



HASEC0190E

SECTRON AUTOMATIC AIR-FUEL RATIO CONTROLLER

OPERATION MANUAL

S E C - V

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1. Outline

SEC-V is a new air-fuel ratio controller equipped with a 4.3-in LCD touch panel.

As a succession equipment of SEC-IV having an actual sales record of 500 units, the upgraded SEC-V will substantially contribute to the CO₂ reduction and energy saving of industrial furnaces.

2. Composition

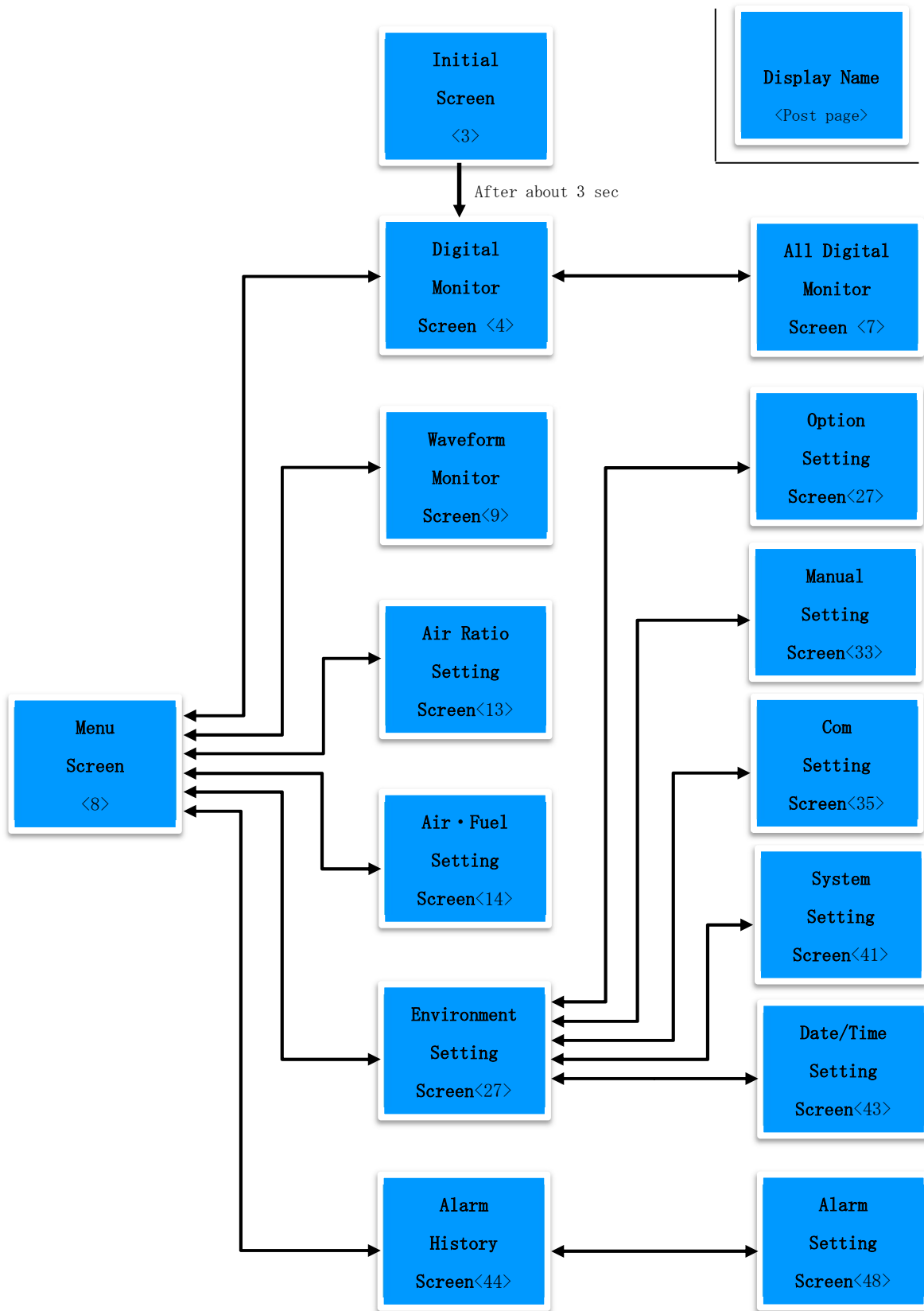
Fuel : Gas

	Equipment Name	Model	Remarks
Standard set	SECTRON	SEC-V	AC100~240V
	Air Differential Pressure Sensor	P92-30	0~3.0kPa (0~10V) DC24V
	Gas Differential Pressure Sensor	P92-30	0~3.0kPa (0~10V) DC24V
	Air Temperature Sensor	KL-200	Sheath TypeK (φ 8×200L)
Optional items	Air Orifice Flow meter	MO-15~400F	
	Gas Orifice Flow meter	MO-15~400F	
	Control Valve For Gas	AZP-20~80	
	Control Motor	CM-101T H/L	Equipped With Limit Switch
	Gas Balance Regulator	G1K-15~150F	
	Gas Temperature Sensor (Option)	KL-200	Sheath TypeK (φ 8×200L)

Fuel : Oil

	Equipment Name	Model	Remarks
Standard set	SECTRON	SEC-V	AC100~240V
	Air Differential Pressure Sensor	P92M-30	0~3.0kPa (0~10V) DC24V
	Oil Flow Sensor	LSF40, 41, 45	Pulse Output
	Air Temperature Sensor	KL-200	Sheath TypeK (φ 8×200L)
	Oil Filter	FH150-02, 04	
Optional	Air Orifice Flow meter	MO-15~400F	
	Oil Control Valve	CR-10, 15	
	Control Motor	CM-101T H/L	Equipped With Limit Switch
	Oil Ratio Regulator	FD-3	

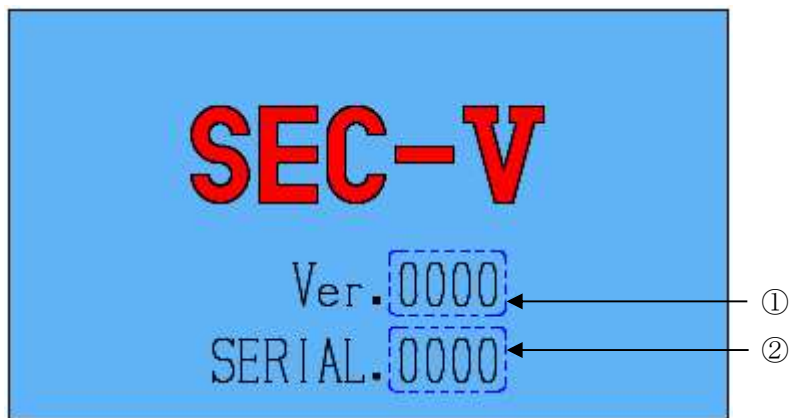
3. Flow Of Operation



4. Initial

4-1. Initial Screen

ON the SECTRON power then initial screen will be displayed.



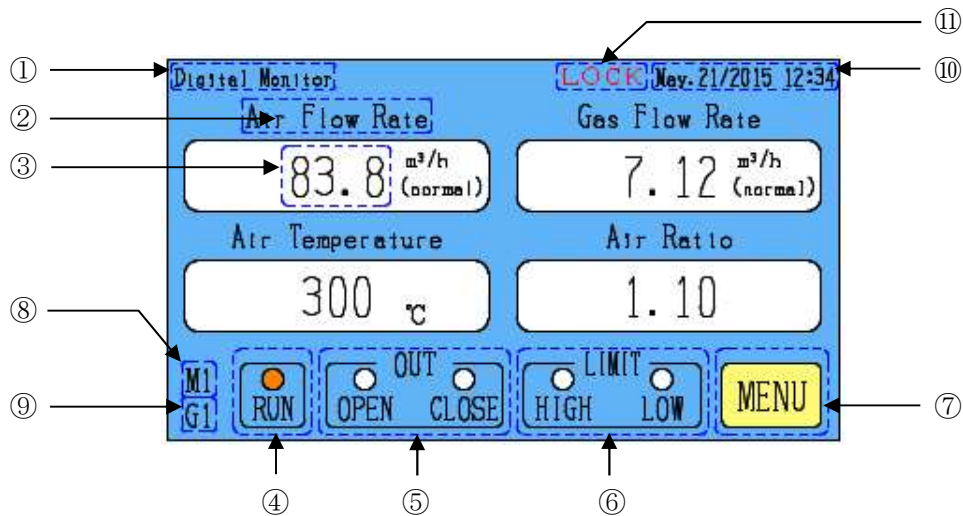
①.Ver. : Current program version is displayed.

②.SERIAL. : Serial number is displayed.

• After about 3 sec, the screen is switched to the **【5-1.Digital Monitor Screen】** .

5. Digital Monitor

5-1. Digital Monitor Screen



①. The name of the currently displayed screen is displayed.

②. The name of the each digital Monitor is displayed.

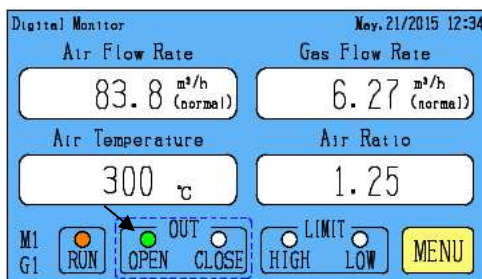
Digital Monitor Change Button : The screen is switched to the

【5-2. Digital Monitor Display Name Switching Screen】

③. The each digital Monitor is displayed. The unused item is gray displayed.

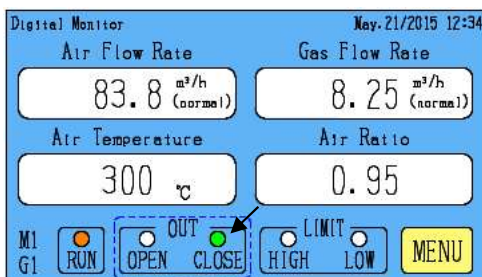
④. RUN: Lamp ON (Orange) : In operation Lamp OFF : In standby

⑤. The state of open output or closed output is displayed.



During combustion at a higher air ratio than the set ratio, OPEN output lamp remains ON/blinking (green).

This indicates that output is ongoing to the fuel control motor OPEN.

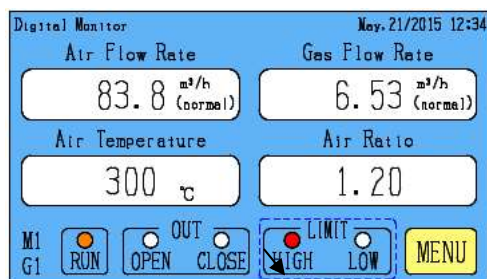


During combustion at a lower air ratio than the set ratio, CLOSE output lamp remains ON/blinking (green).

This indicates that output is ongoing to the fuel control motor CLOSE.

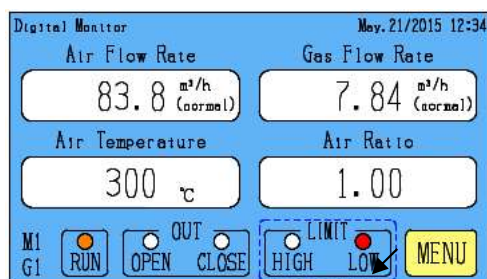
During combustion at the set air ratio, both OPEN and CLOSE output lamps remain OFF

- ⑥. The state of HIGH (full open) limit input or LOW (full close) limit input is displayed.



If the fuel control motor has reached the limit during combustion at a higher air ratio than the set ratio, HIGH lamp remains ON (red).

This indicates that the fuel control motor is fully opened.



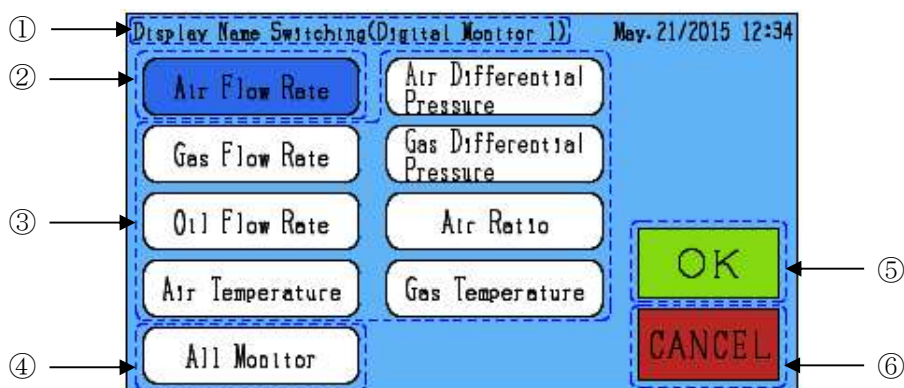
If the fuel control motor has reached the limit during combustion at a lower air ratio than the set ratio, LOW lamp remains ON (red).

This indicates that the fuel control motor is fully closed.

During combustion with the fuel control motor driven within the drive range, both OPEN and CLOSE output lamps remain OFF.

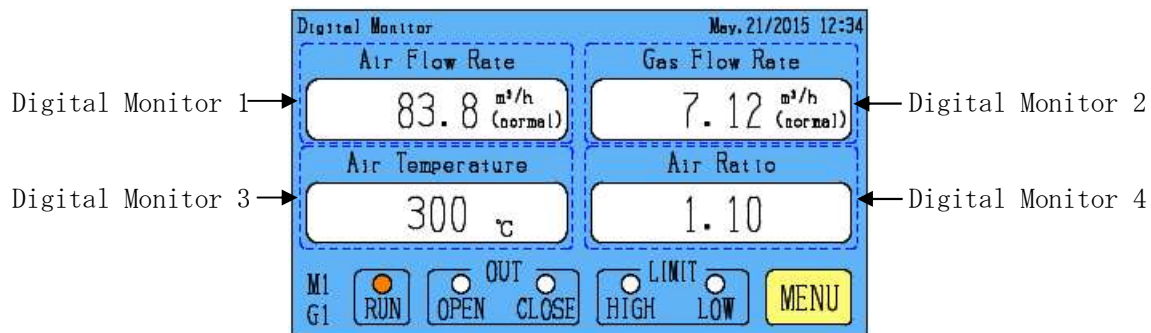
- ⑦. Menu Button: The screen is switched to the **【6-1. Menu Screen】**.
- ⑧. Air ratio setting symbol in the selection is displayed.
- ⑨. Fuel symbol in the selection is displayed.
- ⑩. Clock: Current date and time is displayed.
- ⑪. LOCK: To lock the screen, press and hold down the Menu button for over 5 sec.
 Locked state: "LOCK" is displayed to the left of the current date and time.
 To unlock the screen, press and hold down the Menu button for over 5 sec again.

5-2. Digital Monitor Display Name Switching Screen



①. The name of the currently setting is displayed.

<Positions of Display Name Switching Screen items displayed in Digital Monitor Screen>



②. Select name is displayed in blue.

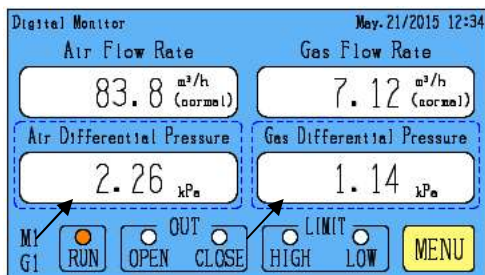
③. Non-selected name is displayed in white.

④. All Monitor Button : The screen is switched to the **【5-3.All Digital Monitor Screen】** .

⑤. OK Button : Determine the displayed item selection, the screen is switched to the **【5-1.Digital Monitor Screen】** .

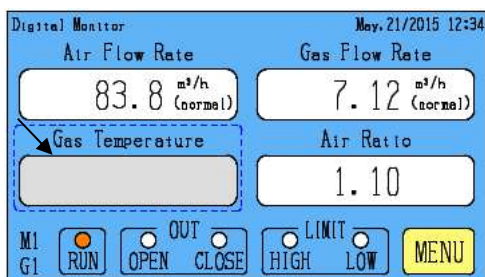
⑥. CANCEL Button : Revocation the displayed item selection, the screen is switched to the

【5-1.Digital Monitor Screen】 .



<Display Name Switching Example 1>

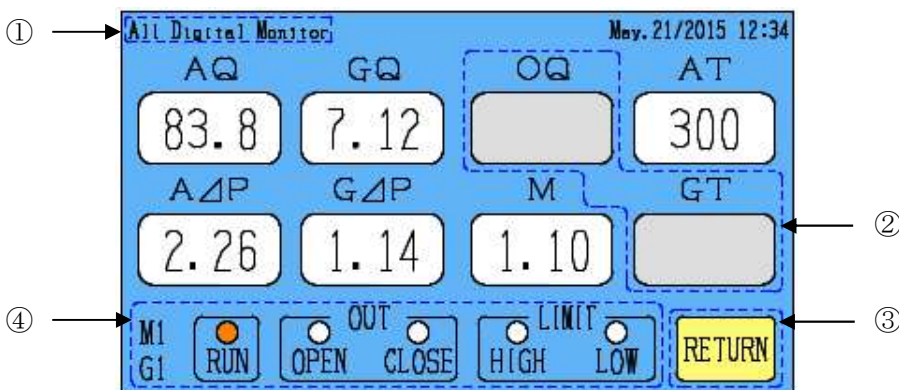
When digital monitor item 3 is changed from Air Temperature to Air Differential Pressure and digital monitor item 4 is changed from Air Ratio to Gas Differential Pressure, the screen as shown on the left is displayed.



<Display Name Switching Example 2>

When digital monitor item 3 is changed from Air Temperature to Gas Temperature and the gas thermocouple is not used, Gas Thermocouple section is dimmed.

5-3. All Digital Monitor Screen



- ①. The name of the currently displayed screen is displayed.
- ②. The unused item is dimmed.
- ③. RETURN Button : The screen is switched to the 【5-1.Digital Monitor Screen】 .
- ④. The same display operation with 【5-1.Digital Monitor Screen】 ④⑤⑥⑧⑨.

<Symbol : Name>

AQ : Air Flow Rate GQ : Gas Flow Rate OQ : Oil Flow Rate
 AT : Air Temperature AΔP : Air Differential Pressure
 GΔP : Gas Differential Pressure M : Air Ratio GT : Gas Temperature

6. Menu

6-1. Menu Screen



①. The name of the currently displayed screen is displayed.

②. Digital Monitor Button : The screen is switched to the 【5-1.Digital Monitor Screen】 .

③. Waveform Monitor Button : The screen is switched to the 【7-1.Waveform Monitor Screen】 .

④. Air Ratio Setting Button : The screen is switched to the 【8-1.Air Ratio Setting Screen】 .

(When the optional Air Ratio Detail Setting is ON, the screen is switched to the 【11-2-1. Air Ratio Detail Setting Screen】 .)

⑤. Air·Fuel Setting Button : The screen is switched to the 【9-1.Air·Fuel Setting Menu Screen】 .

⑥. Environment Setting Button : The screen is switched to the 【10-1.Environment Setting Menu Screen】 .

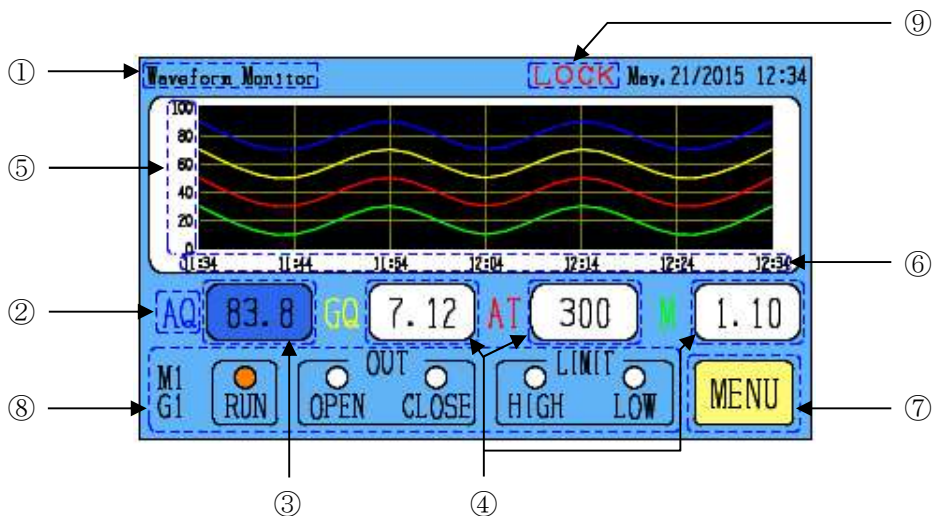
(Option Setting , Manual Setting , Com Setting , System Setting , Date/Time Setting)

⑦. Alarm History Button : The screen is switched to the 【16-1.Alarm History Screen】 .

(Alarm Setting)

7. Waveform Monitor

7-1. Waveform Monitor Screen



<Name : Symbol (Waveform Display Color) >

Air Flow Rate : A Q (Blue)、Gas Flow Rate : G Q (Yellow)、Air Temperature : A T (Red)

Air Ratio : M (Green)、Oil Flow Rate : O Q (Orange)

Air Differential Pressure : A Δ P (Light blue)

Gas Differential Pressure : G Δ P (Purple)、Gas Temperature : G T (Pink)

①. The name of the currently displayed screen is displayed.

②. The symbol of the each waveform Monitor is displayed.

Symbol Button : The screen is switched to the 【7-2. Waveform Monitor Display Name Switching Screen】 .

③. The digital of the each waveform Monitor is displayed.

Select item is displayed in blue.

The selected item is displayed in the display range ⑤.

Unused items or hide items is gray displayed.

④. Non-selected item is white color displayed.

⑤. Display Range : Range of selected items will be displayed.

Display Range Button : The screen is switched to the 【7-3. Waveform Monitor Display Range Setting Screen】 .

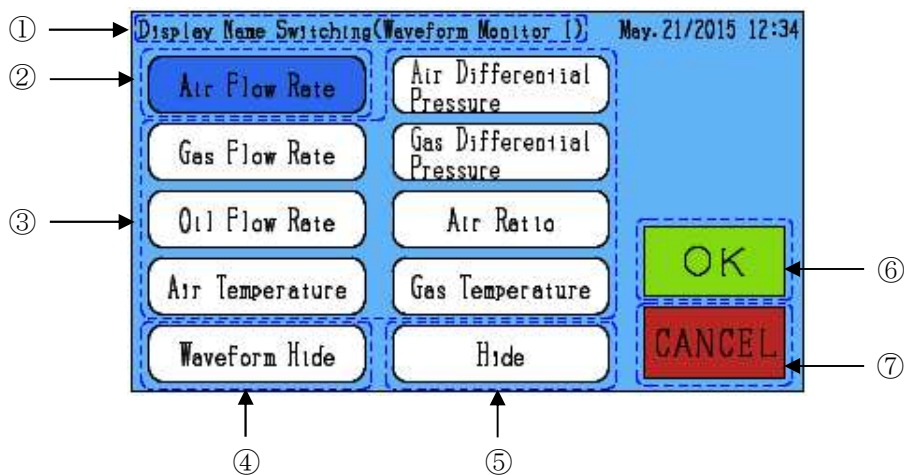
⑥. Time scale : The scale of one hour is displayed.

⑦. Menu Button : The screen is switched to the 【6-1. Menu Screen】 .

⑧. The same display operation with 【5-1. Digital Monitor Screen】 ④⑤⑥⑧⑨.

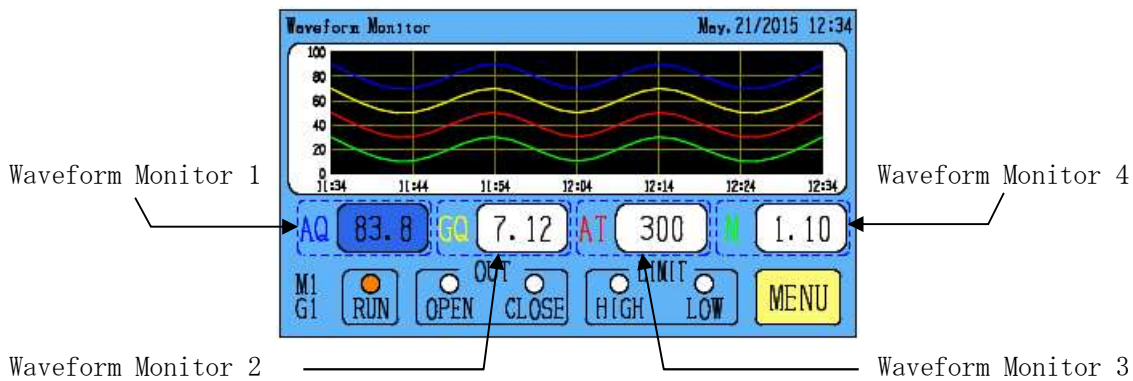
⑨. The same display operation with 【5-1. Digital Monitor Screen】 ⑪.

7-2. Waveform Monitor Display Name Switching Screen

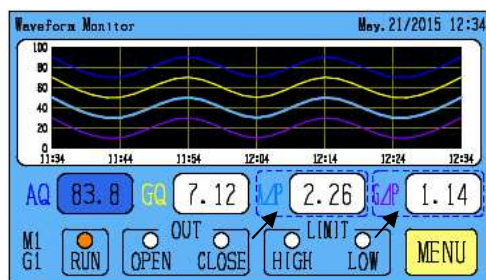


①. The name of the currently displayed screen is displayed.

<Positions of Display Name Switching Screen items displayed in Waveform Monitor Screen>

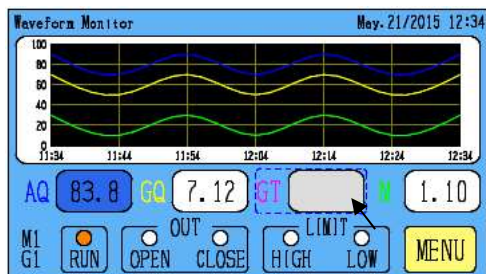


- ②. Select name is displayed in blue.
- ③. Non-selected name is displayed in white.
- ④. Waveform Hide : Waveform of the selected item is hidden.
- ⑤. Hide : Waveform and digital will be hidden. Digital is gray displayed.
- ⑥. OK Button: Determine the displayed item selection, the screen is switched to the **【7-1. Waveform Monitor Screen】**.
- ⑦. CANCEL Button : Revocation the displayed item selection, the screen is switched to the **【7-1. Waveform Monitor Screen】**.



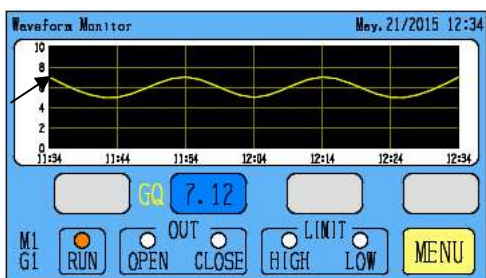
<Display Name Switching Example 1>

When waveform monitor item 3 is changed from Air Temperature to Air Differential Pressure and waveform monitor item 4 is changed from Air Ratio to Gas Differential Pressure, the screen as shown on the left is displayed.



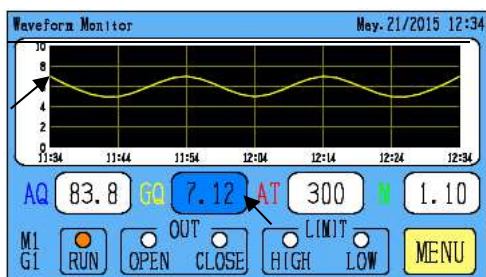
<Display Name Switching Example 2>

When waveform monitor item 3 is changed from Air Temperature to Gas Temperature and the gas thermocouple is not used, Gas Thermocouple section is dimmed and waveform will be non-display.



< Display Name Switching Example 3>

If non-display of waveform is selected for waveform monitor items 1, 3 and 4, the waveform is displayed only for waveform monitor item 2 as shown on the left.

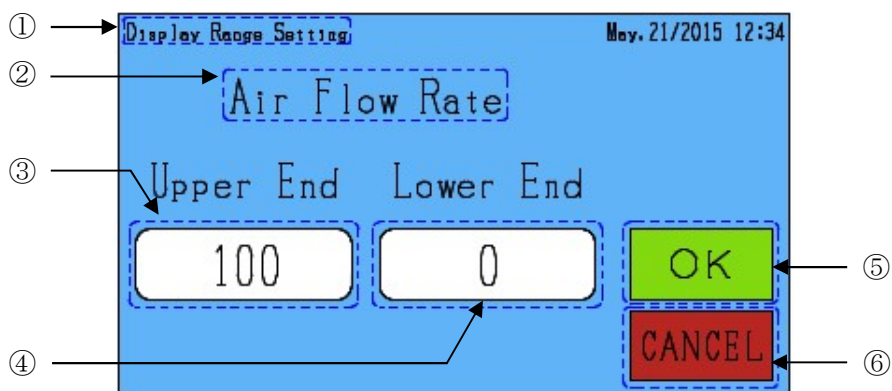


< Display Name Switching Example 4>

If non-display is selected for waveform monitor items 1, 3 and 4, the value and waveform are displayed only for waveform monitor item 2 as shown on the left.

- The time scale of the waveform monitor is 1 hour. The waveform data displayed for over 1 hour disappears.
- The waveform is displayed only while the machine is in operation. If the machine stops and restarts, all the waveforms disappear and then appear again.
- If the waveform of a monitor item extends out of the display range, lines are drawn along the upper and lower limits.
- The waveform data is discarded upon the machine power-off.

7-3. Waveform monitor display range setting screen



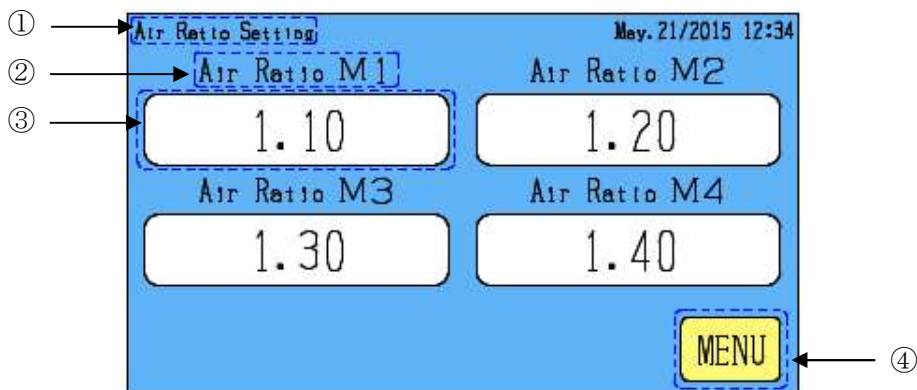
- ①. The name of the currently setting is displayed.
- ②. The name of the currently displayed range setting is displayed.
- ③. The upper end side setting value of the display range is displayed.
 Display range upper end Button : The screen is switched to the **【18-1.Digital Input Screen】** .
- ④. The lower end side setting value of the display range is displayed.
 Display range lower end button : The screen is switched to the **【18-1.Digital Input Screen】** .
- ⑤. OK button : Determine the setting, the screen is switched to the **【7-1.Waveform Monitor Screen】** .
- ⑥. CANCEL button : Revocation the setting, the screen is switched to the **【7-1.Waveform Monitor Screen】** .

<Display range setting range>

Name	Upper End/Lower End	Setting range
Air (gas) flow rate	Upper End	(Lower End +10) ~99999
	Lower End	0 ~ (Upper End -10)
Oil flow rate	Upper End	(Lower End +10) ~9999
	Lower End	0 ~ (Upper End -10)
Air (gas) temperature	Upper End	(Lower End +10) ~800
	Lower End	0 ~ (Upper End -10)
Air (gas) pressure difference	Upper End	(Lower End +0.1) ~3.00
	Lower End	0.00 ~ (Upper End -0.1)
Air ratio	Upper End	(Lower End +0.1) ~4.00
	Lower End	0.00 ~ (Upper End -0.1)

8. Air Ratio Setting

8-1. Air Ratio Setting Screen



- ①. The name of the currently setting is displayed.
- ②. Air ratio symbol : The air ratio can be set for four points: M1 to M4.
The air ratio to be controlled is selected according to the combination of terminal blocks K1 and K2 for input.
If either terminal block K1 or K2 is not connected by wiring, Air Ratio M1 is selected.
- ③. Set value of each air ratio will be displayed.
Air Ratio Setting Button: The screen is switched to the : **【18-1.Digital Input Screen】** .
- ④. Menu Button : The screen is switched to the **【6-1.Menu Screen】** .

※The air ratio settings can be changed from 0.00 to 4.00 in units of 0.01, Be sure to select the set value that fits the burner characteristics. If the set air ratio is not appropriate trouble could be caused.

9. Air•Fuel Setting

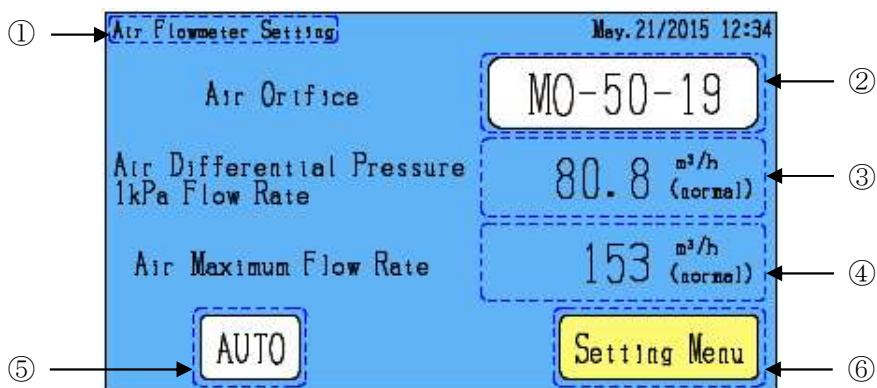
9-1. Air•Fuel Setting Menu Screen



- ①. The name of the currently setting is displayed.
- ②. Air Setting Button : The screen is switched to the 【9-2. Air Flowmeter Setting Screen】 .
- ③. Fuel Setting Button : The screen is switched to the 【9-3. Fuel Selection Screen】 .
- ④. MENU Button : The screen is switched to the 【6-1. Menu Screen】 .

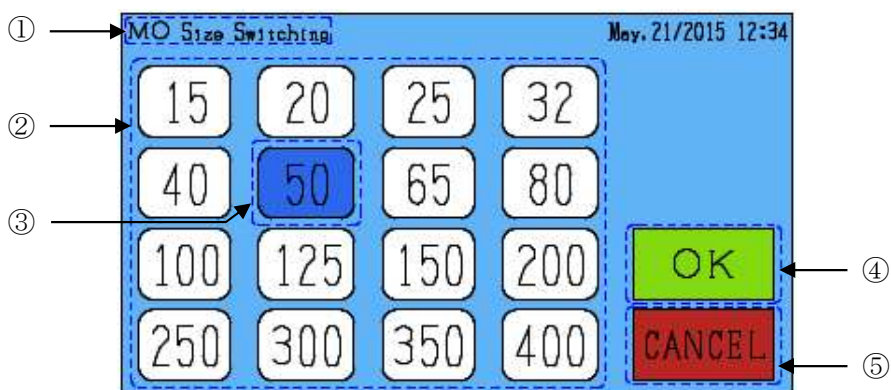
9-2. Air Setting

9-2-1. Air Flowmeter Setting Screen (AUTO)



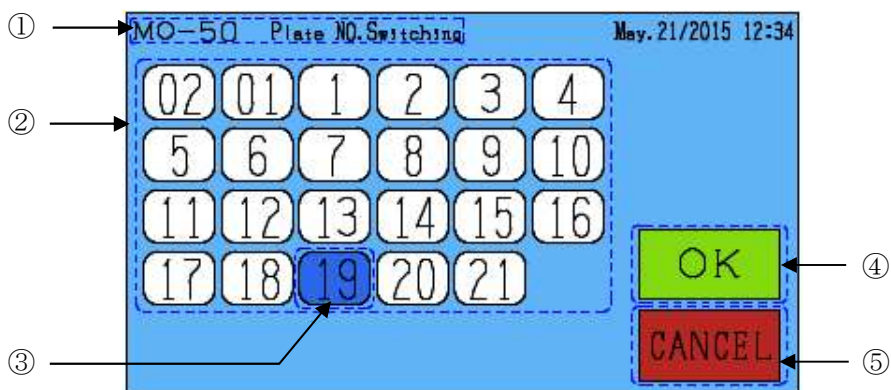
- ①. The name of the currently setting is displayed.
- ②. Air Orifice : Indicates the MO size and Plate No. of the currently-used orifice plate.
Air Orifice Setting Button : The screen is switched to the 【9-2-2. MO Size Switching Screen】 .
- ③. Air Differential Pressure 1kPa Flow Rate : Automatically displays the air flow rate of the currently-used orifice at a differential pressure of 1kPa.
- ④. Air Maximum Flow Rate : Automatically displays the air flow rate at a differential pressure of 3.6kPa of the currently-used orifice plate.
(3.6kPa is the maximum value for the differential pressure sensor.)
- ⑤. AUTO Button : The screen is switched to the 【9-2-4. Air Flowmeter Setting Screen (MANUAL)】 .
- ⑥. Setting Menu Button : The screen is switched to the 【9-1. Air•Fuel Setting Menu Screen】 .

9-2-2. MO Size Switching Screen



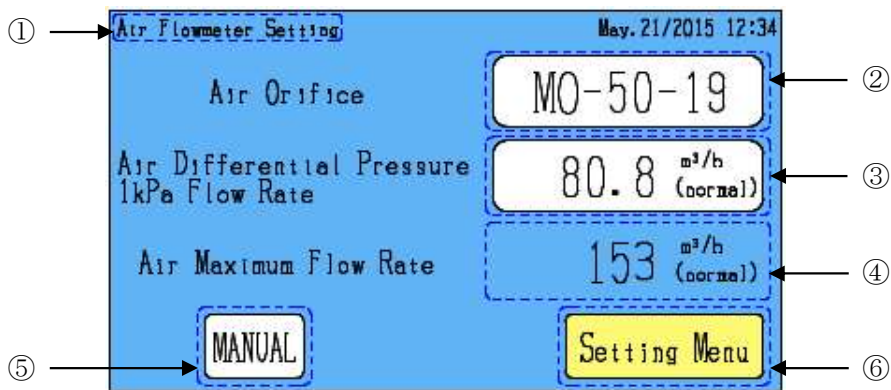
- ①. The name of the currently setting is displayed.
- ②. All MO size is displayed.
- ③. The MO size currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the **【9-2-3. Plate NO. Switching Screen】** .
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the **【9-2-1. Air Flowmeter Setting Screen (AUTO)】** .

9-2-3. Plate NO. Switching Screen



- ①. The name of the currently setting is displayed. (The MO size select will be displayed.)
- ②. The plate NO. currently selected is displayed. (Only the selected MO size standard plate No. is displayed.)
- ③. The plate NO. currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the **【9-2-1. Air Flowmeter Setting Screen (AUTO)】** .
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the **【9-2-2. MO Size Switching Screen】** .

9-2-4. Air Flowmeter Setting Screen (MANUAL)



①. The name of the currently setting is displayed.

②. Air Orifice Setting Button : The screen is switched to the **【18-1.Digital Input Screen】** .

③. Air Differential Pressure 1kPa Flow Rate Setting Button :

The screen is switched to the **【18-1.Digital Input Screen】** .

Input the air flow rate at a differential pressure of 1kPa.

④. Air Maximum Flow Rate : Automatically displays the air flow rate at a differential pressure of 3.6kPa based on the inputted value in [Air Differential Pressure 1kPa Flow Rate].

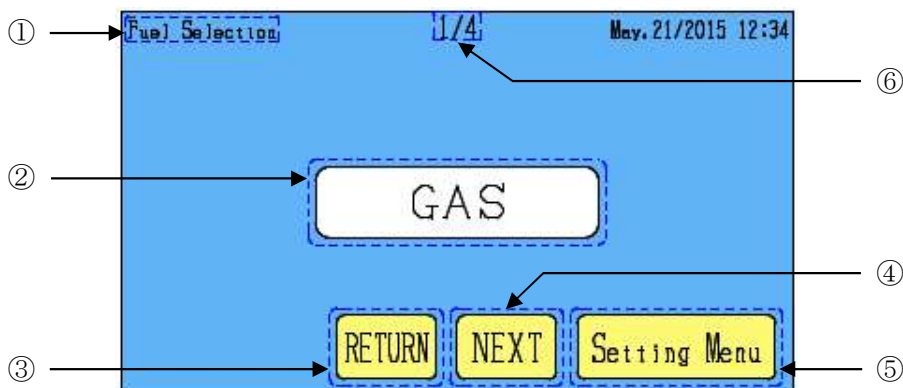
(3.6kPa is the maximum value for the differential pressure sensor.)

⑤. MUNUAL Button : The screen is switched to the **【9-2-1.Air Flowmeter Setting Screen (AUTO)】** .

⑥. Setting Menu Button : The screen is switched to the **【9-1.Air·Fuel Setting Menu Screen】** .

9-3. Fuel Setting (GAS)

9-3-1. Fuel Selection Screen



①. The name of the currently setting is displayed.

②. Fuel Selection Name : Indicates the fuel to be used.

Fuel Selection Button : The screen is switched to the **【9-3-2. Fuel Selection Switching Screen】** .

If OIL has been selected, touch GAS button to change the fuel to gas.

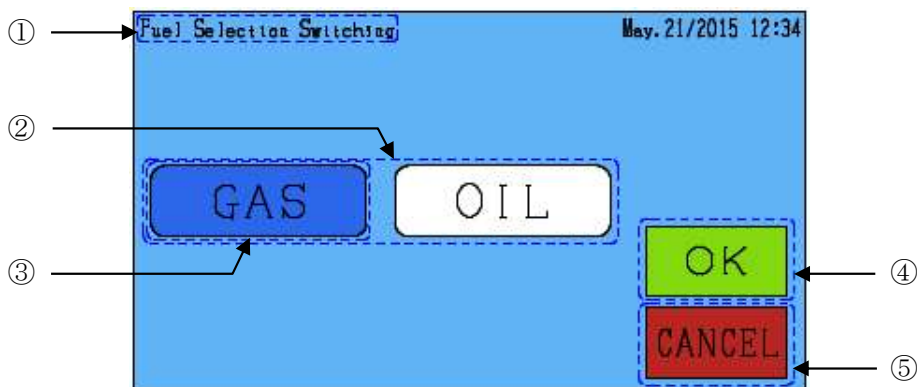
③. RETURN Button : The screen is switched to the **【9-3-6. Gas Flowmeter Setting Screen】** .

④. NEXT Button : The screen is switched to the **【9-3-3. Gas Type Selection Screen】** .

⑤. Setting Menu Button : The screen is switched to the **【9-1. Air·Fuel Setting Menu Screen】** .

⑥. Indicates No. of currently displayed page / Total number of pages.

9-3-2. Fuel Selection Switching Screen



①. The name of the currently setting is displayed.

②. The name of the selection is displayed.

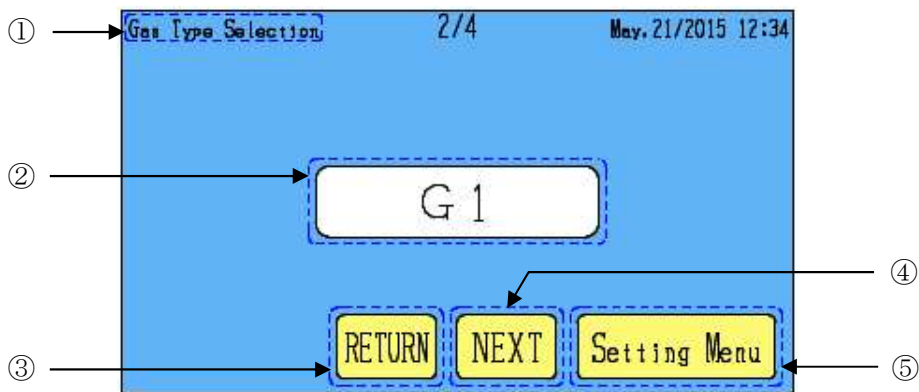
③. The name currently selected is displayed in blue.

If OIL has been selected, touch GAS button to change the fuel to gas.

④. OK button : Determine the setting, the screen is switched to the **【9-3-1. Fuel Selection Screen】** .

⑤. CANCEL button : Revocation the setting, the screen is switched to the **【9-3-1. Fuel Selection Screen】** .

9-3-3. Gas Type Selection Screen



- ①. The name of the currently setting is displayed.
- ②. Gas Symbol : Gas symbol of the currently using is displayed.
Gas Type Selection Button : The screen is switched to the **【9-3-4. Gas Type Selection Switching Screen】** .
- ③. RETURN Button : The screen is switched to the **【9-3-1. Fuel Selection Screen】** .
- ④. NEXT Button : The screen is switched to the **【9-3-5. Gas Type Parameter Setting Screen】** .
- ⑤. Setting Menu : The screen is switched to the **【9-1. Air·Fuel Setting Menu Screen】** .

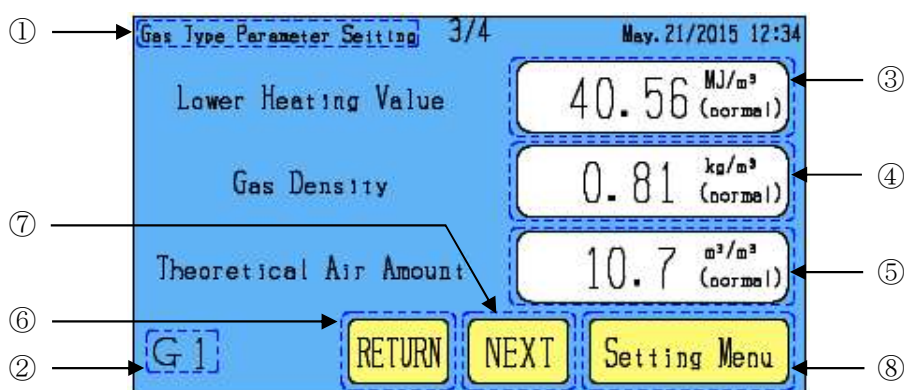
9-3-4. Gas Type Selection Switching Screen

• A maximum of 4 types of gas parameters can be set.



- ①. The name of the currently setting is displayed.
- ②. Gas symbol of the selection is displayed.
- ③. Gas symbol currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the **【9-3-3. Gas Type Selection Screen】** .
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the **【9-3-3. Gas Type Selection Screen】** .

9-3-5. Gas Type Parameter Setting Screen

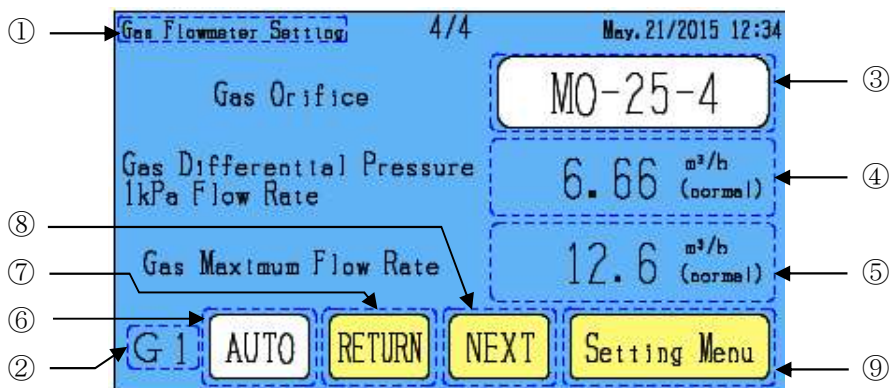


- ①. The name of the currently setting is displayed.
- ②. Gas symbol of the currently parameter setting is displayed.
- ③. Lower Heating Value : Lower Heating value of the currently parameter setting gas symbol is displayed.
Lower Heating Value Setting Button : The screen is switched to the 【18-1.Digital Input Screen】 .
- ④. Gas Density : Gas density of the currently parameter setting gas symbol is displayed.
Gas Density Setting Button : The screen is switched to the 【18-1.Digital Input Screen】 .
- ⑤. Theoretical Air Amount : Theoretical air amount of the currently parameter setting gas symbol is displayed.
Theoretical Air Amount setting Button : The screen is switched to the 【18-1.Digital Input Screen】 .
- ⑥. RETURN Button : The screen is switched to the 【9-3-3.Gas Type Selection Screen】 .
- ⑦. NEXT Button : The screen is switched to the 【9-3-6.Gas Flowmeter Setting Screen】 .
- ⑧. Setting Menu Button : The screen is switched to the 【9-1.Air·Fuel Setting Menu Screen】 .

• Refer to the below table for the lower heating value, gas density and theoretical air amount for each gas type.

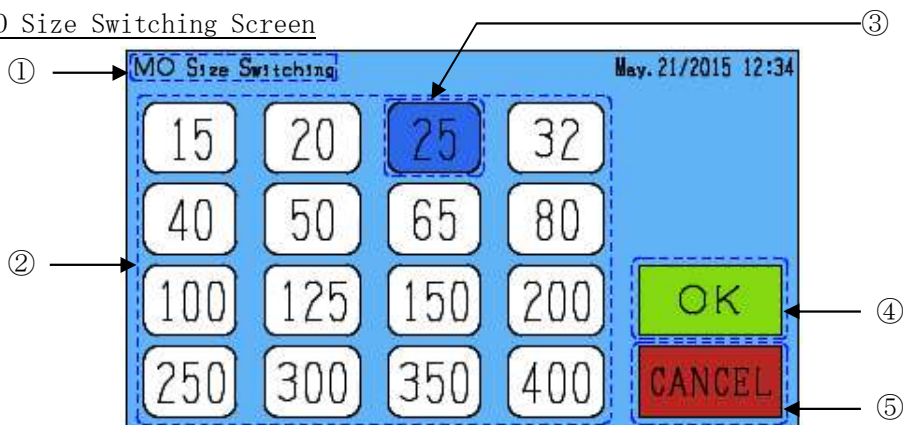
Fuel	Lower Heating Value	Gas Density	Theoretical Air Amount
	MJ/m ³ (normal)	kg/m ³ (normal)	m ³ /m ³ (normal)
LNG	40.79	0.82	10.7
LPG (Butane)	123.74	2.60	31.0
LPG (Propane)	93.39	1.97	23.9

9-3-6. Gas Flowmeter Setting Screen (AUTO)



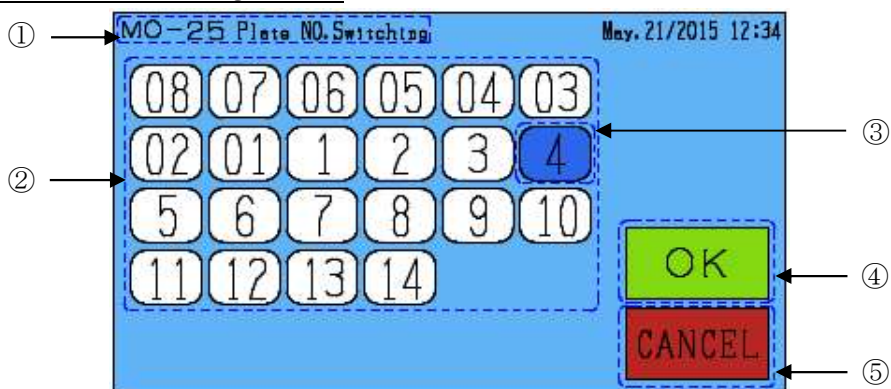
- ①. The name of the currently setting is displayed.
- ②. Gas symbol of the currently parameter setting is displayed.
- ③. Gas Orifice : Indicates the MO size and Plate No. of the currently-used orifice plate.
Gas Orifice Setting Button : The screen is switched to the 【9-3-7.MO Size Switching Screen】 .
- ④. Gas Differential Pressure 1kPa Flow Rate : Automatically displays the gas flow rate of the currently-used orifice at a differential pressure of 1kPa.
- ⑤. Gas Maximum Flow Rate : Automatically displays the gas flow rate at a differential pressure of 3.6kPa of the currently-used orifice plate.
(3.6kPa is the maximum value for the differential pressure sensor.)
- ⑥. AUTO Button : The screen is switched to the 【9-3-9.Gas Flowmeter Setting (MANUAL)】 .
- ⑦. RETURN Button : The screen is switched to the 【9-3-5.Gas Type Parameter Setting Screen】 .
- ⑧. NEXT Button : The screen is switched to the 【9-3-1.Fuel Selection Screen】 .
- ⑨. Setting Menu Button : The screen is switched to the 【9-1.Air·Fuel Setting Menu Screen】 .

9-3-7. MO Size Switching Screen



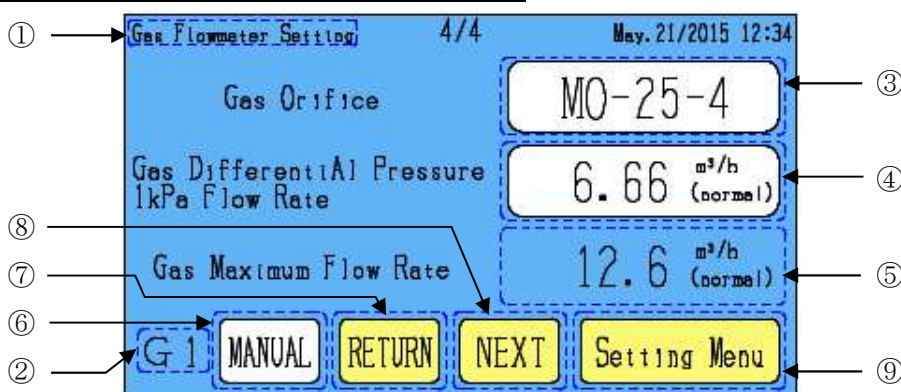
- ①. The name of the currently setting is displayed.
- ②. All MO size is displayed.
- ③. The MO size currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the 【9-3-8.Plate NO. Switching Screen】 .
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the 【9-3-6.Gas Flowmeter Setting Screen】 .

9-3-8. Plate NO. Switching Screen



- ①. The name of the currently setting is displayed. (The M0 size select will be displayed.)
- ②. The plate NO. currently selected is displayed. (Only the selected M0 size standard plate No. is displayed.)
- ③. The plate NO. currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the 【9-3-6. Gas Flowmeter Setting Screen】.
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the 【9-3-7. M0 Size Switching Screen】.

9-3-9. Gas Flowmeter Setting Screen (MANUAL)



- ①. The name of the currently setting is displayed.
- ②. Gas symbol of the currently parameter setting is displayed.
- ③. Gas Orifice Setting Button : The screen is switched to the 【18-1. Digital Input Screen】.
- ④. Gas Differential Pressure 1kPa Flow Rate Setting Button : The screen is switched to the 【18-1. Digital Input Screen】.

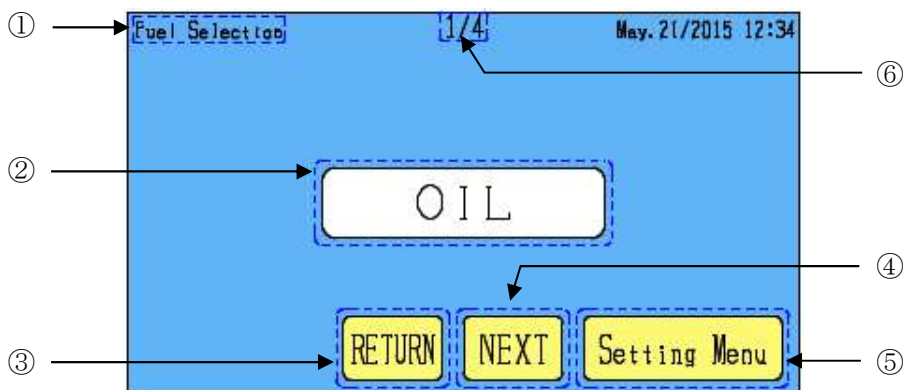
※Input the air flow rate at a differential pressure of 1kPa.

The displayed rate is calculated in terms of gas flow rate.

- ⑤. Gas Maximum Flow Rate : Automatically displays the gas flow rate at a differential pressure of 3.6kPa based on the inputted value in [Gas Differential Pressure 1kPa Flow Rate].
(3.6kPa is the maximum value for the differential pressure sensor.)
- ⑥. MANUAL Button : The screen is switched to the 【9-3-6. Gas Flowmeter Setting (AUTO)】.
- ⑦. RETURN Button : The screen is switched to the 【9-3-5. Gas Type Parameter Setting Screen】.
- ⑧. NEXT Button : The screen is switched to the 【9-3-1. Fuel Selection Screen】.
- ⑨. Setting Menu Button : The screen is switched to the 【9-1. Air·Fuel Setting Menu Screen】.

9-4. Fuel Setting (OIL)

9-4-1. Fuel Selection Screen



①. The name of the currently setting is displayed.

②. Fuel Selection Name : Indicates the fuel to be used.

Fuel Selectin Button : The screen is switched to the **【9-4-2.Fuel Selection Switching Screen】** .

If GAS has been selected, touch OIL button to change the fuel to gas.

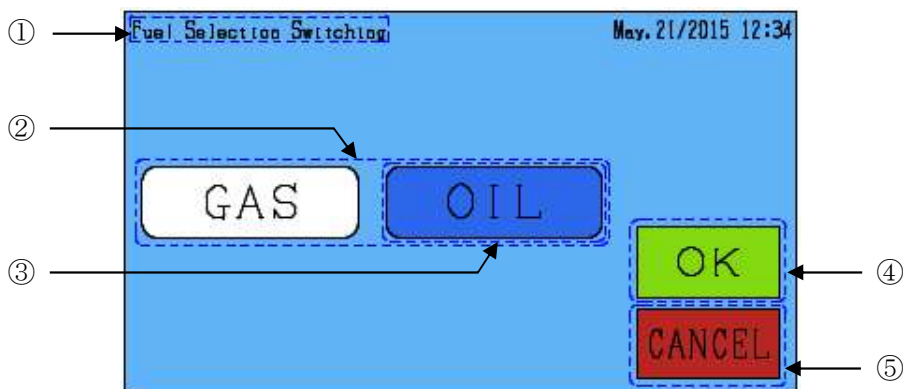
③. RETURN Button : The screen is switched to the **【9-4-6.Oil Flowmeter Setting Screen】** .

④. NEXT Button : The screen is switched to the **【9-4-3.Oil Type Selection Screen】** .

⑤. Setting Menu Button : The screen is switched to the **【9-1.Air·Fuel Setting Menu Screen】** .

⑥. Indicates No. of currently displayed page / Total number of pages.

9-4-2. Fuel Selection Switching Screen



①. The name of the currently setting is displayed.

②. The name of the selection is displayed.

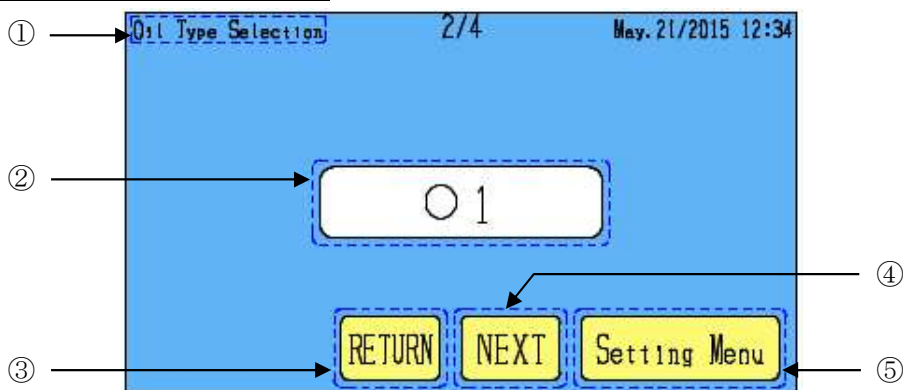
③. The name currently selected is displayed in blue.

If GAS has been selected, touch OIL button to change the fuel to gas.

④. OK button : Determine the setting, the screen is switched to the **【9-4-1.Fuel Selection Screen】** .

⑤. CANCEL button : Revocation the setting, the screen is switched to the **【9-4-1.Fuel Selection Screen】**

9-4-3. Oil Type Selection Screen



①. The name of the currently setting is displayed.

②. Oil Symbol : Oil symbol of the currently using is displayed.

Oil Type Selection Button : The screen is switched to the **【9-4-4.Oil Type Selection Switching Screen】** .

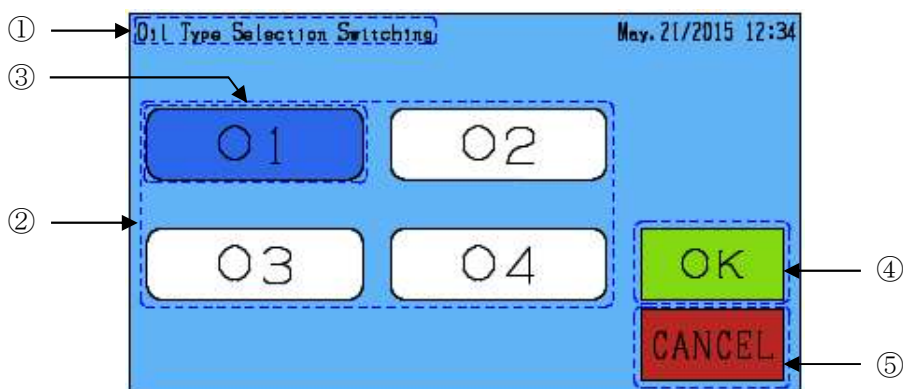
③. RETURN Button : The screen is switched to the **【9-4-1.Fuel Selection Screen】** .

④. NEXT Button : The screen is switched to the **【9-4-5.Oil Type Parameter Setting Screen】** .

⑤. Setting Menu Button : The screen is switched to the **【9-1.Air·Fuel Setting Menu Screen】** .

9-4-4.Oil Type Selection Switching Screen

- A maximum of 4 types of oil parameters can be set



①. The name of the currently setting is displayed.

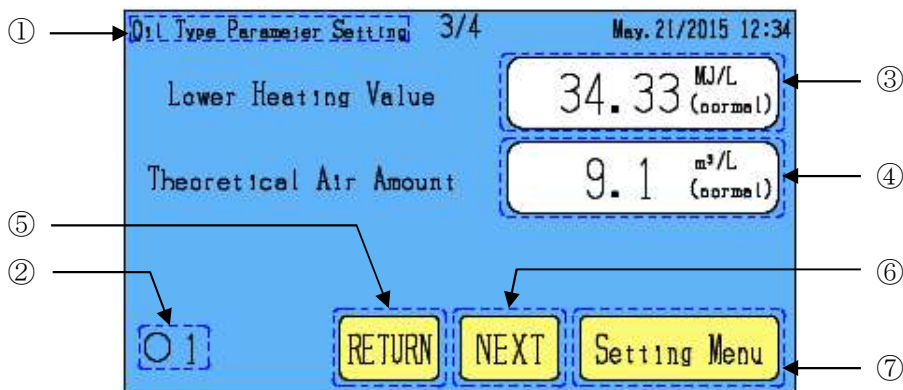
②. Oil symbol of the selection is displayed.

③. Oil symbol currently selected is displayed in blue.

④. OK button : Determine the setting, the screen is switched to the **【9-4-3.Oil Type Selection Screen】** .

⑤. CANCEL button : Revocation the setting, the screen is switched to the **【9-4-3.Oil Type Selection Screen】** .

9-4-5. Oil Type Parameter Setting Screen

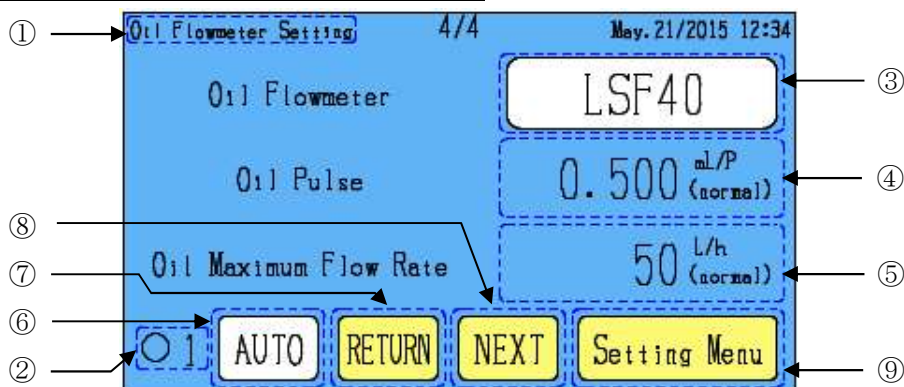


- ①. The name of the currently setting is displayed.
- ②. Oil symbol of the currently parameter setting is displayed.
- ③. Lower Heating Value : Lower Heating value of the currently parameter setting oil symbol is displayed.
Lower Heating Value Setting Button : The screen is switched to the 【18-1.Digital Input Screen】 .
- ④. Theoretical Air Amount : Theoretical air amount of the currently parameter setting gas symbol is displayed.
Theoretical Air Amount setting Button : The screen is switched to the 【18-1.Digital Input Screen】 .
- ⑤. RETURN Button : The screen is switched to the 【9-4-3.Oil Type Selection Screen】 .
- ⑥. NEXT Button : The screen is switched to the 【9-4-6.Oil Flowmeter Setting Screen】
- ⑦. Setting Menu Button : The screen is switched to the 【9-1.Air·Fuel Setting Menu Screen】 .

• Refer to the below table for the lower heating value, theoretical air amount for each oil type.

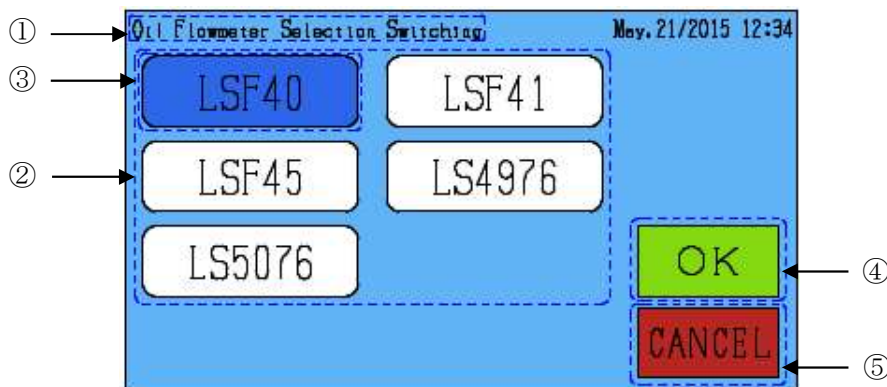
Fuel	Lower Heating Value	Theoretical Air Amount
	MJ/L(normal)	m ³ /L(normal)
Kerosene	34.33	9.1
A Heavy oil	36.92	9.7
Light oil	34.74	9.4

9-4-6. Oil Flowmeter Setting Screen (AUTO)



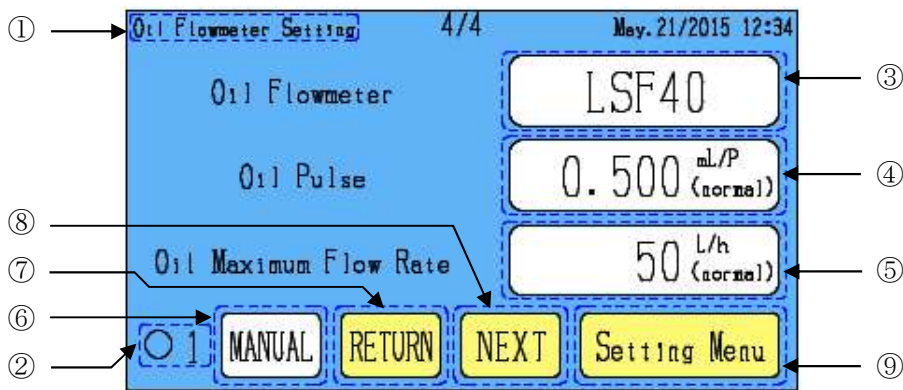
- ①. The name of the currently setting is displayed.
- ②. Oil symbol of the currently parameter setting is displayed.
- ③. Oil Flowmeter : Indicates the model of the oil flowmeter (oil sensor) currently used.
Oil Flowmeter Setting Button: The screen is switched to the **【9-4-7. Oil Flowmeter Selection Switching Screen】**.
- ④. Oil Pulse : Automatically displays the oil pulse of the oil flowmeter currently used.
- ⑤. Oil Maximum Flow Rate : Automatically displays the maximum flow rate of the oil flowmeter currently used.
- ⑥. AUTO Button : The screen is switched to the **【9-4-8. Oil Flowmeter Setting (MANUAL)】**.
- ⑦. RETURN Button : The screen is switched to the **【9-4-5. Oil Type Parameter Setting Screen】**.
- ⑧. NEXT Button : The screen is switched to the **【9-4-1. Fuel Selection Screen】**.
- ⑨. Setting Menu Button : The screen is switched to the **【9-1. Air·Fuel Setting Menu Screen】**.

9-4-7. Oil Flowmeter Selection Switching Screen



- ①. The name of the currently setting is displayed.
- ②. All oil flowmeter is displayed.
- ③. Oil flowmeter currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the **【9-4-6. Oil Flowmeter Setting Screen】**.
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the **【9-4-6. Oil Flowmeter Setting Screen】**.

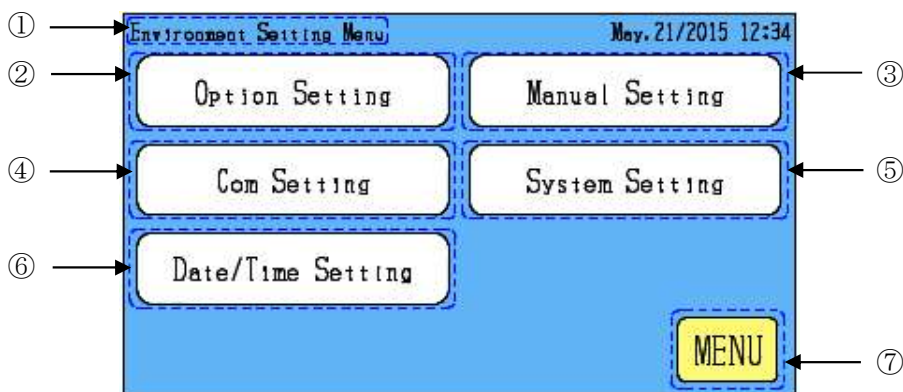
9-4-8. Oil Flowmeter Setting Screen (MANUAL)



- ①. The name of the currently setting is displayed.
- ②. Oil symbol of the currently parameter setting is displayed.
- ③. Oil Flowmeter Setting Button : The screen is switched to the 【18-1.Digital Input Screen】 .
- ④. Oil Pulse Setting Button : The screen is switched to the 【18-1.Digital Input Screen】 .
- ⑤. Oil Maximum Flow Rate Button : The screen is switched to the 【18-1.Digital Input Screen】 .
- ⑥. AUTO Button : The screen is switched to the 【9-4-6.Oil Flowmeter Setting Screen (AUTO)】 .
- ⑦. RETURN Button : The screen is switched to the 【9-4-5.Oil Type Parameter Setting Screen】 .
- ⑧. NEXT Button : The screen is switched to the 【9-4-1.Fuel Selection Screen】 .
- ⑨. Setting Menu Button : The screen is switched to the 【9-1.Air·Fuel Setting Menu Screen】 .

10. Environment Setting

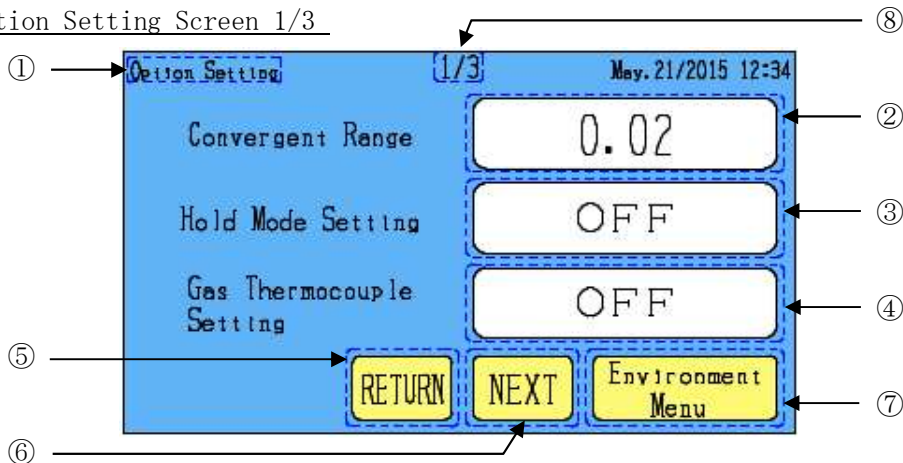
10-1.Environment Setting Menu Screen



- ①. The name of the currently setting is displayed.
- ②. Option Setting Button : The screen is switched to the 【11-1.Option Setting Screen】 .
- ③. Manual Setting Button : The screen is switched to the 【12-1.Manual Setting Screen】 .
- ④. Com Setting Button : The screen is switched to the 【13-1.Com Setting Screen】 .
- ⑤. System Setting Button : The screen is switched to the 【14-1.System Setting Screen】 .
- ⑥. Date/Time Setting Button : The screen is switched to the 【15-1.Date/Time Setting Screen】 .
- ⑦. MENU Button : The screen is switched to the 【6-1.Menu Screen】 .

11. Option Setting

11-1.Option Setting Screen 1/3



- ①. The name of the currently setting is displayed.
- ②. Convergent Range : Indicates the range within which the control is judged stable. (Setting Range : 0.00~1.00)
Used to set the convergent range in terms of +/- margins to the set air ratio.
Example: If the air ratio is set to 1.10 and the convergent range is set to 0.02:
The control is judged stable as long as the air ratio is within 1.08 to 1.12.
Convergent Range Button : The screen is switched to the 【18-1.Digital Input Screen】 .

③. Hold Mode Setting : Set the motion of the fuel control motor after operation stop.

Hold Mode Setting Button : The screen is switched to the 【18-3. OFF/ON Setting Screen】 .

OFF: The fuel control motor will be closed to the full close limit after operation stop.

ON: The fuel control motor position will be held even after operation stop

The motor will start operation from the position held as above.

●Setting Hold Mode to ON is effective in the following cases:

- The product is vulnerable to oxidation and reducing combustion is desirable even after re-ignition. ; or
- The simultaneous monitoring of main and pilot burners or the direct ignition is conducted; where it takes some time to achieve ignition from the full-close state of the fuel control motor because the operation usually starts at the same time as the activation of the main burner' s solenoid valve.

④. Gas Thermocouple Setting : Set whether to use the gas thermocouple.

Gas Thermocouple Setting : The screen is switched to the 【18-3. OFF/ON Setting Screen】 .

OFF: Do not use the gas thermocouple.

ON: Use the gas thermocouple.

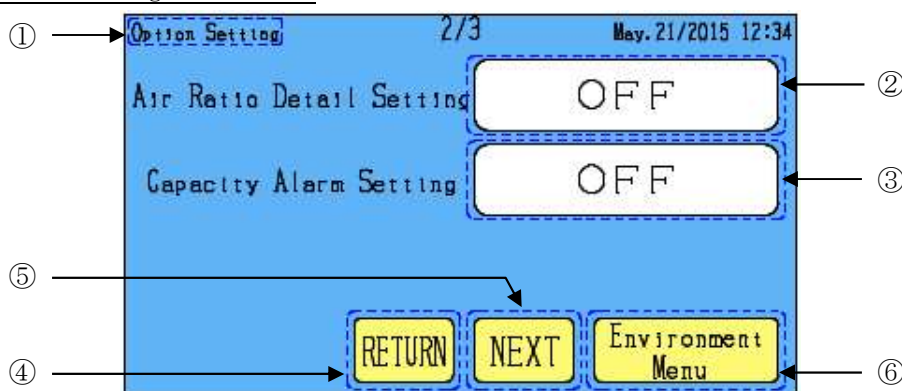
⑤. RETURN Button : The screen is switched to the 【11-3. Option Setting Screen 3/3】 .

⑥. NEXT Button : The screen is switched to the 【11-2. Option Setting Screen 2/3】 .

⑦. Environment Menu : The screen is switched to the 【10-1. Environment Menu Screen】 .

⑧. Indicates No. of currently displayed page / Total number of pages.

11-2. Option Setting Screen 2/3



①. The name of the currently setting is displayed.

②. Air Ratio Detail Setting : Set the air ratio for each capacity at intervals of 10%.

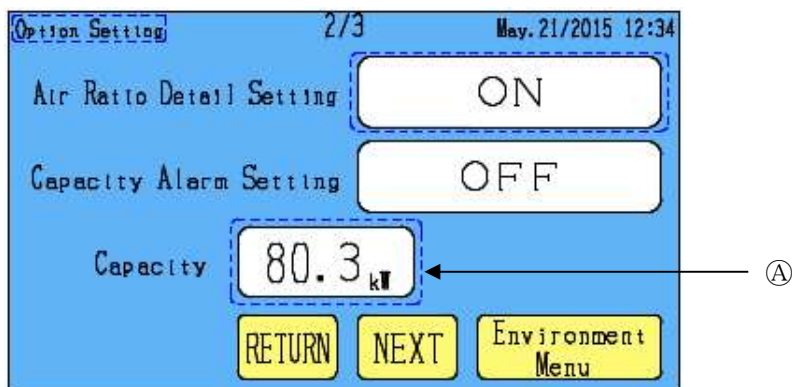
Air Ratio Detail Setting Button: The screen is switched to the 【18-3. OFF/ON Setting Screen】 .

OFF : Operation with normal air ratio setting.

Air ratio setting button of the menu screen: The screen is switched to the **【8-1. Air Ratio Setting Screen】** .

ON : Operation with air ratio detail setting. Combustion capacity will be possible to set.

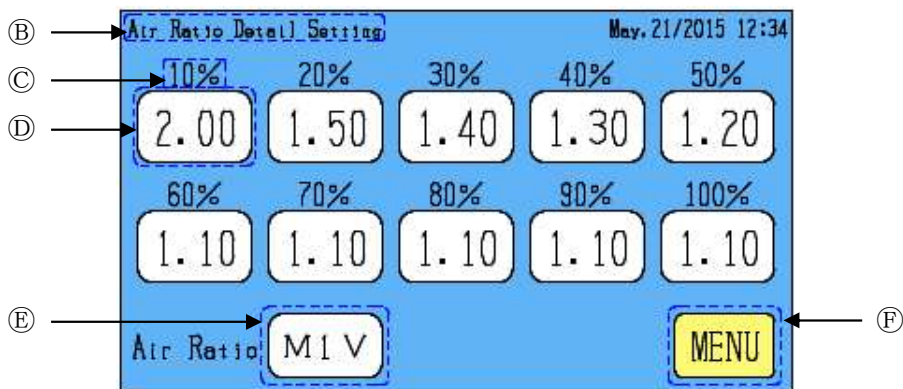
Air ratio setting button of the menu screen: The screen is switched to the **【11-2-1. Air Ratio Detail Setting Screen】** .



- Ⓐ. Capacity : Input the total combustion capacity of all the burners controlled by one SECTRON.
If any heat exchanger is used, the capacity after pre-heating (after air temperature conversion) or an arbitrary capacity can be inputted here

Capacity Setting Button : The screen is switched to the **【18-1. Digital Input Screen】** .

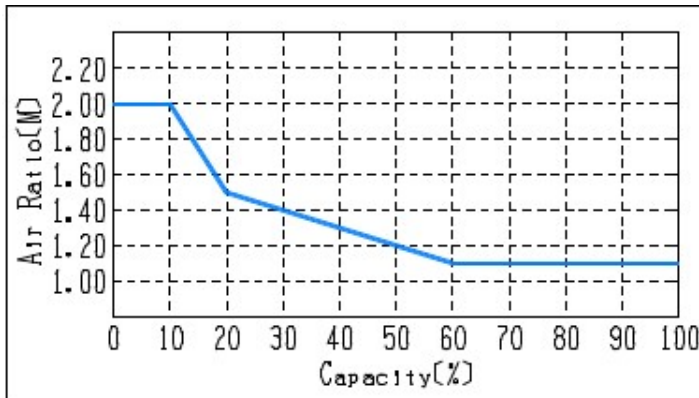
11-2-1. Air Ratio Detail Setting Screen



- Ⓑ. The name of the currently setting is displayed.
- Ⓒ. Percentages of the capacity set in Ⓐ are displayed.
- Ⓓ. The air ratio set for each percentage of the capacity is displayed.
Air ratio setting button of the proportion of capacity : The screen is switched to the **【18-1. Digital Input Screen】** .
- Ⓔ. Air ratio detail Symbol of the currently setting is displayed.
Air Ratio Detail Switching Button : The screen is switched to the **【11-2-2. Air Ratio Detail Switching Screen】** .
- Ⓕ. MENU Button : The screen is switched to the **【6-1. Menu Screen】** .

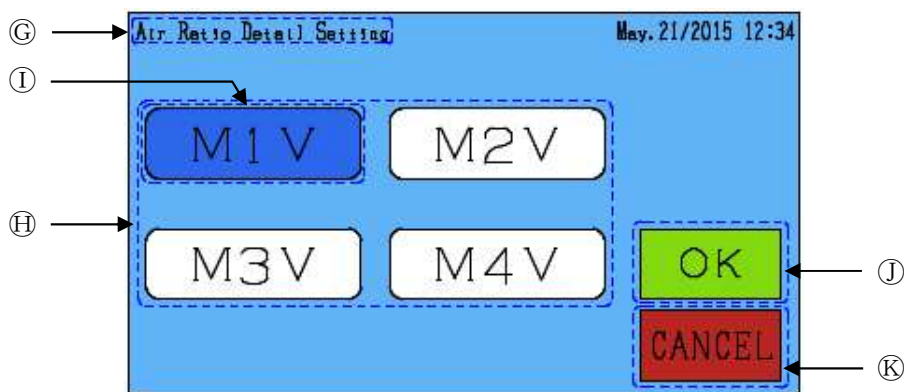
- The set air ratio varies linearly between the capacity percentages.

[Air ratio detail setting operation example]



- For a capacity less than 10%, the set air ratio for 10% of the capacity is applied.
- For a capacity over 100%, the set air ratio for 100% of the capacity is applied.

11-2-2. Air Ratio Detail Switching Screen



Ⓒ. The name of the currently setting is displayed.

Ⓓ. Air ratio detail symbol of the selection is displayed.

The air ratio for 4 points (M1V to M4V) can be set.

The air ratio to be controlled is selected according to the combination of terminal blocks K1 and K2 for input.

If either terminal block K1 or K2 is not connected by wiring, air ratio M1V is selected.

Ⓔ. Air ratio detail symbol currently selected is displayed in blue.

Ⓙ. OK button: Determine the setting, The screen is switched to the **【11-2-1. Air Ratio Detail Setting Screen】**.

Ⓚ. CANCEL button: Revocation the setting, The screen is switched to the **【11-2-1. Air Ratio Detail Setting Screen】**.

● Setting Air Ratio Detail Setting to ON is effective in the following case:

- A higher air ratio is desirable because an air ratio of 1.10 causes soot during low-level combustion.

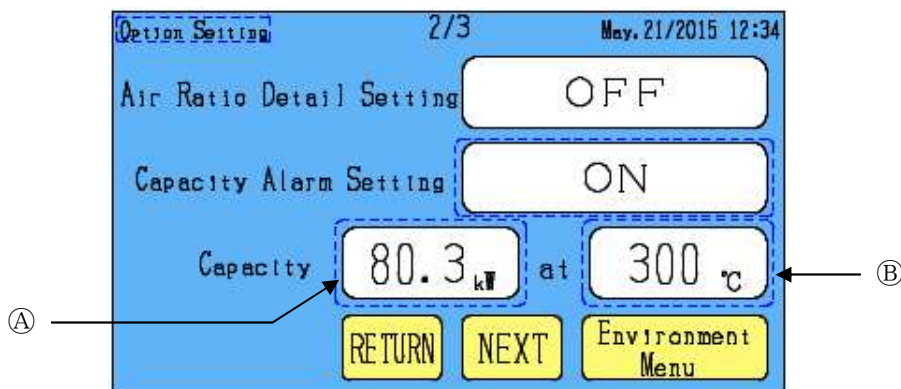
- ③. Capacity Alarm Setting : By alarm setting, alarms can be outputted for the combustion air flow rate, combustion gas flow rate and combustion oil flow rate for the set capacity.

Capacity Alarm Setting Button : The screen is switched to the 【18-3.OFF/ON Setting Screen】 .

OFF : Not use the combustion capacity alarm setting.

ON : Use the combustion capacity alarm setting.

Capacity and preheated air temperature can be set.



- Ⓐ. Capacity : Input the total combustion capacity of all the burners controlled by one SECTRON.

If any heat exchanger is used, the capacity after pre-heating (after air temperature conversion) or an arbitrary capacity can be inputted here.

Capacity Setting Button : The screen is switched to the 【18-1.Digital Input Screen】 .

- Ⓑ. Preheated Air Temperature : Indicates the air thermocouple temperature in a steady state.

If any heat exchanger is used, input the preheated air temperature (air thermocouple temperature) in a steady state

Preheated Air Temperature : The screen is switched to the 【18-1.Digital Input Screen】 .

※Refer to 【17-6. Alarm Setting Screen】 for the setting of capacity alarm

●Capacity alarm Setting to ON is effective in the following case:

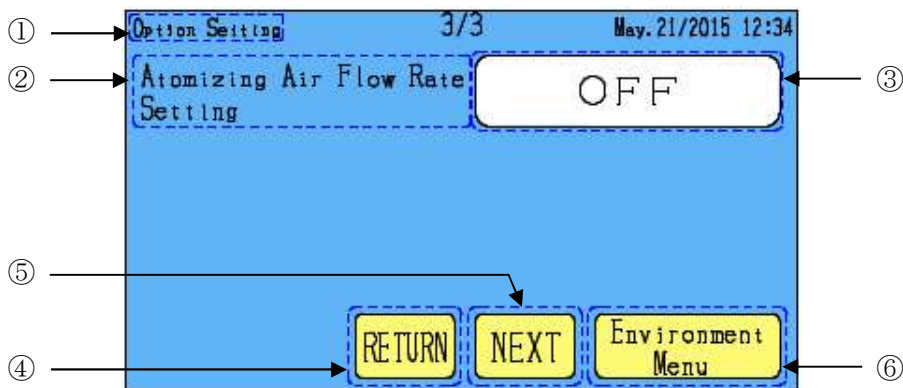
- It is required to prevent any unexpected combustion exceeding the burner's capacity due to unintended displacement of the air butterfly damper or the like.
- It is desirable to output the alarm whenever the flow rate exceeds any value, not only the maximum flow rate, set for each sensor.

④. RETURN Button : The screen is switched to the 【11-1.Option Setting Screen 1/3】 .

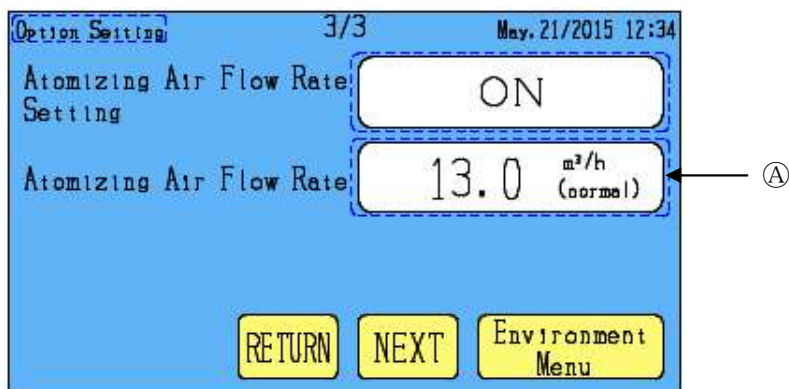
⑤. NEXT Button : The screen is switched to the 【11-3.Option Setting Screen 3/3】 .

⑥. Environment Menu : The screen is switched to the 【10-1.Environment Menu Screen】 .

11-3. Option Setting Screen 3/3



- ①. The name of the currently setting is displayed.
- ②. The setting item displayed varies according to the fuel currently selected.
 Fuel selection gas : 「Primary Air flow rate setting」 is displayed.
 Fuel selection oil : 「Atomizing Air flow rate setting」 is displayed.
- ③. Primary (Atomizing) Air flow rate setting : Used to set the primary (atomizing) air flow rate.
 Primary (Atomizing) Air flow rate setting Button : The screen is switched to the 【18-3. OFF/ON Setting Screen】 .
 OFF : Not use the Primary (Atomizing) Air flow rate setting.
 ON : Use the Primary (Atomizing) Air flow rate setting.
 Primary (Atomizing) Air flow rate can be set.



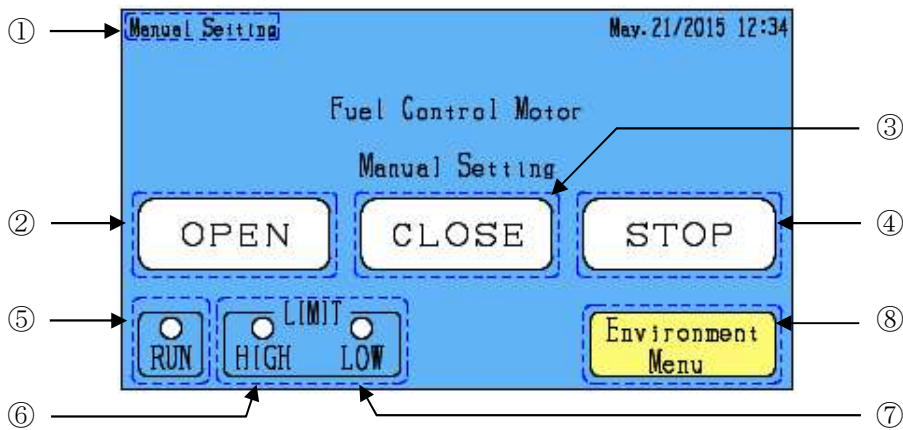
- A. Primary (Atomizing) Air flow rate Button : Please enter the primary (atomizing) air flow rate.
- ④. RETURN Button : The screen is switched to the 【11-2. Option Setting Screen 2/3】 .
- ⑤. NEXT Button : The screen is switched to the 【11-1. Option Setting Screen 1/3】 .
- ⑥. Environment Menu : The screen is switched to the 【10-1. Environment Menu Screen】 .

- Primary (atomizing) air flow rate Setting to ON is effective in the following case:
 - The air ratio is usually controlled based on the inputted air flow rate for the air differential sensor; however, if Atomizing Air Flow Rate Setting is ON, the primary (atomizing) air flow rate is added to that air flow rate for air ratio control, and as a result, less energy is required.
- ※ The air flow rate displayed on the monitor includes the primary (atomizing) air flow rate.

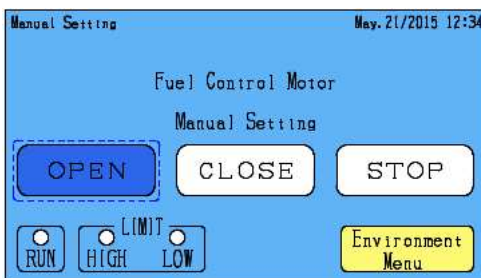
12. Manual Setting

12-1. Manual Setting Screen

This screen is used in the manual operation of the fuel control motor.

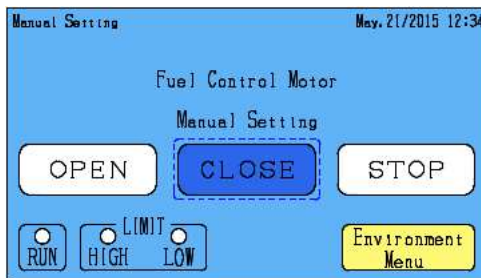


①. The name of the currently setting is displayed.



②. OPEN Button : Fuel control motor open output

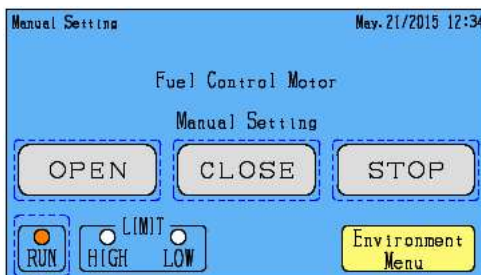
This button remains ON (blue) during the OPEN output until the full open limit is turned ON.



③. CLOSE Button : Fuel control motor close output.

This button remains ON (blue) during the CLOSE output until the full close limit is turned ON.

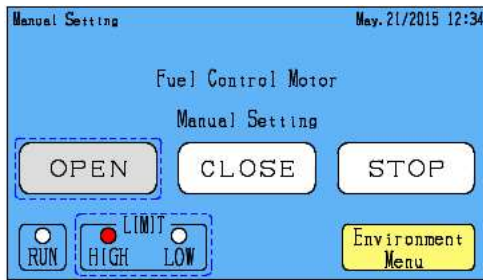
④. STOP Button : Fuel control motor to stop. Each button is displayed in white color.



⑤. RUN : The fuel control motor can be operated manually when the RUN lamp is OFF.

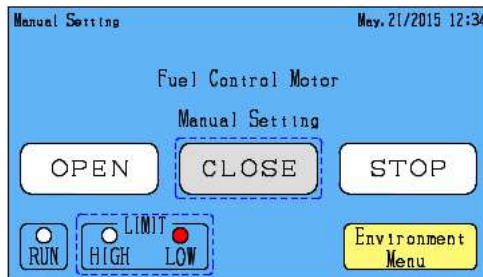
The manual operation of the fuel control motor is disabled when the RUN lamp is ON.

Each button is displayed in gray color.



⑥. HIGH LIMIT : The fuel control motor is full open when this lamp is ON.

OPEN button is gray displayed.



⑦. LOW LIMIT : The fuel control motor is full close when this lamp is ON.

CLOSE button is gray displayed.

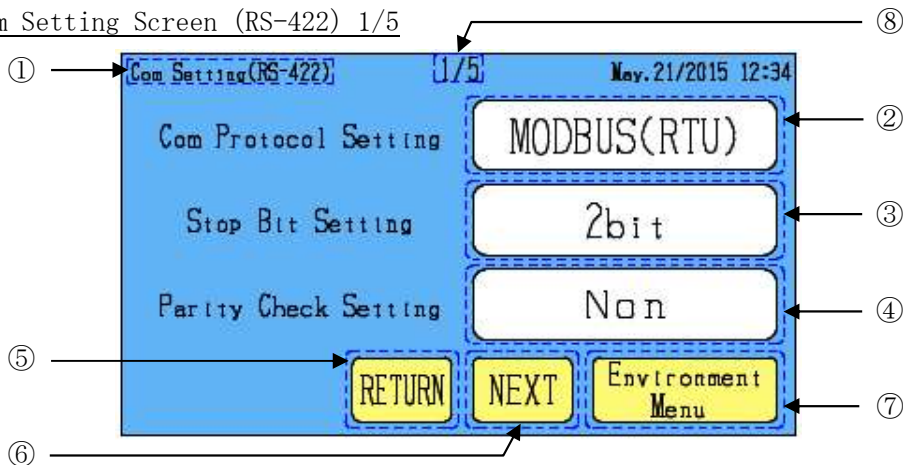
⑧. Environment Menu : The screen is switched to the 【10-1.Environment Menu Screen】 .

- If the full open limit is kept ON for over 20 min, the close input is automatically turned ON and continues until full close limit.
- For both full open limit and full close limit, if the OFF state continues for 20 min, the close output is automatically turned ON and continues until full close limit.
- If the screen is switched back to Environment Setting Menu Screen, the close output is turned ON and continues until full close limit
- Even with the Hold Mode being ON, the close output is turned ON and continues until full close limit if the screen is switched back to Environment Setting Menu Screen.
- If Manual Setting Screen is displayed with the RUN input being OFF, the RUN input is disabled even if it is turned ON.

13. Com Setting

For more information about the communication, please refer to the attachment 【communication materials】.

13-1. Com Setting Screen (RS-422) 1/5



①. The name of the currently setting is displayed.

②. Com Protocol Setting : Set up the RS-422 com protocol.

Com Protocol Setting Button : The screen is switched to the 【13-6. Com Protocol Setting Screen】.

③. Stop Bit Setting : Set up the RS-422 stop bit.

Stop Bit Setting Button : The screen is switched to the 【13-7. Stop Bit Setting Screen】.

④. Parity Check Setting : Set up the RS-422 parity check.

Parity Check Setting Button : The screen is switched to the 【13-10. Parity Check Setting Screen】.

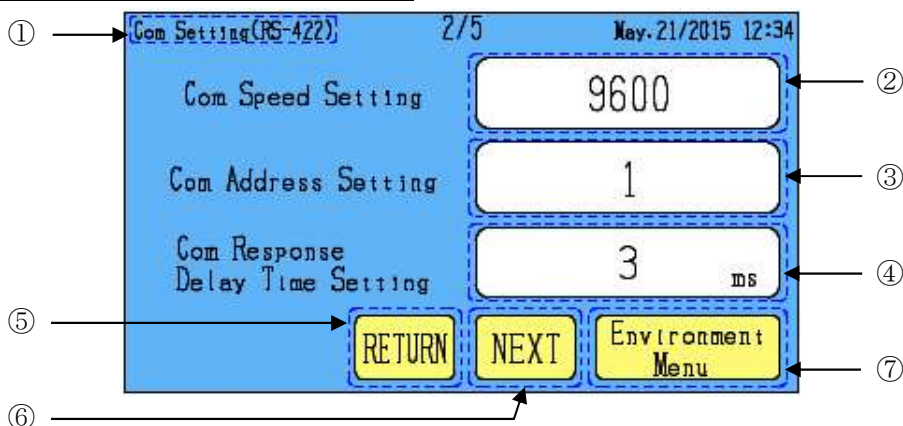
⑤. RETURN Button : The screen is switched to the 【13-5. Com Setting Screen (Loader) 5/5】.

⑥. NEXT Button : The screen is switched to the 【13-2. Com Setting Screen (RS-422) 2/5】.

⑦. Environment Menu : The screen is switched to the 【10-1. Environment Menu Screen】.

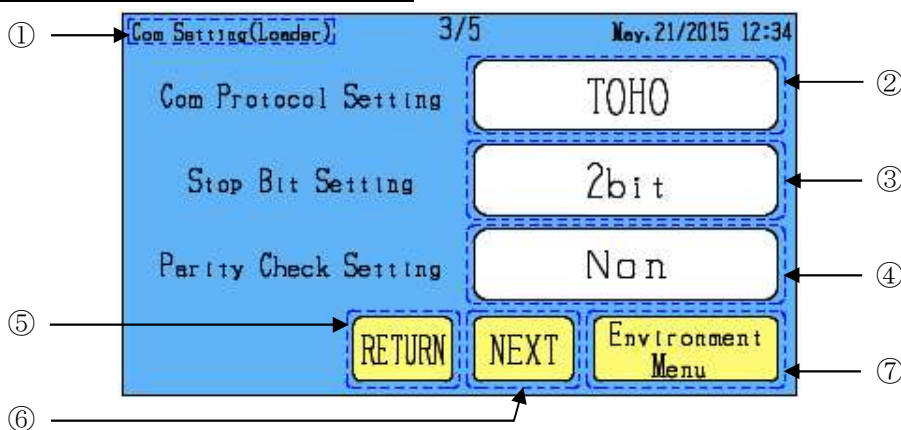
⑧. 通信設定の総頁数と現在表示頁数を表示します。●/■ : ●現在の頁 ■総頁数

13-2. Com Setting Screen (RS-422) 2/5



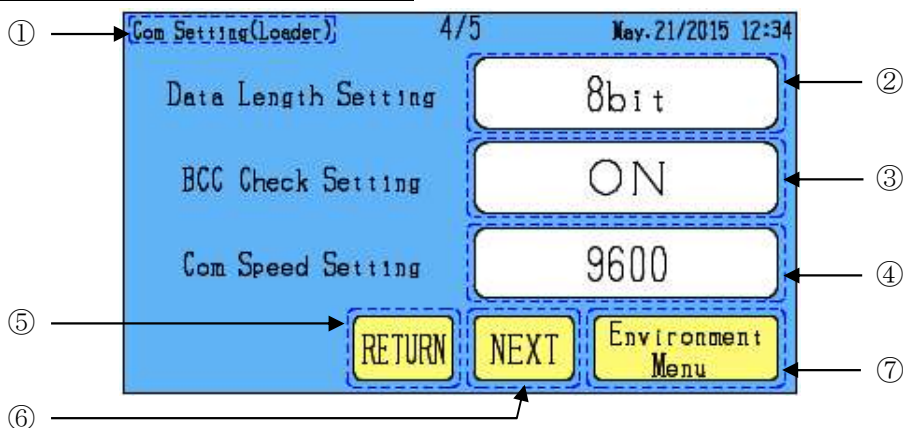
- ①. The name of the currently setting is displayed.
- ②. Com Speed Setting : Set up the RS-422 com speed.
Com Speed Setting Button : The screen is switched to the 【13-11.Com Speed Setting Screen】 .
- ③. Com Address Setting : Set up the RS-422 com address setting.
Com Address Setting Button : The screen is switched to the 【18-1.Digital Input Screen】 . (1~247)
- ④. Com Response Delay Time Setting : Set the time until the response to RS-422 com received.
Com Response Delay Time Setting Button : The screen is switched to the 【18-1.Digital Input Screen】 . (0~250ms)
- ⑤. RETURN Button : The screen is switched to the 【13-1.Com Setting Screen (RS-422) 1/5】 .
- ⑥. NEXT Button : The screen is switched to the 【13-3.Com Setting Screen (Loader) 3/5】 .
- ⑦. Environment Menu : The screen is switched to the 【10-1.Environment Menu Screen】 .

13-3. Com Setting Screen (Loader) 3/5



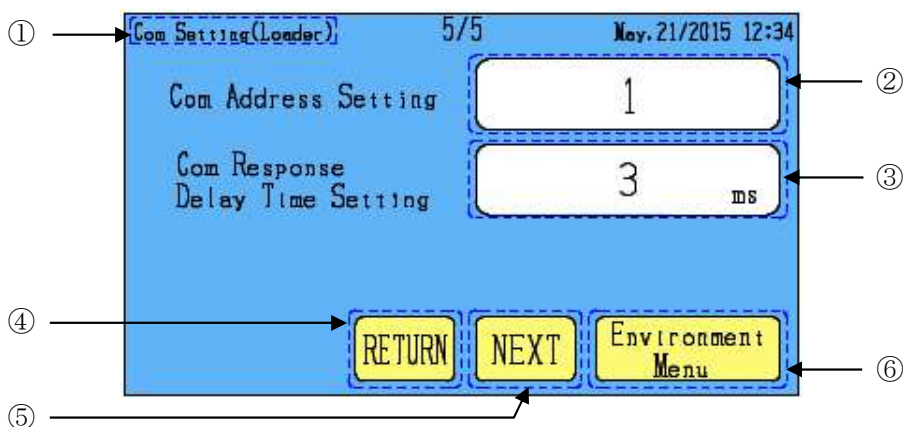
- ①. The name of the currently setting is displayed.
- ②. Com Protocol Setting : Set up the loader com protocol
Com Protocol Setting Button : The screen is switched to the 【13-9.Com Protocol Setting Screen】 .
- ③. Stop Bit Setting : Set up the loader stop bit.
Stop Bit Setting Button : The screen is switched to the 【13-7.Stop Bit Setting Screen】 .
- ④. Parity Check Setting : Set up the loader parity check.
Parity Check Setting Button : The screen is switched to the 【13-10.Parity Check Setting Screen】 .
- ⑤. RETURN Button : The screen is switched to the 【13-2.Com Setting Screen (RS-422) 2/5】 .
- ⑥. NEXT Button : The screen is switched to the 【13-4.Com Setting (Loader) 4/5】 .
- ⑦. Environment Menu : The screen is switched to the 【10-1.Environment Menu Screen】 .

13-4. Com Setting Screen (Loader) 4/5



- ①. The name of the currently setting is displayed.
- ②. Data Length Setting : Set up the loader data length . (The setting is disabled if MODBUS is selected.)
Data Length Setting Button : The screen is switched to the 【13-8.Data Length Setting Screen】 .
- ③. BBC Check Setting : Set up the loader BBC check. (The setting is disabled if MODBUS is selected.)
BBC Check Setting Button : The screen is switched to the 【18-3.OFF/ON Setting Screen】 .
- ④. Com Speed Setting : Set up the loader com speed.
Com Speed Setting Button : The screen is switched to the 【13-11.Com Speed Setting Screen】 .
- ⑤. RETURN Button : The screen is switched to the 【13-3.Com Setting Screen (Loader) 3/5】 .
- ⑥. NEXT Button : The screen is switched to the 【13-5.Com Setting Screen (Loader) 5/5】 .
- ⑦. Environment Menu : The screen is switched to the 【10-1.Environment Menu Screen】 .

13-5. Com Setting Screen (Loader) 5/5



- ①. The name of the currently setting is displayed.
- ②. Com Address Setting : Set up the loader com address setting.
Com Address Setting Button : The screen is switched to the 【18-1.Digital Input Screen】 .
TOHO(1~99)、MODBUS(1~247)

③. Com Response Delay Time Setting : Set the time until the response to loader com received.

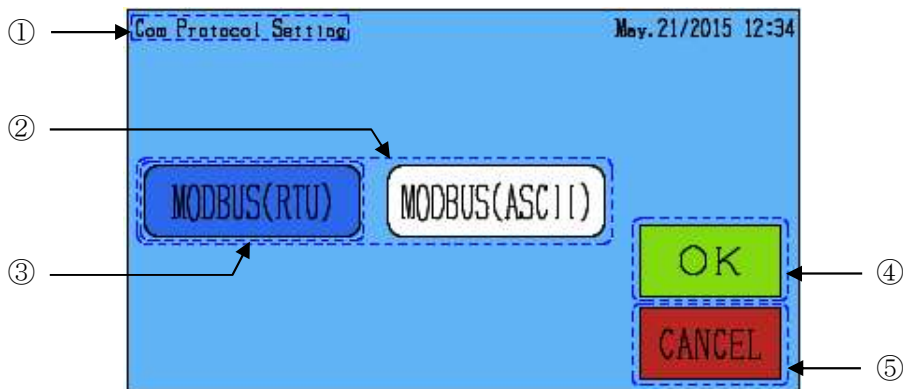
Com Response Delay Time Setting Button : The screen is switched to the 【18-1.Digital Input Screen】 . (0~250ms)

④. RETURN Button : The screen is switched to the 【13-4.Com Setting (Loader) 4/5】 .

⑤. NEXT Button : The screen is switched to the 【13-1.Com Setting (RS-422) 1/5】 .

⑥. Environment Menu : The screen is switched to the 【10-1.Environment Menu Screen】 .

13-6.Com Protocol Setting Screen



①. The name of the currently setting is displayed.

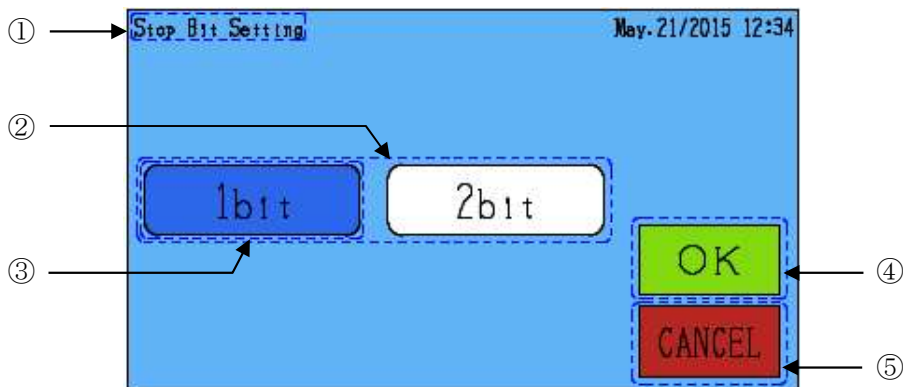
②. Choices is displayed.

③. Button of the currently selected is displayed in blue.

④. OK button : Determine the setting, the screen is switched to the screen before the switched.

⑤. CANCEL button : Revocation the setting, the screen is switched to the screen before the switched.

13-7.Stop Bit Setting Screen



①. The name of the currently setting is displayed.

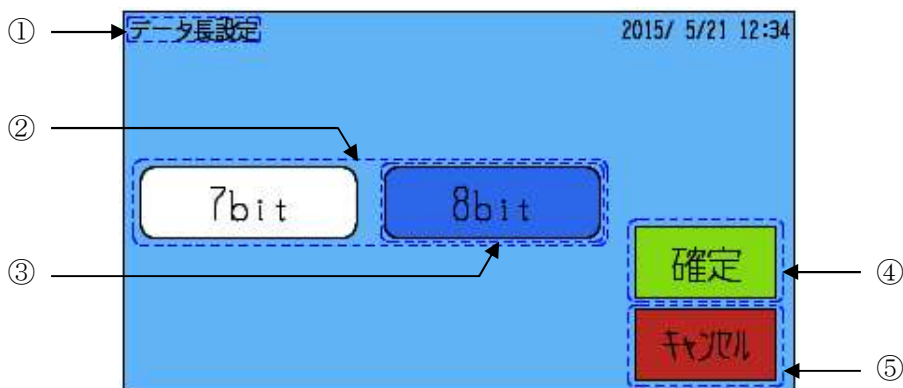
②. Choices is displayed.

③. Button of the currently selected is displayed in blue.

④. OK button : Determine the setting, the screen is switched to the screen before the switched.

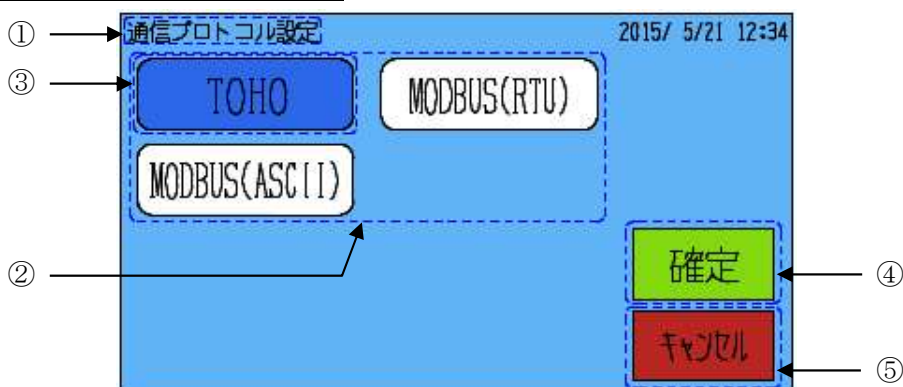
⑤. CANCEL button : Revocation the setting, the screen is switched to the screen before the switched.

13-8. Data Length Setting Screen



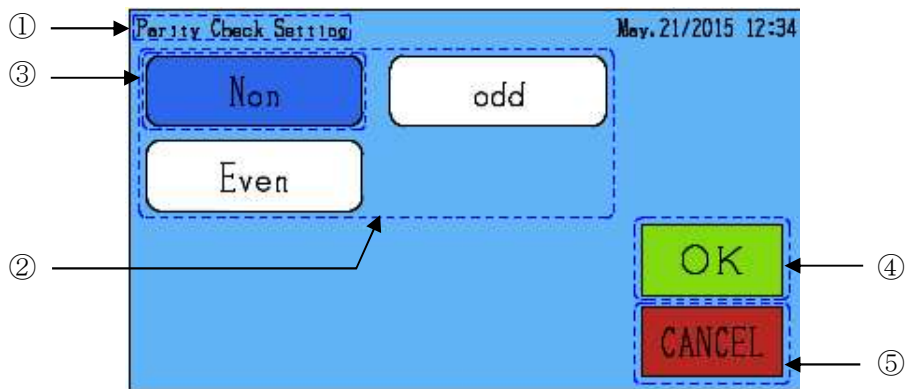
- ①. The name of the currently setting is displayed.
- ②. Choices is displayed.
- ③. Button of the currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the screen before the switched.
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the screen before the switched.

13-9. Com Protocol Setting Screen



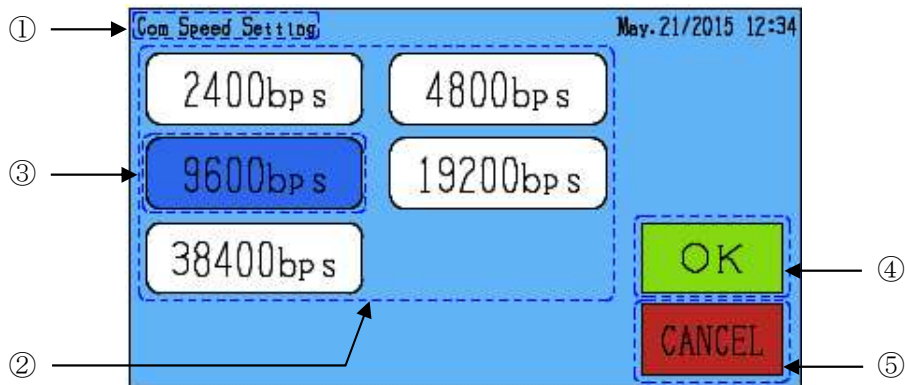
- ①. The name of the currently setting is displayed.
- ②. Choices is displayed.
- ③. Button of the currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the screen before the switched.
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the screen before the switched.

13-10. Parity Check Setting Screen



- ①. The name of the currently setting is displayed.
- ②. Choices is displayed.
- ③. Button of the currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the screen before the switched.
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the screen before the switched.

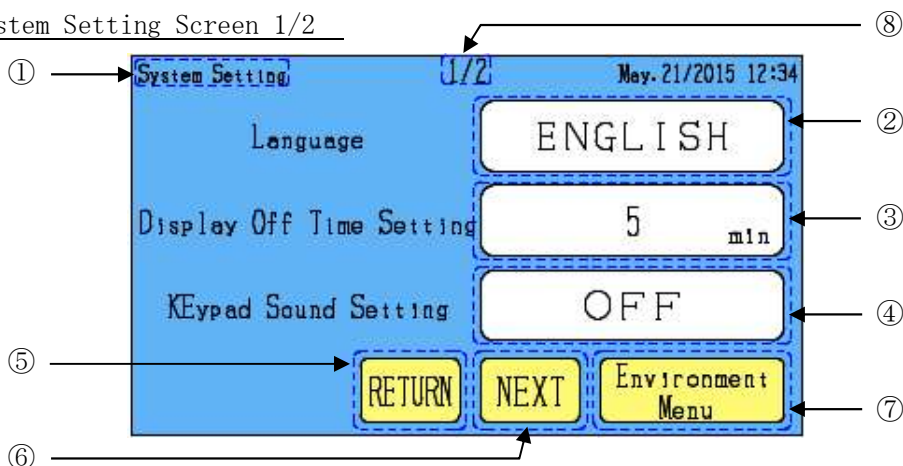
13-11. Com Speed Setting Screen



- ①. The name of the currently setting is displayed.
- ②. Choices is displayed.
- ③. Button of the currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the screen before the switched.
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the screen before the switched.

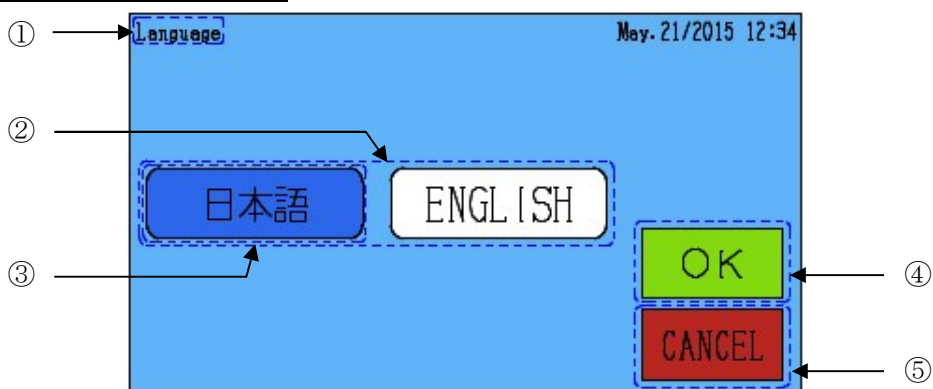
14. System Setting

14-1. System Setting Screen 1/2



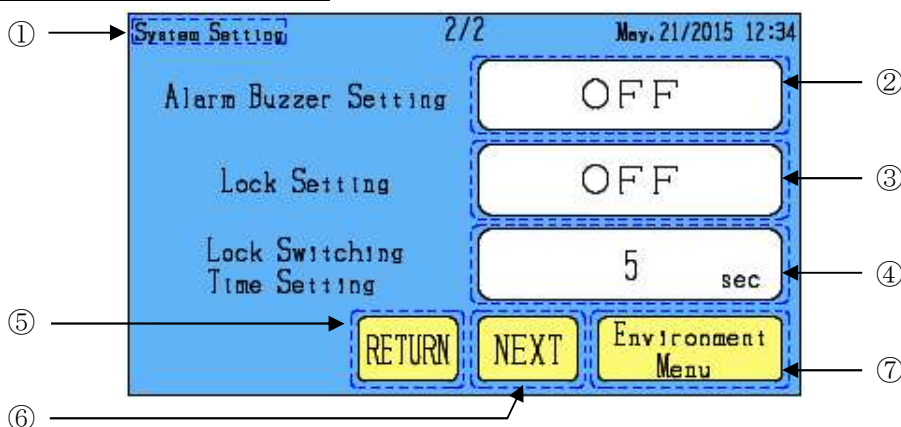
- ①. The name of the currently setting is displayed.
- ②. Language Setting : Set up the Japanese display and English display.
Language Setting Button : The screen is switched to the 【14-2. Language Setting Screen】 .
- ③. Display Off Time Setting : Set the time (minutes) after which the display is turned OFF if no operation is done.
Display Off Time Setting Button : The screen is switched to the 【18-1. Digital Input Screen】 . (0~30min)
※If the time is set to 0 min, the display is always kept ON.
- ④. Keypad Sound Setting : Set the ON/OFF of keypad tone.
Keypad Sound Setting Button : The screen is switched to the 【18-3. OFF/ON Setting Screen】 .
OFF : The keypad tone does not sound.
ON : The keypad tone does sound.
- ⑤. RETURN Button : The screen is switched to the 【14-3. System Setting 2/2】 .
- ⑥. NEXT Button : The screen is switched to the 【14-3. System Setting 2/2】 .
- ⑦. Environment Menu : The screen is switched to the 【10-1. Environment Menu Screen】 .
- ⑧. Indicates No. of currently displayed page / Total number of pages.

14-2. Language Setting Screen



- ①. The name of the currently setting is displayed.
- ②. Choices is displayed.
- ③. Button of the currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the 【14-1.SyStem Setting Screen 1/2】 .
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the 【14-1.System Setting Screen1/2】 .

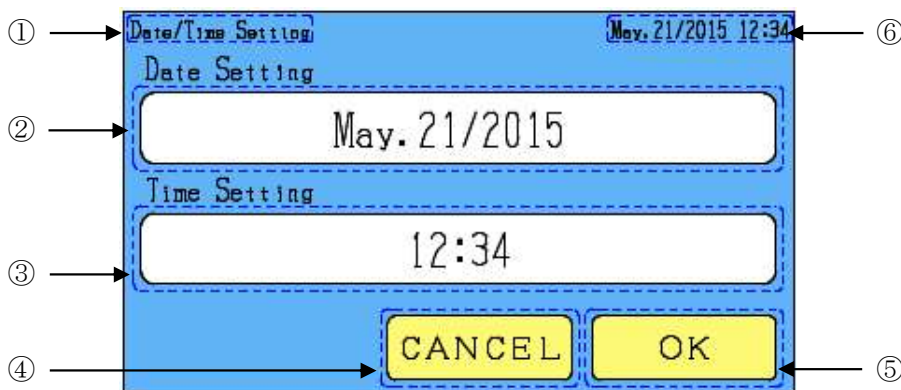
14-3. System Setting Screen 2/2



- ①. The name of the currently setting is displayed.
- ②. Alarm Buzzer Setting : Set the ON/OFF of the buzzer sounds alarm occurs.
Alarm Buzzer Setting Button : The screen is switched to the 【18-3.OFF/ON Setting Screen】 .
OFF : The buzzer not sounds when an alarm occurs.
ON : The buzzer sounds when an alarm occurs.
- ③. Lock Setting : Set the lock function that limits the action of the touch panel.
Lock Setting Button : The screen is switched to the 【18-3.OFF/ON Setting Screen】 .
OFF : The button lock is disabled.
ON : The button lock is effectiveness.
- ④. Lock Switching Time Setting : Set the time (seconds) for which the button has to be kept pressed to switch ON/OFF the lock function.
Lock Switching Time Setting Button : The screen is switched to the 【18-1.Digital Input Screen】 . (1~10sec)
- ⑤. RETURN Button : The screen is switched to the 【14-1.System Setting Screen 1/2】 .
- ⑥. NEXT Button : The screen is switched to the 【14-1.Syatem Setting Screen 1/2】 .
- ⑦. Environment Menu : The screen is switched to the 【10-1.Environment Menu Screen】 .

15. Date/Time Setting

15-1. Date/Time Setting Screen



①. The name of the currently setting is displayed.

②. Date Setting : Set up the date.

Date Setting Button : The screen is switched to the 【15-2. Date Setting Screen】 .

Year : 2000~2099 Month : 1~12 Date : 1~31 (Depending on the month setting)

③. Time Setting : Set up the hour and minute.

Time Setting Button : The screen is switched to the 【18-1. Digital Input Screen】 .

Hour : 0~23 Month : 00~59

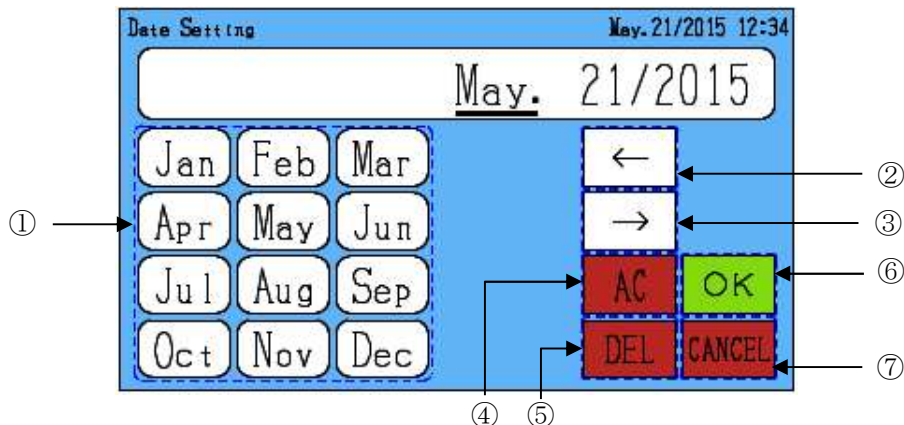
④. CANCEL button : Revocation the setting, the screen is switched to the 【10-1. Environment Menu Screen】 .

⑤. OK button : Determine the setting, the screen is switched to the 【10-1. Environment Menu Screen】 .

⑥. Date and time : This section blinks when the battery is running out.

※Be sure to turn OFF the power before replacing the battery. Redo the setting after the replacement.

15-2. Date Setting Screen



①. Month Input Button

②. Left Button : Move the cursor to the left, the screen is switched to the 【18-1. Digital Input Screen】 .

③. Right Button : Move the cursor to the left, the screen is switched to the 【18-1. Digital Input Screen】 .

④. AC Button : Will return to the initial value.

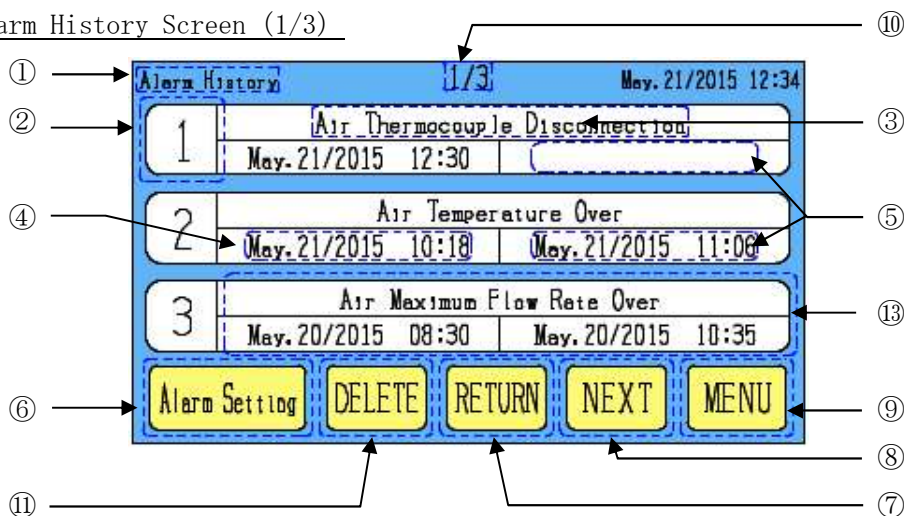
⑤. DEL Button : Will be 「Jan」 .

⑥. OK button : Determine the setting, the screen is switched to the 【15-1. Date/Time Setting Screen】 .

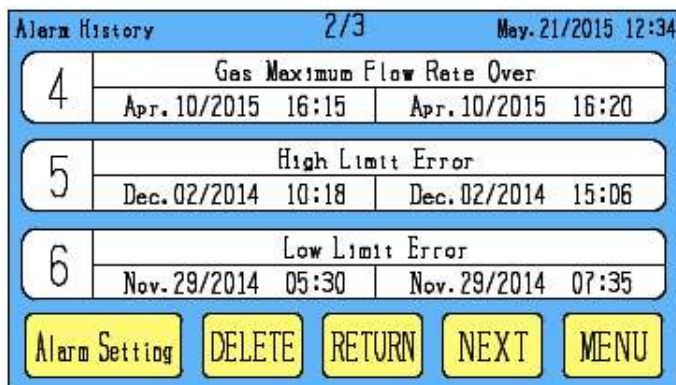
⑦. CANCEL button : Revocation the setting, the screen is switched to the 【15-1. Date/Time Setting Screen】 .

16. Alarm History

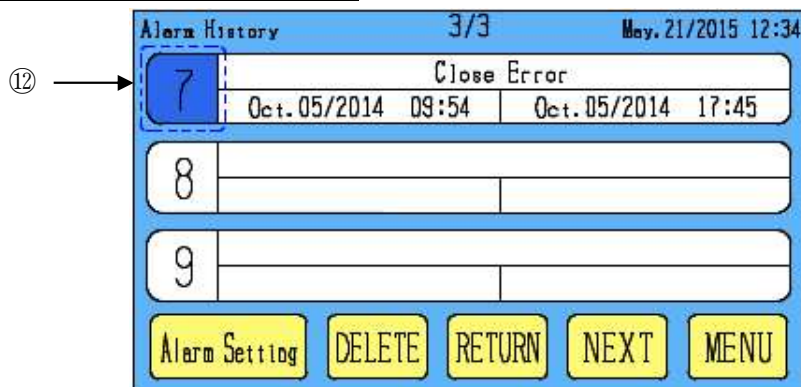
16-1. Alarm History Screen (1/3)



16-2. Alarm History Screen (2/3)



16-3. Alarm History Screen (3/3)



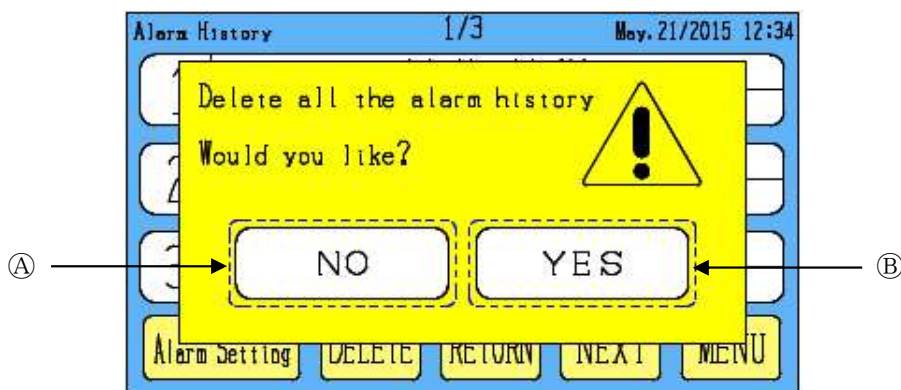
①. The name of the currently setting is displayed.

②. Alarm History Number : The alarm history number is displayed here. Up to 9 alarms are recorded, and if more alarms occur, the record is deleted from the oldest one.

- ③. Alarm name is displayed.
- ④. Occurrence time of the alarm is displayed.
- ⑤. Release time of the alarm is displayed.

The release time is not displayed if the alarm has not been released yet.

- ⑥. Alarm Setting Button : The screen is switched to the 【17-1.Alarm Setting Screen】 .
- ⑦. RETURN Button : The screen is switched to the 【16-3.Alarm History Screen (3/3)】 .
- ⑧. NEXT Button : The screen is switched to the 【16-2.Alarm History Screen (2/3)】 .
- ⑨. MENU Button : The screen is switched to the 【6-1.Menu Screen】 .
- ⑩. Indicates No. of currently displayed page / Total number of pages.
- ⑪. DELETE Button : An alarm history screen confirmation window pops up.



- Ⓐ. NO Button : No alarm history is deleted, and the pop-up window disappears.
- Ⓑ. YES Button : Alarm histories are deleted, and the pop-up window disappears.

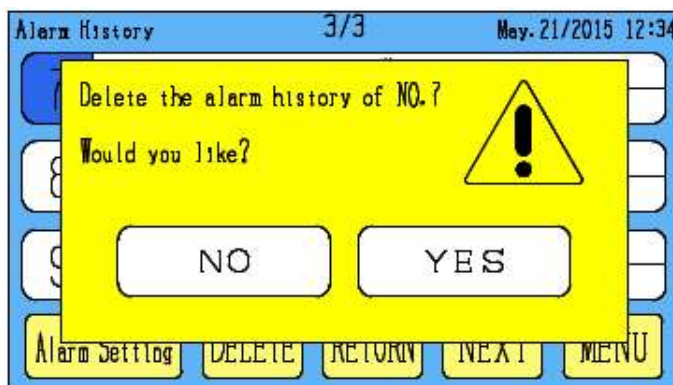
※Any alarm not released yet will not be deleted

- ⑫. Alarm History Selection Button : You can select and delete individual alarm histories.

Select the alarm history to be deleted.

The No. of selected alarm turns blue.

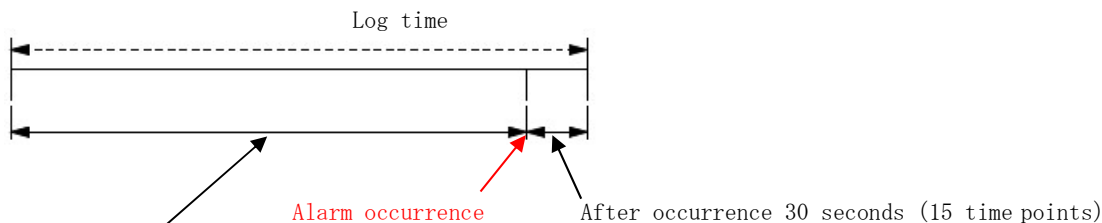
To cancel the selection, touch the selected one again.



- ⑬. Alarm name Button : The screen is switched to the 【16-4.Alarm Log Screen】 .

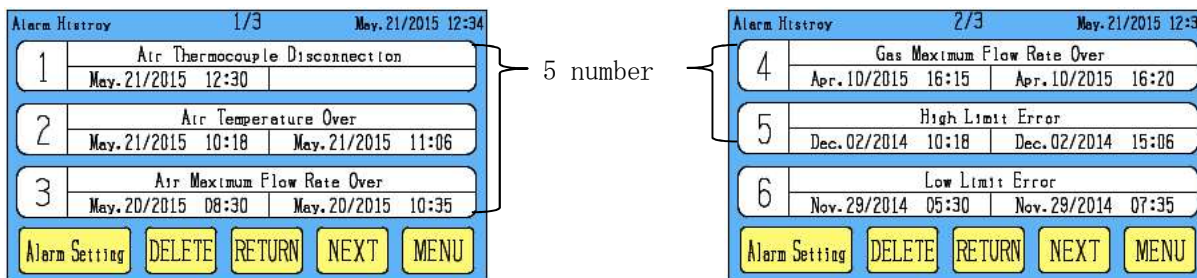
16-4. Alarm Log

- The log is recorded for the time period from a point 4 min and 30 sec before the alarm occurrence to a point 30 sec after the occurrence. (※Recording interval: 2 sec)

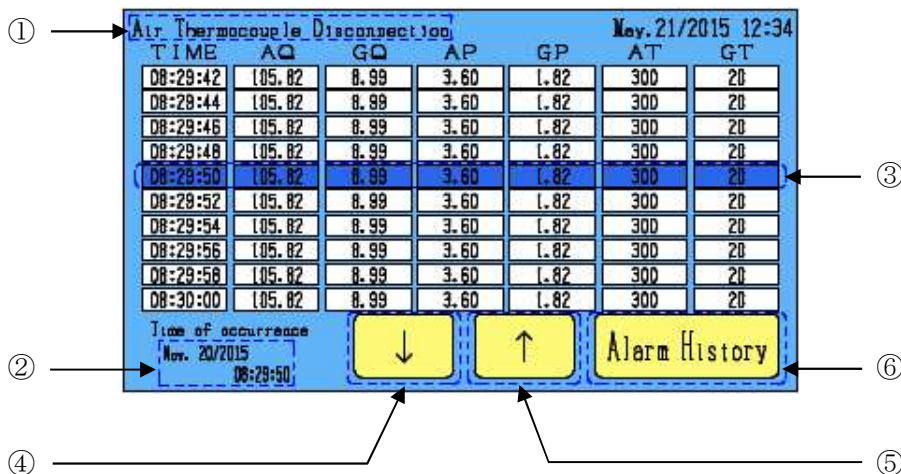


Before occurrence 4 minutes and 30 seconds (135 time points)

- The log is preserved for the 5 newest alarms in the alarm history screen.



16-5. Alarm Log Screen



- Name of in circulation alarm
- Alarm occurrence time
- Log of the alarm occurrence time is displayed in blue.
- Down Button : Displays the logs for the following 20 sec (10 time points)
After they are displayed, the DOWN button will be dimmed.
- Up Button : Displays the logs for the previous 20 sec (10 time points).
After displaying the logs for a time period of 4 min and 40 sec (140 time points), the UPPER key will be dimmed.
- Alarm History Button : The screen is switched to the **【16-1.Alarm History Screen】**.

16-6. Alarm Log Screen Display

- Alarm log screen shown when the fuel gas and the gas thermocouple are OFF.

Air Thermocouple Disconnection						May.21/2015 12:34	
TIME	AQ	GQ	AP	GP	AT	GT	
08:29:42	105.82	8.99	3.60	1.82	300	20	
08:29:44	105.82	8.99	3.60	1.82	300	20	
08:29:46	105.82	8.99	3.60	1.82	300	20	
08:29:48	105.82	8.99	3.60	1.82	300	20	
08:29:50	105.82	8.99	3.60	1.82	300	20	
08:29:52	105.82	8.99	3.60	1.82	300	20	
08:29:54	105.82	8.99	3.60	1.82	300	20	
08:29:56	105.82	8.99	3.60	1.82	300	20	
08:29:58	105.82	8.99	3.60	1.82	300	20	
08:30:00	105.82	8.99	3.60	1.82	300	20	

Time of occurrence
Nov. 20/2015
08:29:50

↓ ↑ Alarm History

- Alarm log screen shown when the fuel gas and the gas thermocouple are ON.

Air Thermocouple Disconnection						May.21/2015 12:34	
TIME	AQ	GQ	AP	GP	AT	GT	
08:29:42	105.82	8.99	3.60	1.82	300		
08:29:44	105.82	8.99	3.60	1.82	300		
08:29:46	105.82	8.99	3.60	1.82	300		
08:29:48	105.82	8.99	3.60	1.82	300		
08:29:50	105.82	8.99	3.60	1.82	300		
08:29:52	105.82	8.99	3.60	1.82	300		
08:29:54	105.82	8.99	3.60	1.82	300		
08:29:56	105.82	8.99	3.60	1.82	300		
08:29:58	105.82	8.99	3.60	1.82	300		
08:30:00	105.82	8.99	3.60	1.82	300		

Time of occurrence
Nov. 20/2015
08:29:50

↓ ↑ Alarm History

- Alarm log screen shown when the fuel oil.

Air Thermocouple Disconnection						May.21/2015 12:34	
TIME	AQ	OQ	AP	GP	AT	GT	
08:29:42	105.82	10.57	3.60		300		
08:29:44	105.82	10.57	3.60		300		
08:29:46	105.82	10.57	3.60		300		
08:29:48	105.82	10.57	3.60		300		
08:29:50	105.82	10.57	3.60		300		
08:29:52	105.82	10.57	3.60		300		
08:29:54	105.82	10.57	3.60		300		
08:29:56	105.82	10.57	3.60		300		
08:29:58	105.82	10.57	3.60		300		
08:30:00	105.82	10.57	3.60		300		

Time of occurrence
Nov. 20/2015
08:29:50

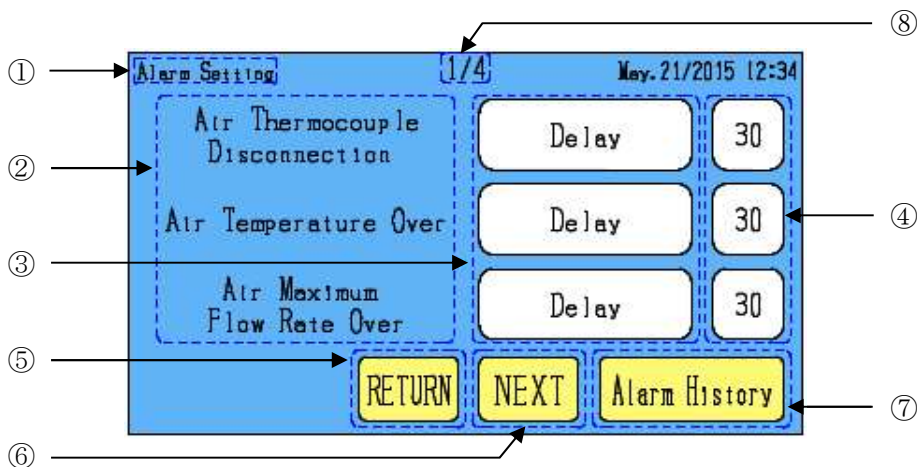
↓ ↑ Alarm History

16-7. Notes Of Alarm Log

- If “Delay” is selected in the alarm setting, the delay setting time is added to the actual time of alarm occurrence to display Time of occurrence
Example: If the alarm actually occurs at 08:29:20 and the delay setting time is 30 sec, Time of occurrence will be “08:29:50.”
- If an alarm occurs when one of the first 4 alarm logs is reviewed, the displayed content does not change, but in Alarm History Screen, the alarm history No. will be increased by one.
- If an alarm occurs when the fifth alarm log is reviewed, the fourth alarm log will be brought down and displayed.
- For any alarm that occurred due to a date/time IC error, Time of occurrence will not be shown in the log.
- The alarm log for the system error is not recorded.

17. Alarm Setting

17-1. Alarm Setting Screen 1/4 (1/6)



①. The name of the currently setting is displayed.

②. Alarm name : Alarm name is displayed.

③. Alarm Function : Alarm function setting is displayed.

Alarm Function Setting Button : The screen is switched to the **【17-10. Alarm Function Setting Screen】**.

④. Delay Setting Time : If alarm function “Delay” is selected, the delay setting time is shown here.

Delay Setting Time Button : The screen is switched to the **【18-1. Digital Input Screen】** . (1~99sec)

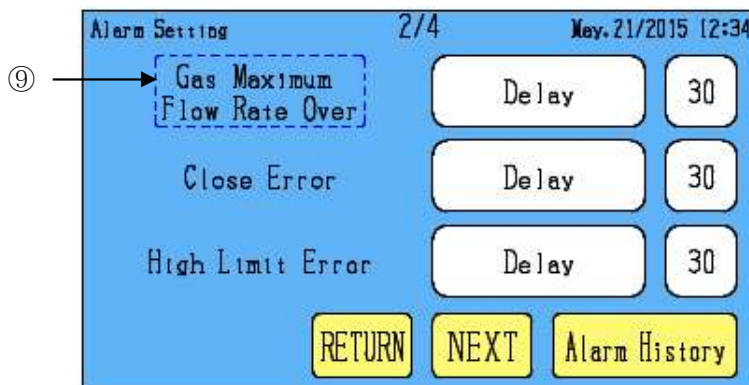
⑤. RETURN Button : The screen is switched to the **【17-4(17-8). Alarm Setting Screen 4/4(6/6)】** .

⑥. NEXT Button : The screen is switched to the **【17-2. Alarm Setting Screen 2/4(2/6)】** .

⑦. Alarm History Button : The screen is switched to the **【16-1. Alarm History Screen】** .

⑧. Indicates No. of currently displayed page / Total number of pages.

17-2. Alarm Setting Screen 2/4 (2/6)

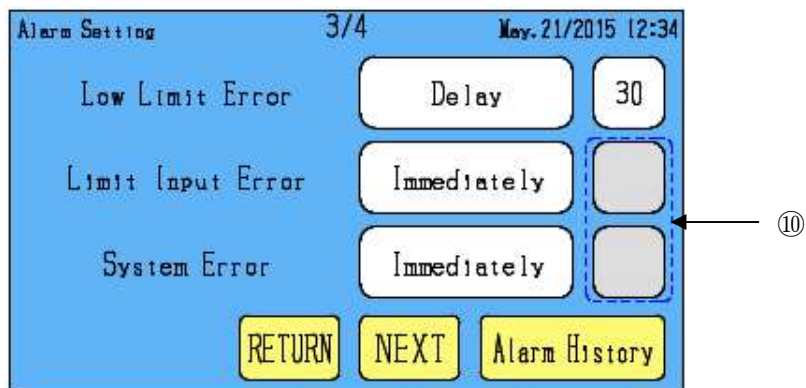


⑨. The alarm setting item displayed varies according to the fuel currently selected.

Fuel Selection Gas : “Gas Maximum Flow Rate Over” is displayed.

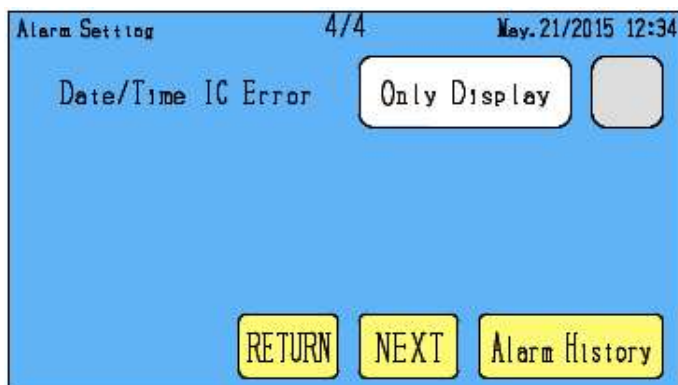
Fuel Selection Oil : “Oil Maximum Flow Rate Over” is displayed.

17-3. Alarm Setting Screen 3/4 (3/6)



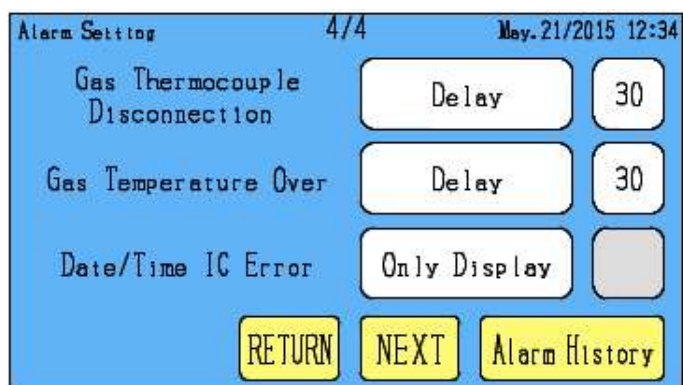
⑩. If alarm function “Delay” is not selected, these sections are dimmed.

17-4. Alarm Setting Screen 4/4 (4/6)



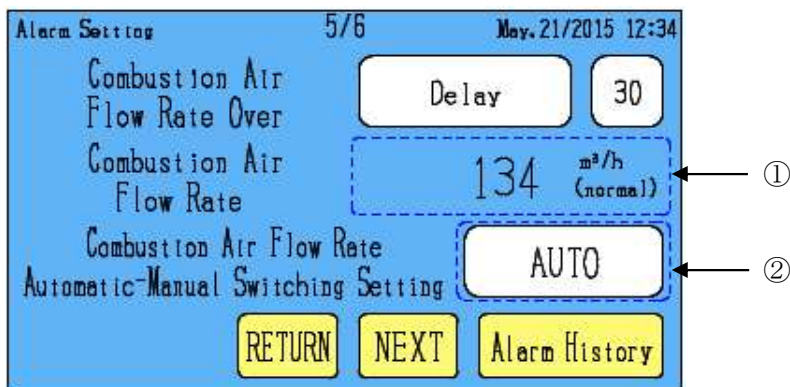
17-5. Alarm Setting Screen 4/4 (4/6)

If the optional “Gas thermocouple setting” is ON, alarm setting is enabled for “Gas Thermocouple Disconnection” and “Gas Temperature Over.”



17-6. Alarm Setting Screen 5/6 (AUTO)

If the optional “capacity alarm setting” is ON, alarm setting is enabled for “Combustion Air Flow Rate Over”.



①. Combustion Air Flow Rate : Automatically displays the combustion air flow rate based on the capacity and preheated air temperature manually set in 【11-2. Option Setting Screen 2/3】 and on the gas (oil) parameter.

※1. A flow rate that will not be exceeded even in a cold state is displayed.

※2. The calculated flow rate increased by ten percent is shown here.

<Calculation formula>

Combustion Air Flow Rate

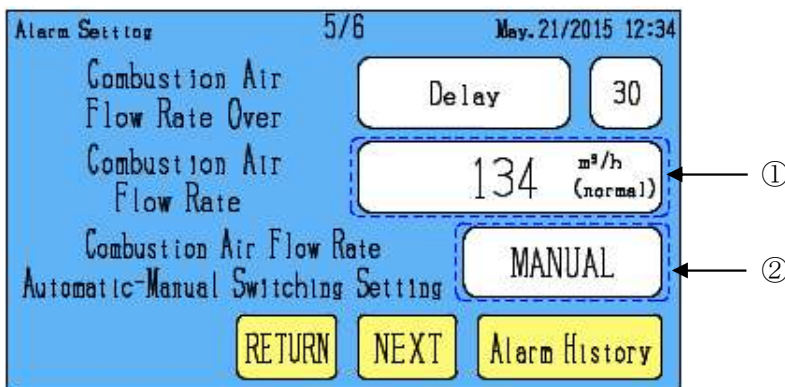
$$= \text{Capacity} \times 3.6$$

$$\div \text{Fuel Type Lower Heation Value} \times \text{Fuel Type Theoretical Air Amount} \times \text{Setting Air Ratio}$$

$$\times \sqrt{\frac{(\text{Absolute Temperature} + \text{Preheated Air Temperature})}{(\text{Absolute Temperature})}} \times 1.1$$

②. Combustion Air Flow Rate Automatic-Manual Switching Setting Button : The screen is switched to the 【17-7. Alarm Setting Screen 5/6 (MANUAL)】.

17-7. Alarm Setting Screen 5/6 (MANUAL)

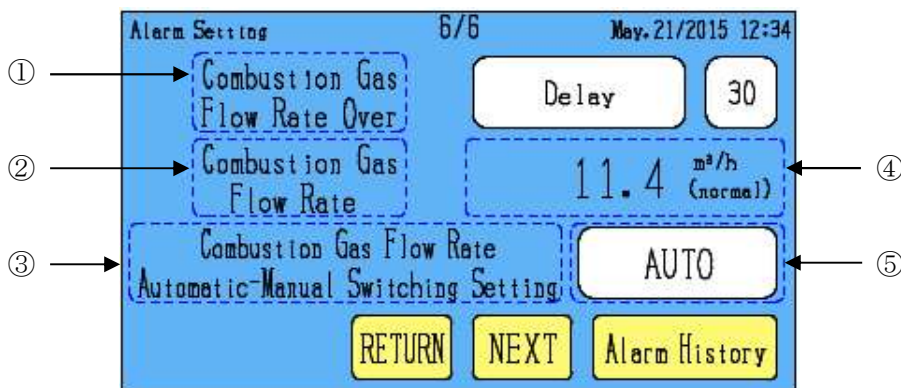


①. Combustion Air Flow Rate : The screen is switched to the 【18-1. Digital Input Screen】.

②. Combustion Air Flow Rate Automatic-Manual Switching Setting Button : The screen is switched to the 【17-6. Alarm Setting Screen 5/6 (AUTO)】.

17-8. Alarm Setting Screen 6/6 (AUTO)

If the optional “capacity alarm setting” is ON, alarm setting is enabled for “Combustion Gas Flow Rate Over”.



- ①. The alarm setting item displayed varies according to the fuel currently selected.
 Fuel Selection Gas : 「Combustion Gas Flow Rate Over」 is displayed.
 Fuel Selection Oil : 「Combustion Oil Flow Rate Over」 is displayed.
- ②. The alarm setting item displayed varies according to the fuel currently selected.
 Fuel Selection Gas : 「Combustion Gas Flow Rate」 is displayed.
 Fuel Selection Oil : 「Combustion Oil Flow Rate」 is displayed.
- ③. The alarm setting item displayed varies according to the fuel currently selected.
 Fuel Selection Gas : 「Combustion Gas Flow Rate Automatic-Manual Switching Setting」 is displayed.
 Fuel Selection Oil : 「Combustion Oil Flow Rate Automatic-Manual Switching Setting」 is displayed.
- ④. Combustion Gas(Oil) Flow Rate : Automatically displays the combustion air flow rate based on the capacity and preheated air temperature manually set in 【11-2. Option Setting Screen 2/3】 and on the gas (oil) parameter.
 - ※1. A flow rate that will not be exceeded even in a cold state is displayed.
 - ※2. The calculated flow rate increased by ten percent is shown here.

<Calculation formula>

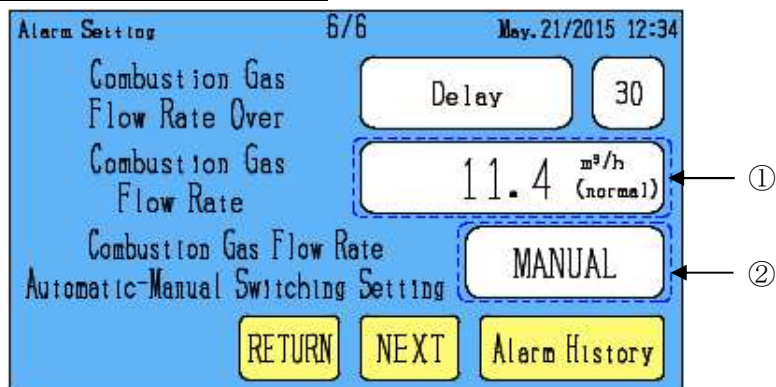
Combustion Gas(Oil) Flow Rate

$$= \text{Capacity} \times 3.6$$

$$\div \text{Fuel Type Lower Heation Value} \times \sqrt{\frac{(\text{Absolute Temperature} + \text{Preheated Air Temperature})}{(\text{Absolute Temperature})}} \times 1.1$$

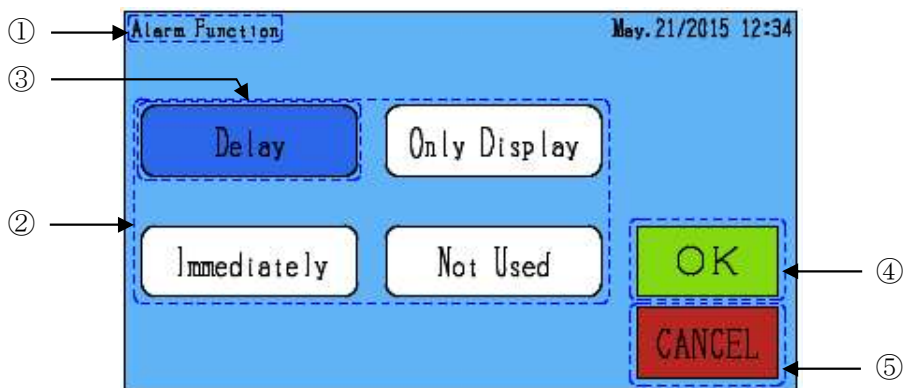
- ⑤. Combustion Gas(Oil) Flow Rate Automatic-Manual Switching Setting Button : The screen is switched to the 【17-9. Alarm Setting Screen 6/6 (MANUAL)】.

17-9. Alarm Setting Screen 6/6 (MANUAL)



- ①. Combustion Gas(Oil) Flow Rate : The screen is switched to the **【18-1.Digital Input Screen】** .
- ②. Combustion Gas(Oil) Flow Rate Automatic-Manual Switching Setting Button : The screen is switched to the **【17-8.Alarm Setting Screen 6/6 (AUTO)】**

17-10. Alarm Function Setting Screen



- ①. The name of the currently setting is displayed.
- ②. Alarm Function Setting : Alarm function setting is displayed.
- ③. Alarm function setting currently selected is displayed in blue.
- ④. OK button : Determine the setting, the screen is switched to the screen before the switched.
- ⑤. CANCEL button : Revocation the setting, the screen is switched to the screen before the switched.

Delay : The time of display (output) of an alarm that occurs can be delayed.

The delay time setting is enabled. (1~99 sec)

Only Display : When an alarm occurs, the screen will not be switched to Alarm Occurrence Screen and the alarm name will be shown on the left top of the monitor screen.

Immediately : The alarm will be immediately displayed (outputted) upon occurrence.

Not Used : The alarm will not be displayed (outputted).

17-11. Alarm Occurrence Screen

If “Delay” or “Immediately” is selected in the alarm function setting, Alarm Occurrence Screen will appear after occurrence of an alarm.



①. The latest alarm name of the During Occurrence is displayed.

②. The occurrence time of the alarm is displayed.

③. Buzzer Stop Button : To stop the alarm buzzer.

After the buzzer stops, the button will be dimmed.

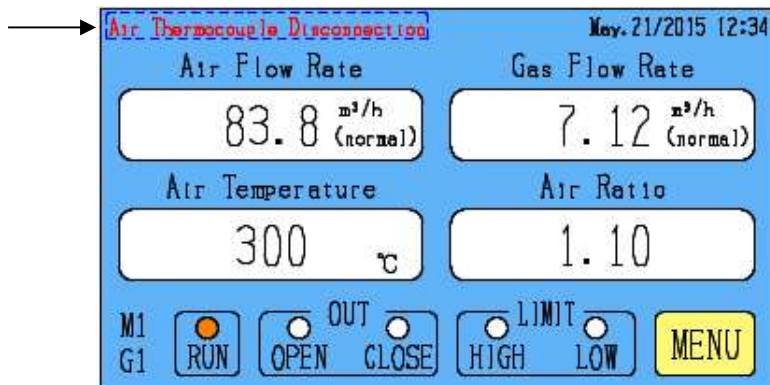
※If the buzzer is set to OFF, Buzzer Stop Button is not displayed.

④. RETURN Button : The alarm buzzer will stop and the screen displayed before the alarm occurrence will reappear.

※1. If the alarm is not released, the alarm name will be shown on the left top of the monitor screen.

※2. The two or more alarms have occurred, their alarm names will be displayed in turn.

< Monitor Display >



17-12. Measures Of Alarm

If more than one alarms occur at the same time, one with higher priority takes precedence.

Alarm name	Cause	Workaround	Priority ranking
Air Thermocouple Disconnection	The air thermocouple is defective or the compensating lead wire is disconnected.	Check the air thermocouple, the wiring, etc.	3
Air Temperature Over	The air temperature exceeded 600°C.	Check the heat exchanger, the thermocouple, etc.	5
Air Maximum Flow Rate Over	The air differential pressure sensor exceeds 3.6kPa.	Check the air line adjustment equipment, the differential pressure sensor, etc.	6
Combustion Air Flow Rate Over *2	The combustion air flow rate exceeded.	Check the air line adjustment equipment, the differential pressure sensor, etc.	9
Gas Thermocouple Disconnection *1	The gas thermocouple is defective or the compensating lead wire is disconnected.	Check the air thermocouple, the wiring, etc.	4
Gas Temperature Over *1	The air temperature exceeded 600°C.	Check the heat exchanger, the thermocouple, etc.	7
Gas Maximum Flow Rate Over	The gas differential pressure sensor exceeds 3.6kPa.	Check the gas line adjustment equipment, the differential pressure sensor, etc.	8
Combustion Gas Flow Rate Over *2	The combustion gas flow rate exceeded.	Check the gas line adjustment equipment, the differential pressure sensor, etc.	10
Oil Maximum Flow Rate Over	The oil sensor exceeded maximum flow rate .	Check the oil line adjustment equipment, the oil sensor, etc.	11
Combustion Oil Flow Rate Over *2	The combustion oil flow rate exceeded.	Check the oil line adjustment equipment, the oil sensor, etc.	12
Close Error	If any alarm is displayed, take action promptly. If operation stop is required for checkup, check each equipment. Upon completion of the action, the alarm display disappears and the previously shown screen reappears.	The power supply to the fuel control motor or the wiring may be defective. Check the power supply, the control motor and the wiring.	14

Alarm name	Cause	Workaround	Priority ranking
High Limit Error	The fuel control motor was in the fully open state for over 30 sec.	Fuel may be short-supplied. Check the fuel flow rate, the valve opening, etc.	15
Low Limit Error	The fuel control motor was in the fully closed state for over 30 sec.	Fuel may be over-supplied. Check the fuel flow rate, the valve opening, etc.	16
Limit Input Error	Both the High limit lamp and the Low limit lamp of the fuel control motor are in the simultaneous ON state.	The wiring may be wrong. Check the control motor, the SECTRON wiring, etc.	13
Date/Time IC Error	There is abnormal on the Date/Time IC.	Please return the SECTRON. Operation is operating normally.	2
System Error	There is an internal anomaly in SECTRON.	Please return the SECTRON.	1

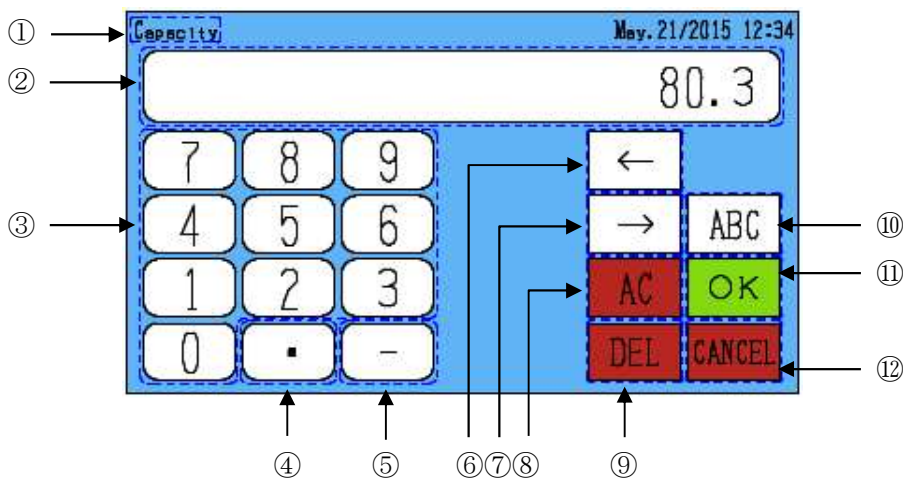
*1. Displayed only when the optional “Gas thermocouple setting” is ON.

*2. Displayed only when the optional “Capacity alarm setting” is ON.

※If any alarm is displayed, take action promptly. If operation stop is required for checkup, check each equipment. Upon completion of the action, the alarm display disappears and the previously shown screen reappears.

18. Character Input · OFF / ON Setting Screen

18-1. Digital Input Screen



- ①. The name of the currently setting is displayed.
- ②. Set value of the currently being modified is displayed.
- ③. Numerical Input Button
- ④. Point Input Button : A decimal point “.” will be displayed if inputted.
- ⑤. Minus Input Button : A minus sign “-” will be displayed if inputted.

In the air/gas orifice model setting, this mark is used as a hyphen.

- ⑥. Left Button : Displayed in the date/time setting and used to move the cursor to the left.
- ⑦. Right Button : Displayed in the date/time setting and used to move the cursor to the right.
- ⑧. AC Button : In a value setting, this button is used to reset the set value to 0.

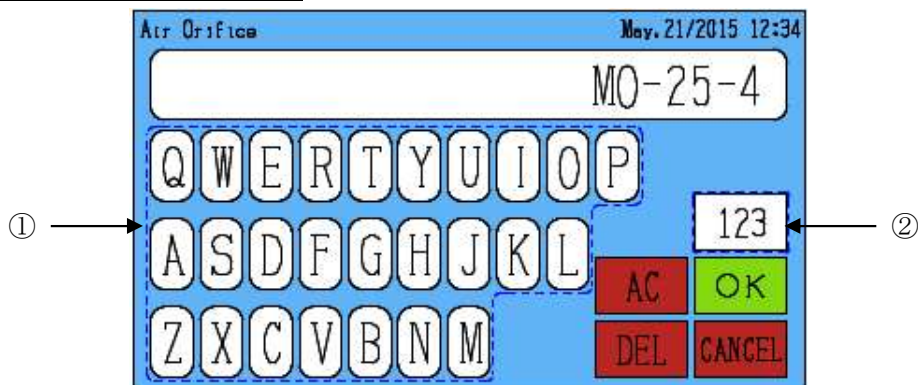
In the air/gas orifice model setting, this button is used to delete all the inputted letters.

- ⑨. DEL Button : One letter of the inputted set value will be deleted.
- ⑩. Alphabetic Input Button : Displayed when the air/gas orifice model is inputted.

The screen is switched to the **【18-2. Alphabetic Input Screen】**.

- ⑪. OK button : Determine the setting, the screen is switched to the screen before the switched.
- ⑫. CANCEL button : Revocation the setting, the screen is switched to the screen before the switched.

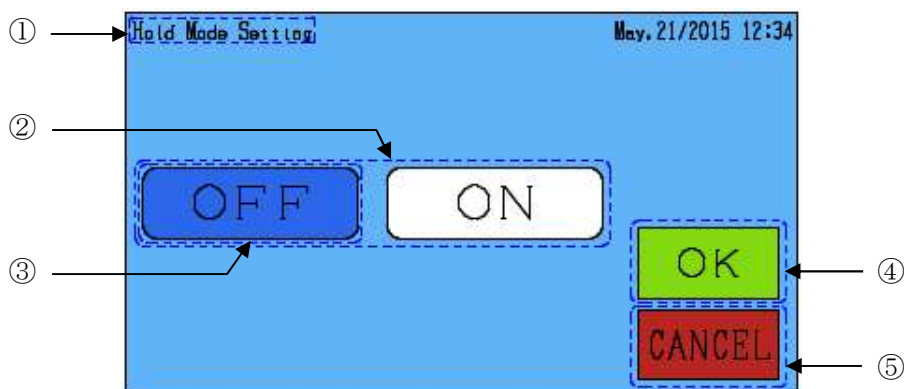
18-2. Alphabetic Input Screen



①. Alphabetic Input Button

②. Digital Input Button : The screen is switched to the 【18-1. Digital Input Screen】 .

18-3. OFF/ON Setting Screen



①. The name of the currently setting is displayed.

②. Choices is displayed.

③. Button of the currently selected is displayed in blue.

④. OK button : Determine the setting, the screen is switched to the screen before the switched.

⑤. CANCEL button : Revocation the setting, the screen is switched to the screen before the switched.

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The specifications are subject to change for improvement without notice.