Manual

FN-MASS FLOWMETER

MODEL : KC-7730 Series

FN-Mass flow meter

Golden Rules Co.,Ltd.

A-1805, Songdomirae-ro 30, Yeonsu-gu, Incheon, Korea
Tel : +82-32-817-1240
E-mail : hhm617@hanmail.net
http://www.goldenrules.co.kr

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Warning and caution

- Before installing the FN-MASS, foreign substances in the bureaucracy must be removed, check that the flow direction and the installation direction match, and check that the FN-MASS connection is fully tightened and there is no leakage.
- Check that the power input 24V DC connection terminal is correct, the output terminal connection 4 ~ 20mA DC is correct, and the control cable is used as a shielding wire.
- Make sure the high and low pressure valves and equivalent valves of the FN-MASS 3-way block valve are open. However, if the pipe is flushed to remove foreign substances from the pipe, close the high and low pressure valve to prevent foreign substances from entering the pipe before performing flushing.
- The flow meter uses a pressure tube, so be careful not to damage it. In particular, do not move or transport the product by holding only the pressure tube.
- When moving or installing, fix the eyebolt (refer to the figure below) on the flange with a rope.
- Do not install in a place subject to vibration such as a truck.
- Transport the FN-MASS so that its indicator is in the forward direction.
- Since the life of FN-MASS is affected by the ambient temperature, make sure that the ambient temperature of the installation site does not exceed the allowable temperature (-20 ~ +60℃).
- Make sure the flow meter power is off before making any wiring.

- Opening the mass flow meter cover with power applied in an explosion-proof area may cause an explosion. Be careful.

- The rated power supply of FN-MASS is DC 24V, and to prevent device damage and breakdown, use a power suitable for the rated power.

- The wiring terminal has a low risk of electric shock, but it may cause damage or fire due to incorrect contact with the human body and electric current.
  Please pay attention to wiring.

- To prevent malfunction due to external electrical signals, connect the ground wire to the ground terminal (M4) of the lug part of the FN_MASS enclosure.
  Be sure to install and use ring-type crimp terminals with insulation caps.

- When removing or removing the device, be sure to cut off the power before working, which may cause abnormal operation or malfunction.

■ Ground

The power and ground wire of the device should be connected with 4㎟ (AWG11) or more.

For grounding, connect external earth and internal earth at the same time.

In the case of internal ground, it is wired by our company and shipped.

⚠	When checking the indicator, connect a 250Ω resistor in series to the (+) of the flow signal output terminal.

Chapter 1 Overview

summary

KC-7730 FN-MASS Flow Meter

Golden Rule's KC-7730 series high-precision mass flow meter senses the flow of fluid in industrial sites, and is applied to places such as adjustment and measurement of flow rate.
It is a fixed sensor installation type and uses a microprocessor to measure flow, adjust flow, and diagnose at the same time.
It can be applied according to the instantaneous value of mass flow rate, accumulated quantity and environment setting, and is displayed on a 2 x 16 LCD panel.
It is a programmable transmitter and can be easily set through RS-485S communication port and Golden Rule high-performance interface software or instrument panel display.
In the KC-7730 series of Golden Rule Co., Ltd., instantaneous flow rate, accumulated flow rate, response speed, electric potential cut-off, flow correction factor, etc. are initially protected by password and can be changed by the user.
You can check the performance of the instrument through the Smartinterface TM Software guide of Golden Rule,
Input power, output, installation, and packaging methods can be selected according to the user's request.

How to use the manual

This manual provides necessary information for installing and
operating a smart differential pressure mass flow meter.
The chapters in the five parts of this manual cover the following areas:

. Chapter 1: Overview
. Chapter 2: Installation and wiring instructions
. Chapter 3: How to operate (Explain system operation and programming)
· Chapter 4: RS-485 Protocol
. Chapter 5: Diagnosis and A/S of fault
· Chapter 6: Area of Use and Quality Assurance

Please refer to the catalog for product specifications.

Notes and safety information

We mark references, cautions, and warnings throughout this book to draw your attention to important information.

warning!
This reference represents important information to prevent damage to people and products.

caution!
This reference represents important information for the protection of products and performance.

Reference
This statement is presented to inform you of important details.

Takeover of the product

When you receive the Golden Rule FN-mass flow meter, carefully check the exterior of the packaging box for damage that occurred during shipping. If the box is damaged, notify the domestic shipping company and notify the factory or agent. Remove the packing list and check that all components ordered are present. It is important to ensure that no spare parts or accessories are discarded along with the packaging material.

We do not return any products without initial contact with Golden Rule's customer support department.

technical support

If a problem is found with the customer's flow meter, please refer to each step of installation, operation and setup.

Check the configuration. Verify that the customer's settings and adjustments are free of disruptions as recommended by the factory.

For specific information and recommended actions, refer to Chapter 5 Diagnosis of Failure.

If the problem persists despite the troubleshooting procedures outlined in Chapter 5, please contact us by email.

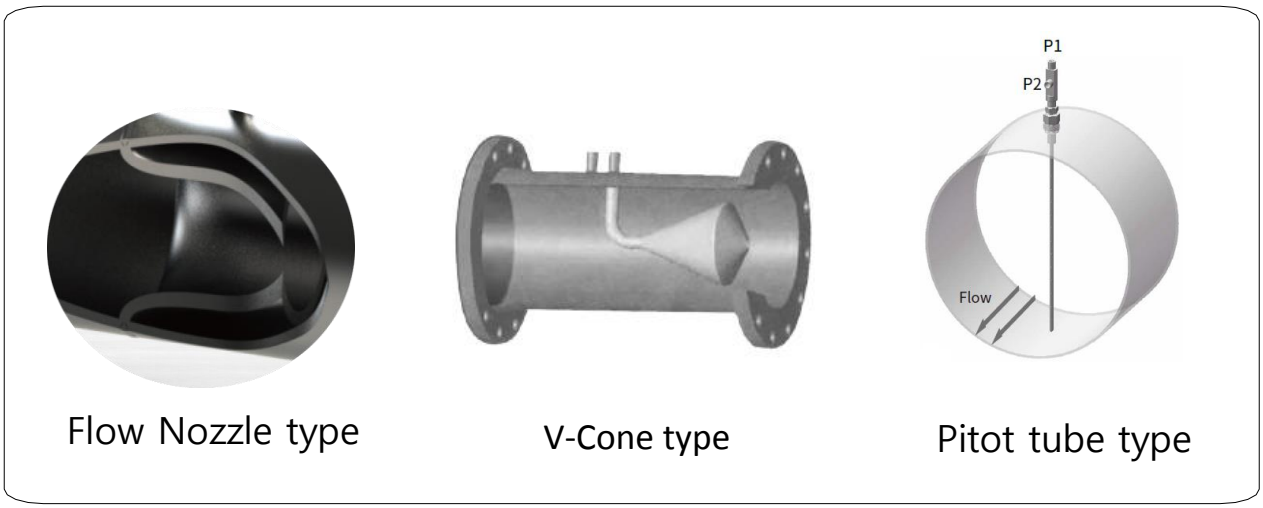
E-mail: hhm617@hanmail.net

When contacting the technical support team, please provide the following information:

- Product serial number, model name (indicated on the product name plate)
- Problems caused and correct actions taken
- Application information (fluid, pressure, temperature and piping status)

FN - Mass Flow Sensing

d/p type – Mass flow sensor (Flow Nozzle, Orifice, V-Cone, Pitot tube)



Flow Nozzle type　　V-Cone type　　Pitot tube type

(KC-7730)Series measurement sensor

The unique D/P type-Mass Flow meter of Golden Rule Co., Ltd. guarantees the excellent accuracy of industrial flow meters, and robustness and reliability in the case of high pressure and high pressure.

As a differential pressure measurement method, the sensor uses an Orifice Plate, Flow Nozzle, V-cone, and Pitot Tube to minimize pressure loss during design, and it is a new technology mass flow meter that measures the flow rate by a calculation method utilizing its own patented technology.

This is a new concept mass flow transmitter that derives the flow rate with advanced calculation under the variable physical properties of the actual fluid.

It is capable of engineering under demanding conditions in the industrial field and is developed with domestic proprietary technology to minimize industrial losses and secure technical freedom, and is a measuring device with excellent accuracy and stability.

In addition, it can be used in various fluids, and the required straight pipe part of the existing differential pressure flow meter was supplemented through various experimental data so that the desired degree can be maintained even in a short straight pipe part.

By configuring a communication network
(RS-485), you can monitor the progress of the mass flow meter, and install an automatic valve to control the mass flow rate set by the user.

Fabrication of Flow Nozzle and Orifice complies with ISO-5167 standard and is made with ISO-9001 quality management system.

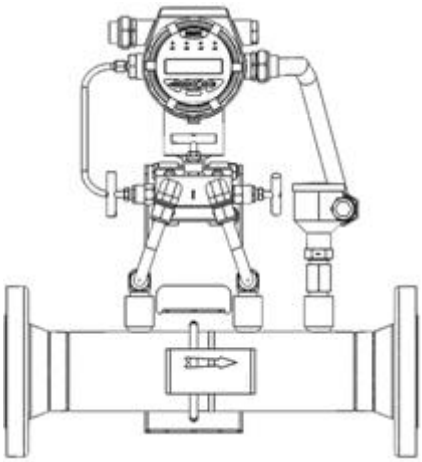
Chapter 2 Installation

Installation overview

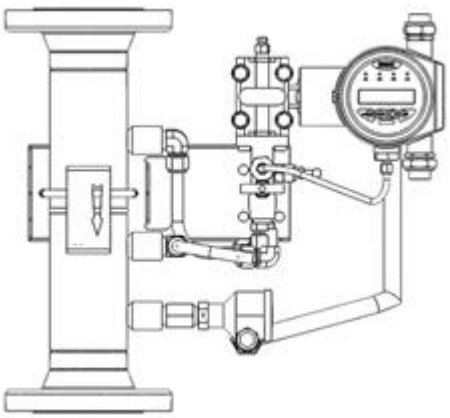
The KC-7730 series flowmeters are factory calibrated to the specified pipe size as specified in the product's calibration certificate.
Factory calibration suggests calculating the average flow rate through which the flow passes through the pipe in order to determine the correct insertion depth.
(If the pipe size is different from the calibrated size of the flow meter, the changed setting value must be re-entered.)

warning!

Agency approvals for hazardous area installations vary by flow meter model. Refer to the flow meter nameplate for specific flow meter approvals prior to installation in hazardous areas.



<Horizontal installation>



<Vertical installation>

- In order to prevent deterioration of the life or performance of the flow meter, install it correctly, taking into account the installation location, installation direction, and surrounding space.
- When installing the product, align the arrow with the direction of fluid flow in the pipe, and install the FN-MASS so that the differential pressure sensor is horizontal (the display is horizontal at the time of shipment), and can be used for piping in either vertical or horizontal direction.
- It is recommended to avoid places subject to vibration or shock as much as possible. If there is a pulsation of the fluid, install a device that can absorb the pulsation and install the FN-MASS. In particular, when installing the FN-MASS, be careful as errors and operating errors may occur if the gasket is smaller than the inner diameter of the pipe.

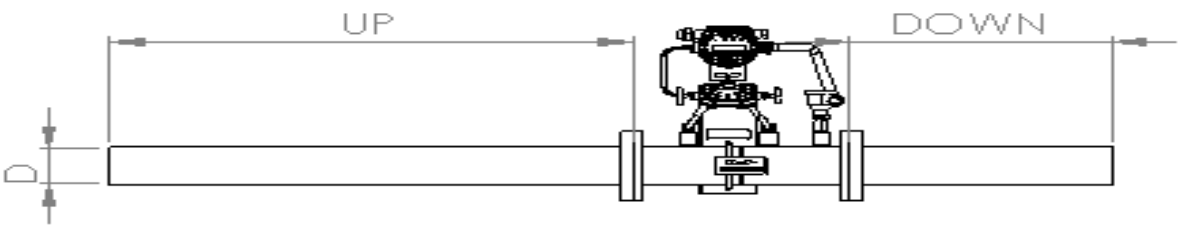
Requirements for normal flow measurement

Requirements for normal flow measurement

- This flow meter is a mass flow meter using a precision sensor. Be careful as it may be affected by impact.
- Secure the distance between the front and rear ends of the flow meter as much as the specified distance. If there are bends such as valves or elbows, secure an additional distance. In the case of built-in flow rectifier, the required straight pipe part can be reduced.

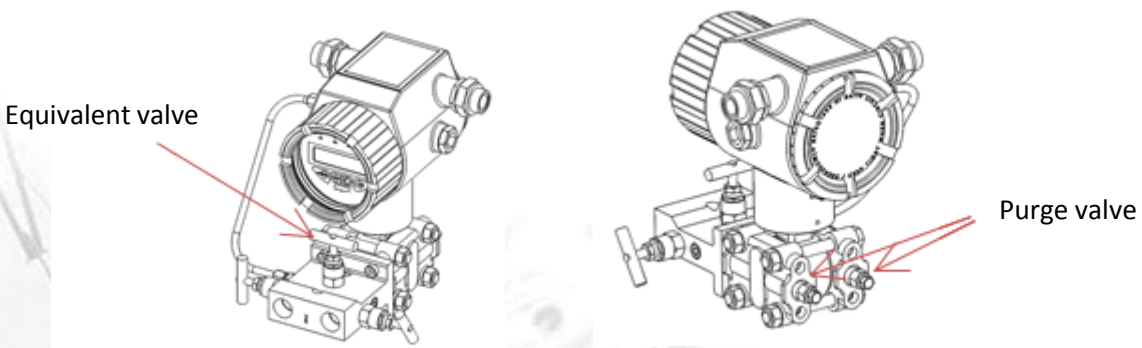
	Normal	Bend	Conditioner
UP	10D	15D	5D
DOWN	4D	5D	3D

* D: Flow meter inner diameter



During initial installation, follow the procedure below.

Open all 3-way manifold valves to equalize the influence of the pressure sensor by fluid pressure. The equivalent method is to close only the equivalent valve in the center direction after a certain period of time has passed with all three-way valves open.



① If there is an offset value of the differential pressure sensor that may occur during movement and installation after opening the equivalent valve, complete the zero point setting through the manual sensor auto zero setting method.

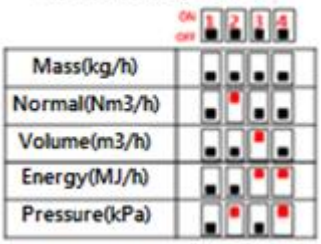
② Open the rear purge valve of the differential pressure sensor to remove impurities. In the case of liquids, in particular, use after completely removing the gas (air) stagnant inside the sensor.

③ If fluid flows, close the equivalent valve for normal use.

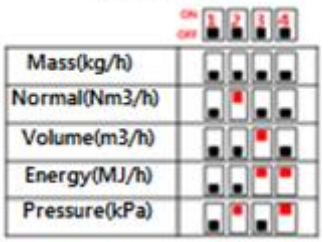
Wiring

Terminal block

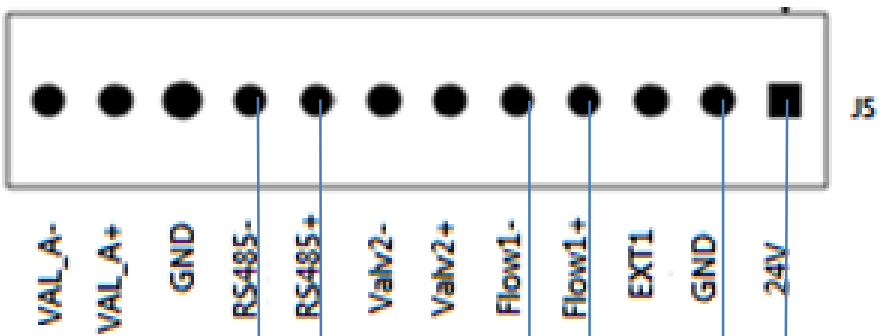
MONITORING(4-20mA)



VALVE(4-20mA)



LOOP POWER

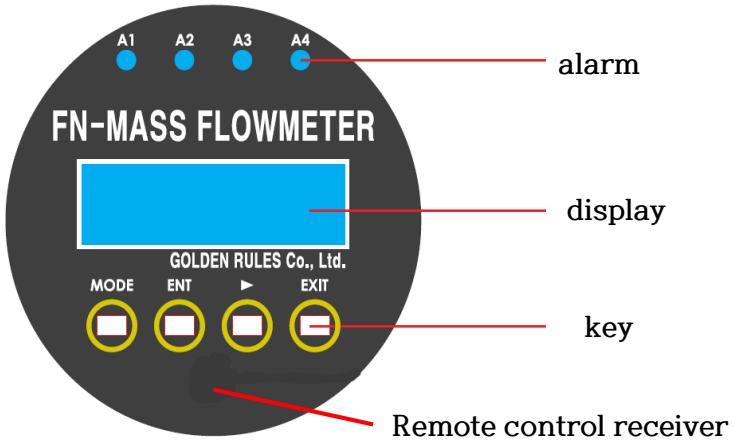


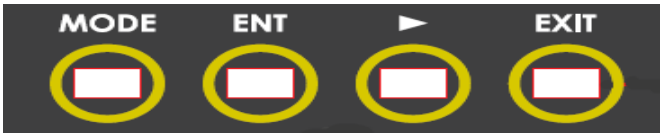
24V	DC 24V Input (+)	RS485+	RS-485 (+)
GND	DC 24V Input (-)	RS485-	RS-485 (-)
EXT1	NO CONNECT	GND	ground
FLOW+	4~20mA output (+)	VAL_AIN	VALVE 4~20mA input(+)
FLOW-	4~20mA outpt (-)	FGND	VALVE 4~20mA input(-)
VALV2+	VALVE 4~20mA output (+)		
VALV2-	VALVE 4~20mA output (-)		

- The wiring of analog output is marked as I (+) and I (-) on the top of the terminal block for a 2-wire loop, and the part where the flow signal 4 ~ 20mA is output is I (+) and I (-). Please wire.
  If there is no special request, the rated power is DC 24V, and it is connected to P(+) and P(-) of the power. If the power is less than DC 12V, please specify in the order form or contact us.
- The overall wiring length should be within 200m.
- If wire fragments remain inside the flow meter during wiring, it may cause abnormalities, breakdowns, or malfunctions. Do not leave any fragments.

Display

3.1 Display front and screen display





alarm	Display of flow status and temperature information inside the protective device	
	A1	Lights up when more flow than the set flow rate flows
	A2	Lights up when a small flow rate flows compared to the set flow rate value.
	A3	Lights up when a large amount of flow flows compared to the set accumulated value.
	A4	Lights up when the temperature inside the protective device is higher than the set value
display	Screen display and parameter information display of each menu group	
key	Display and parameter setting and change	
Remote control receiver	Receiver by user's remote control command	

MODE	Used to move between groups and change the number to be set
ENTER	Used to execute or save the setting command displayed on the current screen
SHIFT	Used to move the command within each group or the number of digits to be set.
EXIT	Used when moving the upper command

< Flow computer remote control key>

By pressing the operation button on the remote control, you can check the data of the flow computer and modify the option value through the infrared LED frequency value.

Power: Lithium battery CR2025 (3.0V DC)

Operating temperature: -10℃ ~ +50℃

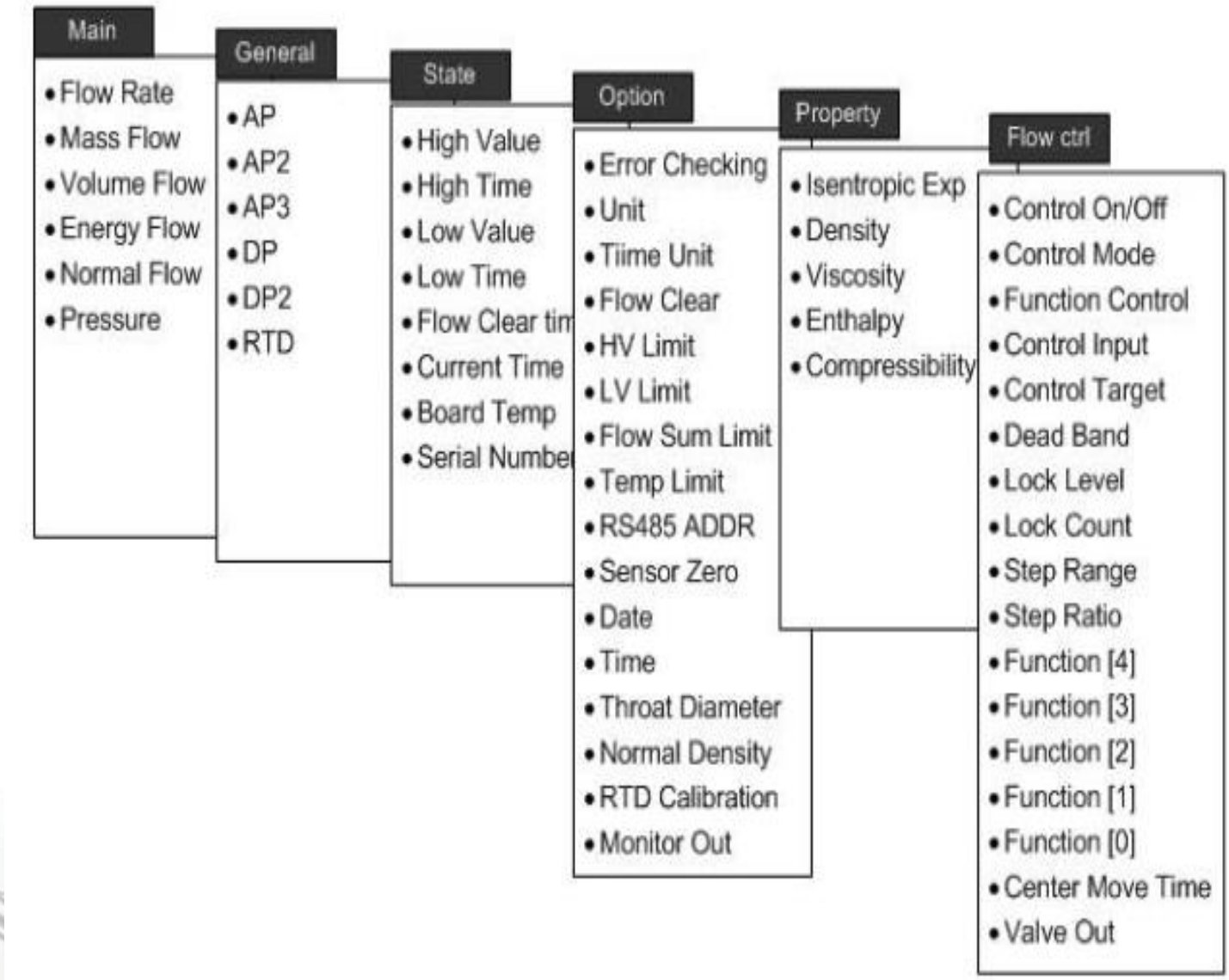
Infrared LED current: 300 ~ 700mA

Oscillation frequency: 3.64MHz ±0.5%

Operating angle: horizontal ±20˚, vertical ±20˚

This chapter covers how to program the flow meter and how to operate it to check the progress of the meter. All explanations on programming are conducted by looking at the LCD window.

◉ Menu setting configuration



O main screen

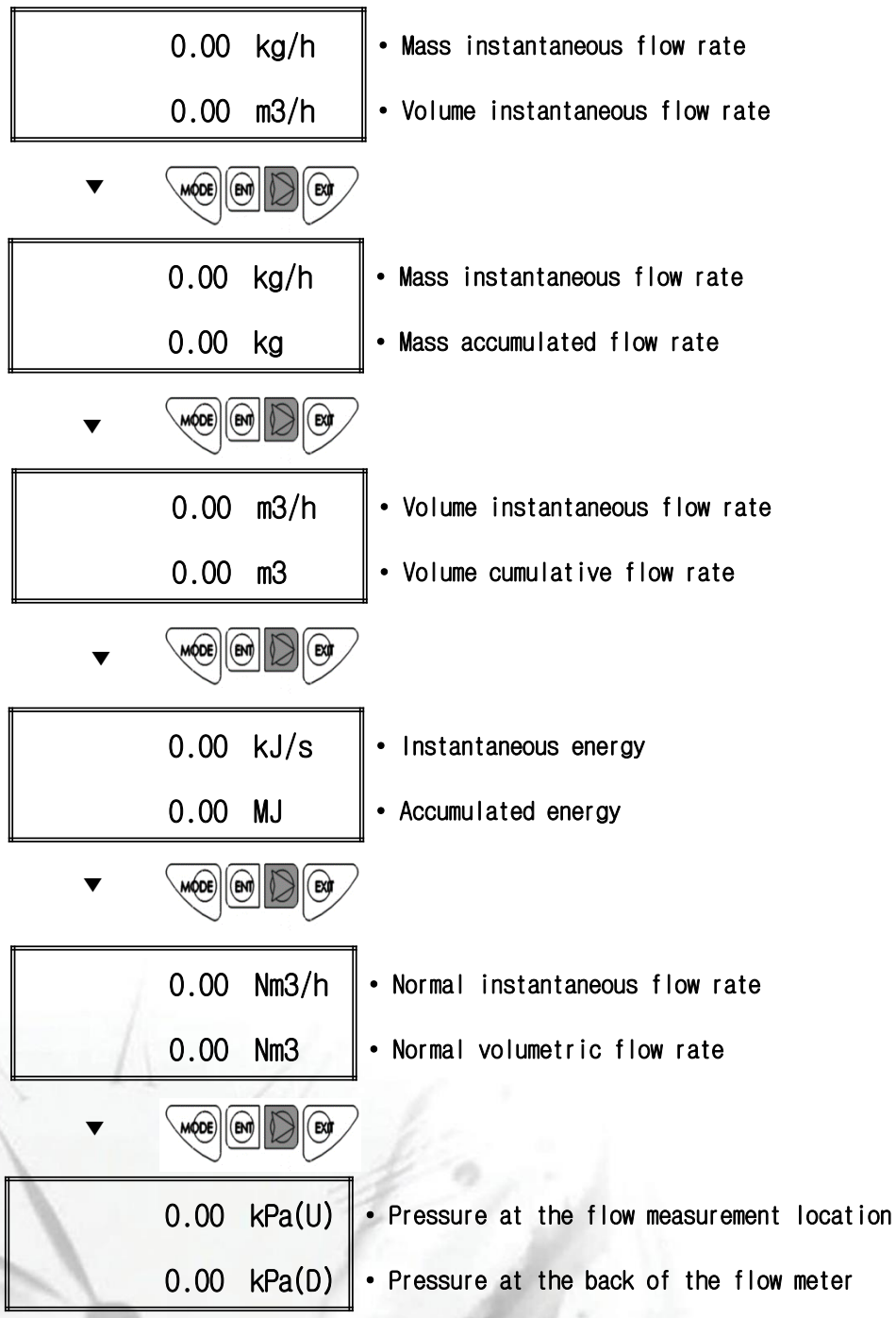
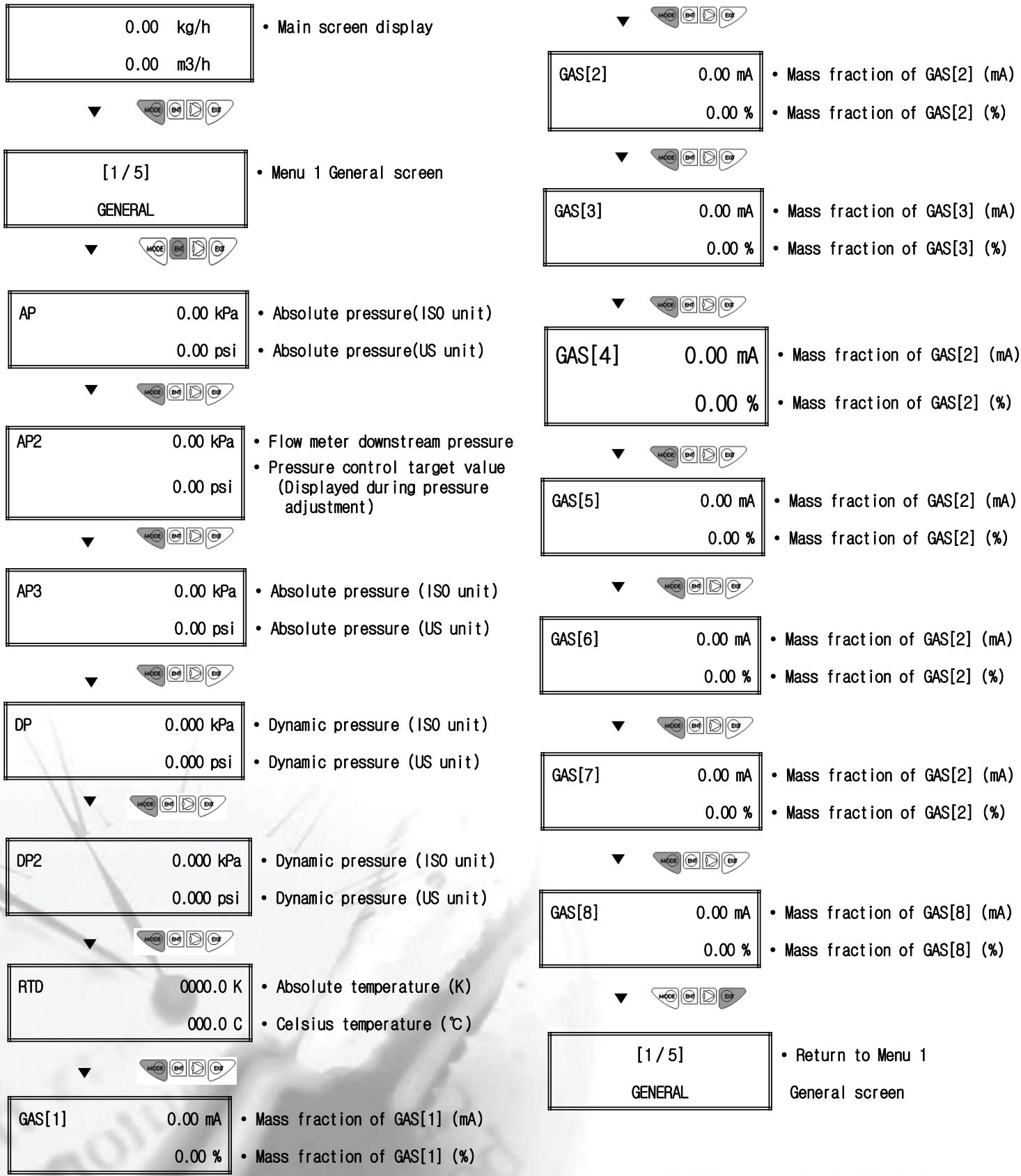
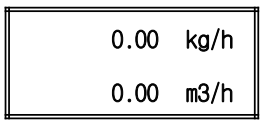


Figure 3-1 KC-7730 front display and display screen

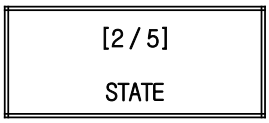
3.1. General screen (Group 1)



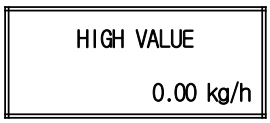
3.2. State screen(Group 2)



• Main screen display

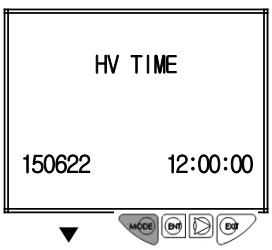


• Menu 2 State



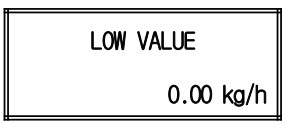
• Maximum flow value

• Instantaneous flow rate



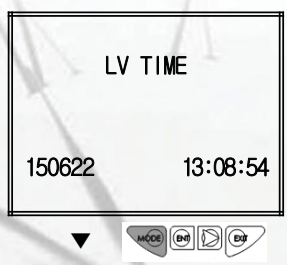
• Generation information of the maximum flow value

• [YMD], [HMS]
(Currently, June 22, 20, 12:00)



• Minimum flow value

• Minimum instantaneous flow rate

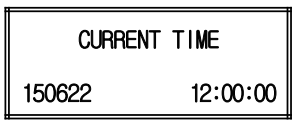


• Generation information of the minimum flow rate value

• [YMD], [HMS]
(Currently, June 22, 20, 12:00)

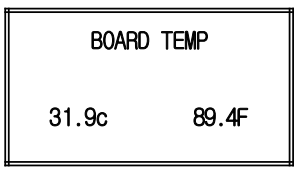
• Accumulated flow and energy initialization information

• [YMD], [HMS]



•

• [YMD], [HMS]

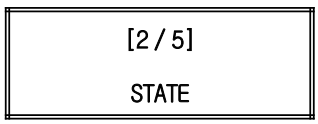


• Board temperature information

• Board temperature
(31.9℃, 89.4°F)

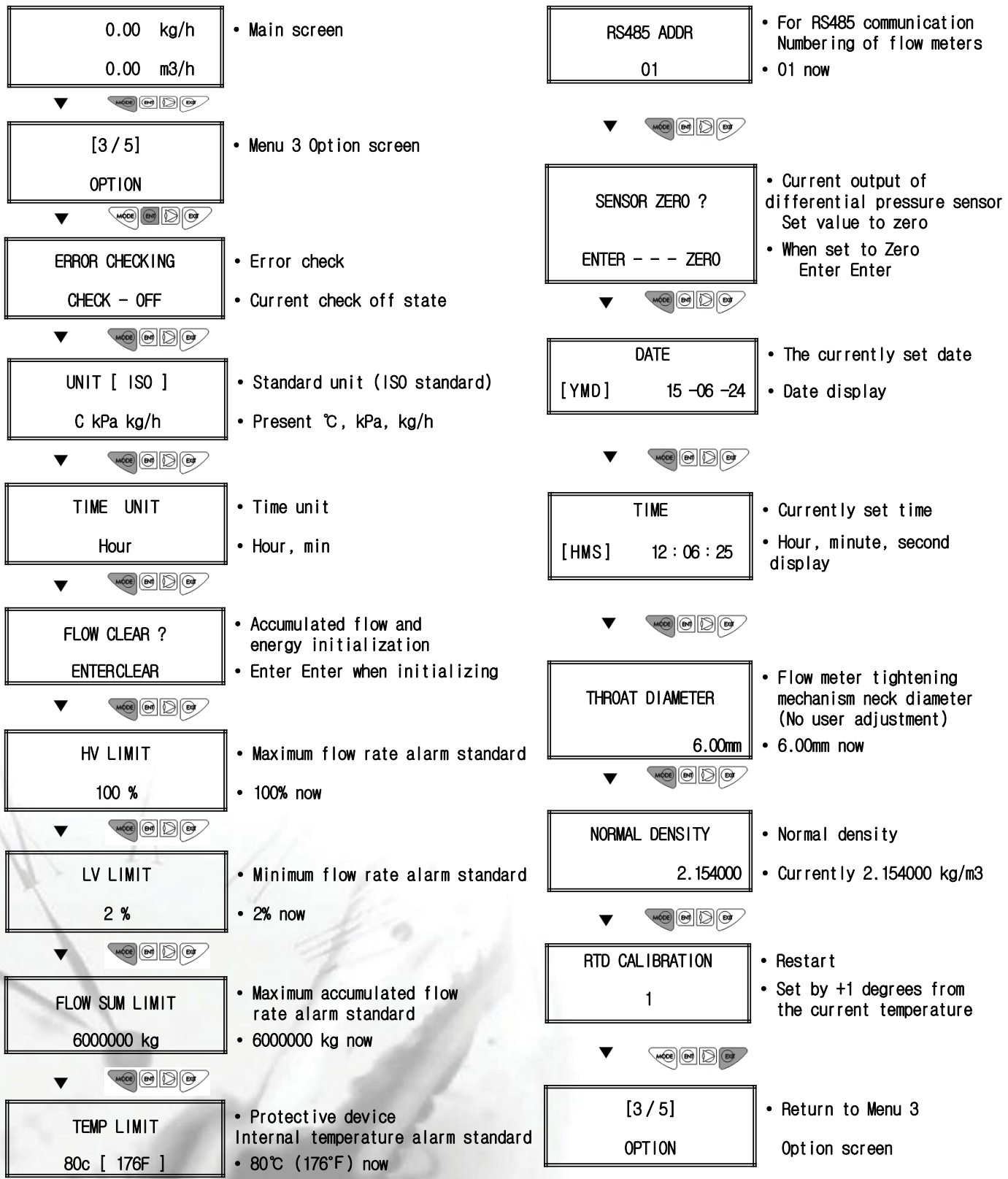
• Serial Number

• 현재 FM00A001

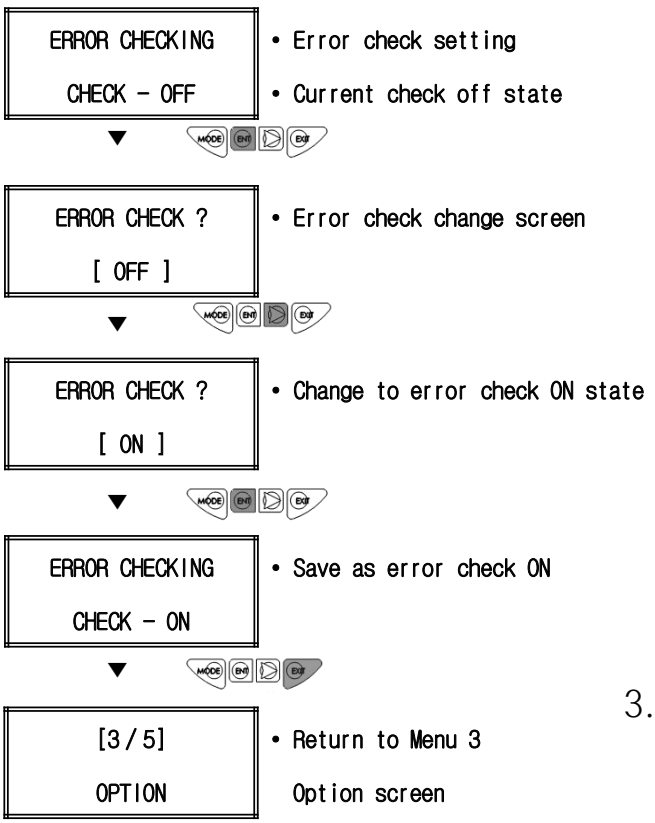


• Return to Menu 1 State screen

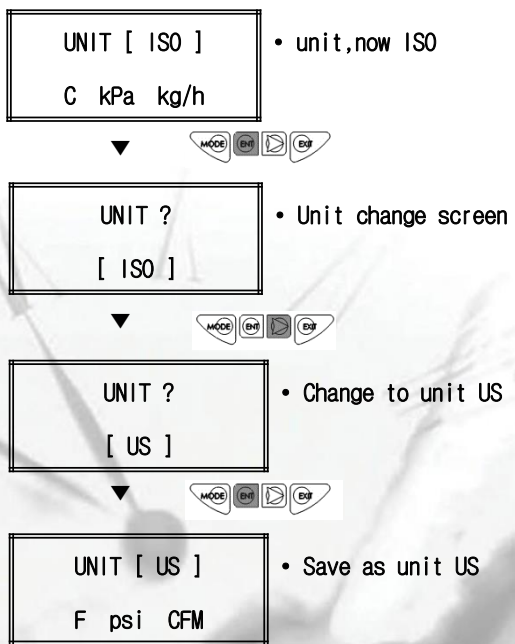
3.3. State screen (Group 3)



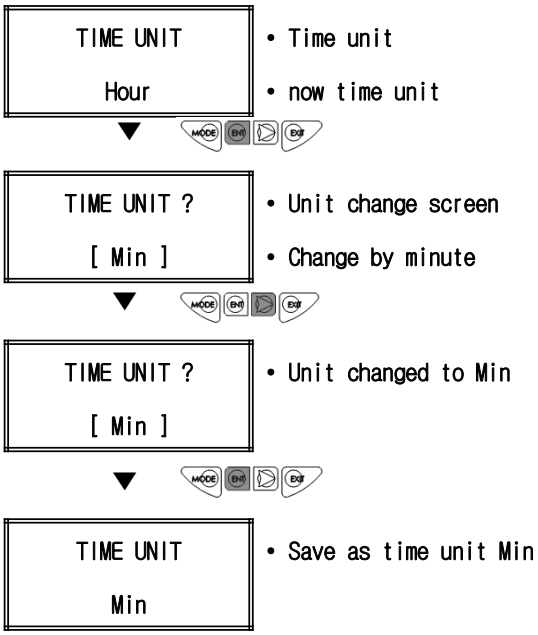
3.3.1. Error checking



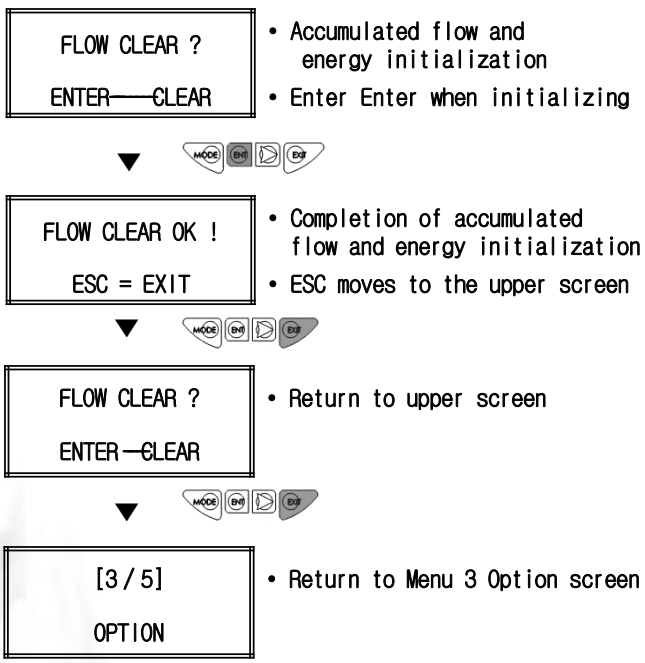
3.3.2. Unit



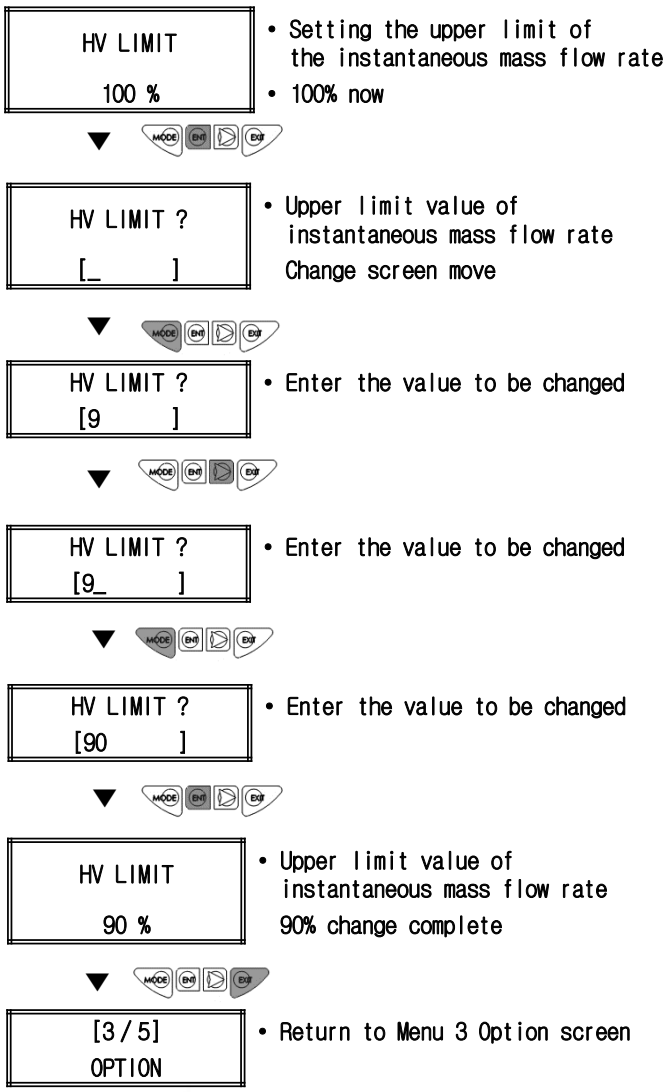
3.3.3 Time Unit



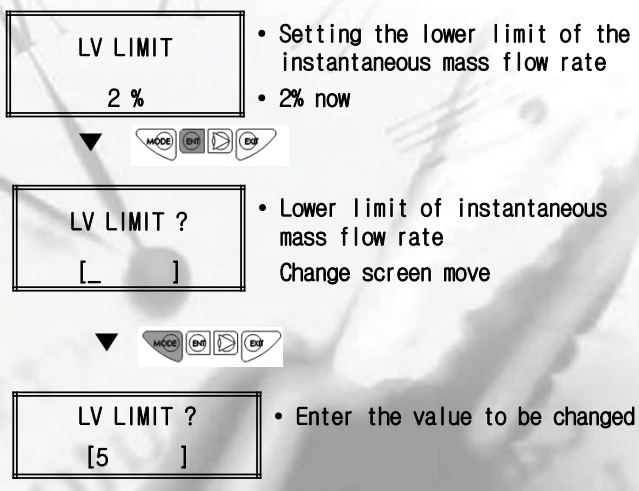
3.3.4. Flow clear



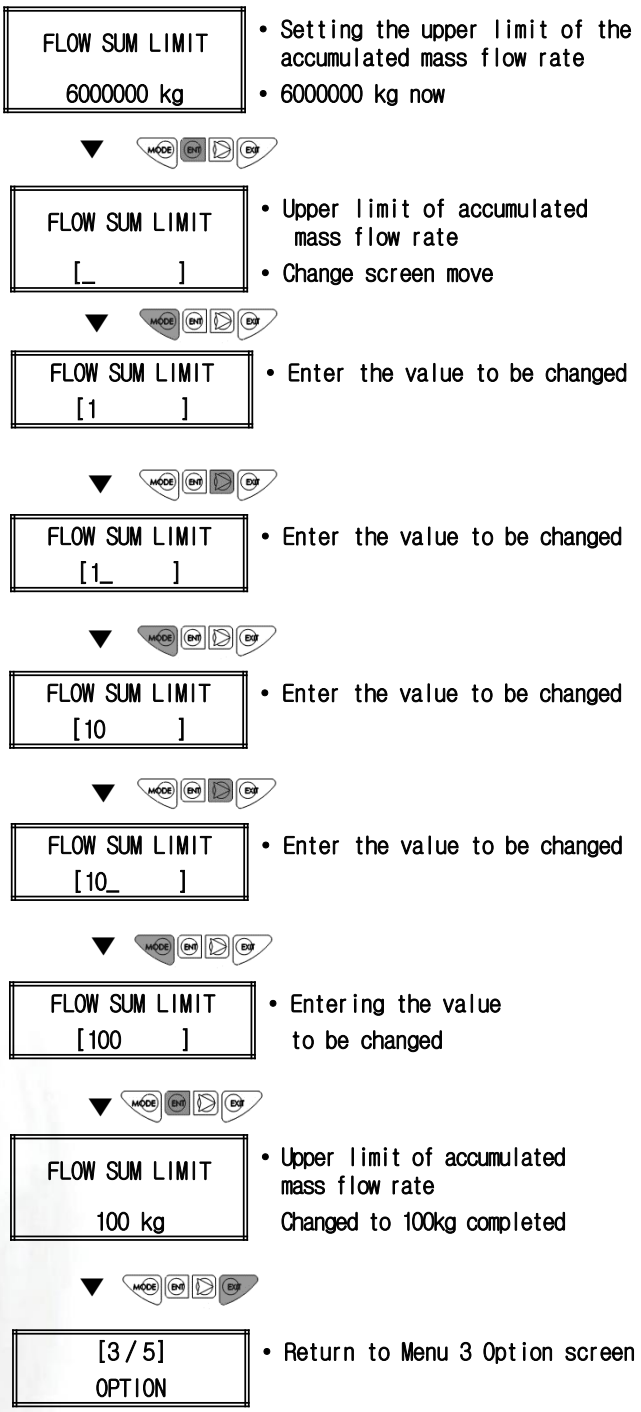
3.3.5. HV limit



3.3.6. LV limit



3.3.7. Flow sum limit



3.3.8. Temp limit

TEMP LIMIT 80c [176F]	• Set internal board temperature upper limit value • 80℃ [176°F] now
▼	
BD TEMP LIMIT ? [_]	• Board temperature upper limit Change screen move
▼	
BD TEMP LIMIT ? [7]	• Enter the value to be changed
▼	
BD TEMP LIMIT ? [7_]	• Enter the value to be changed
▼	
BD TEMP LIMIT ? [70]	• Entering the value to be changed
▼	
TEMP LIMIT 70c [158F]	• Upper limit of internal board temperature. Change complete • 70℃ [158°F]
▼	
[3 / 5] OPTION	• Return to Menu 3 Option screen

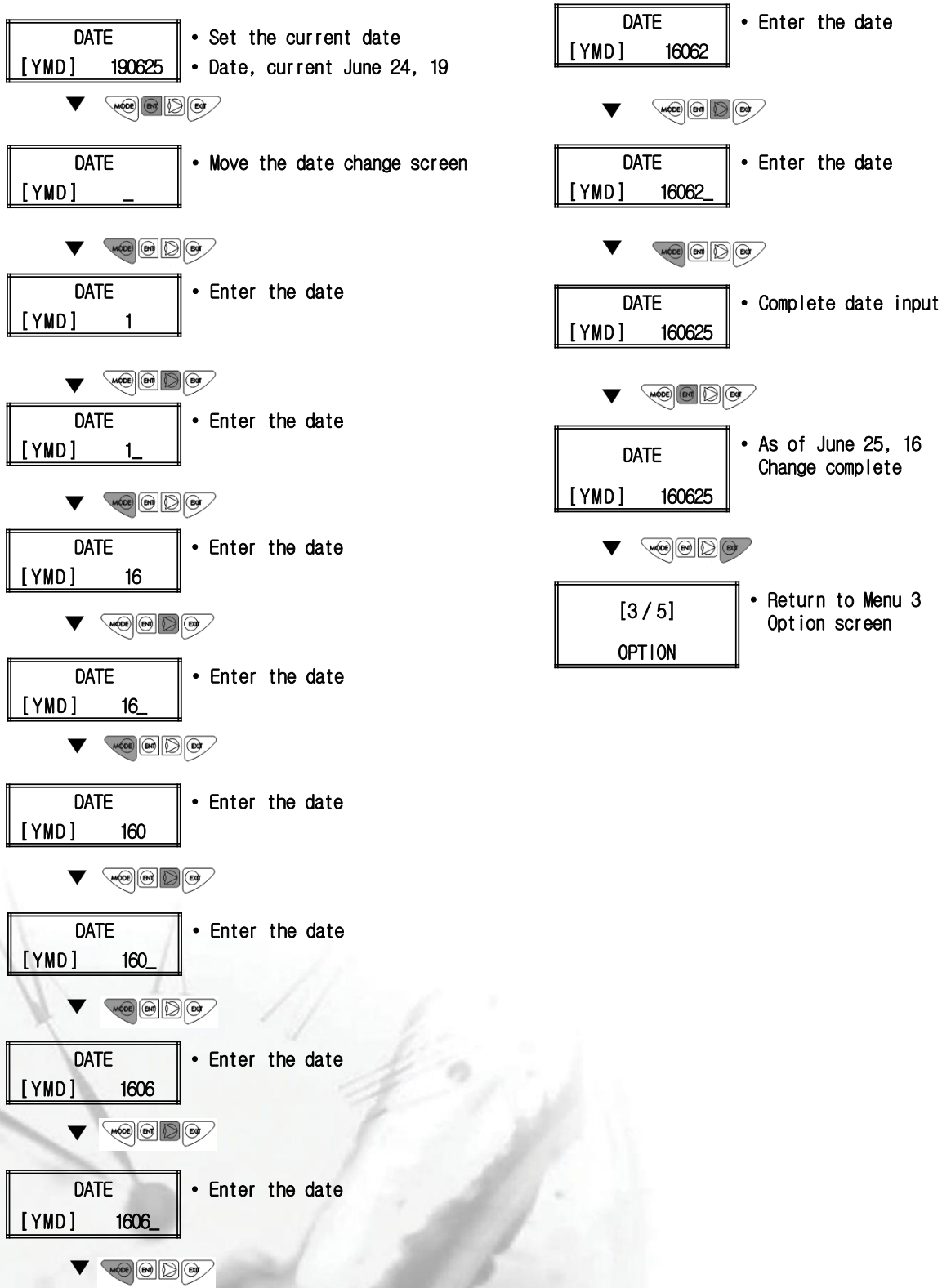
3.3.9 RS485 ADDR

RS485 ADDR 01	• Communication flow meter number setting • ADD = 01 now
▼	
RS485 ADDR [_]	• Communication flow meter number Change screen move
▼	
RS485 ADDR [0]	• Enter the number to be changed
▼	
RS485 ADDR [0_]	• Enter the number to be changed
▼	
RS485 ADDR [02]	• Enter the number to be changed
▼	
RS485 ADDR 02	• Communication flow meter number Changed to ADD = 02 completed
▼	
[3 / 5] OPTION	• Return to Menu 3 Option screen

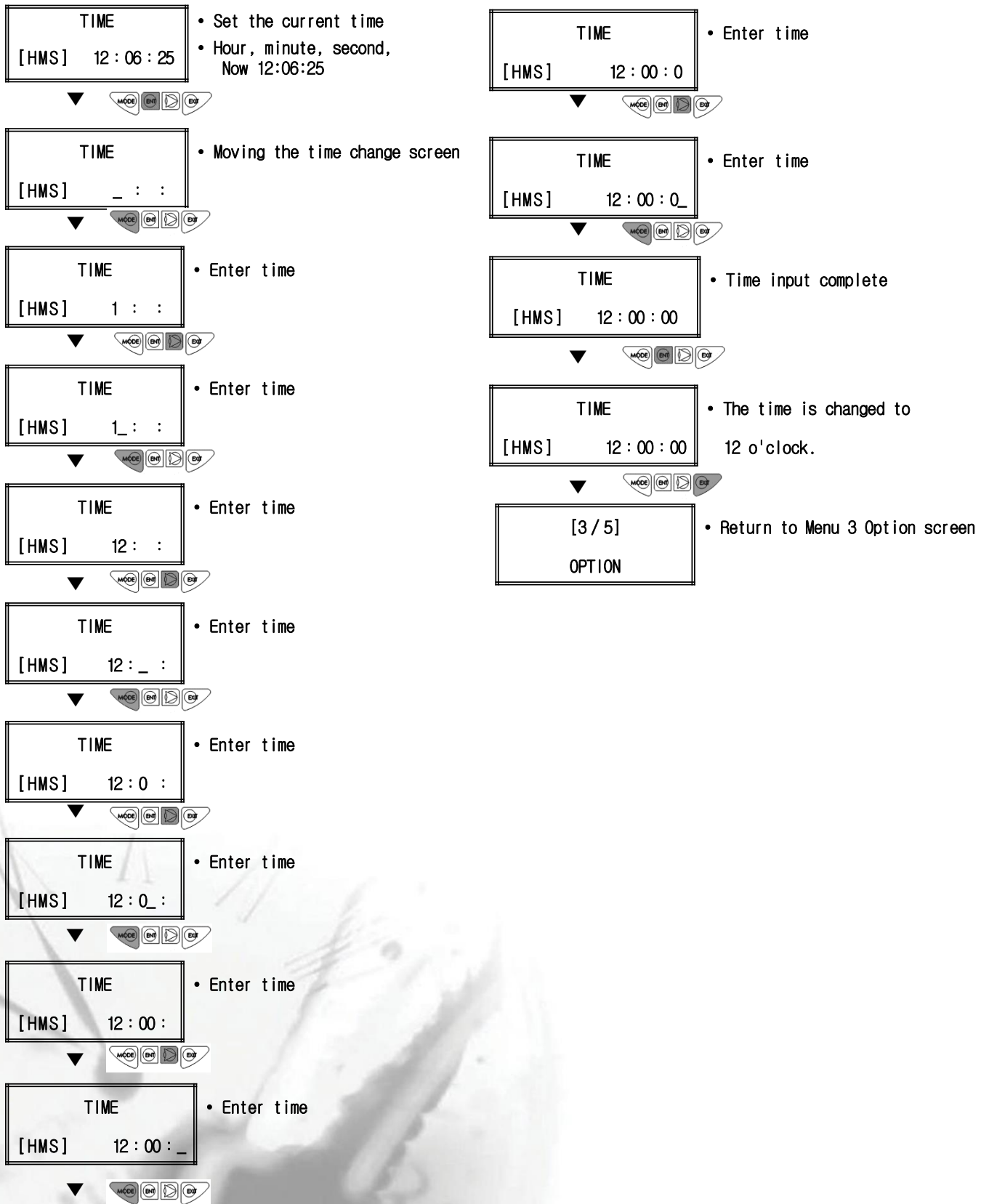
3.3.10. Sensor zero

SENSOR ZERO ? ENTER- ——ZERO	• Set the current value of the differential pressure sensor to zero • Enter Enter if set to zero
▼	
SENSOR ZERO OK ! ESC = EXIT	• The present value of the differential pressure sensor is zero. Change complete • ESC moves to the upper screen
▼	
SENSOR ZERO ? ENTER - - -ZERO	• Return to upper screen
▼	
[3 / 5] OPTION	• Return to Menu 3 Option screen

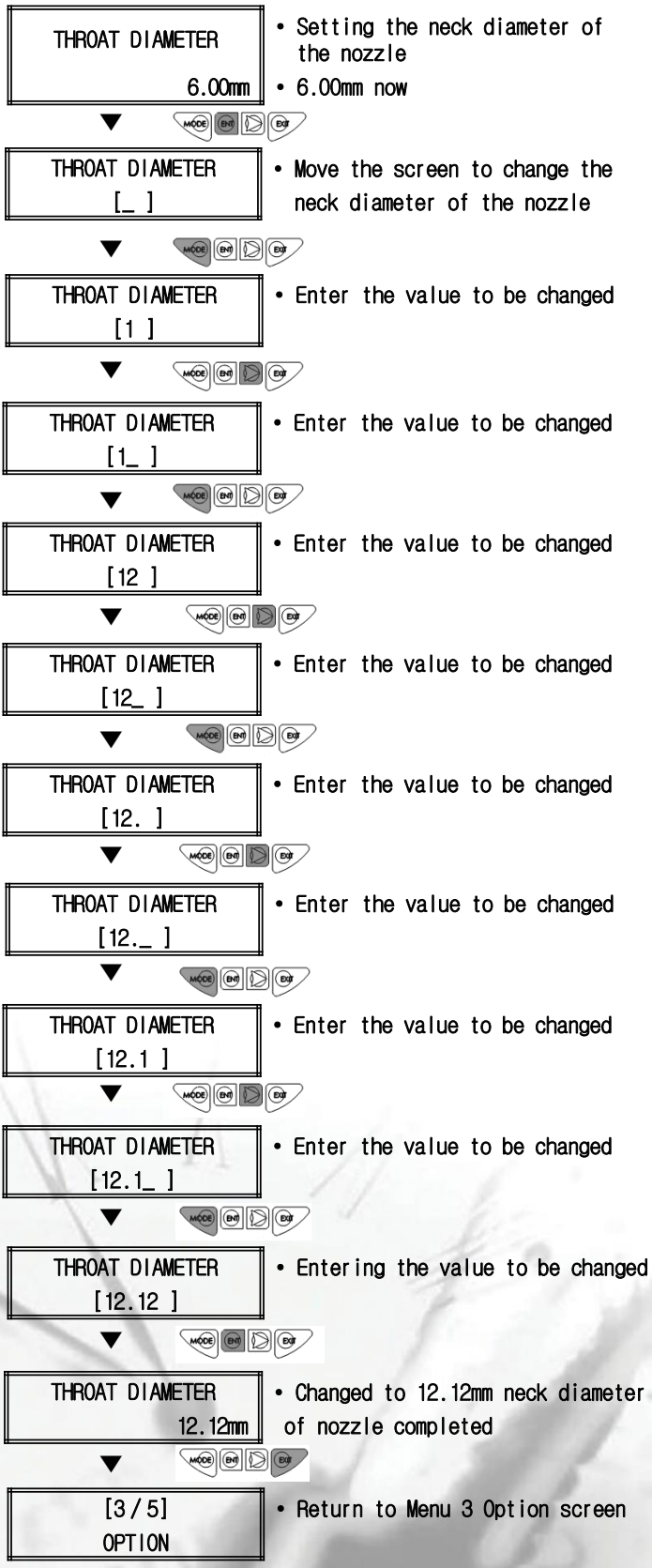
3.3.11. Date


DATE
[YMD] 190625
• Set the current date
• Date, current June 24, 19
DATE
[YMD] _
• Move the date change screen
DATE
[YMD] 1
• Enter the date
DATE
[YMD] 1_
• Enter the date
DATE
[YMD] 16
• Enter the date
DATE
[YMD] 16_
• Enter the date
DATE
[YMD] 160
• Enter the date
DATE
[YMD] 160_
• Enter the date
DATE
[YMD] 1606
• Enter the date
DATE
[YMD] 1606_
• Enter the date
DATE
[YMD] 16062
• Enter the date
DATE
[YMD] 16062_
• Enter the date
DATE
[YMD] 160625
• Complete date input
DATE
[YMD] 160625
• As of June 25, 16 Change complete
[3/5]
OPTION
• Return to Menu 3 Option screen

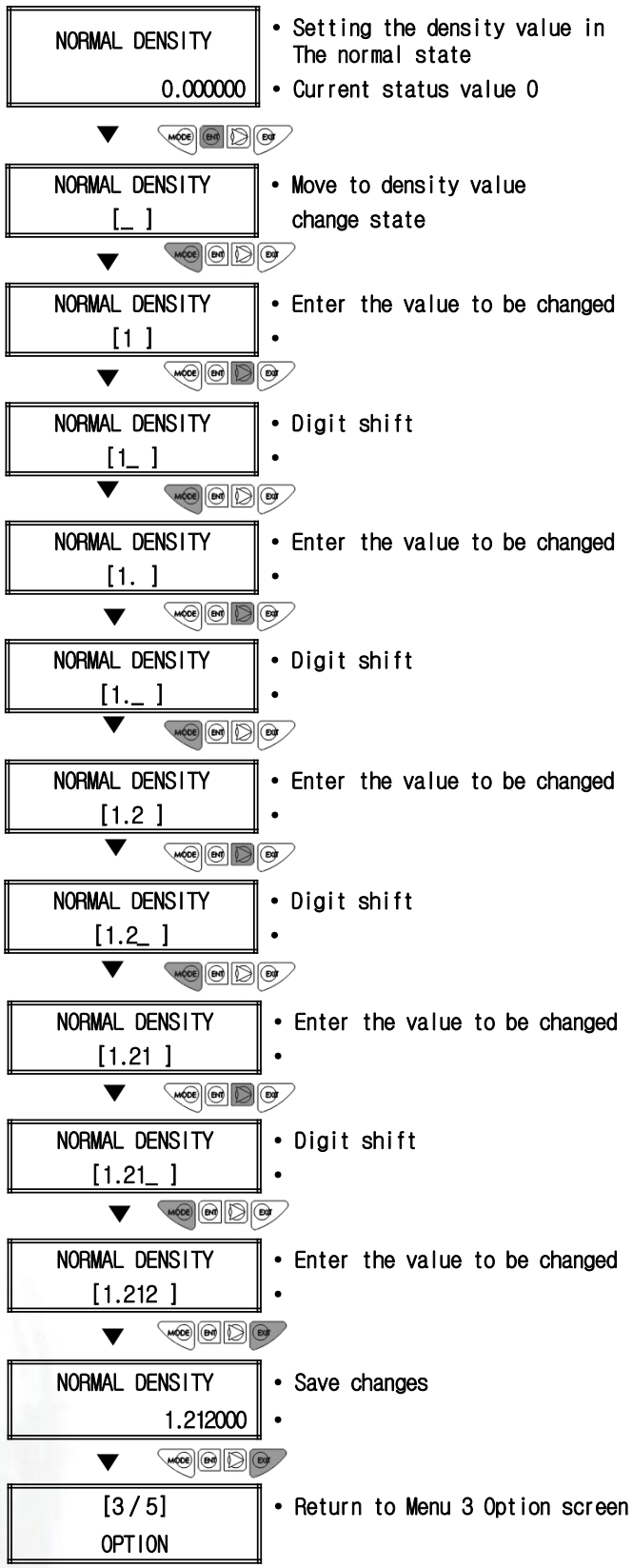
3.3.12. Time


TIME
[HMS] 12 : 06 : 25
• Set the current time
• Hour, minute, second,
Now 12:06:25
TIME
[HMS] _ : :
• Moving the time change screen
TIME
[HMS] 1 : :
• Enter time
TIME
[HMS] 1_ : :
• Enter time
TIME
[HMS] 12 : :
• Enter time
TIME
[HMS] 12 : _ :
• Enter time
TIME
[HMS] 12 : 0 :
• Enter time
TIME
[HMS] 12 : 0_ :
• Enter time
TIME
[HMS] 12 : 00 :
• Enter time
TIME
[HMS] 12 : 00 : _
• Enter time
TIME
[HMS] 12 : 00 : 0
• Enter time
TIME
[HMS] 12 : 00 : 0_
• Enter time
TIME
[HMS] 12 : 00 : 00
• Time input complete
TIME
[HMS] 12 : 00 : 00
• The time is changed to
12 o'clock.
[3 / 5]
OPTION
• Return to Menu 3 Option screen

3.3.13. Throat diameter



3.3.14. Normal density



3.3.15. RTD CALIBRATION

RTD CALIBRATION 0.0	• Input of offset value of temperature sensor • Current offset value 0
▼	
RTD CALIBRATION [_]	• Move to temperature value change state
▼	
RTD CALIBRATION [1]	• Enter the value to be changed •
▼	
RTD CALIBRATION [1_]	• Digit shift •
▼	
RTD CALIBRATION [1.]	• Enter the value to be changed •
▼	
RTD CALIBRATION [1._]	• Digit shift •
▼	
RTD CALIBRATION [1.2]	• Enter the value to be changed •
▼	
NORMAL DENSITY 1.212000	• Save changes •
▼	
[3/5] OPTION	• Return to Menu 3 Option screen

3.3.16 MONITER OUTPUT (4-20mA output)

MONITER OUT MASS [Kg/h]	• Current analog output value • Current analog output unit
▼	
MONITER OUT ? [MASS]	• Analog output value change • Current output value selection window
▼	
MONITER OUT ? [VOLUME]	• Enter the output unit to be changed • MASS, VOLUME, ENERGY, NORMAL, PRESSURE
▼	
MONITER OUT ? [VOLUME]	• Enter the value to be changed •
▼	
MONITER OUT [VOLUME] [m3/h]	• Save changes •
▼	
[3/5] OPTION	• Return to Menu 3 Option screen

3.4. Property (Group 4)

0.00 kg/h 0.00 m3/h	• Main screen display

[4/5] PROPERTY	• Menu 4 Property Screen

ISENTROPIC EXP. 0.0000	• At current temperature and pressure Insulation index of fluid • Represents up to 4 decimal places.

DENSITY 0.0000	• The density of the fluid at the current temperature and pressure • Represents up to 4 decimal places.

VISCOSITY 0.0000	• Viscosity at current temperature and pressure • Represents up to 4 decimal places.

ENTHALPY 0.0000	• Enthalpy at current temperature and pressure • Represents up to 4 decimal places.

COMPRESSIBILITY 0.0000	• Compression rate at current temperature and pressure • Represents up to 4 decimal places.

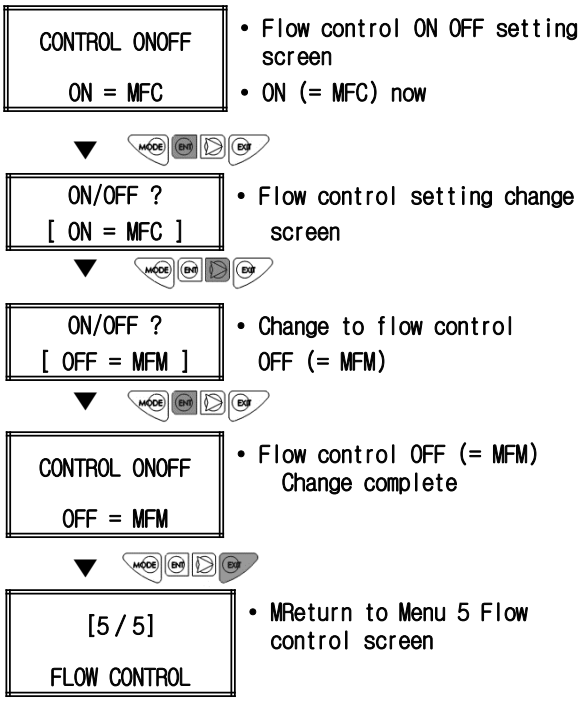
[4/5] PROPERTY	• Return to Menu 4 Property screen

3.5. Flow control (Group 5)

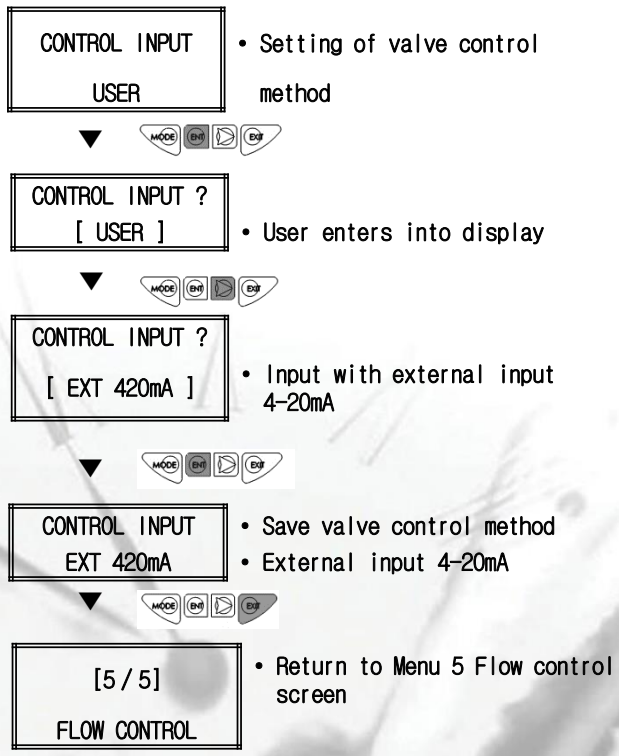
0.00 kg/h 0.00 m3/h	• Main screen display
[5 / 5] FLOW CONTROL	• Menu 5 Flow control screen
CONTROL ONOFF ON = MFC	• Flow control ON Off setting • ON (= MFC) now
CONTROL INPUT USER	• Select flow control input method
CONTROL TARGET 0.0	• Flow control target value
DEAD BAND 0.00	• Range without flow control
LOCK LEVEL 0.00	• That the flow rate is stable Recognized range
LOCK COUNT 0	• That the flow has stabilized Time setting to be judged
STEP RANGE 0.00	•
STEP RATIO 0.00	•

FUNCTION [4] 0.0000000000	• 4th order term value of function • Display to 10 decimal places
FUNCTION [3] 0.0000000000	• Cubic term value of function • Display to 10 decimal places
FUNCTION [2] 0.0000000000	• Quadratic term value of function • Display to 10 decimal places
FUNCTION [1] 0.0000000000	• Value of the first term of the function • Display to 10 decimal places
FUNCTION [0] 0.0000000000	• Value of the zero-order term of the function • Display to 10 decimal places
CENTER MOVE TIME 00	• Wait setting time for valve center value setting
MONITOR OUT MASS [kg/h]	• Analog value output setting •
VALVE OUT PRESSURE [kpa]	• Setting of valve control target value •
[5 / 5] FLOW CONTROL	• Return to Menu 5 Flow control screen

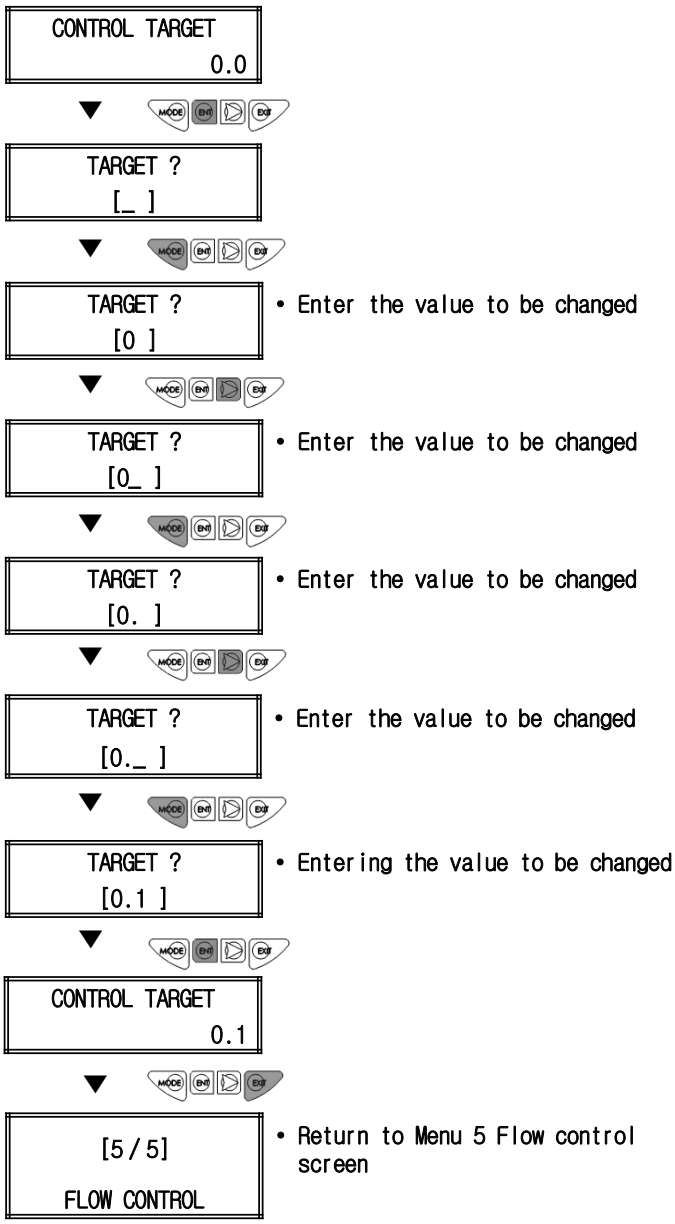
3.5.1. Control on off



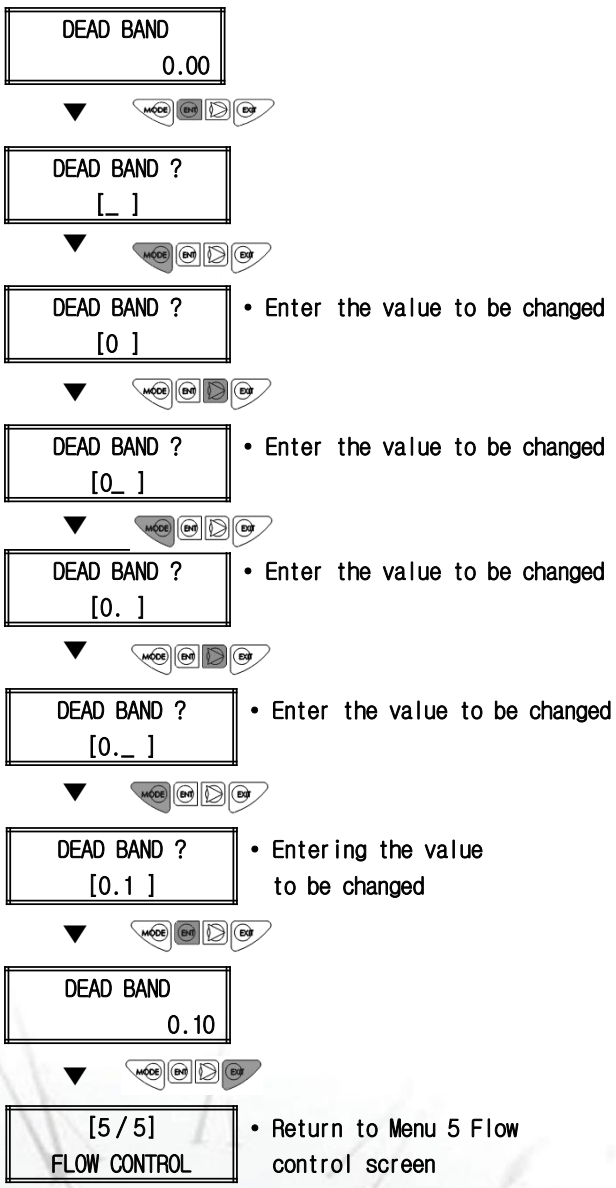
3.5.2. Control input



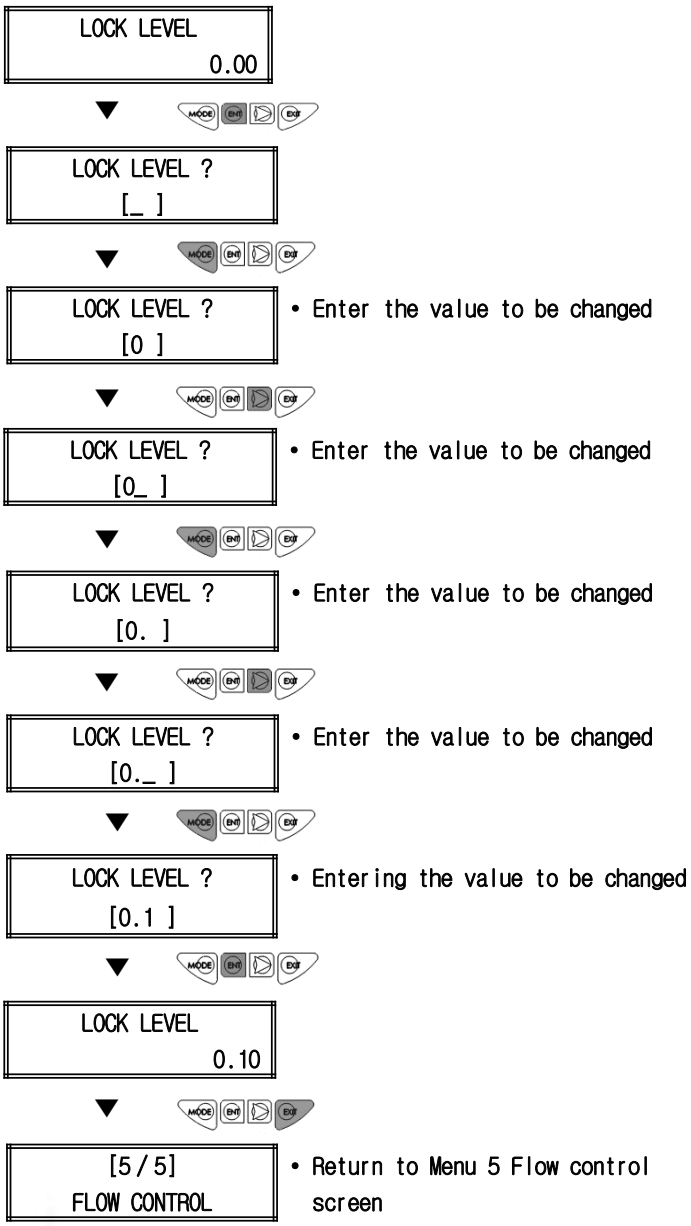
3.5.3. Control target



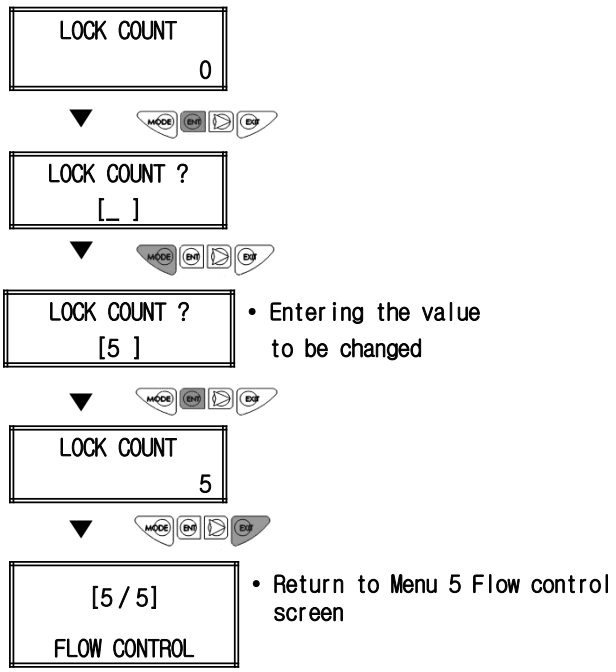
3.5.4. Dead band



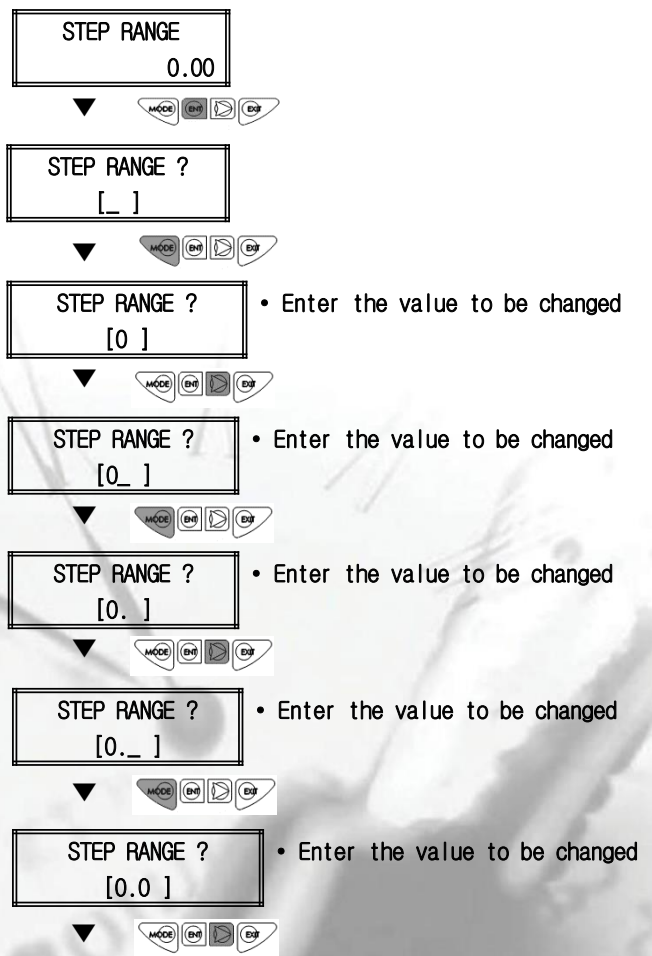
3.5.5. Lock level

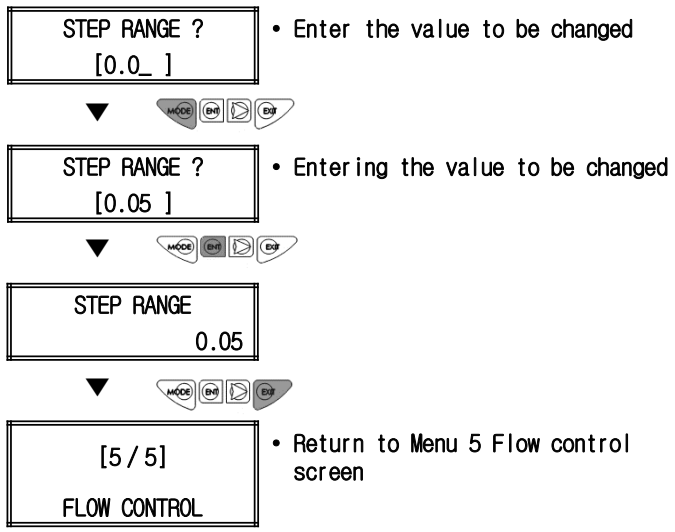


3.5.6. Lock count

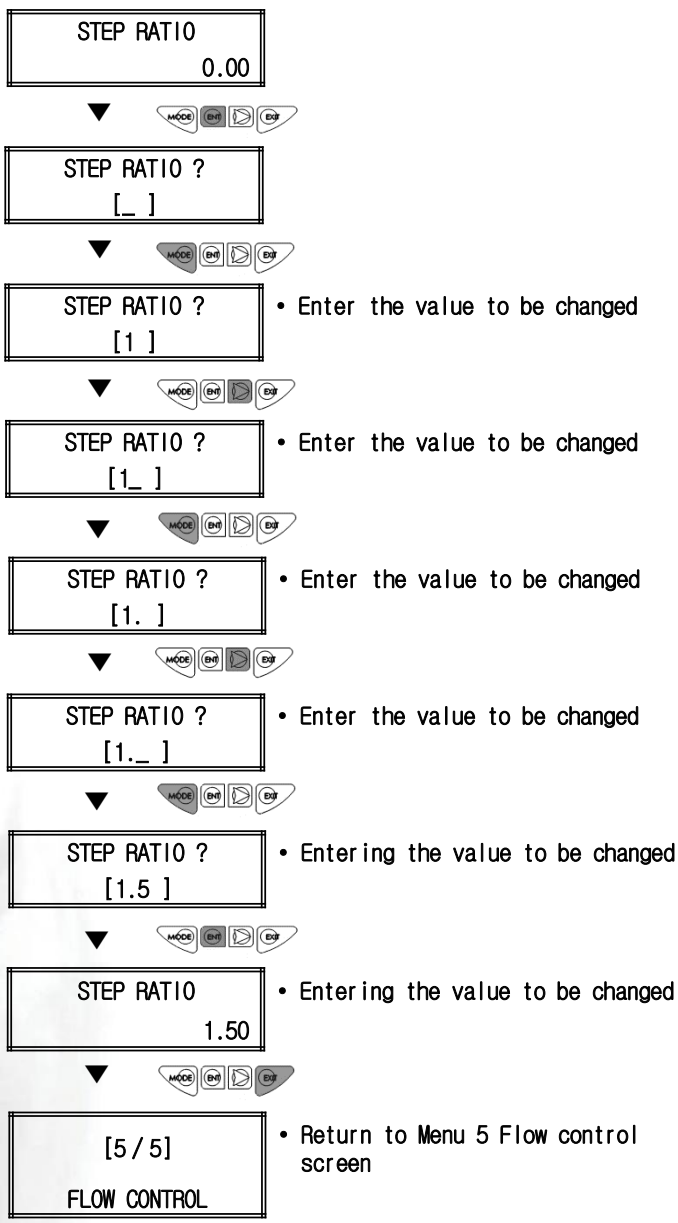


3.5.7. Step range





3.5.8. Step ratio



3.5.9. Function

FUNCTION [ ] 0.0000000000	• Setting the value of the [] order term of the function
FUNCTION [ ] ? [_]	• Change screen of [] order term of function
FUNCTION [ ] ? [0]	• Enter the value to be changed
FUNCTION [ ] ? [0_]	• Enter the value to be changed
FUNCTION [ ] ? [0.]	• Enter the value to be changed
FUNCTION [ ] ? [0._]	• Enter the value to be changed
FUNCTION [ ] ? [0.2]	• Enter the value to be changed
FUNCTION [ ] ? [0.2_]	• Enter the value to be changed
FUNCTION [ ] ? [0.21]	• Enter the value to be changed
FUNCTION [ ] ? [0.21_]	• Enter the value to be changed
FUNCTION [ ] ? [0.212]	• Entering the value to be changed
FUNCTION [ ] 0.2120000000	• Completion of changing the value of the [] order term of the function
[5 / 5] FLOW CONTROL	• Return to Menu 5 Flow control screen

3.5.10. Center move time

CENTER MOVE TIME 00	
CENTER TIME ? [_]	
CENTER TIME ? [1]	• Enter the value to be changed
CENTER TIME ? [1_]	• Enter the value to be changed
CENTER TIME ? [15]	• Entering the value to be changed
CENTER MOVE TIME 15	
[5 / 5] FLOW CONTROL	• Return to Menu 5 Flow control scree

3.5.11 Valve control analog output (4-20mA) Change of unit

OUT MASS [kg/h]	• Current analog output value • Current analog output unit
OUT [MASS]	• Change of analog output value • Select current output value
MONITEROUT ? [VOLUME]	• Input output unit to change • MASS,VOLUME< ENERGY, NORMAL< PRESSURE
MONITEROUT ? [VOLUME]	• Enter the value to be changed •
MONITEROUT ? VOLUME [m3/h]	• Save changes •
[5 / 5] FLOW CONTROL	• Return to Menu 5 Flow control screen

MODBUS RTU
Read input register(0x04)
RS485(2-wire), 9600bps, 8n1, no flow control

FLOW (0x1000 ~0x1FFF)

No.	ADDR	PARAMETER	ISO	US	FORMAT	WIDTH	SCALE	R/W	DESC.	MISC.
1	0x1000	AP1 pressure value	Kpa	psi	0.00	4	-	RO	Psi see conversion table for unit calculation	
2	0X1004	AP2 Pressure value	Kpa	Psi	0.00	4		RO	Psi see conversion table for unit calculation	
3	0X1008	AP3 Pressure value	kpa	psi	0.00	4		RO	Psi see conversion table for unit calculation	
4	0X100C	AP1 current value	mA	-	0.00	4		RO		
5	0X1010	AP2 current value	mA	-	0.00	4		RO		
6	0X1014	AP3 current value	mA	-	0.00	4		RO		
7	0X1018	DP1 Pressure value	kpa	Psi	0.00	4		RO	Psi see conversion table for unit calculation	
8	0X101C	DP2 Pressure value	kpa	psi	0.00	4		RO	Psi see conversion table for unit calculation	
9	0X1020	DP1 current value	mA	-	0.00	4		RO		
10	0X1024	DP2 current value	mA	-	0.00	4		RO		
11	0X1028	RTD temperature value	˚C	-	0.00	4		RO	F,K see conversion table for unit calculation	
28	0X106C	MASS FLOW RATE	Kg/h Kg/M	Lb/h Lb/M	0.00	4		RO	Lb/h Units and minutes are calculated Conversion table reference	
29	0X1070	VOLUME FLOW RATE	m^3/h m^3/M	ft^3/h ft^3/M	0.00	4		RO	ft^3/h Units and minutes are calculated Conversion table reference	

FLOW (0x1000 ~0x1FFF)

No.	ADDR	PARAMETER	ISO	US	FORMAT	WIDTH	SCALE	R/W	DESC.	MISC.
30	0X1074	ENERGY FLOW RATE	Kj/s	-	0.00	4		RO		
31	0X1078	NORMAL FLOW RATE	Nm^3/h Nm^3/M	Nft^3/h Nft^3/M	0.00	4		RO	ft^3/h Units and minutes are calculated Conversion table reference	
32	0X107C	PRESSURE	kpa	psi	0.00	4		RO	Psi see conversion table for unit calculation	
33	0X1080	TOTAL MASS FLOW	kg	lb	0.00	4		RO	lb see conversion table for unit calculation	
34	0x1088	TOTAL VOLUME FLOW	m^3	ft^3	0.00	4	-	RO	ft^3 see conversion table for unit calculation	
35	0x1088	TOTAL ENERGY FLOW	MJ	-	0.00	4		RO		
36	0x108C	TOTAL NORMAL FLOW	Nm^3	Nft^3	0.00	4		RO	Nft^3 see conversion table for unit calculation	
37	0x1090	BD TEMP.	℃	F	0.00	4		RO	F Psi see conversion table for unit calculation	
38	0x1094	TOUCH1 VOLTAGE	V	-	0.00	4		RO		
39	0x1098	TOUCH2 VOLTAGE	V	-	0.00	4		RO		
40	0x109C	TOUCH3 VOLTAGE	V	-	0.00	4		RO		
41	0x10A0	TOUCH4 VOLTAGE	V	-	0.00	4		RO		
42	0x1044	TOUCH REF VOLTAGE	V	-	0.00	4		RO	Touch reference voltage	

CONTROL (0x2000 ~0x2FFF)

No.	ADDR	PARAMETER	ISO	US	FORMAT	WIDTH	SCALE	R/W	DESC.	MISC.
1	0X2000	EXT CONTROL Value	-	-	0.00	4		RO		
2	0X2004	EXT CONTROL current	mA	-	0.00	4		RO	-	

ALARM (0x3000 ~0x3FFF)

No.	ADDR	PARAMETER	ISO	US	FORMAT	WIDTH	SCALE	R/W	DESC.	MISC.
1	0x3000	HV ALARM	%	-	integer	2	-	RO	1 = ALARM on, 0 = ALARM X	
2	0X3004	LV ALARM	%	-	Integer	2		RO	1 = ALARM on, 0 = ALARM X	
3	0X3008	BD TEMP ALARM	˚C	F	Integer	2		RO	1 = ALARM on, 0 = ALARM X	
4	0X300C	TOTAL FLOW ALARM	Kg	Lb	integer	2		RO	1 = ALARM on, 0 = ALARM X	
5	0X3010	HV TIME(YY/MM)	-	-	YYMM	2		RO	HIGH = year, LOW = month (For the actual year, add 2000 to the received value)	
6	0X3014	HV TIME(DD/HH)	-	-	DDHH	2		RO	HIGH = day, LOW = hour	
7	0X3018	HV TIME(MM/SS)	-	-	MMSS	2		RO	HIGH = min, LOW = sec	
8	0X301C	HV VALUE	Kg/h	Lb/h	0.00	4		RO	Units are calculated Conversion table reference	
9	0X3020	LV TIME(YY/MM)	-	-	YYMM	2		RO	HIGH = year, LOW = month (For the actual year, add 2000 to the received value)	
10	0X3024	LV TIME(DD/HH)	-	-	DDHH	2		RO	HIGH = day, LOW = hour	
11	0X3028	LV TIME(MM/SS)	-	-	MMSS	2		RO	HIGH = min, LOW = sec	
12	0X302C	LV VALUE	Kg/h	Lb/h	0.00	4		RO	Units are calculated Conversion table reference	
13	0X3030	CLEAR TIME(YY/MM)	-	-	YYMM	2		RO	HIGH = year, LOW = month (For the actual year, add 2000 to the received value)	
14	0X3034	CLEAR TIME(DD/HH)	-	-	DDHH	2		RO	HIGH = day, LOW = hour	
15	0X3038	CLEAR TIME(MM/SS)	-	-	MMSS	2		RO	HIGH = min, LOW = sec	

SYSTEM (0x4000 ~0x4FFF)

No.	ADDR	PARAMETER	ISO	US	- FORMAT	WIDTH	SCALE	R/W	DESC.	MISC.
1	0x4000	MONITORING SOURCE	-	-	integer	2	-	RO	0 = MASS, 1 = VOLUME, 2 = NORMAL, 4 = PRESSURE	
2	0X4004	CONTROL SOURCE	-	-	integer	2	-	RO	0 = MASS, 1 = VOLUME, 2 = NORMAL, 4 = PRESSURE	
3	0X4008	SYSTEM SYNC	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
4	0X400C	SYSTEM FLASH	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
5	0X4010	SYSTEM FLASH RW	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
6	0X4014	SYSTEM ENV.	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
7	0X4018	SYSTEM MATRIX	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
8	0X401C	SYSTEM BATTERY	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
9	0X4020	SYSTEM RTC	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
10	0X4024	SYSTEM AP1	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
11	0X4028	SYSTEM DP1	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
12	0X402C	SYSTEM RTD	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
13	0X4030	SYSTEM AP2	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
14	0X4034	SYSTEM EXT. CONTROL	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
15	0X4038	SYSTEM BD TEMP	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
16	0X403C	SYSTEM GAS INPUT	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
17	0X4040	SYSTEM CRITICAL	-	-	integer	2	-	RO	System self-diagnosis items: 0 = normal, 1 = error	
18	0X4044	SN [0 – 1]	-	-	integer	2	-	RO	HIGH = SN 1 digit, LOW = SN 2 digit	
19	0X4048	SN [2 – 3]	-	-	integer	2	-	RO	HIGH = SN 3 digit, LOW = SN 4 digit	
20	0X404C	SN [4 – 5]	-	-	integer	2	-	RO	HIGH = SN 5 digit, LOW = SN 6 digit	
21	0X4050	SN [6 – 7]	-	-	integer	2	-	RO	HIGH = SN 7 digit, LOW = SN 8 digit	
22	0X4054	SN [8 – 9]	-	-	integer	2	-	RO	HIGH = SN 9 digit, LOW = SN 10 digit	

MULTIPLE READ (0xA000 ~0xAFFF)

No.	ADDR	PARAMETER	ISO	US	- FORMAT	WIDTH	SCALE	R/W	DESC.	MISC.
1	0xA000	AP Pressure value	Kpa	psi	0.00	4	-	RO	Psi See conversion table for unit calculation	
2	0XA004	RTD Temperature value	℃	F	0.0	4	-	RO	F, K See conversion table for unit calculation	
3	0XA008	NORMAL FLOW RATE	Nm^3/h Nm^3/M	Nft^3/h Nft^3/M	0.00	4	-	RO	Nft^3/h For unit and minute calculation, see conversion table	
4	0XA00C	TOTAL NORMAL FLOW	Nm^3	Nft^3	0.00	4	-	RO	Nft^3See conversion table for unit calculation	

MULTIPLE READ (0xB000 ~0xBFFF)

No.	ADDR	PARAMETER	ISO	US	- FORMAT	WIDTH	SCALE	R/W	DESC.	MISC.
1	0xB000	AP Pressure value	kpa	Psi	0.00	4	-	RO	Psi See conversion table for unit calculation	
2	0XB004	AP2 Pressure value	Kpa	psi	0.00	4	-	RO	psi See conversion table for unit calculation	
3	0XB008	MASS FLOW RATE	Kg/h Kg/M	Lb/h Lb/M	0.00	4	-	RO	lb/h For unit and minute calculation, see conversion table	
4	0XB00C	TOTAL MASS FLOW	kg	Lb	0.00	4	-	RO	lb See conversion table for unit calculation	
5	0XB010	TARGET	-	-	0.0	4	-	RW		

5.1 Abnormality measures

Error RTD Sensor	• Error Flashing • Temperature sensor error
Error AP Sensor	• Error Flashing • Pressure sensor error
Error DP Sensor	• Error Flashing • Differential pressure sensor error

5.2 Protective measures

An internal fuse is installed to protect the circuit from overvoltage.

When reverse voltage is input, there is a cut-off function to protect the flow meter, but it does not operate.

5.3. Maintenance (A/S)

Since the FN-mass flowmeter's operator is safely protected by a protective device, do not release the interlock device to maintain the protective structure.

Do not arbitrarily remove the blanking element that sealed the opening.

Do not open the protective parts arbitrarily while power is on.

Do not remove the protective device arbitrarily while power is on.

Do not open protective parts when explosive gas may be present.

When separating the FN-mass flowmeter, open the equivalent valve of the 3-way block valve to equalize the pressure, then completely close the low and high pressure side valves and separate the FN-mass flowmeter connected to the block valve. do it..

The replacement of the FN-mass flowmeter must be done by our maintenance specialist.

Chapter 6 Area of Use and Quality Assurance

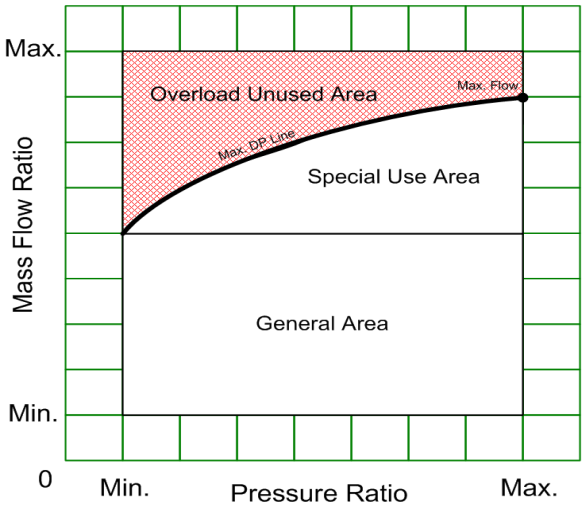
6. 1. Area of use

FN-MASS use area is divided into general area, special use area, and overload unused area.

The general-purpose area can be used in the entire pressure range, the special area is the range other than the general-purpose area where flow rate can be displayed, and the overload area is the area outside the limit line of the flow rate display.

Before installing the flow meter, the user informs the supplier of the pressure range (minimum value and maximum value) of the flow rate so that the general-purpose range can be set.

Max. When the differential pressure sensor range is reached on the DP line, the alarm warning light A1 flashes.



. Warranty

Golden Rule's KC-7730 is thoroughly managed by ISO 9001 quality assurance system.

The free service period is limited to cases that occur under normal use within the warranty period (1 year after shipment),

The following cases are treated as paid service.

① Failure that occurred in the product after the warranty period has passed

② Failure that has not been repaired by our company or caused by arbitrarily altering the structure, performance, and function of the product.

③ Failure due to user's intentional negligence or inexperience

④ Malfunction due to faulty power connection or abnormal power supply

⑤ Failure due to defects in peripheral devices

⑥ Failure caused by natural disaster

In the event of a breakdown after the warranty period or due to negligence in use, we will provide repair support at the minimum cost by applying the actual cost.

The mass flowmeter of Golden Rule Co., Ltd. is tested according to the certification conditions of the certification body before shipment.

Mass Flow meter manufacturer

Golden Rules

Golden Rules Co.,Ltd.

A-1805, Songdomirae-ro 30, Yeonsu-gu, Incheon, Korea
Tel : +82-32-817-1240
E-mail : hhm617@hanmail.net
http://www.goldenrules.co.kr