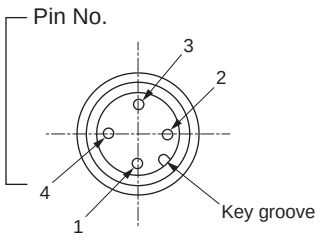
Wiring method

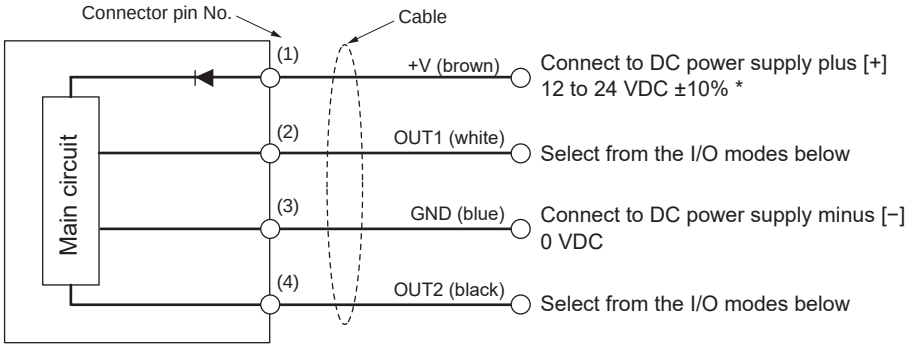
· Always read the safety precautions before wiring.

· The cable used is a 4-conductor cabtyre cable with a core of 0.5 mm^2.

*** Keep the cable far away from power cords or other things that may cause noise. Noise can cause malfunctions.**

[Connector (male)]





* With a standard analog output (0 to 5 V/1 to 5 V). With option (4 to 20 mA/0 to 10 V/1 to 10 V), it is 24 VDC ±10%.

I/O mode

OUT 1: analog flow output, analog temperature output, flow switch 1 output, flow switch 2 output, temperature switch 1 output, temperature switch 2 output, integrated pulse output, integrated switch output, external input, OFF

OUT 2: analog flow output, analog temperature output, flow switch 1 output, flow switch 2 output, temperature switch 1 output, temperature switch 2 output, integrated pulse output, integrated switch output, IO-Link, OFF

Item	[A, D] 0 to 5V/ 1 to 5V	[B, E] 4 to 20mA	[C, F] 0 to 10V/ 1 to 10V
Allowable load weight	50 kΩ or more	500 Ω or less	50 kΩ or more

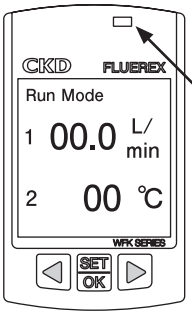
The default settings are the following:

IO-Link/Analog output	OUT1	OUT2
Switch/analog output	Analog flow output	Analog temp output
IO-Link compatible	OFF	IO-Link

IO-Link parameter specifications

1. General

Item	Details
Communication protocol	IO-Link
Communication protocol version	V1.1
Transmission bit rate	COM2 (38.4 kbps)
Port	M12 Class A
Process data (input)	4 byte
Process data (output)	0 byte
Min. cycle time	5 ms
Data storage	1 kbyte
SIO mode support	None



Power light (green)

· Lights when the power is ON. Blinks during IO-Link communication.

2. Process data

Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Data	MSB															LSB
	Instantaneous flow rate [Flow Rate]															
Data range	Refer to Table 1															
Format	UInteger 16															

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Data	Error	WARNING	-	-	Switch output				MSB							LSB
					4	3	2	1	Fluid temperature [Temperature]							
Data range	True/False								−10 to 110°C							
Format	Boolean								Integer 8							

Data range (Table 1)

Flow rate range	005	020	050	100	250
Data range	0.00 to 5.50 L/min	0.0 to 22.0 L/min	0.0 to 55.0 L/min	0 to 110 L/min	0 to 275 L/min

* IODD files can be downloaded from the CKD website. (https://www.ckd.co.jp/en/)

Names and functions of display/operation section

Main screen
The state of instantaneous flow rate, integrating flow, temperature, and various settings are displayed.

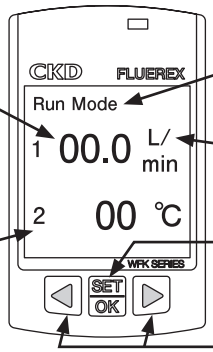
Mode display
Display the screen mode.

Unit display
Display the value units.

Output display
Indicates the switch output status.

Set key

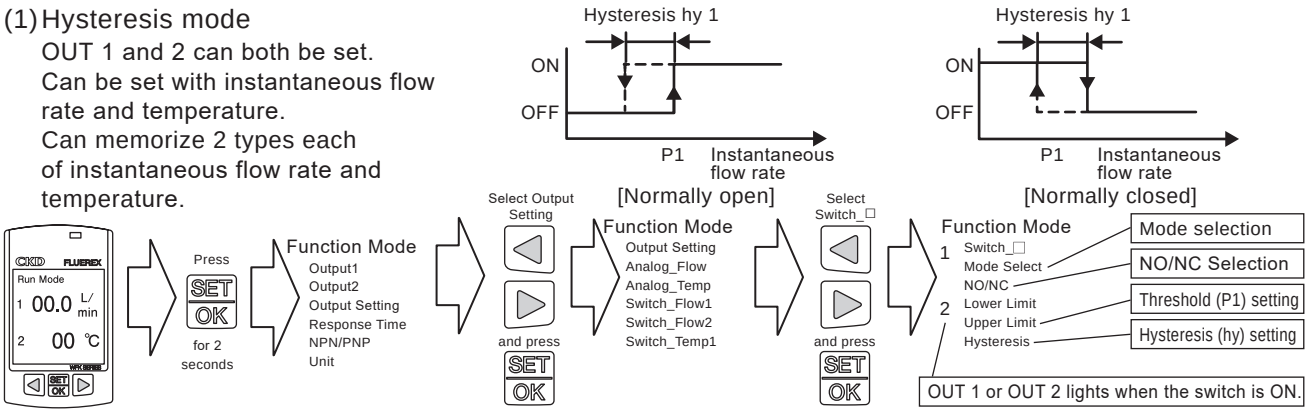
Selection key
Up/down changes depending on the orientation of the screen display.
Also, you can return to the previous selection screen by pressing ◁ and ▷ at the same time, and then releasing them.



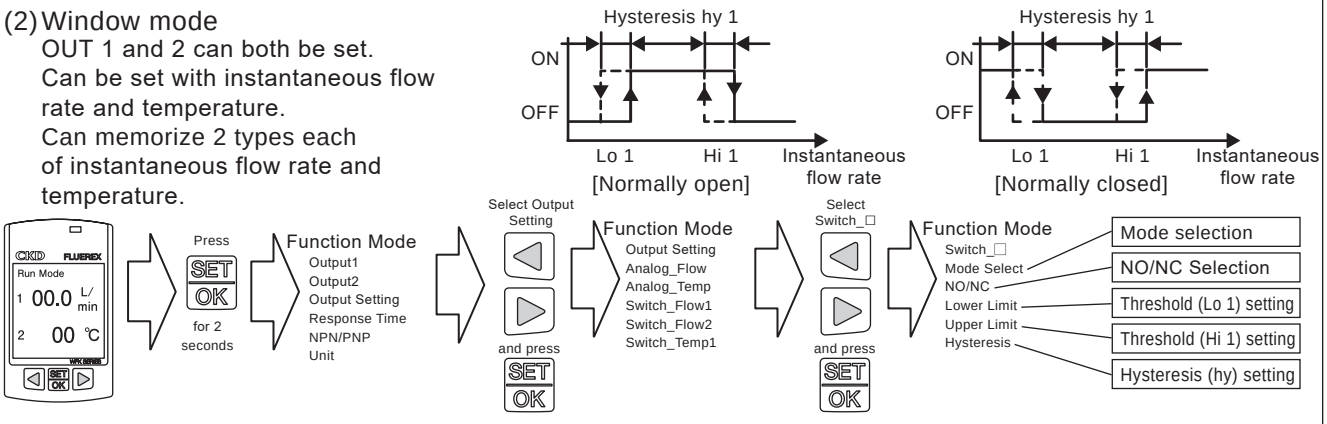
Output mode and output operation

1. Switch output

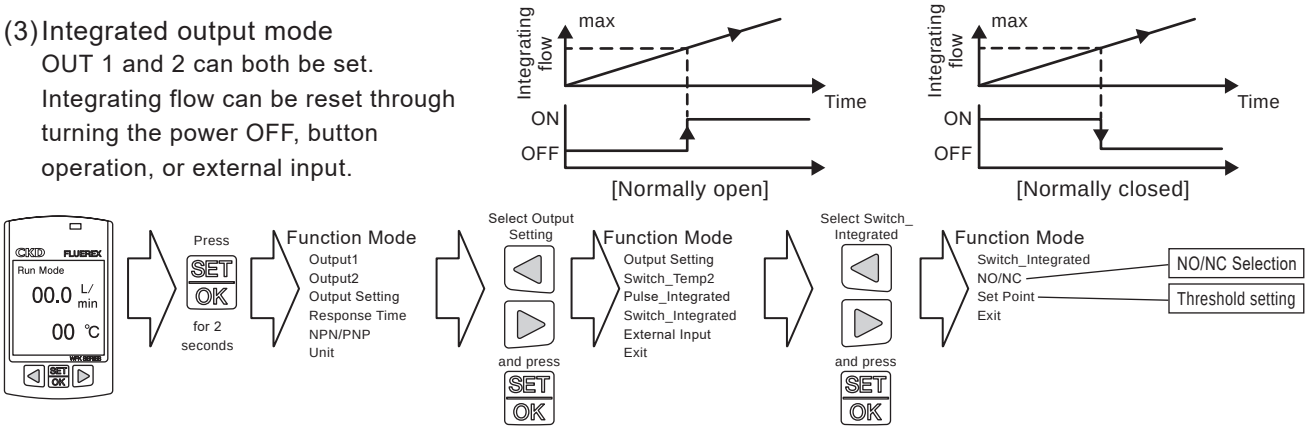
(1) Hysteresis mode
OUT 1 and 2 can both be set.
Can be set with instantaneous flow rate and temperature.
Can memorize 2 types each of instantaneous flow rate and temperature.



(2) Window mode
OUT 1 and 2 can both be set.
Can be set with instantaneous flow rate and temperature.
Can memorize 2 types each of instantaneous flow rate and temperature.



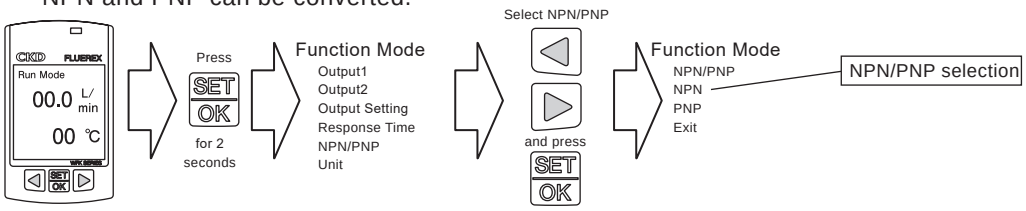
(3) Integrated output mode
OUT 1 and 2 can both be set.
Integrating flow can be reset through turning the power OFF, button operation, or external input.



(4) NPN/PNP conversion

NPN and PNP can be converted.

* Perform NPN and PNP conversion when the switch output is OFF.
Conversion settings are applied when the power is turned back ON.

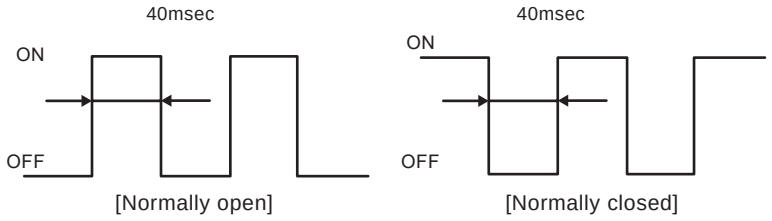


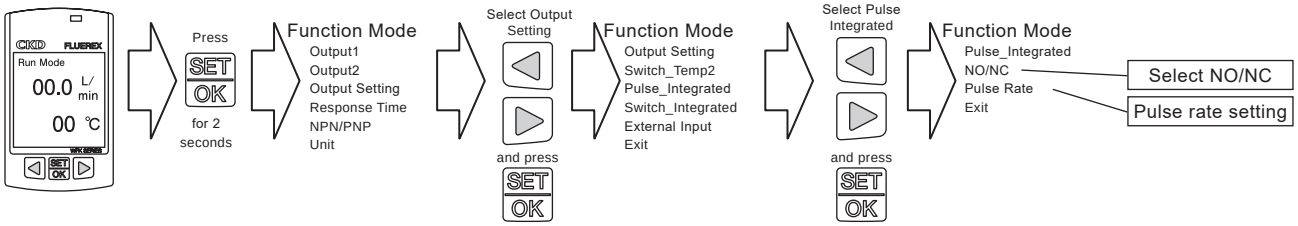
2. Integrated pulse output

Pulse output matches the integrating flow count.

Selectable pulse rates

Model	5 L	20 L	50 L	100 L	250 L
0.1 L	○	○			
0.5 L	○	○	○		
1 L	○	○	○	○	
10 L		○	○	○	○
50 L			○	○	○
100 L				○	○

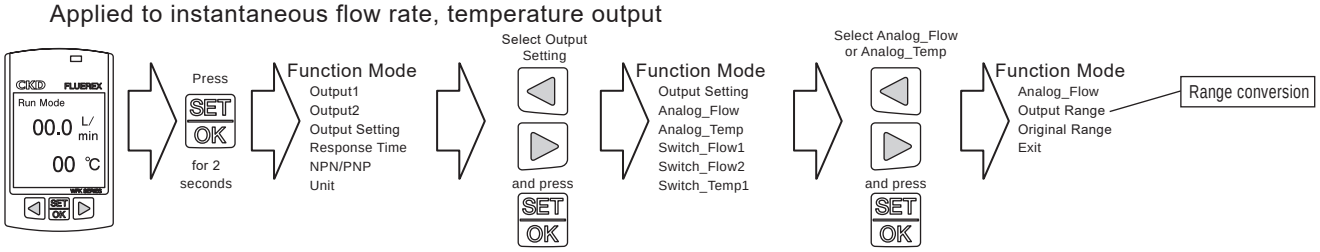




3. Analog output

(1) Output conversion

0 to 5 V/1 to 5 V ..... select between 0 to 5 V output and 1 to 5 V output
4 to 20 mA..... no output conversion
0 to 10 V/1 to 10 V..... select between 0 to 10 V output and 1 to 10 V output
Applied to instantaneous flow rate, temperature output



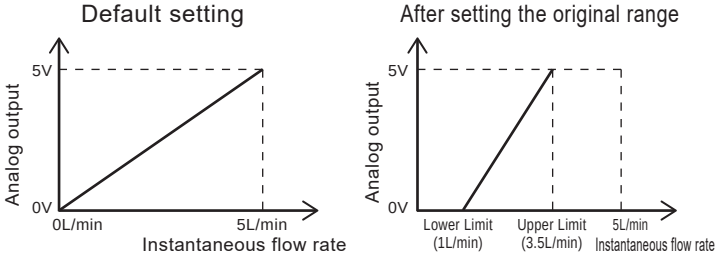
(2) Original analog output

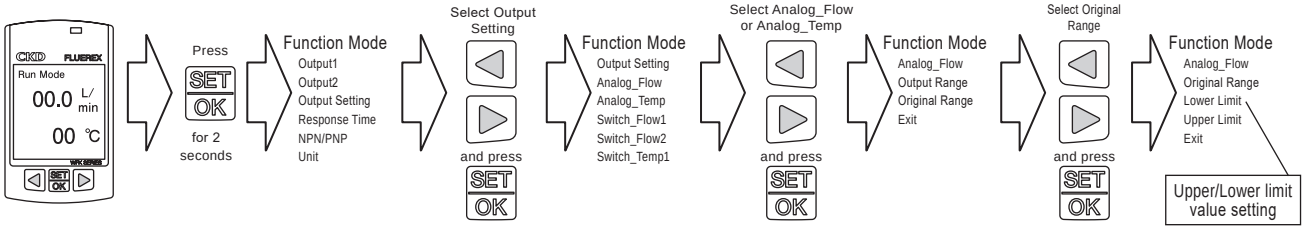
An analog output function that freely sets the upper and lower limits of normal analog output.

・Settable range

Instantaneous flow rate : 0 to F.S. L/min
Fluid temperature : -10 to 100°C

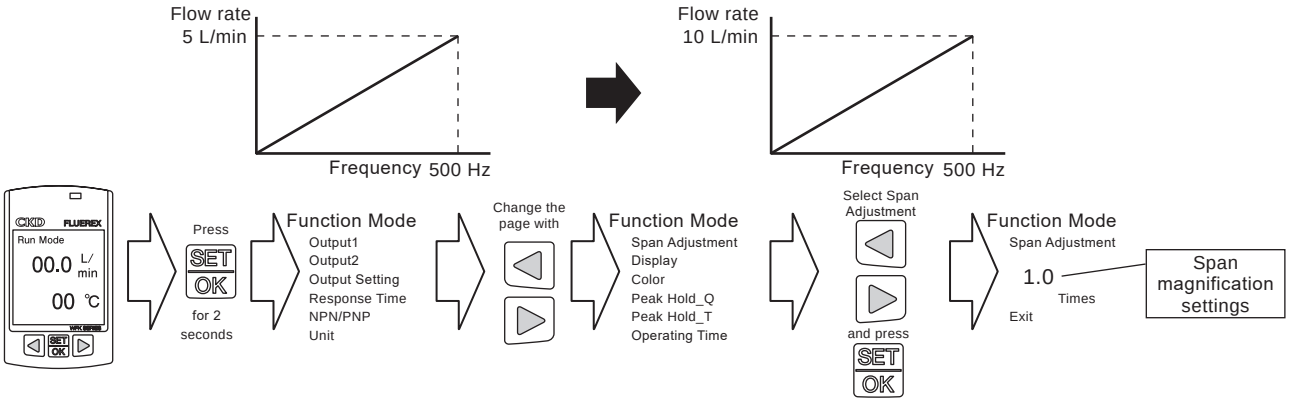
・Example (WFK2-005, instantaneous flow rate,
Lower Limit = 1L/min,
Upper Limit = 3.5L/min
if set to .)





4. Span adjustment

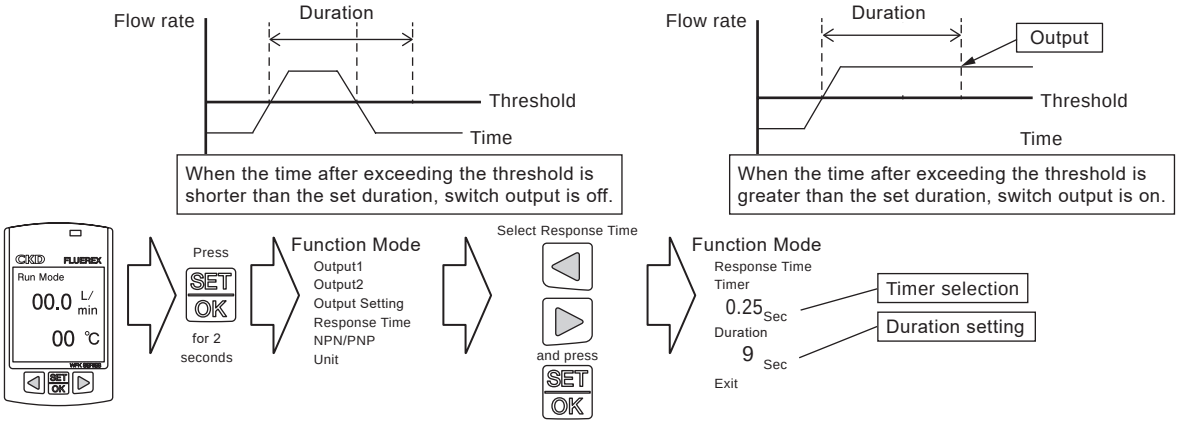
Span adjustment can be set from 0.1 to 2.5 times with the initial flow rate value.
[Ex.] When set to 2.0 times



5. Setting response time

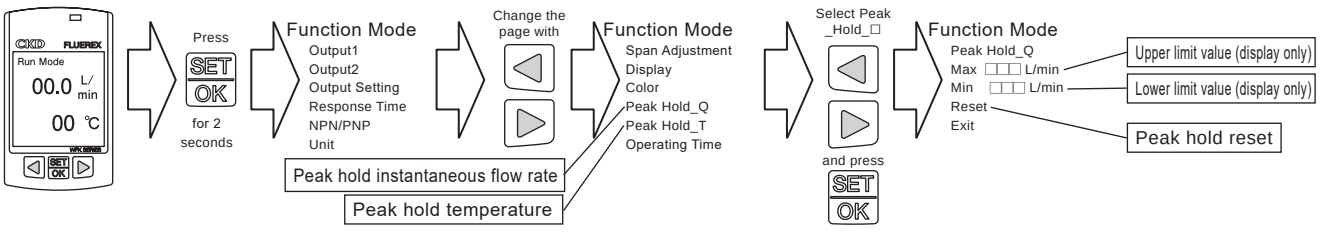
(1) Timer selection
Instantaneous flow rate response time (average movement time) can be changed.
Select from 0.25 sec, 0.5 sec, 1 sec, 5 sec, and 10 sec (1 sec at factory settings)

(2) Duration....can be set from 0 to 9 sec
During switch output, the time it takes for the output to occur after exceeding the threshold can be set.



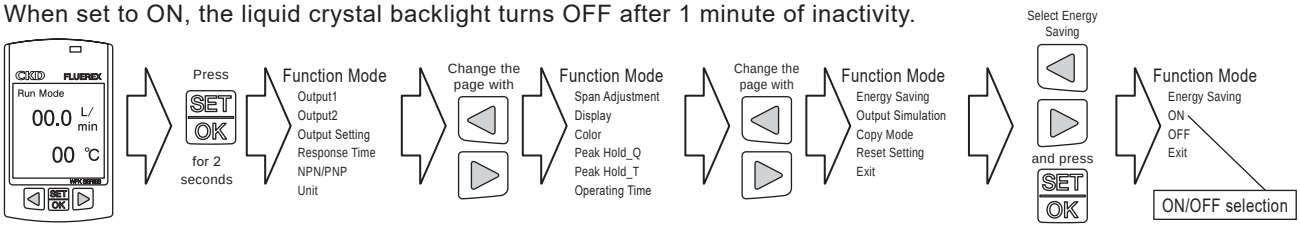
6. Peak hold

The max. and min. flow rates of instantaneous flow rate and temperature can be confirmed.
The max. and min. flow rates can be reset through turning the power OFF, button operation, or external input.



7. Energy Saving setting

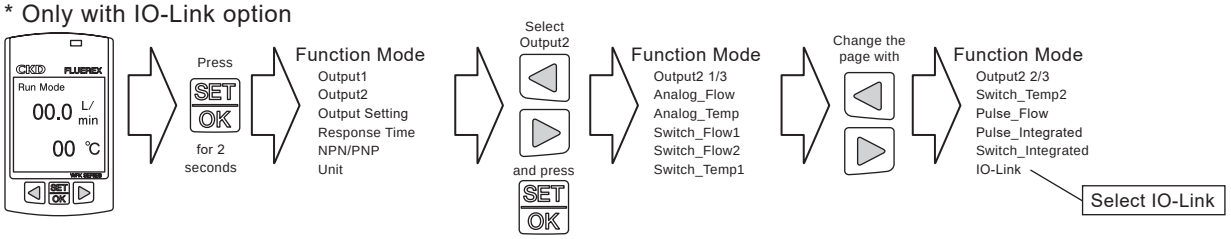
Energy saving can be set to "ON" or "OFF".
When set to ON, the liquid crystal backlight turns OFF after 1 minute of inactivity.



8. IO-Link

Acquiring measurement data, changing the threshold, and other bi-direction communication are possible with an IO-Link connection (OUT 2 only).

* Only with IO-Link option



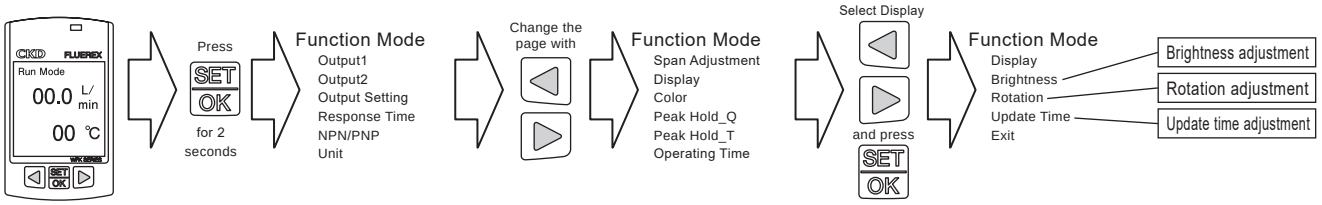
9. Screen display

(1) Display

Brightness ..... select from 25%, 50%, 75%, and 100%.

Rotation ..... select from 0°, 90°, 180°, and 270°.

Update time..... select from 0.25 sec, 0.5 sec, 1 sec, 5 sec, and 10 sec.



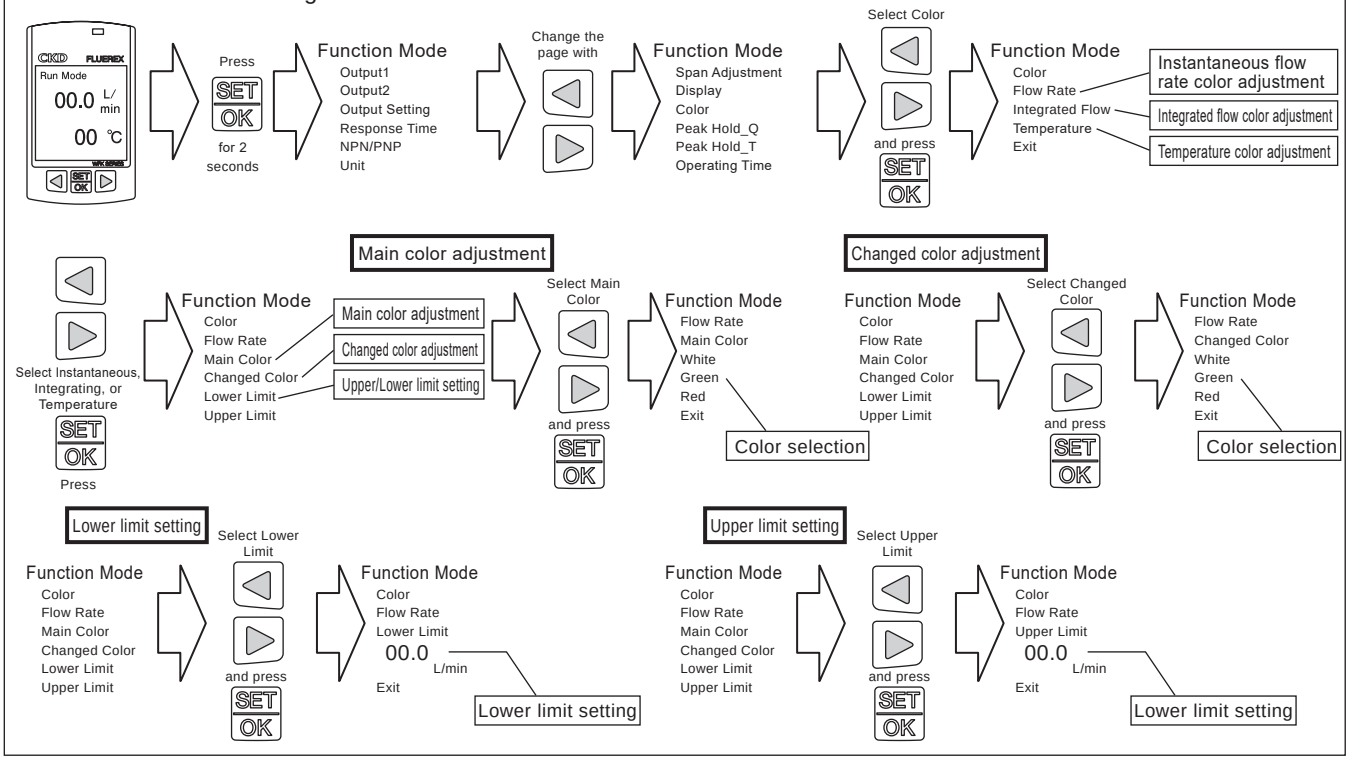
(2) Color

Main Color: change the color of characters on the main display. (Select from white, green, and red)

Changed Color: change the color when the instantaneous flow rate, integrating flow rate, and temperature go above or below their set upper and lower limits.

Change character color……select from white, green, and red

- Upper limit setting: the upper limits of instantaneous flow rate, integrating flow rate, and temperature at which character color changes.
- Lower limit setting: the lower limits of instantaneous flow rate, integrating flow rate, and temperature at which character color changes.

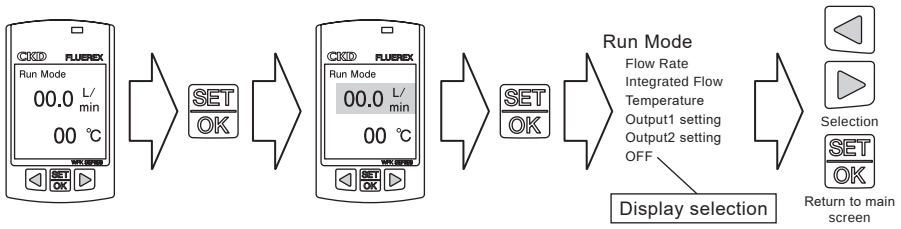


Refer to the instruction manual regarding operation of other functions (setting copy, external input, unit change, simulation output, power ON time display, all reset, etc.).

Easy setting function

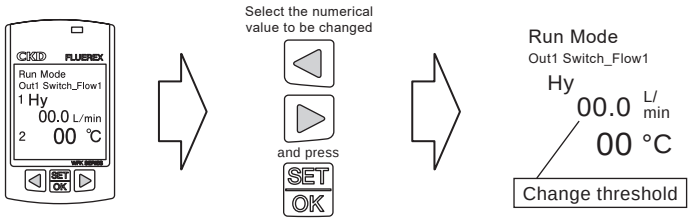
Frequently used settings can be set from the normal screen using shortcut operations.

Change main screen display

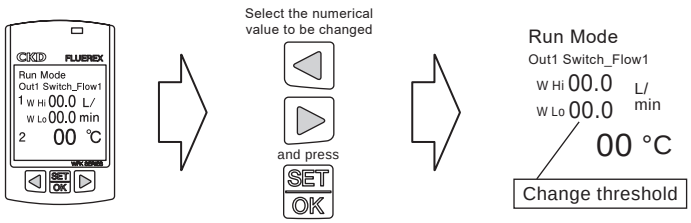


Switch setting

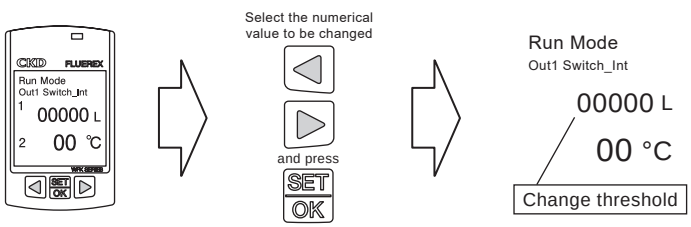
Hysteresis mode



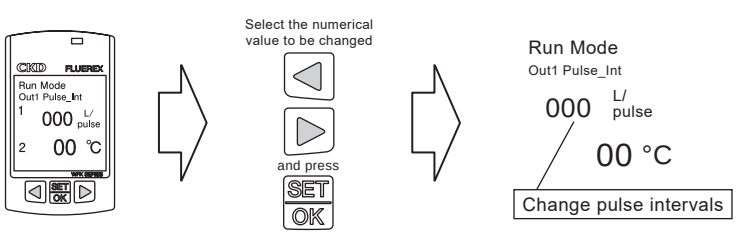
Window mode



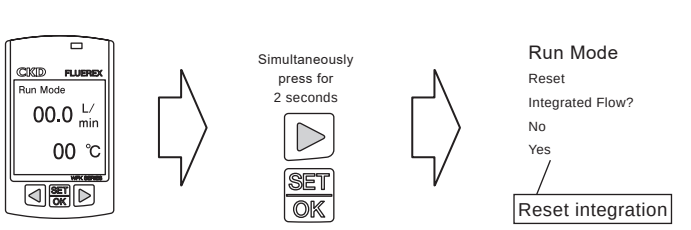
Integrated Switch setting



Integrated Pulse setting



Integration reset



Key lock