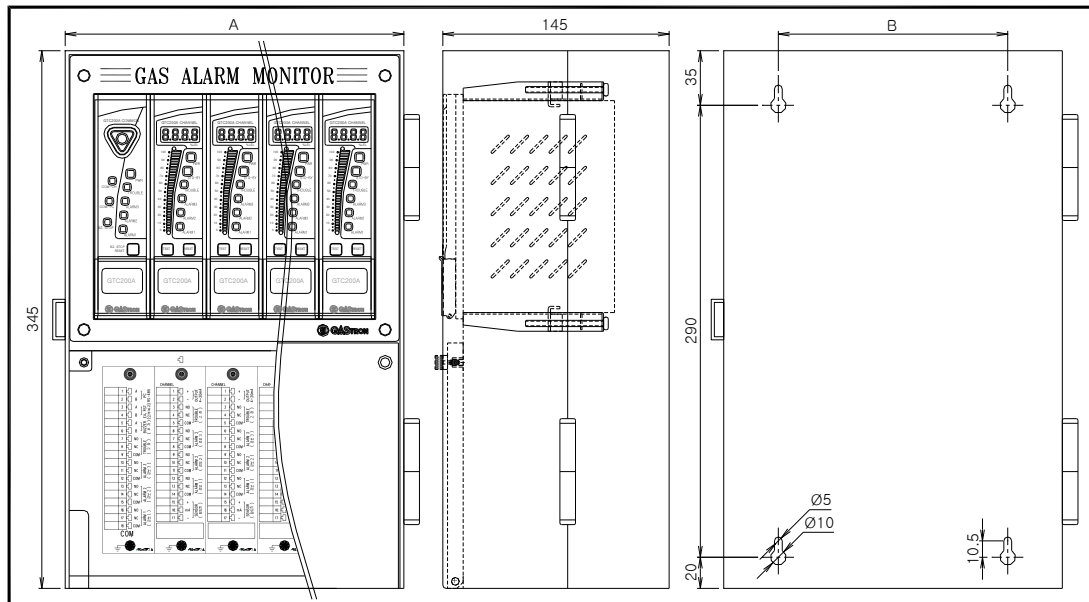
7-3. Wall Mount Type Dimension
7-3-1. The type including the power unit
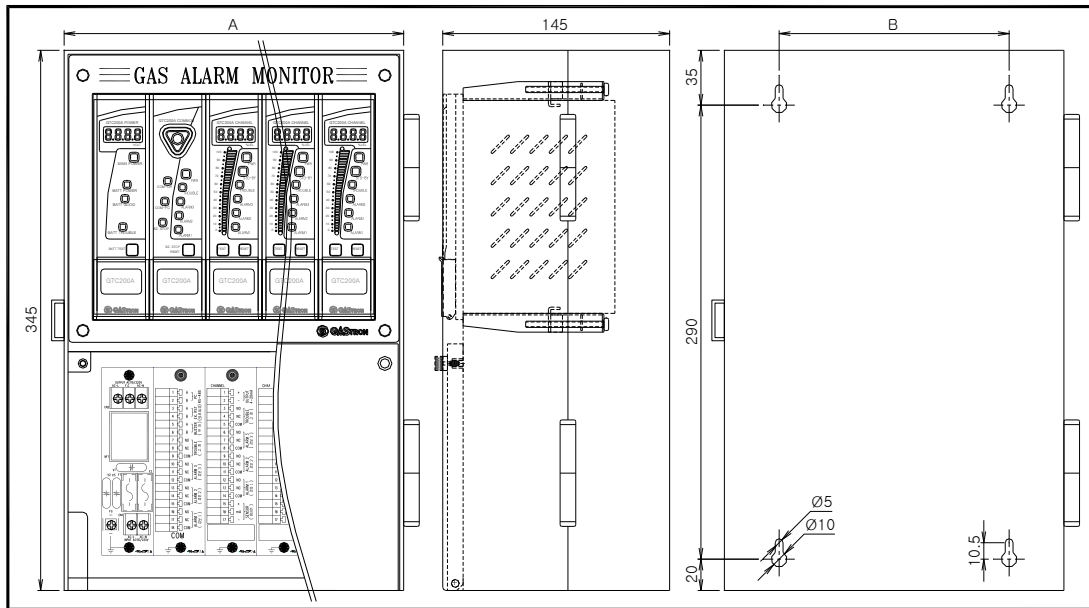
CHANNEL	A(mm)	B(mm)	CHANNEL	A(mm)	B(mm)
3 Channel	217	147	7 Channel	361	291
5 Channel	289	219	9 Channel	433	363
-. Above 4 types are standard model and the others size should be special ordered. .						

7-3-2. The type excluding the power unit

CHANNEL	A(mm)	B(mm)	CHANNEL	A(mm)	B(mm)
4 Channel	217	147	8 Channel	361	291
6 Channel	289	219	10 Channel	433	363
-. Above 4 types are standard model and the others size should be special ordered. .						

29

The products and instruction manual can be revised for improvement performance and easy use without prior notice.

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