User Manual

MODEL : RSM-60

CO/CO2 Gas Analyzer

Version : 1.0

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RSM-60
CO/CO2 Gas Analyzer

1. Important Information

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1. Safety

The following guidlines and instruction described in this manual should to the described in RSM-60 instrument and all user should be understood essentially.

1.1 Purpose

■ Prevention of personal injury
■ Prevention of damage to measuring system or devices
■ To ensure the availability and correct operation of the measuring system

1.2 Safety symbol

General instruction in this chapter, which apply to the entire document and all procedures for handling the measuring system, certain sections within this document provide further safety instruction specific to the task at hand
These are usually marked as below symbols.

Warning
Potential danger to personal injury from electrical equipment

Warning
Potential danger to personal injury from mechanical effects, gas leakage, chemical products or other reasons

Warning
Potential danger to system environment, measuring system, and other equipment or functional device

Warnings that refer to various potential sources of damage factors should be marked with a warning symbol.

1.3 Permissible User

All design, mounting, installation, commissioning, and maintenance should be carried out by an appropriately trained person only.
The following information should be checked by technical experts.

■ All safety relevant work should be carried out by qualified person only.
These persons should be qualified by virtue of their expertise (training, education and experience) and understanding of the relevant standards, specifications, accident prevention rules and system specifications. They also should be able to identify and avoid potential risks in good time.
■ The documentation supplied with the system and the relevant technical documentation is available to these persons for all work carried out and these persons adhere to the instructions in this documentation in order to prevent danger or damage.

1.4 Proper Handling

To ensure that the relevant safety precautions are observed and the DSM series operates correctly, it is imperative that :
■ The system be used in accordance with the technical data and specifications regarding usage, assemble, connection and
■ User act in accordance with the local, system-specific conditions and with due consideration paid to the operating dangers and specifications
■ All of the measures required to maintain the device, for example, transportation and storage, as well as maintenance and inspection requirement, are provided.

1.5 Safety Precautions

1.5.1 Basical precautions to prevent to damage and personal injury

Incorrect using of measuring instrument can lead to personal injury or damage to the device.
Therefore, In order to prevent such damage
■ Always follow safety instructions and safety precautions.
■ Make sure that first aid equipment is at the ready, and that a doctor can be called immediately, if necessary.
If the DSM is used as a sensor in entire operating system, the operator must ensure that any failure or malfunction on the DSM can not lead to operating conditions that cause damage or lead to other hazardous operating conditions

1.5.2 Safety precautions for electrical devices

Since the DSM system components are designed to be use in industrial power facilities, the relevant standards and rules must be observed at all times,
These include the following rules:
■ Make sure that electric power is off when it comes to electrical connections
■ Replace any shock protection measures before reconnecting the electric power

1.5.3 Trobleshooting

The operator must be ensure that

■ The maintenance personnel should be always on the alert.

■ The maintenance personnel is qualified to respond to malfunction on the DSM and associated system malfunctions correctly.

■ The proper tools should be available at all times.

■ All malfunction should be analyzed by qualified personnel, faults corrected and the system operation should be optimized to prevent the potential similar operation error in the future

2. Operating Information

2.1 Caution

The following guidlines and instruction described in this manual should to the described in RSM-60 instrument and all user should be understood essentially.

2.2 Products demage

■ User shall be ensure this guildline

■ RSM-60 sensor module do not designed to liquid spiling detecting, thus ensure of non-spiling of liquid.

■ Corpuscular gas can be contaminatioed of optical device

■ Ensure that prevent of sensor superheating

■ Shall not be use in high humidity and wet place

2.3 Personnel Injury

■ All safety relevant work such as gas sensor module should be carried out by qualified person only. Unpermissible user`s gas handling can be leads to cause of death.

■ Ensure that do not use this analyzer for safety or emergency control device

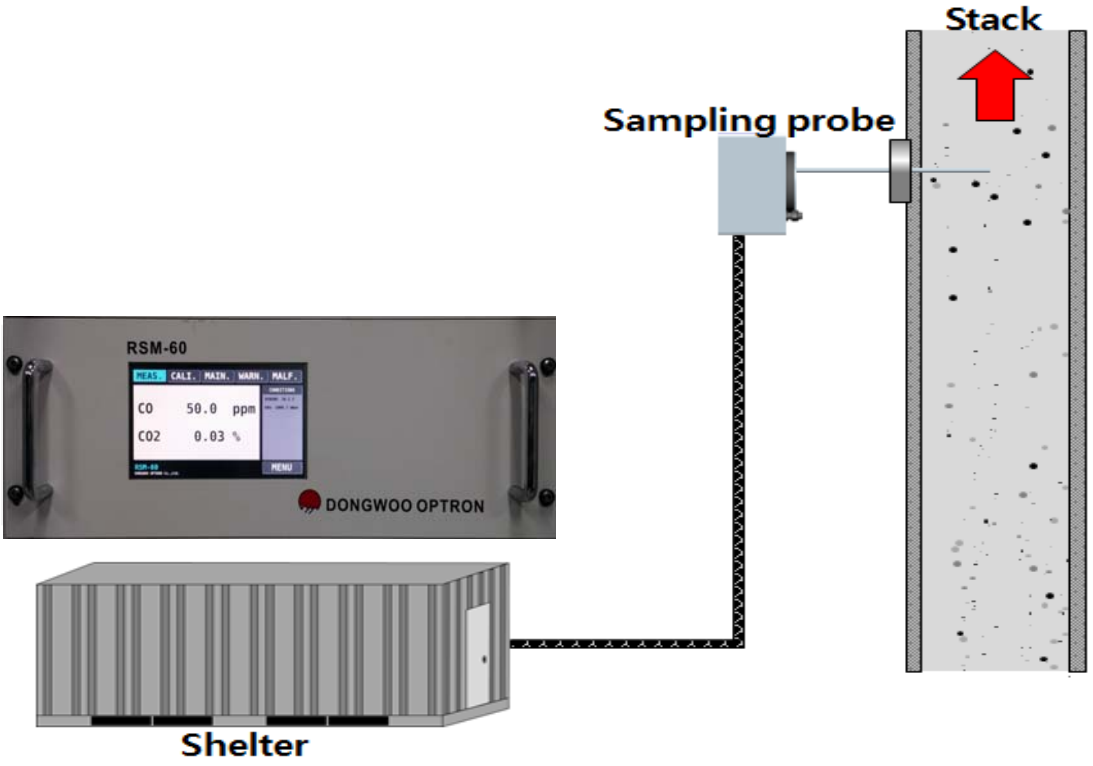
■ Ensure that there is no waring alram when it comes to out of operating range gas(Temp, Pressure) input.

■ Ensure that there is potential possibility of gas condensing when an input gas temperature is higher than cell temperatre.
Ensure that there will be serious potential demage to cell on this case.

3. Application

The RSM-60 CO/CO2 is continuous emission monitoring system which available to measure of CO/CO2 concentration from the combustion process of plant and Stack gas.
Extracted sampling gas from the stack will be deliver to measurement chamber and then carry out qualitative and quantitative analyzing by NDIR(Non-dispersive infrared absorption) principle.
The RSM-60 composition is Main contron unit(M/U) and Preprocessing device(Gas conditioner).
The Main control unit is composed again IR Source, Detector, Gas cell, Control board and the Preprocessing device(or Gas conditioning system) is composed Sampling probe, Filter, Tube bundle, pump, etc.
The RSM-60 can be use continuous emission monitoring for Stack gas and in accordance with the ambient condition, it can be assemble with another preprosses assembling parts.
Furthermore, it also can be applied to CDM(Clean Development Mechanism)

Fig.1 System composition



3.1.1 Technical Advantages

Function	Advantage	
Sampling Measurement	■	High Accracy and Reliability
Maintenance	■	Easy maintenance and contents
	■	Maintain the stability
Auto calibration	■	Maintaine the high accuracy
	■	Precise and Reliable measurement and analyzing
Integrated Control	■	Available to check and control the system by TCP/IP
	■	Available to measuring and calibration without extra interface.
	■	Available to control analog/digital input & output
Easy Maintenance	■	No need to extra service tool on general maintenance.
		Normal function and basic service operation by intergrated control system
	■	Good accessability by 7" touch screen
		Easy to analyzing of data and device conditions
	■	Easy start up, Parameterization, diagnosis and maintenance
	■	Recording and Displaying of measurement value by graph
Independent Software	■	Available to operating of independent software for remote control by TCP/IP protocol
	■	Available to Zero calibration by remoting function

Self diagonosis

For continueous and high level of accuracy, DSM Series is availale to use automatic check cycle function. This automatic check cycle is available to setting of interval time (Basic : one time / 24hours)

Display the error or warning message when it comes to setting value error.

USB interface function

Communications such as software upgrades, data backup for internal storage, connection of an external expansion monitor are supported.

Temperature sensor

Available to real-time check internal temperature not only device but also gas chamber

Analog signal output

5channel and 4 ~ 20 mA analog signal output for transmitting the measured gas concentration value

Digital signal output

Digital signal output for status and error message

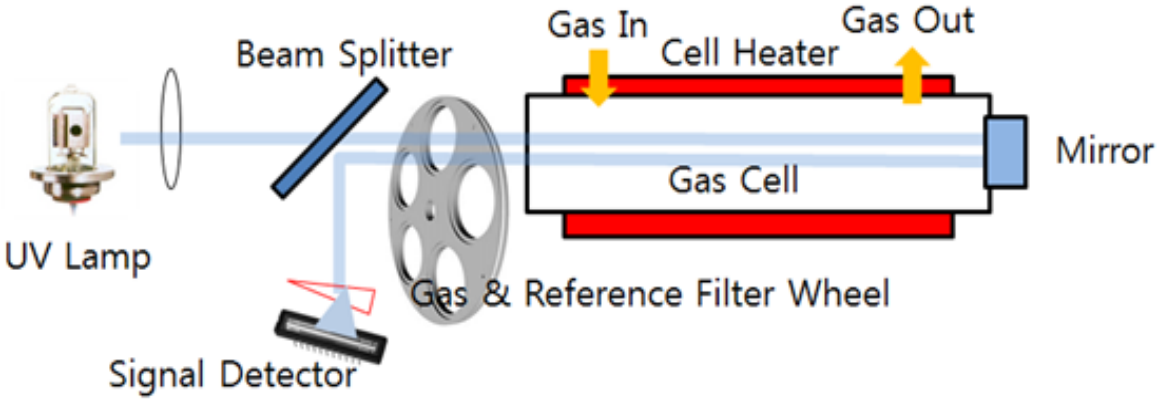
Measuring, Maintenance, Malfunction, Calibration

Digital signal input

External sensor, Switch or Signal input purpose

2.2 Measuring Principle

Fig. 2 Optical system



The Ultraviolet trait is available to state transition of gas molecular energy level.
In accordance with gas trait, there will be need Ultraviolet light source which can keep an unique energy dispersion. This light source and light absorption will be follow the "Beer Lambert" rule.
The gas moecular has unique reaction from specific short light wavelength and this is also can be adjusted peripheral devices.

DSM Series composion is distinguish the light absorption range of NO, NO2 gases.
Assembled device only for sorting of NOx range light by UV lamp 200~400nm on the gas cell, and analyzing the gas concentration with light absorption on specific range.
Normally, The comparison gas cell place with specimen gas cell and then detect the intensity of specific gas cell and standard gas, The DSM series place a filter wheel on front side of Gas cell for identify with standard gases. Besides, it is designed to acquisition and storage of gas cell to time and coefficient with mirror periodicaly.
The measuring structure is as below <Fig.1>
The UV Lamp light source and intensity will be changed in accordance with gas concentration when it passed to gas molecular and delivered to detector. i.e. the gas molecular absorption coeffiicinet is 'b', Optical path(Gas cell length) is 'L', Gas concentration is 'x' and Light intensity is I', It can be calculated as below

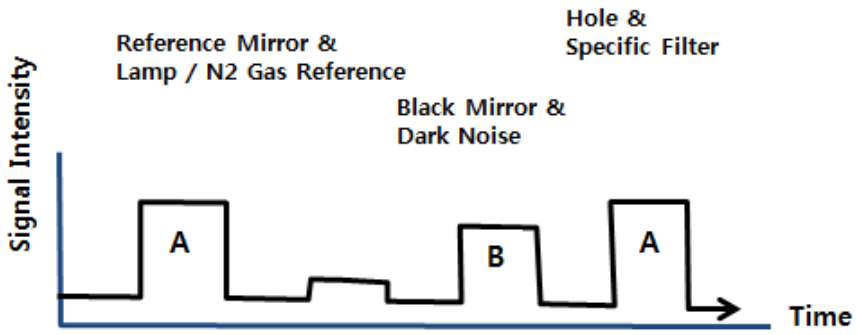
The differential equation for (1) will be as below

I = Aexp(-b * L * X) ---------- (2)

The 'A' is relevant factor with initial light intensity I_0 and optical attenuation of gas cell, it is a fixed constant value.
In the event of passing of optical filter, unabroption range of gas molecular also detected, therefore this value also should be compensated.

V = C + Aexp (-bLX) ---------- (3)

The 'V' is voltage value for light intensity and 'C', 'A' are coeffecient value.
This is for coeffecient value for linearity value for each concentration.
The DSM series 'V' is to be equibalence with intergral calculus value of light intensity.
The <Fig. 3> is shown the continuous-state of DSM series time vs Fitler wheel

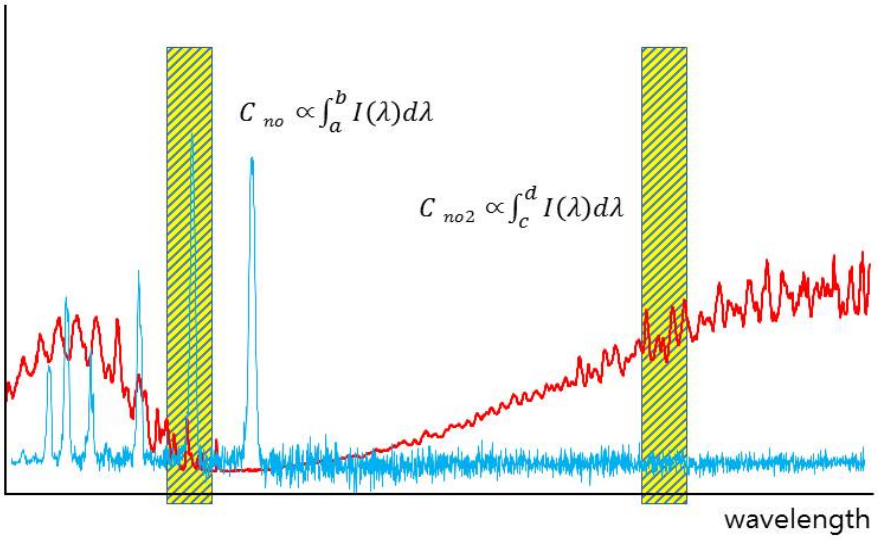


2.2.1 Filter wheel

The DSM has five(5) filter wheel and it is analyzing the gas characteristic by periodic rotation.
The Filter 1 is Dark noise filter and this is for getting of dark signal of Detector.
It is available to get a pure detector noise by total absorption of UV lamp light source.
The Filter 2 is Measuring hole which can penentrate 100% of light source on measuring mode.
There is no specific optical filter for direct light activate to gas molecular of gas cell.
This filter position is also for auto calibration and inspection
The Filter 3 is Reference Mirror. It is utilized for light intensity change monitoring and substitute of standard gases(zero, N2). As this filter is placed on optical path periodcally,
As this filter is placed on optical patch periodcally, The light intensity changes and Zero signal changes monitoring can lead to measuring value compensation.
The Filter 4~6 are for reduction of interfere gas effection.

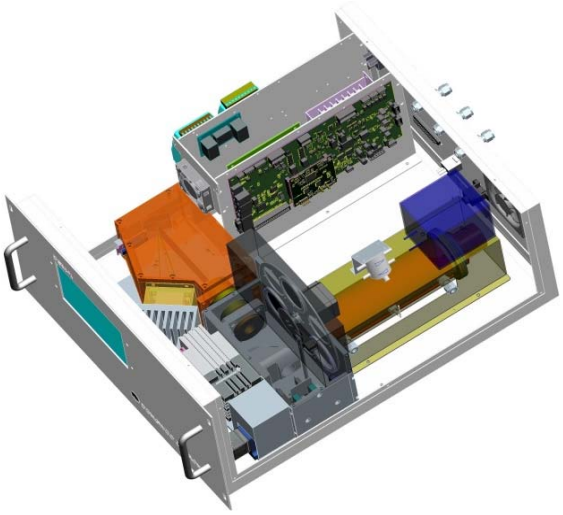
It is band pass filter for specific wave length and it is carry out only penentrate of measuring gas wave length from mixed gases.

<Fig. Measuring principle>



2.3 System composition

<Fig. 5. DSM composition>



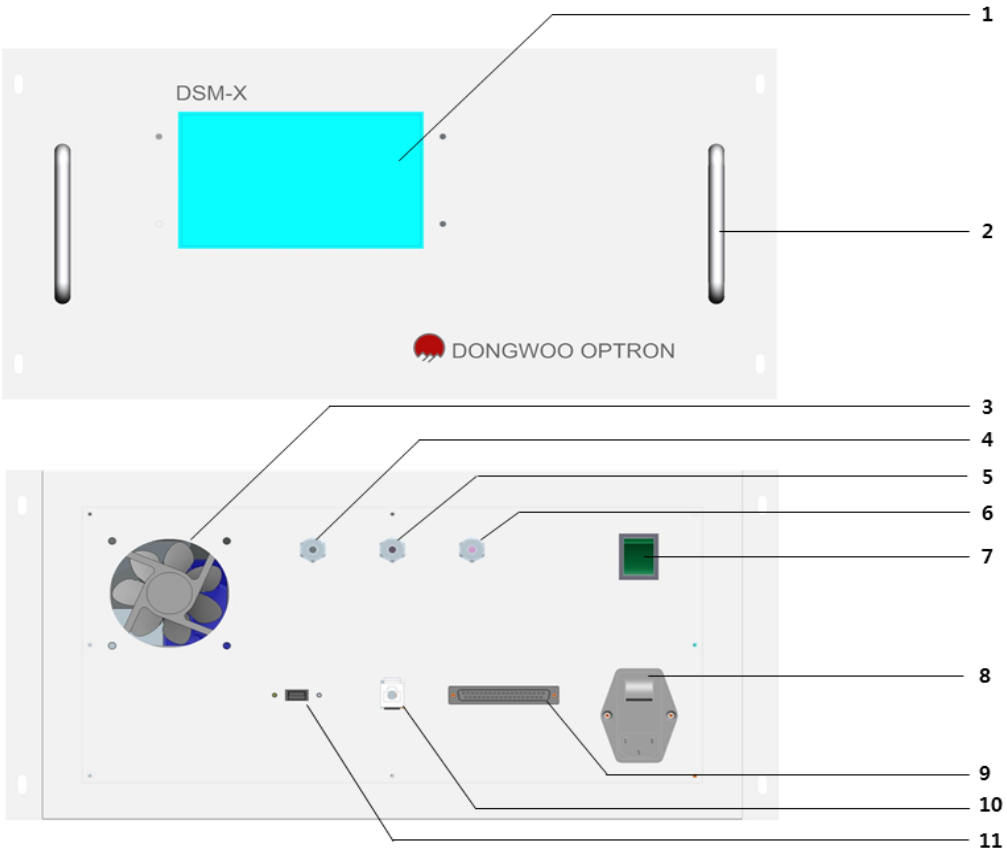
Name	Part number
UV Lamp	DWO12001
UV driver	DWO12002
UV detector	DWO12003
Beam splitter	DWO12004
PCB Board	DWO12005
IO Board	DWO12006(*)
Gas chamber	DWO12007
Chopper wheel	DWO12008(**)
4.3" LCD monitor	DWO12009
O_2 sensor	DWO120010
Bypass regulator	DWO12011
Power supply(Single)	DWO12012
Power supply(Dual)	DWO12013
Stepping motor(Large)	DWO12014
Stepping motor(Small)	DWO12015

* DWO12006-1(A/O Channel Extra Extention Board)
  DWO12006-2(D/O Chaneel Extra Extention Board)

* DWO12008-1(NO Filter)
  DWO12008-2(SO2 Filter)
  DWO12008-3(NO2 Filter)

2.3.1 External

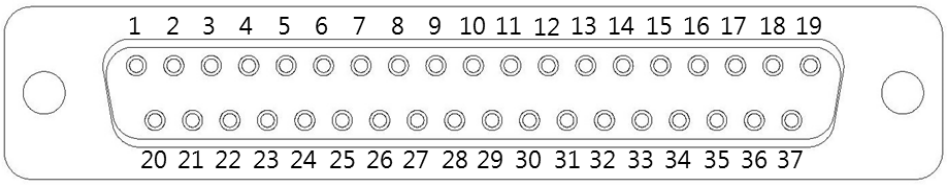
<Fig. 6 DSM series main body external>



No	Title	Description
1	7" LCD window	Touch screen LCD
2	Knob	Knob
3	Cooling fan	Cooling fan
4	Sample In	Sample gas inlet
5	Gas In	Calibration gas inlet
6	Gas out	Gas bent of Cell Chamber
7	UV lamp power	UV lamp on/off (Apart from main power)
8	Main power	220 voltage main power
9	Signal connector	37pin socket for signal connection
10	TCP/IP connector	Digital communication interface
11	USB Connector	USB for Keyboard and Data stroage

2.3.2 External interface pin

<Fig. 7. 37pin DSUB Connector>



No	Connector Name	Description
1	CON8-4	Analog OUT #1+(Board)
2	CON8-3	Analog OUT #1- (Board)
3	CON8-8	Analog OUT #2+(Board)
4	CON8-7	Analog OUT #2- (Board)
5	IOUT0	Analog OUT #3+(Module)
6	AGND	Analog OUT #3- (Module)
7	IOUT1	Analog OUT #4+(Module)
8	AGND	Analog OUT #4- (Module)
9	IOUT2	Analog OUT #5+(Module)
10	AGND	Analog OUT #5- (Module)
11	CON7-2	Digital IN #1+
12	CON7-1	Digital IN #1-
13	NC	NC
14	NC	NC
15	NC	NC
16	CON6-7	RS422_TXP/RS485+
17	CON6-8	RS422_RXP
18	CON6-9	RS422_TXP/RS485-
19	CON6-10	RS422_RXN
20	CON7-10	Digital OUT #1+
21	CON7-9	Digital OUT #2+
22	CON7-12	Digital OUT #3+
23	CON7-11	Digital OUT #4+
24	CON7-13	Digital OUT GND
25	CON7-18	Relay OUT #1+
26	CON7-17	Relay OUT #1-
27	CON7-20	Relay OUT #2+
28	CON7-19	Relay OUT #2-
29	CON7-22	Relay OUT #3+
30	CON7-21	Relay OUT #3-
31	CON7-24	Relay OUT #4+
32	CON7-23	Relay OUT #4-
33	NC	NC
34	NC	NC
35	CON6-1	RS232C_TX
36	CON6-3	RS232C_RX
37	CON6-6	RS232C_GND

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3. Installation

Plan

Prearranged plan

Inspection checklist for planing

Installation

DSM Installation

3.1 Plan

This chapter describes the individual steps involved in planning of project from choosing the system to putting it into operation. This chapter is primarily intended for planning engineers.
If user already completed project planning, please check again that you have done correctly in accordance with provided information in this chapter.

3.2 Prearranged plan

Described in this chapter is usually carry out by the customer and below checklist should be use as a guide.
In order to ensure that system operates correctly and specified data is maintained, we recommend that user include and observe any operating constraints when planning.
If user already reviews the checklist, we recommend that user contact to distributor or representative to clarify any questions and receive the precise order data for your configuration.
The DSM system is normally configured and parameterized in accordance with the customer specifications and User will be received questionnaire before place an order.

ATTENTION

If any site information submitted with an order is changed or if User want to change the application, please contact to your local sales representative or distributor or manufacturer to determine whether the device can be used for the new application or purpose

3.2.1 User preparation

The following preparations are usually carry out by user and described in the next chapter.

■ Preparing for Installation at the measuring point
- Selection of measuring room position
- Selection of sample line route
- Installation of Sample probe flange

■ Preparation of electrical equipment
- Preprocessing device(Gas sampler) installation and wiring facility
- Sample line facility from measuring room and measuring point
- Signal cable connection for interface, if necessary

3.2.2 Installation and commission step

For the correct commissioning, the following component should be installed in avance.

■ Preprocessing device(Gas sampler)

■ Sample probe

3.3 Inspection checklist for planning

The following checklist help user carry out and check the necessary installation planning step and inspect before system operation.

User can check any questions that have already been clarified or steps you have already completed in the column on the right. This enables you keep track of any point that have yet to be clarified.

Topic	Task	Measures/Consideration	☐
Determine the measuring point	Ensure that inlet & outlet section are unimpeded :		☐
	* Is the duct diameter size proper?		☐
	* Is there enough space for probe installation and uninstallation ?		☐
	Recommend that avoiding of duct cross section point and		☐
	any interfering object which can be affected gas flow		☐
	Gas emission	Obtain official approval for emission measuring point.	☐
		Measuring point gas can be typical gas concentration?	☐
	Operating condition	Stack and weather conditions are checked?	☐
		Stack/Duct gas temperature	☐
		Technical check should be carry out when it comes to gas temperature is over than 200 ℃ * Measuring of actual gas temperature * Flange temperature while the plant is on operation	☐
		High dust or soot in the duct can be lead to measurement value tolerance. On this case, The filter selection is important	☐
	Installation site	Recommend that no interfere place from a probe or another devices	☐
Probe	Selection of proper flange	Flange and Flange tube for installation to steel duct	☐
		Concreat duct or thin thickness of duct should be need holding plate (User supplied) and need to long length of flange which mounted tube	☐
		Recommend that discuss flange and installation with field service engineer	☐
	Mounting hole selection	Probe measuring point can be typical point ?	☐
		Flange tube size check	☐
		Ensure that enough space for duct insulation cutting and installation, maintainace.	☐
		Ensure that enough space for probe disassembling from stack mounting hole	☐
		Check the ambient temperature condition for devices and accessaries	☐

Space	Platform (bottom)	Probe installation should be 1.3~1.5m height from platform (bottom)	☐
		Ensure that platform should be safe and enough space for whole devices installation. This is related with probe and sample line assembling/ disassembling.	☐
Main Unit	Installation point	This place should be easy access point of sample line and also should be nearest distance from stack	☐
	Installation condition	The sampling analyzer unit is sensetive for ambient condition, therefore it should be keep identical enivirnmental condition	☐
Safety	Each of country regulation subject should be respected		☐

3.4 Installation

3.4.1 Preparation for Installation

The ambient temperature condition for main analyzer should be under than 45℃.

The Sampling analyzer is sensetive for ambient condition and it can be lead to any effection to measuring value. On this case, there will be need to specific devices.

3.4.2 Flange mounting

In order to probe installation to stack, the master flange should be installed in advance.

The standard probe diameter is 34mm, therefore master flange inner diameter should be larger than this. In according to stack wall thickness, probe length also should be considered.

Due to the weight of the probe, we recommend that user reinforce the flange tube with connection plates.

The analyzer installation should be carry out by skilled engineers.

Ensure that below each of step for safety precaution

- ■ Prevent any damage caused by falling parts
- ■ Precaution to protect from explosion or toxic gases emitted from the duct.
- ■ Precaution to prevent from duct inside insulation material fire and explosion by welding
- ■ Cover the flange hole until the device to be mounted.

3.4.3 Installation procedure

■ Carefully mark the center points of the flange on the duct wall.
■ Brick/concrete duct: cut out an opening on the duct that is approx. 2 cm larger than the outside diameter of the flange tube
■ Install the fixed steel plates on the duct
■ Cut out a hole in accordance with flange tube diameter
■ Carry out welding to flange tube
■ Weld on junction plates for reinforcement, if possible
■ Brick/concrete duct : secure the holding plate with welded flange with tube on the duct

3.4.4 Brick/Concrete duct

In ducts other than steel ducts, an additional holding plate with a suitable opening for welding the flange with tube into position must be provided.

3.4.6 Preparation of Eectrical devices

■ Power and signal cables to probe installation point
■ Electric Panel for analyzer main unit power on
■ DSM Series main unit
■ Preprocessing(Gas sampler) system

The relevant safety instruction which describes in Chapter 2 of this manual and general safety regulations must be followed at all times.
Always disconnect the equipment from the power supply and ensure that the power supply cannot be reconnected by third parties.
The power supply must be disconnected for installing the devices.

If possible, Do not lay down power supply cables in the direct vicinity of signal cables.
Protect open ends on preinstalled cables against the effects of weather until the devices are installed.

3.5 DSM Installation

The main unit storage case and control panel should be installed in advance.
The Analyzer installation should be carry out by skilled engineers.

Ensure that below each of step before installation
■ Preparations have been carried out correctly
■ Clarify check again planning and checklist.
Ensure that electric power off before installation of cables and relevant component.

3.5.1 Flange cover opening

Open the flange cover from fixed flange on the duct.
It is nothing to do when plant facility is not running but ensure that all precaution when it comes to plant facility is running.
In the event of duct inside pressure is over pressure and if flange cover is already opened,
Needs to caution for safety accidents since significant amount of gas can be emitted from the duct

If necessary, Shall be use the mask which can filtering toxic gases.
(E.g, 3M 6200 mask body + 6002 filter)
Should be wear heat-resistant gloves when it comes to high temperature gas.

3.5.2 Probe inserting

Insert the probe to stack/duct.
Fix up the probe to flange by using of M16 * 60 mm bolts and nuts.

Ensure that any precaution to prevent safety accidents since significant amount of gas or foreign material can be emitted from the duct by different partial pressure.
Recommend use of protective glasses, if necessary.

3.5.4 Sample line connection

▶Connect the sample tube
Connect the sample tube from probe to analyzer unit
▶Connect the electr power cables
Firmly fix up to prevent to disconnection

The relevant safety instruction which describes in Chapter 2 of this manual and general safety regulations must be followed at all times.
Always disconnect the equipment from the power supply and ensure that the power supply cannot be reconnected by third parties.
The power supply must be disconnected for installing the devices.

Ensure that match up of electric power between device setting and supplied electric power.

3.5.5 Electric power impression

Clarify again all cable connection
If there is no problem, turn on the system main power switch
When the electric power is properly supplied, the main menu program will be displayed on the LCD screen. At this time, gas concentration value will be output automatically.
For the analyzer program setting, please refer to 4.1 operation program.

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Multi Gas Analyzer

4. Software operation

Basic measurment mode

Service mode

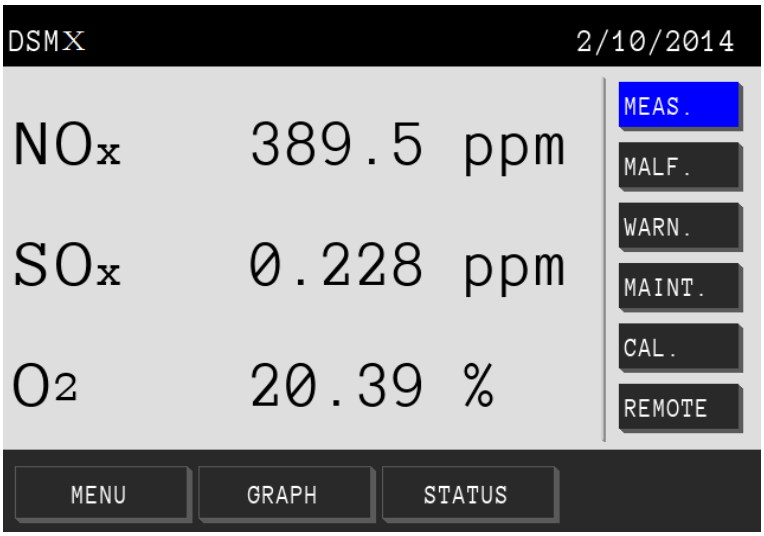
Calibration mode

Factor value

4.1 Basic measurement mode

4.1.1 Main screen

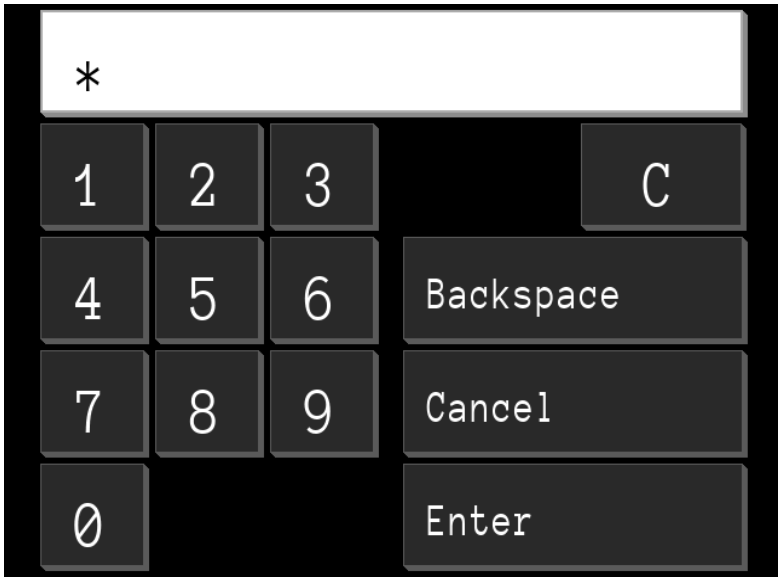
<Fig.8 Main GUI >



Display the Measure, Malfunction, Warning, Maintenance, Calibration, Remote status.
Display the current gas concentration.

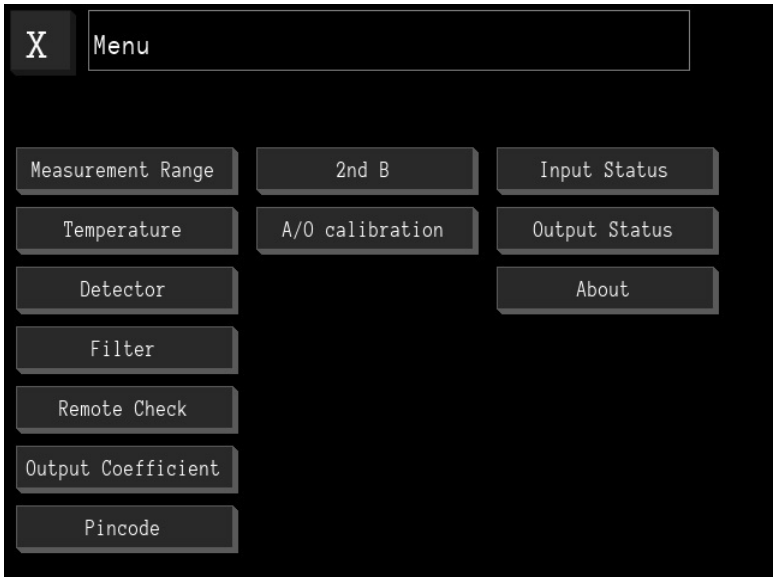
4.1.2 Password

<Fig. 9. Secret display>



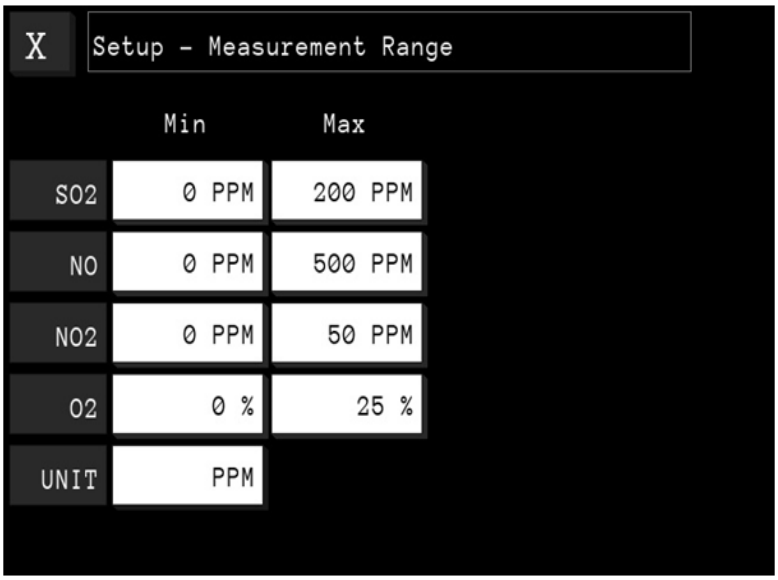
Input the pin code (factory setting value : "0")
If user enter valid pin code, below screen will be displayed.

<Fig.10 Menu>



4.1.3 Device setting menu

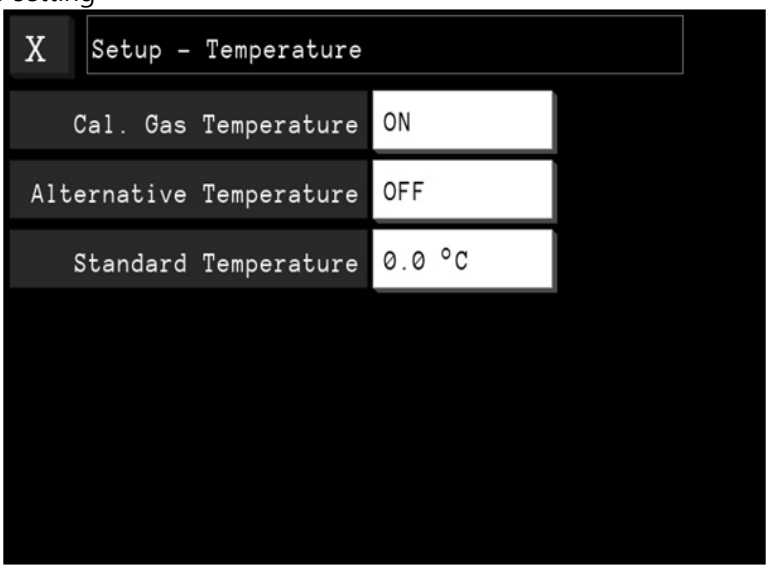
<Fig.10 Range setting>



Measurement range

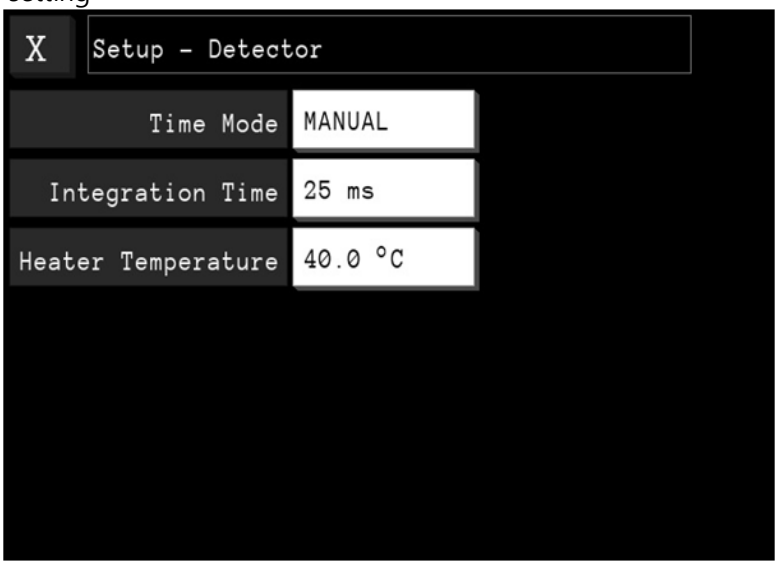
- Min : gas minimum value
- Max : gas maximum value
- Unit : Unit setting (ppm/mg)

<Fig.12 Temperature setting >



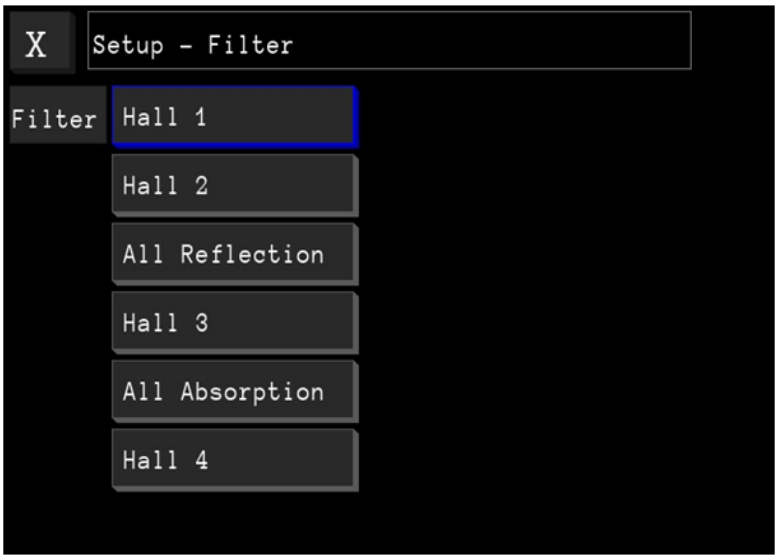
Setup - Cell
- Cal. Gas Temperature : Compensation value setting by temperature sensor
- Alternative Temperature : Temperature compensation by input temperature value
- Standard Temperature : Target temperature when it comes to temperature compensation

<Fig.13 UV Detector setting>



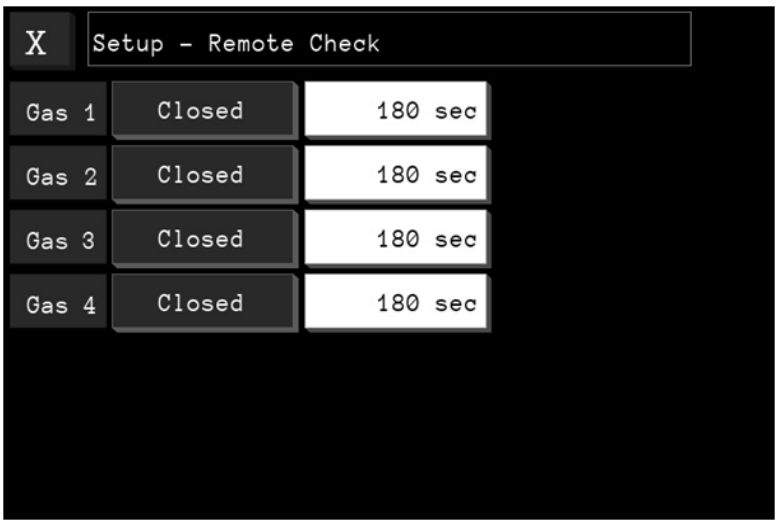
Setup - Detector
- Time mode : Detector measuring time mode (Auto/Manual)
- Intergration Time : Initial measuring time of detector
- Heater Temperature : Input the detector temperature

<Fig.14 Filter setting>



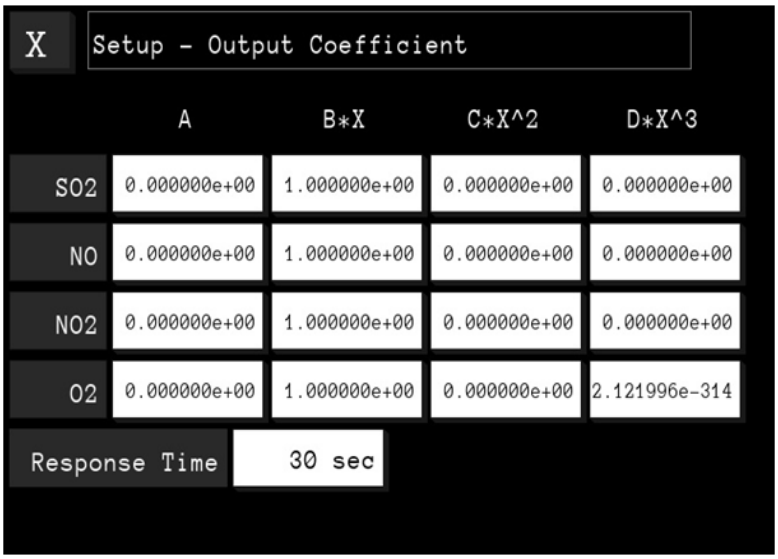
- Filter : All absorption (100%), All Reflection(100%), None (None filter)
  Click the button to move each of filter

<Fig.15 Remote Check>



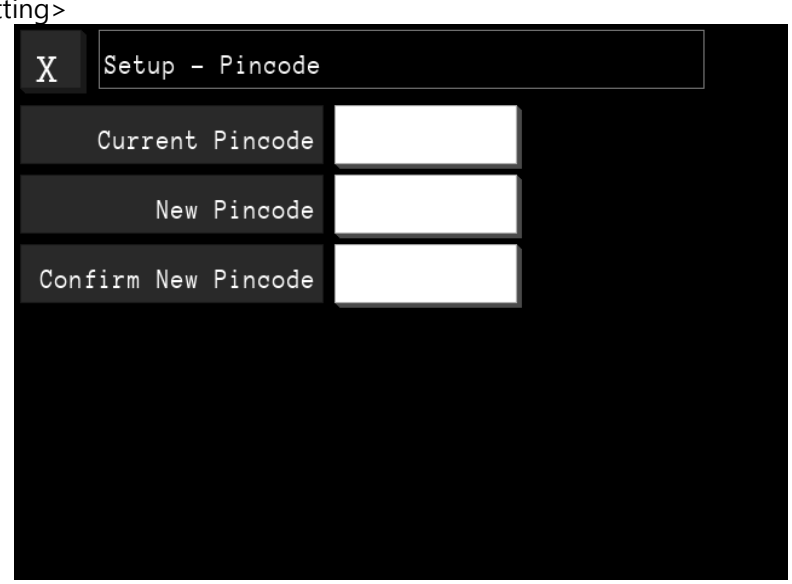
- Gas 1 : Gas 1 valve setting and measuring time setting
- Gas 2 : Gas 2 valve setting and measuring time setting
- Gas 3 : Gas 3 valve setting and measuring time setting
- Gas 4 : Gas 4 valve setting and measuring time setting

<Fig.16 Output coefficient>



- Coefficient : Coefficient value setting for each of gases(User setting)
- Response Time : Output value update time

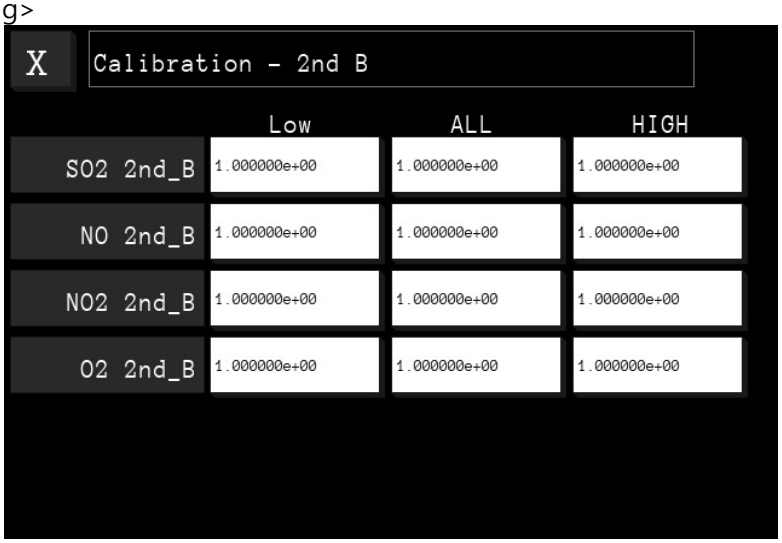
<Fig.17 Pincode setting>



- Pincode setting

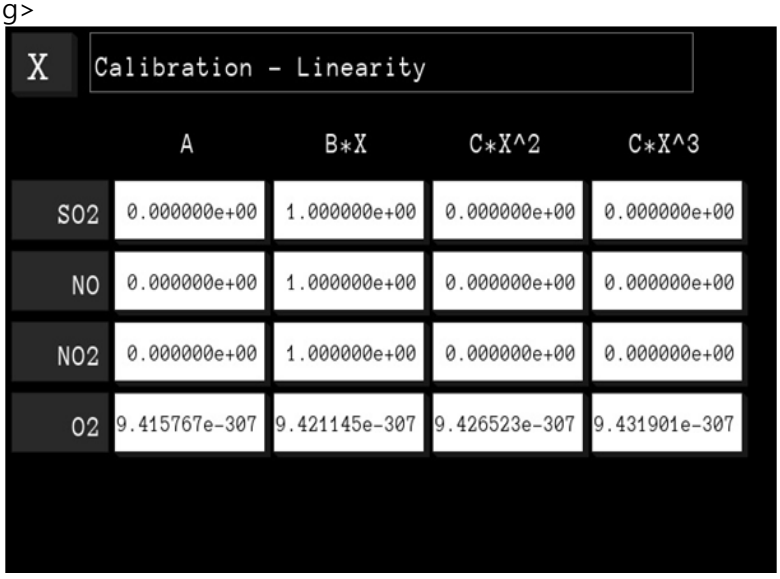
4.2 Calibration

<Fig.18 Factor setting>



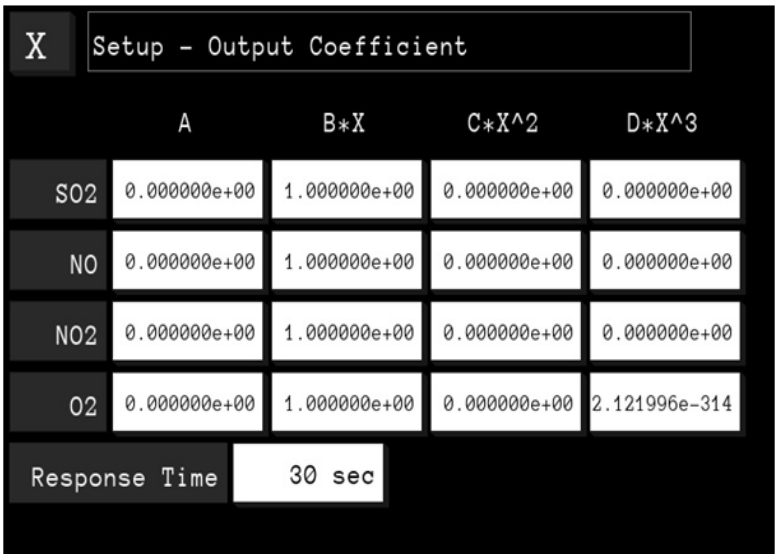
- Low : Apply to under than 30% range
- ALL : Apply to 100% range
- HIGHT : Apply to over then 70% range

<Fig.19 Factor setting>



- Coefficient value : Gas calibration coefficient value setting

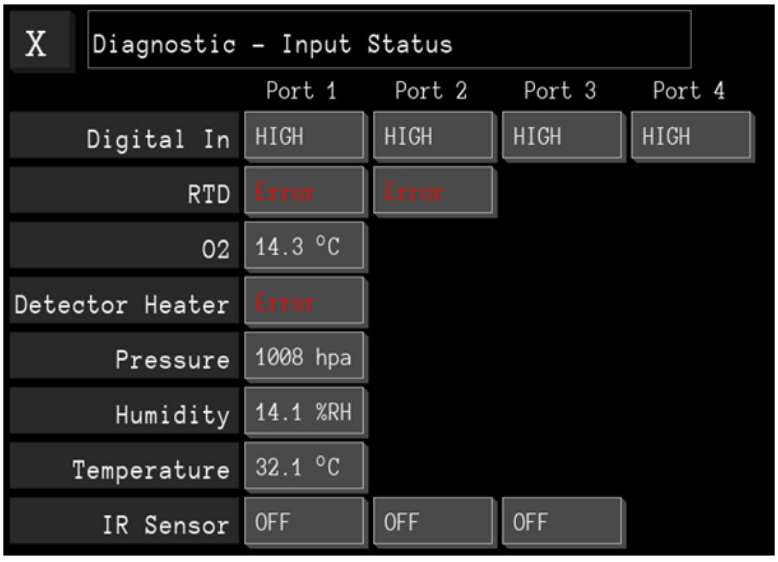
<Fig.20 Output coefficient>



- Coefficient value : Gas calibration coefficient value setting
- Response Time : Output value update time

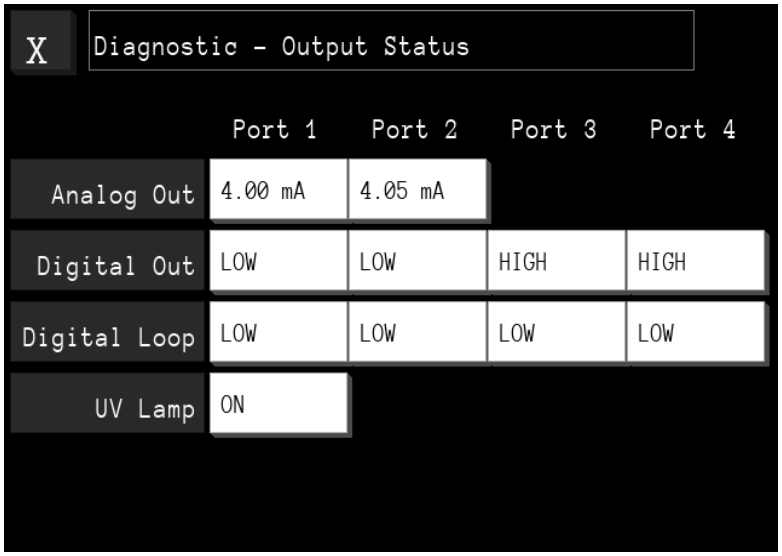
4.3 Diagnostic

<Fig.21 Input Status>



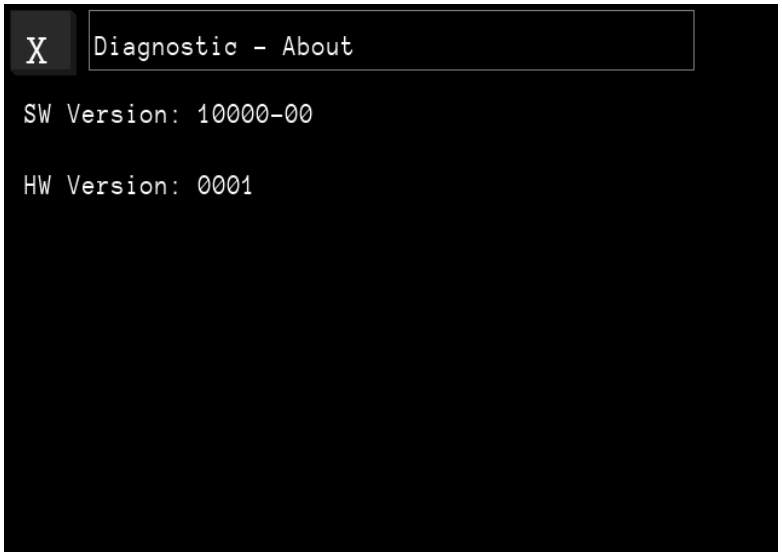
- Output of sensor setting value
Digital In : Display the digital input value
RTD : Display the inside temperature
O2 : Display the gas cell temperature
Detector Heater : Display the detector temperature
Pressure : Display the inside pressure
Humidity : Display the inside humidity
Temperature : Display the inside temperature
IR Sensor : Display the sensor input value

<Fig.22 Output Status>



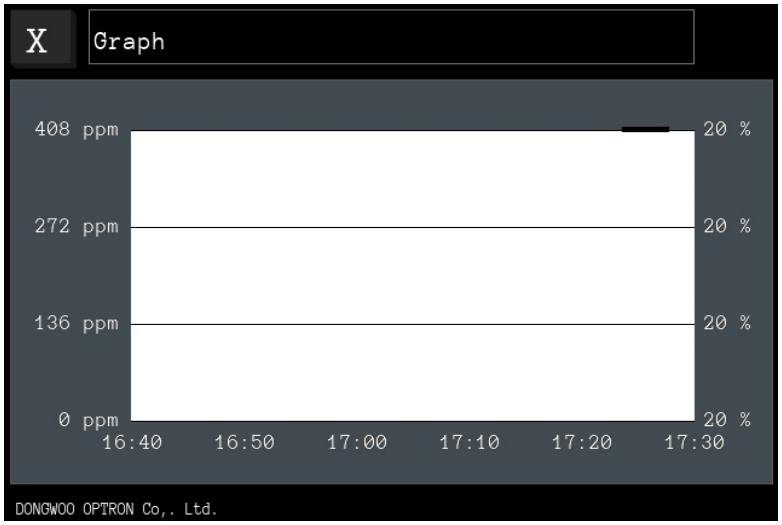
- Display the sensor output value
Analog Out : Display the analog output value
Digital Out : Display the digital output value
Digital Loop : Display the digital loop value
UV Lamp : Display the UV lamp power

<Fig.23 About>



- Display the S/W and H/W information

<Fig.24 Graph>



- Gas concentration graph

<Fig.25 Status>

- Display the analyzer status

DSM Series
Multi Gas Analyzer

5. Technical Specification

Specification

Dimension

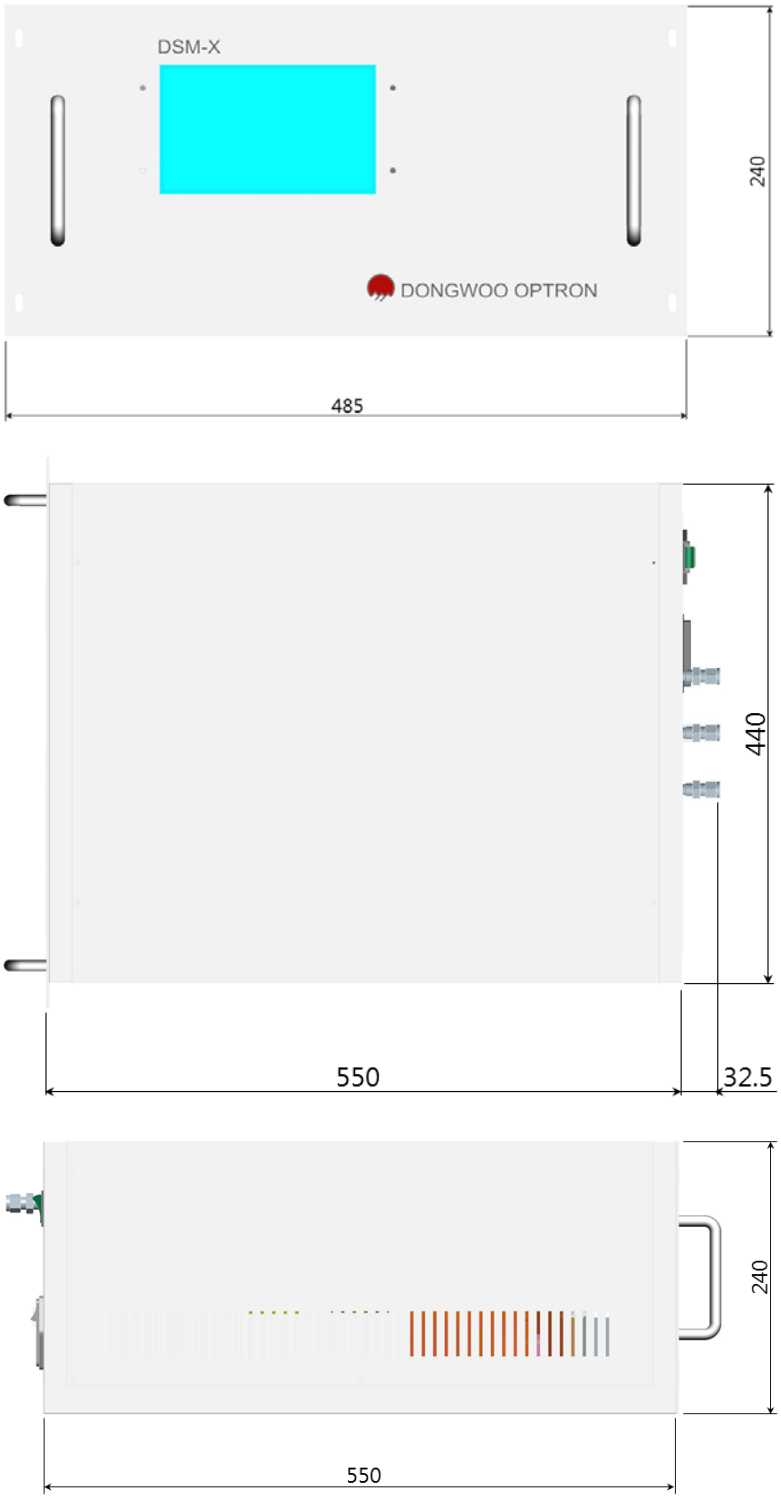
System configuration

5.1 Technical specification

Technical Data			
Measurement			
Measurement range	DSM-20	DSM-XG	DSM-XT
Nitrogen monoxide NO	0-2000ppm	0-2000ppm	0-2000ppm
Nitrogen dioxide NO2	0-500ppm	0-500ppm	0-500ppm
Sulfer dioxide SO2	-	0-1000ppm	0-1000ppm
Carbon monoxide CO	-	-	0-2000ppm
Oxygen O2	0-25%	0-25%	0-25%
Measurement principle	NOx - UV absorption		
	SO2 - UV absorption		
	CO - NDIR		
	O2 - Paramagnetic		
Measuring unit	ppm, mg, %		
Response Time	< 10 s		
Function			
Repeatability	< 0.5% F.S		
Linearity	< 0.5% F.S		
Accuracy	< 0.5% F.S		
Zero Drift	< 0.5% F.S		
Span Drift	< 1% F.S		
Response Time	< 120 s		
Ambient condition			
Ambient Temperature	+5 ℃ ~ +45 ℃ Max 50 ℃		
Storage Temperature	+5 ℃ ~ +45 ℃		
Gas Temperature	< 200 ℃		
Sample gas flow	0.5 L/min ~ 1.5 L/min		
Input / Output			
Output	• 0/4 ~ 20 mA, 16bit, 5 Ch • Digital: 12V DC/2A; 24V DC/1A, 8Ch		
Input	Analog 4ch, digital 4ch		
Display	7" LCD Monitor		
External input deivce	Touch screen / USB Keyboard		
Interface	• TCP/IP • RS-485 • RS-232		
etc			
Material	SUS 304, Al 6061		
Electric power	220VAC, 50/60Hz, 100VAC~240VAC (optional)		
Power consumption	500 W		
Weight	About 30 kg		
Dimension	W440 X D550 X H240		
Sampling method	Electronic gas conditioner		
Sampling pump	Diaphragm pump		
Sample tube	PTFE		

5.2 Dimension

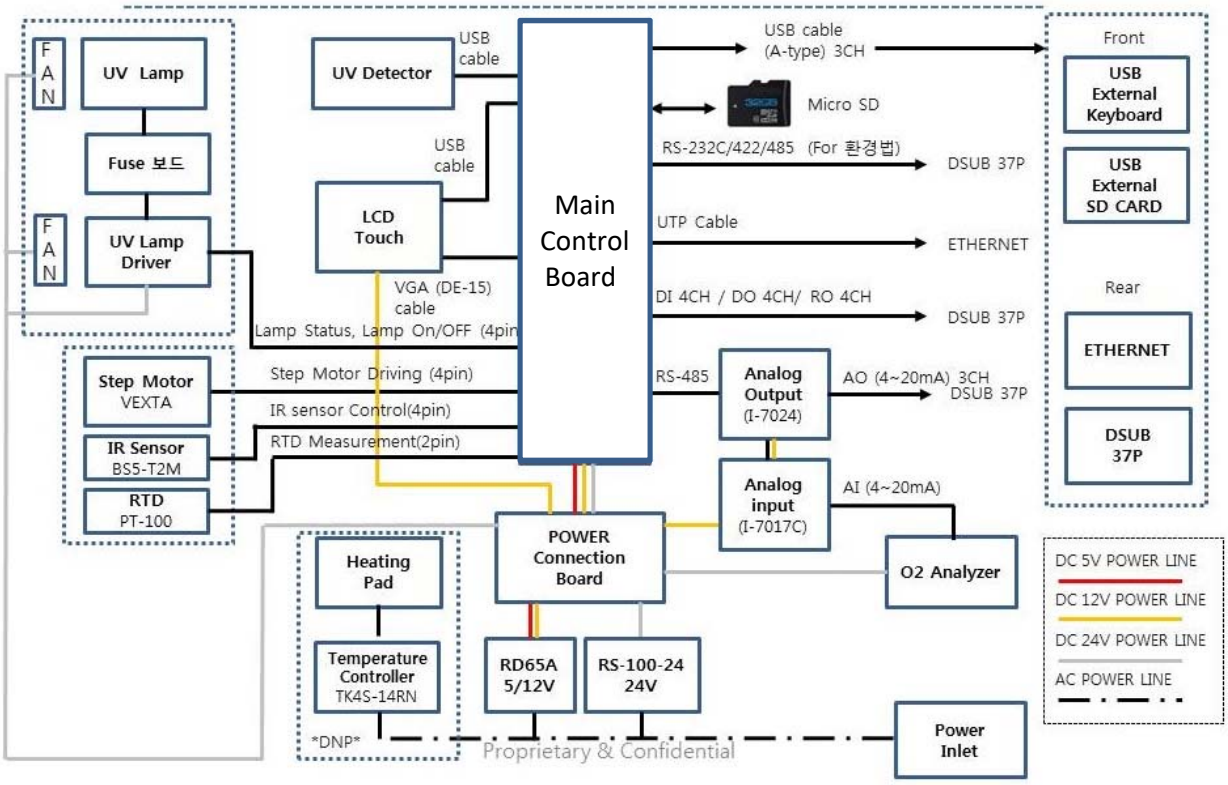
<Fig.26 Dimension>



Name	Part Number
DSM Series Main unit	MU12001

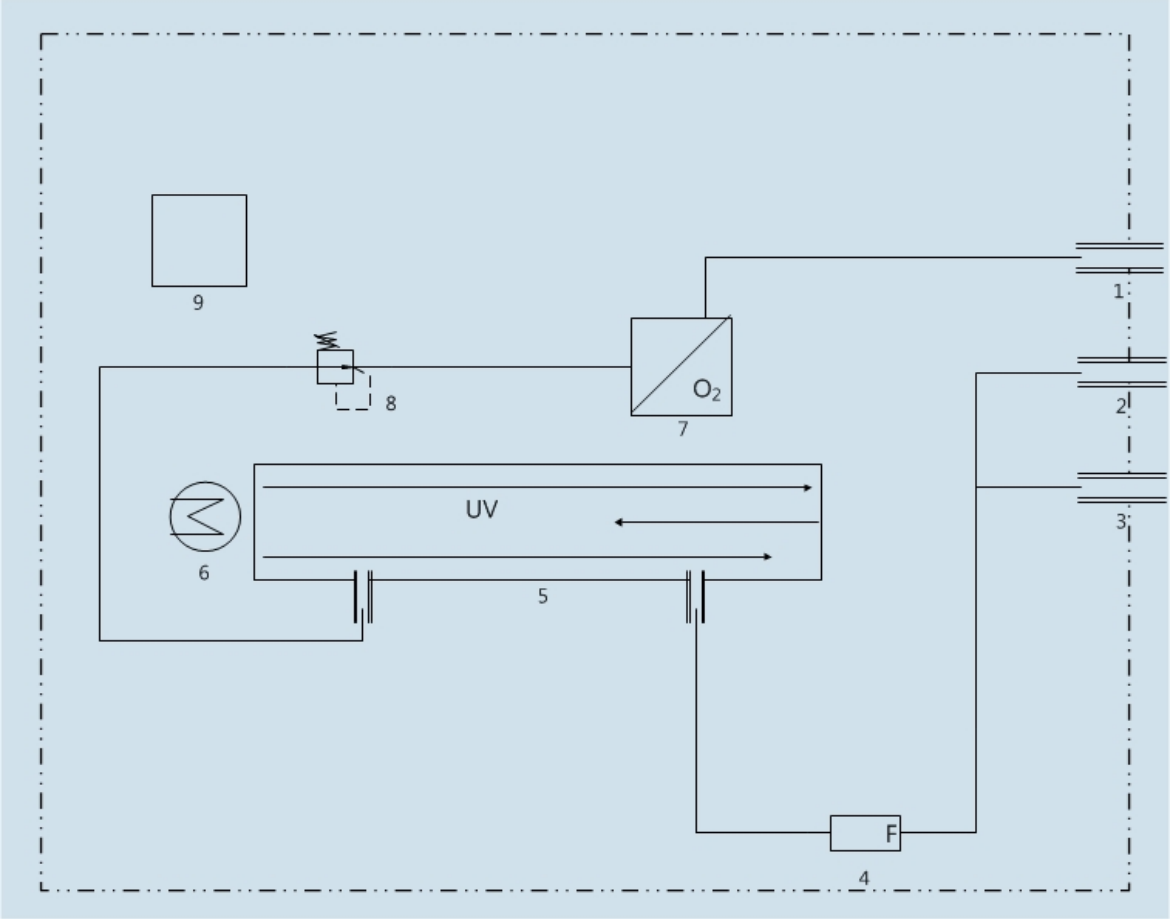
5.3 System Configuration

<Fig.27 Wiring diagram>



5.3.1 Gas flow

<Fig.28 DSM Gas flow chart>



1 Gas outlet
2 Sample Gas Inlet
3 Calibration Gas Inlet
4 Electronic flow meter
5 Gas cell
6 UV Lamp
7 Oxygen sensor
8 By-Pass regulator
9 UV Detector