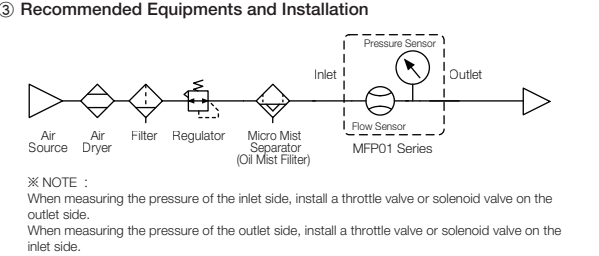
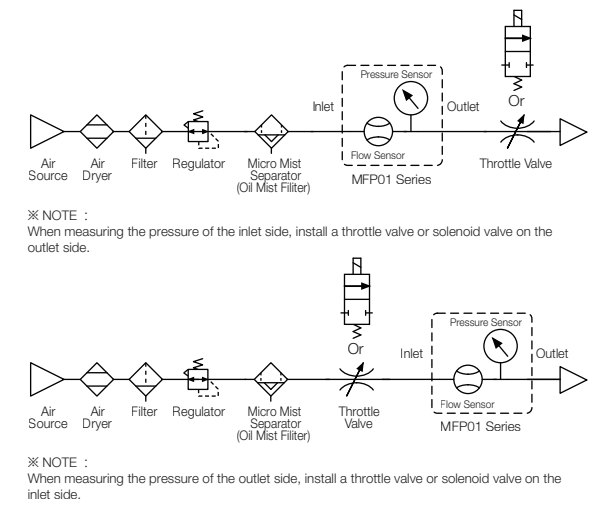


For your safety, please read the following before using.

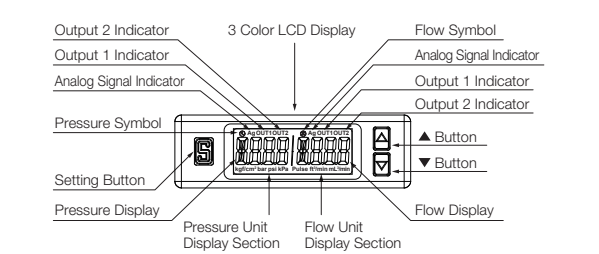
- Check the regulator and flow adjustment valve before introducing the fluid.
- On the inlet side, be sure to install an air filter below the filtration level of 10um.
The sensing element cannot measure properly if foreign matter adheres to it.
- Recommended Equipments and Installation



4 Recommended Equipments and Installation Example



A. PANEL DESCRIPTION



B. ORDERING INFORMATION

M F P 0 1 A - 0 0 5 - 0 1 0 - R 6

UL Certified

Blank:Standard type
A: UL certified (MOQ: 100 pcs)

Flow Rate Range

005:500 mL/min 500:50 L/min
010:1000 mL/min 101:100 L/min
050:5 L/min 201:200 L/min
100:10 L/min

Output Specifications

010 : 2 NPN output + Analog output 1~5V
011 : 2 NPN output + Analog output 4~20mA
02 : 2 NPN output + RS485
030 : 2 PNP output + Analog output 1~5V
031 : 2 PNP output + Analog output 4~20mA
04 : 2 PNP output + RS485

Port Size

R6 : Ø6 mm, for Flow Rate Range 005, 010, 050, 100, 500.
R8 : Ø8 mm, for Flow Rate Range 101, 201.
F1C : Rc½", with internal threads,
for Flow Rate Range 005, 010, 050, 100, 500.
F4C : Rc½", with internal threads, for Flow Rate Range 101, 201.

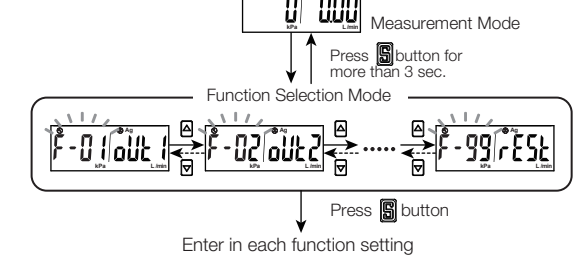
Optional Parts

MP-A26 : Mounting bracket (BT-26)
MP-B4 : Panel adapter (PA-G)
MP-C4 : Panel adapter + Front protective lid (PA-H)

C. OPERATION INSTRUCTIONS

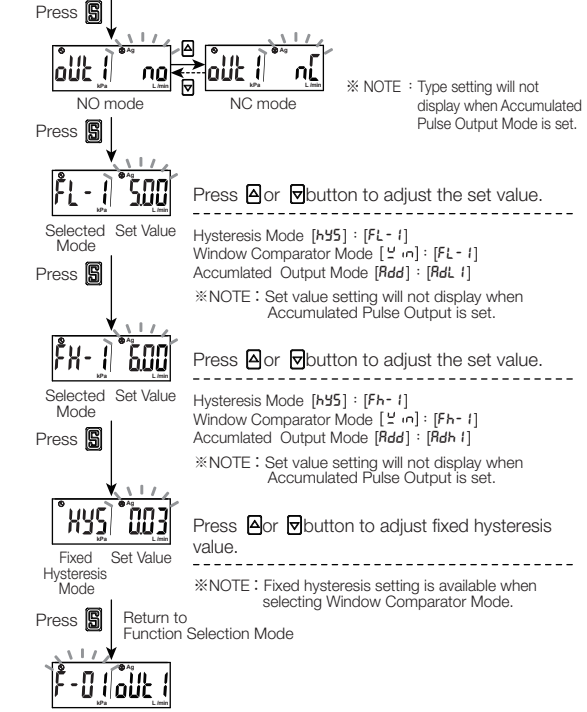
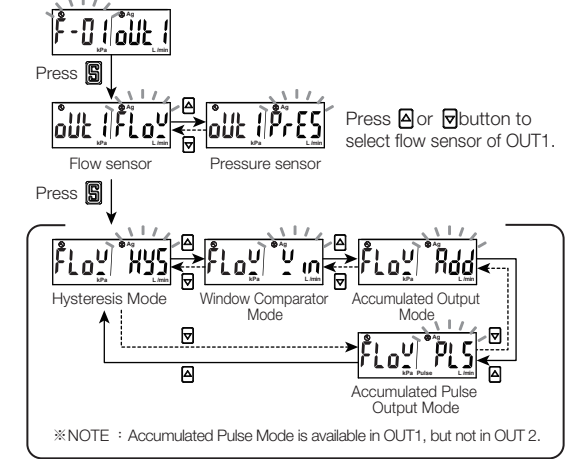
1 Function Selection Mode

At Measurement Mode, press  button for more than 3 sec. to display [F-01]. Press  or  button to select other setting functions. Press  for 3 sec. at Function Setting Mode to return to Measurement Mode.

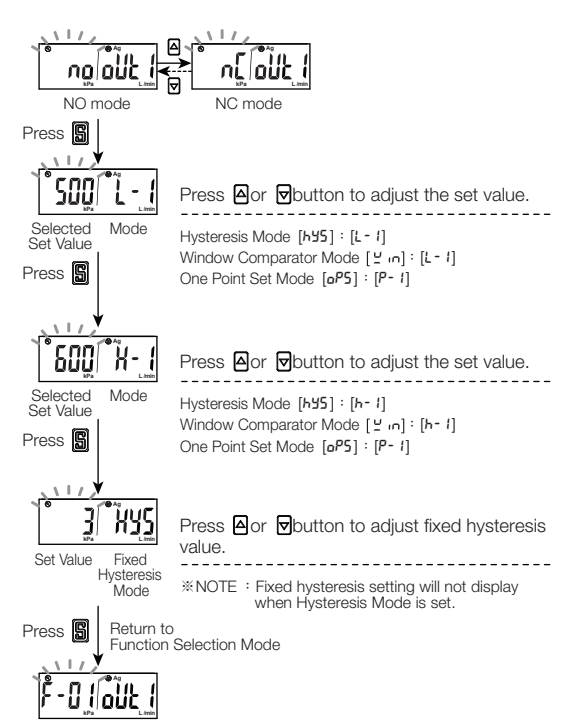
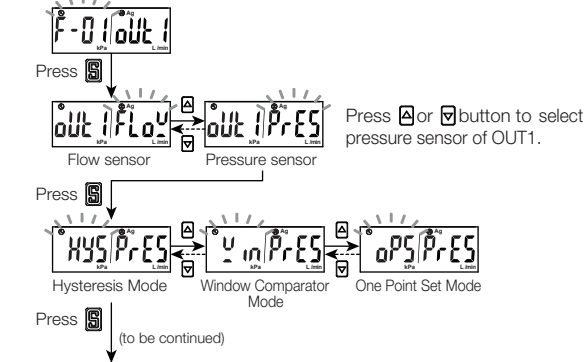


2 [F-01] OUT1 Setting

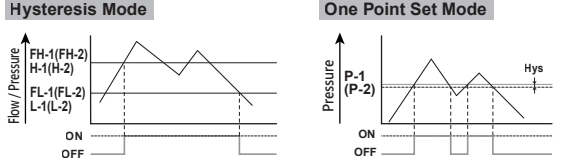
1. Flow sensor setting



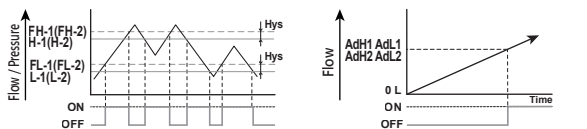
2. Pressure sensor setting



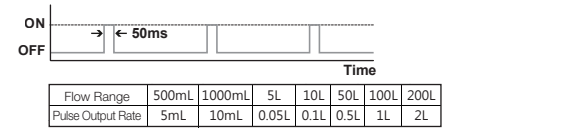
Normal Open Mode



Window Comparator Mode



Accumulated Pulse Output Mode

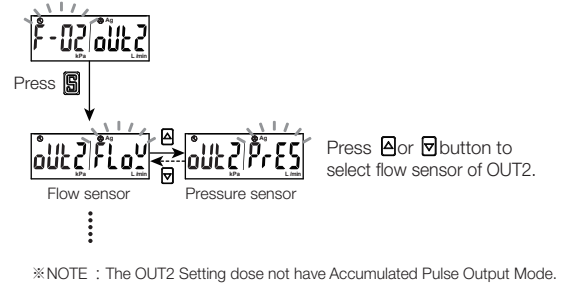


※ NOTE:

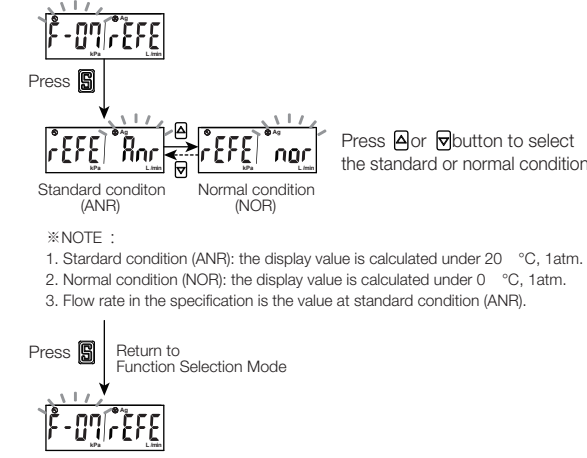
- In case hysteresis is set at less than or equal to 2 digits, switch output may chatter if input pressure fluctuates near the set point.
- When using window comparator mode, the difference between two set points must be greater than the fixed hysteresis, otherwise will cause the switch output to malfunction.

3 [F-02] OUT2 Setting

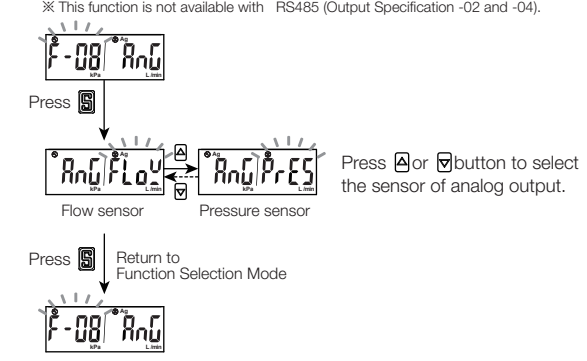
※ Check the [F-01] for the same follow setting.



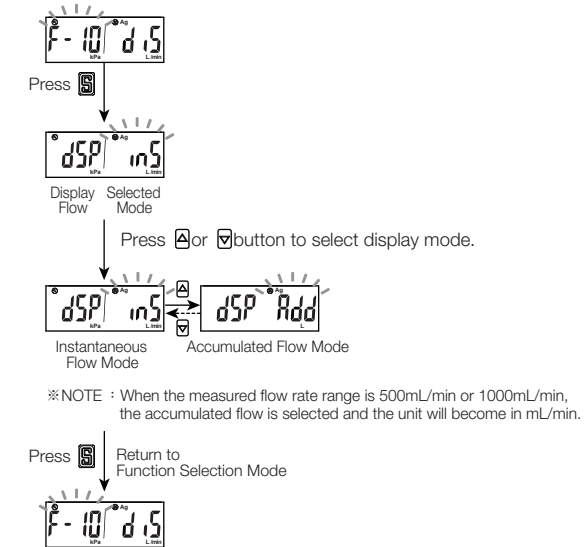
4 [F-01] Flow Reference Standard Setting



5 [F-08] Analog Output Setting

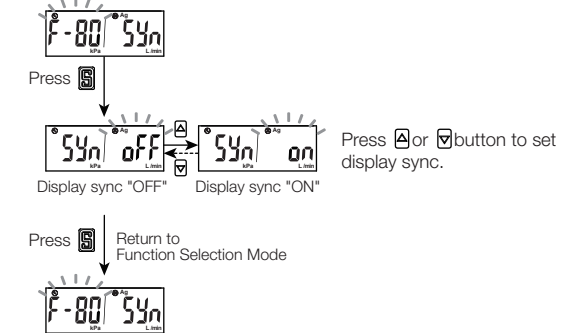


6 [F-10] Flow Sensor Display Mode Setting

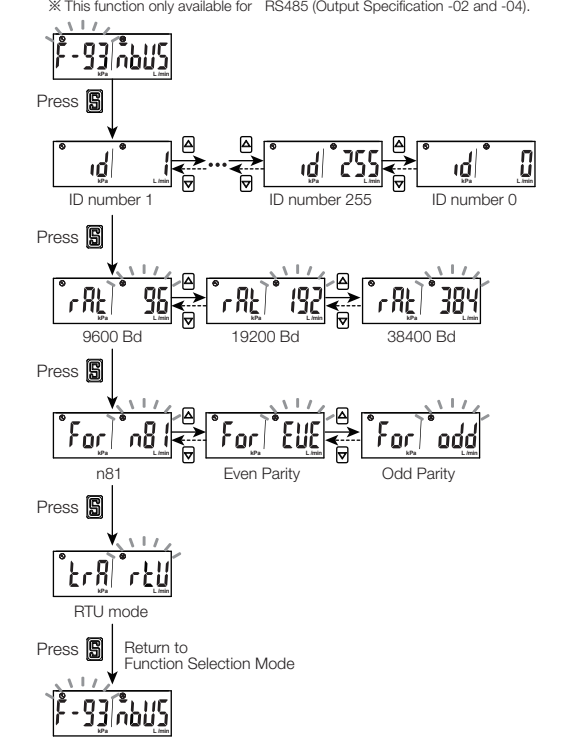


7 [F-80] Sync the value of flow analog output and display

※ 1. This function is not available with RS485 (Output Specification -02 and -04).
2. This function is available for output of flow rate only.

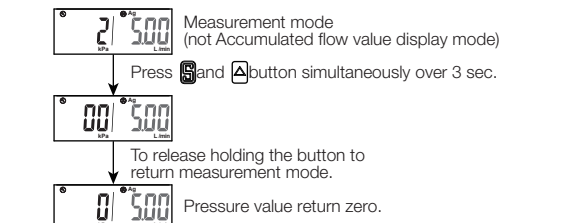


8 [F-93] Modbus RTU Setting



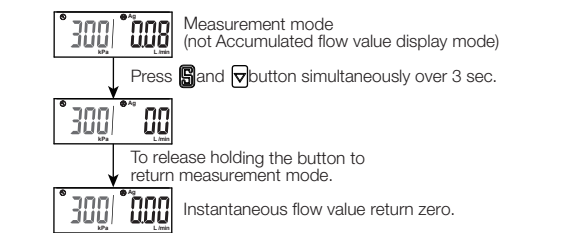
9 Pressure Zero Adjustment Function

The displayed value can be adjusted to "0" when the pressure is within ±3% F.S. of the zero point at the time of shipment from the factory.

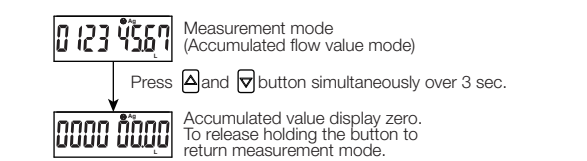


10 Instantaneous Flow Zero Adjustment Function

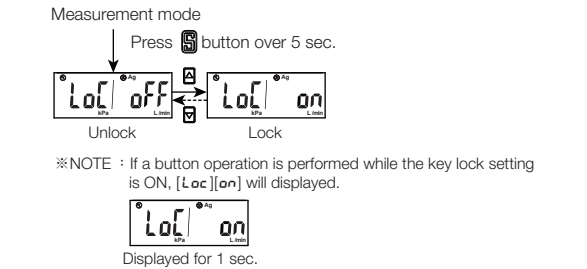
The displayed value can be adjusted to "0" when the measured flow is within ±5% F.S. of the zero point at the time of shipment from the factory.



11 Reset Accumulated Flow Function



12 Key Lock / Unlock Mode



D. Modbus RTU INSTRUCTIONS

Function Code	Explanation	Operation
0000H	ID Number (0 ~ 255) Range : 0 ~ 255	Read Write
0001H	Baud rate setting 0 : 9600 bps 1 : 19200 bps 2 : 38400 bps	Read Write
0002H	Transmission format setting 0 : N.8.1 1 : E.8.1 2 : O.8.1	Read Write
0003H	Communications protocol setting 0 : RTU	Read Write
0004H	Measured flow rate range 0 : 500 mL/min 1 : 1000 mL/min 2 : 5 L/min 3 : 10 L/min 4 : 50 L/min 5 : 100 L/min 6 : 200 L/min	Read
0005H	Instantaneous flow value	Read
0006H	Flow unit 0 : LPM (L/min or mL/min) 1 : CFM (ft³/min)	Read Write
0007H	Decimal place for flow value 0 : None 1 : One decimal place 0.1 2 : Two decimal places 0.01 3 : Three decimal places 0.001	Read
0008H	Accumulated flow value (ADL) XXXX 9999	Read
0009H	Accumulated flow value (ADH) 9999 XXXX	Read
000AH	Flow reference standard 0 : ANR (Standard condition) 1 : NOR (Normal condition)	Read Write
000BH	Flow sensor display mode 0 : Instantaneous flow 1 : Accumulated flow	Read Write
000CH	Accumulated value hold 0 : None 1 : 2min /times 2 : 5min/times	Read Write
000DH	Flow display refresh time 0 : 200ms 1 : 500ms 2 : 1000ms	Read Write
000EH	Rated pressure range 3 : -0.100 ~ 1.000 MPa	Read
000FH	Display pressure value	Read
0010H	Pressure unit 0 : kPa 1 : kgf/cm² 2 : bar 3 : psi	Read Write
0011H	Decimal place for pressure value 1 : One decimal place 0.1 2 : Two decimal places 0.01 3 : Three decimal places 0.001	Read
0012H	Pressure display refresh time 0 : 200ms 1 : 500ms 2 : 1000ms	Read Write
0013H	Fine adjustment setting 0 : OFF 1 : FLOW SENSOR 2 : PRESSURE SENSOR	Read Write

Function Code	Explanation	Operation
0014H	Fine adjustment of display value -25 ~ 25 (-2.5% ~ +2.5%)	Read Write
0015H	Response time of flow sensor 0 : 50ms 4 : 400ms 1 : 80ms 5 : 800ms 2 : 120ms 6 : 1500ms 3 : 200ms	Read Write
0016H	Response time of pressure sensor 0 : 2.5ms 4 : 500ms 1 : 25ms 5 : 1000ms 2 : 100ms 6 : 1500ms 3 : 250ms	Read Write
0017H	OUT1 corresponding sensor 0 : FLOW SENSOR 1 : PRESSURE SENSOR	Read Write
0018H	OUT1 output mode FLOW 0 : Hysteresis 1 : Window Comparator 2 : Accumulated Output 3 : Accumulated Pulse Output PRESSURE 0: One Point Set 1: Hysteresis 2: Window Comparator	Read Write
0019H	OUT1 output type 0 : N.O. mode 1 : N.C. mode	Read Write
001AH	Flow setting value FL-1	Read Write
001BH	Flow setting value FH-1	Read Write
001CH	Flow setting value ADL1	Read Write
001DH	Flow setting value ADH1	Read Write
001EH	Fixed hysteresis setting for flow value HYS 1 ~ 8	Read Write
001FH	Pressure setting value P-1 or L-1	Read Write
0020H	Pressure setting value H-1	Read Write
0021H	Fixed hysteresis setting for pressure value HYS 1 ~ 8	Read Write
0022H	OUT1 switch 0 : OFF 1 : ON	Read
0023H	OUT2 corresponding sensor 0 : FLOW SENSOR 1 : PRESSURE SENSOR	Read Write
0024H	OUT2 output mode FLOW 0 : Hysteresis 1 : Window Comparator 2 : Accumulated Output PRESSURE 0 : One Point Set 1 : Hysteresis 2 : Window Comparator	Read Write
0025H	OUT2 output type 0 : N.O. mode 1 : N.C. mode	Read Write
0026H	Flow setting value FL-2	Read Write
0027H	Flow setting value FH-2	Read Write
0028H	Flow setting value ADL2	Read Write
0029H	Flow setting value ADH2	Read Write

Function Code	Explanation	Operation
002AH	Fixed hysteresis setting for flow value HYS 1 ~ 8	Read Write
002BH	Pressure setting value P-2 or L-2	Read Write
002CH	Pressure setting value H-2	Read Write
002DH	Fixed hysteresis setting for pressure value HYS 1 ~ 8	Read Write
002EH	OUT2 switch 0 : OFF 1 : ON	Read
002FH	Color display for OUT1 or OUT2 selection 0 : OUT1 1 : OUT2	Read Write
0030H	Display color setting 0 : SOG (Switch on Green) 1 : SOR (Switch on Red) 2 : GRN (Always is Green) 3 : RED (Always is Red)	Read Write
0031H	Power-save mode 0 : NO 1 : YES	Read Write
0032H	Reset to the default setting 0 : RECALL	Write
0033H	Instant flow zero adjustment 0 : When over ±5% F.S., error code 03H will show.	Write
0034H	Pressure zero adjustment 0 : When over ±3% F.S., error code 03H will show.	Write
0035H	Reset accumulated flow 0 : Accumulated flow value return to zero	Write
0036H	Key lock/unlock setting 0 : OFF 1 : ON	Read Write
0037H	Switch output 0 : NPN 1 : PNP	Read

● Read / Write Code

Read/Write Code	Explanation
03H	Read pressure sensor data Range 1 ~ 4 data Number, 2 ~ 8 Bytes
06H	Write pressure sensor data

● Error Code Description

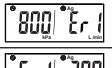
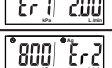
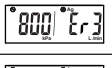
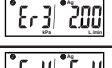
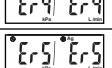
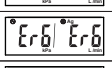
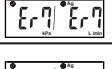
Error Code	Explanation
01H	Read / Write error
02H	Function Code error
03H	Illegal data or over setting value

E. FUNCTION INSTRUCTION

Function Code	Item	Explanation
[F - 01]	[OUT1] OUT 1 setting	Select Output 1 corresponding to flow sensor or pressure sensor. Set the flow rate or pressure value to switch ON/OFF.
[F - 02]	[OUT2] OUT 2 setting	Select Output 2 corresponding to flow sensor or pressure sensor. Set the flow rate or pressure value to switch ON/OFF.
[F - 03]	[LCD] LCD Display color setting	Select back light color and display mode.
[F - 04]	[RESP] Response time setting	Select the response time for analog output. Pressure sensor: 2.5ms ~ 1500ms. Flow sensor: 50ms ~ 1500ms.
[F - 05]	[DPR] Display refresh time setting	Display refresh cycle can be set in 200ms, 500ms or 1000ms.
[F - 06]	[UNIT] Unit setting	Select the UNIT of pressure / flow sensor.
[F - 07]	[REFE] Flow reference standard setting	Select the flow value is shown under standard (ANR) or normal condition (NOR).
[F - 08]	[ANOG] Analog output setting	Select the analog corresponding to pressure or flow sensor. (※1)
[F - 09]	[EEP-] Accumulated value hold setting	To save the last accumulated flow value every 2 or 5 minutes.
[F - 10]	[d/s] Flow sensor display mode setting	Select to display Instantaneous Flow or Accumulated Flow Mode.
[F - 80]	[Sync] Sync the value of flow analog output and display	Turn ON to synchronize the value of flow analog output and display. (※1) (※3) (Default setting : OFF)
[F - 91]	[ECO] Power-Save mode setting	Select if turn on power-save mode to reduce power consumption
[F - 92]	[INP] External input setting	Select for Accumulated flow rate zero clear, Auto-Shift or Auto-Shift zero. (※1)
[F - 93]	[IDB5] Modbus RTU setting	Set ID number, baud rate and transmission format. (※2)
[F - 94]	[FINE] Fine adjustment setting	The displayed value can be adjusted slightly.
[F - 95]	[FORC] Forced output function	To force output ON/OFF to test the switch function.
[F - 99]	[RESET] Reset to the default setting	Return to the factory default setting.

- ※ Note :
- This function is not available with RS485 (Output Specification -02 and -04).
 - This function only available for RS485 (Output Specification -02 and -04).
 - This function is available for output of flow rate only.

F. ERROR CODE INSTRUCTION

Error Type	Error Code	Error Condition	Troubleshooting
OUT1 Excess Load Current Error		Output 1 load current is more than 125 mA.	Turn power off and check the cause of overload current or lower the current load under 125 mA, then restart.
			
OUT2 Excess Load Current Error		Output 2 load current is more than 125 mA.	
			
Zero Adjustment Error		The instant flow is over ±5% F.S. of the zero point.	Perform the zero clear function again under no flow conditions.
		The pressure value is over ±3% F.S. of the zero point.	Perform the zero clear function again under no pressure conditions.
System Error		Memory error	Turn power off, and then restart. If error condition remains, please return to factory for inspection.
		Internal data error	
		Internal data error	
		System parameter error	
Applied Flow/ Pressure Error		The instant flow has exceeded the upper limit of the flow display range.	Reduce the flow to the display range.
		The pressure has exceeded the upper limit of the pressure display range.	Reduce the pressure to the display range.
		The instant flow has exceeded the lower limit of the flow display range.	Ensure the flow is in the correct direction.
		The pressure has exceeded the lower limit of the pressure display range.	Increase the pressure to the display range.