OVAL INSTRUCTIONS

Ins. No. E-023-9-E

SMART COMMUNICATION UNIT
MODEL EL 2310-08J □□□

Applicable flowmeter : OVAL Coriolis Flowmeters

ALTI*mass*, ALTI*mass* Ⅱ, MT9411, MT9431, MT9603,
CoriMate Ⅱ Separate-type Model

Compatible transmitter : ALTImass (PA0K), ALTImassⅡ (PA2K)

Rack-mount type (PA5K), (MT9411-******B),
(MT9431-******B), (MT9603-******B)

For the installation of application software "LinkTop" and the interface driver, refer to Ins. No. E-020IMC "Smart Communication Unit MODEL: EL2310 Software Installation Procedure Manual".

CONTENTS

The indications **NOTE**, **CAUTION**, and **WARNING** shown throughout this manual are to draw your attention to specific items:

➡ NOTE

Notes are separated from the general text to bring user's attention to important information.

⚠ **CAUTION**

Caution statements call attention to user about hazards or unsafe practices that could result in minor personal injury or property damage.

⚠ **WARNING**

Warning statements call attention to user about hazards or unsafe practices that could result in serious personal injury or death.

1. SMART COMMUNICATION UNIT

1.1 General

Described in this manual are the operating instructions to use the Smart Communication Unit Model EL2310 which operates in the Microsoft operating system Windows environment.
The EL2310 is a communication terminal designed for use in combination with a personal computer (hereinafter referred to as PC) and any one of the OVAL Coriolis series flowmeters to set up, alter, adjust, or read out parameters and variables, through interactive communications, locally at the point of measurement or from a terminal in a remote location. Using a Windows PC at hand, you can monitor multiple windows on its screen.

※: The EL2310 operates on the application software "LinkTop" furnished.

2. BEFORE YOU BEGIN

2.1 Inspection Upon Receipt

※Be sure you have the following items.
Remove the products from the EL2310 carton and make sure you have all the components required.

CD-ROM (one)
(LinkTop and driver)

Interface Adapter

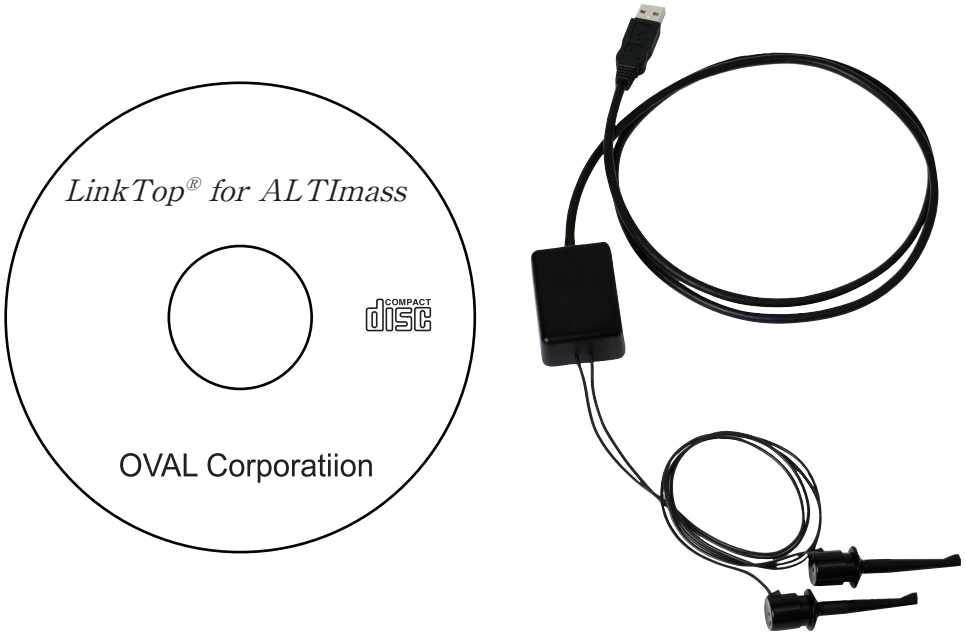


Fig.1

➡ NOTE: For the installation of “LinkTop” and the interface driver, refer to “Installation Procedure Manual”.

2.2 Hookup with Associated Equipment and Devices

Equipment set-up with associated equipment and devices are shown in Fig. 2.

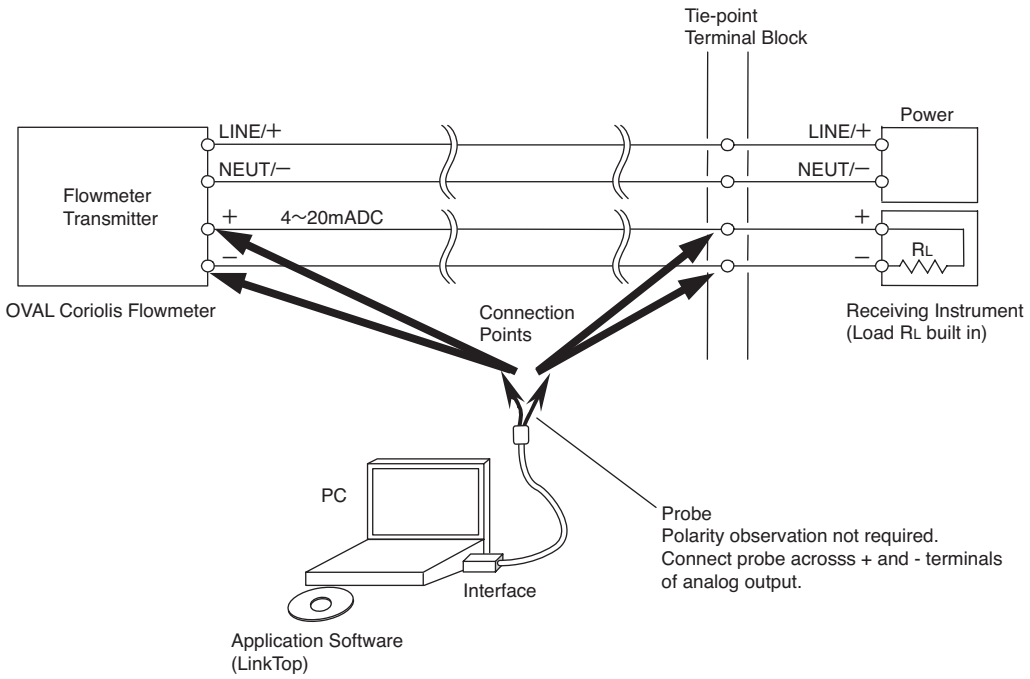


Fig.2

➡ NOTE: In Fig. 2, the customer is to supply the PC that meets the following requirements:

◇OS: Windows 7 to 11 (32bit/64bit) Japanese version / English version
◇RAM: 1GB or larger.
◇Hard disk: 10MB or larger
◇Provision of USB port

The load resistance RL in the receiving instrument shown in the figure above must be 250Ω or more, with the upper limit of 600Ω.
If the receiving instrument does not have a built-in RL, use it with an external RL connected in series.

2.3 PC Interface Adapter

Comprised of components as shown in Fig. 3, it converts the flowmeter transmitter signal (Bell 202) into the USB signal.

All dimension in millimeters

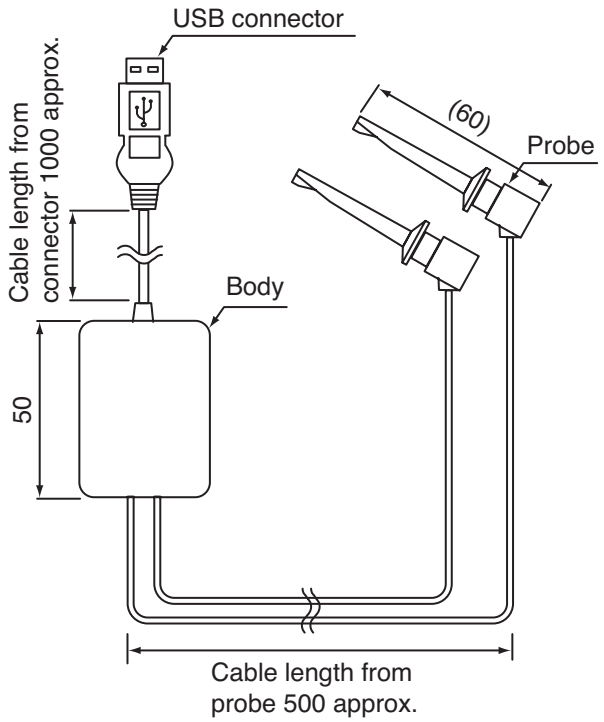


Fig.3

3.EL2310 OPERATION

3.1 About LinkTop Screen

Fig. 4 shows how the LinkTop window looks.

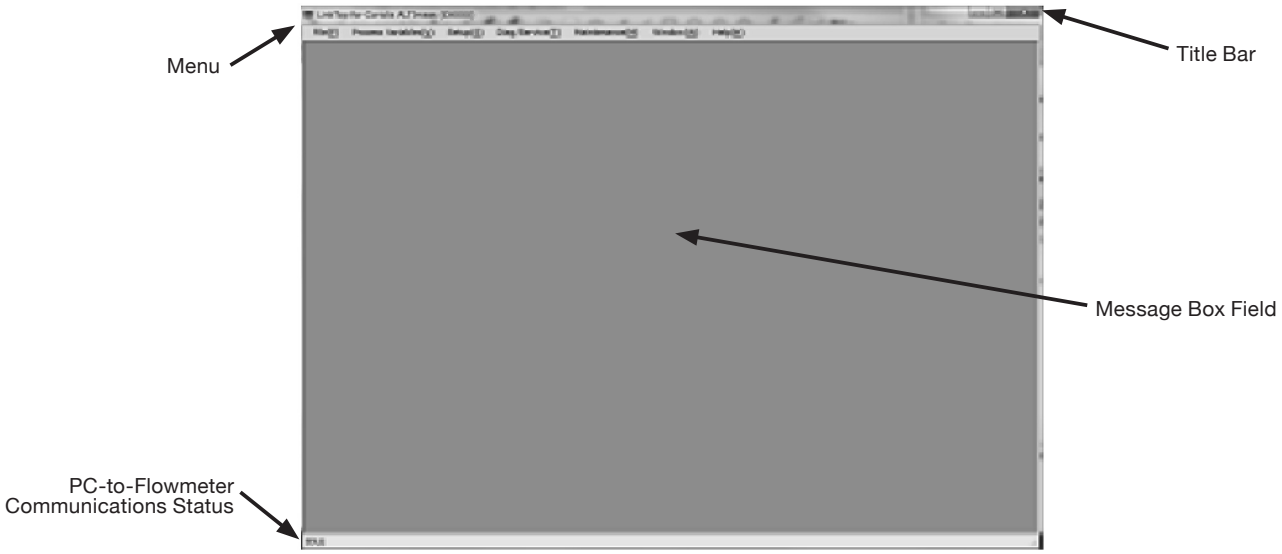


Fig.4

The state of communications is indicated at bottom left of the screen by :

◇During communications : SEND, RECEIVE WAIT

◇Communications interrupted : IDLE

◇When communication is completed : CLOSE

➡ NOTE: You can display an explanation window (Manual) on the screen to check the explanation of the function.

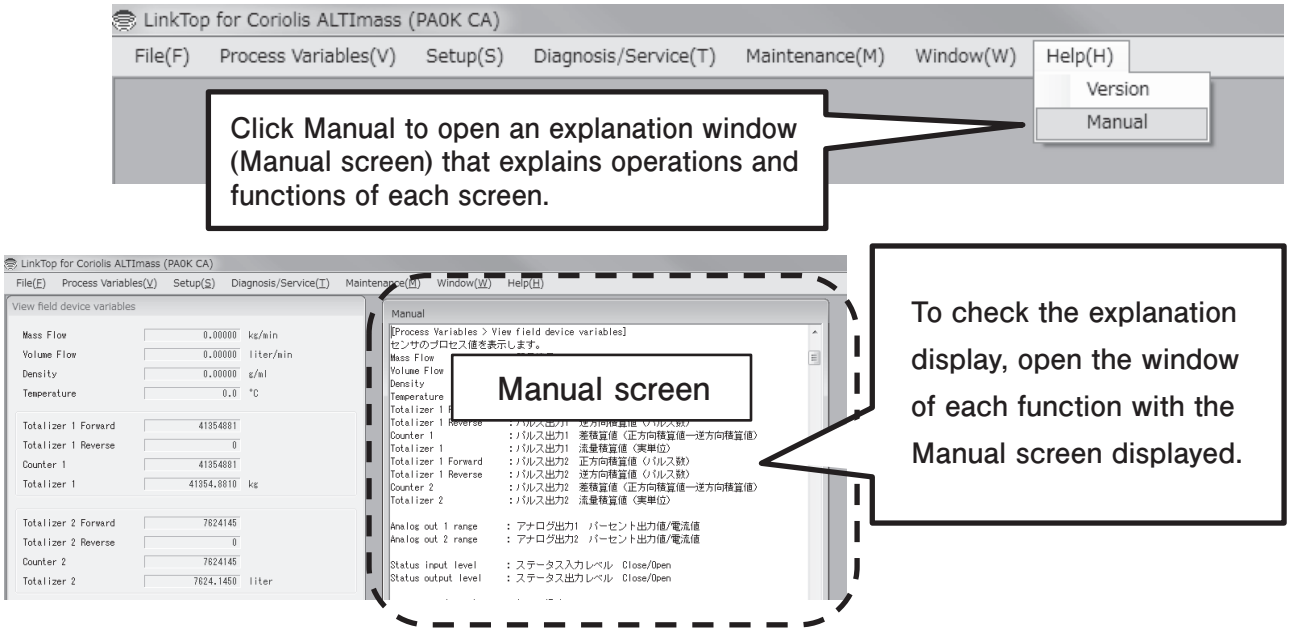


Fig.5

3.2 Starting the LinkTop and Connections

① Hook up the flowmeter transmitter, interface adapter, and "LinkTop" preinstalled PC as shown in Fig. 2.

② To get the LinkTop up and running, click "Start" at lower left of the PC screen and click "LinkTop for Coriolis ALTImass (E) " from "Program".

③ Click "Port settings (I)" in "File (F)" at the top-level menu of screen.

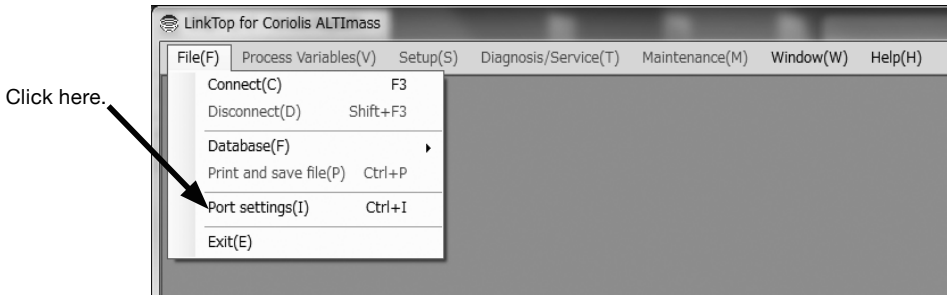


Fig.6

④ Set up the port.

Select COM □ of the corresponding communication port from "Port" drop-down list.

(□ represents the port number connected to the communication interface. If the corresponding communication interface port number is unknown, open Windows Device Manager and find the port number by viewing the list of "Port (COM and LPT)".)

Then select "HART" from "Speed" drop-down list, unless otherwise required.

Click "OK" to complete the setting.

Fig.7

⑤ On the screen as shown in Fig. 7, click "Connect (C) F3" in "File (F)" at the top-level menu of screen.

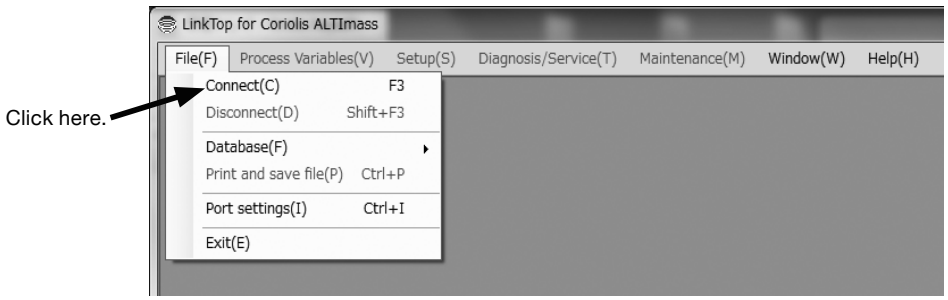


Fig.8

⑥ "Polling address" setting screen appears. The standard "Polling address" of a flowmeter is "0". After you select "0", click "OK" to initiate the connection.

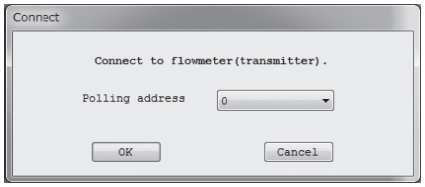


Fig.9

⑦ As you click "OK" and start the connection process, a message box like the one in Fig. 10 appears. A bar graph in the middle of message box indicates progress of connection process.

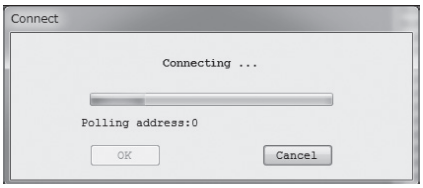


Fig.10

When the connection process begins, the transmitter connected is automatically identified and the transmitter name appears in the title bar. In addition, "SEND, RECEIVE WAIT" is displayed at the lower left of the screen where the communication status is shown.

⑧ Upon completion of connections, a message box like the one in Fig. 11 appears. Click "OK" button. If an error/status has occurred, a pop-up window appears to show the error/status that has occurred as shown in Figure 12.

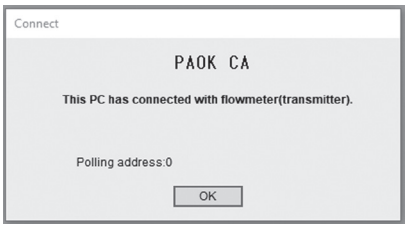


Fig.11

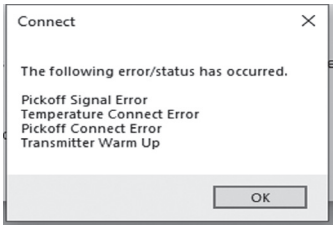


Fig.12

⑨ When connection is complete, of the menus at the top-level menu of screen, certain items that had been dimmed and unable to select become available (menu characters turned black).

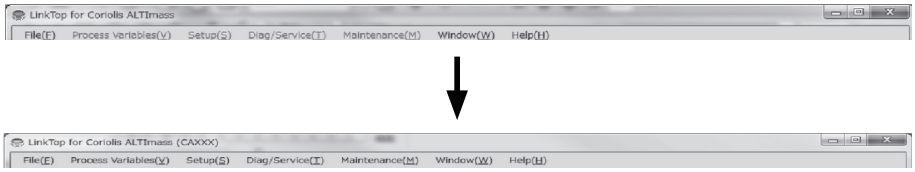


Fig.13

3.3 Terminating the Connection

To terminate connection between the flowmeter transmitter and LinkTop, follow the procedure given below:

① Click on "File (F)" at top-level menu on the screen as shown in Fig. 14, and select "Disconnect (D) Shift + F3".

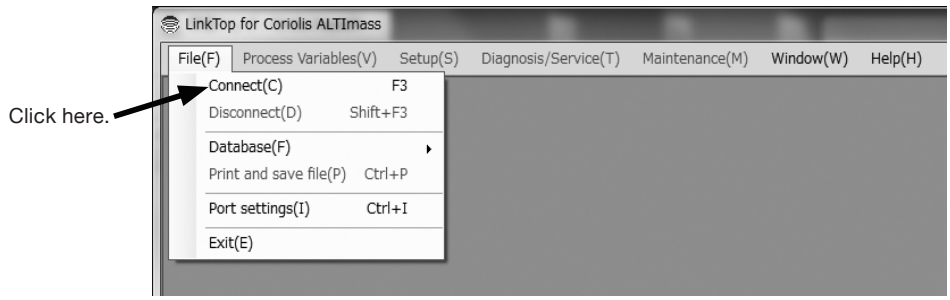


Fig.14

② At the message box as shown in Fig. 15, click on "OK". This brings the connection between the flowmeter and LinkTop to come to an end.

③ Clicking on "Cancel" abandons the process of terminating the connection.

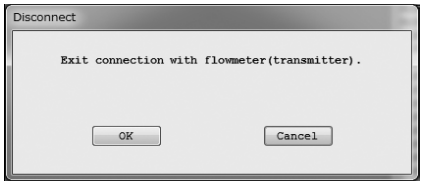


Fig.15

④ When connection is terminated, part of the menu becomes inactive (indicated in gray) as shown in Fig. 16.

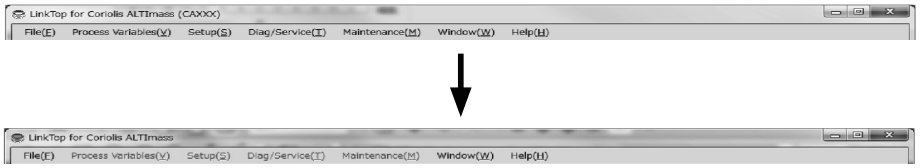


Fig.16

3.4 Terminating the LinkTop

To exit the LinkTop, click on "File (F)" > "Exit (E)" at the top-level menu. A message box as shown in Fig. 17 appears. If you are sure to exit the LinkTop, click on "OK" button. Clicking on "OK" button will cause the application window to disappear from the desktop.
To abort the terminating process, click on "Cancel".

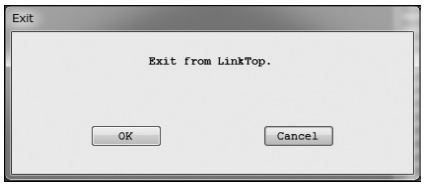


Fig.17

3.5 Menu: Process Variables (Processing Values Display)

"Process Variables" menu can be used to confirm flowmeter's process variables (instantaneous flow rate, fluid density, fluid temperature, total flow, and analog output), chart display, and the state of Write Protect mode.
For the actual screen, refer to Fig. 18.

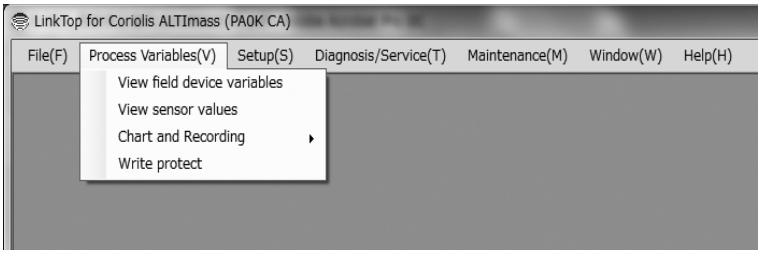


Fig.18

3.5.1 Processing value measurements (View field device variables)

① Click on "Process Variables (V)" > " View field device variables" at the top-level menu.

② The following window will be displayed (Fig. 19).
Items displayed differ depending on the model.

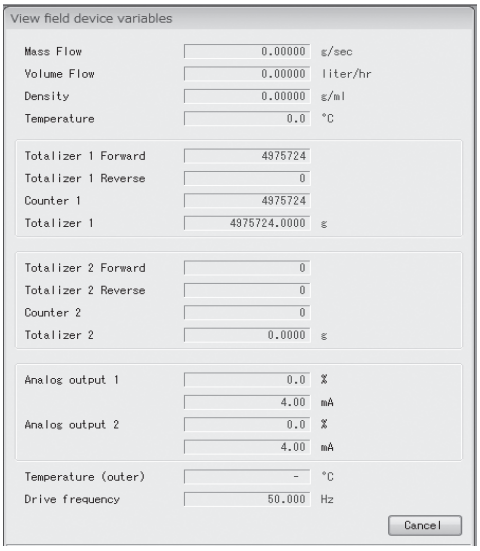


Fig.19

③ If there is some kind of problem with the flowmeter transmitter, then an error message will be displayed in the window under the process value measurement window. For details, refer to section 3.12.4, "Error and status display list".

④ To close the process value measurement window, click "Cancel".

3.5.2 Measurement of Internal Process Values (View sensor values)

Chart display of flow rate (mass and volume), density, and temperature as well as data recording can be carried out.

① Click "Process Variables (V)" > "View sensor values" in the menu at the top of the screen.

② The window shown below (Fig. 20) appears.

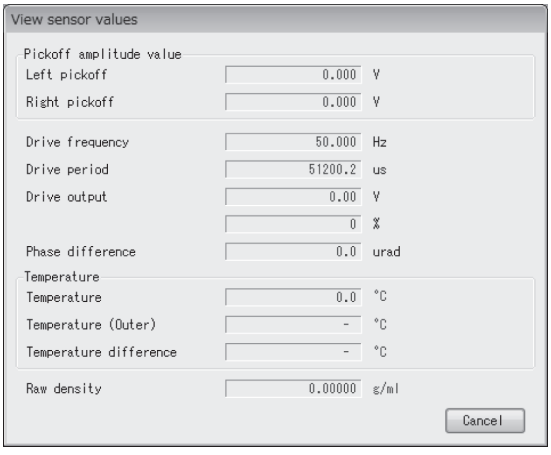


Fig.20

③ Click "Cancel" to close the window for process value measurement.

3.5.3 Chart Display and Logging (Chart and Recording)

Chart display of flow rate (mass and volume), density, and temperature as well as data recording can be carried out.

① Click "Chart and Recording" in the menu at the top of the screen, and then click "Active" to display the toolbar as shown in Figure 21 at the top of the screen.

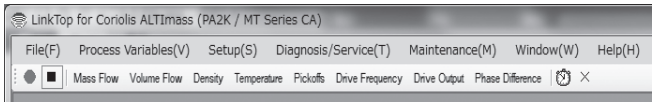


Fig.21

② Click button on the tool bar or "Chart and Recording" - "Interval" from menu. Then a window as shown in Fig. 19 appears, enabling setting of update interval of chart display and logging interval. Select the preferred interval from "1 Second", "2 Seconds", "3 Seconds", "5 Seconds", "10 Seconds", "30 Seconds", "1 Minute", "5 Minutes", "10 Minutes", and "1 Hour" and click "OK".

➡ NOTE: If the logging interval is set faster than a certain value, the logging items will be limited (excluded items will be grayed out).

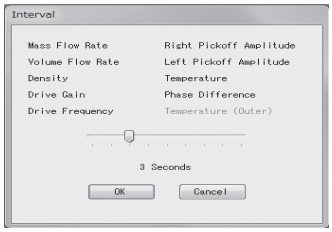


Fig.22

③ Click the "Mass Flow" button on the toolbar or "Chart and Recording" – "Chart" – "Mass Flow" in the menu to open the window shown in Figure 23 and display the Mass Flow chart.
To change the scale of the vertical axis, enter the desired values on "Max" and "Min" under "Scale", then click "OK".

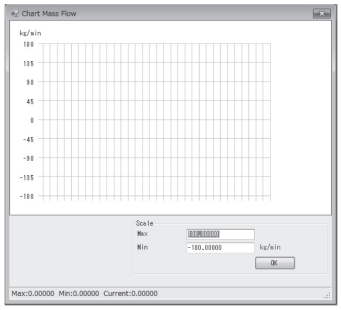


Fig.23

④ A chart is generated according to update interval selected in ② .

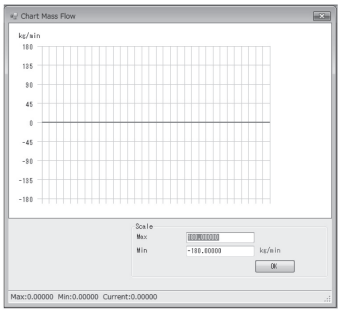


Fig.24

⑤ To hide the chart, click "Mass Flow" button on the tool bar or "Chart and Recording" - "Chart" - "Mass Flow" from menu again.

⑥ The following charts can be displayed by the same operation.

- Volume Flow
- Density
- Temperature
- Pickoffs
- Drive Frequency
- Drive Output
- Phase Difference

⑦ Clicking  on the tool bar or "Chart and Recording" - "Recording" - "Start" from menu shows a dialog box (Fig. 25). Select a disk and folder to create a file, and enter the file name, then click "Save". A CSV file is created and data logging begins.

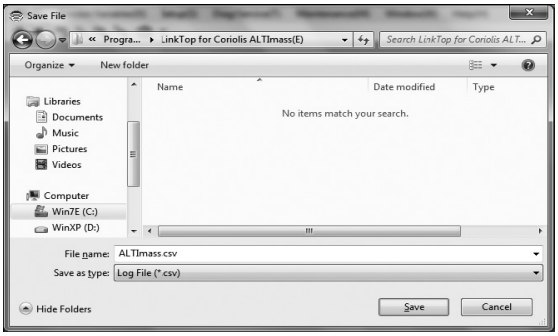


Fig.25

⑧ If you click the button with the square on the tool bar or "Chart and Recording" - "Recording" - "Stop" from menu, logging stops (terminating the writing process on a file) and the file is completed. Click "OK" on the following message box (Fig. 26).

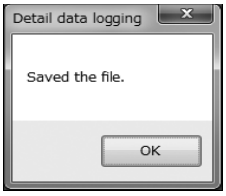


Fig.26

⑨ A log file when logging interval is set to "5 Seconds" are shown in Fig. 27, where the value of the parameter is stored approximately every 5 seconds.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Date	Time	Mass Flow	Unit	Volume Flow	Unit	Density	Unit	Temperature	Unit	Temperature (outer)	Unit	Left Pickoff (V)	Right Pickoff (V)	Drive Frequency (Hz)	Drive Output (V)	Phase Differential (urad)
2	2019/6/4	11:02:45	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
3	2019/6/4	11:02:50	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
4	2019/6/4	11:02:55	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
5	2019/6/4	11:03:00	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
6	2019/6/4	11:03:05	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
7	2019/6/4	11:03:10	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
8	2019/6/4	11:03:15	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
9	2019/6/4	11:03:20	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
10	2019/6/4	11:03:25	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
11	2019/6/4	11:03:30	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
12	2019/6/4	11:03:35	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
13	2019/6/4	11:03:40	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
14	2019/6/4	11:03:45	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
15	2019/6/4	11:03:50	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
16	2019/6/4	11:03:55	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
17	2019/6/4	11:04:00	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
18	2019/6/4	11:04:05	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
19	2019/6/4	11:04:10	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
20	2019/6/4	11:04:15	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
21	2019/6/4	11:04:20	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
22	2019/6/4	11:04:25	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
23	2019/6/4	11:04:30	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
24	2019/6/4	11:04:35	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
25	2019/6/4	11:04:40	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
26	2019/6/4	11:04:45	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
27	2019/6/4	11:04:50	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
28	2019/6/4	11:04:55	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
29	2019/6/4	11:05:00	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
30	2019/6/4	11:05:05	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
31	2019/6/4	11:05:10	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
32	2019/6/4	11:05:15	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
33	2019/6/4	11:05:20	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8
34	2019/6/4	11:05:25	0	kg/min	0	liter/min	0	g/ml	-221	℃	50	℃	0	0	50	0	-3.8

Fig.27

⑩ If you click ✕ button on the tool bar or "Chart and Recording" - "Active" from menu, chart display and data logging are terminated.

3.5.4 Display of the transmitter writing state (Write protect)

① Click "Process Variables (V)" in the menu at the top of the screen, and then select and click "Write protect" to display the following window (Fig. 28).

Fig.28

"Write protect" indicates whether or not the transmitter is writeable.

- "Not write protected" (writeable): Parameters can be modified and various settings can be made.
- "Write protected" (not writeable): Parameters cannot be modified and various settings cannot be made.

② To close the transmitter write protect window, click "Cancel".

NOTE :

Switching between enable/disable of "write protect" needs to be done on the transmitter. Please refer to the instruction manual of the flowmeter for details.

3.6 Menu: Setup (Settings)

The "Setup" menu can be used to set the flowmeter's various parameter values, the transmitter's information, and so on.
If a "Diagnosis/Service" window is displayed on the screen, then it will not be possible to set the various parameters, transmitter information, and so on. Close these windows before making settings.
For the actual screen, refer to Fig. 29.

Setup	Field device varaiables		
	Outputs	I/O function select	※1
		Analog/Pulse Assign	
		Analog output1	
		Analog output2	
		Pulse output1	
		Pulse output2	※4
		Status output	
		Error output	
	Status input		
	H/L alarm	H/L alarm assign	
		H/L alarm parameters	
	Characterize sensor	Sensor type	
		Flow parameters	
		Density parameters	
		Density parameters (Extended)	※3
		Zero factor	
	Device information		
	LCD	Variables priority	
		Refresh LCD	
		Font	
		Decimal	
		Back light	
		Contrast	
		LCD Reverse	※1
	Key		
	Polling address		※2

※1 Not displayed on PA0K.
※2 Not displayed on PA0K (HART5 type).
※3 Not displayed depending on the model.
※4 Displayed only on PA0K.

Setup Item Tree

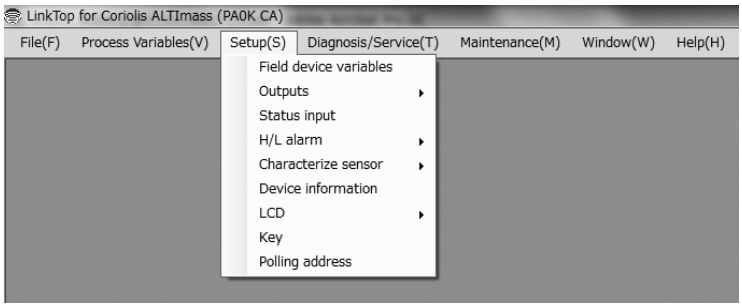


Fig.29

3.6.1 Transmitter variables (Field device variables)

① Click "Setup (S)" in the menu, and then select and click "Field device variables".

② The following window will be displayed (Fig. 30).

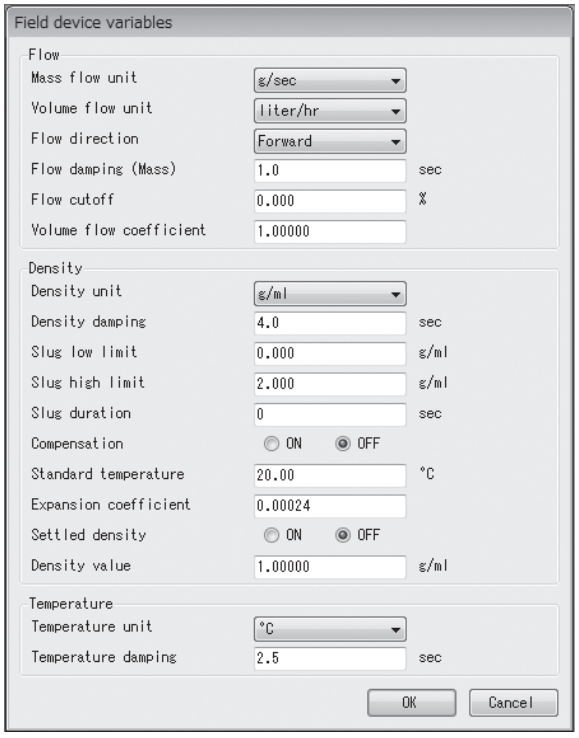


Fig.30

③ In the "Flow" section, the mass flow unit, volume flow unit, inflow direction, flow damping, flow cutoff, and volume flow compensation coefficient can be set.
The flow direction can be set to either "Forward" or "Reverse", whereby "Forward" means the direction indicated on the flowmeter unit with an arrow is treated as the "positive direction", and "Reverse" means the opposite direction of the arrow is treated as the "positive direction". Set the "Flow cutoff" as a percentage of the maximum allowable flow rate.

④ In the "Density" section, the density unit, density damping, gas multiphase flow detection, density compensation, and settled density can be set.
When measured density value exceeds "Slug low limit" or "Slug high limit", it is detected as gas multiphase flow, forcibly setting measured flow rate and output to "0". When "Slug low limit" is set to "0" and "Slug high limit" is set to "10", the gas multiphase flow detection function is turned "OFF". Also, if it is within the time set in "Slug duration", then the gas multiphase flow state will be ignored, and ordinary measurements will be continued.
When density compensation "Compensation" is set to "ON", the density and volume flow are converted based on the standard temperature (calculated with "Standard temperature" and "Expansion coefficient").
When settled density "Settled density" is set to "ON", then the value set with "Density value" is reflected in the volume flow.

⑤ In the temperature "Temperature" section, the temperature unit and temperature damping can be set.

⑥ After all settings are complete, click the "OK" button to display a message box (Fig. 31).
Click "OK" here to change the settings to the inputted values, and to reflect the changed setting values in the flowmeter's output. For the sake of safety, if the flowmeter's output is used to control valves or other such parts, then change that control loop to manual control so that the control loop is not influenced by the flowmeter's output.

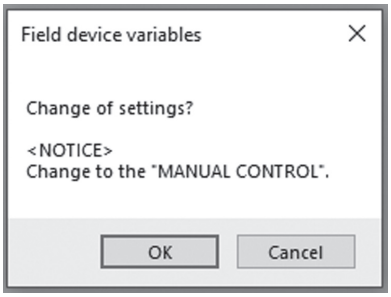


Fig.31

⑦ Click "OK" to change the settings to the inputted values, and then click the "OK" button in the displayed message box (Fig. 32) to complete the setting process.

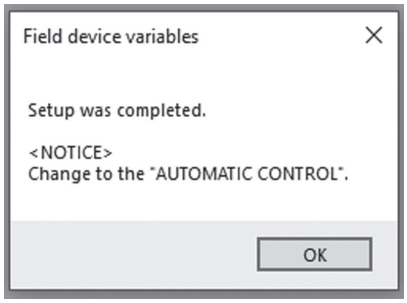


Fig.32

3.6.2 Output settings (Outputs)

3.6.2.1 Selection of Input/Output Functions (I/O function select)

① Click "Setup (S)" > "Outputs" > "I/O function select" in the menu.

② The following window appears. In this window, select input/output functions. If "Status output" is set for "Analog 2 function," the status output is performed by 4mA/20mA output.

※ Operable functions differ depending on the model.

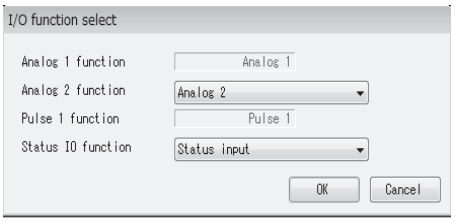


Fig.33

3.6.2.2 Analog and pulse assignment (Analog/Pulse Assign)

① Click on "Setup (S)" > "Outputs" > "Analog/Pulse assign" in the menu.

② The following window will be displayed (Fig. 34). Assign analog output 1 and 2 here, as well as pulse output 1 and 2.

※ Items displayed differ depending on the model.

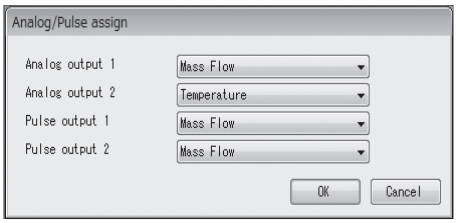


Fig.34

③ Set each item assignment. Make your selections from the drop-down lists by clicking the triangles on the right side of each item, as shown in Fig. 35 and Fig. 36.

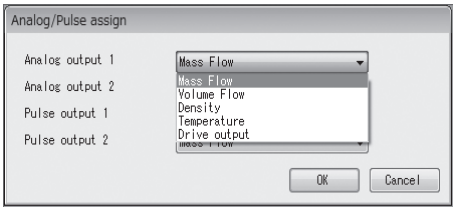


Fig.35

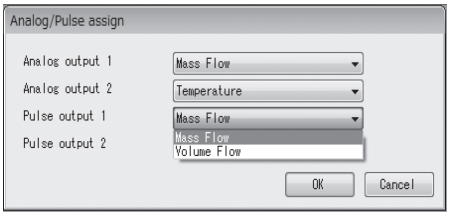


Fig.36

④ Click the "OK" button after all settings are completed to display the message box (Fig. 37).
Click "OK" here to change the settings to the inputted values, and to reflect the changed setting values in the flowmeter's output. For the sake of safety, if the flowmeter's output is used to control valves or other such parts, then change that control loop to manual control so that the control loop is not influenced by the flowmeter's output.
When the pulse output assignment is modified, the cumulative total will be reset, and a confirmation message box will be displayed as shown in Fig. 38. To avoid resetting the cumulative total, click the "Cancel" button. If you do not mind resetting the total, click the "OK" button again.
Also note that if "Cancel" is clicked, settings will not be modified.

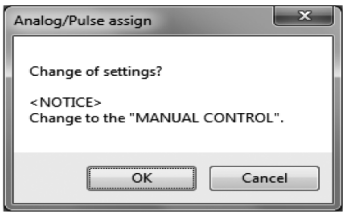


Fig.37

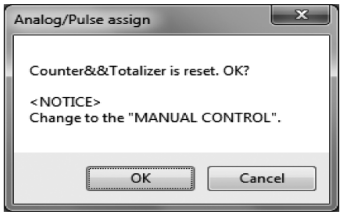


Fig.38

⑤ Click "OK" to change the settings to the inputted values, and then click the "OK" button in the displayed message box (Fig. 39) to complete the setting process.
Also note that when the analog output assignment is changed, this can generate an alarm.
In this case, the message box shown in Fig. 40 will be displayed.

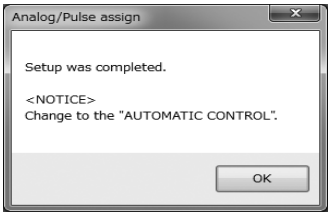


Fig.39

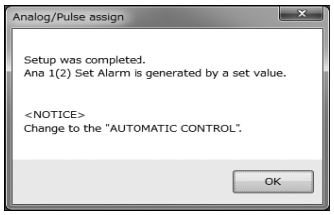


Fig.40

⑥ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ④ .

3.6.2.3 Analog output 1 setting (Analog output 1)

① Click on "Setup (S)" > "Outputs" > "Analog output 1" in the menu.

② The following window will be displayed (Fig. 41). Set analog output 1 here.

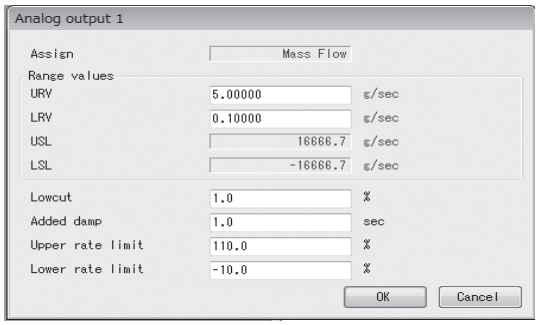


Fig.41

③ Set each item. USL (the sensor's upper limit) and LSL (the sensor's lower limit) indicate the input range of URV (20mA setting) and LRV (4mA setting), so use this as a rule of thumb when making your settings.
When "Lowcut" is set to "0.0%", the lowcut function is turned off. "0.0%" is the standard setting. If anything other than flow (mass or volume) is assigned, be sure to set 0.0%. Also note that when "Bi direction" is selected, the lowcut function will work in both positive and negative directions.
Set output ranges for "Upper rate limit" and "Lower rate limit" (110% = 21.6mA, -10% = 2.4mA).
※ The setting cannot be changed for some models.

④ Click the "OK" button after all settings are completed to display the message box (Fig. 42).
Click "OK" here to change the settings to the inputted values, and to reflect the changed setting values in the flowmeter's output. For the sake of safety, if the flowmeter's output is used to control valves or other such parts, then change that control loop to manual control so that the control loop is not influenced by the flowmeter's output.

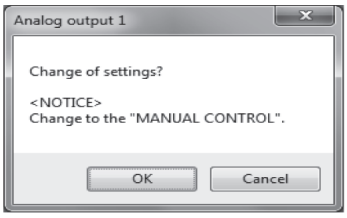


Fig.42

⑤ Click "OK" to change the settings to the inputted values, and then click the "OK" button in the displayed message box (Fig. 43) to complete the setting process.

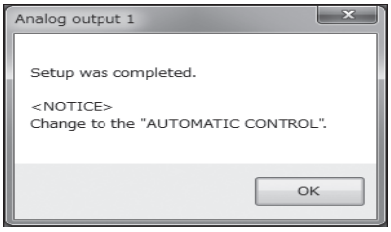


Fig.43

⑥ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ④ .

3.6.2.4 Analog output 2 setting (Analog output 2)

① Click on "Setup (S)" > "Outputs" > "Analog output 2" in the menu.

② "Analog output 2" can be set by following the same procedures as described in 3.6.2.3 "Analog output 1", steps ② to ⑤ .

3.6.2.5 Pulse output 1 setting (Pulse output 1)

① Click on "Setup (S)" > "Outputs" > "Pulse output 1" in the menu.

② The following window will be displayed (Fig. 44). Set pulse output 1 here.

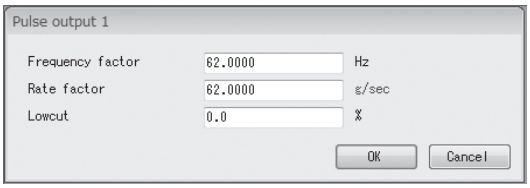


Fig.44

③ Set each item.
- 「Frequency factor」: Frequency factor setting for pulse output 1.
- 「Rate factor」: Rate factor setting for pulse output 1.
- 「Lowcut」: Lowcut value for pulse output 1 setting.

When "Lowcut" is set to "0.0%", the lowcut function is turned off. "0.0%" is the standard setting.
When "Bi direction" is selected, the lowcut function will work in both positive and negative directions.

④ Click the "OK" button after all settings are completed to display the message box (Fig. 45).
Click "OK" here to change the settings to the inputted values, and to reflect the changed setting values in the flowmeter's output. For the sake of safety, if the flowmeter's output is used to control valves or other such parts, then change that control loop to manual control so that the control loop is not influenced by the flowmeter's output. When "OK" is clicked in Fig. 38, the cumulative total will be reset, and a confirmation message box will be displayed as shown in Fig. 46. To avoid resetting the cumulative total, click the "Cancel" button. If you do not mind resetting the total, click the "OK" button again.
Also note that if "Cancel" is clicked, settings will not be modified.

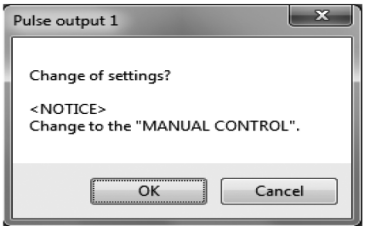


Fig.45

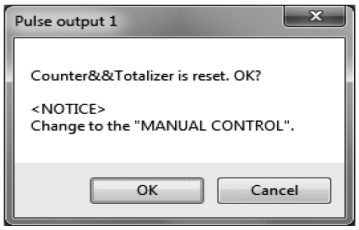


Fig.46

⑤ Click "OK" to change the settings to the inputted values, and then click the "OK" button in the displayed message box (Fig. 47) to complete the setting process.

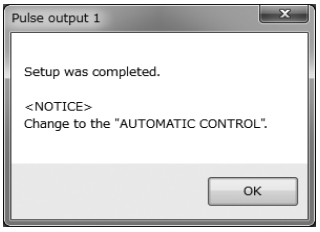


Fig.47

⑥ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ④ .

3.6.2.6 Pulse output 2 setting (Pulse output 2)

① Click on "Setup (S)" > "Outputs" > "Pulse output 2" in the menu.

② "Pulse output 2" can be set by following the same procedures as described in 3.6.2.5 "Pulse output 1", steps ② to ⑤ .

3.6.2.7 Status output setting (Status output)

① Click on "Setup (S)" > "Outputs" > "Status output " in the menu.

② The following window will be displayed (Fig. 48). Set the status output function here.

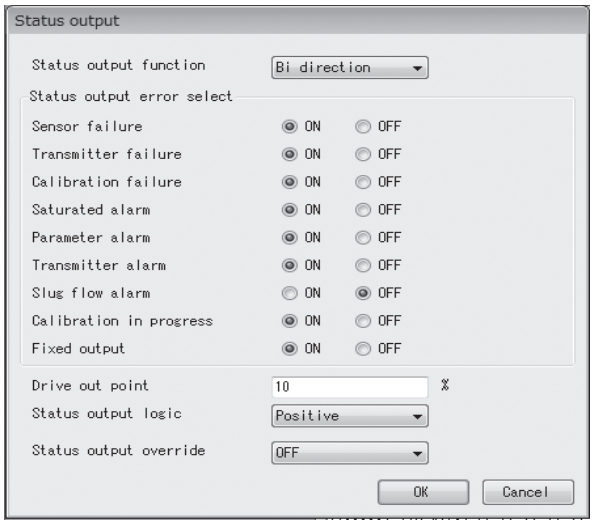


Fig.48

③ Click the triangle on the right side of "Status output function" as shown in Fig. 49, and select the function to set for status output from the drop-down list.

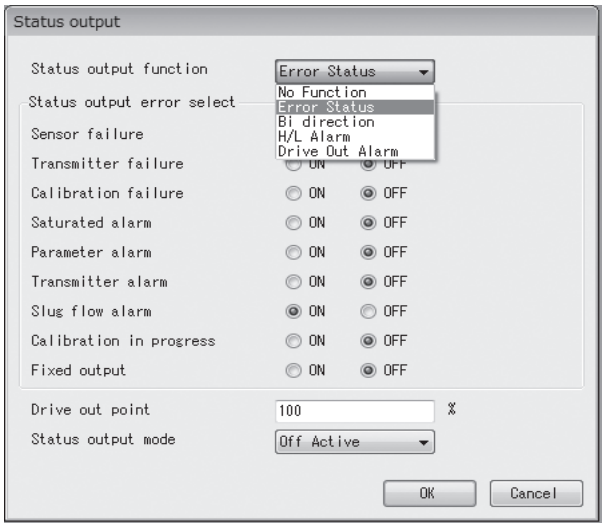


Fig.49

④ Status output is open drain output (equivalent to open collector output), and can be selected from 5 functions: "No function", "Error Status", "Bi direction", "H/L Alarm" and "Drive Out Alarm".

- "No function": No status output
- "Error Status": A function for switching status output when the item selected with "Status output error select" has an error status.
- "Bi direction": A function for switching the status output when the flow (mass and volume) enters bidirectional mode (the output increases with the flow, regardless of the flow direction) and the flow reverses.
  If the "Flow direction" is "Forward", then the direction of the arrow on the flowmeter is treated as the "positive direction", and if it is "Reverse", then the opposite direction from the arrow on the flowmeter is treated as the "positive direction".
- "H/L Alarm": This function switches the status output when the item set with "H/L alarm assign" reaches a value set with "High alarm point" or "Low alarm point". The standard setting is "No Function".
- "Drive Out Alarm": This status output is used for maintenance purposes. It outputs an alarm when drive voltage exceeds "Drive out point".

To halt the status output function, select "No Function".
When "No Function" is selected, status output will be "OFF".
It is also possible to select the status output logic with "Status output mode (Status output logic)".
The standard setting is "OFF" (in other words, "Off active (Positive)" is selected).

⑤ To use status output as "H/L Alarm", select items as described in section 3.6.4.1 "H/L alarm assign" 3.6.4.2 "H/L alarm parameters".

⑥ The items in "Status output error select" are as described in this table:

Selection Item	Error Name	Details
Sensor failure	Sensor error	Occurs when the input from a sensor (drive or temperature) is outside the range, or when a measurement result (flow or density) is outside the acceptable range
Transmitter failure	Transmitter error	Occurs when there is an error in the transmitter's internal data processing
Calibration failure	Calibration error	Occurs when "Auto Zero" cannot exit normally
Saturated alarm	Output saturation alarm	Occurs when the analog output is outside the range of 2.4mA or 21.6mA, or when the pulse output is 11kHz or higher
Parameter alarm	Parameter alarm	Occurs when a set parameter is outside the range
Transmitter alarm	Transmitter alarm	Occurs when an error occurs in the transmitter's internal temperature
Slug flow alarm	Gas multiphase flow alarm	Occurs when the previously set density range is exceeded due to the interfusion of air bubbles or other causes
Calibration in progress	Calibration execution in progress	Occurs when calibration is being executed
Fixed output	Fixed output in progress	Occurs when analog output, pulse output, status output, and so on are in a fixed state

➡ Notes: 1. Click "ON" for the items to set to error output.
2. Error output is only valid if "Status output function" is set to "Error Status".
3. Status output is switched when one or more of the selected items is in error status.
4. For details regarding errors, refer to section 3.11.4 "Error and status display list".

⑦ "Drive out point" represents a threshold of drive output and is for maintenance purposes. By assigning drive output alarm on the status output, an alarm output can be generated when drive output exceeds the threshold.

[Reference] 100% is achieved when the drive output voltage (calculated value) is between 60V and 70V. Differences may occur depending on the frequency.

⑧ The "Status output override" setting assigns a status output to analog output 2. When "ON", analog output 2 becomes 4/20mA status output. (PA2K and PA5K only)

⑨ Click the "OK" button after all settings are completed to display the message box (Fig. 50).
Click "OK" here to change the settings to the inputted values, and to reflect the changed setting values in the flowmeter's output. For the sake of safety, if the flowmeter's output is used to control valves or other such parts, then change that control loop to manual control so that the control loop is in a state whereby it is not influenced by the flowmeter's output.

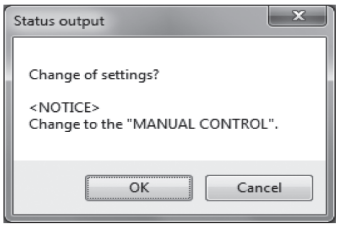


Fig.50

⑩ Click "OK" to change the settings to the selected values, and then click the "OK" button in the displayed message box (Fig. 51) to complete the setting process.

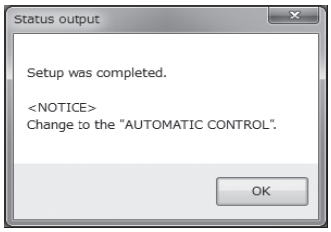


Fig.51

⑪ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ⑦ .

3.6.2.8 Error output level settings (Error output)

① Click on "Setup (S)" > "Outputs" > "Error output" in the menu.

② The following window will be displayed (Fig. 52). Set the analog and pulse output level for when errors occur here.

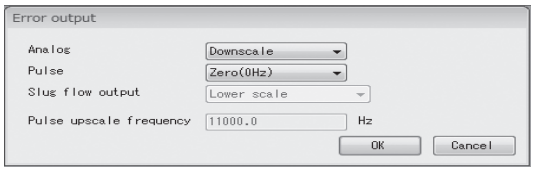


Fig.52

③ Select the output levels to set from the drop-down lists by clicking the triangles on the right side of the "Analog" and "Pulse" items, as shown in Fig. 53 and Fig. 54.

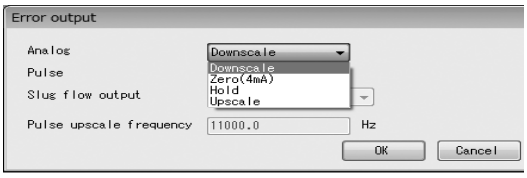


Fig.53

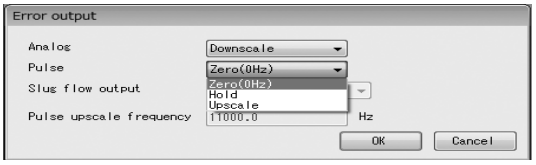


Fig.54

④ Output levels are as follows:

Output Level	Analog Output	Pulse Output
Downscale	2.4mA	———
Zero（4mA, 0Hz）	4mA	0Hz
Hold	Maintains the final measurement value	Maintains the final measurement value
Upscale	21.6mA	11kHz ※

➡ Note: The "Error output" functions when there is a "Sensor Failure", "Xmtr Failure", or "Parameter Alarm". For a description of error items, refer to section 3.12.4 "Error and status display list".
※ For some models, the frequency will be the one set in "Pulse upscale frequency."

⑤ Once all the settings are complete, click the "OK" button to display the message box (Fig. 55). Click "OK" here to change the settings to the inputted values, and to reflect the changed setting values in the flowmeter's output. For the sake of safety, if the flowmeter's output is used to control valves or other such parts, then change that control loop to manual control so that the control loop is not influenced by the flowmeter's output.

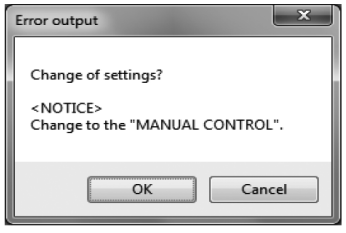


Fig.55

⑥ Click "OK" to change the settings to the selected values, and then click the "OK" button in the displayed message box (Fig. 56) to complete the setting process.

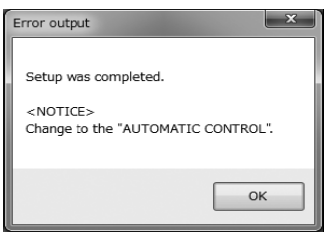


Fig.56

⑦ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ⑤ .

3.6.3 Status input setting (Status input)

① Click on "Setup (S)" >"Status input" in the menu.

② The following window will be displayed (Fig. 57). Set the status input function here.

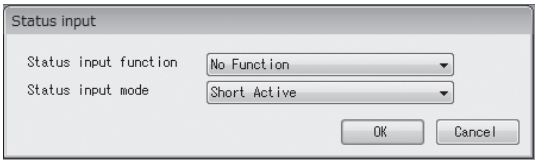


Fig.57

③ Click the triangle on the right side of "Status input function" as shown in Fig. 58, and select the output level from the drop-down list.

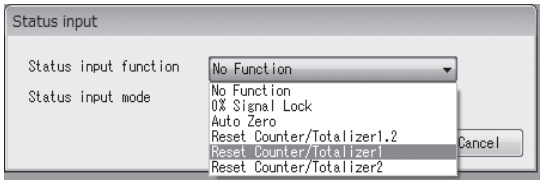


Fig.58

④ It is possible to select from the five functions"No Function", "0% Signal Lock", "Auto Zero", "Reset Counter/Totalizer 1, 2", "Reset Counter/Totalizer 1", and "Reset Counter/Totalizer 2" for status input.
・"No Function": No status output.
・"0% Signal Lock": A function for locking each output by forcing a 0% setting.
・"Auto Zero": A remote zero point adjustment (remote zero) function.
・"Reset Counter/Totalizer 1, 2": A function for resetting remote cumulative totals 1 and 2.
・"Reset Counter/Totalizer 1": A function for resetting remote cumulative total 1.
・"Reset Counter/Totalizer 2": A function for resetting remote cumulative total 2.
The standard setting is "No Function".
To halt the status input functions, select "No Function".
※ The selection items differ depending on the model.

⑤ For the status input, it is possible to select from the following two types: A contact point input or B contact point input.
・"Short Active (Normal Open)": A contact point input
・"Open Active (Normal Close)": B contact point input
The standard selection is "Short Active (Normal Open)".

⑥ After all settings are complete, click the "OK" button to display a message box (Fig. 59).
Click "OK" here to change the settings to the inputted values, and to reflect the changed setting values in the flowmeter's output. For the sake of safety, if the flowmeter's output is used to control valves or other such parts, then change that control loop to manual control so that the control loop is not influenced by the flowmeter's output

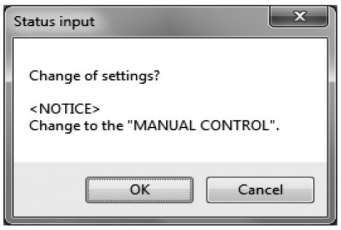


Fig.59

⑦ Click "OK" to change the settings to the selected values, and then click the "OK" button in the displayed message box (Fig. 60) to complete the setting process.

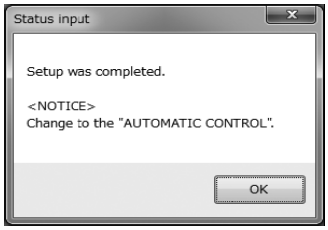


Fig.60

⑧ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ⑥ .

3.6.4 H/L alarm setting (H/L alarm)

3.6.4.1 H/L alarm assignment (H/L alarm assign)

① Click on "Setup (S)" > "H/L alarm" > "H/L alarm parameters" in the menu.

② The following window will be displayed (Fig. 61). Set the H/L alarm assignment here.

Fig.61

③ Click the triangle on the right side of "H/L alarm assign" and select the assignment to set from the drop-down list as shown in Fig. 62.

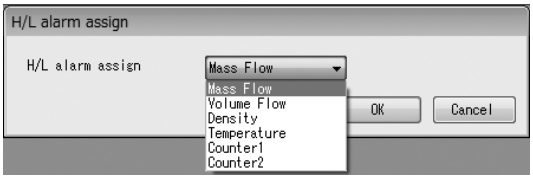


Fig.62

④ After all settings are complete, click the "OK" button to display a message box (Fig. 63).
Click "OK" here to change the settings to the inputted values, and to reflect the changed setting values in the flowmeter's output. For the sake of safety, if the flowmeter's output is used to control valves or other such parts, then change that control loop to manual control so that the control loop is not influenced by the flowmeter's output.

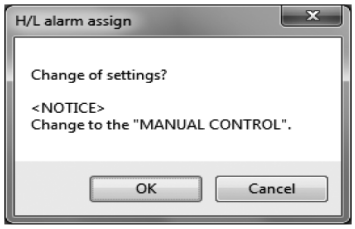


Fig.63

⑤ Click "OK" to change the settings to the selected values, and then click the "OK" button in the displayed message box (Fig. 64) to complete the setting process.
Also note that when the assignment is changed, this can cause the "H/L Alarm Point Set Alarm" to occur. If this happens, the screen shown in Fig. 65 will be displayed after the change.

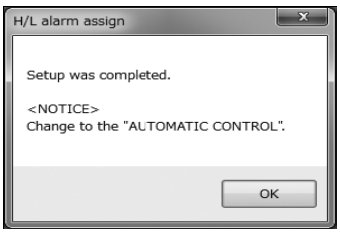


Fig.64

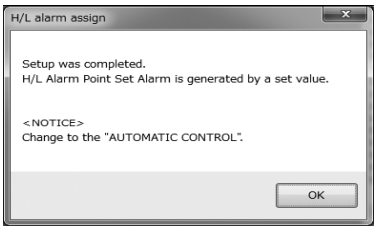


Fig.65

⑥ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ④ .

3.6.4.2 H/L alarm parameter settings (H/L alarm parameters)

① Click "Setup (S)" > "H/L alarm" > "H/L alarm parameters" in the menu.

② The following window will be displayed (Fig. 66). Set the H/L alarm parameters here.

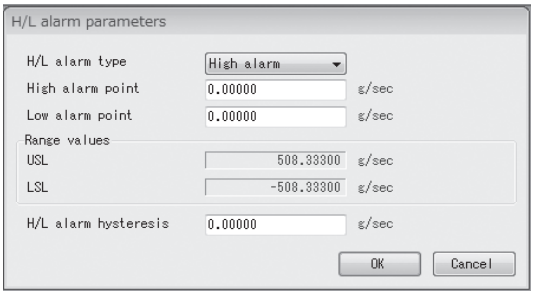


Fig.66

③ H/L alarm is a function that switches the status output when the item set with "H/L alarm assign" reaches a value set with "High alarm point" or "Low alarm point" (when the setting of "Status output function" is "H/L Alarm"). "H/L alarm type" includes the three types "High alarm", "Low alarm", and "H/L alarm".
Select the alarm type that matches your usage purpose.

- "High alarm": The status output is switched when the set item exceeds "High alarm point."
- "Low alarm": The status output is switched when the set item falls below "Low alarm point."
- "H/L alarm": Switches the status output when either "High alarm point" or "Low alarm point" is reached.

(Supplementary Information)
If "H/L alarm hysteresis" is a value other than 0, then status output is switched when "High alarm point" is exceeded, or when the value goes under "Highalarm point - H/L alarm hysteresis". "Low alarm point" works the same way in that the status output is switched when the value goes under "Low alarm point", or when "Low alarm point + H/L alarm hysteresis" is exceeded.

④ Set each item. For the items with a triangle on the right side, click the triangle to make your selection from the drop-down list, as shown in Fig. 67. For the other items, directly input a numerical value.

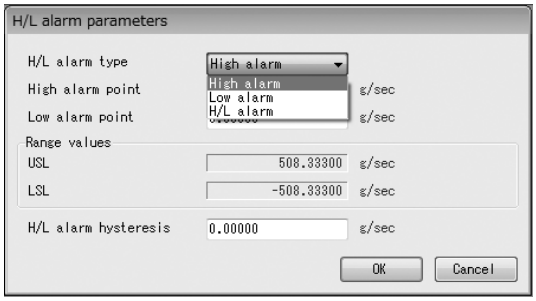


Fig.67

⑤ After all settings are complete, click the "OK" button to display a message box (Fig. 68).
Click "OK" here to change the settings to the inputted values, and to reflect the changed setting values in the flowmeter's output. For the sake of safety, if the flowmeter's output is used to control valves or other such parts, then change that control loop to manual control so that the control loop is not influenced by the flowmeter's output.

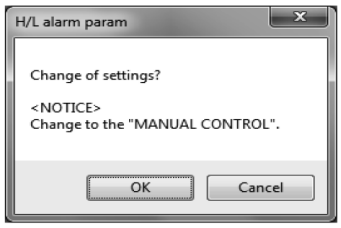


Fig.68

⑥ Click "OK" to change the settings to the inputted values, and then click the "OK" button in the displayed message box (Fig. 69) to complete the setting process.

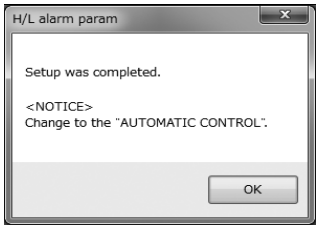


Fig.69

⑦ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ⑤ .

3.6.5 Characterize sensor

3.6.5.1 Sensor type

The type of the sensor to be combined and the setting of the maximum measurement range can be checked.

3.6.5.2 Flow parameters

Adjustment parameters for the flow rate of the sensor to be combined can be checked.

3.6.5.3 Density parameters

Adjustment parameters for the density of the sensor to be combined can be checked.

3.6.5.4 Density parameters (Extended)

Extended adjustment parameters for the density of the sensor to be combined can be checked.

※ Some models do not have this item.

3.6.5.5 Zero factor

Zero-point adjustment values for the flow rate can be checked.

3.6.6 Transmitter information settings (Device information)

① Click the "Setup (S)" menu, and then select and click "Device information".

② The following window will be displayed (Fig. 70). Set the transmitter information here.

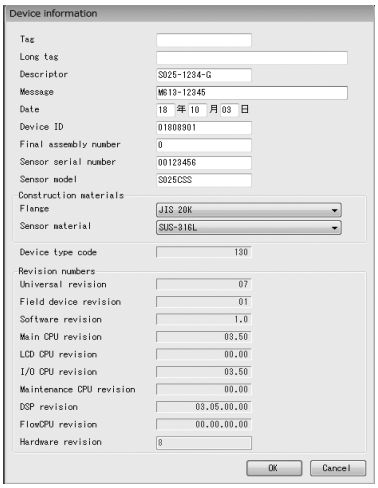


Fig.70

③ Set each item. For the items with a triangle on the right side, click the triangle to make your selection from the drop-down list, as shown in Fig. 71 and Fig. 72. For the other items, directly input a numerical value.

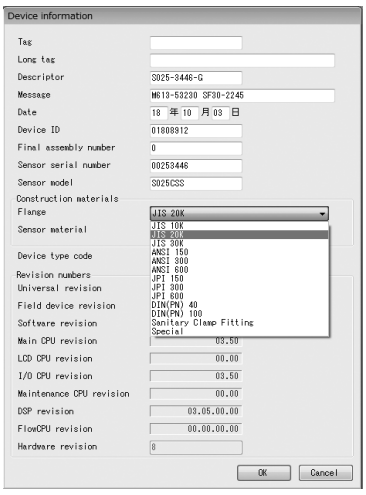


Fig.71

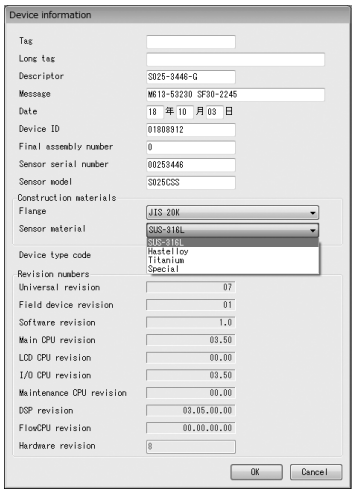


Fig.72

④ In the case of an item that is to be inputted directly, when the cursor is held over the input field, a description of the input restrictions will appear as shown in Fig. 73. Use this as a guide while making your setting.

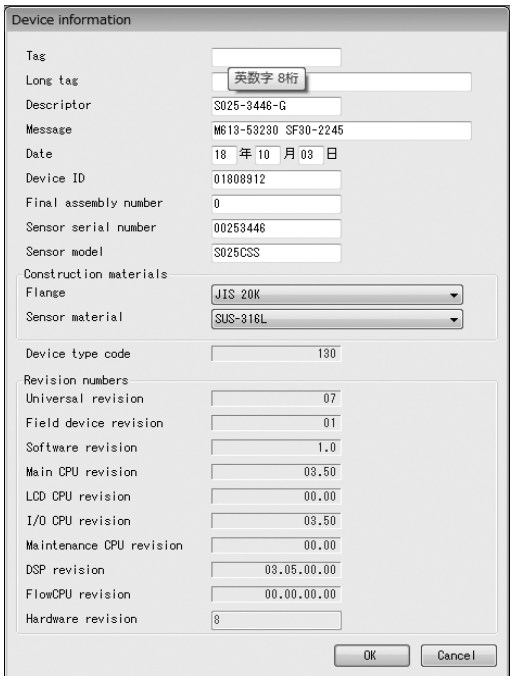


Fig.73

⑤ After all settings are complete, click the "OK" button to display a message box (Fig. 74).

Fig.74

⑥ Click "OK" to change the settings to the inputted values, and then click the "OK" button in the displayed message box (Fig. 75) to complete the setting process.

Fig.75

⑦ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ⑤ .

3.6.7 Transmitter display settings (LCD)

3.6.7.1 Display order settings (Variables priority)

① Click "Setup (S)" > "LCD" > "Variables priority" in the menu.

② The following window will be displayed (Fig. 76). Set the order to be used for displaying measurement values on the LCD here.

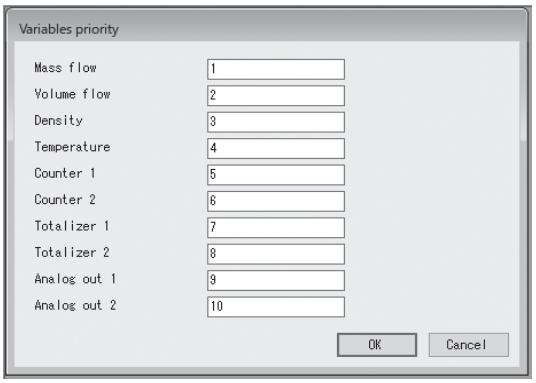


Fig.76

③ If the LCD's "Font" setting is "Double Angle", then two items will be displayed at a time, starting with the first item. If the setting is "Normal", then three items will be displayed on the screen at a time, so pick the items you want to see first and assign the numbers accordingly. An item with the setting 0 is not displayed.
If a number is duplicated or skipped, then an input error will occur and the setting will not be possible.

④ After all settings are complete, click the "OK" button to display a message box (Fig. 77).

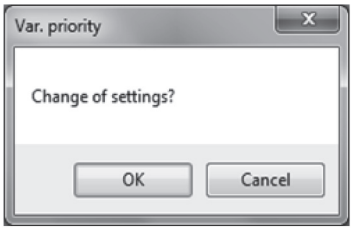


Fig.77

⑤ Click "OK" to change the settings to the inputted values, and then click the "OK" button in the displayed message box (Fig. 78) to complete the setting process.

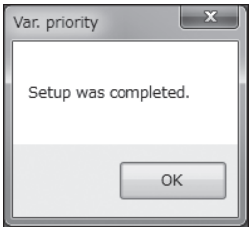


Fig.78

⑥ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ④ .

3.6.7.2 Display update frequency setting (Refresh LCD)

① Click "Setup (S)" > "LCD" > "Refresh LCD" in the menu.

② The following window will be displayed (Fig. 79). Set the display update frequency for displaying measurement values on the LCD here.

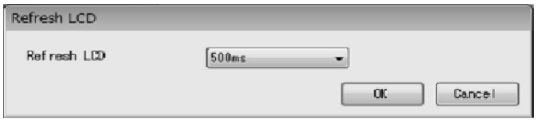


Fig.79

③ Click the triangle on the right side of "Refresh LCD" as shown in Fig. 80, and select the frequency to set from the drop-down list.

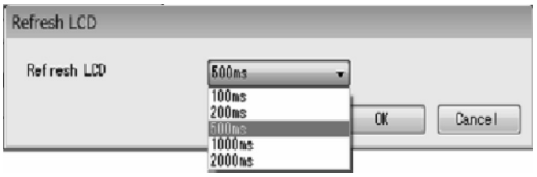


Fig.80

④ After the setting is complete, click the "OK" button to display a message box (Fig. 81).

Fig.81

⑤ Click "OK" to change the settings to the selected values, and then click the "OK" button in the displayed message box (Fig. 82) to complete the setting process.

Fig.82

⑥ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ④ .

3.6.7.3 Display character size setting (Font)

① Click "Setup (S)" > "LCD" > "Font" in the menu.

② The following window will be displayed (Fig. 83). Set the size of characters to be used for measurement values displayed on the LCD here.

Fig.83

③ Click the triangle on the right side of "Font" as shown in Fig. 84, and select the font to set from the drop-down list.

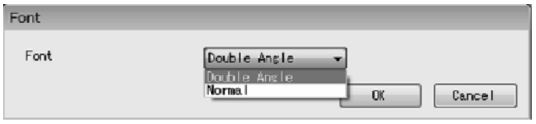


Fig.84

④ After the setting is complete, click the "OK" button to display a message box (Fig. 85).

Fig.85

⑤ Click "OK" to change the settings to the selected values, and then click the "OK" button in the displayed message box (Fig. 86) to complete the setting process.

Fig.86

⑥ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ④ .

3.6.7.4 Measurement value decimal point position settings (Decimal)

① Click "Setup (S)" > "LCD" > "Decimal" in the menu.

② The following window will be displayed (Fig. 87). Set the decimal point position to be used for measurement values displayed on the LCD here.

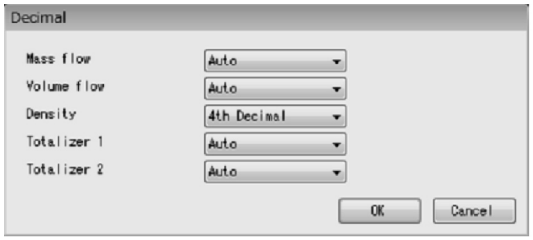


Fig.87

③ Click the triangle on the right side of each item as shown in Fig. 88, and select the decimal points to set from the drop-down lists.

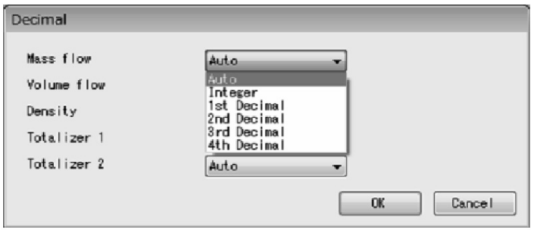


Fig.88

④ This can be used to set the decimal point position to a number between 0 and 4, or to automatic.

- "Auto": If the value is less than 10, then the decimal part will be displayed up to the 5th position. If the value is 10 or greater and less than 100, then the decimal part will be displayed up to the 4th position; if it is 100 or greater and less than 1000, then the decimal part will be displayed up to the 3rd position; if it is 1000 or greater and less than 10000, then the decimal part will be displayed up to the 2nd position; and if it is 10000 or greater and less than 100000, then the decimal part will be displayed up to the 1st position. If the value is 100000 or greater, then it will be displayed as an integer.
- "Integer": The value will always be displayed as an integer.
- "1st Decimal": The value will be displayed up to the 1st position after the decimal point.
- "2nd Decimal": The value will be displayed up to the 2nd position after the decimal point.
- "3rd Decimal": The value will be displayed up to the 3rd position after the decimal point.
- "4th Decimal": The value will be displayed up to the 4th position after the decimal point.

The standard setting is "Auto" for everything else.

⑤ After all settings are complete, click the "OK" button to display a message box (Fig. 89).

Fig.89

⑥ Click "OK" to change the settings to the selected values, and then click the "OK" button in the displayed message box (Fig. 90) to complete the setting process.

Fig.90

⑦ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ⑤ .

3.6.7.5 Display backlight time setting (Back light)

① Click "Setup (S)" > "LCD" > "Back light" in the menu.

② The following window will be displayed (Fig. 91). Turn the back light on or off here, and set the length of time on.

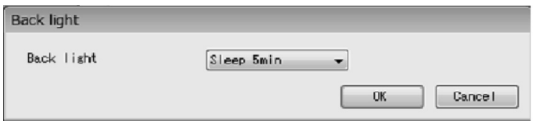


Fig.91

③ Click the triangle on the right side of "Back light" as shown in Fig. 92, and select the time to set from the drop-down list.

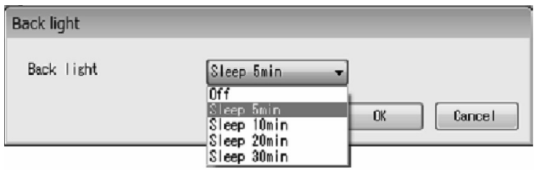


Fig.92

④ Set the amount of time to keep the display screen's back light on here.
- "Off": Back light remains in the off state.
- "Sleep 5min": The back light turns off 5 minutes after the last key operation, or after it turns on.
- "Sleep 10min": The back light turns off 10 minutes after the last key operation, or after it turns on.
- "Sleep 20min": The back light turns off 20 minutes after the last key operation, or after it turns on.
- "Sleep 30min": The back light turns off 30 minutes after the last key operation, or after it turns on.

The back light behaves the same way when an error occurs. Note, however, that the red backlight will not turn completely off, and will blink.

➡ Note: The red back light operates the same as if "Sleep 5min" were selected when "Off" is selected.

⑤ After the setting is complete, click the "OK" button to display a message box (Fig. 93).

Fig.93

⑥ Click "OK" to change the settings to the selected values, and then click the "OK" button in the displayed message box (Fig. 94) to complete the setting process.

Fig.94

⑦ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ⑤ .

3.6.7.6 Display contrast setting (Contrast)

① Click "Setup (S)" > "LCD" > "Contrast" in the menu.

② The following window will be displayed (Fig. 95). Set the contrast of displayed dots here.

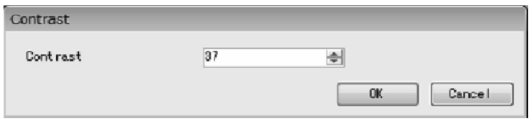


Fig.95

③ Use the up/down switch on the right side of the window to set the numerical value.
Range: 1 to 63
Higher values will result in a higher contrast.

④ After the setting is complete, click the "OK" button to display a message box (Fig. 96).

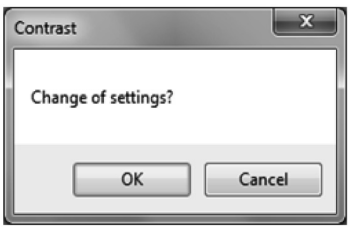


Fig.96

⑤ Click "OK" to change the settings to the inputted values, and then click the "OK" button in the displayed message box (Fig. 97) to complete the setting process.

Fig.97

⑥ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ④ .

3.6.7.7 LCD Reverse

The display screen can be reversed upside down.
※ This function is available only for ALTImassⅡ .

3.6.8 Transmitter key settings (Key)

① Click "Setup (S)" > "Key" in the menu.

② The following window will be displayed (Fig. 98). Set the sensitivity of transmitter keys and other items here.

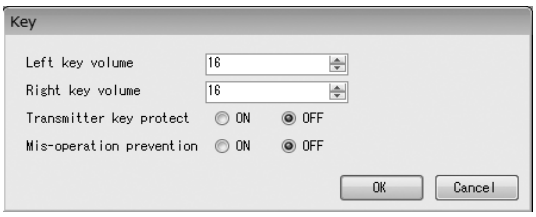


Fig.98

③ Set each item. Click the up/down switches on the right side of items to change the numerical values. For other items, select "ON" or "OFF".
- "Left key volume": Sensitivity setting for the transmitter's left-side keys.
- "Right key volume": Sensitivity setting for the transmitter's right-side keys.
- "Transmitter key protect": Function for restricting the modification of parameters from the transmitter side.
- "Mis-operation prevention": Function for preventing erroneous transmitter key operations.

After all settings are complete, click the "OK" button to display a message box (Fig. 99).

Fig.99

④ Click "OK" to change the settings to the inputted values, and then click the "OK" button in the displayed message box (Fig. 100) to complete the setting process.

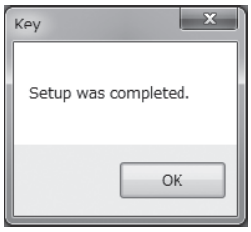


Fig.100

⑤ After the "OK" button is clicked, the item input window will appear again. Click the "Cancel" button to close the item input window.
To cancel the settings, click the "Cancel" button in any step from ② to ③ .

3.6.9 Polling Address

※ Some models do not have this item.

① Click on "Setup (S)" >"Polling address" in the menu and the following window (Fig. 101) will appear.

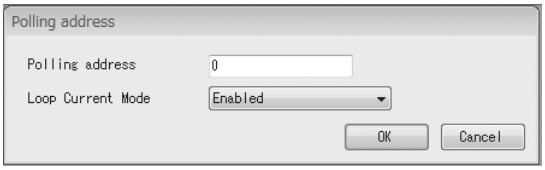


Fig.101

② Enter the number for the item.

Setting Item	Description	Setting range
Polling address	Polling address (address for multi-drop) Default: 0 If multiple numbers of this flowmeter were to be connected on the same segment, set an address other than "0" and avoid duplicating address for each flowmeter.	0 to 63
Loop Current Mode	Enabled: 4-20mA analog output is enabled Disabled: Fixed at 4mA (Setting when multidrop is used) ※ Reflected only to the analog output 1.	Enabled Disabled

③ Click "OK" after entering the number. Then a message box (Fig. 102) appears. By clicking "OK", the new setting will be applied to the polling address.

④ If the setting is modified from the previous setting, a message box (Fig. 103) will appears. Click "OK" to complete setting.

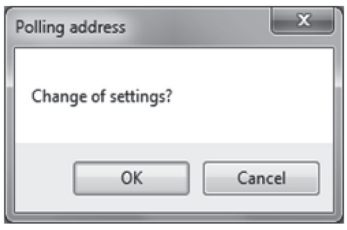


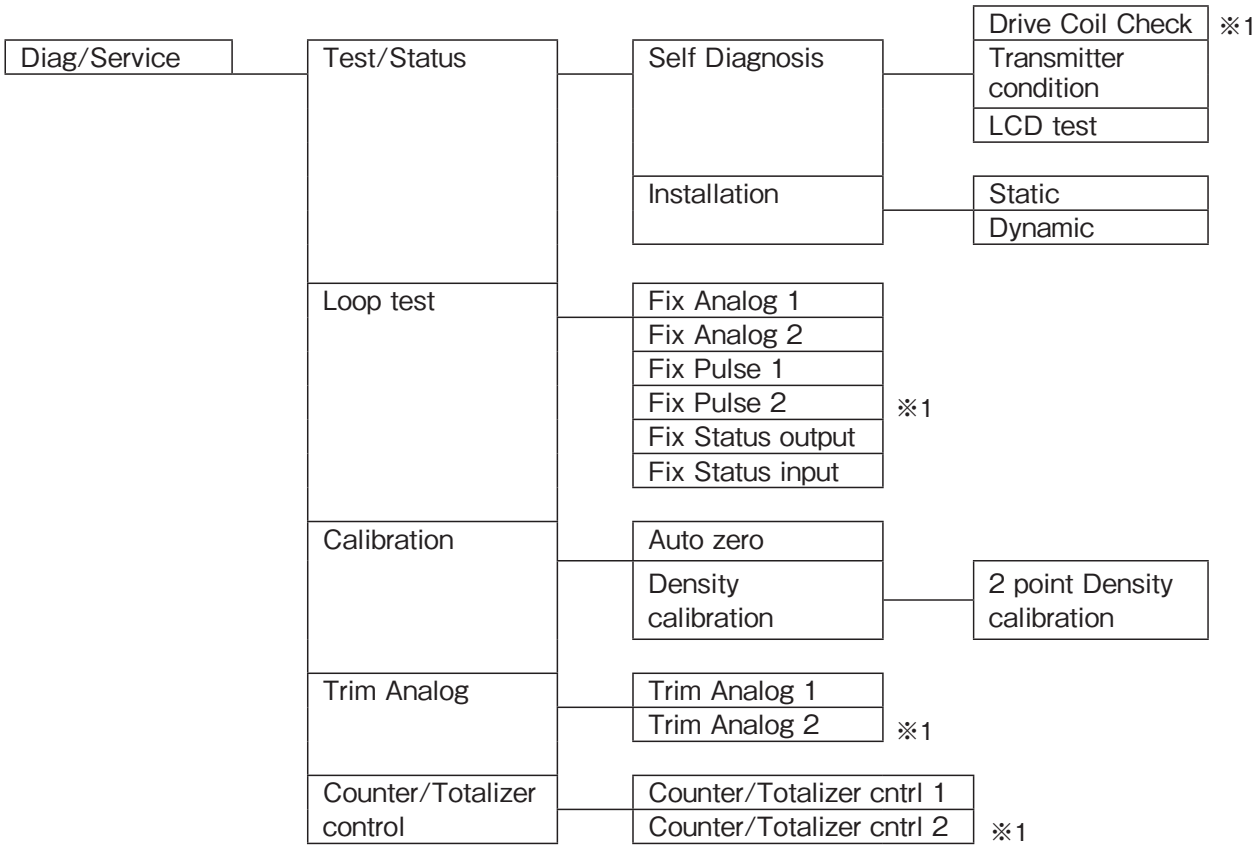
Fig.102

Fig.103

⑤ To complete setting process, click "Cancel" on the item setting window.

3.7 Menu：Diagnosis/Service (Checking and Adjustment)

"Diagnosis/Service" can be used to diagnose the flowmeter transmitter, perform loop tests on each output, adjust output values, reset cumulative totals, and calibrate sensor input.
When the "Setup (S)" windows are displayed on the screen, it will not be possible to perform checks or adjustments. So, close them first.
Also note that other than "Loop test", the "Diagnosis/Service (T)" window cannot be displayed simultaneously with multiple windows (other than "Counter/Totalizer cntrl").
The actual screen is as shown in Fig. 104.



Diagnosis/Service Item Tree

※1 Not displayed depending on the model.

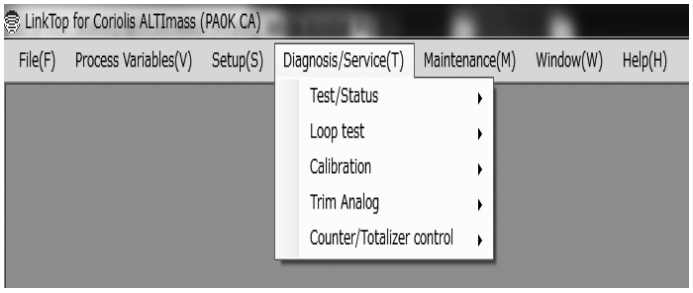


Fig.104

3.7.1 Transmitter self-diagnosis functions (Test/Status)

These functions are used to self-diagnose the flowmeter transmitter.

3.7.1.1 Self-diagnosis function 1 (Self diagnosis)

3.7.1.1.1 Transmitter internal state checks (Transmitter condition)

① Click "Diagnosis/Service (T)" > "Test/Status" > "Self diagnosis" > "Transmitter condition" in the menu.

② When the "OK" button is pressed after the process control loop is switched to manual according to the caution screen, the following window (Figure 105) appears. This window is used to check the internal state of the transmitter.

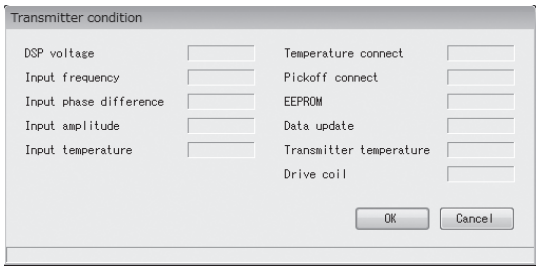


Fig.105

Item	Description	How to handle when NG occurs
DSP voltage	Status of voltage inside transmitter	Check the status of the power supply again.
Input frequency	Status of input frequency	Check the connection status of the sensor and the transmitter.
Input phase difference	Status of input phase difference	Check the connection status of the sensor and the transmitter and the status of fluid.
Input amplitude	Status of input amplitude	Check the connection status of the sensor and the transmitter.
Input temperature	Status of input temperature	Check the connection status of the sensor and the transmitter.
Temperature connect	Connection status of temperature sensor	Check the connection status of the sensor and the transmitter.
Pickoff connect	Connection status of pickoff sensor	Check the connection status of the sensor and the transmitter.
EEPROM	Status of internal memory	The transmitter may be malfunctioning.
Data update	Communication status inside the transmitter	The transmitter may be malfunctioning.
Transmitter temperature	Temperature status inside the transmitter	The temperature of the transmitter is abnormal. Check the temperature of the installation environment.
Drive coil	Status of resistance value of drive coil	Check the connection status of the sensor and the transmitter.

※ In case of abnormality, refer also to the instruction manual of the flowmeter. If the abnormality persists, please consult OVAL sales office or nearest representative.

③ Click the "OK" button to display a message box (Fig. 106).
This conducts checks, so if the output of the flowmeter is being used to control valves and so on, make sure to switch that control loop to manual control so that it is in a state whereby it is not affected by the output of the flowmeter.

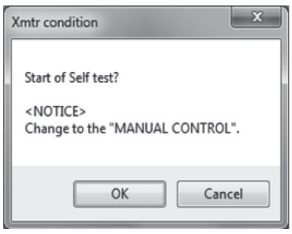


Fig.106

④ Click "OK" to execute the checks. Once they are finished, a message box (Fig. 107) will be displayed. Click the "OK" button to complete the transmitter internal state check.
The results are displayed as shown in Fig. 108.

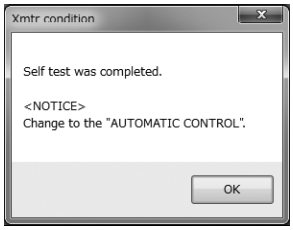


Fig.107

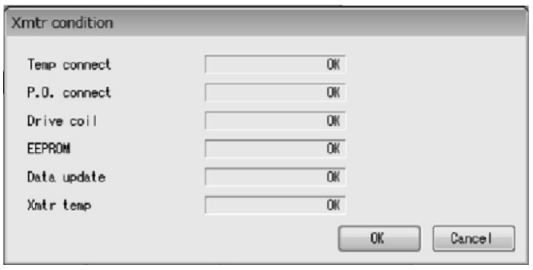


Fig.108

⑤ Click the "OK" button to return to the window from before the check, and then click the "Cancel" button to close the window.
Clicking "OK" here will start the transmitter internal state check over again.

3.7.1.1.2 LCD test

① Click on "Diagnosis/Service (T)" >"Test/Status" > "Self diagnosis" > LCD test" in the menu.

② The following window will be displayed (Fig. 109). This will test the LCD.

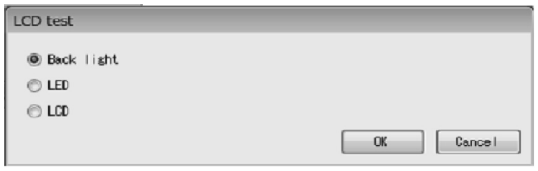


Fig.109

- "Back light": Tests the back light. The back light lights up in white for 3 seconds, in orange for 3 seconds, and is turned off for 3seconds. This process is repeated twice. During that, the green LED blinks.
- "LED": Tests the LED. Both the red and green lights up for 1.5 seconds and then are turned off for 1.5 seconds. This process is repeated six times. Note that the red and the green do not light up at the same time. The back light lights up in white and the LCD is not displayed.
- "LCD": Tests the LCD. All dots light up for 3 seconds and then are turned off for 3 seconds. This process is repeated twice. During that, the green LED blinks.

③ Click the "OK" button to display a message box (Fig. 110).

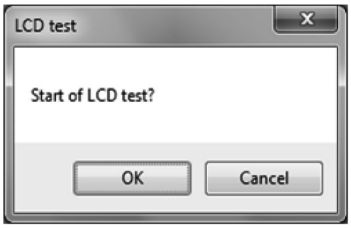


Fig.110

④ Click "OK" to start the test. Note that if another test is started during the execution of a test, then the first test will be cancelled and the new test will be given priority.

⑤ Click the "OK" button to return to the window from before the check, and then click the "Cancel" button to close the window.
Clicking "OK" here will start the LCD test over again.

3.7.1.2 Self-diagnosis function 2 (Installation)

3.7.1.2.1 Static device installation state check (Static)

① Click on "Diagnosis/Service (T)" >"Test/Status" > "Installation" > "Static" in the menu.

② The following window will be displayed (Fig. 111). This will check the static device installation state. Click "OK" after completely stopping the fluid.

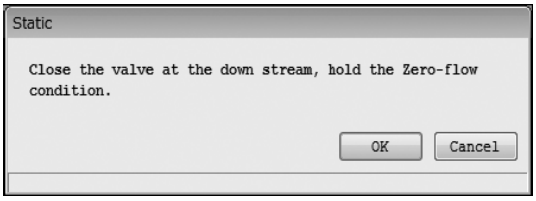


Fig.111

③ Click the "OK" button to display a message box (Fig. 112).

Fig.112

④ During the check, a progress bar will appear as shown in Fig. 113, allowing for the confirmation of the state of the check.

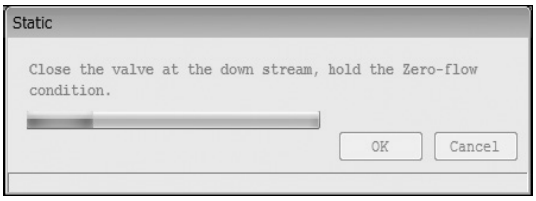


Fig.113

⑤ Click "OK" to execute the checks. Once they are finished, a message box (Fig. 114) will be displayed. Click the "OK" button to complete the static device installation state check.
The results are displayed as shown in Fig. 115.

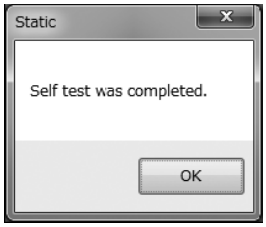


Fig.114

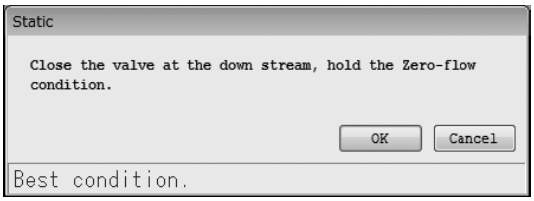


Fig.115

Diagnosis results are as follows (phase difference received from the DSP is monitored for 30 seconds, and the difference between the maximum and minimum values is examined):

- "Best condition": 25μrad or less
- "Good condition": More than 25μrad and equal to or less than 75μrad.
- "Not so good condition": More than 75μrad and equal to or less than 150μrad.
- "Bad condition": More than 150μrad, or "Pickoff Signal Error, Drive Input Out of Range" occurred.

⑥ Click the "OK" button to return to the window from before the check, and then click the "Cancel" button to close the window.
Clicking "OK" here will start the static device installation state check over again.

3.7.1.2.2 Dynamic device installation state check (Dynamic)

① Click on "Diagnosis/Service (T)" > "Test/Status" > "Installation" > "Dynamic" in the menu.

② The following window will be displayed (Fig. 116). This will check the dynamic device installation state. After stabilizing the flow rate, click "OK."

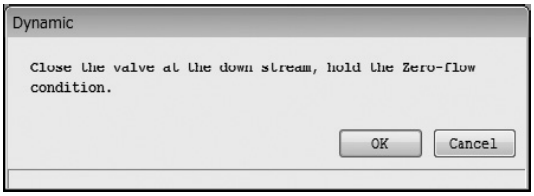


Fig.116

③ Click the "OK" button to display a message box (Fig. 117).

Fig.117

④ During the check, a progress bar will appear as shown in Fig. 118, allowing for the confirmation of the state of the check.

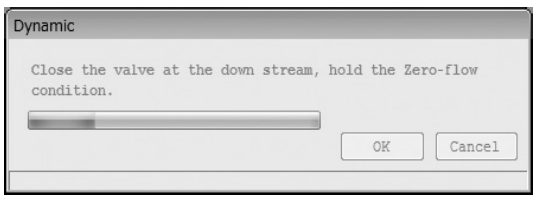


Fig.118

⑤ Click "OK" to execute the checks. Once they are finished, a message box (Fig. 119) will be displayed. Click the "OK" button to complete the dynamic device installation state check.
The results are displayed as shown in Fig. 120.

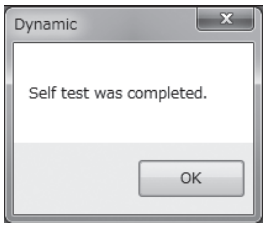


Fig.119

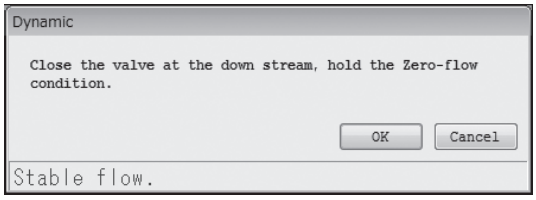


Fig.120

Diagnostic results (Monitor the phase difference received from DSP for 30 seconds and check the difference between the maximum and minimum values.)

- "There is no flow quantitiy": When the flow rate is 0
- "Low flow": When the flow rate is too low
- "Stable flow": 1000μrad or less.
- "Not so stable flow": More than 1000μrad and equal to or less than 2000.
- "Unstable flow": More than 2000μrad, or "Pickoff Signal Error, Drive Input Out of Range" occurred.

⑥ Click the "OK" button to return to the window from before the check, and then click the "Cancel" button to close the window.
Clicking "OK" here will start the dynamic device installation state check over again.

3.7.2 Loop test (Loop test)

Simulated output is created.

3.7.2.1 Analog output 1 loop test (Fix Analog 1)

This test can be used to put analog output into a simulated output state, and to verify the output line with a loop test.
Since this creates simulated output regardless of the process state, if the flowmeter's output is used to control valves or other such parts, then for the sake of safety, change the control loop to manual control so that the control loop is not influenced by the flowmeter's output.

① When "Diagnosis/Service (T)" > "Loop test" > "Fix analog 1" in the menu are clicked, a message box (Figure 121) appears. Then, after confirming that the process control loop has been switched to manual, click the "OK" button.

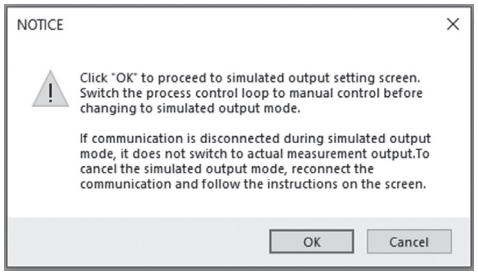


Fig.121

② The following window will be displayed (Fig. 122). Select the simulated output value and click the "Start" button. To pick another current value to output, select "Other" and click the "Start" button after inputting the analog value.
Click the "Cancel" button to exit "Fix Analog".

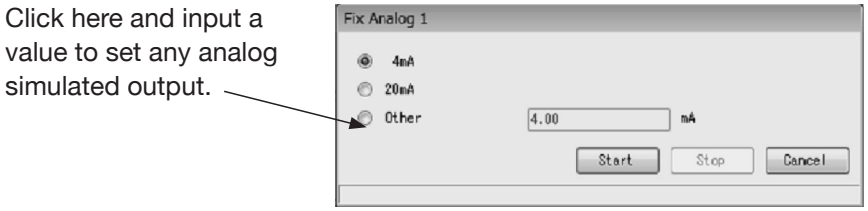


Fig.122

③ Click the "Start" button to display a message box (Fig. 123). Click the "OK" button to start "Fix Analog". Click the "Cancel" button to return to the window shown in Fig. 122.

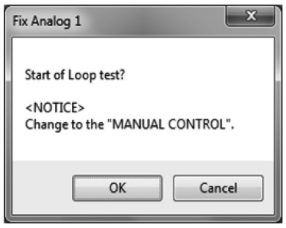


Fig.123

④ Click the "OK" button to cause the set analog value to be outputted. While the simulated output value is being outputted, a message at the bottom of the window will indicate that the system is "creating simulated output", as shown in Fig. 124.
Click the "Stop" button to halt the simulated output.

Fig.124

⑤ After the "Stop" button is clicked, a message box (Fig. 125) will be displayed. Click the "OK" button.

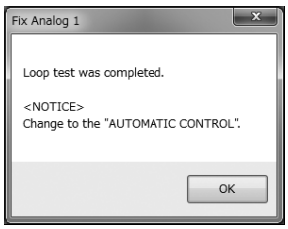


Fig.125

⑥ Clicking the "OK" button would return the interface to the window shown in Fig. 122, so click the "Cancel" button to exit "Fix Analog".

3.7.2.2 Analog output 2 loop test (Fix Analog 2)

The analog output 2 loop test can be executed by following the same procedures as described in section 3.7.2.1 "Fix Analog 1", steps ① to ⑤ .

3.7.2.3 Pulse output 1 loop test (Fix Pulse 1)

This test can be used to put pulse output into a simulated output state, and to verify the output line with a loop test.
Since this creates simulated output regardless of the process state, if the flowmeter's output is used to control valves or other such parts, then for the sake of safety, change the control loop to manual control so that the control loop is not influenced by the flowmeter's output.

① When "Diagnosis/Service (T)" > "Loop test" > "Fix Pulse" in the menu are clicked, a message box (Fig. 126) appears. Then, after confirming that the process control loop has been switched to manual, click the "OK" button.

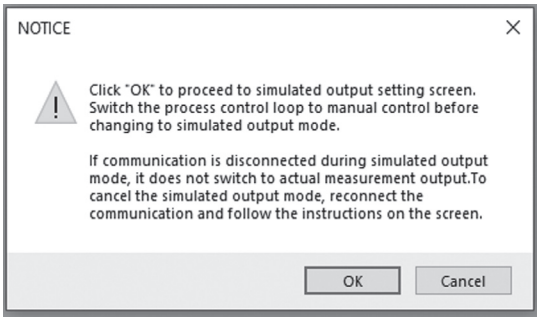


Fig.126

② The following window will be displayed (Fig. 127). Select the simulated output value and click the "Start" button. To pick another pulse frequency to output, select "Other" and click the "Start" button after inputting the pulse frequency.
The indicator in the window turns green while the pulse is output and red while the pulse is stopped.
The range of pulse frequency values that can be inputted is 0.1 to 11000 Hz.
Click the "Cancel" button to exit "Fix Pulse".

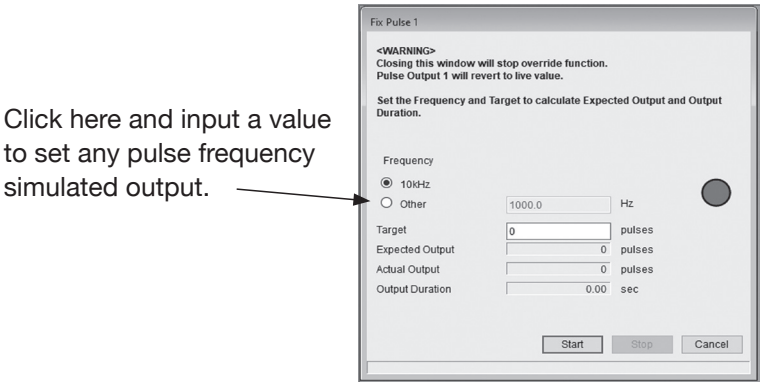


Fig.127

③ The number of simulated output pulses can be set in "Target." "0" indicates continuous output.
The expected number of outputs is displayed in "Expected Output."
(The expected number obtained by calculation may be different from the value set in "Target," but it is not abnormal.)
The approximate output duration is displayed in "Output Duration."

④ Click the "Start" button to display a message box (Fig. 128). Click the "OK" button to start "Fix Pulse". Click the "Cancel" button to return to the window shown in Fig. 127.

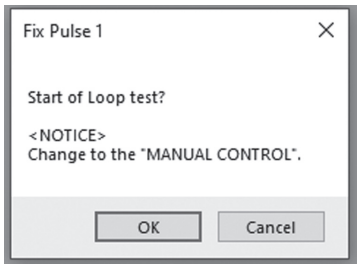


Fig.128

⑤ Click the "OK" button to cause the simulated output value to be outputted. While the simulated output value is being outputted, a message at the bottom of the window will indicate that the system is "creating simulated output", as shown in Fig. 129.
Click the "Stop" button to halt the simulated output.

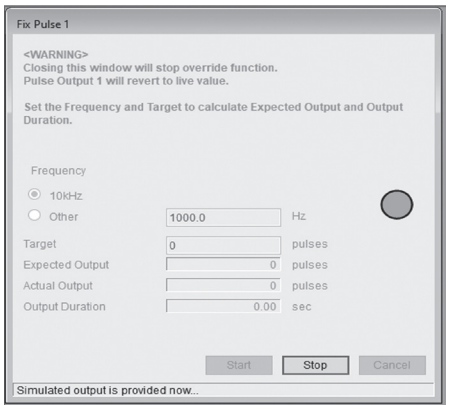


Fig.129

⑥ If the output is executed with the number of pulses being specified in "Target," the screen shown in Figure 130 appears after the output is completed.
"Actual Output" is the actual number of pulses output. It may differ from "Expected Output" but it is not abnormal.

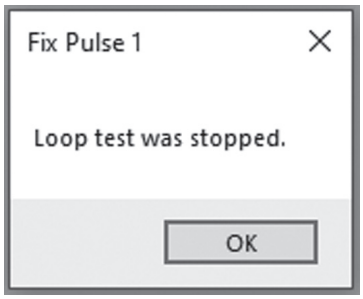


Fig.130

⑦ Clicking the "OK" button would return the interface to the window shown in Fig. 127, so click the "Cancel" button to exit "Fix Pulse".

3.7.2.4 Pulse output 2 loop test (Fix Pulse 2)

The pulse output 2 loop test can be executed by following the same procedures as described in section 3.7.2.3 "Fix Pulse 1", steps ① to ⑥ .

3.7.2.5 Status output loop test (Fix Status output)

This puts status output into a simulated output state, and conducts a loop test on the output line.
Since this creates simulated output regardless of the process state, if the flowmeter's output is used to control valves or other such parts, then for the sake of safety, change the control loop to manual control so that the control loop is not influenced by the flowmeter's output.

① When "Diagnosis/Service (T)" > "Loop test" > "Fix Status output" in the menu are clicked, a message box (Figure 131) appears. Then, after confirming that the process control loop has been switched to manual, click the "OK" button.

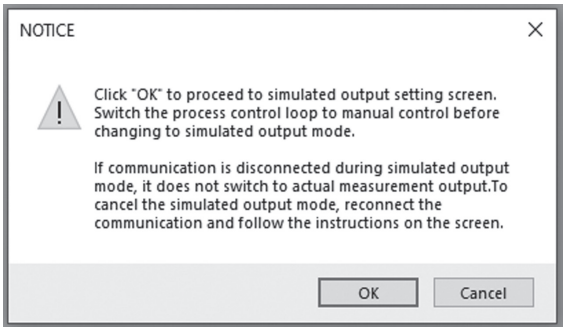


Fig.131

② The following window will be displayed (Fig. 132). Select either "ON" or "OFF" for the simulated output state, and then click the "Start" button.

Fig.132

③ Click the "Start" button to display a message box (Fig. 133). Click the "OK" button to start "Fix Status output".
Click the "Cancel" button to return to the window shown in Fig. 132.

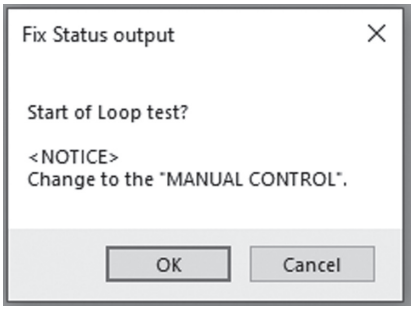


Fig.133

④ Click the "OK" button to cause the simulated output state to be outputted. While the simulated output is being outputted, a message at the bottom of the window will indicate that the system is "creating simulated output", as shown in Fig. 134.
Click the "Stop" button to halt the simulated output.

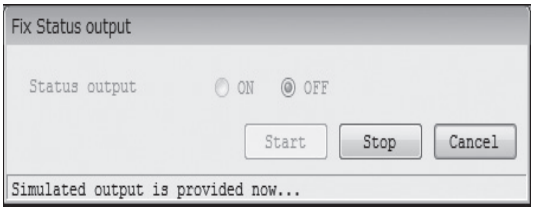


Fig.134

⑤ After the "Stop" button is clicked, a message box (Fig. 135) will be displayed. Click the "OK" button.

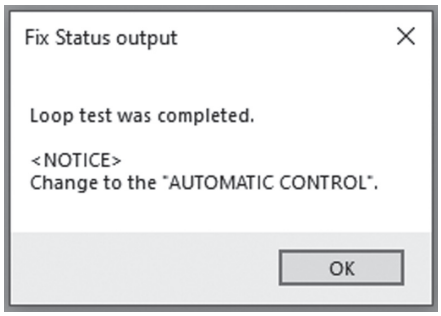


Fig.135

⑥ Clicking the "OK" button would return the interface to the window shown in Fig. 132, so click the "Cancel" button to exit "Fix Status output".

3.7.2.6 Status input loop test (Status input)

This displays the state of status input.
① Click "Diagnosis/Service (T)" > "Loop test" > "Status input" in the menu.

② A window will appear as shown in Fig. 136, displaying the current state of status input, either "Short" or "Open". After verifying the state, click the "Cancel" button and exit "Status input".

Fig.136

3.7.3 Transmitter adjustment function (Calibration)

This is an flowmeter transmitter adjustment function.

3.7.3.1 Automatic zero point adjustment (Auto zero)

This adjusts the zero point of the flowmeter transmitter, on the flowmeter side.

① Click on "Diagnosis/Service (T)" > "Calibration" > "Auto zero" in the menu.

② The following window will be displayed (Fig. 137). Click the "OK" button after completely stopping the fluid.

Fig.137

③ Click the "OK" button to display a message box (Fig. 138).

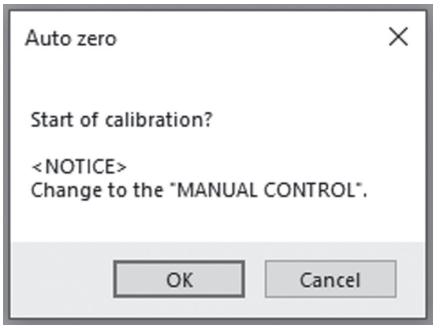


Fig.138

④ Click the "OK" button to adjust the zero point. While this adjustment is occurring, a message at the bottom of the window will indicate that the system is "Adjusting. Please wait", as shown in Fig. 139.

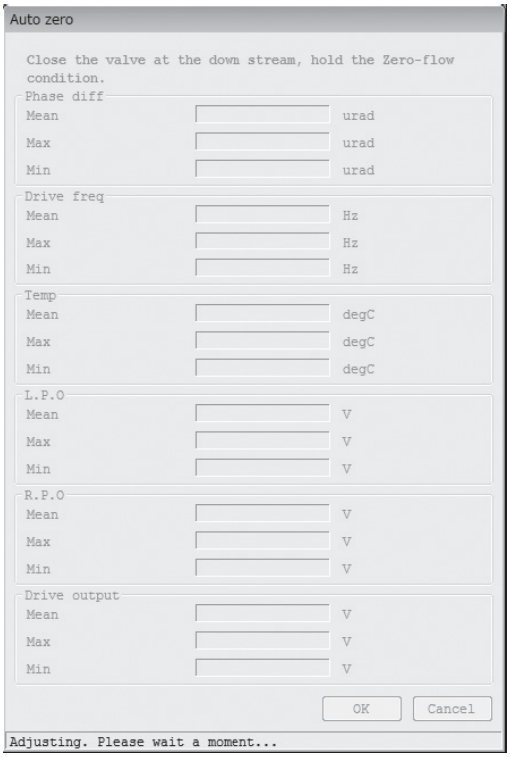


Fig.139

⑤ Click "OK" to execute the zero point adjustment, then click "OK" again in the message box (Fig. 140) displayed when adjustment is complete to exit automatic zero point adjustment.
The results are displayed as shown in Fig. 142.

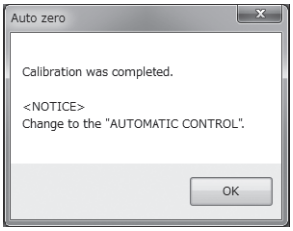


Fig.140

⚠ CAUTION

If the zero-point adjustment fails, the screen shown in Fig. 141 appears and the "Auto Zero Failed" error occurs.
Review the installation environment and fluid conditions, and perform the zero-point adjustment again.
When the zero-point adjustment is completed, the "Auto Zero Failed" error status will be resolved.

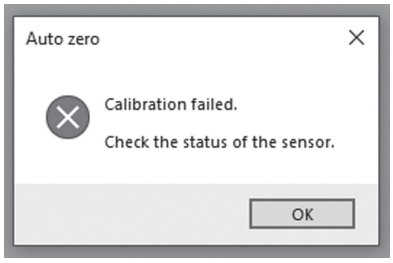


Fig.141

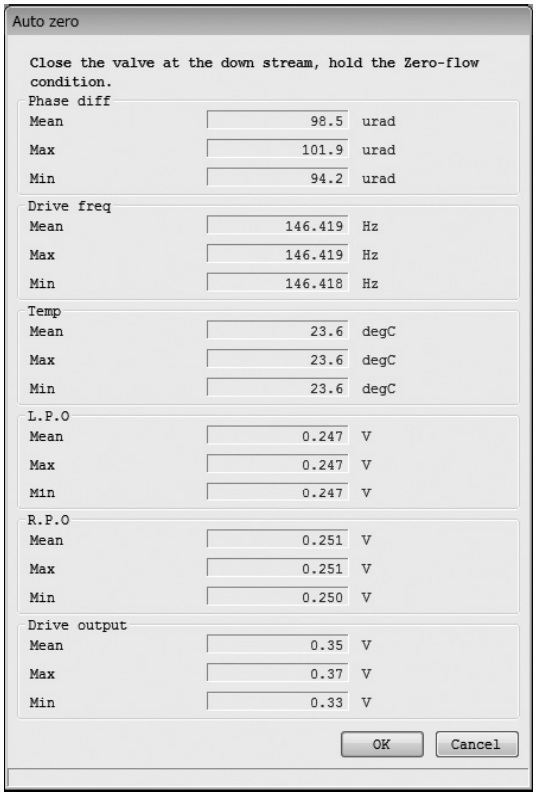


Fig.142

⑥ Click the "OK" button to return to the window shown in Fig. 142, then click the "Cancel" button to exit "Autozero".

⚠ CAUTION

Adjust the zero point when the temperature of the process fluid is stable at the temperature at which it will be used.
Also, the sensor unit's internal process fluid must be in a completely halted state, or it will not be possible to accurately adjust the zero point adjustment.

3.7.3.2 Density calibration

3.7.3.2.1 Two-point Density Calibration

Calibrates density measurement with air and water (liquid).
Density calibration requires a liquid of known density.

This product can be used in a state at the time of factory shipment, so usually no calibration is required.

① Click "Diagnosis/Service (T)" > "Calibration" > "Density calibration" > "2 point Density calibration" in the menu.
② The screen shown in Fig. 143 opens.
Calibrate the calibration value [fa20kd] of air at 20°C in the item of "Air." (The density of air is fixed at 0.0012 g/ml.) Fill the sensor with air and execute "Calibration" to enter [fa20kd].
If the frequency and temperature are known in advance, enter the values in the items of "Frequency" and "Temperature" and execute "Apply" to enter the calculated value of [fa20kd].
When "Download" is executed, the calibration value is written to the transmitter.
③ Calibrate the calibration value [fw20] of liquid at 20°C in the item of "Water."
Fill the sensor with water (or liquid of known density), and enter the density of the liquid at the current temperature. Execute "Calibration" to enter the calibration value [fw20] and the density [Density (Water)] of the liquid, and the temperature [Calibration temperature] and the frequency [Calibration frequency] at the time of calibration.
If the frequency and temperature are known in advance, enter the values in the items of "Frequency" and "Temperature" and execute "Apply" to enter the value for [fw20] calculated from the entered values.
When "Download" is executed, the calibration value is written to the transmitter.

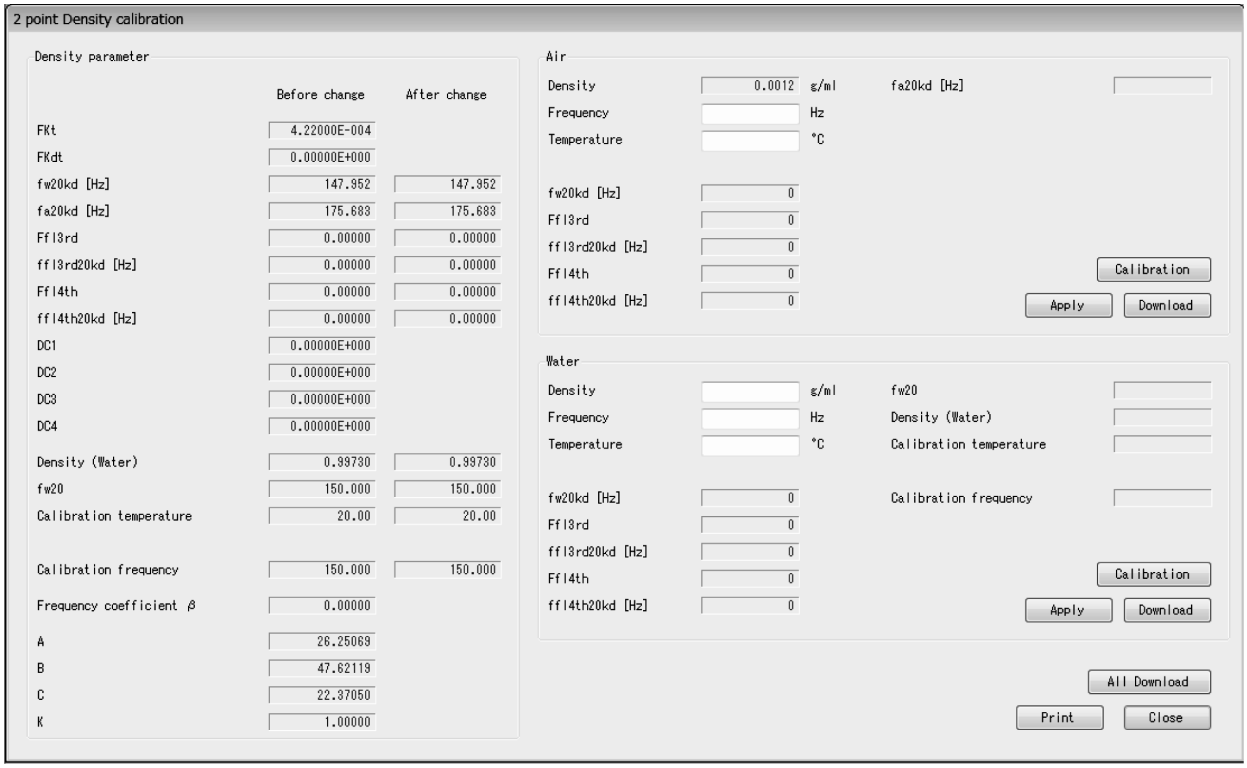


Fig.143

3.7.4 Analog output adjustment (Trim Analog)

This adjusts the output value of the flowmeter transmitter's analog output.
(The analog output has been adjusted at the time of shipment, so usually no adjustment is required.)
This function is for adjusting the values by outputting analog values equivalent to 4mA and 20mA regardless of the processing state. If the flowmeter's output is used to control valves or other such parts, then for the sake of safety, change the control loop to manual control so that the control loop is not influenced by the flowmeter's output.

3.7.4.1 Analog output 1 adjustment (Trim Analog 1)

This adjusts the output value of the flowmeter transmitter's analog output 1.

① When "Diagnosis/Service (T)" > "Trim Analog" > "Trim Analog 1" in the menu are clicked, a message box (Fig. 144) appears. Then, after confirming that the process control loop has been switched to manual, click the "OK" button.

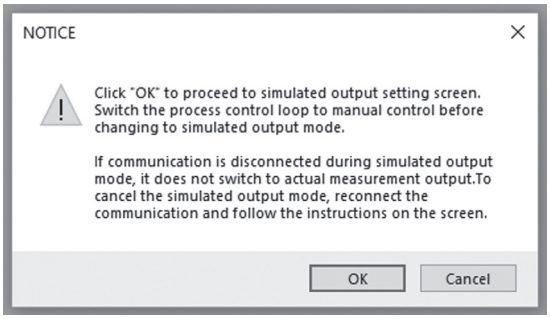


Fig.144

② The following window will be displayed after the "OK" button is clicked (Fig. 145). Select the scale from 4 to 20mA for adjusting analog 1, or select another scale (Other scale), then click the "OK" button.

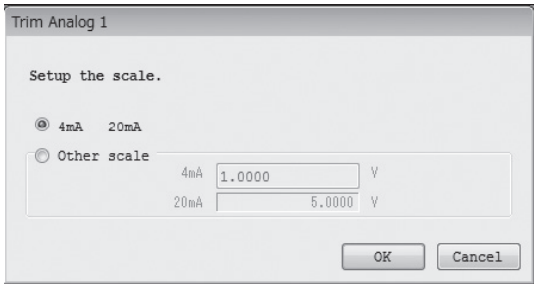


Fig.145

When the 4 to 20mA scale is used for adjustment, a standard ammeter is inserted into the analog output 1 output loop, and adjustment follows the method described in steps ④ to ⑥ .
When another scale is used, load resistance is inserted into the analog output 1 output loop, and adjustment follows the method described in steps ⑧ to ⑩ (this description covers the situation where R_L=250 ohms will be inserted, with adjustment to both ends of the voltage value scale of 1 to 5V).

③ A message box (Fig. 146) will be displayed. Click the "OK" button to adjust analog output 1.

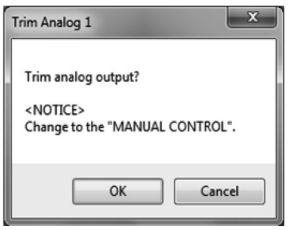


Fig.146

④ Select "4mA to 20mA" from the window shown in Fig. 147 and click the "OK" button to display the window shown in Fig. 145. Select whether to adjust 4mA or 20mA. This description assumes that 4mA will be adjusted first, followed by 20mA.
Input the value reading currently output on the ammeter and click the "OK" button.

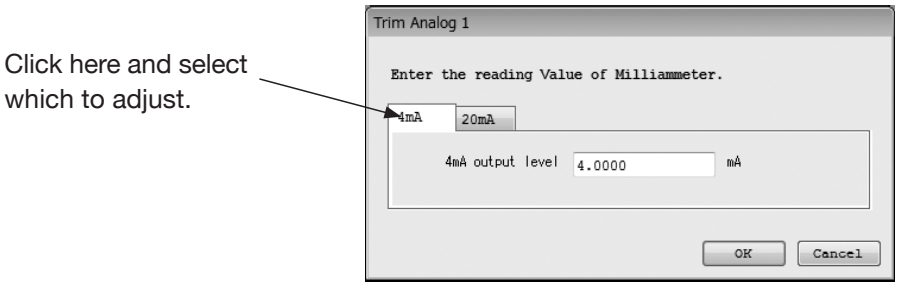


Fig.147

Once the value reading is sent, the transmitter will automatically make adjustments so that the output becomes 4mA. Verify that the connected ammeter indicates 4mA.
If another adjustment is necessary, input the value reading of the ammeter into this window again, and click the "OK" button.

⑤ To adjust 20mA, click the 20mA side of the window shown in Fig. 147, and adjust until the connected ammeter indicates 20mA, in the same was as with the 4mA adjustment.

⑥ Click the "Cancel" button to exit analog output value adjustment. Click the "OK" button when the "Adjustment is finished" message box appears as shown in Fig. 148.

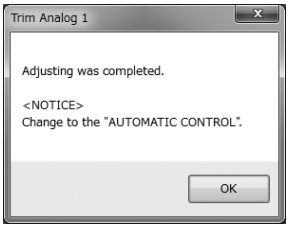


Fig.148

⑦ Click the "Cancel" button to halt adjustment in progress, and follow the instructions that appear.

⑧ When "Other scale" is selected in the window shown in Fig. 145, another scale can be inputted as shown in Fig. 149. When an analog value equivalent to 4mA output is inputted into the first field (the 4mA side), then a corresponding value is automatically inputted into the second field (the 20mA side).

There is no need to input a value into the second field. Inputting into the first field causes a value to be inputted into the second field as well.

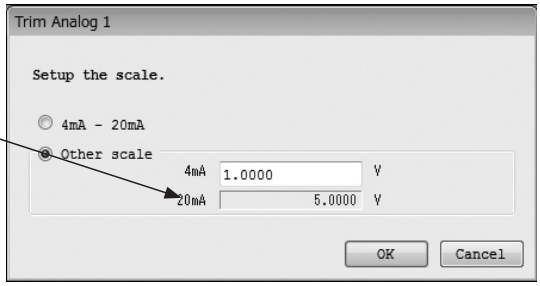


Fig.149

Analog output can be adjusted here for the 1 to 5V scale.
Click the "OK" button to start the adjustment. Connect a meter (standard voltmeter) to both ends of the load resistance RL.

⑨ Select the 4mA side or the 20mA side for adjustment from the window that appears, as shown in Fig. 150. This description assumes that 4mA will be adjusted first, followed by 20mA.
Input the value reading currently output on the meter and click the "OK" button.

Click here and select which to adjust.

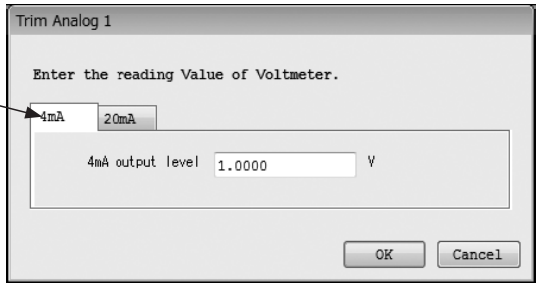


Fig.150

When a value reading is sent, the transmitter will make adjustments so that the output automatically becomes 4mA. Verify that the connected meter indicates 1V.
If another adjustment is necessary, input the value reading of the meter into this window again, and click the "OK" button.

⑩ To adjust 20mA, click the 20mA side of the window shown in Fig. 140, and adjust until the connected meter indicates 5V, in the same was as with the 4mA adjustment.

⑪ Click the "Cancel" button to exit analog output value adjustment. Click the "OK" button when the "Adjustment is finished" message box appears as shown in Fig. 138.

⑫ Click the "Cancel" button to halt adjustment in progress, and follow the instructions that appear.

3.7.4.2 Analog output 2 adjustment (Trim Analog 2)
This adjusts the output value of the flowmeter transmitter's analog output 2. Analog output 2 can be adjusted by following the same method as described in section 3.7.4.1 "Trim Analog 1", steps ① to ⑩ .

3.7.5 Cumulative total display and control (Counter/Totalizer control)
Use this for functions such as displaying the cumulative totals, and starting, stopping, and resetting the count.

3.7.5.1 Cumulative total 1 display and control (Counter/Totalizer control 1)

① Click "Diagnosis/Service (T)" > "Counter/Totalizer control" > "Counter/Totalizer control 1" in the menu.

② The following window will be displayed (Fig. 151).

Fig.151

③ Cumulative totals include "Totalizer 1 Foward", "Totalizer 1 Reverse", "Counter 1", and "Totalizer 1".

- "Totalizer 1 Foward": This count is incremented whenever the flow goes in the direction set with "Flow direction"
  (the positive direction).
- "Totalizer 1 Reverse": This count is incremented whenever the flow goes in the reverse direction, if "Bi direction"
  is selected for "Status output func".
- "Counter 1": "Counter 1=Totalizer 1 Foward – Totalizer 1 Reverse".
- "Totalizer 1": "Totalizer" is the total cumulative flow, which is calculated by multiplying the total count by the amount of flow in a single count.
  Also note that if "Flow direction" is "Forward", the arrow on the flowmeter will be treated as the "positive direction", and if it is "Reverse", then the opposite direction of the arrow on the flowmeter will be treated as the "positive direction".

④ This window can be used to "Start", "Stop", or "Reset" the cumulative total. Note that "Start", "Stop", and "Reset" only affect the cumulative total, and do not work on the pulse output.
Selecting "Reset" will cause the window to appear as shown in Fig. 152.

Fig.152

⑤ To close the cumulative total 1 display and control window, click "Cancel".

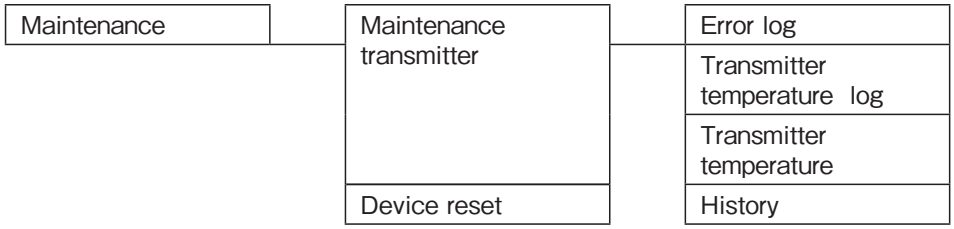
3.7.5.2 Cumulative total 2 display and control (Counter/Totalizer control 2)

Use this for functions such as displaying, starting the count, stopping the count, and resetting the count of cumulative total 2. Use the same method as described in section 3.7.5.1 "Counter/Totalizer 1", steps ① to ⑤ .

※ Some models do not have the function of Totalizer 2.

3.8 Menu: Maintenance

The "Maintenance (M)" menu can be used to display the current value and a log of the transmitter's internal temperature, as well as a log of errors that occur during operation.
It is also possible to display the length of time the transmitter has been running, display elapsed time, make settings, and so on.
The actual screen is as shown in Fig. 153.
Software reset of the transmitter is also possible through communication, but do not use this function other than maintenance purposes.



Maintenance Item Tree

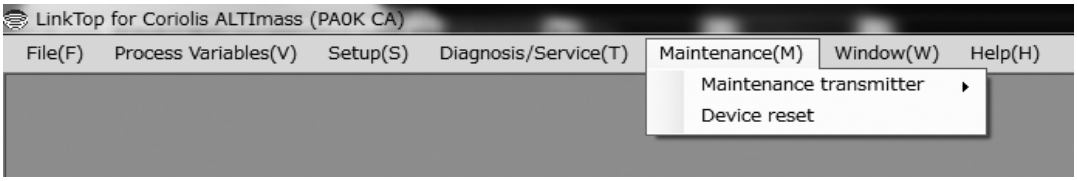


Fig.153

3.8.1 Log and transmitter internal temperature display (Maintenance transmitter)

3.8.1.1 Error log display (Error log)

① Click on "Maintenance (M)" >"Maintenance transmitter" > "Error log" in the menu.

② The following window will be displayed (Fig. 154).
Error log will be automatically displayed in chronological order.
To stop error log display, click "Cancel".

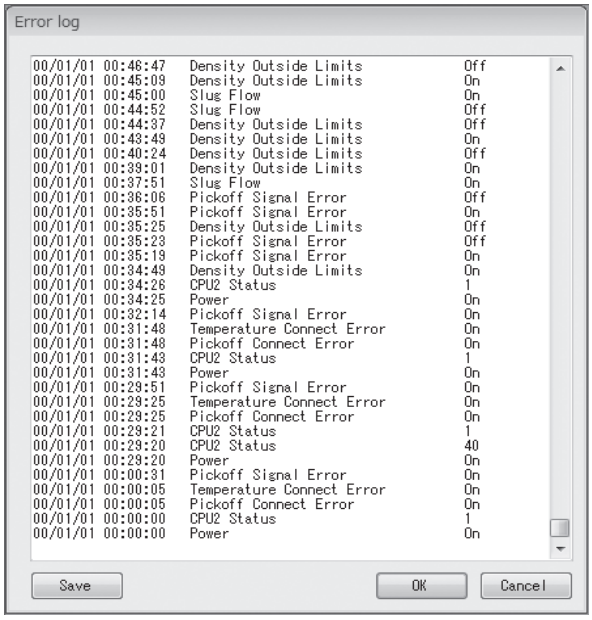


Fig.154

③ Click "OK" to reload the most recent log. Then a message box (Fig. 155) will be displaed.

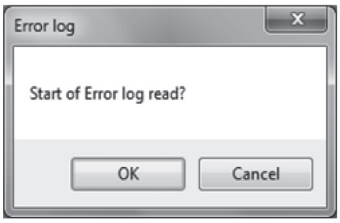


Fig.155

④ It is also possible to save a log to a file here. Click the "Save" button to display Fig. 156, specify the save location and file name, and then click "OK" to create a CSV file, completing the save process.

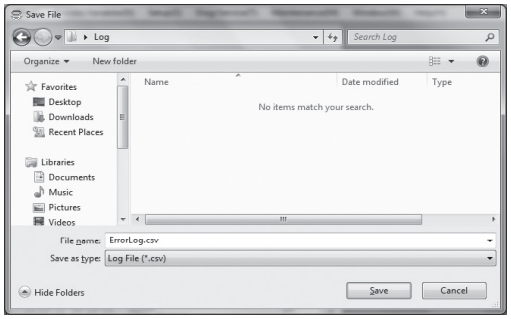


Fig.156

⑤ Click "Cancel" to close the "Error log" window.

3.8.1.2 Transmitter internal temperature log display (Transmitter temperature log)

① Click on "Maintenance (M)" >"Maintenance transmitter" > "Transmitter temperature log" in the menu.

② The following window will be displayed (Fig. 157).

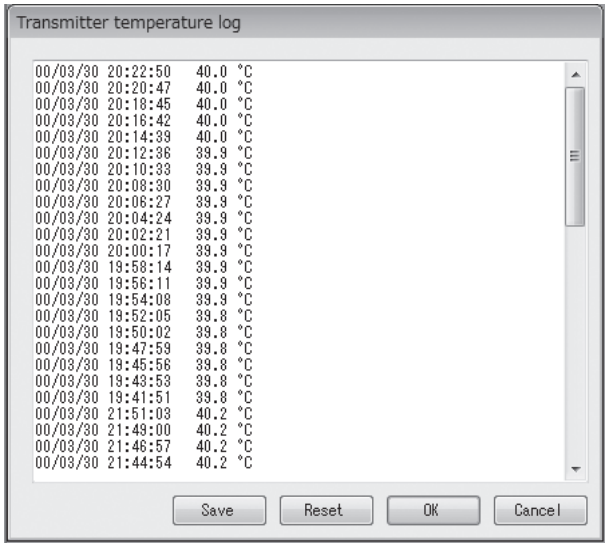


Fig.157

③ The converter‘s internal temperature is saved to the log approximately once every 2 minutes, and log entries begin to be repeatedly overwritten after 64 entries are saved. If the transmitter’s internal temperature exceeds 90℃ , then an "Transmitter temperature alarm" will occur, and after 32 log entries are saved from that point, the saving of logs will halt.
To restore the system from this state, click the "Reset" button to display a message box (Fig. 158).

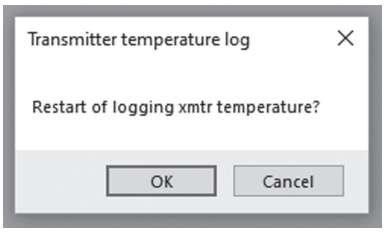


Fig.158

④ Click the "OK" button here to display a message box (Fig. 159) and resume the function for saving log entries.

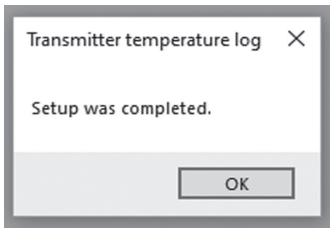


Fig.159

⑤ Also, to display the most recent log entry, click the "OK" button in the screen shown in Fig. 157 to display a message box (Fig. 160).

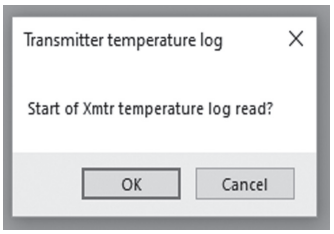


Fig.160

⑥ Click the "OK" button again to display the most recent log entry.

⑦ It is also possible to save a log to a file here. Click the "Save" button to display Fig. 161, specify the save location and file name, and then click "OK" to create a CSV file, completing the save process.

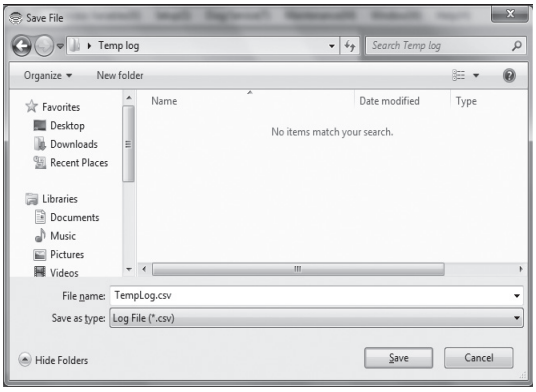


Fig.161

⑧ Click "Cancel" to close the "Transmitter temperature log" window.

3.8.1.3 Ttransmitter internal temperature display (Transmitter temperature)

①Click on "Maintenance (M)" >"Maintenance transmitter" > "Transmitter temperature" in the menu.

② A window such as the one shown in Fig. 162 will appear, displaying the transmitter's current internal temperature. After verifying the temperature, click the "Cancel" button to exit "Transmitter temperature".

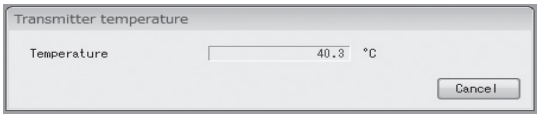


Fig.162

3.8.1.4 Transmitter elapsed time display (History)

① Click on "Maintenance (M)" >"Maintenance transmitter" > "History" in the menu.

② The following window will be displayed (Fig. 163).

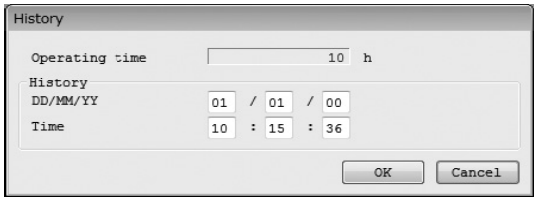


Fig.163

③ It is possible to display the total running time of the transmitter "Operating Time", as well as set the "History" setting, including second, minute, hour, day, month, and year. Also note that the changed date and other values are reflected in the log data. Note, however, that time stops while the power is off, so a discrepancy will arise.

④ After the setting is complete, click the "OK" button to display a message box (Fig. 164).

Fig.164

⑤ Click "OK" to change the settings to the selected values, and then click the "OK" button in the displayed message box (Fig. 165) to complete the setting process.

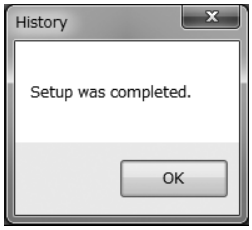


Fig.165

⑥ Click the "OK" button to return to the item input window, then click the "Cancel" button to exit "History".

To cancel the settings, click the "Cancel" button in any step from ② to ④ .

3.8.2 Device Reset

When "Device reset" is executed, the transmitter can be restarted.
This function may be used to eliminate abnormal conditions.

① Click "Maintenance (M)" > "Device reset" in the menu.

② A window (Fig. 166) will appear.

Fig.166

③ A message box (Fig. 167) will appear as you click "OK". To exit "Device reset", click "Cancel".

④ To start device reset, click "OK". To complete device reset, click "OK" on a message box (Fig. 168). To abort device reset process, click "Cancel".

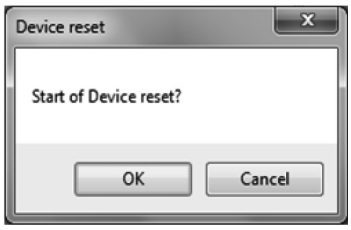


Fig.167

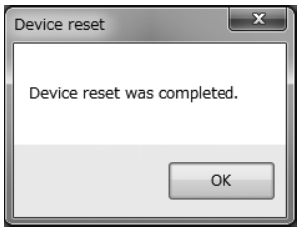


Fig.168

⑤ Clicking "OK" on a window (Fig. 168) brings back the display to ② . To exit device reset, click "Cancel".

3.9 Menu: Window

The "Window" menu can be used to arrange the currently displayed windows.
The options for arranging windows are "Cascade", "Tile Horizontal", and "Tile Vertical".
For instance, assume that multiple windows are being displayed on top of each other, as shown in Fig. 169.

① Select "Cascade" to display these windows stacked, as shown in Fig. 170.

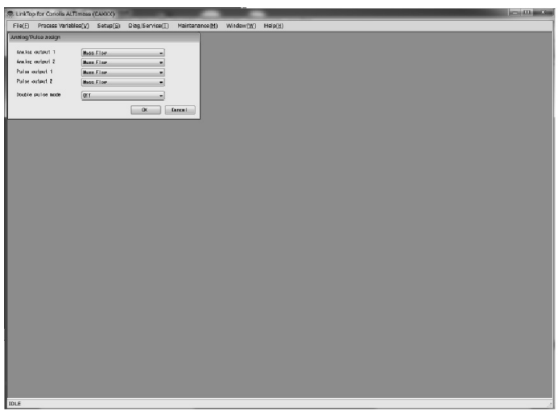


Fig.169

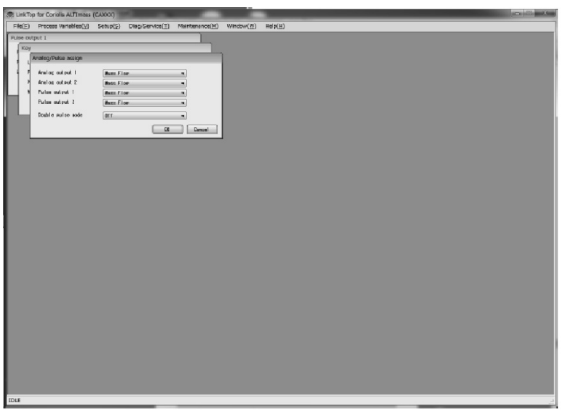


Fig.170

② Select "Tile Horizontal" to display these windows lined up vertically, as shown in Fig. 171.

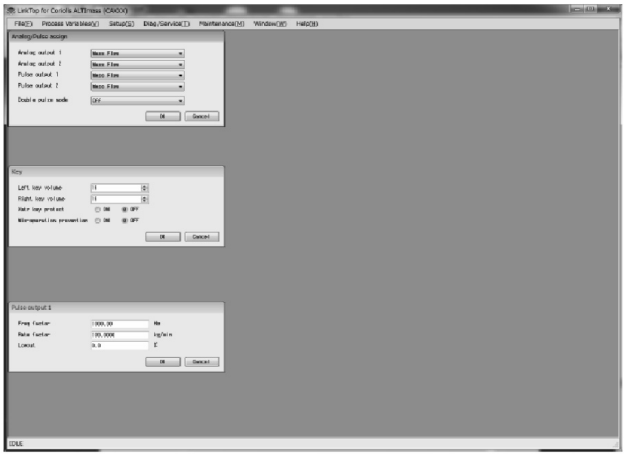


Fig.171

③ Select "Tile Vertical" to display these windows lined up horizontally, as shown in Fig. 172.

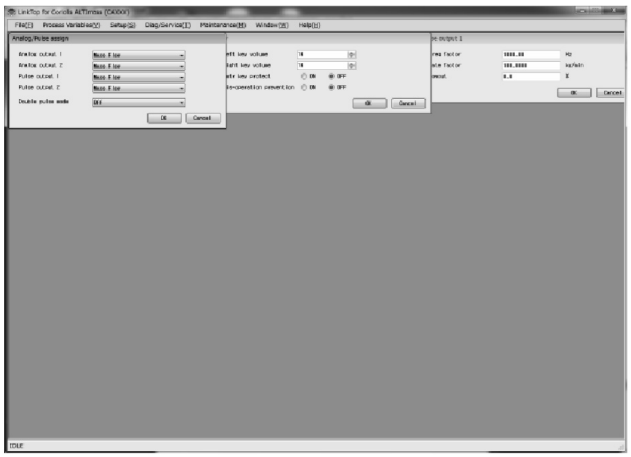


Fig.172

3.10 Menu: File

The "File" menu can be used to connect communications (refer to section 3.2 "Starting and Connecting LinkTop), to disconnect (refer to section 3.3 "Ending the Connection", and 3.4 "Exiting LinkTop), as well as to set ports (refer to section 2.3 "Installing the Driver"), to create a flowmeter transmitter parameter database, and print parameters. This section describes the database and printing features.

3.10.1 Database

The various parameters, transmitter information, and so on inputted through the "Setup" menu (described in section 3.6) are stored in a database. This can be saved on a hard disk, USB memory, or other type of storage medium.
Setting values can also be downloaded to the flowmeter transmitter.

3.10.1.1 Opening files

It is possible to load data from a saved file.
① Click "File (F)" > "Database (F)"> "Open File (O)" in the menu.

② The common dialog box (Fig. 173) appears. Select the disk and folder which have the file to be opened from the drop-down list.

③ Select the file to open from the displayed files. Verify the "File Name (N)" and then click the "Open (O)" button. Click the "Cancel" button to exit without opening a file.

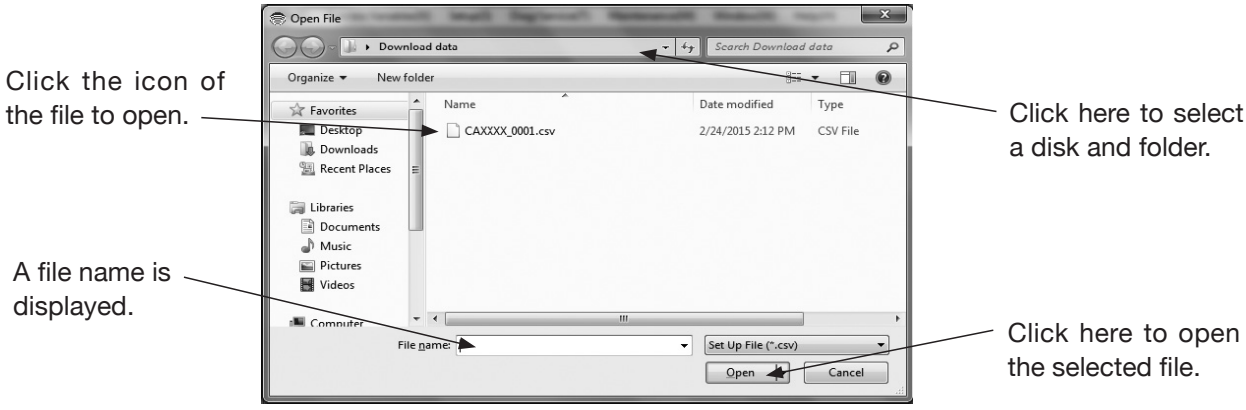


Fig.173

④ Select the file to open from the displayed files. Verify the "File Name (N)" and then click the "Open (O)" button. Click the "Cancel" button to exit without opening a file.

⑤ The selected file can be printed. For more information on printing, refer to section 3.10.2 "Printing".

3.10.1.2 Downloading

This function is used to send all the parameters from a selected file to the flowmeter transmitter. This makes it possible to use the same parameters to set up another flowmeter transmitter (to copy settings).

① To download, verify the parameters in the current flowmeter to ensure that it is the right flowmeter. To save parameters, follow the instructions in section 3.10.2 "Print and save file".

② After verifying the flowmeter, load the data to be downloaded.

③ Click "File (F)" > "Database (F)" > "Download (D)" in the menu.

④ The standard dialog will be displayed (Fig. 174). Select the disk and folder where the file to be downloaded is stored from the drop-down list.

⑤ Select the file to download by clicking it. Verify the "File Name (N)" and click the "Open (O)" button. To exit without downloading the file, click the "Cancel" button.

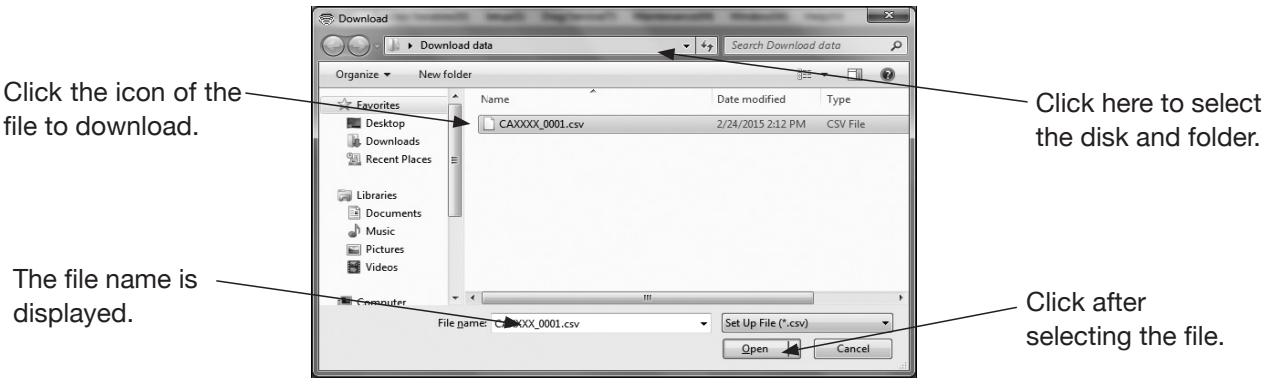


Fig.174

⑥ A message box (Fig. 175) will be displayed. Click the "OK" button to download the data to the transmitter.
To not download the data, click the "Cancel" button.

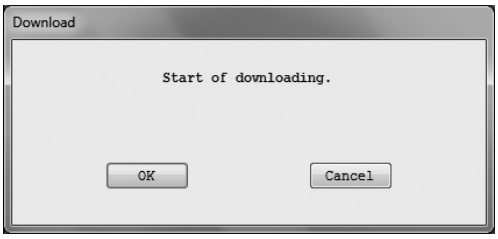


Fig.175

⑦ Once the data is downloaded, the various setting values will be modified, and this will change the output values from the flowmeter as well. If the flowmeter's output is used to control valves or other such parts, then for the sake of safety, change the control loop to manual control so that the control loop is not influenced by the flowmeter's output.

⑧ After the "OK" button is clicked and the download starts, a message box (Fig. 176) will be displayed. It is possible to verify the state of download progress by watching the progress bar in the middle of the window.

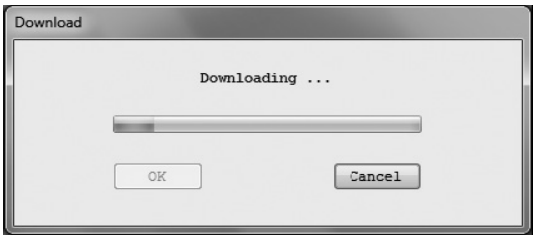


Fig.176

⑨ Once the download is complete, a message box (Fig. 177) will be displayed. Click the "OK" button.

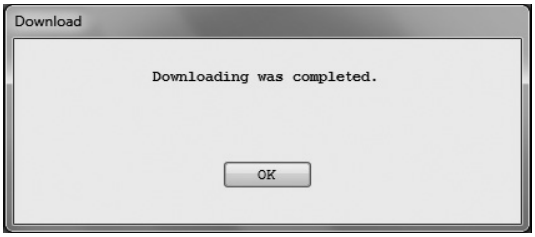


Fig.177

⑩ Confirm the downloaded contents.
Confirm that the settings have been changed to the downloaded contents according to "3.6 Menu: Setup (Settings)."

3.10.2 Print and save file

The setting parameter sheet for the transmitter can be printed and the parameters can be saved as a CSV file.

① Click on "File (F)" > "Print and save file (P)" in the menu.
② A message box (Fig. 178) appears. Click "OK" to continue, or click "Cancel" to stop.

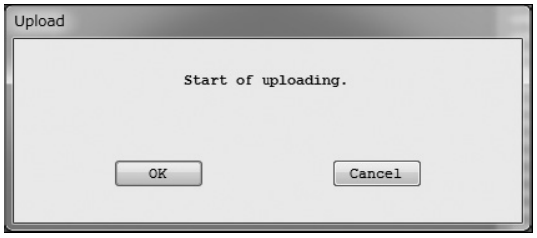


Fig.178

③ By clicking "OK" on the message box (Fig. 178), uploading of every parameter will begin (Fig. 179). Click "Cancel" to stop uploading.

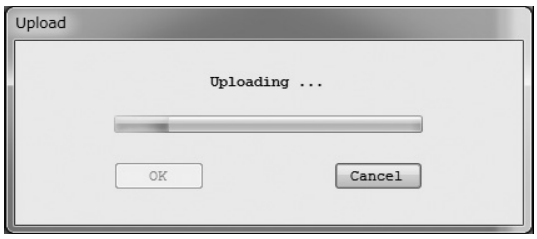


Fig.179

④ The following window will be displayed (Fig. 180). Verify the various parameter values here, and either click the "Print" button to print, or the "Save" button to save.

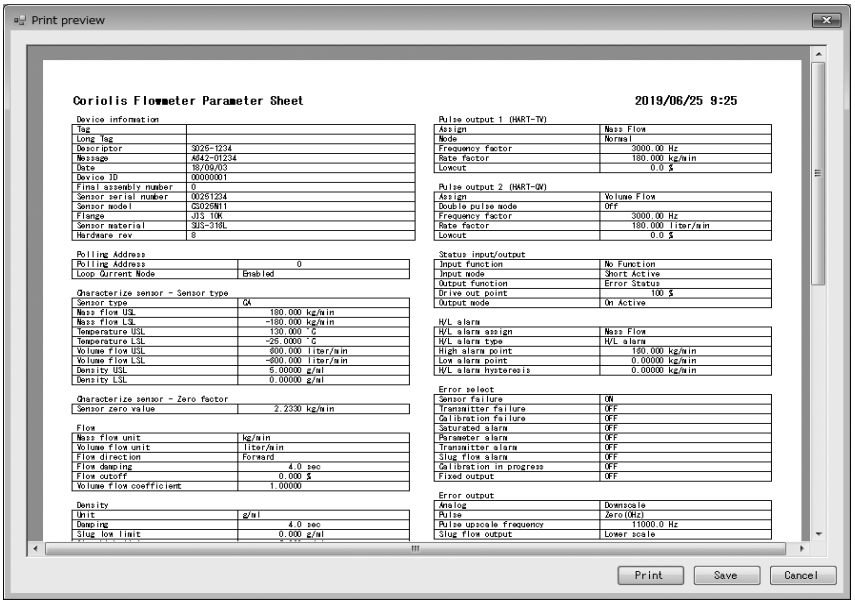


Fig.180

⑤ When the "Save" button is clicked, a common dialog as shown in Figure 181 appears. Specify the place to save the file and the file name to save the file.

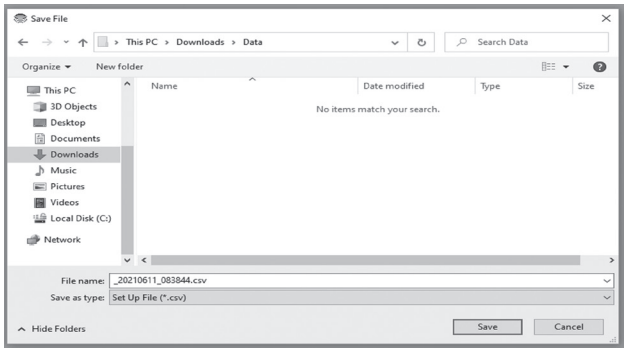


Fig.181

⑥ When the "Print" button is clicked, a print setting screen opens. After completing the setting, click "OK" to print the parameter sheet as shown in Figure 182.

Coriolis Flowmeter Parameter Sheet 2020/08/03 15:26

Device information

Tag	
Long Tag	
Descriptor	
Message	
Date	00/00/00
Device ID	00000001
Final assembly number	0
Sensor serial number	00000000
Sensor model	
Flange	JIS 10K
Sensor material	SUS-316L
Device type code	0
Hardware rev	8

Polling Address

Polling Address	0
Loop Current Mode	Enabled

Characterize sensor - Sensor type

Sensor type	CA
Mass flow USL	360.000 kg/min
Mass flow LSL	-360.000 kg/min
Temperature USL	200.000 °C
Temperature LSL	-200.000 °C
Volume flow USL	1200.00 liter/min
Volume flow LSL	-1200.00 liter/min
Density USL	5.00000 g/ml
Density LSL	0.00000 g/ml

Characterize sensor - Zero factor

Sensor zero value	0.0000 kg/min

Flow

Mass flow unit	kg/min
Volume flow unit	liter/min
Flow direction	Forward
Flow damping	0.8 sec
Flow cutoff	0.000 %
Volume flow coefficient	1.00000

Density

Unit	g/ml
Damping	4.0 sec
Slug low limit	0.000 g/ml
Slug high limit	10.000 g/ml
Slug duration	0 sec
Compensation	OFF
Standard temperature	20.00 °C
Expansion coefficient	0.00024
Settled density	OFF
Density value	1.00000 g/ml

Temperature

Unit	°C
Damping	4.0 sec

Analog output 1 (HART-PV)

Assign	Mass Flow
Mode	Normal
URV	180.000 kg/min
LRV	0.00000 kg/min
Lowcut	0.0 %
Added damping	0.0 sec
Upper rate limit	110.0 %
Lower rate limit	-10.0 %

Analog output 2 (HART-SV)

Assign	Mass Flow
Mode	Normal
URV	180.000 kg/min
LRV	0.00000 kg/min
Lowcut	0.0 %
Added damping	0.0 sec
Upper rate limit	110.0 %
Lower rate limit	-10.0 %

Pulse output 1 (HART-TV)

Assign	Mass Flow
Mode	Normal
Frequency factor	1000.00 Hz
Rate factor	180.000 kg/min
Lowcut	0.0 %

Pulse output 2 (HART-QV)

Assign	Mass Flow
Double pulse mode	Off
Frequency factor	1000.00 Hz
Rate factor	180.000 kg/min
Lowcut	0.0 %

Status input/output

Input function	No Function
Input mode	Short Active
Output function	No Function
Drive out point	100 %
Output mode	Off Active

H/L alarm

H/L alarm assign	Mass Flow
H/L alarm type	High alarm
High alarm point	0.00000 kg/min
Low alarm point	0.00000 kg/min
H/L alarm hysteresis	0.00000 kg/min

Error select

Sensor failure	OFF
Transmitter failure	OFF
Calibration failure	OFF
Saturated alarm	OFF
Parameter alarm	OFF
Transmitter alarm	OFF
Slug flow alarm	OFF
Calibration in progress	OFF
Fixed output	OFF

Error output

Analog	Downscale
Pulse	Zero(0Hz)
Pulse upscale frequency	----------
Slug flow output	----------

Characterize sensor - Flow parameters

SK20	56.05967 Hz*kg/h/urad
SKM	1.00000E+000
SKt	4.44000E-004
Calibration temperature	20.00 °C
Calibration temperature (Outer)	20.00 °C
Calibration frequency	150.000 Hz
SKdt	0.00000E+000
SKfa	0.00000E+000
SKfb	0.00000E+000
FKt	4.22000E-004
FKdt	0.00000E+000

Characterize sensor - Density parameters

Density (Water)	0.99740 g/ml
Calibration temperature	20.01 °C
Calibration temperature (Outer)	20.01 °C
Calibration frequency	150.001 Hz
Frequency coefficient β	0.00000E+000
A	26.25069
B	47.62119
C	22.37050
K	1.00000
fw20kd	147.953
fa20kd	175.684

Write protect

Write protect	Not write protected

Fig.182

3.11 Menu: Help

In the "Help" menu, you can open the version confirmation window and the operation manual window. When "Manual" is clicked, the operation manual window as shown in Figure 183 appears and detailed explanations of each window can be confirmed.

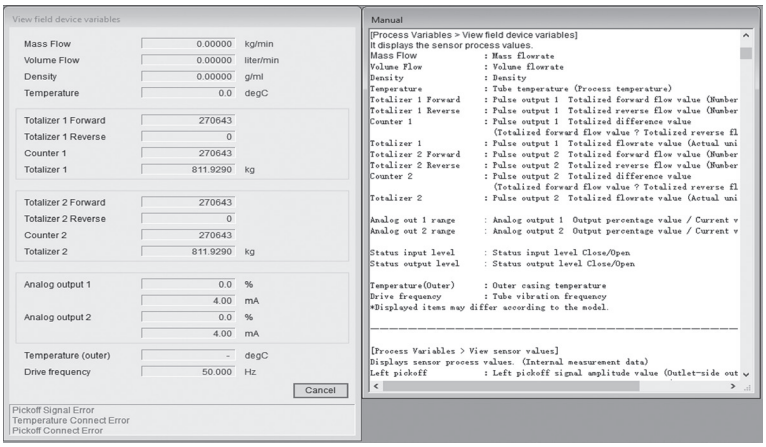


Fig.183

3.12 Troubleshooting

3.12.1 If there is no response

If there is a problem preventing communication between the PC and flowmeter when the flowmeter is connected as described in section 3.2 "Starting and Connecting LinkTop", or while this application is being used, then a message box will appear as shown in Fig. 184. Click the "OK" button if this happens, then verify the following and try reconnecting from the beginning as described in section 3.2 "Starting and Connecting LinkTop":

・Is the smart communication unit's probe or unit disconnected?
・Is the flowmeter transmitter receiving power?

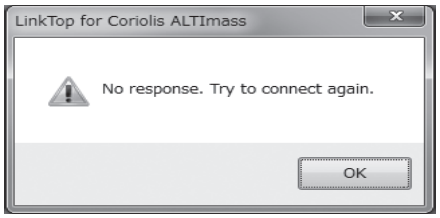


Fig.184

3.12.2 If it is not possible to connect to the flowmeter

If, when the flowmeter is connected as described in section 3.2 "Starting and Connecting LinkTop", a transmitter not supported by this application software is connected, then the message box shown in Fig. 188 will appear. Click the "OK" button, then verify the following and try reconnecting from the beginning as described in section 3.2 "Starting and Connecting LinkTop":

・Does the connected transmitter match the type of transmitter supported by the application software that is running?

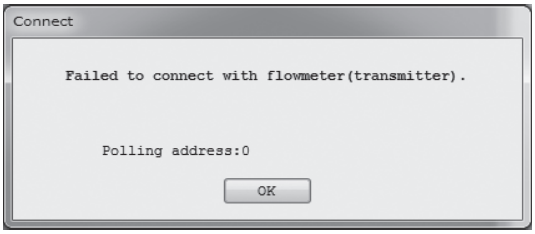


Fig.185

3.12.3 Input errors

If incorrect data is inputted into the "Menu: Setup (Settings) or the "Menu: Diagnosis/Service (Checking and Adjustment)", and an attempt is made to communicate with the flowmeter transmitter, then an error box will appear on the desktop indicating an "input error ". Also note that there are two types of input errors; one where it is determined that there is an error in the setting in LinkTop, and one where the data is sent to the flowmeter transmitter, and the error is in the setting on the transmitter side.

① If a mistake is discovered in LinkTop settings after the setting items are inputted and the "OK" button is clicked, then the error box shown in Fig. 186 will be displayed. Click the "OK" button and correct the mistaken input.

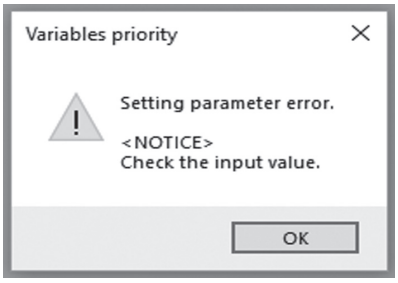


Fig.186

② If a mistake is discovered in settings on the transmitter side after the setting items are inputted and the "OK" button is clicked, then the error box shown in Fig. 187 will be displayed. Click the "OK" button and correct the mistaken input. Also note that if an input error is discovered on the transmitter's side, then a message will be displayed with error details, so use this as a guide when correcting the input.

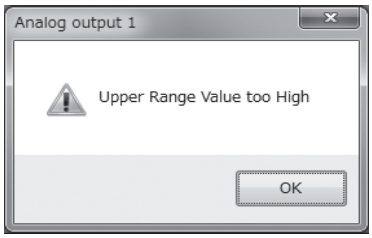


Fig.187

3.12.4 Error and status display list

Error List

Error Type	Name	Details	Resolution Conditions
Saturated Alarm	Analog Output 1 Saturated	Value of analog output 1 has exceeded possible output range (-10% to 110%) and unable to output properly	Measurement is out of range. Control selected measurement so that the measurement falls within the range between lower limit and upper limit for analog output or modify the range setting. (Refer to section “Analog Output Function” on the instruction manual of the flowmeter.)
	Analog Output 2 Saturated	Value of analog output 2 has exceeded possible output range (-10% to 110%) and unable to output properly	
	Pulse Output 1 Saturated	Value of pulse output 1 is over 11KHz and unable to output properly	Selected instantaneous flow rate is exceeding full-scale flow rate of pulse output. Lower the instantaneous flow rate or increase full-scale flow rate setting. (Refer to section “Pulse Output Function” on the instruction manual of the flowmeter.)
	Pulse Output 2 Saturated	Value of pulse output 2 is over 11KHz and unable to output properly	
Sensor Failure	Drive Input Out of Range	Drive frequency is out of normal range and unable to measure properly	There may be an error in drive coil connection. Check the connection status of drive coil by self-diagnostic function. (Refer to section “Drive coil check” on the instruction manual of the flowmeter.)
	Scale Over	Mass flow or volumetric flow is over 110% of the maximum allowable range and possibly unable to measure properly	Mass flow or volumetric flow rate is bigger than the specified range. Make sure to operate within the maximum allowable range.
	Temperature Out of Range	Measured temperature is out of normal range and unable to measure properly	There may be an error with temperature sensor. Check the connection status of temperature sensor by self-diagnostic function. (Refer to section “Transmitter check” on the instruction manual of the flowmeter.)
	Density Outside Limit	Measured density is out of normal range (0 to 5[g/mL]), and unable to measure properly	Measured fluid may contain air bubbles. Check if air bubbles are entrapped in the fluid.
	Pickoff Signal Error	Pick-off signal voltage is out of normal range and unable to measure properly	There may be an error with pick-off sensor. Check the connection status of pick-off coil by self-diagnostic function. (Refer to section “Transmitter check” on the instruction manual of the flowmeter.)
	Temperature Connect Error	Unable to verify normal connection of the temperature sensor	There is an error with temperature sensor connection. Check the connection status of temperature sensor.
	Pickoff Connect Error	Unable to verify normal connection of the pick-off sensor	There is an error with pick-off coil connection. Check the connection status of pick-off coil.
	Drive Coil Error	Unable to verify normal connection of drive coil	There is an error in drive coil connection. Check the connection status of drive coil. (This error does not appear during measurement. To make sure the error is cleared, perform drive coil check by self-diagnostics.)

Error Type	Name	Details	Resolution Conditions
Transmitter Failure	EEPROM Error	Unable to operate due to parameter error	Malfunction of EEPROM is suspected. Please contact OVAL.
	Data Update Error	Error existent in internal data	Malfunction of transmitter is suspected. Please contact OVAL.
Parameter Alarm	Analog 1 Set Alarm	Parameter settings of analog output 1 or analog output 2 are under any of following conditions: • Upper limit＜Lower limit • Upper or lower limit＞max. acceptable setting • Upper or lower limit＜－max. acceptable setting	Verify parameters and make necessary changes to set proper values. (Refer to section “Analog Output Function” on the instruction manual of the flowmeter.)
	Analog 2 Set Alarm		
	H/L Alarm Point Set Alarm	Parameter settings of H/L Alarm (High Alarm Point or Low Alarm Point) are under any of following conditions: • High alarm point＜Low alarm point • High alarm point or Low alarm point＞max. acceptable setting • High alarm point or Low alarm point＜– max. acceptable setting	Verify parameters and make necessary changes to set proper values. (Refer to section “H/L Alarms Function” on the instruction manual of the flowmeter.)
Calibration Failure	Auto Zero Failed	Auto Zero adjusted value is out of normal range	Stabilize the flow condition and perform Zero adjustment again.
Slug Flow Alarm	Slug Flow Alarm	Certain period of time has passed since air bubbles are detected by slug flow detection	Air may be entrapped in measured fluid. Inspect fluid and process line for improper conditions.
Transmitter Alarm	Transmitter Temperature Alarm	Internal temperature of transmitter is abnormal (80℃)	Increasing temperature inside transmitter may shorten parts life. Take necessary measures to lower the ambient temperature.

Status List

Status Type	Name	Details	Resolution Conditions
Fixed Output	Analog Output 1 Fixed	Analog output 1 fixed output is in progress (※1)	Analog output 1 fixed output is complete
	Analog Output 2 Fixed	Analog output 2 fixed output is in progress (※1)	Analog output 2 fixed output is complete
	Pulse Output 1 Fixed	Pulse output 1 fixed output is in progress (※1)	Pulse output 1 fixed output is complete
	Pulse Output 2 Fixed	Pulse output 2 fixed output is in progress (※1)	Pulse output 2 fixed output is complete
	Status Output Fixed	Status output fixed output is in progress (※1)	0% Signal Lock from status input is complete
	0% Sig Lock	0% Signal Lock from status input is in progress (※1) (No pulse output with analog output clamped at 4mA)	0% Signal Lock from status input is complete
Calibration in Progress	Calibration in Progress	Auto Zero in progress	Auto Zero is complete
H/L Alarm	H/L Alarm Triggered	H/L Alarm triggered (See section “High/Low Alarm Function” on instruction manual for details.)	When following conditions are met: ・Something other than H/L Alarm is set for Status Output func ・High Alarm or H/L Alarm is set for H/L Alarm type, and measurement value set for H/L Alarm Assign is High Alarm point−H/L Alarm hys or below ・Low Alarm or H/L Alarm is set for H/L Alarm type, and measurement value set for H/L Alarm Assign is High Alarm point+H/L Alarm hys or above
Drive Out Alarm	Drive Out Alarm	Drive output is over the threshold	Drive output is under the threshold
Maintenance	Self Diagnosis	Self-diagnosis in progress	When following processes are complete: Self Diag−Transmitter condition Self Diag−LCD test
	Installation	Pipeline vibration check in progress	When following processes are complete: Installation−Static Installation−Dynamic
Transmitter Operation	Transmitter Operating−Time Over	Total run time has exceeded 100,000 hours. Malfunction and degradation of components are concerned. Transmitter replacement is recommended.	At master reset
	Transmitter Warm Up	Warmup in progress (at power-on)	20 minutes after power-on
	Power OK?	Poor power supply condition is suspected. (Short-duration power cycling has occurred several times.) While operation should not be affected by this status, verification of power supply is recommended.	20 minutes after the last power-on

➡ Note ※ 1. Simulated output is available regardless of alarm state.
(Certain types of errors disable the output, however.)

4. PRODUCT CODE EXPLANATION

Item	Product Code												Description
	①	②	③	④	⑤	⑥	–	⑦	⑧	⑨	⑩	⑪	⑫	
Mode	E	L	2	3	1	0	–							Smart Communication Unit
Power source								0						Always "0"
Applicable flowmeter (application software)									8					OVAL Coriolis Flowmeter ALTImass (PA0K Transmitter), (PA5K Transmitter) ALTImass Ⅱ (PA2K Transmitter), CoriMate Ⅱ Separate-type Model MT9411, MT9431, MT9630 (※1)
Language										0				Less application software ("0" in the 8th digit)
										J				Japanese (Japanese version OS)
										E				English (English version OS)
Interface											0			Less interface (application software only)
											1			Interface provided
Media (application software)												0		Less application software ("0" in the 8th digit)
												1		CD–ROM
												9		Other than the above
Reserve code													0	

➡ Note : ※1 You need different software for transmitters depending on their production periods. Please check the product code of the transmitter to choose the corresponding EL2310 in the table below.

	Product code	Corresponding EL2310
MT9603	MT9603-□□□□□□A	EL2310-05□□□□
	MT9603-□□□□□□B	EL2310-08□□□□
MT9411 MT9431	MT9411-□□□□□□ MT9431-□□□□□□	EL2310-05□□□□
	MT9411-□□□□□□B MT9431-□□□□□□B	EL2310-08□□□□

5. GENERAL SPECIFICATIONS

Item		Description
Interface (※1)	Connector	USB (type A)
	Input/output signal	Bell 202 ⇔ USB
	Operating temp.	–5 to 60℃
	Outline dims.	Basic unit: 50W×20H×35D (in mm) Probe: 1500mm approx. (fixed to the interface itself)
	Housing	Plastic (black)
Communication protocol		HART™ protocol
Communication terminal resistance		Load resistance 250Ω min. (Upper limit depends on flowmeterṡ transmitter specifications.)
Functions		◇ Monitors flowmeter transmitter output. ◇ Reads, sets up, and saves parameters. ◇ Trims analog outputs. ◇ Checks analog output loop. ◇ Confirms diagnostic messages.

➡ Notes ※ 1. Installation of dedicated driver software is required. (Stored in the driver software LinkTop CD-ROM.)
※: PC requirements (Movement environment)
- OS : Windows 7 to 11 (32bit/64bit) Japanese/English
- Memory (RAM) : 1GB or more recommended
- Free disk space : 10MB min.
- Ensure that a USB interface port is installed.

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OVAL Corporation
Head Office: 10-8, Kamiochiai 3-chome, Shinjuku-ku, Tokyo, Japan
Phone. 81-3-3360-5121 Fax. 81-3-3365-8605