GASTRON

GPD-100
Instruction Manual

Revision: 1.4

For proper use, please read this manual carefully prior to

Thank you for purchasing our GASTRON's product.

Gastron is a specialized company in producing gas detector and gas monitoring system. We have been recognized by customers for our best quality products and excellence in easy-to-use design. We are striving to provide the suitable product that fits customer's needs, and continuously put every effort to develop better gas detector to satisfy customer's requirements. From now on, we will be your reliable partner to shed a bright light on your concern about gas detector. Please contact us if you have any question. You can obtain best solution from us with great satisfaction.

This instruction manual describes how to operate the gas detector. It also briefly explains how to repair and maintain the device.   Please keep this manual in safe place after reading carefully. This instruction manual will be of great help when you encounter any trouble or question while you are using the device. (Instruction Manual Rev 1.4 is suitable for more than program version V.1.10. Please refer to Instruction Manual Rev 1.1 up to program version V.1.01.)

 If you have any problem when using our product, contact us to following address:

- Address: 23, Gunpocheomdansaneop 1-ro, Gunpo City, Gyeonggi-do, KOREA
- Tel : 031-490-0800
- Fax : 031-490-0801
- URL : www.gastron.com
- E-mail : info@gastron.com

Note

- · For accurate operation of the gas detector, check and calibrate at least once every 6 months.
  (* KOSHA GUIDE : P-166-2020 / refer to 7 Calibration & maintenance No. 7.1)
- · We recommend that the gas detector should be inspected and calibrated with calibration gas prior to use for accurate operation.
- · Without getting calibrated, the device might be malfunctioned due to sensor aging problem.
- · When it is necessary to disassemble the device, technician with special skills for a gas detector must perform it.
- · For more details about maintenance and calibration of gas detector, contact our technical department via email or visiting our web site.

GASTRON reserves the right to change published specifications and designs without prior notice.

※ KOSHA GUIDE : P-166-2020

→ Calibration should be performed at the cycle recommended by the manufacturer. If there is no specific calibration cycle, it should be carried out quarterly.

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1. Introduction

The GPD-100 is a portable gas detector that has been developed to detect a variety of gases so as to prevent serious accidents caused by unexpected gas leaks in hazardous areas such as industrial plants, gas storage facilities and factories in the process of producing or consuming combustible gases and toxic gases.

The portable gas detector GPD-100 continuously monitors the air for detecting dangerous gas leaks and displays the measured value of gas concentration. It makes a visual signal and an audible alarm when it detects gas leaks.

2. Structure

The body of GPD-100 is made of polycarbonate-ABS housing. A Diaphragm pump is equipped inside the GPD-100. The sampling pump pulls the air containing leaked gas in the device.

The GPD-100 mainly consists of three parts as follows: (1) LED that presents the measured value of gas concentration and shows alerts to the user at front panel, (2) Port that takes in and releases gas, and (3) terminal that enables to connect USB, Micro SD card and DC jack. A sensor is a removable cartridge type, so that it can be easily detached and replaced.

[Figure 1. GPD-100 Overview]

3. Specification

3.1. General Specifications

I T E M S	S P E C I F I C A T I O N	
Measuring Type	Auto Sampling type	
Display Type	LED segment Type	
Measuring Method	• Electrochemical / Cartridge • Catalytic/ Cartridge • semiconductor / Cartridge • Photoionization detector(PID) / Cartridge	
Detectible Gas	Flammable gas, Toxic gas, Oxygen (Note1)	
Measuring Range	000.0 ~ 9999(Note1)	
Accuracy	≤ ±3% / Full Range	
Zero Drift	≤ 2% / Full Range	
Response Time	Target gas response time may vary. Refer to the sensor module datasheet or contact GASTRON for specific sensor data.	
Pump Type	Diaphragm Pump	
Flow Rate	100 ~ 650 ml (Normal 300~500ml / min)	
Gas Sample Line	5m (1/4" Tube)	
Approvals Classification	CE (No. K5004/E12)	
Storage	Micro SD Card (Max. 32GB, file system format: FAT/FAT32)	
Warranty	Main Unit	2Year
	Sensor	1Year

※ Note1. Refer to the "List of detectable gases & vapours" or contact GASTRON for specific gas

3.2. Mechanical Specifications

I T E M S	S P E C I F I C A T I O N
Dimension / mm	208(W) × 95(H) × 100(D) mm
Weight including Sensor	App. 1.2kg
Sample gas vent / inlet	1/4" Teflon Tube
Body material	PC-ABS(polycarbonate-ABS)

3.3. Electrical Specifications (Standard Type)

I T E M S	S P E C I F I C A T I O N	
Battery Type	Lithium-Ion 7.3 V / 5.5Ah	
Charge Time	4 Hours	
Operating Time	Normal Sensor Type	10 Hours
	CEC Sensor Type	5 Hours

Charge Voltage (DC Adaptor Output Voltage)	DC 12V /2A
DC Adaptor Input Voltage	AC100~230V 50/60Hz

3.4. Environmental Specifications

I T E M S		S P E C I F I C A T I O N
Operation Temperature	Main Unit	5 to 40 ℃
	Sensor	Sensor dependant, Refer to the sensor module datasheet or contact GASTRON for specific sensor data.
Storage Temperature	Main Unit	-20 to 50 ℃
	Sensor	Sensor dependant, Refer to the sensor module datasheet or contact GASTRON for specific sensor data.
Operation Humidity	Main Unit	5 to 99% RH (Non-condensing)
	Sensor	Sensor dependant, Refer to the sensor module datasheet or contact GASTRON for specific sensor data.
Pressure Range		90 to 110KPa
Max. air velocity		6m/s

4. Name and Functional Description of Components

4.1. Composing Elements

[Figure 2. GPD-100 composing elements]

4.2. Front Panel Display part

[Figure 3. Front panel display part]

No	Name	Descriptions
1	Calibration icon	Indicating that calibration procedure is being processed.
2	Setting icon	Indicating that value setting operation is being processed.
3	Pump Icon	Pump Operation Status display
4	Test Icon	Indicating that gas detector operates in test mode.
5	Time setting Icon	It turns on when internal time is being set.
6	Log Status Icon	It turns on when log save is being set.
7	DC Adaptor Icon	Indicating that DC adaptor connection status
8	Battery Icon	Indicating that Battery charging status
9	Measurement Unit	Indicating that current measuring unit presented on screen.(PPB, PPM, %VOL, %LEL)
10	Flow Rate	When this icon appears, measured value of flow is indicated as 10 different levels, while in normal measuring state.
11	Communication Icon	This icon is turned on, when USB communication is being used.
12	Lock Icon	Indicating device is in lock mode. Configuration mode is not allowed.
13	Pyrolyzer Icon	Indicating that Pyrolyzer operation status
14	Trouble icon	It turns on when fault is detected
15	Alarm2 icon	Indicating that 2nd alarm is set or detected.
16	Alarm1 icon	Indicating that 1st alarm is set or detected.
17	Zero, Span icon	Indicating that zero or span mode is entered during calibration
18	Gas concentration display	It is used for displaying measured value or message to the user
19	Power LED	This Power LED is turned on when power is successfully supplied.
20	Trouble LED	This Trouble LED is turned on when a device is recognized as malfunctioned
21	Alarm LED	This Alarm1 LED is turned on, when the measured value of gas concentration exceeds the preset value of Alarm1 level
22	Power Key	Power on /off control key
23	RUN / MODE Key	This key is used for changing setting mode or measuring mode.
24	AUTO ZERO Key	Auto Zero calibration key
25	Down Key	It is a key to decrease a setting value in function setting mode.
26	Up Key	It is a key to increase a setting value in function setting mode.
27	RESET key	In function setting mode, Reset Key is used for recovering the device's state back to menu state or standby state.

[Table 1. Front Display part description]

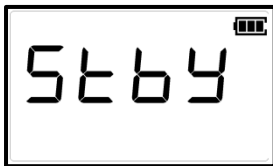# 5. Operation

5.1. Connecting Sampling Probe

• Connect a sampling Probe(1/4"Teflon tube) to a "GAS IN" port

Figure 4. Sampling Port Connection

5.2. Power On

• Press power switch( ) and hold it more than 2 seconds. Then it starts up.

• Power LED turns on and 'LOAd' is displayed (during about 15 seconds) indicating sensor data is being loaded. After 'Walt' is displayed, make sure that 'Stby '(stand by) shows up blinking.

	➢ When you turn on the power switch, version information will show up in LCD like "UX.XX". Then "L0Ad"(Load) message flashes on and off during about 15 seconds. Once warming-up is finished, "Stby"(Stand by) message will come up, which indicates that the device is now ready to measure. If the device detects a fault in device or sensor cartridge, a faulty alarm occurs.

5.3. Gas Measurement Mode

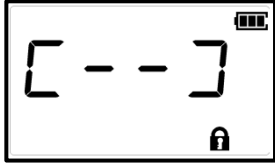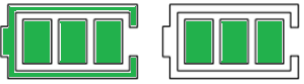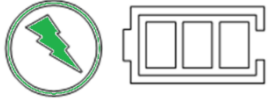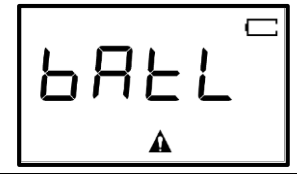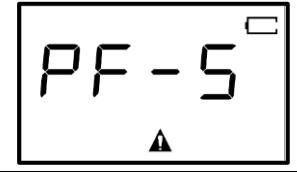|	
	➢ When you press a switch "RUN/MODE", the device will count down from 20 to 1, which is the time duration necessary to allow the sensor to stabilize. When it reaches to 0, the measured value of gas concentration is displayed on LCD.
	Note 1) In the occurrence of fault in sensor cartridge, error message ranging from "E-10" to "E-31" flashes in LCD and also trouble LED turns on. (Please refer to error and warning messages)
	Note 2) In case where gas concentration value is greater than 10% of specified high scale value, "OuEr" message flashes every half a second. **Note 3)** Sensor stabilization time varies depending on the sensor type.
	✓ In case of combustible sensor : 10 seconds ✓ In case of toxic sensor & O2 sensor : 20 seconds

5.4. Mode Configuration

![Stby display]	➢ While the device displays "Stby"(Stand by), press and hold "RUN/MODE" key more than 2 seconds. Then you will enter menu selection mode.
![[--] password display]	➢ Password entering screen shows up. Input password using "⬆"Key or "⬇"Key. If you press "RUN/MODE" key after entering password, then you enter a configuration menu ("ConF") **Note 1)** Password must be entered, "FAIL" is displayed when "RUN/MODE" key is pressed in the initial password ([--]) status. Default password value : [00]
![ConF display]	➢ Select "COnF"(configuration) using "⬆" key or "⬇" key and then press "RUN/MODE" key. You will enter environment configuration mode.

5.5. Power Status

Item	Power Icon display	Description
Full charge	![battery full icons]	Full charge status. Outline of the battery icon keeps blinking. Battery is not charged in this state.
80% charge	![80% battery]	more than 80% of Battery level indicator (The outer line of the battery does not blink)
60% charge	![60% battery]	more than 60% of Battery level indicator (The outer line of the battery does not blink)
40% charge	![40% battery]	more than 40% of Battery level indicator (The outer line of the battery does not blink)
20% charge	![20% battery]	more than 20% of Battery level indicator (The outer line of the battery does not blink)
5% charge	![5% battery icons]	Battery low message shows up in LCD and battery icon keeps blinking.
charging status	![charging icons]	This icon keeps blinking when battery is being charged. When DC adaptor is recognized after it is inserted, this icon turns on.

[Table 2. Power Status description]

5.5.1. Power Status Details

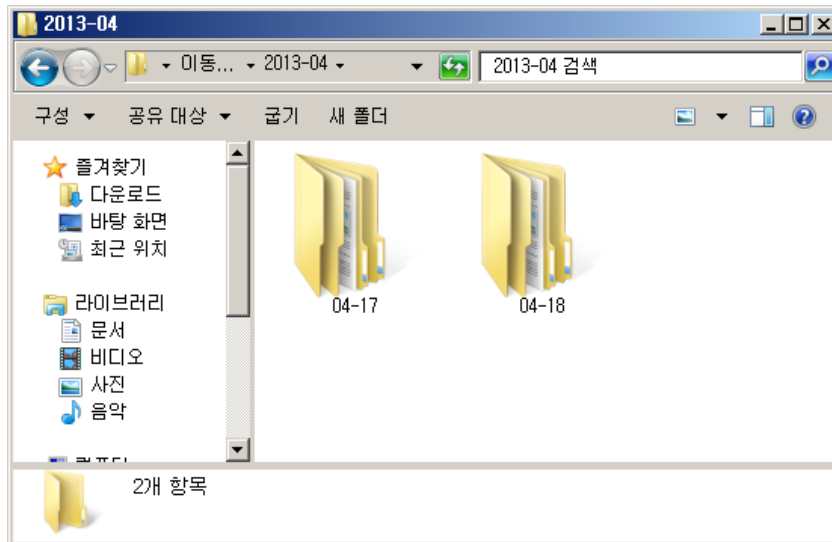|	
bAtL ⚠	➢ If the battery is less than 5%, a warning message "BatL"(Battery Low) will be displayed. In the "BatL" status, it is not possible to enter the gas measurement mode even if the "RUN/MODE" key is pressed.
PF-5 ⚠	➢ If the battery is less than 3%, a warning message "PF-5"(Power-OFF) will be displayed and the detector will be powered off automatically after 5 seconds count.

5.6. How to use a log mode

⚠ If you use the Micro SD card for the first time after purchase, check the Micro SD card recognition in the PC environment and then connect it to the detector.
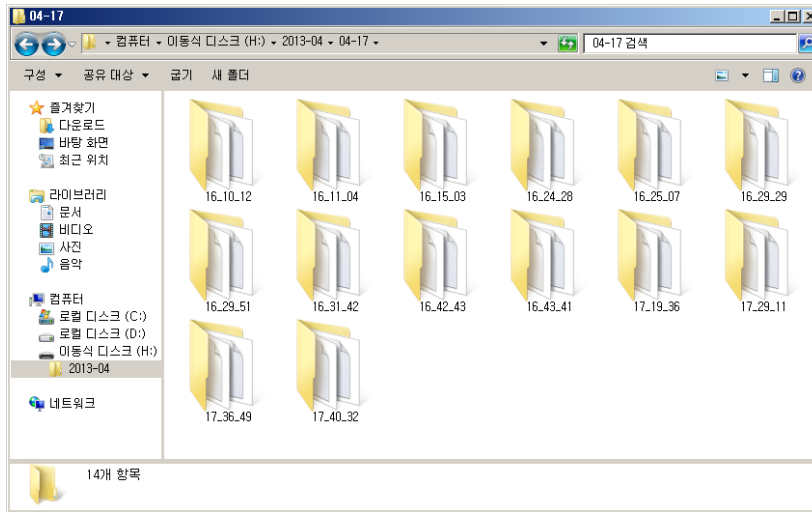
⚠ If the Micro SD card is normally recognized by the PC, the Windows version does not have a problem using this function.

- When you want to read data stored in an external memory after operating the log mode, connect the external memory to PC.
- For the log saved on the Micro SD Card, a folder will be created according to the measured date and time, and a text file is created according to the run status in the created folder.
- You can see the folders named by date when the data has been stored. The date is determined by the date you set in "tImE" mode. (04-17 folder of the figure below, displays the April 17)
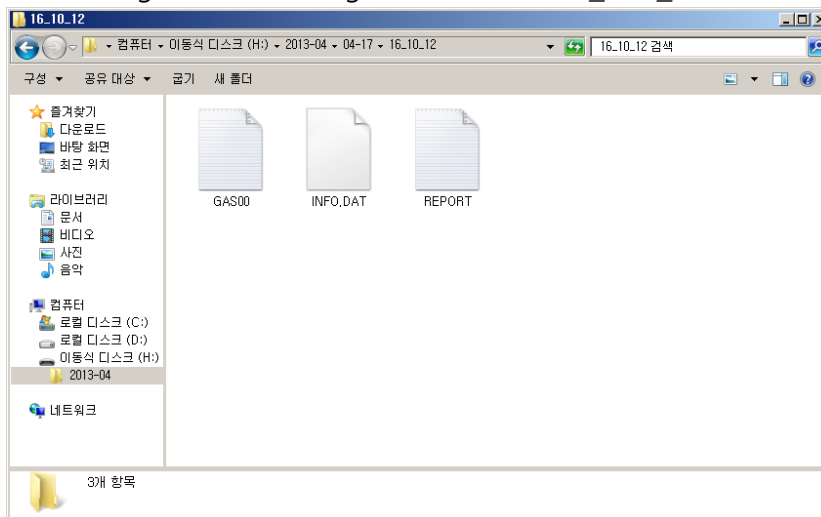

[Figure 5. Date folders stored in SD card]

- Inside the folder named by date, there are folders named by time(hour_min_sec) stored. Each of these folders contains log data regarding measurement record and equipment information. (04-17 folder of the figure below, displays the April 17)

[Figure 6. Time folders generated in date folder]

- Three types of files are generated as log data in the hour_min_sec folder.

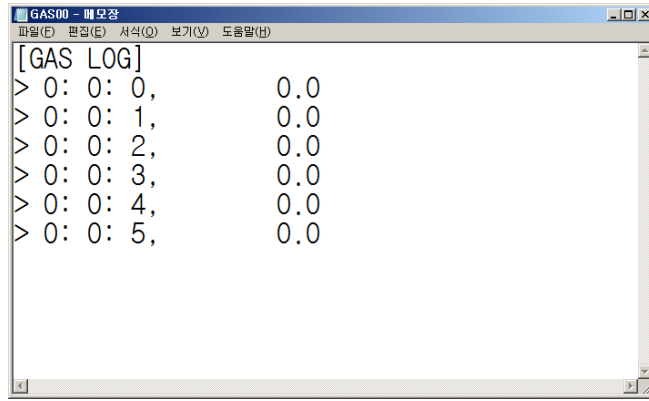[Figure 7. Log data files saved in time folder]

File	Name	Description
Gas Log File	GAS00.TXT	Log about gas measurement records
Report File	REPORT.TXT	Log about System Status and Measurement Status
System File	INFO.DAT	System File

[Table 3. Log File description]

5.6.1. Gas log file

- Gas log files are stored in GAS00.txt name, to open using Notepad or Text editor.
- In the GAS00.TXT file, gas measurement log records are saved in unit of second.
- GAS00.txt file is saved for up to 12 hours, and a new GAS01.txt file is created after 12 hours.
- Up to 100 files are created in the folder, GAS00 → 01 → 02 → ⋯ → 99, the files after GAS99.txt are overwritten with the GAS00.txt file.

- By using notepad, you can see the stored value as shown below figure.
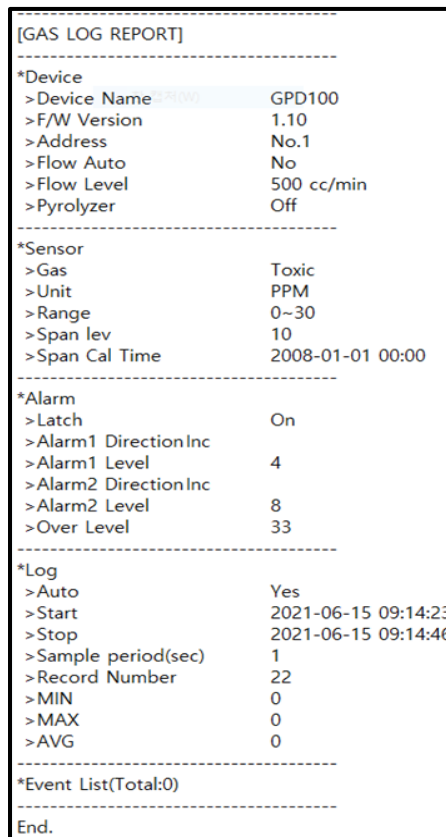

[Figure 8. Gas Log File]

- The contents of the Text log file have the meaning as described below table.

Item	Log Format	
Contents	0:0:0	0.0
Description	Measurement Time(Second unit)	Gas Data

[Table 4. Gas Log description]

5.6.2. Report log file

- Report files are stored in REPROT.txt name, to open using Notepad or Text editor.
- REPORT file contains data as follows: measurement equipment type, equipment setting status, senor and log related information.
- By using notepad, you can see the stored value as shown below figure.

```
---------------------------------------
[GAS LOG REPORT]
---------------------------------------
*Device
>Device Name          GPD100
>F/W Version          1.10
>Address              No.1
>Flow Auto            No
>Flow Level           500 cc/min
>Pyrolyzer            Off
---------------------------------------
*Sensor
>Gas                  Toxic
>Unit                 PPM
>Range                0~30
>Span lev             10
>Span Cal Time        2008-01-01 00:00
---------------------------------------
*Alarm
>Latch                On
>Alarm1 Direction Inc
>Alarm1 Level         4
>Alarm2 Direction Inc
>Alarm2 Level         8
>Over Level           33
---------------------------------------
*Log
>Auto                 Yes
>Start                2021-06-15 09:14:23
>Stop                 2021-06-15 09:14:46
>Sample period(sec)   1
>Record Number        22
>MIN                  0
>MAX                  0
>AVG                  0
---------------------------------------
*Event List(Total:0)
---------------------------------------
End.
```

[Figure 9. Report file status]

Item	sub time	Description	Note
Device	Device Name	Model name of the product	
	F/W Version	Firmware version number	
	Address	Address of the device	
	Flow Auto	Whether or not flow auto function is under operation	
	Flow Level	Setting value of flow level	
	Pyrolyzer	Whether or not CEC is under operation / CEC voltage setting	Displays voltage setting only when CEC is ON
Sensor	Gas	Measurement Gas type	
	Unit	Measurement unit	
	Range	Measurement range	
	Span Lev	Span level	
	Span Cal time	Time when span calibration has been done	
Alarm	Latch	Whether or not alarm latch mode is under operation	
	Alarm1 direction	Output polarity for alarm1	
	Alarm1 Level	Criterion level for alarm1	
	Alarm2 direction	Output polarity for alarm2	
	Alarm2 Level	Criterion level for alarm2	
	Over Level	Over level of measurement	
Log	Auto	Whether or not auto saving is under operation	
	Start	Time when logging starts	
	Stop	Time when logging starts	
	Sample period(sec)	Logging sampling period (seconds)	
	Record Number	The number of measurement records	
	MIN	Minimum value	
	MAX	Maximum value	
	AVG	Average value	
Event List		Total number of events occurred	

[Table 5. Report file items description]

6. System Mode

6.1. Mode configuration

- Menu structure of the device is as following table.

Item	Display	Description	Note
CONFIGURATION MODE	CONF	Configuration of internal function	
PROGRAM MODE	PRGM	Configuration of related gas measurement	
CALIBRATION MODE	CALB	Calibration gas	
ALARM MODE	ALAM	Configuration of Alarm setting	
TIME MODE	TIME	Setting of Internal Time	Factory Mode
SENSOR DATA MODE	S-DT	Check of sensor data	Factory Mode
TEST MODE	TEST	Test Mode	Factory Mode
FLOW MODE	FLOW	Configuration of flow setting	Factory Mode
Log Mode	Log	Configuration of log function	
MAINTENANCE MODE	M-T	Configuration of Maintenance setting	Factory Mode

[Table 6. Mode Configuration]

6.2. Detailed Mode description

- Detailed menu and sub-menu of the device is as following table

Level 1		Level 2		Level 3	
COnF	Configuration	Add	Specify a detector number	[01] ranges between 01 and 64	
		PSWd	Set password	[00] ranges between 00 and 99	
		SUPr	Set the measured gas suppression rate	OFF or 1~50%	
		PyrO	Set if CEC is used or not	ON / OFF	
		Py-U	Indicate CEC voltage	Set value between 0.50V and 1.80V (Display 0.50U ~ 1.80U)	
		U0.00	Program version number		
Prgm	Measurement data	UnIt	Measurement unit	%LEL, %VOL, PPM, PPB	
		dP-S	Specify location of the decimal point	Set 0000, 0.000, 00.00 or 000.0	
		H-SL	Set Full Scale	Set value between 0 and 9999	
CALb	Calibration mode	ZERO	ZERO Calibration Mode	YES/NO	Set ZERO Calibration
				0.0	Measured value display mode
				WAIt	Under zero calibration
				0.0	Measured value after

					completing calibration
		SPAN	SPAN Calibration Mode	YES/NO	Span calibration setting
				50.0	Span calibration value
				50.3	Measured value of standard gas
				WAIt	Under span calibration
				50.0	Measured value after completing calibration
ALAm	Alarm setting	LACH	Alarm occurrence setting	ON/OFF	
		AL-1	Alarm1 value setting	0 ~ 90% of Full scale setting	
		1H/1L	Alarm1 operational direction	H: Upward Alarm L: Downward Alarm	
		AL-2	Alarm2 value setting	0 ~ 100% of Full scale setting	
		2H/2L	Alarm2 operational direction	H: Upward Alarm L: Downward Alarm	
LOg	Saving log	CtrL	Log saving mode	ON /OFF	
		AUto	Set log auto saving mode	ON /OFF	
		mSdC	Check the external memory capacity	Display Remaining capacity and total capacity (displayed in GB units)	

[Table 7. Menu Table]

6.3. Configuration Mode

StbY	➤ While the device displays "Stby"(Stand by), press and hold "RUN/MODE" key more than 2 seconds. Then you will enter menu selection mode.
[- -]	➤ Password entering screen shows up. Input password using "⬆"Key or "⬇"Key. If you press "RUN/MODE" key after entering password, then you enter a configuration menu ("ConF") **Note1)** (Password must be entered, "FAIL" is displayed when "RUN/MODE" key is pressed in the initial password([--]) status.)
SET COnF	➤ Select "COnF"(configuration) using "⬆" key or "⬇" key and then press "RUN/MODE" key. You will enter environment configuration mode.
SET Add	➤ "Add" message will show up. In this state, you can set an address that is used to identify the device when communicating data. ➤ If you press "RUN/MODE" key, then you enter an address setting function. ➤ Address is a mode in which you can set the device's address so as to

C013 (SET)	identify each detector by PC uniquely. Address number(initially [01]) will increase or decrease by pressing " ^ " or " v " key. ➢ When desired address is displayed, press "RUN/MODE" key. Then the address is set to be the number displayed in the screen. After that, the device goes to next item.
PSWd (SET) **C003** (SET) **no** (SET) **C013** (SET)	➢ This is a password mode in which to obtain an authority to change the program of detector. Password increases or decreases by pressing " ^ " or " v " key. ➢ When the desired password is displayed, press the "RUN/MODE" key to enter the password change check mode. ➢ Select No / YES through the " ^ "Key 나 " v "Key to decide whether the password is changed or not, and press "RUN/MODE" key to check the changed password. ➢ If "No" is selected, the existing password will be retained, and if "YES" is selected, the password will be changed to the desired password. ➢ After checking the changed password, press the "RUN/MODE" key to enter the next item, "SUPr" mode. ➢ If the "RUN/MODE" key is pressed when the password value is the same as before, it enters the "SUPr" mode without checking the password.
SUPr (SET) **OFF** (SET)	➢ This is a suppression mode("SUPr") in which you can set suppression percentage of gas concentration that is supposed to be presented as '0'. The percentage number increases or decreases whenever " ^ " key or " v " key is pressed. (Possible to set OFF or 1~50, 1% ~ 50% of High scale) ➢ When desired number is displayed, press "RUN/MODE" key. Then a suppression percentage is set to be the number displayed. After that, the device goes to next item.
PYr0 (SET) **OFF** (SET)	➢ This is a Pyrolyzer(CEC) mode in which you can set whether Pyrolyzer is applied or not. When you press " ^ " key or " v " key, it will switch between ON and OFF alternatively. ➢ When desired option is displayed, press "RUN/MODE" key. Then Pyrolyzer mode is specified. After that, the device goes to next item. ➢ If Pyrolyzer is On, it automatically changes to "F-LE"(Flow Level) 250 in "FLOW" mode and if Pyrolyzer is Off, it automatically changes to "F-LE"(Flow Level) 500 in "FLOW" mode.
PY-U (SET)	➢ This is a "Py-V" mode in which you can set the voltage level used by Pyrolyzer. ➢ When you press "RUN/MODE" key, you will enter voltage setting function. ➢ Pyrolyzer voltage is a mode in which you can set voltage value used by pyrolyzer of detector. When you press " ^ " key or " v " key, the voltage level(1.30V) will increase or decrease.

SET 1.50U	➢ Voltage can be set between 0.5V and 1.8V. When desired value is displayed, press "RUN/MODE" key. Then the voltage is set to the value displayed. After that, the device goes to next item.
SET U1.10	➢ This is a mode in which program version is viewed. ➢ If you press "RUN/MODE" key, you will enter a menu mode.
SET COnF	

6.4. Program setting mode

SET Pr9m	➢ While the screen displays "Stby", press "RUN/MODE" key and hold it more than 2 seconds. Then you will enter menu selection mode. ➢ Password entering screen shows up. Input password using "🔼"Key or "🔽"Key. If you press "RUN/MODE" key after entering password, then you enter a configuration menu ("ConF") ➢ Select "Prgm"(programmable) using "🔼" key or "🔽" key. If you press "RUN/MODE" key while "Prgm" is being displayed, then you will enter program setting mode.
SET Un1t **SET** 3.00 PPM	➢ This is a mode in which gas concentration measurement unit is set. When you press "🔼" or "🔽" key, unit icon will be changed at the right side of screen. (%LEL, %VOL, PPB, PPM) ➢ When desired icon is displayed, press "RUN/MODE" Key. Then measurement unit is set as you select. After that, the device goes to next item.
SET dP-S 0300 0.300 03.00 030.0	➢ This is a "dP-S"(decimal point) mode in which you can set the decimal point position for gas concentration value. ➢ Press "RUN/MODE" key while "dP-S" is being displayed, then you will enter decimal point position setting function. ➢ Decimal point is necessary to change depending on measurement range. Decimal point position can be adjusted in four ways as shown in a left figure by pressing "🔼" key or "🔽" key. ➢ When desired decimal point is displayed, press "RUN/MODE" Key. Then decimal point position is set as desired. After that, the device goes to next item.

SET H-SL **SET** 3.00 PPM	➢ This is a function to set maximum gas concentration value which is to be displayed, denoted as "H-SL"(High scale setting). ➢ When you press "RUN/MODE" key, you can enter high scale setting function. ➢ High scale value has been specified within the range in compliance with domestic standard and regulations when the product is released. note 1) High scale range can be changed according to customer's request. ➢ High scale value can be adjusted depending on measurement range. When you press "⌃" key or "⌄" key, scale value will increase or decrease. ➢ When desired value is displayed, press "RUN/MODE" key. Then high scale value is set to be the desired value. **Note 1)** When changing High scale, the following values are automatically changed. Span calibration gas concentration value is changed to 50% of High scale, Alarm1 value is changed to 20% of High scale, Alarm2 is changed to 40% of High scale

6.5. Zero Calibration

6.5.1. Auto Zero Calibration

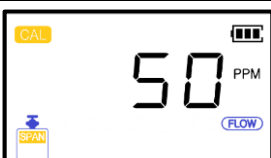|	
CAL AUTO (FLOW) ZERO CAL 2ErO (FLOW) ZERO	➢ Alternative way to conduct zero calibration is to start calibration in measurement state. ➢ Insert clean air or 100% nitrogen through gas in port using calibration tool. ➢ When you press and hold "AUTO ZERO" key in measurement mode, AUTO ZERO calibration will start up.
CAL WAIt (FLOW) ZERO CAL 9OOd (FLOW) ZERO 0.00 PPM (FLOW)	➢ While zero calibration is being performed automatically, "WAIt" message will display on LCD. If it completes successfully, "gOOd" (Good) will appear on LCD. ➢ If Zero Calibration fails, "FAIL" will show up during 2 seconds. Then the device will transit to the calibration mode.

6.5.2. Manual Zero Calibration

SET CALb	➢ While the screen displays "Stby", press "RUN/MODE" key and hold it more than 2 seconds. Then you will enter menu selection mode. ➢ Password entering screen shows up. Input password using "⬢" or "⬢" key. If you press "RUN/MODE" key after entering password, then you will go to a configuration menu ("ConF") ➢ Select "CALb"(Calibration) by using "⬢" or "⬢"Key and press "RUN/MODE" key to switch to the Zero / Span Calibration standby screen.
CAL CALb ZERO	➢ While "ZERO" icon at the left corner of the bottom is blinking, press "RUN/MODE" key. Then you will enter Zero Calibration mode.
CAL nO (FLOW) ZERO	➢ You can set No/YES using "⬢" key or "⬢" key. ➢ If you select YES, you will enter zero(0) calibration mode. ➢ The screen to check the measured gas concentration value is displayed. ➢ Insert clean air or 100% nitrogen through gas in port using calibration tool. ➢ Once the measured value is stabilized, press "RUN/MODE" key. Then zero

	calibration will be conducted automatically with indicating "WAIt"(wait) message in LCD. If calibration is successfully finished, "g00d" (Good) will show up. ➢ If Zero Calibration fails, "FAIL" will appear and remain for 2 seconds. Then it will return to the display where measured concentration value displays. ➢ If you press "RUN/MODE" key or "RESET" key on the current measurement concentration value screen, the "SPAN" icon blinks and the gas calibration (Span Calibration) standby screen is displayed.

6.6. Span Calibration

	➢ If you press "RUN/MODE" key in "CALb" mode, you will enter calibration mode. ➢ When "ZERO" icon is blinking at the left corner of bottom, change it to "SPAN" icon by " ⌃ " key or " ⌄ " key. While "SPAN" is blinking, press "RUN/MODE" key. You will enter the span calibration mode.
	➢ Select No/Yes by " ⌃ " key or " ⌄ " key. It indicates whether you do span calibration or not.
	➢ If YES is selected, the number blinks. While the number blinks, you can set standard gas value by " ⌃ " key or " ⌄ " key. ➢ Span calibration gas concentration value can be set from 10% of the minimum high scale to the maximum high scale. ➢ Insert standard gas through gas in port with calibration tool. Once the measured value is stabilized after inserting gas, press "RUN/MODE" key. Then span calibration will be conducted automatically. If calibration is successfully completed, "gOOd"(Good) will appear on LCD. Then it transits to calibration mode. ➢ If it fails, "FAIL" will appear on LCD and then it transits to calibration concentration display mode. ➢ If you press "RUN/MODE" key or "RESET" key on the current measurement concentration value screen, the "CALb"(Calibration) selection screen is displayed.

CAL **50** PPM **FLOW**	

6.7. Alarm mode

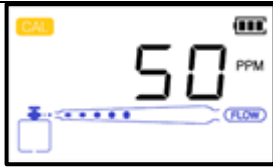|	
SET **ALAm**	➢ While the screen displays "Stby", press "RUN/MODE" key and hold it more than 2 seconds. Then you will enter menu selection mode. ➢ Password entering screen shows up. Input password using " ⌃ " key or " ⌄ " key. If you press "RUN/MODE" key after entering password, then you will go to a configuration menu("ConF"). ➢ Select "ALAm"(alarm) by " ⌃ "Key or " ⌄ "Key. If you press "RUN/MODE" key, then you will go to alarm setting mode.
SET **LACH** AL1 AL2	➢ This is a mode in which you can set alarm latch type. If you press "RUN/MODE" key, then you will enter alarm latch type setting mode.
SET **oFF** AL1 AL2 **SET** **on** AL1 AL2	➢ There are two modes in alarm latch type; "on" and "0FF". "on" and "0FF" will be alternatively switched when pressing " ⌃ " key or " ⌄ " key. ➢ In OFF mode, alarm will reset automatically. In on mode, the user needs to reset alarm by pressing "Reset Key" explicitly.
SET **AL-1** AL1 **SET** **1.00** PPM AL1	➢ This is a mode in which alarm1 value is set. This mode is indicated by presenting "AL-1" in the screen. ➢ This is a function that allows the user to change alarm1 value. Maximum value can be 90% of high scale. When pressing " ⌃ " key or " ⌄ " key, the alarm1 value will increase or decrease. ➢ When desired value is displayed, press "RUN/MODE" Key. Then alarm1 is set to the value. After that, it goes to next item. ➢ Alarm level has been set within the range in compliance with domestic standard, when the product is released.
SET **1H** AL1	➢ This is a mode in which you can set an operational direction for alarm1. When pressing " ⌃ " key or " ⌄ " key, "1H" and "1L" will appear alternatively. ➢ In "1H" mode, alarm will operate when measured value equals to or is higher than alarm1 setting value. In "1L" mode, alarm will operate when measured value equals to or is lower than alarm1 value. ➢ When desired mode is displayed, press "RUN/MODE" key. Then mode is set

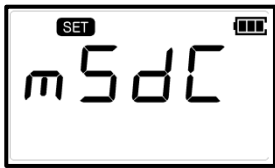|	
SET 🔋 **IL** AL1	to the value. After that, it goes to next item.
SET 🔋 **AL-2** AL2 SET 🔋 **2.00** PPM AL2	➢ This is a mode in which alarm2 value is set. This mode is indicated by presenting "AL-2" in the screen. ➢ This is a function that allows the user to change alarm2 value. Maximum value is 90% of high scale. When pressing "⬆" key or "⬇" key, the alarm2 value will increase or decrease. ➢ When desired value is displayed, press "RUN/MODE" Key. Then alarm2 value is set to the value. After that, it goes to next item. ➢ Alarm level has been set within the range in compliance with domestic standard, when the product is released.
SET 🔋 **2H** AL2 SET 🔋 **2L** AL2	➢ This is a mode in which you can set an operational direction for alarm2. When pressing "⬆" key or "⬇" key, "2H" and "2L" will appear alternatively. ➢ In "2H" mode, alarm will operate when measured value equals to or is higher than alarm2 setting value. In "2L" mode, alarm will operate when measured value equals to or is lower than alarm2 value. ➢ When desired mode is displayed, press "RUN/MODE" key. Then the mode is set to the value. After that, it goes to next item.

6.8. Log Save Mode

6.8.1. Log Save Mode Setting

⚠️ If you use the Micro SD card for the first time after purchase, check the Micro SD card recognition in the PC environment and then connect it to the detector.

SET 🔋 **LOG**	➢ While the screen displays "Stby", press "RUN/MODE" key and hold it more than 2 seconds. Then you will enter menu selection mode. ➢ Password entering screen shows up. Input password using "⬆" key or "⬇" key. If you press "RUN/MODE" key after entering password, then you will go to a configuration menu("ConF"). ➢ After selecting "LOg"(LOG) by "⬆" key or "⬇" key, press "RUN/MODE" key. Then you will enter the log save mode.
SET 🔋 **CtrL** SET 🔋 **On**	➢ In "CtrL" mode, you can set the log save mode ON/OFF by "⬆" or "⬇" key after pressing "RUN/MODE" Key. ➢ By pressing "RUN/MODE" Key when On is displayed, it enters the log auto save setting mode and the log save mode will initiate **Note 1)** Log data begins to be saved upon expiration of Wait time after pressing "RUN/MODE" key in "Stby" state.

AUtO **YES**	- In "AUtO"(Auto) mode, log will be recorded/saved automatically. - After selecting YES / NO, press the "RUN/MODE" key to set the automatic / manual mode and enter the memory capacity check mode. (YES : Auto mode / NO : Manual mode) - In auto mode, measured values (every 1 second) and detector information (once at the start of save and once at the end of save) are automatically saved in external memory. - In manual mode, press "⬆"Key and "RESET" key at the same time to start saving the log and press "⬇"Key and "RESET" key at the same time to stop saving the log
mSdC	It indicates the type of external memory. When you press "RUN/MODE" Key in this case, it transits to a next mode.
1.799 **1.909**	It presents the currently available capacity of external memory. When pressing "RUN/MODE" key, you can see total capacity of the memory.

6.8.2. Log Save Mode Operation

Stby **10:23**	If the log save mode is set to ON, "Stby"(standby) and the set time are displayed alternately in the standby state. The set time is the same as the set time in "tImE" mode.
Stby	"Log Status Icon" is activated by inserting SD card in "Stby" state. - If the "Log Status Icon" blinks while saving the log in Run(gas measurement) mode, it indicates that the log is being saved normally. (If the "Log Status Icon" does not blink, it means that the log is not being saved.) - Log save operates during normal gas measurement after the sensor

stabilization.
➢ When automatic log save mode is set, log save is automatically started after sensor stabilization when entering Run mode from "Stby" status and log save is automatically ended when exiting "Stby" state from Run mode.

- Note 1) In case where recording/saving mode is ON, log data will be saved only when SD card is plugged in.
- Note 2) 2, 4, 8, 16, 32GB SD cards can be recognized. "W-05" Error message is displayed when inserting an SD card over 32GB, the log cannot be saved.
- Note 3) Log file is not created when a Warning code related to SD card occurs.
- Note 4) Log stop time in INFO.DAT file and REPORT.TXT file is not saved when SD card is forcedly removed during log save.
- GPD-100 has only data saving function which is saving logs to SD card. It is not able to read data through GPD-100. (It is not supported data reading function.)

7. Troubleshooting

7.1. Fault Code

Fault	Description & Condition	Possible cause
E-10	Sensor cartridge is not loaded to main body or is not qualified.	1) Sensor Cartridge connection fail. 2) Sensor Cartridge Unit fault.
E-11	Communication between sensor cartridge and main body is broken	1) Sensor Cartridge Unit Fault. 2) Main Unit Fault.
E-12	No sensor is included in sensor cartridge.	1) Sensor Cartridge Unit Fault.
E-13	EEPROM in sensor PCB is malfunctioned.	1) EEPROM Fault of Sensor Cartridge Unit.
E-20	Flow sensor is not working properly	Flow Sensor fault of main unit.
E-21	Flow of the flow sensor is too low	Flow rate is measured at 10% or less.
E-22	Flow of the flow sensor is too high	Flow rate is measured at 200% or over.
E-30	The current of Pyrolyzer is measured below the threshold.	1) CEC connection fault 2) Heater fault of CEC
E-31	Internal EEPROM is not recognized	EEPROM Fault of Main Unit

[Table 8. Fault Code]

7.1.1. Fault Alarm Clear

- In case of E-10, E-11, E-12, E-13 fault, the fault alarm is automatically canceled when the normal sensor cartridge is inserted.
- In case of E-20, E-21, E-22, E-30 fault, the fault alarm is cleared through recheck process as follows.

	➢ In the gas measurement mode, when a fault("E-20", "E-21", "E-22", "E-30") occurs due to the pump and CEC, press the "RESET" key once to turn off the buzzer alarm. ➢ "Reset" key is pressed once more after the buzzer alarm is turned off, the pump and CEC are operated, and the current fault state is rechecked and entered into the next mode according to the result of the recheck. **Note 1)** In case of other fault alarms ("E-20", "E-21", "E-22", "E-30"), press the "RESET" key to turn off the buzzer alarm only. ➢ During fault recheck, fault code is displayed, trouble LED is ON, and the fault icon will be blinking.
	➢ If the detector pump and CEC fault returns to normal state, enter "Stby"(Standby) after display "good".
	➢ If the detector pump and CEC remain in a bad state, the fault alarm is maintained after display "FAIL"

7.2. Warning Code

Warning	Description & Condition	Possible cause
W-00	Time is not specified	Time setting fault of main unit
W-01	Reserved message	
W-02	Reserved message	
W-03	Battery voltage measured below 5 volts	1) Battery connection fail 2) Battery fully discharged
W-04	In case of initialization Error of external SD	1) SD card insertion fail

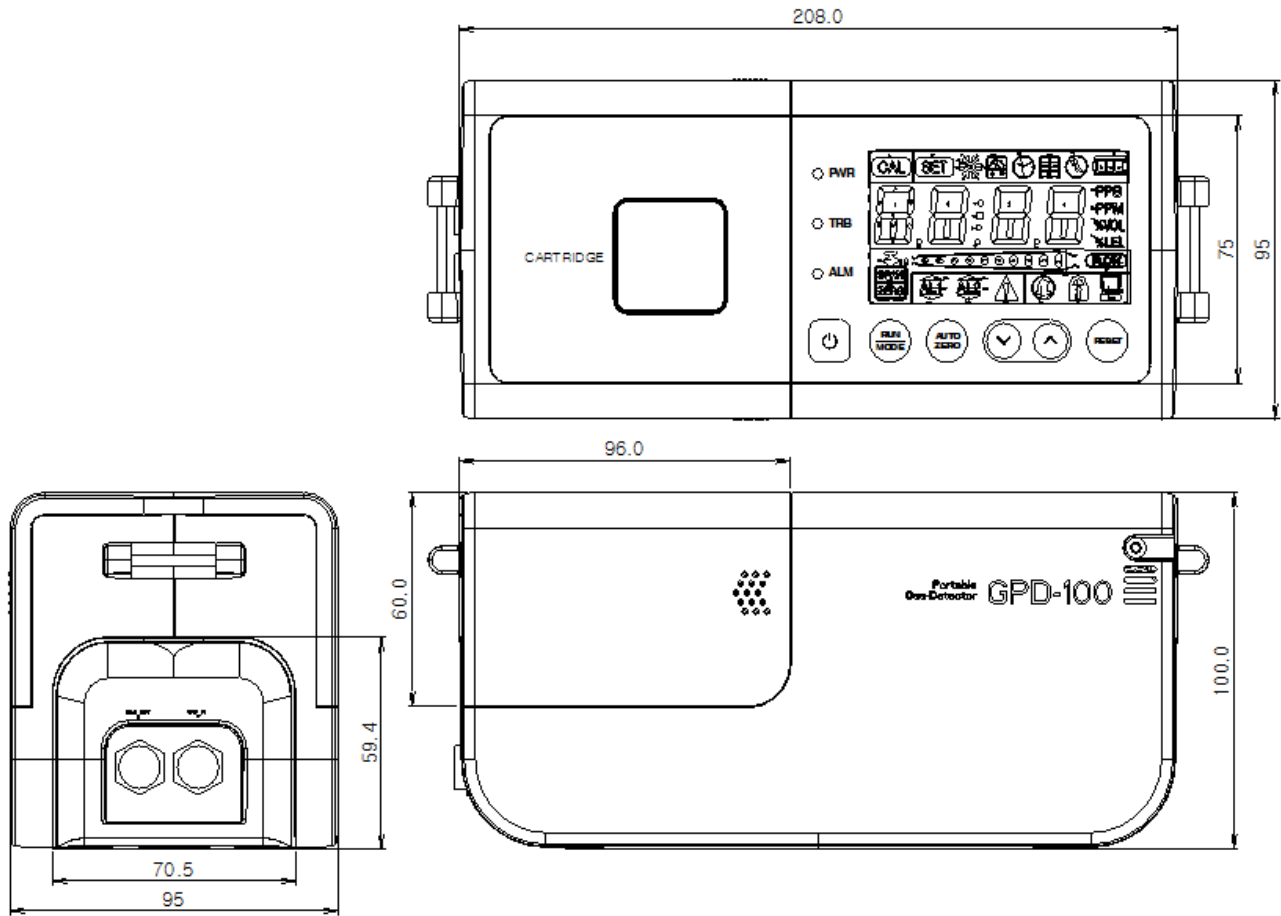|	memory card	2) Temporary F/W perform error
W-05	In case of external SD memory card format error	1) SD card insertion fail 2) Insert SD card other than FAT12, 16, 32 3) Temporary F/W perform error
W-06	In case of external SD memory card is not inserted after setting the log save mode ON	When SD card is not inserted
W-07	In case of external SD memory card remaining capacity is less than 10MB	Insufficient SD card capacity

[Table 9. Warning Code]

7.3. Recovery List

No.	Possible cause	Corrective action
1	Sensor Cartridge connection fail	1) Check Sensor Cartridge connection 2) Sensor Cartridge must be returned to the factory or authorized service center for repair.
2	Sensor Cartridge Unit fault.	Sensor Cartridge must be returned to the factory or authorized service center for repair.
3	Gas Sensor Fault	Replacement of gas sensors
4	EEPROM Fault of Sensor Cartridge Unit.	1) After EEPROM format of sensor cartridge, Re-setting and re-calibration. 2) If the same fault occurs, Sensor Cartridge must be returned to the factory or authorized service center for repair.
5	Flow Sensor fault of Main unit.	Main unit must be returned to the factory or authorized service center for repair.
6	Flow rate was measured at 10% or less	1) check GAS IN, GAS OUT flow status 2) If the same fault occurs, Main unit must be returned to the factory or authorized service center for repair.
7	Flow rate was measured at 200% or over.	Main unit must be returned to the factory or authorized service center for repair.
8	CEC connection fault	1) Check CEC connection status 2) If the same fault occurs, CEC unit must be returned to the factory or authorized service center for repair.
9	Heater fault of CEC	CEC unit must be returned to the factory or authorized service center for repair.

10	EEPROM Fault of Main unit.	1) After EEPROM format of main unit, Re-setting and re-calibration. 2) If the same fault occurs, Main unit must be returned to the factory or authorized service center for repair.
11	CEC fault	CEC unit must be returned to the factory or authorized service center for repair.
12	Main unit fault	Main unit must be returned to the factory or authorized service center for repair.
13	Time setting status error	1) Time resetting of main unit 2) Replacement of Backup Battery 3) If the same fault occurs, Main unit must be returned to the factory or authorized service center for repair.
14	Calibration period is expired	1) Sensor re-calibration. 2) Replacement of gas sensors
15	Sensor manufacturing date is not registered	Sensor re-calibration
16	Battery Fault	1) Check the battery connection 2) Replacement of battery

[Table 10. Recovery List]

8. Appearance and Dimensions

[Figure 10. GPD-100 Dimension]

9. Revision History

Version	Contents	Date
Rev0.0	* Initial version of the manual	2011.12.31
Rev0.1	* modify GPD-100 image in page 1 * add Battery status * add Flow calibration method * Battery Spec 4.3A -> 4.4A	2011.12.21
Rev1.0	Factory Mode Manual Separation	2016.09.23
Rev1.1	Added description regarding data saving function	2019.05.23
Rev1.2	* Modify warning list * Modify fault list * Add Fault alarm clear function * Change the capacity display and unit of log save mode * Change the pyrolyzer voltage setting range * Add the check password change function * Change password entry function in the initial password([--]) state * Add automatic flow level change function according to pyrolyzer ON/OFF * Add "BatL", "PF-5" screen display when battery is low * Change the SD card recognition range * Modify LCD screen in CALB mode * Modify log mode manual	2021.09.29
Rev1.3	* Change "Flow Rate" specification * Change "Operation Temperature for main unit" specification * Modify flow rate description of fault code * Modify the "Recovery list" table	2022.11.18
Rev1.4	* Modify Warning List 1, 2 * Add the SD card related warning text (clause 5.6, 6.8)	2023.07.04