NITTOSEIKO
Taking new steps forward together

EXPLOSION-PROOF TYPE EYE SERIES FLOW METER

(FLOWEYE / NICOEYE)

INSTRUCTION MANUAL

MNV10051 25.07

Note: Photo shows flow meter model FQ

Thank you for purchasing an eye series flowmeter FQ,NQ of our make this time. This instruction manual explains various cautions necessary for operating this flowmeter. The user is kindly requested to read through this manual so that this flowmeter may be used correctly and in safety for a long period of time.
For any inquiry about this flowmeter or order of spare parts, please let us know the type and the serial No. indicated on the nameplate without fail.

Contents

1. Introduction

Thank you for adopting explosion proof type EYE series flow meter of our make this time.

Before using your instrument, please read carefully this instruction manual which explains specifications, type, installation, etc. of the instrument.

Pease note in advance that there may be cases where no revision of this manual is made even for any change in specifications, construction and component parts which is considered as not putting any obstacle from the viewpoints of function and performance.

In case the instrument failed to make normal operation, please inform us of the type and serial No. of the instrument concerned, the contents of trouble, circumstance in which the failure took place, etc. concretely, preferably with presentation of relative sketch, data, etc.

It is to be noted, however, that we cannot assume responsibility for any failure by the instrument of discharging the prescribed functions after a repair made by the user himself regardless of our position.

For any inquiry about troubles, the user is kindly requested to contact our agent from whom you purchased the product or the nearest branch office of our company.

⚠ Any unauthorized modification, etc. of this product made by the user presents a risk of spoiling the guarantee of safety or the prescribed function of the product. In case there is any need of modification, etc., the user is kindly requested to inform the dealer from whom you purchased the product or our branch office closest to you of the matter.

In this document, the following symbol marks are used for safe and correct use of the flow meter:

⚠ : Indicates a general handling precaution.

⚠ **Warning** : Indicates contents the neglect of which in the handling may eventually lead to death or serious injury.

⚠ **Caution** : Indicates contents the neglect of which in the handling may eventually lead to injury or production of material damages.

2. Handling precautions

⚠ This instrument is inspected sufficiently in the factory before delivery. Upon receipt of the delivery of this instrument, check well the appearance of the instrument to make sure that there is no damage in it.

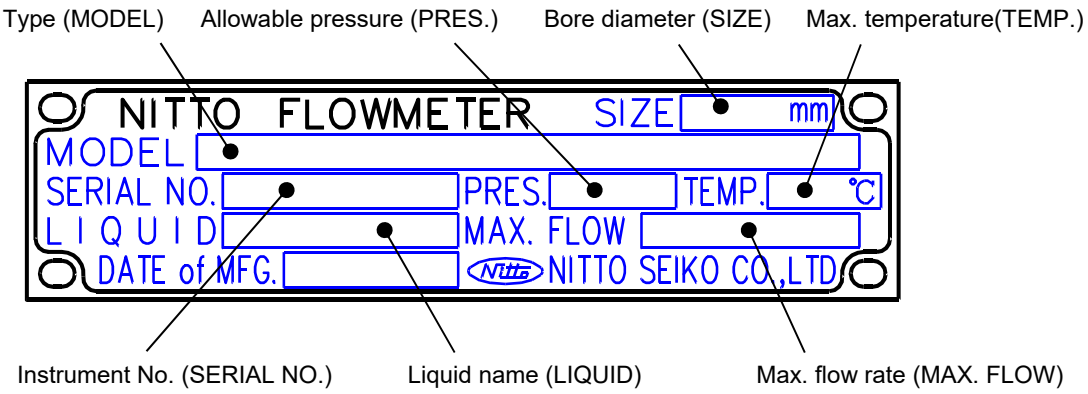
In this section are described precautions necessary for the handling of the instrument. Please read this section carefully before using your instrument. For other matters, refer to the relative sections as required. For any inquiry about troubles, please contact our agent from whom you purchased the product or the nearest branch office of our company.

2.1. Matters to be checked about type and specifications

⚠Caution: **Please check the type and specifications.**

This flow meter was assembled and adjusted according to their respective specifications for delivery. Check the name plate provided on the counting unit, etc. to make sure that the type and other specifications are conformable to your order.

[Contents of indication on the nameplate]



2.2. Precautions regarding measured liquid

⚠Warning: **Take care about the liquid to be measured.**

If you use any liquid unfit for the material used for the instrument, it may cause injury or material damage with splashing of liquid leaking due to corrosion which develops from the inside of the instrument. Check the corrosion resistance of the material used for this product and the liquid concerned.

⚠Warning: **Use in the range of specified working pressure and temperature.**

If you use your flow meter at any higher pressure or temperature, it may cause breaking of flow meter body or measuring unit or injury or material damage with splashing of broken pieces or liquid.

⚠Warning: **Take protective measures against burning.**

In the case of use of any high-temperature liquid (40°C or over), the body unit and the radiating fins may get very hot and cause burning. Be sure to take protective measures against burning in due consideration of heat radiation, heat preservation and maintenance & inspection.

2.3. Precautions regarding place of installation

⚠ Caution: **Avoid place with large temperature gradient or large temperature fluctuations.**

When the instrument is subject to radiant heat, etc., either take shielding measures or install the instrument in a way to secure sufficient ventilation.

⚠ Caution: **Avoid installing in any corrosive atmosphere.**

When using this instrument in a corrosive atmosphere, arrange to secure sufficient ventilation and take protective measures against penetration and accumulation of rain water in the conduit pipe.

2.4. Precautions regarding piping installation

⚠ Caution: **Provide a bypass piping.**

There is a risk of material damage with breaking of internal component parts of the flow meter due to flushing or exhaustion of air from inside the piping in the initial period of operation.

⚠ Caution: **Install in a state free from any vibrations or displacement of piping.**

If you install the flow meter in a place subject to great vibrations or displacement of piping, it may cause injury or material damage with breaking of flow meter body or measuring unit or splashing of broken pieces or liquid.

⚠ Caution: **Install the piping at a position not subject to any impact pressure.**

If any valve instantly closing the piping is provided close to the flow meter in either the upstream or downstream side, it presents a risk of injury or material damage with breaking of flow meter body or measuring unit due to impact pressure by water hammer, etc.

⚠ Caution: **Provide a strainer also on the downstream side.**

Provide a strainer also on the downstream side as required for protection against inflow or mixing in the process liquid resulting from breaking of internal component parts. Otherwise, there is a risk of production of material damage due to mixing in the process liquid.

2.5. Precautions regarding control system

⚠ Warning: **Supplement a control output function other than the output of this product.**

There is a risk of loss of safety and/or process specifications due to operating error or interruption of the control signal.

When using this flow meter on an important process line, it is recommended to supplement another control function to the system so as to avoid danger or material damage due to operating error.

2.6. Precautions regarding maintenance & inspection

Warning: Remove internal pressure and completely eliminate the residual liquid.

If the liquid used is either toxic or corrosive, it may cause injury or material damage at the time of disassembling or inspection of the flow meter.

2.7. Precautions regarding use for high-pressure gas liquid or inflammable gas liquid

Warning: Use flow meter approved for high-pressure gas or flow meter certified as product of explosionproof type.

For any high-pressure gas liquid or inflammable gas liquid, use flow meter approved for high-pressure gas or article certified as product of pressure resistant and explosionproof structure, article certified as product of intrinsically safe construction, etc. If you use a model of general structure, it may cause explosion or fire, leading to injury or material damage.

2.8. Precautions regarding transportation & storage

Pack the flow meter for storage.

The packing style for storage shall be the same as or close to the state in which the product was delivered from our factory.

Select a place satisfying the following conditions for the storage:

- Place protected against rain or water.
- Place subject to little vibrations or shocks.
- Place with following temperature & humidity conditions during storage:
  Preferably a place with normal temperature & humidity. (25°C 65%)
  Temperature: -10 - 60°C
  Humidity: 5 - 80% RH (without dew condensation)

Caution: Clean well the flow meter.

For storing your flow meter after use, clean well the inside of the liquid end and, after drying, put a cover on the entire instrument for storage.

2.9. Precautions regarding battery life

Caution: Pay due attention to battery life.

The service life of the battery is about 3 years. Replace the battery at an early time if a battery alarm is indicated.

2.10. Precautions regarding explosionproofing

⚠ Warning: Do no make any modification.

Any modification or change which may cause some change in the electric constant of the circuit inside the main body, or any modification or change which may cause some change in the wiring, correction, composition, etc. of parts or internal lead wires will spoil the explosionproofing performance of the product.

⚠ Warning: Use attached pressure-resistant packing fixture.

The pressure-resistant packing fixture attached to this instrument is constructed as part of the pressure-resistant explosionproof structure. Be sure to use the attached pressure-resistant packing fixture when you use this flow meter as explosionproof output type.

⚠ Warning: Do not open the top case while feeding power from an external power source.

Turn off power and wait for no less than 3 minutes, for removing the top case from the bottom case.

⚠ Warning: Select a non-hazardous place for replacing the battery unit.

To replace the batter, remove the counting unit and move it to a non-hazardous place in advance.

3. Outline of the product

Explosion proof type EYE series flow meter realized indication of multiple functions, expansion of flow rate range, high-accuracy measurement and improved durability, by loading a microcomputerized counting unit on a rotary piston type flow meter of the simplest construction among positive displacement flow meters and adding a number of improvements to it.

3.1. Standard specifications

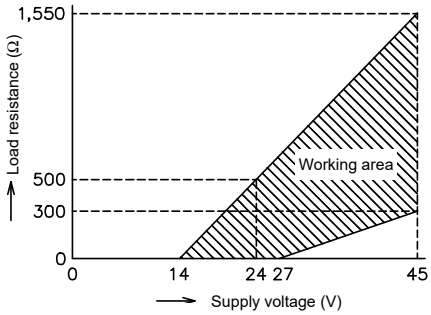
3.1.1. Specifications of measuring unit

Nominal size & capacity symbol		FLOWEYE(FQ)			NICOEYE(NQ)			
		020	025	040	10L0	10LM	10LL	10LG
Measured fluid		Chemical solution, edible liquid, petroleum, water, etc.						
Nominal size		20A	25A	40A	1/4B, 15A	1/2B, 15A		1/2B, 20A
Viscosity of liquid		0.5 – 10,000 mPa·s			0.4 -100 mPa·s (also manufacturable for 100 mPa·s or over)			
Liquid temperature		-10 - 80°C			-5 - 120°C			
Liquid pressure		1.0 MPa or under			1.0 MPa or under			
Measuring accuracy		Within ±0.5%			Within ±0.75%			
Standard connection	Screwed type	-----			Rc1/4	Rc1/2		
	Flange type	JIS10K			JIS10K			
Materials		Body: SCS14, Measuring chamber: SCS14 Rotor: PPS			Material symbol LS : Body, Pressure proof cover : SCS14 Rotor: special carbon, aluminium Material symbol S2 : Body, SUS316 Pressure proof cover: SCS14 Rotor: special carbon, aluminium			

3.1.2. Specifications of counting unit

System			Electronic system
Indication	Display unit		Numerical indication: 7-segment LCD 5W x 10H, 8-digit, mode, alarm indication: LCD 2H
	Indicated items	Accumulated total flow	Unresettable accumulated total flow: 8-digit (Mode 1), Resettable accumulated total flow: 8-digit (Mode 4)
		Instantaneous flow rate	Instantaneous flow rate (/h): 4-1/2 digit (Mode 2), Instantaneous flow rate (/min): 4-1/2 digit (Mode 3), Instantaneous flow rate (%): 4 digit (Mode 5)
		Alarm	Alarm for excessive flow rate (OVER), Alarm for upper limit flow rate (HIGH), Alarm for lower limit flow rate (LOW), Battery alarm (BATT)(*1)
	Switching of indication		Operate by bringing the operating magnet close to the respective switches on the glass face from outside the vessel. POWER: Switches lighting/extinction of the display. MODE: Switches the indicated items. RESET: Resets the resettable accumulated total flow.
			(*1) Field indication type only (Note 2) Accumulated total flow and instantaneous flow rate cannot be displayed at a time.
Output (output type only)	Pulse & alarm output	Number of outputs	2 (SIG1, SIG2)
		Output assignment	To each of SIG1, SIG2, one is selected and assigned from among the respective outputs of "Without output", "Unit pulse", "Unitless pulse", "Alarm for excessive flow rate", "Alarm for upper limit flow rate" , "Alarm for lower limit flow rate", "Alarm for upper & lower limit flower rates".
		Type of signal	Voltage no-contact or open collector Voltage no-contact output: Signal level H: Approx. equal to voltage of external power source (at no load) L: 0.5V or under (at no load) Output resistance: Approx. 2.3 kΩ (short-circuit protection resistance approx. 100Ω Open collector Output / Voltage & current: DC27V, 30 mA Voltage at ON: 0.5V or under
		Signal logic	Positive or Negative logic Positive logic: Logic 1 at H (transistor: OFF) / Negative logic: Logic 1 at L (transistor: ON)
		Unit pulse Signal width	0.5 - 200.0ms (Standard 1ms)
	Analogue output	Number of outputs	1
		Output assignment	Instantaneous flow rate
		Type of signal	4 - 20mADC
		Conversion accuracy	±0.5% full scale
		Resolution	1/1,000
		Allowable load resistance	Refer to allowable load resistance.
			(Note 3) An external power source is required for "Pulse & alarm output" and "Analogue output".
Power source	Field integration type		Built-in lithium battery (DC3.6V Service life approx. 3 years)
	Type of output	Pulse & alarm output	External power source required, voltage DC12/24V, current consumption approx. 12 - 25 mA (with DC12V power source), approx. 12 - 38 mA (with DC24V power source)
		Analogue output	External power source required, voltage DC14 - 45V, current consumption approx. 22 mA. Refer to allowable load resistance characteristic.
Ambient temperature			-10 - 60°C
Explosionproof			Flameproof enclosure ExdⅡBT4X
Material			Aluminium die casting

Drawing of allowable load resistance



Indication unit and output pulse unit

FLOWEYE(FQ)

Nominal size symbol	Indication of flow rate		Unit of integrated indication	Output pulse unit	
	/h	/min		Unit pulse	Unitless pulse
020	0.1L～0.01m³ (1L)	0.01L～1L (0.1L)	0.01L～1m³ (0.01L)	0.01L～1m³ (0.01L)	9.6mL
025	1L～0.1m³ (0.01m³)	0.01L～1L (0.1L)	0.1L～1m³ (0.1L)	0.1L～1m³ (0.1L)	35.1mL
040	1L～0.1m³ (0.01 m³)	0.01L～1L (0.1L)	0.1L～1m³ (0.1L)	0.1L～1m³ (0.1L)	87.9mL

NICOEYE(NQ)

Nominal size symbol	Indication of flow rate		Unit of integrated indication	Output pulse unit	
	/h	/min		Unit pulse	Unitless pulse
10LO	0.1L～1L (0.1L)	0.1mL～0.01L (1mL)	1mL～1m³ (1mL)	1mL～1m³ (1mL)	0.5mL
10LM	0.1L～1L (0.1L)	0.1mL～0.01L (1mL)	1mL～1m³ (1mL)	1mL～1m³ (1mL)	0.9mL
10LL	0.1L～0.01m³ (1L)	1mL～0.1L (0.01L)	0.01L～1m³ (0.01L)	0.01L～1m³ (0.01L)	2.1mL
10LG	0.1L～0.01m³ (1L)	1mL～0.1L (0.01L)	0.01L～1m³ (0.01L)	0.01L～1m³ (0.01L)	6.6mL

Notes)1. The respective units can be selected from among 0.1mL, 1 mL, 0.01L, 0.1L, 1L, 0.01 m³, 0.1m³, 1 m³.

2. No simultaneous indication of /h and /min can be made for the indication of flow rate.

3. ( ) indicates a standard setting.

4. Unitless pulse indicates a nominal value.

3. 1. 3. Flow rate range

FLOWEYE(FQ)

Measuring accuracy ±0.5%

Viscosity mPa·s	Example of liquid	Range of flow rate (L/H)		
		020	025	040
	Water	100 - 700	300 - 2100	650 - 4500
0.5 -	Gasoline	130 - 850	380 - 2500	850 - 5500
1 -	Kerosene	100 - 850	300 - 2500	650 - 5500
4 -	Gas oil	70 - 1000	200 - 3000	450 - 6500
10 -	Heavy oil A	40 - 1000	120 - 3000	260 - 6500
50 -	Heavy oil B	25 - 1000	75 - 3000	160 - 6500
100 -	Heavy oil C	15 - 1000	45 - 3000	100 - 6500
500 -		15 - 800	45 - 2400	100 - 5200
1000 -		15 - 600	45 - 1800	100 - 3900
5000 - 10000		15 - 300	45 - 900	100 - 2000

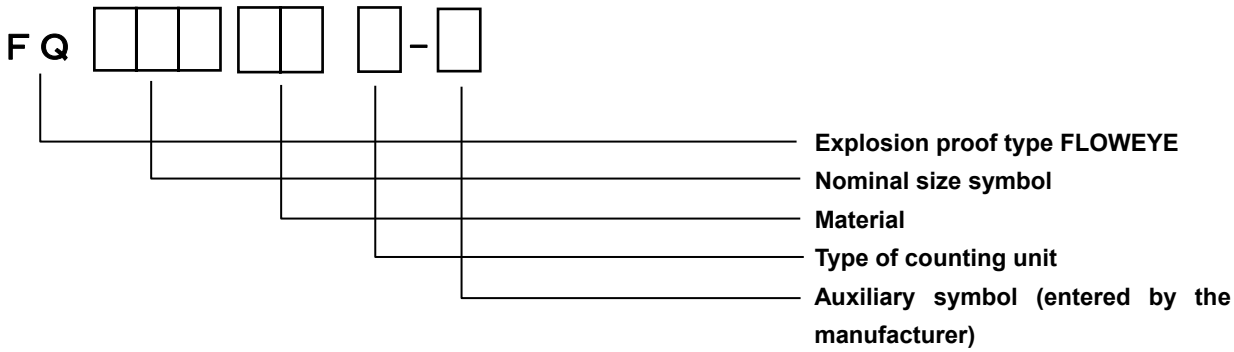
NICOEYE(NQ)

Measuring accuracy ±0.75%

Viscosity (mPa·s)	Example of liquid	Range of flow rate (L/H)			
		L	LM	LL	LG
0.4～0.8	Gasoline	7～50	12～100	15～200	40～600
0.8～1.0	Water	7～50	12～100	15～200	30～600
1～3	Kerosene	7～50	8～100	10～200	20～600
3～10	Gas oil	5～50	6.5～100	9～200	17.5～600
10～50	Heavy oil A	2.5～50	5～100	8～200	15～600
50～100	Heavy oil B/C	1～50	2～100	4～200	10～600

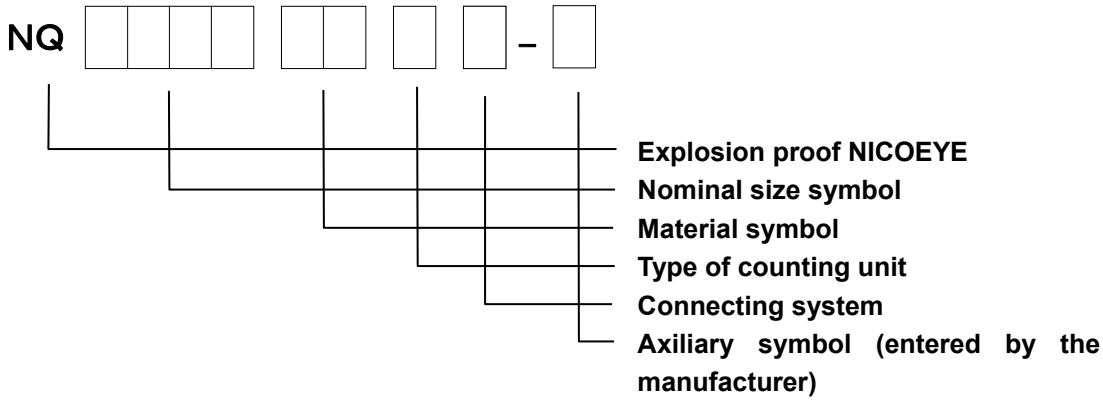
3. 2. Type and specification code

FLOWEYE(FQ)



Type	Specification code			Description
FQ				Explosion proof type FLOWEYE
Nominal size symbol	020 025 040			Diameter 20 mm ~ Nominal size of flange 20A Diameter 25 mm ~ Nominal size of flange 25A Diameter 40 mm ~ Nominal size of flange 40A
Material		S2		Body: Stainless steel casting (scs14)
Type of counting unit		D		Field integration type
		E		Output type

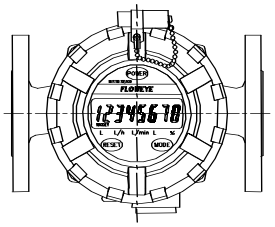
NICOEYE(NQ)



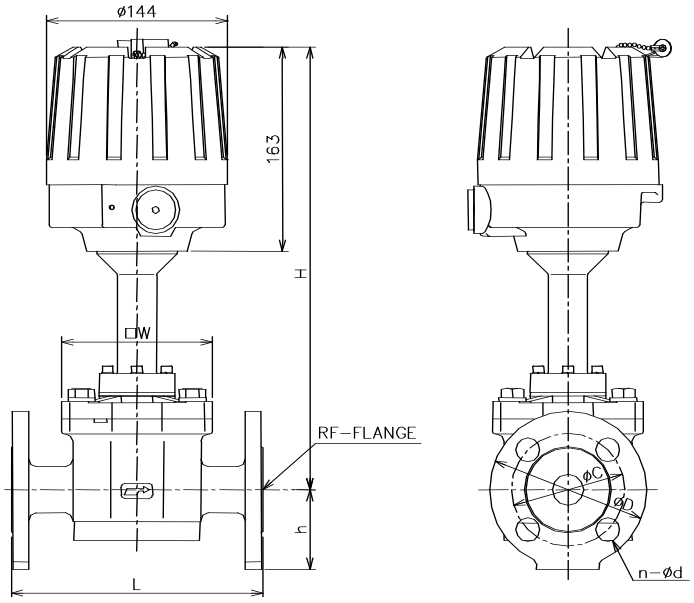
Type	Specification code				Description
NQ					Explosion proof type NICOEYE
Nominal size symbol	10L0				flow rate 50L/h
	10LM				flow rate 100L/h
	10LL				flow rate 200L/h
	10LG				flow rate 600L/h
Material symbol	LS				Main body, pressure proof cover: SCS14
	S2				Main body, pressure proof cover: SUS316
Type of counting unit		**D**			Field integration type
		E			Output type
Connecting system			S		Screwed type 1.0MPa or under
			F		Flange type

3. 3. External dimension drawing

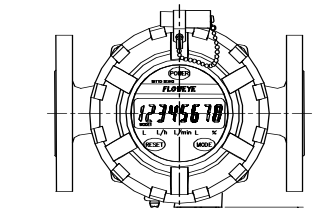
(1) FLOWEYE (FQ) Field integration type



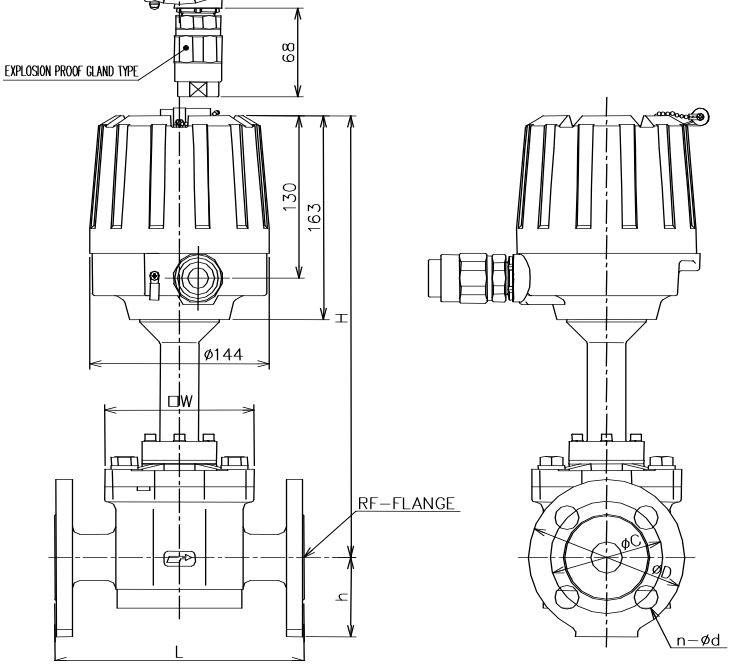
TYPE	FLANGE	L	□W	H	h	D	C	n	d	Weight
FQ020	20AJIS10K	160	90	338	51	100	75	4	15	7.7kg
FQ025	25AJIS10K	200	120	354	64	125	90	4	19	11.6kg
FQ040	40AJIS10K	230	150	380	71	140	105	4	19	18.2kg



(2) FLOWEYE (FQ) Output type

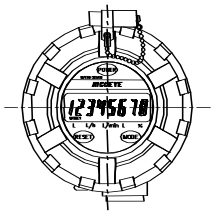


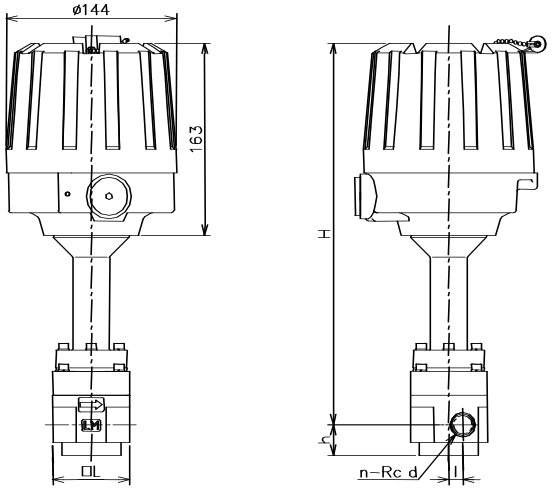
TYPE	FLANGE	L	□W	H	h	D	C	n	d	Weight
FQ020	20AJIS10K	160	90	338	51	100	75	4	15	7.7kg
FQ025	25AJIS10K	200	120	354	64	125	90	4	19	11.6kg
FQ040	40AJIS10K	230	150	380	71	140	105	4	19	18.2kg



(3) NICOEYE（ＮＱ）Field integration type（Screwed type）

The size of the LS type (Material symbol) is shown.

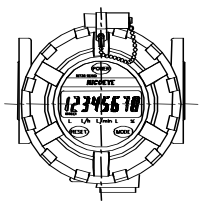


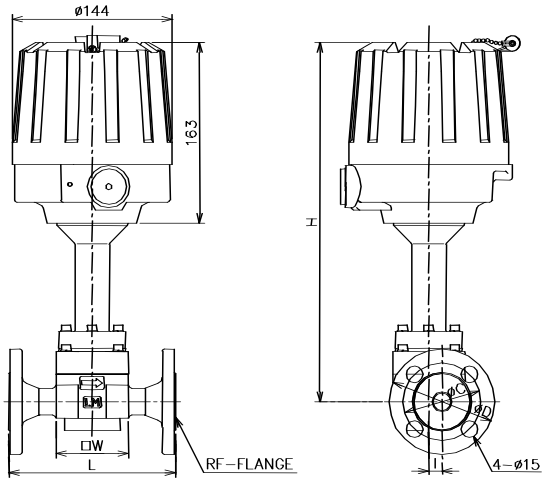


TYPE	□L	H	h	I	n-d	Weight
NQ10L0	60	317	24	7	2-1/4	4.6kg
NQ10LM	65	324	26	12	2-1/2	6.0kg
NQ10LL	65	324	26	12	2-1/2	6.0kg
NQ10LG	80	331	26	19	2-1/2	7.0kg

(4) NICOEYE（ＮＱ）Field integration type（Flange type）

The size of the LS type (Material symbol) is shown.

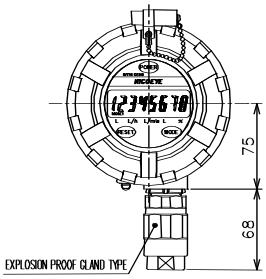


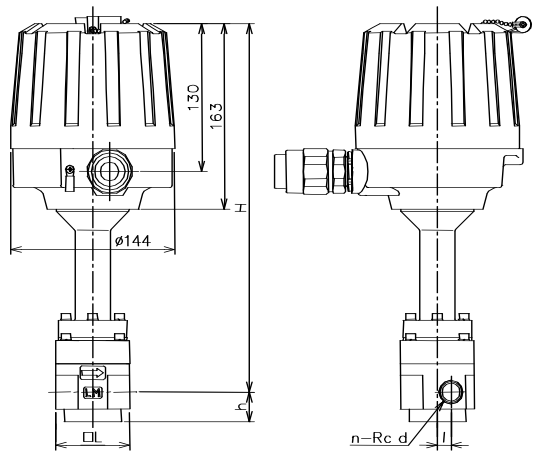


TYPE	FLANGE	L	□W	H	I	D	C	Weight
NQ10L0	15AJIS10K	150	60	317	7	95	70	6.4kg
NQ10LM		150	65	324	12	95	70	8.2kg
NQ10LL		150	65	324	12	95	70	8.2kg
NQ10LG	20AJIS10K	180	80	331	19	100	75	9.9kg

(5) NICOEYE（ＮＱ）Output type（Screwed type）

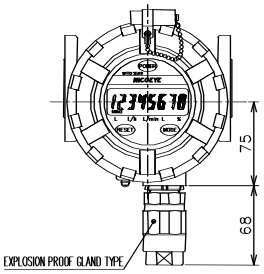
The size of the LS type (Material symbol) is shown.

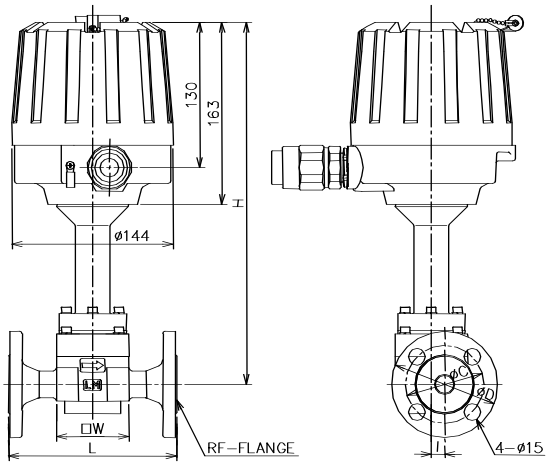




(6) NICOEYE（ＮＱ）Output type（Flange type）

The size of the LS type (Material symbol) is shown.





4. Installation procedure

4.1. Piping design

Perform piping design considering the following items, to enable correct measurement:

(1) Place of installation
- Place easy for inspection
- Place protected against direct sunshine
- Place protected against rain or dewdrops
- Place with little corrosive gas
- Place with little production of dust
- Place with little production of electromagnetic noise
- Place with little vibrations of piping and fluid

(2) Protection against noise
Select a place not close to any motor, transformer and other power source for protection against noise trouble.

(3) Service area
Select a place where a sufficient space can be secured as service area required for performing installation, wiring, inspection, etc. See paragraph 4.2.2 (7).

(4) Mounting posture
Perform piping design in such a way that the inside of the measuring chamber of the flow meter may always be filled with a running liquid.

4.2. Mounting

4.2.1. Mounting precautions

(1) The flow meter is very carefully packed. Take care not to damage the equipment at the time of unpacking. Moreover, carry the product to near the place of installation in the packed state as delivered, to prevent damage due to accident during the transportation to the place of installation.

(2) Take care to avoid dropping or applying any excessive shock to the product.

(3) Make sure that the direction of flow of the fluid to be measured agrees with the direction of the mark indicating the direction of flow on the measuring unit.

(4) When mounting the flow meter on a vertical piping, mount in such a way that the fluid flows from bottom to top as much as possible.

(5) It is undesirable to leave the flow meter in a state of non use for a long time after its installation. When leaving it out of use for a long time for some inevitable reason, take the following measures:
- Verification of closed state of the equipment
  Make sure of perfect sealing at the screw of case on the counting unit, the wiring connection port, etc.
- Implementation of regular inspection
  Inspect the items mentioned above and the state inside the case of the counting unit at least one a year. In addition, inspect each time where there is a fear of penetration of rain water, etc. into the counting unit.

(6) The flange bolts shall be tightened uniformly.

4.2.2. Piping precautions

(1) Be sure to install a strainer on the inlet side of the flow meter. To avoid outflow to the downstream side due to damage to internal component part, install a strainer also on the outlet side of the flow meter, as required.

(Note) FLOWEYE…60-mesh is the standard mesh of the strainer element.
NICOEYE…200-mesh is the standard mesh of the strainer element

(2) The flow meter shall be installed on the outlet side of the pump. In the case where it is used with a tank head, provide a head (pressure) larger than the sum of the pressure loss of the strainer and the flow meter.

(3) Provide a bypass piping. In designing this piping, take account of protection of the measuring unit inside the flow meter with flushing in the early period of operation and evacuation of air from inside the piping as well as ease of maintenance and inspection.

(4) Install without any decentering of the piping, to avoid applying piping stress to the flow meter.

(5) When using liquid packing and sealing tape, etc. at the time of piping installation, take good care to prevent the packing and tape, etc. from protruding into the piping.

(6) In the case where the pump is of either plunger type or diaphragm type, the liquid may produce pulsating current and cause damage to the rotor or instrumental error in some cases. For measuring a flow with such pulsating currents, remove the pulsating currents completely by installing an air chamber or an accumulator on the pump side where the pulsating currents are produced.

(7) In the piping installation, secure a space necessary for inspection and disassembling, etc. of the flow meter. Especially, secure a space enabling disassembling of the measuring unit of

the flow meter.

4. 2. 3. Checking adjacent pipes

(1) In the case where there is any inclination or eccentricity of the piping or a face-to-face dimension out of tolerance, rectify such irregularity before installing the flow meter without fail.

(2) A newly installed pipeline may contain foreign matters such as weld refuse or wood chips, etc. in some cases. Remove such foreign matters by flushing, before installing the flow meter.
It will help prevent damage to the internal component parts due to flowing of foreign matters into the measuring unit at the time of measurement.

4. 2. 4. Precautions for the execution of heat insulation

(1) For any liquid with properties of freezing or solidifying inside the piping or liquid of specifications requiring heat insulation of the liquid, execute a heat insulation work on the measuring unit of the flow meter, the strainer and the piping.

(2) Before starting the heat insulation work, check for any leakage of liquid.

(3) For the flow meter and the strainer, adopt a heat insulation method enabling easy maintenance, inspection and disassembling. Moreover, execute the work in a way not to conceal the nameplate, the caution plate, etc., to secure the safety of handling by clearly showing the flow meter specifications and the precautions to take.

(4) Do not heat insulate the counting unit.

4. 2. 5. Precautions for outdoor installation

The allowable ambient temperature of the counting unit is -10 to 60°C. In a place subject to rain water or direct sunshine, provide a guard for protection against rain or sunshine for the counting unit. Especially, when using the flow meter in a place where salt damage is feared, take protective measures against salt damage.

5. Wiring & setting of PC board for output type

An external power source is required for using an output type. For the connection, refer to paragraphs 5.6 to 5.9.

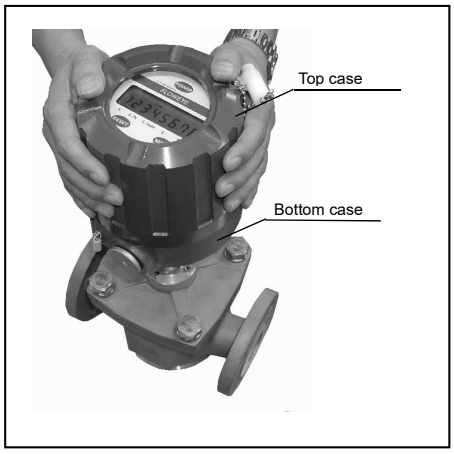
5. 1. Cable

Cable: Use the following types or equivalent:
Shielded control cable (JIS C 3401)
Shielded rubber cabtyre cable (JIS C 3327)
Shielded vinyl cabtyre cable (JIS C 3312)
Sectional area of conductor: 1.25 to 2.0 mm^2
Number of cores: Use 2 to 6-core cables depending on the purpose of use.

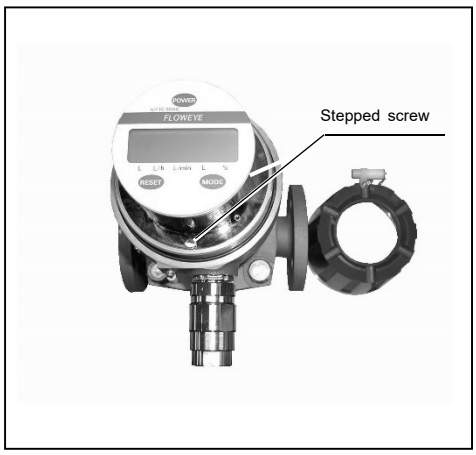
5. 2. Terminal arrangement

No.	Signal name	
1	＋	Analogue output 4 - 20 mADC
2	－ ＡＮＡＬＯＧ	
3	ＳＩＧ２	Pulse output or alarm output
4	ＳＩＧ１	Pulse output or alarm output
5	＋１２／２４Ｖ	Power source for pulse & alarm output
6	０Ｖ	

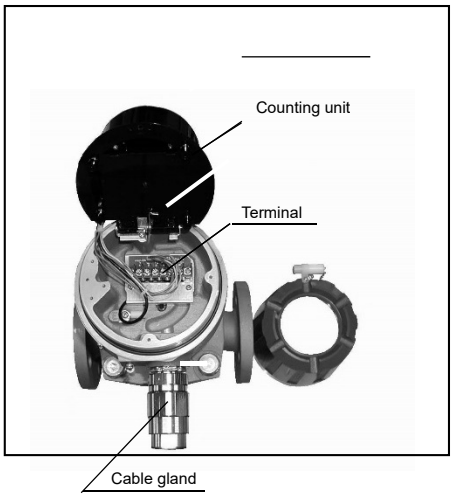
5. 3. Method of connection to terminal



Turn the top case to remove it from the bottom case.



Remove one piece of stepped screw.



A 6P terminal block will appear if you lift the counting unit.
Bring in the cable through the cable gland, and connect the wire securely.

⚠ Be sure to take the following precautions for using your flow ter in an explosionproof area:

⚠ No modification or change of the vessel is allowed.

⚠ No cable gland other than the specified one can be used.

⚠ As cable, use one the allowable temperature of which is no less than 70°C without fail.

⚠ In the case of a type with screw connected conduit pipe, use HIV wire of 0.9 mm^2 stipulated in JIS C 3317 without fail.

⚠ After shutting off the power source, wait for at least 3 minutes before opening the top case.

5. 4. Pressure-resistant packing fixture for explosionproof type

Use the attached pressure-resistant packing fixture because it is constructed as part of the pressure-resistant explosionproof structure.

Assemble by selecting a proper one from among the attached pressure-resistant packings according to the finished outside diameter of the cable.

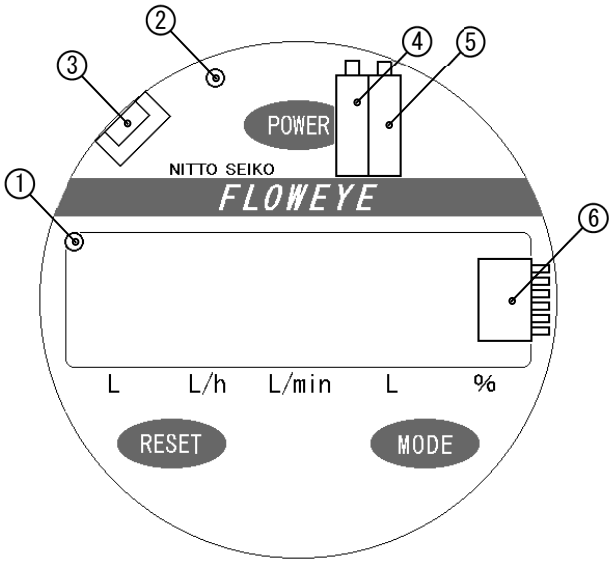
Outside diameter of cable (mm)	Model No. of pressure-resistant packing
10.0 - 12.0	24－φ12
12.0 - 14.0	24－φ14
14.0 - 16.0	24－φ16

5. 5. Output PC board

(1) Output PC board

Of the 2 PC boards found in the counting unit, the one on the lower side is the output PC board.

Arrangement of setting device & regulator



① LED for checking supply from external power source (LD2)
Lights when power source for pulse & alarm output is supplied.

② LED for checking supply from external power source (LD1)
Lights when power source for analogue output is supplied.

③ Connector for connecting terminal block (CN1)
This is a connector for connecting between the terminal block and the output PC board.

④ 20 mA regulator (VR2)
Regulates the analogue output at 100% flow rate.

⑤ 4 mA regulator (VR1)
Regulates the analogue output at 0% flow rate.

⑥ Signal type setting switch (DS1)
Sets the signal type for SIG1, SIG2.

(2) Contents of setting

● Type of signal of SIG1

Contents of setting of DS1	Type of signal (Signal logic)
ON 1 2 3	Voltage no-contact (positive logic)
ON 1 2 3	Voltage no-contact (positive logic)
ON 1 2 3	Open collector (positive logic)
ON 1 2 3	Open collector (positive logic)

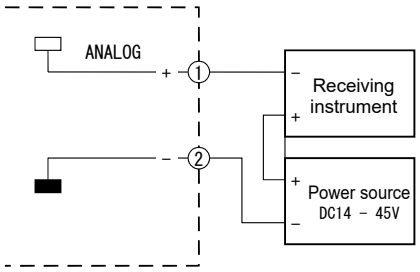
● Type of signal of SIG2

Contents of setting of DS1	Type of signal (Signal logic)
ON 4 5 6	Voltage no-contact (positive logic)
ON 4 5 6	Voltage no-contact (positive logic)
ON 4 5 6	Open collector (positive logic)
ON 4 5 6	Open collector (positive logic)

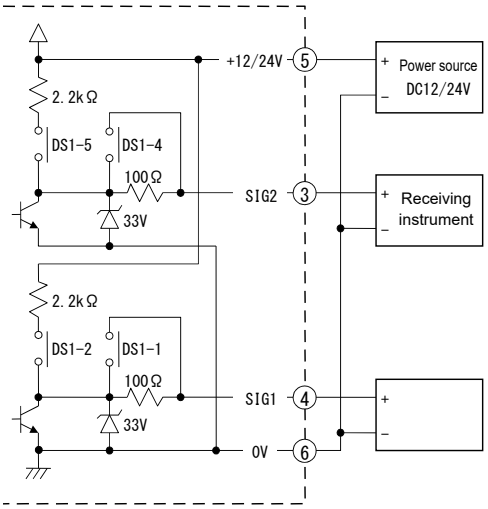
The SIG1 output and SIG2 output of standard model are delivered with the following setting:

SIG1 output	Type of signal:	Voltage no-contact	SIG2 output	Type of signal:	Voltage no-contact
	Signal logic:	Positive logic		Signal logic:	Positive logic
	Pulse output:	Unit pulse output		Pulse output:	Unit pulse output

5. 6. Connection of analogue output



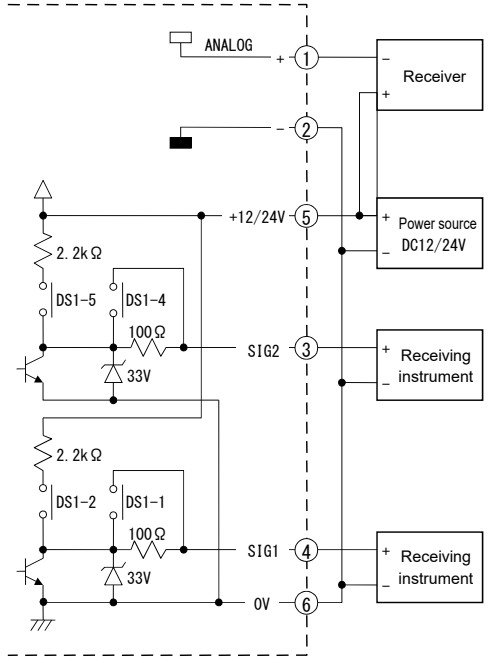
output



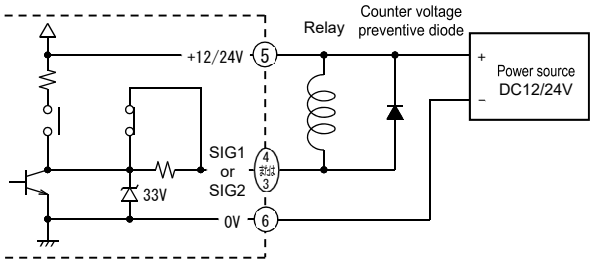
5. 7. Connection of pulse output or alarm

5. 8. Connection of analogue, pulse and alarm outputs

(Case of power source common to analogue, pulse and alarm)



5. 9. Case of connection of relay to pulse output and alarm output



⚠ Be sure to connect a counter voltage preventive diode.

⚠ Set open collector signal (negative logic, or positive logic)as kind of output signal of the flow meter.

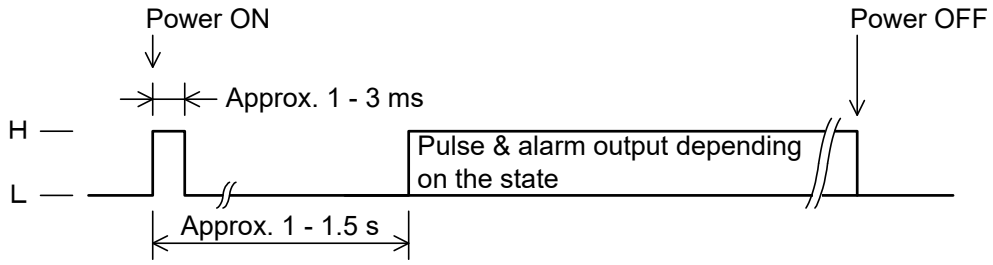
⚠ For the rating of open collector, refer to "3.1.2 Specifications of counting unit".

5. 10. Caution for power – ON or power - OFF

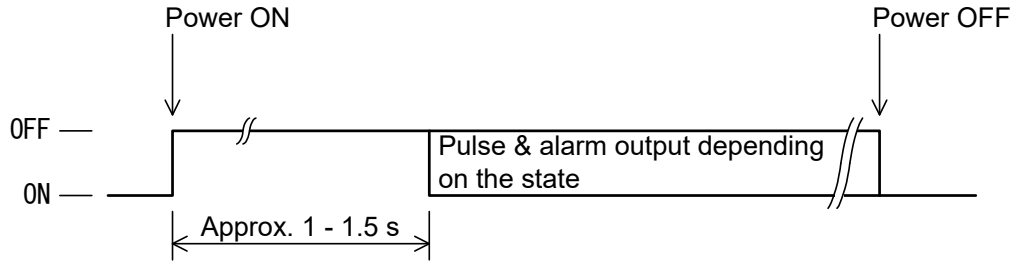
5. 10. 1. Pulse output, alarm output.

The pulse & alarm output makes the action as shown in the drawing below when an external power source is turned on or off.

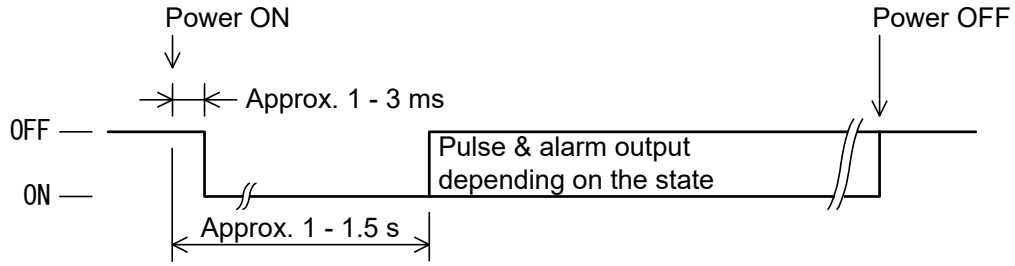
1） Case of voltage no-contact output, positive logic



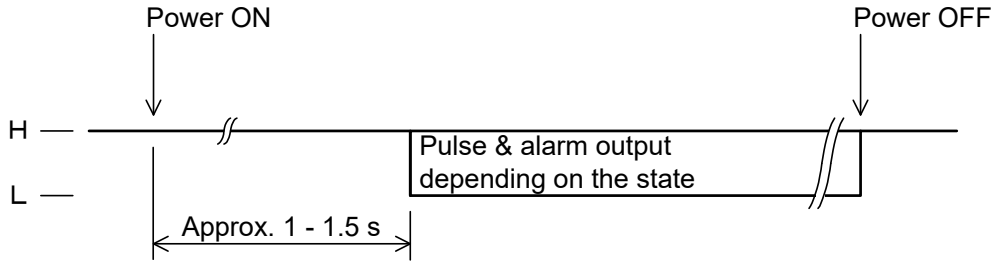
2） Case of voltage no-contact output, negative logic



3） Case of open collector output, positive logic



4） Case of open collector output, negative logic

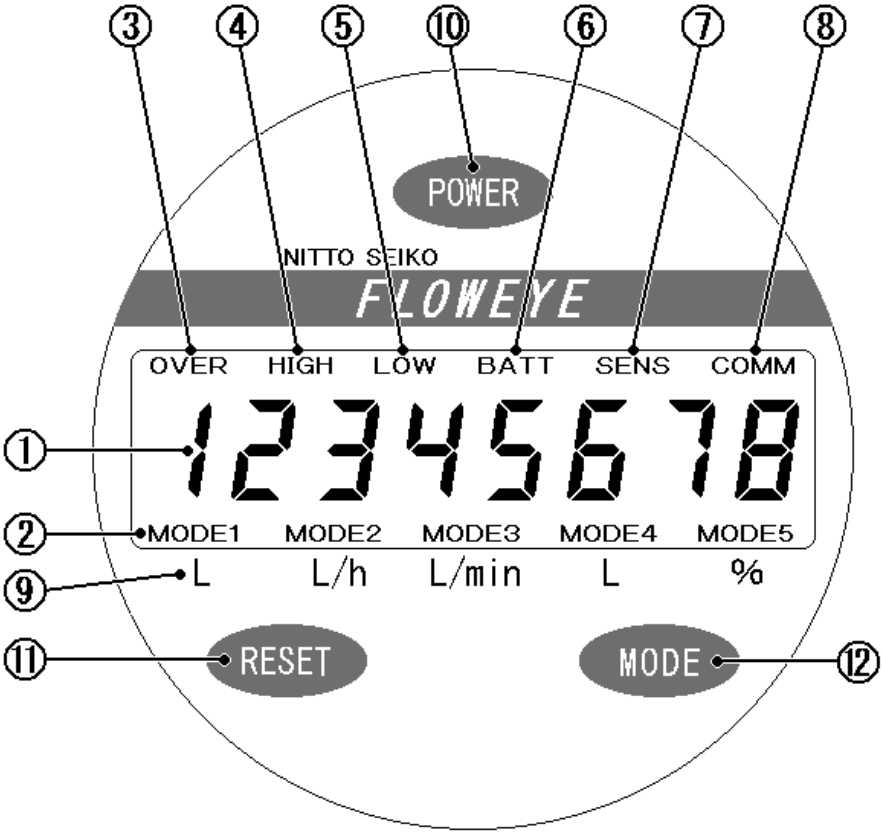


5. 10. 2. Memory of total value

When turning off power within minutes after turning on power, total value data during this period will not be memorized.

6. Basic operation

6. 1. Composition and function of liquid crystal display and switches



*Above drawing is for common use in FLOWEYE and NICOEYE

① Indication of segment
Indicates the accumulated total value, instantaneous flow rate, etc.

② Indication of mode
Indicates the currently displayed mode.
MODE 1: Accumulated total flow (unresettable)
MODE 2: Instantaneous flow rate (/h)
MODE 3: Instantaneous flow rate (/min)
MODE 4: Accumulated total flow (resettable)
MODE 5: Instantaneous flow rate (%)

③ Indication of alarm for excessive flow rate (OVER):
Lights when the instantaneous flow rate exceeded the alarm value for excessive flow rate.

④ Indication of alarm for upper limit flow rate (HIGH):
Lights when the instantaneous flow rate exceeded the alarm value for upper limit flow rate.

⑤ Indication of alarm for lower limit flow rate (LOW):
Lights when the instantaneous flow rate dropped to under the alarm value for lower limit flow rate.

⑥ Indication of battery alarm (BATT):
(Field integration type only)
Lights when the residual capacity of the built-in battery became small.

⑦ Indication of alarm for sensor abnormality (SENS):
This device does not indication.

⑧ Indication of external power supply (COMM):
(Output type only)
Lights when power is supplied from an external power source.

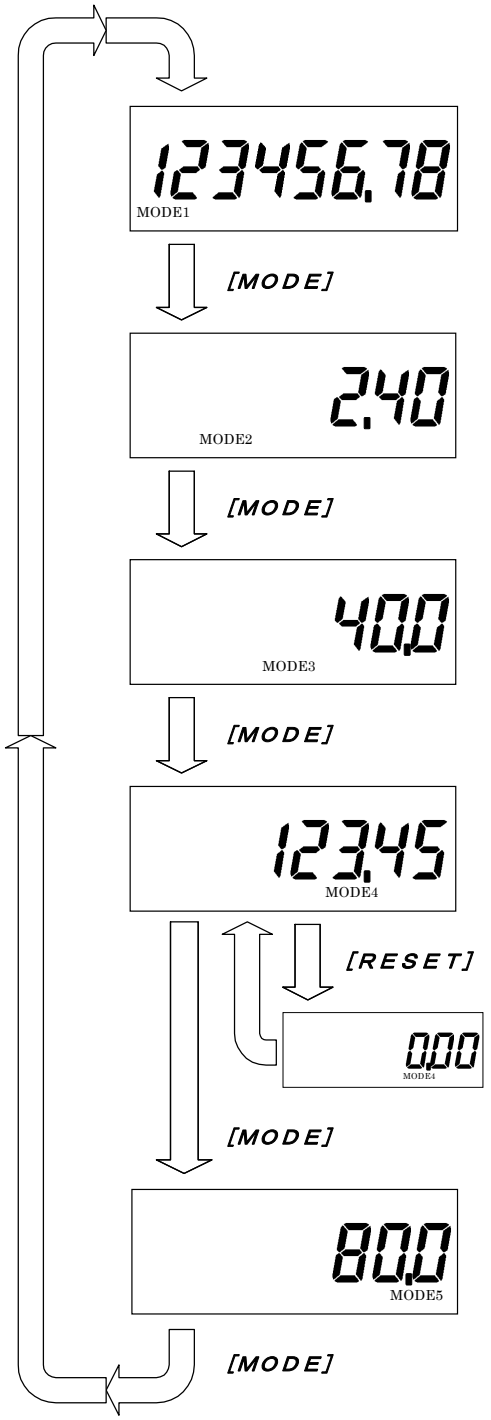
⑨ Unit nameplate:
Indicates the unit of each mode.

⑩ POWER:
Switches ON/OFF of the LCD indication.
Gets into the setting mode.

⑪ RESET:
Resets the accumulated total value of the accumulated flow rate (resettable) to 0.

⑫ MODE:
Switches the displayed mode.

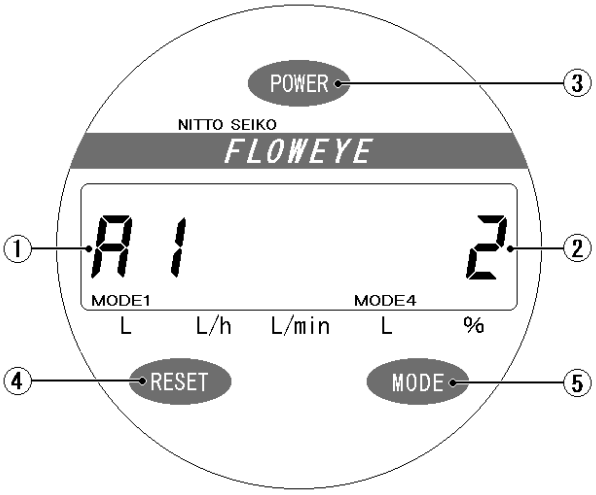
6. 2. Switching the indication of accumulated total flow and instantaneous flow rate

Content of indication	Content of operation
	● If you bring the magnet close to the position of [MODE] during an indication of accumulated total flow (unresettable) (MODE 1), the indication will be switched to that of Instantaneous flow rate (/h) (MODE 2). ● If you bring the magnet close to [MODE] during an indication of instantaneous flow rate (/h) (MODE 2), the indication will be switched to that of instantaneous flow rate (/min) (MODE 3). ● If you bring the magnet close to [MODE] during an indication of instantaneous flow rate (/min) (MODE 3), the indication will be switched to that of accumulated total flow (resettable) (MODE 4). ● If you bring the magnet close to [RESET] during an indication of accumulated total flow (MODE 4), the value of accumulated total flow (resettable) will be reset to zero. ● If you bring the magnet close to [MODE] during an indication of accumulated total flow (resettable) (MODE 4), the indication will be switched to that of instantaneous flow rate (%) (MODE 5). ● If you bring the magnet close to [MODE] during an indication of instantaneous flow rate (%) (MODE 5), the indication will be switched to that of accumulated total flow (unresettable) (MODE 1).

7. How to set data

On this flow meter, the unit of accumulation, etc. can be changed by changing the contents of set item in the data setting mode.。

7. 1. Construction and functions of liquid crystal display and switches



① Indication of set item No.:
- Indicates the set item No.

② Indication of set contents
- Indicates the contents of setting.

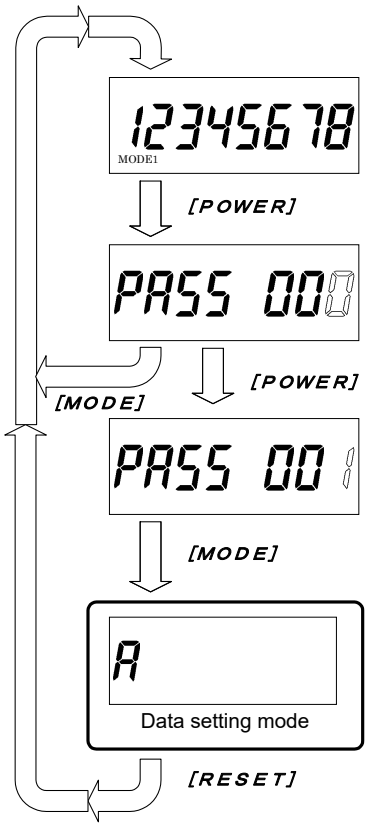
③ POWER:
- Gets into the setting mode.
- Used for moving a group in the set items list.
- Use for changing the contents of setting.

④ RESET:
- Used for moving unit position in the contents of setting.
- Used for ending the setting mode.

⑤ MODE:
- Used for moving items in the set items list.
- Use for determining the contents of setting.

7. 2. Operating method of setting mode

7. 2. 1. How to start and end the setting mode

Content of indication	Content of operation
	● If you continue bringing the magnet closer to ***[POWER]***, the picture will be switched to pass No. input picture, after blinking the indication several times. ◆ If you bring the magnet close to ***[MODE]***, the pass No. input picture will be ended. ◆ If you bring the magnet close to ***[POWER]***, one unit column will start blinking. ◆ If you bring the magnet close to ***[RESET]***,the blinking unit position will move. ● Bring the magnet close to ***[POWER]*** and change the content of setting to "001". ● If you bring the magnet close to ***[MODE]***, the picture will get into the data setting mode. ● To end the data setting mode, bring the magnet close to ***[RESET]*** at the head of the group.

The items available for setting vary depending on the pass No.
- User level: : "001"
- Service level : "***"

Content of indication	State of indication
8	Represents lighting.
8	Represents blinking.

7. 2. 2. Setting items table

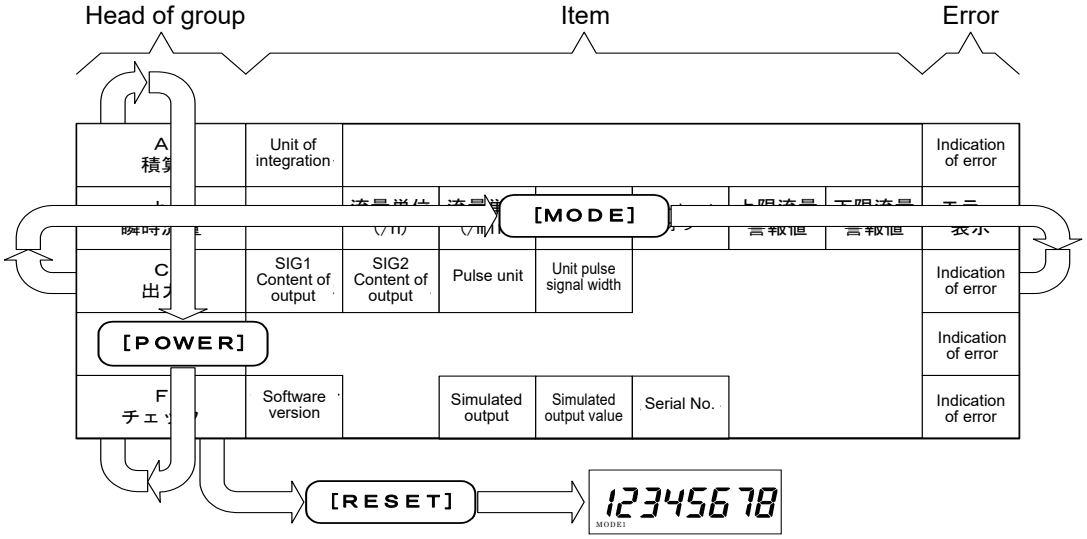
Group name	1	2	3	4	5	6	7	8	···	Indication of error
A Integration	Unit of integration									Indication of error *1
b Instantaneous flow rate		Flow rate unit (/h)	Flow rate unit (/min)	0 - 100% span	Low cut-off	Upper limit flow rate alarm value	Lower limit flow rate alarm value			Indication of error *1
C Output	SIG1 Content of output	SIG2 Content of output	Pulse unit	Unit pulse signal width						Indication of error *1
E Processing					Instantaneous flow rate indication renewal time	Alarm renewal time	Read EEPROM	Write EEPROM		Indication of error *1
F Check	Software version *1		Simulated output	Simulated output value	Serial No. *1					Indication of error *1
G Service	Segment check *1	Input check *1			Accumulated flow rate (unresettable)	Accumulated flow rate (resettable)	Serial No.	Average instantaneous flow rate	···	Indication of error *1

*1 Indication only

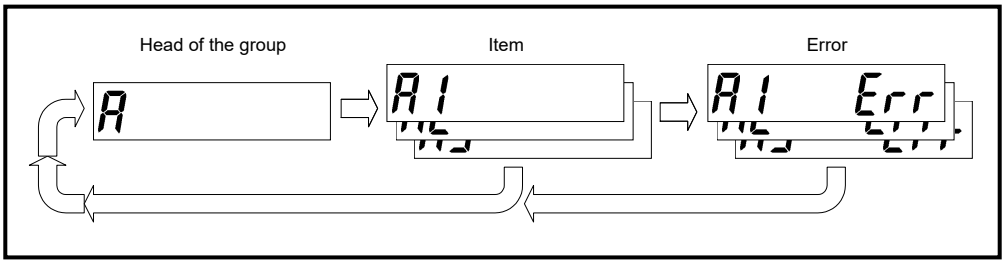
: User level (Item available for setting by the user)

: Service level (Item available for setting by servicing staff of our company)

7. 2. 3. How to move set item



- To move a set item, select (move) a setting group (line), and then elect (move) an item (string) in the group.
- To move a setting group, bring the magnet close to ***[POWER]*** at the head of the group.
- After moving to the head of the target group, bring the magnet close to ***[MODE]*** and move to the target item.
- To end the setting, bring the magnet close to ***[RESET]*** at the head of the group.



- If you bring the magnet close to ***[MODE]*** at the last item in the group, the group name and the item name concerned will be displayed, if there is an error in the set item.
  If there is no error, the indication will return to the head of the group.

- If you bring the magnet close to ***[MODE]*** when an error item No. is displayed, the next error item No. will be displayed. When there is no more error to be indicated, the indication will return to the head of the group.

7. 3. Setting of data by exercises

7. 3. 1. Setting a unit of integration

Set a unit of integration for indication of total integration and accumulated flow rate (resettable).

Method of setting:

Set the setting item "A1: Unit of integration".
Change the seal for unit nameplate.

Contents of setting:

A1: Unit of integration

Content of setting	Unit of integration
0	0．1 mL
1	1 mL
2	0．01 L
3	0．1 L
4	1 L
5	0．01 m^3
6	0．1 m^3
7	1 m^3

⚠The unit of integration available for setting varies depending on the type and bore diameter of the flow meter.

For the range available for setting, refer to the paragraph of **"Data A. Parameters list, A1. Unit of integration"**.

Exercise: Change the unit of integration from 0.1L to 0.01 m^3.

Content of setting	Content of operation
A1 MODE1 3 MODE4	● Move to setting item "A1. Unit of integration".
A1 MODE1 3 MODE4	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The content of setting starts blinking.)
A1 MODE1 5 MODE4	● Bring the magnet close to ***[POWER]***, and change the content of setting to 5.
A1 MODE1 5 MODE4	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)

7. 3. 2. Setting the unit of instantaneous flow rate

Set the unit of instantaneous flow rate indication.

Method of setting:

Flow rate unit /h: Set the setting item "b2. Instantaneous flow rate unit (/h) ".

Flow rate unit /min: Set the setting item "b3. Instantaneous flow rate unit (/min) ".

Change the seal of unit nameplate.

⚠When you changed the instantaneous flow rate unit (/min), other setting items using instantaneous flow rate must also be changed.

Setting items requiring change: b4: 0 - 100% span
b6: Upper limit flow rate alarm value
b7: Lower limit flow rate alarm value

Contents of setting:

b2: Instantaneous flow rate unit (/h)

Contents of setting	Instantaneous flow rate unit
0	0.1 mL/h
1	1 mL/h
2	0.01 L/h
3	0.1 L/h
4	1 L/h
5	0.01 m^3/h
6	0.1 m^3/h
7	1 m^3/h

b3: Instantaneous flow rate unit (/min)

Contents of setting	Instantaneous flow rate unit
0	0.1 mL/min
1	1 mL/min
2	0.01 L/min
3	0.1 L/min
4	1 L/min
5	0.01 m^3/min
6	0.1 m^3/min
7	1 m^3/min

⚠The unit of integration available for setting varies depending on the type and bore diameter of the flow meter.

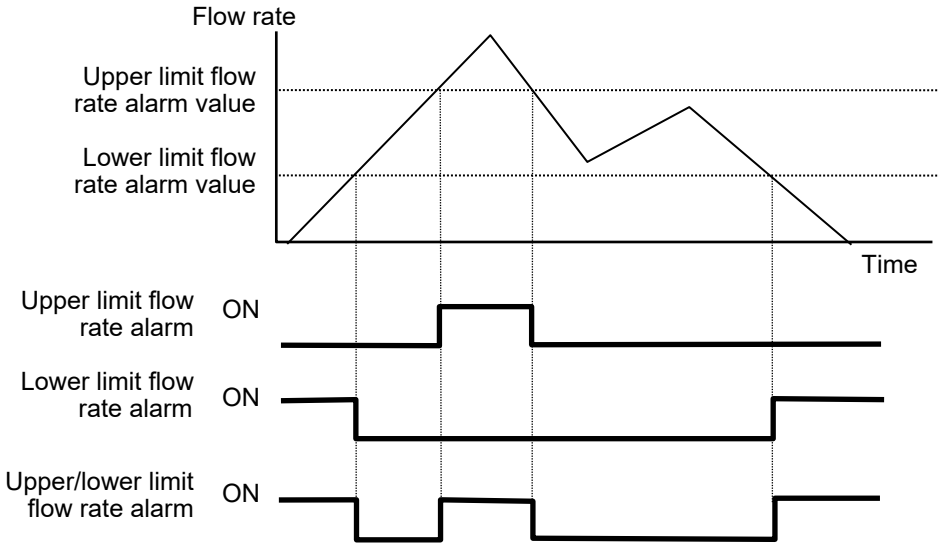
For the range available for setting, refer to the paragraphs of **"Data A. Parameters list, b2. Instantaneous flow rate unit (/h) and b3. Instantaneous flow rate unit (/min)"**.

Exercise: Change the instantaneous flow rate unit from 0.01m^3/h to 1L/h.

Content of indication	Content of operation
b2 MODE2 5	● Move to setting item "b2. Instantaneous flow rate unit (/h)".
b2 MODE2 5	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The content of setting starts blinking.)
b2 MODE2 4	● Bring the magnet close to ***[POWER]***, and change the content of setting to 4.
b2 MODE2 4	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)

7. 3. 3. Setting the upper limit flow rate alarm value (lower limit flow rate alarm value)

Set the upper limit flow rate alarm value (lower limit flow rate alarm value).



Method of setting:

Upper limit flow rate alarm value: Set the setting item "b6. Upper limit flow rate alarm value".

Lower limit flow rate alarm value: Set the setting item "b7. Lower limit flow rate alarm value".

⚠ The unit of set value of flow rate alarm value is the same as the unit of instantaneous flow rate (/h).

Content of setting:

Setting range
0≦Lower limit flow rate alarm value＜Upper limit flow rate alarm value≦99999

Exercise: Change the upper limit flow rate alarm value from 3.00 m^3/h to 6.50 m^3/h.

Content of indication	Content of operation
HIGH b6 003.00 MODE2	● Move to setting item "b6. Upper limit flow rate alarm value".
HIGH b6 003.00 MODE2	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The unit position for change of setting starts blinking.)
HIGH b6 003.00 MODE2	● Bring the magnet close to ***[RESET]***, and move the position for change of setting by 1 to the left.
HIGH b6 003.50 MODE2	● Bring the magnet close to ***[POWER]***, and change the content of the position for change of setting to 5.
HIGH b6 003.50 MODE2	● Bring the magnet close to ***[RESET]***, and move the position for change of setting by 1 to the left.
HIGH b6 006.50 MODE2	● Bring the magnet close to ***[POWER]***, and change the content of the position for change of setting to 6.
HIGH b6 006.50 MODE2	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)

7. 3. 4. Setting the 0 - 100% span (analogue output span)

Set the span limit flow rate for indication and analogue output of instantaneous flow rate (MODE 5).

Method of setting:

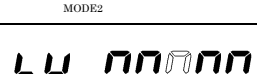
Set the setting item "b4: 0 - 100% span"

⚠ The unit of set value of span is the same as the unit of instantaneous flow rate (/h).

Content of setting:

Setting range
0＜0 - 100% span value≦19999

Exercise: Change the 0 - 100% span from 300 L/h to 6000 L/h.

Content of indication	Content of operation
	● Move to setting item "b4. 0 - 100% span".
	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The unit position for change of setting starts blinking.)
	● Bring the magnet close to ***[RESET]***, and move the position for change of setting by 2 to the left.
	● Bring the magnet close to ***[POWER]***, and change the content of the position for change of setting to 0.
	● Bring the magnet close to ***[RESET]***, and move the position for change of setting by 1 to the left.
	● Bring the magnet close to ***[POWER]***, and change the content of the position for change of setting to 6.
	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)

7. 3. 5. Setting the content of setting for SIG1 (SIG2)

Set the content of setting for SIG1 (SIG2).

Method of setting:

Content of setting for SIG1: Set the setting item "C1: Content of SIG1 output".
Content of setting for SIG2: Set the setting item "C2: Content of SIG2 output".

Content of setting:

C1: Content of SIG1 output

Content of setting	Content of output
--- (---)	Without output
unS (unS)	For in-factory inspection (Do not use)
Sc (Sc)	Unit pulse
Ou (Ov)	Alarm for excessive flow rate
hi (hi)	Alarm for upper limit flow rate
Lo (Lo)	Alarm for lower limit flow rate
hL (hL)	Alarm for upper & lower limit flow rates

C2: Content of SIG2 output

Content of setting	Content of output
--- (---)	Without output
unS (unS)	For in-factory inspection (Do not use)
Sc (Sc)	Unit pulse
Ou (Ov)	Alarm for excessive flow rate
hi (hi)	Alarm for upper limit flow rate
Lo (Lo)	Alarm for lower limit flow rate
hL (hL)	Alarm for upper & lower limit flow rates

⚠An alarm for excessive flow rate is produced in case the maximum usable flow rate at the measuring unit of the flow meter is exceeded.
The value of this maximum usable flow rate cannot be changed.

Exercise: Change the content of SIG1 output from unit pulse to alarm for upper limit flow rate.

Content of indication	Content of operation
C1 Sc	● Move to the setting item "C1: Content of SIG1 output".
C1 Sc	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The content of setting starts blinking.)
C1 hi	● Bring the magnet close to ***[POWER]***, and change the content of setting to hi.
C1 hi	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)

7. 4. Other functions and operations

(1) Changing the pulse unit of unit pulse

Method of setting: "C3: Unit of unit pulse".

Content of setting: C3: Unit of unit pulse

Content of setting	Pulse unit
0	0.1 mL
1	1 mL
2	0.01 L
3	0.1 L

Content of setting	Pulse unit
4	1 L
5	0.01 m^3
6	0.1 m^3
7	1 m^3

⚠ The unit of integration available for setting varies depending on the type and bore size of the flow meter. For the range of setting, refer to **"Data A. Parameters list, C3. Unit of unit pulse"**.

Exercise: Change the unit of unit pulse from 0.1L to 1L.

Content of indication	Content of operation
C3 3	● Move to the setting item "C3: Unit of unit pulse".
C3 3	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The content of setting starts blinking.)
C3 4	● Bring the magnet close to ***[POWER]***, and change the content of setting to 4.
C3 4	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)

(2) Changing the pulse width of unit pulse

Method of setting: Set setting item "C4: Signal width of unit pulse".

Content of setting: C4: Signal width of unit pulse

Range of setting
0.5≦Signal width of unit pulse≦200.0 (ms)

⚠ The unit of integration available for setting varies depending on the type and bore size of the flow meter.
For the range of setting, refer to **"Data C. Table of unit pulse signal range"**.

Exercise: Change the signal width of unit pulse from 1 ms to 5 ms.

Content of indication	Content of operation
C4 001.0	● Move to the setting item "C4: Signal width of unit pulse".
C4 001.0	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The content of setting starts blinking.)
C4 001.0	● Bring the magnet close to ***[RESET]***, and move the position for change of setting by 1 to the left.
C4 005.0	● Bring the magnet close to ***[POWER]***, and change the content of the position for change of setting to 5.
C4 005.0	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)

(3) Changing the low cut-off

Set the low cut-off in the % value of 0 - 100% span (MODE 5).

Method of setting: Set "b5. Low cut-off".

Content of setting:

Range of setting
0.0≦Low cut-off≦99.9 (%)

Exercise：Change low cut-off from 3.0% to 5.0%.

Content of indication	Content of operation
	● Move to the setting item "b5. Low cut-off".
	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The content of setting starts blinking.)
	● Bring the magnet close to ***[RESET]***, and move the position for change of setting by 1 to the left.
	● Bring the magnet close to ***[POWER]***, and change the content of setting to 5.
	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)

(4) Changing the time for renewal of indication of instantaneous flow rate

The indication of instantaneous flow rate is renewed at every second as a standard.
The time for renewal of indication can be set for either every second or every operation of instantaneous flow rate. (It is set for every second at the time of delivery from the factory.)

> ⚠The indication is renewed very fast and the indication becomes difficult to read during power supply from an external power source. Use with "renew indication in every second" normally.

Method of setting: Set the setting item "E5: Time for renewal of indication of instantaneous flow rate".

Content of setting: E5: Time for renewal of indication of instantaneous flow rate

Set value	Content of renewal of indication
0	Every operation of instantaneous flow rate
1	Every second

Exercise: Change the time for renewal of indication of instantaneous flow rate from every second to every operation of instantaneous flow rate.

Content of indication	Content of operation
E5 1	● Move to the setting item "E5: Time for renewal of indication of instantaneous flow rate".
E5 1	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The content of setting starts blinking.)
E5 0	● Bring the magnet close to ***[POWER]***, and change the content of the position for change of setting to 0.
E5 0	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)

(5) Changing the time for renewal of indication (output) of alarm

The indication (output) of alarm is renewed at every second as a standard.
The time for renewal of alarm can be set for either every operation of instantaneous flow rate or every second. (It is set for renewal at every operation of instantaneous flow rate at the time of delivery from the factory.)

Method of setting: Set the setting item "E6: Time for renewal of alarm".

Content of setting: E6: Time for renewal of alarm

Set value	Content of renewal of indication
0	Every operation of instantaneous flow rate
1	Every second

Exercise: Change the time for renewal of alarm from every operation of instantaneous flow rate to every second.

Content of indication	Content of operation
E6 0	● Move to the setting item "E6: Time for renewal of alarm".
E6 0	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The content of setting starts blinking.)
E6 1	● Bring the magnet close to ***[POWER]***, and change the content of the position for change of setting to 1.
E6 1	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)

(6) How to write the content of setting in EEPROM

The contents of set items are recorded in EEPROM.
By recording the contents of setting in EEPROM, you can read out the contents of setting from EEPROM and recover the original setting, even in case the contents of set item disappeared.

⚠ Writing in or readout from EEPROM consumes a lot of electric power. If you repeat writing in and readout from EEPROM during a battery operation, the battery life will be shortened. Be careful.

⚠ In the case where power is supplied from an external source, the set value is automatically written in EEPROM when the data setting mode is ended.

⚠ During an indication of battery alarm, no writing in or readout from EEPROM can be made (except when power is supplied from an external source).

The data written in EEPROM are as shown in the table below.

Groupname	1	2	3	4	5	6	7	8	9
A Integration	Unit of integration	Processing of back flow							
b Instantaneous flow rate		Flow rate unit (/h)	Flow rate unit (/min)	0 - 100% span	Low cut-off	Upper limit flow rate alarm value	Lower limit flow rate alarm value		
C Output	SIG1 Content of output	SIG2 Content of output	Pulse unit	Unit pulse signal width					
E Processing					Instantaneous flow rate indication renewal time	Alarm renewal time	Read EEPROM	Write EEPROM	
F Check	Software version		Simulated output	Simulated output value	Serial No.				
G Service	Segment check	Input check			Accumulated flow rate (unresettable)	Accumulated flow rate (resettable)	Serial No.	Average instantaneous flow rate	Measure instantaneous flow rate

: Data recorded in EEPROM

Exercise: Write the contents of setting in EEPROM

Content of indication	Content of operation
E8 Put	● Move to the setting item "E8: Write EEPROM".
E8 rEAdy	● If you bring the magnet close to ***[RESET]***, indication and non indication of "rEAdy" are repeated. ● Bring the magnet away from ***[RESET]*** while "rEAdy" is indicated.
E8 StArt	● If you bring the magnet close to ***[POWER]*** while "rEAdy" is indicated, writing in EEPROM starts.
E8 End	● When the writing in EEPROM is completed, "End" is displayed for several seconds.
E8 Put	● The writing in EEPROM has been completed.

(7) How to read out the content of setting from EEPROM

Set the setting item for the content recorded in EEPROM.
By recording the contents of setting in EEPROM, you can read out the contents of setting from EEPROM and recover the original setting, even in case the contents of set item disappeared.

⚠ If you write or read out date in/from EEPROM in the state where the external power source is cut off, the is consumed. Make writing in and readout from EEPROM in the state where an external power source is connected as much as possible.

⚠ During an indication of battery alarm, no writing in or readout from EEPROM can be made (except when power is supplied from an external source).

Exercise: Read out the contents of setting from EEPROM.

Content of indication	Content of operation
E7 GEt	● Move to the setting item "E7: Read EEPROM".
E7 rEAdY	● If you bring the magnet close to ***[RESET]***, indication and non indication of "rEAdy" are repeated. ● Bring the magnet away from ***[RESET]*** while "rEAdy" is indicated.
E7 StArt	● If you bring the magnet close to ***[POWER]*** while "rEAdy" is indicated, readout from EEPROM starts.
E7 End	● When the readout from EEPROM is completed, "End" is displayed for several seconds.
E7 GEt	● The readout from EEPROM has been completed.
E7 Err	● In case of a failure in readout, an indication as shown on the left is given for several seconds. Perform a read EEPROM operation again.

7.5 Standard setting at the time of delivery

Unless otherwise specified, the setting at the time of shipment will be as follows:

Flow meter		FLOWEYE(FQ)			NICOEYE(NQ)			
Capacity type		020	025	040	10L0	10LM	10LL	10LG
Setting item No.	Name	Content of standard setting						
A 1	Unit of integration	2(0.01L)	3(0.1L)	3(0.1L)	1(1mL)	1(1mL)	2(0.01L)	2(0.01L)
b 2	Flow rate unit (/h)	4(1L)	5(0.01m^3)	5(0.01m^3)	3(0.1L)	3(0.1L)	4(1L)	4(1L)
b 3	Flow rate unit (/min)	3(0.1L)	3(0.1L)	3(0.1L)	1(1mL)	1(1mL)	2(0.01L)	2(0.01L)
b 4	0 - 100% span	Maximum value of flow rate range of measured liquid (*1) at the time of your placing of order						
b 5	Low cut-off	03.0(3.0%)			01.0(1.0%)			
b 6	Upper limit flow rate alarm value	Maximum value of flow rate range of measured liquid (*1) at the time of your placing of order						
b 7	Lower limit flow rate alarm value	Minimum value of flow rate range of measured liquid (*1) at the time of your placing of order						
C 1	Content of output at SIG1	unS (No Unit pulse)						
C 2	Content of output at SIG2	SC (Unit pulse)						
C 3	Pulse unit	2(0.01L)	3(0.1L)	3(0.1L)	1(1mL)	1(1mL)	2(0.01L)	2(0.01L)
C 4	Unit pulse signal width	001.0(1.0ms)						
E 5	Instantaneous flow rate indication renewal time	1 (every second)						
E 6	Alarm renewal time	0 (At every renewal of instantaneous flow rate)						
F 3	Simulated output mode	oFF (No simulated output is made)						
F 4	Simulated output value	000.0(0.0%)						
SIG1	Type of signal	Voltage no-contact (positive logic)						
SIG2	Type of signal	Voltage no-contact (positive logic)						
G 5	Accumulated integration	0.00(0.00L)	0.0(0.0L)	0.0(0.0L)	0(0mL)	0(0mL)	0.00(0.00L)	0.00(0.00L)
G 6	Accumulated flow rate (resettable)	0.00(0.00L)	0.0(0.0L)	0.0(0.0L)	0(0mL)	0(0mL)	0.00(0.00L)	0.00(0.00L)

As for range, refer to 3.1.3. Range of flow rate.

7.6. Setting for use

In you changed the set value for use, enter the content of setting in the blank column in the table below.

Capacity type		
Setting item No.	Name	Content of setting
A 1	Unit of integration	
b 2	Flow rate unit (/h)	
b 3	Flow rate unit (/min)	
b 4	0 - 100% span	
b 5	Low cut-off	
b 6	Upper limit flow rate alarm value	
b 7	Lower limit flow rate alarm value	
C 1	Content of output at SIG1	
C 2	Content of output at SIG2	
C 3	Pulse unit	
C 4	Unit pulse signal width	
E 5	Instantaneous flow rate indication renewal time	
E 6	Alarm renewal time	
F 3	Simulated output mode	
F 4	Simulated output value	
SIG1	Type of signal	
SIG2	Type of signal	
G 5	Accumulated integration	
G 6	Accumulated flow rate (resettable)	

8. Operation

8.1 Processing before passing of liquid

8.1.1 Verification after piping installation & wiring

Check the nameplate of the flow meter, to make sure that its contents meet the operating conditions. Check again also for any error in the method of installation, piping connection and wiring.

8.1.2 Execution of flushing

To completely remove dust, weld refuse, etc. due to piping work, perform flushing by removing the flow meter and installing a short pipe of the same length as the face-to-face dimension of the flow meter. After that, clean the strainer element, and install the flow meter.

8.2 Precautions to take before start of operation

In the early period of operation, a large amount of air is discharged from inside the piping, and it sometimes causes damage to the flow meter because of high-speed rotation of the rotor inside. To prevent such damage, evacuate air sufficiently well by opening the respective valves little by little.

[Operating procedure for opening/closing of valves]

①	Upstream & downstream side valves	→	Fully close.
②	Bypass valve	→	Fully open.
③	Upstream side valve	→	Slightly open.
④	Downstream side valve	→	Slightly open.
⑤	Pass liquid.		
⑥	Bypass valve	→	Close slowly.
⑦	Upstream & downstream side valves	→	Open slowly to a proper flow rate in the range of flow rate.

Check various portions of the flow meter for any leakage, unusual noise or vibrations.

8.3 Operating precautions

8.3.1 Cautions for use of high-temperature liquid

(1) Retightening of bolts

In the measurement of high-temperature liquid, there are cases where the bolts on the body are loosened. Retighten the bolts.

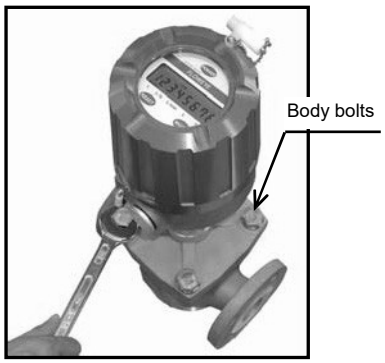
(2) Protection against burning

Implement protective measures against burning because the body gets very hot.

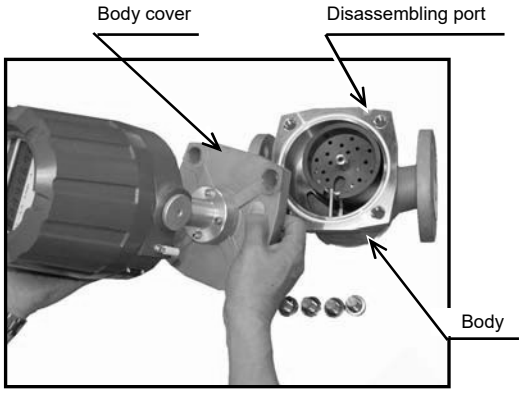
9. Maintenance

9.1 Disassembling procedure of measuring unit

(Photo shows flow meter model FQ)

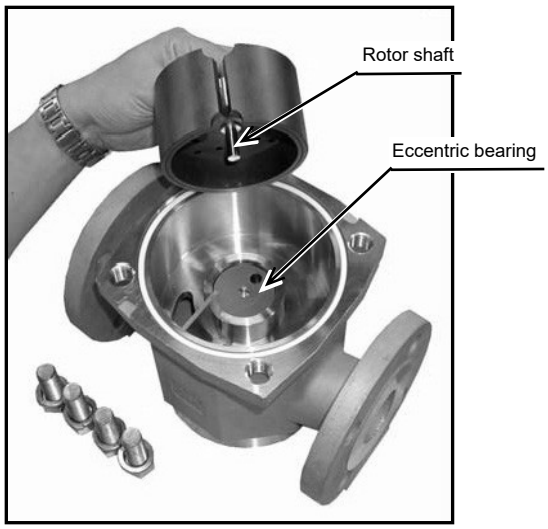


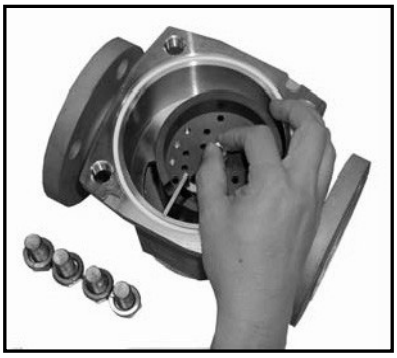
Remove all body bolts.



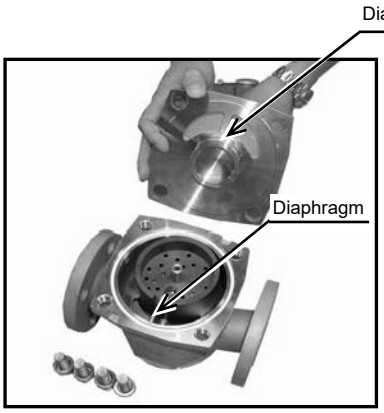
Insert a minus screwdriver in the disassembling port at 2 points and lift the body cover to separate the body from the body cover.

Clean well the rotor and the body cover with gasoline or water, etc. If, after replacing the rotor, the rotor is hooked on the diaphragm, slightly shave the contact point of the rotor by using a file, so that the rotor may turn smoothly.





Check if the rotor turns smoothly. If it is hooked, biting of foreign matter is suspected. Remove the foreign matter.

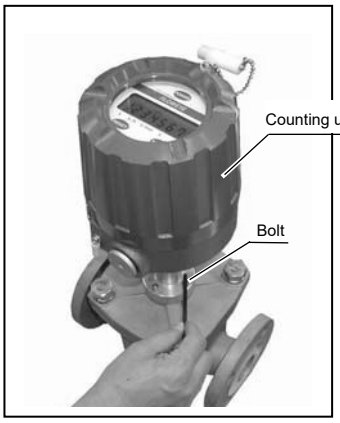


Fit the diaphragm to the diaphragm groove position in the body cover, and set the body cover on the body in upright position.

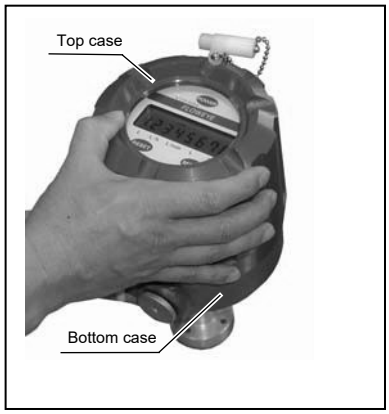
Tighten all body bolts.

9. 2. How to replace the battery（Field integration type）

⚠ Perform replacement of battery unit in a non hazardous place.



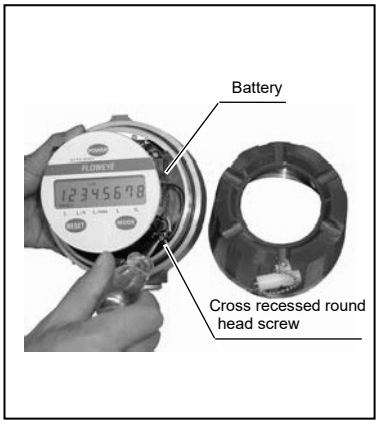
Remove the bolts (4 hexagon bolts) fastening the counting unit, and move the counting unit to a non hazardous place.



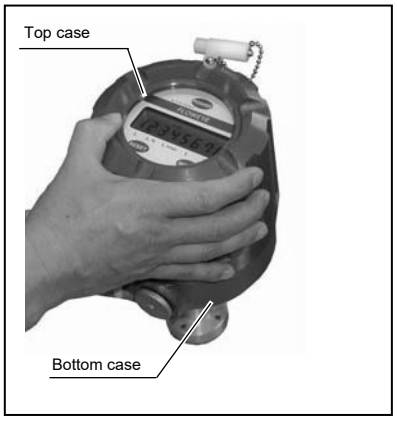
Turn the top case and remove it from the bottom case.

Remove the 4 cross recessed round head screws fastening the battery.

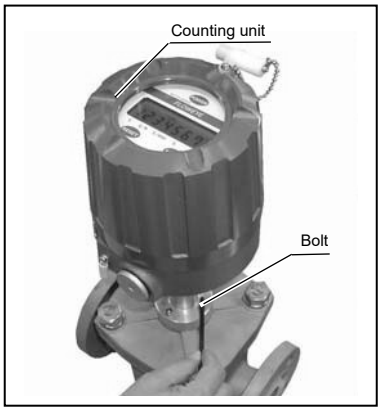
Extract the battery connector and insert a new battery connector within about one minute after that.



Fasten the new battery with 4 cross recessed round head screws.



Install the top case on the bottom case.



Install the counting unit on the flow meter body with the bolts (4 hexagon bolts).

Cautions) 1. The replacement of the battery must be made quickly within one minute.

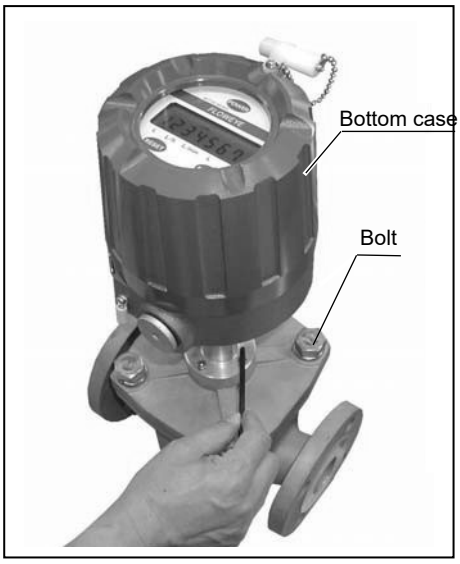
2. Perform replacement of the battery within about 5 days after an alarm message "BATT" appeared on the LCD display unit. In the case where more than 5 days have passed or that the battery is completely exhausted, there are cases where the internal set value and the integrated value change to the values recorded in EEPROM.

⚠ Extract by holding the connector.
⚠ Connect by checking the orientation of the battery.
⚠ Do not short-circuit (+) and (-) of the battery.
⚠ Do not throw the battery in a fire.
⚠ Do not charge the battery.
⚠ Take care to avoid spilling of liquid such as water, etc. on the counting unit.
⚠ When power is supplied from an external power source, be sure to cut off the external power source before proceeding to the battery replacement work.
⚠ This is a special battery unit and, therefore, cannot be replaced with any battery found in the market.

9. 3. Changing the direction of reading

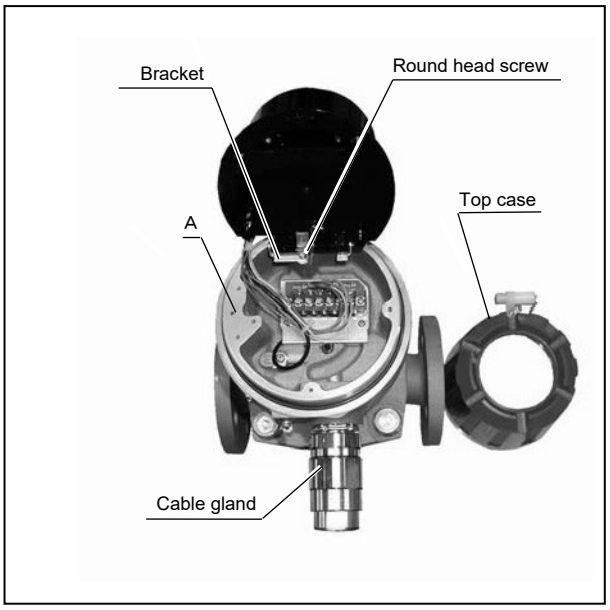
⚠ When power is supplied from an external power source, be sure to cut off the external power source before proceeding to the work.

Case of change by 180° against the direction of flow



Remove the bottom case fastening bolts (4 hexagon bolts) and change the mounting position by 180°

Case of change by 90° against the direction of flow



a.

b. Remove the stepped screw.

c. Remove the 3 round head screws fastening the bracket, and mount the bracket at the portion A in the above drawing.

9. 4. Simulated output

The output type has a simulated output function for making indication and output regardless of the actual flow rate.

By using this function, you can verify the wire connection and the exchange of signals with external equipment.

⚠Be sure to supply power from an external source, for using the simulated output function.

⚠No simulated output can be used for the field integration type.

Signals available for simulated output

Unit pulse	Alarm for upper & lower limit flow rate
Alarm for upper limit flow rate	Alarm for excessive flow rate
Alarm for lower limit flow rate	Analogue signal

⚠No simulated output can be made for back flow alarm and error alarm.

Method of setting:

- Set the setting item "F3: Simulated output mode".
- Set the setting item "F4: Simulated output value".
  As simulated output value, set % value of 0 - 100% span (MODE 5).

Contents of setting:

F3: Simulated output mode

Contents of setting	Instantaneous flow rate mode
on (on)	Makes a simulated output.
oFF (oFF)	Does not make any simulated output.

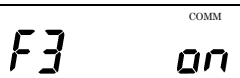
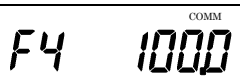
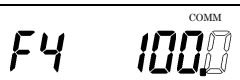
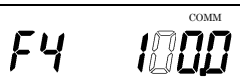
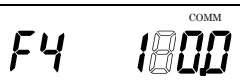
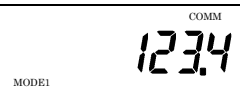
F4: Simulated output value

Setting range
0.0≦Simulated output value≦199.9 (%)

⚠ The indication "MODE" blinks during an operation of simulated output.

⚠ The simulated output action automatically ends in approximately 13 minutes, to pass to a normal operation.

Exercise: Performs simulated output value at 80%.

Content of indication	Content of operation
	Feed power from an external power source. (COMM. lights.)
	● Move to the setting item "F3: Simulated output mode".
	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The column for change of setting starts blinking.)
	● Bring the magnet close to ***[POWER]***, and change the content of setting to "on".
	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)
	● Move to the setting item "F4: Simulated output value".
	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The column for change of setting starts blinking.)
	● Bring the magnet close to ***[RESET]***, and move the column for change of setting by 2 position to the left.
	● Bring the magnet close to ***[POWER]***, and change the content of setting to 8.
	● Bring the magnet close to ***[RESET]***, and move the column for change of setting by 1 position to the left.
	● Bring the magnet close to ***[POWER]***, and change the content of setting to 0.
	● Bring the magnet close to ***[MODE]***, and register the data. (The content of setting stops blinking.)
	● End the setting mode. (Simulated output starts working.) **The indication "MODE" blinks during an operation of simulated output.**

Exercise: End the simulated output mode.

Content of indication	Content of operation
	● Move to the setting item "F3: Simulated output mode".
	● Bring the magnet close to ***[RESET]***, and get into the data change mode. (The column for change of setting starts blinking.)
	● Bring the magnet close to [POWER], and change the content of setting to "oFF".
	● Bring the magnet close to [MODE], and register the data. (The content of setting stops blinking.)
	● End the setting mode.

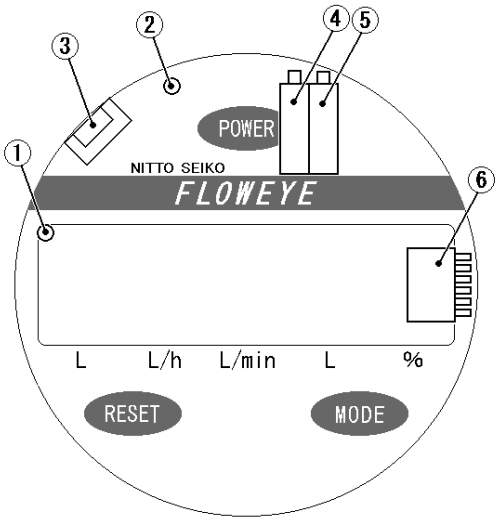
Indication of error:

Content of indication	Content of operation
	The external power supply was cut off during a simulated output. Feed power from an external power source.

9.5. Analogue output adjusting procedure

The analogue output value is adjusted at the time of delivery. In case of any deviation of the analogue output value, adjust the analogue output by the following steps:

(1) Arrangement of setting device & regulator



① LED for checking supply from external power source (LD2)
Lights when power source for pulse & alarm output is supplied.

② LED for checking supply from external power source (LD1)
Lights when power source for analogue output is supplied.

③ Connector for connecting terminal block (CN1)
This is a connector for connecting between the terminal block and the output PC board.

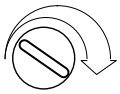
④ 20 mA regulator (VR2)
Regulates the analogue output at 100% flow rate.

⑤ 4 mA regulator (VR1)
Regulates the analogue output at 0% flow rate.

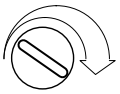
⑥ Signal type setting switch (DS1)
Sets the signal type for SIG1, SIG2.

(2) Contents of adjustment

- 4 mA regulator (VR1)

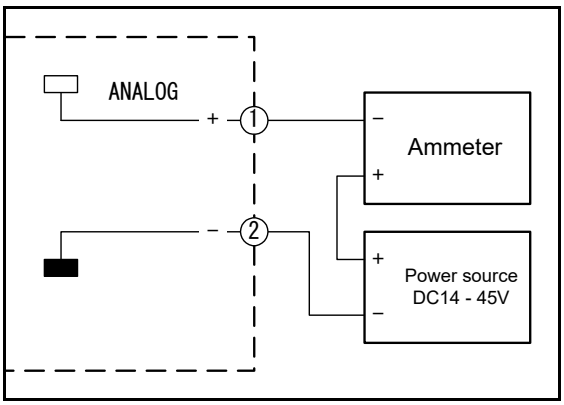
	The current value increases if you turn this regulator in the clockwise direction. Adjust in such a way that the current value becomes 4 mA with a 0% flow rate.

- 20 mA regulator (VR2)

	The current value increases if you turn this regulator in the clockwise direction. Adjust in such a way that the current value becomes 20 mA with a 100% flow rate.

(3) Method of adjustment

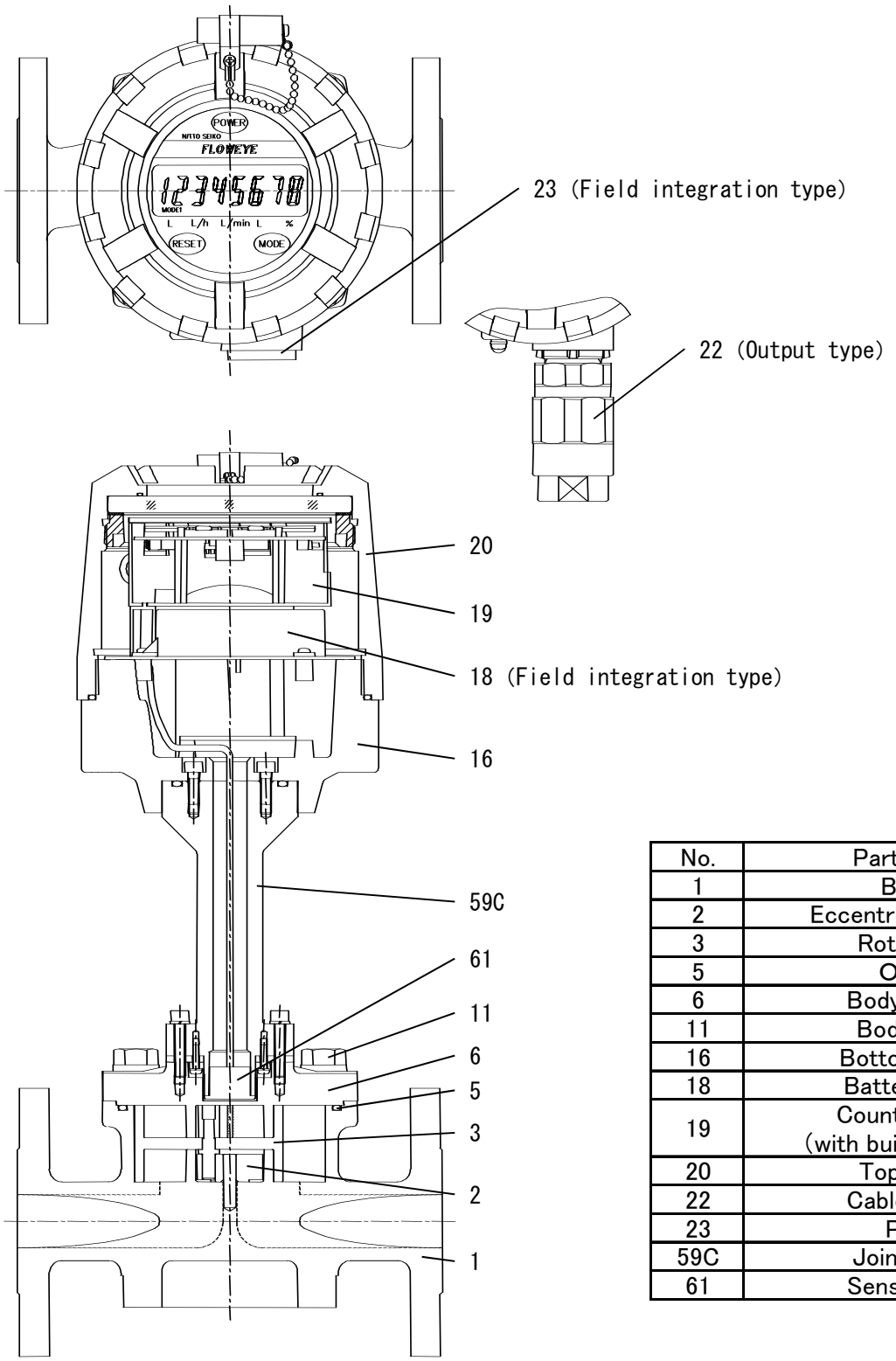
1. Connect an ammeter as shown below.



2. Feed power from an external power source, and set the flow rate at 0% by using the simulated output function. (For the method of simulated output, refer to "9.4 Simulated output".
3. Adjust to have a current output of 4 mA with the 4 mA regulator (VR1).
4. Set the flow rate at 100% by using the simulated output function.
5. Adjust to have a current output of 20 mA with the 20 mA regulator (VR2).
6. Stop the simulated output function.
7. Stop power supply from an external power source, and return the wiring as it was before.

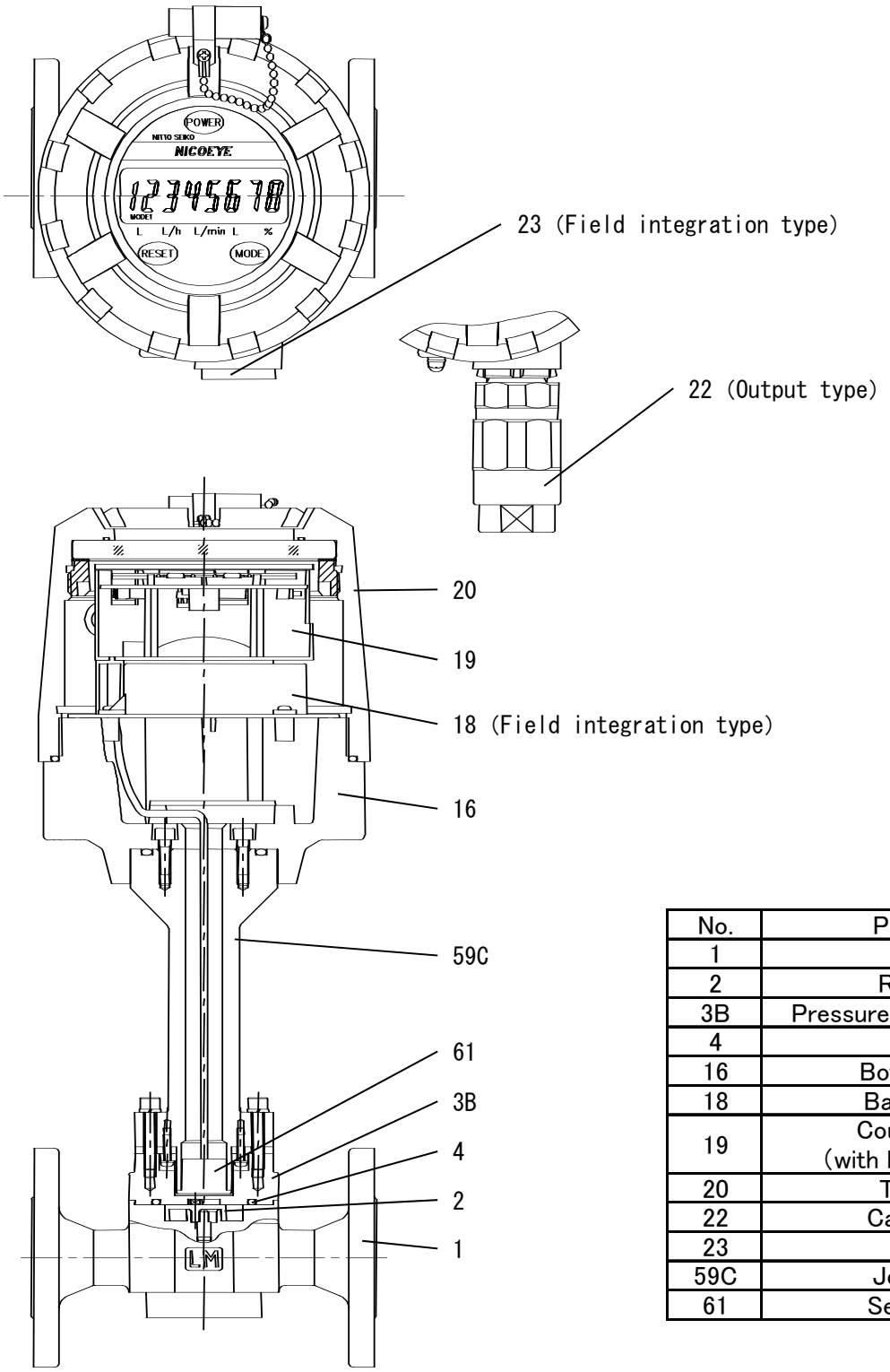
9.6. Sectional view

9.6.1 FLOWEYE



No.	Part name	Q'ty
1	Body	1
2	Eccentric bearring	1
3	Rotor set	1
5	Oring	1
6	Body cover	1
11	Body bolt	4
16	Bottom case	1
18	Battery unit	1
19	Counting unit (with built-in PCB)	1
20	Top case	1
22	Cable gland	1
23	Plug	1
59C	Joint case	1
61	Sensor unit	1

9.6.2 NICOEYE



No.	Part name	Q'ty
1	Body	1
2	Rotor set	1
3B	Pressure-resistant cover	1
4	Oring	1
16	Bottom case	1
18	Battery unit	1
19	Counting unit (with built-in PCB)	1
20	Top case	1
22	Cable gland	1
23	Plug	1
59C	Joint case	1
61	Sensor unit	1

10. Troubleshooting

10. 1. Troubleshooting

(1) Disagreement between actual flow rate and indicated value of integration on flow meter.

Cause	Remedy	Reference page
● Use out of flow rate range.	● Change flow rate. ● Change flow meter size.	3-2
● Open bypass valve. ● No rise of pressure on inflow side.	● Check piping system.	
● Mixing of air in measured liquid.	● Install air separator, etc. ● Change piping system.	
● Clogged strainer.	● Clean strainer element.	
● Biting of dust and scale in impeller, preventing rotation of impeller. ● Frozen or solidified measured liquid, preventing rotation of rotor.	● Disassemble measuring unit, clean and inspect parts for damage.	9-1
● Unmatching of unit of integration on flow meter (Unmatching of setting item A1: Unit of integration)	● Set setting item A1: Unit of integration.	7-3
● Flow meter in simulated output mode (MODE indication blinking)	● Terminate simulated output mode.	9-4

(2) Disagreement between integrated value indicated on flow meter and output pulse number on flow meter.

Cause	Remedy	Reference page
● No supply of external power.	● Supply external power.	5-3
● Wrong wire connection.	● Correct connection.	5-3
● Wrong signal type.	● Correct signal type.	5-2
● Short pulse width, without counting by receiving instrument. (signal width: standard 1 ms)	● Change signal width receivable by the receiver. ● Set output signal width.	7-8
● Long pulse width, with overlapping of pulses. (signal width: standard 1 ms)	● Set output signal width.	7-8 Data C
● Wrong contents of output signal. (Wrong contents of set item C1:SIG1 output, C2:SIG2 output)	● Set contents of either setting item C1:SIG1 output or C2:SIG2 output.	7-7
● Wrong output pulse unit. (Wrong setting item C3: Unit pulse unit)	● Set setting item C3: Unit pulse unit.	7-8
● Flow meter in simulated output mode. (MODE indication blinking)	● Terminate simulated output mode.	9-4

(3) Disagreement between flow rate and analogue output

Cause	Remedy	Reference page
● No supply of external power.	● Supply external power.	5-3
● Wrong wire connection.	● Correct connection.	5-3
● Wrong analogue span. (Wrong setting item b4:0 - 100%)	● Set setting item b4: 0 - 100% span.	7-6
● Deviation of analogue output value.	● Adjust analogue output value.	9-6
● Flow meter in simulated output mode. (MODE indication blinking)	● Terminate simulated output mode.	9-4

(4) No change from "0" of instantaneous flow rate indicated on flow meter even with flowing of liquid.

Cause	Remedy	Reference page
● Use out of flow rate range.	● Change flow rate. ● Change flow meter size.	3-2
● Open bypass valve. ● No rise of pressure on inflow side.	● Check piping system.	
● Clogged strainer.	● Clean strainer element.	
● Biting of dust and scale in impeller, preventing rotation of impeller. ● Frozen or solidified measured liquid, preventing rotation of rotor.	● Disassemble measuring unit, clean and inspect parts for damage.	9-1
● Unmatching of instantaneous flow rate unit on flow meter. (Unmatching of setting item b2: Unit of instantaneous flow rate (/h), b3: Unit of instantaneous flow rate (/min))	● Set setting item b2: Unit of instantaneous flow rate (/h), b3: Unit of instantaneous flow rate (/min).	7-4
● Use under low cutoff.	● Set setting item b5: Low cutoff. ● Set setting item b4: 0 - 100% span.	7-9
● Flow meter in simulated output mode (MODE indication blinking)	● Terminate simulated output mode.	9-4

(5) No signal output from flow meter

Cause	Remedy	Reference page
● No supply of external power.	● Supply external power.	5-3
● Wrong wire connection.	● Correct connection.	5-3
● Wrong signal type.	● Correct signal type.	5-2
● Short pulse width, without counting by receiving instrument. (signal width: standard 1 ms)	● Change signal width receivable by the receiver. ● Set output signal width.	7-8
● Wrong contents of output signal. (Wrong contents of set item C1:SIG1 output, C2:SIG2 output)	● Set contents of either setting item C1:SIG1 output or C2:SIG2 output.	7-7
● Wrong output pulse unit. (Wrong setting item C3: Unit pulse unit)	● Set setting item C3: Unit pulse unit.	7-8
● Flow meter in simulated output mode. (MODE indication blinking)	● Terminate simulated output mode.	9-4

(6) Integrated volume agrees, but no agreement of instantaneous flow rate.

Cause	Remedy	Reference page
● Unmatching of instantaneous flow rate unit on flow meter. (Unmatching of setting item b2: Unit of instantaneous flow rate (/h), b3: Unit of instantaneous flow rate (/min))	● Set setting item b2: Unit of instantaneous flow rate (/h), b3: Unit of instantaneous flow rate (/min).	7-4

(7) Others

No indication

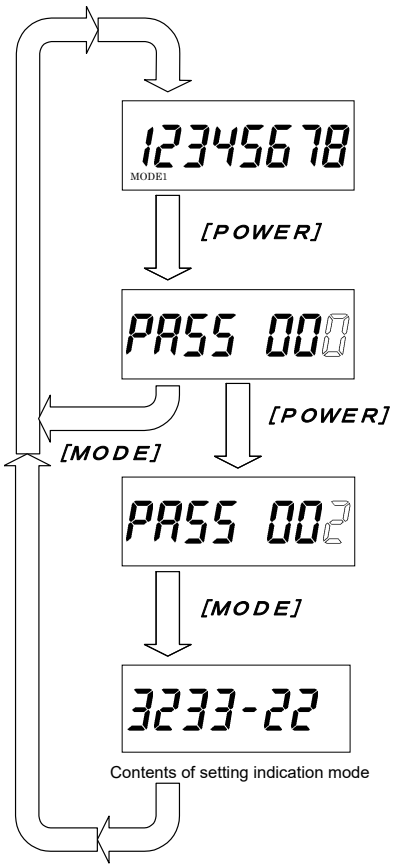
Cause	Remedy	Reference page
● LCD indication OFF.	● Bring the operating magnet close to the position of POWER on the glass face.	6-1
● Battery capacity exhausted.	● Replace battery with a new one.	9-2
● No external power supply.	● Supply external power.	5-3

Indicates "BATT"

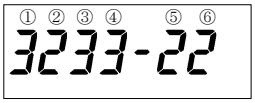
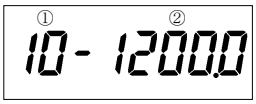
Cause	Remedy	Reference page
● Reduced battery capacity.	● Replace battery with a new one.	9-2

10. 2. Items to be checked in case of an inquiry

For making an inquiry, perform the following work and record the current contents of setting of the flow meter, in addition to the flow meter model and serial number:

Content of indication	Content of operation
	● If you bring the magnet close to ***[POWER]***, the picture will change to the pass number input picture, after blinking the indication several times. ◆ If you bring the magnet close to ***[MODE]***, the pass number input picture will be terminated. ◆ If you bring the magnet close to ***[POWER]***, one unit column will start blinking. ◆ If you bring the magnet close to ***[RESET]***, the blinking unit column will move. ● Bring the magnet close to ***[POWER]***, and change the content of setting to "002". ● If you bring the magnet close to ***[MODE]***, the system will get into the contents of setting indication mode. The indication will change every 10 seconds, to show 3 different pictures in total. Note the contents of each picture on paper. ● When the indication of 3 pictures is over, the picture will return the normal processing picture.

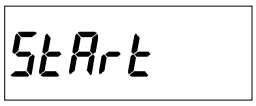
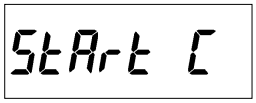
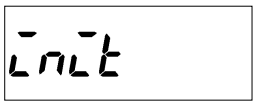
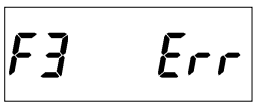
Content of indication:

Example of indication	Content of indicated value	Content of indication of flow meter
	①Unit of indication (/h) ②Unit of indication (/min) ③Unit of indication (integration) ④Unit of output (unit) ⑤Content of output of SIG1 ⑥Content of output of SIG2	
	①Unit signal width value ②Low cut OFF	
	①Program version ②Span flow rate	

Also check the following contents from the nameplate:

Flow meter model	
Serial number	

10. 3. Special indication pictures list

	Indication	Content of indication	Remedy
At closing of power (during resetting of CPU)		Started while preserving internal set values.	Use as it is.
		Integrated value read from EEPROM.	Use as it is.
		Integrated value and internal set values read from EEPROM.	Use as it is.
		Proper values set because of abnormality with integrated value and internal set values.	Contact Nitto Seiko Co., Ltd.
At turning OFF of external power source (when battery is removed)		Action stopped.	Use as it is.
		Action stopped after recording of integrated value in EEPROM.	Use as it is.
		Got into the pass No. setting picture.	Bring the magnet close to [MODE], to end the pass No. setting picture.
		External power source turned OFF during simulated output.	Supply power from external source.

Data A. Parameters list

In this section are indicated all parameters used in FLOWEYE, NICOEYE.

●Contents of respective items

Setting item No.	Designation	Scope & content of data	Reference page	Unit	Description
①	②	③	④	⑤	⑥

Contents of items

	Item	Contents
①	**Setting item No.**	Parameter No.
②	**Designation**	Name of parameter
③	**Scope & content of data**	Indicates the range available for setting, in the case of a numeral type. Indicates selectable contents, in the case of a selection type.
④	**Reference page**	Indicates the reference page about the method of setting.
⑤	**Unit**	Indicates the unit of set value. Indicates the item No. for which a unit is set, in the case of setting item No.
⑥	**Description**	Indicates the contents of parameter.

A: Integration group

Setting item No.	Designation	Scope & content of data	Reference page	Unit	Description
A 1	Unit of integration	**Contents of setting Unit of integration** 0 0.1 mL 1 1 mL 2 0.01 L 3 0.1 L 4 1 L 5 0.01 m^3 6 0.1 m^3 7 1 m^3	7-3		MODE 1, 4 indication units The value available for setting varies depending on the nominal diameter. 【FQ】 FQ020:2 - 7 (0.01L - 1m^3) FQ025:3 - 7 (0.1L - 1m^3) FQ040:3 - 7 (0.1L - 1m^3) 【NQ】 NQ10L0:1 - 7 (1mL - 1m^3) NQ10LM:1 - 7 (1mL - 1m^3) NQ10LL:2 - 7 (0.01L - 1m^3) NQ10LG:2 - 7 (0.01L - 1m^3)

b: Instantaneous flow rate group

Setting item No.	Designation	Scope & content of data	Reference page	Unit	Description
b 2	Unit of instantaneous flow rate (/h)	**Contents of setting** **Unit of flow rate** 0 — 0.1 mL/h 1 — 1 mL/h 2 — 0.01 L/h 3 — 0.1 L/h 4 — 1 L/h 5 — 0.01 m^3/h 6 — 0.1 m^3/h 7 — 1 m^3/h	7-4		The value available for setting varies depending on the nominal diameter. 【FQ】 FQ020:3 - 5 (0.1L – 0.01m^3) FQ025:4 - 6 (1L – 0.1m^3) FQ040:4 - 6 (1L – 0.1m^3) 【NQ】 NQ10L0:2 - 4 (0.01L – 1L) NQ10LM:2 - 4 (0.01L – 1L) NQ10LL:3 - 6 (0.1L – 0.01m^3) NQ10LG:3 - 6 (0.1L –0.01m^3)
b 3	Unit of instantaneous flow rate (/min)	**Contents of setting** **Unit of flow rate** 0 — 0.1 mL/min 1 — 1 mL/min 2 — 0.01 L/min 3 — 0.1 L/min 4 — 1 L/min 5 — 0.01m^3/min	7-4		The value available for setting varies depending on the nominal diameter. 【FQ】 FQ020:2 - 4 (0.01L – 1L) FQ025:2 - 4 (0.01L – 1L) FQ040:2 - 4 (0.01L – 1L) 【NQ】 NQ10L0:0 - 2 (0.1mL – 0.01L) NQ10LM:1 - 3 (1mL – 0.1L) NQ10LL:1 - 3 (1mL – 0.1L) NQ10LG:1 - 3 (1mL –0.1L)

		0.1 m^3/min 6 1 m^3/min 7			
b 4	0 - 100% span	00000 : 19999	7-6	b2	MODE 5 indication span, and analogue output span
b 5	Low cut-off	00.0 : 99.9	7-9	%	Value for stop of flow rate b4: Set % value of 0 - 100% span.
b 6	Alarm value for upper limit flow rate	Excess of alarm value for lower limit flow rate : 99999	7-5	b2	
b 7	Alarm value for lower limit flow rate	00000 : Under alarm value for upper limit flow rate	7-5	b2	

C: Output group

Setting item No.	Designation	Scope & content of data	Reference page	Unit	Description
C 1	Content of setting for SIG1	**Content of setting** **Content of output** --- Without output unS Unitless pulse Sc Unit pulse ou Alarm for excessive flow rate hL Alarm for upper limit flow rate Lo Alarm for lower limit flow rate hL Alarm for upper & lower limit flow rates Fr Back flow alarm Err Error alarm	7-7		
C 2	Content of setting for SIG2	**Content of setting** **Content of output** --- Without output unS Unitless pulse Sc Unit pulse ou Alarm for excessive flow rate hL Alarm for upper limit flow rate Lo Alarm for lower limit flow rate	7-7		

		hL Alarm for upper & lower limit flow rates Fr Back flow alarm Err Error alarm			
C 3	Unit pulse unit	**Content of setting** **Pulse unit** 0 0.1 mL/p 1 1 mL/p 2 0.01 L/p 3 0.1 L/p 4 1 L/p 5 0.01 m^3/p 6 0.1 m^3/p 7 1 m^3/p	7-8		The value available for setting varies depending on the nominal diameter. 【FQ】 FQ020:2 - 7 (0.01L – 1m^3) FQ025:3 - 7 (0.1L – 1m^3) FQ040:3 - 7 (0.1L – 1m^3) 【NQ】 NQ10L0:1 - 7 (1mL –1m^3) NQ10LM:1 - 7 (1mL –1m^3) NQ10LL:2 - 7 (0.01L –1m^3) NQ10LG:2 - 7 (0.01L –1m^3)
C 4	Unit pulse signal width	000.5 : 200.0		msec	The setting width varies depending on the nominal diameter and unit pulse unit (see data C).

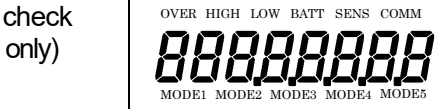
E. Processing group

Setting item No.	Designation	Scope & content of data	Reference page	Unit	Description
E 5	Instantaneous flow rate indication renewal time	**Content of setting** **Content of action** 0 At every renewal of instantaneous flow rate 1 At every second	7-10		Initial value: 1 (At every second)
E 6	Alarm renewal time	**Content of setting** **Content of action** 0 At every renewal of instantaneous flow rate 1 At every second	7-10		Initial value: 0 (At every renewal of instantaneous flow rate)
E 7	Read EEPROM		7-12		
E 8	Write EEPROM		7-11		

F. Check group

Setting item No.	Designation	Scope & content of data	Reference page	Unit	Description
F 1	Software version (indication only)				
F 3	Simulated output mode	**Content of setting** **Content of action** on Makes a simulated output. oFF Does not make any simulated output.	9-4		
F 4	Simulated output	000.0 : 199.9	9-4	%	Set % value of 0 - 100% span.
F 5	Serial number (indication only)				

G. Service group

Setting item No.	Designation	Scope & content of data	Reference page	Unit	Description
G 1	Segment check (indication only)				Lighting of all segments
G 2	Input check				
G 5	Accumulated integration	00000000 : 99999999		A1	Contents of indication in MODE 1
G 6	Reset integration	00000000 : 99999999		A1	Contents of indication in MODE 4
G 7	Serial number				
G 8	Averaging of instantaneous flow rate	**Content of setting** **Content of action** 0 Does not make any averaging of instantaneous flow rate 1 Performs averaging of instantaneous flow rate			Initial value: 0 (Does not make any averaging of instantaneous flow rate)
G 9	Measure instantaneous flow rate	**Content of setting** **Content of action** 0 Measure flow rate for the first turn of rotor. 1 Measure flow rate for the first pulse period.			Initial value: 0 (Measure flow rate for the first turn of rotor)
G10	Check pulse				
G11	Check analogue output				
G12	Actual maximum flow rate	00000000 : 99999999		L/h	Max. value of actual flow rate (No correction of instrument error is made to this value.)

DATA B: LIST OF CORRESPONDENCE OF SEGMENT CHARACTERS

This section presents the characters on the segment indicating unit used for this flow meter.

Contents of indication	Corresponding character
-	—
0	0 (O)
1	1
2	2
3	3
4	4
5	5 (S)
6	6
7	7
8	8
9	9
A	A
b	b
C	C
c	c
d	d
E	E
F	F

Contents of indication	Corresponding character
G	G
H	H (X)
h	h
i	i
J	J
L	L
n	n
O	O (0)
o	o
P	P
q	q
r	r
S	S (5)
t	t
U	U
v	v (u)
X	X (H)
Y	Y

Data C. Unit pulse signal width range table

TYPE	Max. flow rate (L/h)	Unit pulse set value	Unit pulse unit	Signal width available for setting (ms)
FQ020	300	2	0.01L	0.5～ 28.8
		3～7	0.1L～1m³	0.5～200.0
	600	2	0.01L	0.5～ 14.4
		3	0.1L	0.5～144.0
		4～7	1L～1m³	0.5～200.0
	700	2	0.01L	0.5～ 12.3
		3	0.1L	0.5～123.4
		4～7	1L～1m³	0.5～200.0
	800	2	0.01L	0.5～ 10.8
		3	0.1L	0.5～108.0
		4～7	1L～1m³	0.5～200.0
	850	2	0.01L	0.5～ 10.2
		3	0.1L	0.5～101.6
		4～7	1L～1m³	0.5～200.0
	1,000	2	0.01L	0.5～ 8.6
		3	0.1L	0.5～ 86.4
		4～7	1L～1m³	0.5～200.0
FQ025	900	3	0.1L	0.5～ 70.2
		4～7	1L～1m³	0.5～200.0
	1,800	3	0.1L	0.5～ 35.1
		4～7	1L～1m³	0.5～200.0
	2,100	3	0.1L	0.5～ 30.1
		4～7	1L～1m³	0.5～200.0
	2,400	3	0.1L	0.5～ 26.3
		4～7	1L～1m³	0.5～200.0
	2,500	3	0.1L	0.5～ 25.3
		4～7	1L～1m³	0.5～200.0
	3,000	3	0.1L	0.5～ 21.1
		4～7	1L～1m³	0.5～200.0
FQ040	1,950	3	0.1L	0.5～40.6
		4～7	1L～1m³	0.5～ 200.0
	3,900	3	0.1L	0.5～20.3
		4～7	1L～1m³	0.5～ 200.0
	4,500	3	0.1L	0.5～17.6
		4	1L	0.5～ 193.4
		5～7	0.01m³～1m³	0.5～200.0
	5,200	3	0.1L	0.5～ 15.2
		4	1L	0.5～167.3
		5～7	0.01m³～1m³	0.5～200.0
	5,500	3	0.1L	0.5～ 14.4
		4	1L	0.5～158.2
		5～7	0.01m³～1m³	0.5～200.0
	6,500	3	0.1L	0.5～ 12.2
		4	1L	0.5～133.9
		5～7	0.01m³～1m³	0.5～200.0

TYPE	Max. flow rate (L/h)	Unit pulse set value	Unit pulse unit	Signal width available for setting (ms)
NQ10L0	10	1	1mL	0.5～ 90.0
		2～7	0.01L～1m³	0.5～200.0
	15	1	1mL	0.5～ 60.0
		2～7	0.01L～1m³	0.5～200.0
	30	1	1mL	0.5～ 30.0
		2～7	0.01L～1m³	0.5～200.0
	40	1	1mL	0.5～ 22.5
		2～7	0.01L～1m³	0.5～200.0
	50	1	1mL	0.5～ 18.0
		2	0.01L	0.5～180.0
		3～7	0.1L～1m³	0.5～200.0
NQ10LM	20	1	1mL	0.5～ 40.5
		2～7	0.01L～1m³	0.5～200.0
	30	1	1mL	0.5～ 27.0
		2～7	0.01L～1m³	0.5～200.0
	60	1	1mL	0.5～ 13.5
		2	0.01L	0.5～148.5
		3～7	0.1L～1m³	0.5～200.0
	80	1	1mL	0.5～ 10.1
		2	0.01L	0.5～111.4
		3～7	0.1L～1m³	0.5～200.0
	100	1	1mL	0.5～ 8.1
		2	0.01L	0.5～ 89.1
		3～7	0.1L～1m³	0.5～200.0
NQ10LL	40	2	0.01L	0.5～189.0
		3～7	0.1L～1m³	0.5～200.0
	60	2	0.01L	0.5～126.0
		3～7	0.1L～1m³	0.5～200.0
	120	2	0.01L	0.5～ 63.0
		3～7	0.1L～1m³	0.5～200.0
	160	2	0.01L	0.5～ 47.3
		3～7	0.1L～1m³	0.5～200.0
	200	2	0.01L	0.5～ 37.8
		3～7	0.1L～1m³	0.5～200.0
NQ10LG	120	2	0.01L	0.5～ 49.5
		3～7	0.1L～1m³	0.5～200.0
	180	2	0.01L	0.5～ 33.0
		3～7	0.1L～1m³	0.5～200.0
	360	2	0.01L	0.5～ 16.5
		3～7	0.1L～1m³	0.5～200.0
	480	2	0.01L	0.5～ 12.4
		3	0.1L	0.5～185.6
		4～7	1L～1m³	0.5～200.0
	600	2	0.01L	0.5～ 9.9
		3	0.1L	0.5～148.5
		4～7	1L～1m³	0.5～200.0

⚠This table shows the pulse width in the case without uneven speed rotation, pulsating current, etc.
⚠There are cases where the pulses overlap even in the above indicated range, depending on the working environments of the flow meter.

Product warranty

The products and specifications described in this document are subject to change (including specification change and production termination) without notice for product improvement. When you consider using or ordering the product described in this document, please contact us as appropriate to confirm that the information described in this document is the latest.

This product is manufactured and inspected under the appropriate quality control as an industrial instrument, and delivered. However, failure may occur due to an unexpected cause. When this product is used for process control that may cause serious problems in terms of safety, safety can be achieved by duplicating the control system, such as adding equipment that performs the same function in addition to this product. Acceptance inspection will be conducted promptly for the purchased product, and with regard to the handling before or during the acceptance inspection of this product, please give due consideration to management and maintenance.

Warranty period

The warranty period for this product is one year after delivery.

The warranty period shall start from the date of the form (delivery note, installation commission confirmation, receipt).

Scope of warranty

If a failure or defect is found in our product during this warranty period due to our responsibility, we will provide replacement products, or replace or repair the defect part free of charge.

However, if any failure or damage falls under any of the following articles, this warranty does not apply.

1. **When it originates in the specification and the standard specified you, your handling method, etc.**
2. **In the case where the change in structure, performance, specifications, etc which carried out after purchase or delivery, and in which we are not involved.**
3. **When it is due to a phenomenon that cannot be foreseen by the technology that has been put into practical use on or before the time of purchase or contract.**
4. **When used out of range of conditions and environment described in catalogs and specifications.**
5. **In case where this product is used incorporated into your device and the damage could be avoided by the device function which should have in general concept.**
6. **Due to natural disasters or force majeure**
7. **Consumables such as batteries and relays, and optional items such as cables.**

In addition, the warranty mentioned here is limited to the warranty of the product purchased or delivered, and the damage caused by the failure of this product or damage is excluded.

NITTOSEIKO CO.,LTD.

【Website】 【Inquiry Form】

Control System Division Global Sales Section
Website: https://global.nittoseiko.com/