NITTOSEIKO
Taking new steps forward together

Vortex Type Flow Sensor
FLOP ® Type QS・QU

INSTRUCTION MANUAL

MNW10254 25.07

Type QS

Type QU

Please keep this instruction manual in a place where you can take it out and refer to it as soon as it is needed. Also, when reselling or transferring this product, please also attach this instruction manual to the product.
For inquiries about this flow meter and ordering parts, be sure to inform us of the model number and the serial number displayed on the name plate.

Contents

1. Introduction

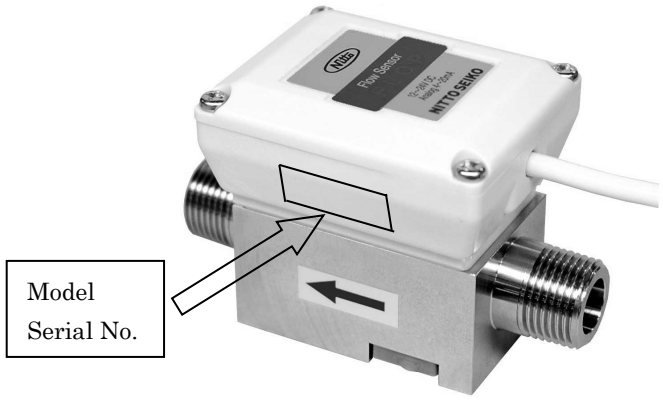
Thank you for purchasing a vortex type flow sensor FLOP of our make this time. Before using our instrument, please read carefully this instruction manual which explains specification, type, installation, etc. of the instrument.

Please note in advance that there may be cases where no revision of this manual is made even for any changes in specifications, construction and component parts which is considered as not putting any obstacle from the viewpoint 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 repair made by the user himself regardless of our position.

For any inquiry about trouble, 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 agent from whom you purchased the product or nearest branch office of our company.

In this document, the following symbol marks are used for safe and correct use of the equipment.

⚠ : 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. When received 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 the 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 Safety precautions

Warning Do not disassemble.
This equipment is strictly adjusted at factory. Surely not to disassemble.

Warning Prevent from wet of counter case.
It causes of damage or overheat ignition.

Warning Fasten by adequate torque when piping.
Excessive tightening causes damage or leakage.

Warning Make sure the + and – of wiring.
It causes of damage or overheat ignition.

Warning Do not wire to different voltage.
Wiring to other than the 12-24V DC causes of damage or overheat ignition.

2.2 Precaution regarding piping

Caution

Take care about installation place.

Do not install following place. It causes malfunction, damage, or trouble.

- Outdoor
- Place with large mechanical vibration or impact
- Place with many dust
- Environment temperature exceed 0-50℃.
- Place near the noise source

Caution

Liquid flow is match to arrow mark.

Make sure the flow direction being match to arrow mark. Otherwise, it causes malfunction, damage, or trouble.

Caution

Support a body by spanner etc. when piping.

Do not hold a counter unit when piping. Otherwise, it causes malfunction, damage or trouble.

Caution

Union joint is fixed by hand.

Excessive tightening causes damage or leakage. Do not use pipe wrench.

Caution

Install to a plastic pipe when body material is PPS.

If install to a metal pipe, thermal expansion cause damage or leakage.

2.3 Precaution regarding battery life

Caution

Pay due attention to battery life.

The service life of battery for Local indication type is about 2 years. Replace the battery at an early time if a battery alarm is indicated.

3. Outline

Vortex type flow sensor FLOP with simple structure measures the frequency of Karman's vortex generated downstream of the vortex generating body.

【Feature】

- Simple structure without moving parts and excellent reliability and durability
- Low pressure loss with little object in the flow channel
- It can output momentary flow rate as 4-20mA DC.

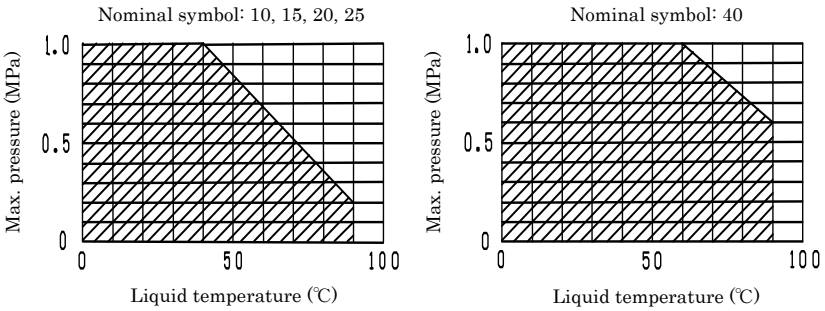
3.1 Standard specification

3.1.1 Sensor

Fluid Water, Pure water, Chemical liquid, etc
Nominal size 10A, 15A, 20A, 25A, 32A, 40A
Liquid Temp. 0～90℃
Accuracy Within ±2% FS
Connection Screw joint, Union joint, JIS10K wafer
Flow rate / Kinematic viscosity

Capacity symbol	Flow rate (L/min)	Kinematic viscosity (mm^2/s)
10	4 ～ 25	2 or less
15	8 ～ 50	3 or less
20	12 ～ 80	4 or less
25	20 ～ 130	5.5 or less
32	35 ～ 220	6.5 or less
40	60 ～ 350	9 or less

Liquid Press. 1.0 MPa or less
(In case of linear PPS material, use in the range shaded part in the below drawing.)



Wetted parts material

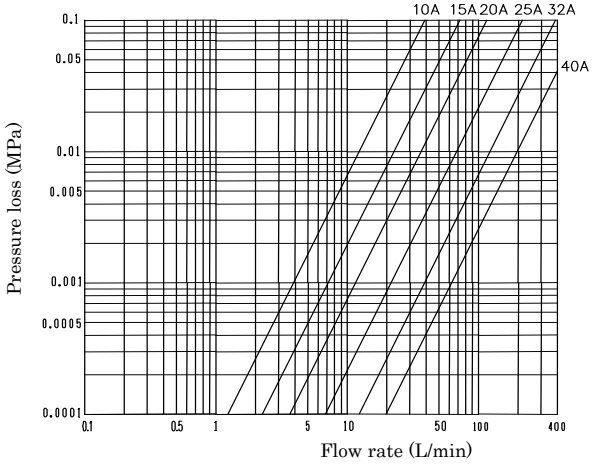
(Local indication type, Local indication with output type)

Body	Vortex generating body	Vortex detector	Sealing O-ring
Linear PPS	Linear PPS	Linear PPS	FPM
SUS316	PEEK (10,15A)	PEEK	FPM
SUS316	SUS316 (20,25A)	PEEK	FPM

(Remote control type)

Body	Vortex generating body	Vortex detector	Sealing O-ring
SUS316	PEEK (10,15A)	PEEK	EPDM
SUS316	SUS316 (20,25,32A)	PEEK	EPDM

Pressure loss (Liquid viscosity: 1mPa・s)



3.1.2 Transmitter

(1) Remote control type

Power	12-24V DC	
Ambient temp.	0-50℃	
Output signal	4-20mA DC	
	Max. load resistance 150Ω (at 12V) – 500Ω (at 24V)	

(2) Local indication type

Power	AA lithium battery	
	Voltage	3V DC
	Battery life	Approx. 2 years
Ambient temp.	0-50℃	
Indication	Numeric	7segment LCD
		8 digits (7H: 4 digits + 10H: 4 digits)
Article	Total, Momentary flow rate (Change by MODE switch)	

(3) Local indication with output type

Power	12-24V DC	
Ambient temp.	0-50℃	
Indication	Numeric	7segment LCD
		8 digits (7H: 4 digits + 10H: 4 digits)
Article	Total, Momentary flow rate (Change by MODE switch)	
Output signal	4-20mA DC	
	Max. load resistance 120Ω (at 12V) – 600Ω (at 24V)	

3.2 Model

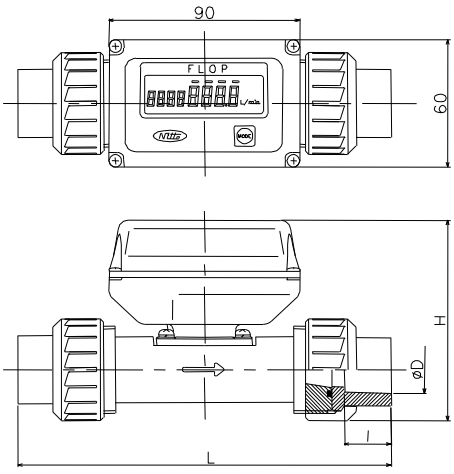
Type						Description
QS						Local indication type
QU						Remote control type
Capacity symbol	10					10A
	15					15A
	20					20A
	25					25A
	32					32A
	40					40A
Body material		2				Linear PPS
		6				SUS316
Output			0			Without
			2			4-20mA DC
Process connection				R		Screw joint
				U		Union joint
				W		JIS10K wafer
Nominal diameter of union joint					16	16mm
					20	20mm
					25	25mm
					-	Other than union joint

＊Available combination is referred to following table.

Type	Material	Capacity	Wafer	Union joint (Nominal size)	Screw joint (Nominal size)
Local indication	Linear PPS	10	—	○ (16)	○ (R1/2)
		15	—	○ (16,20)	—
		20	—	○ (20,25)	—
		25	—	○ (25)	—
		40	○	—	—
	Stainless steel	10	—	—	○ (R3/8)
		15	—	—	○ (R1/2)
		20	—	—	○ (R3/4)
		25	—	—	○ (R1)
Local indication with output	Linear PPS	10	—	○ (16)	○ (R1/2)
		15	—	○ (16,20)	—
		20	—	○ (20,25)	—
		25	—	○ (25)	—
		40	○	—	—
	Stainless steel	10	—	—	○ (R3/8)
		15	—	—	○ (R1/2)
		20	—	—	○ (R3/4)
		25	—	—	○ (R1)
Remote control	Stainless steel	10	—	—	○ (R3/8)
		15	—	—	○ (R1/2)
		20	—	—	○ (R3/4)
		25	—	—	○ (R1)
		32	—	—	○(R1・1/4)

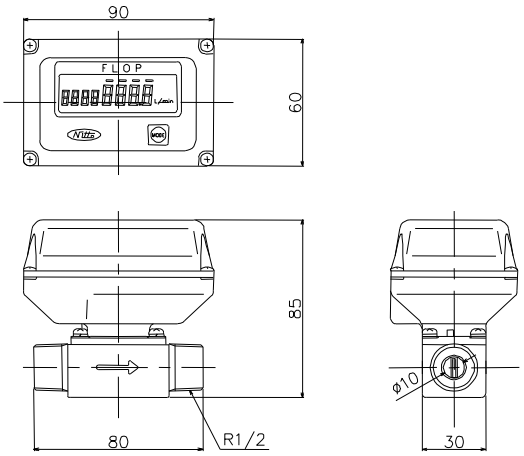
3.3 External dimension

Local indication type (Union joint)



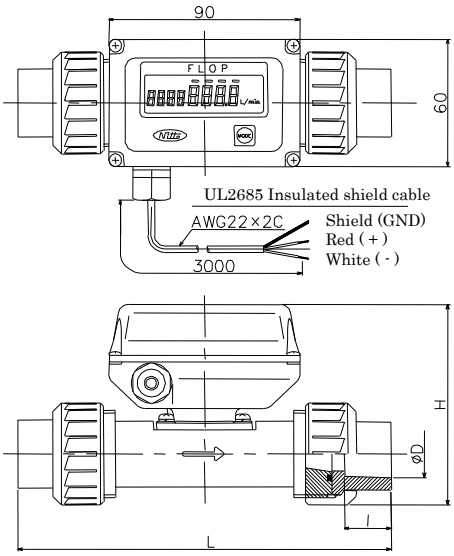
Model	Size (mm)				
	L	l	H	ØD	Ød
QS1020U16	176	22	94	22.3	10
QS1520U16	176	22	96	22.3	14
QS1520U20	190	25	100	26.3	14
QS2020U20	190	25	110	26.3	18
QS2020U25	192	29	113	32.3	18
QS2520U25	192	29	115	32.3	23

Local indication type (Screw joint)



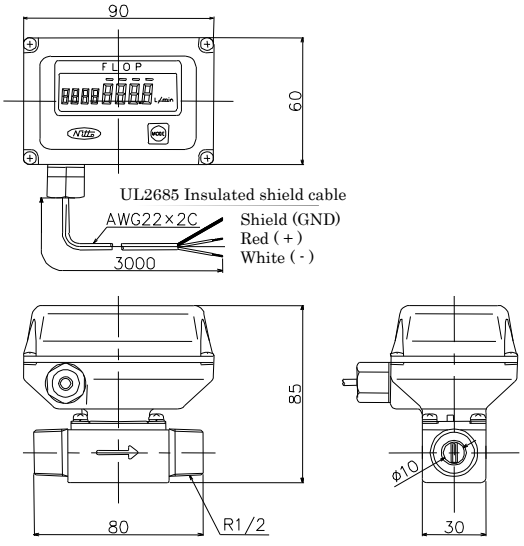
<Model: QS1020R>

Local indication with output type (Union joint)



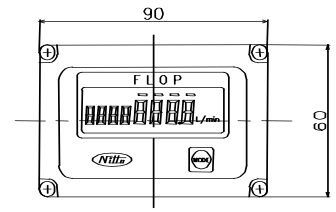
Model	Size (mm)				
	L	l	H	ØD	Ød
QS1022U16	176	22	94	22.3	10
QS1522U16	176	22	96	22.3	14
QS1522U20	190	25	100	26.3	14
QS2022U20	190	25	110	26.3	18
QS2022U25	192	29	113	32.3	18
QS2522U25	192	29	115	32.3	23

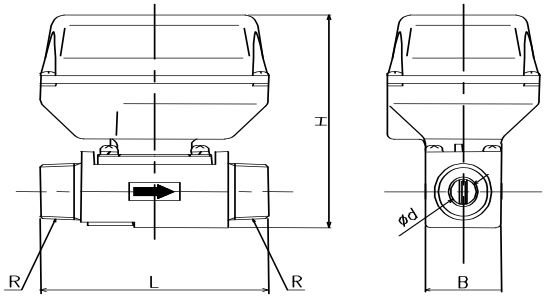
Local indication with output type (Screw joint)



<Model: QS1022R>

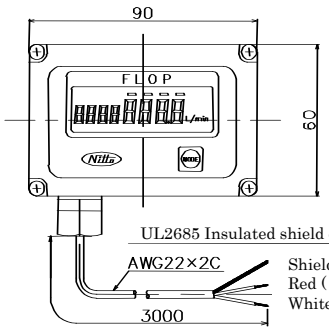
Local indication type (Screw joint)

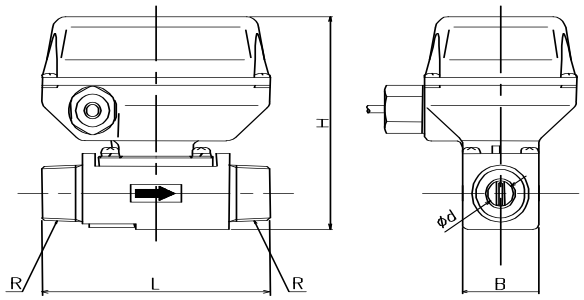




Model	Size (mm)				
	L	H	B	ød	R
QS1060R	80	85	30	10	R3/8
QS1560R	90	89	30	14	R1/2
QS2060R	120	98	40	18	R3/4
QS2560R	130	103	40	23	R 1

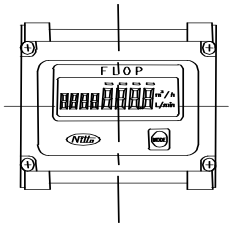
Local indication with output type (Screw joint)

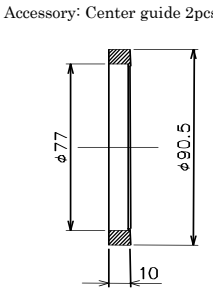


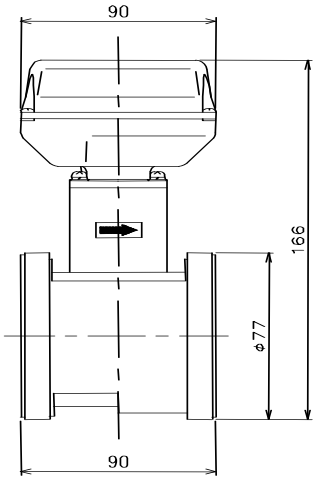


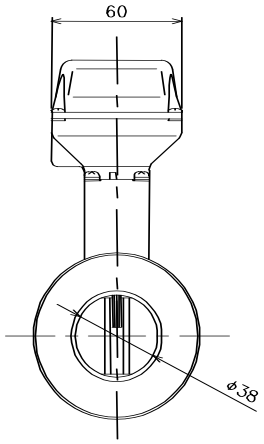
Model	Size (mm)				
	L	H	B	ød	R
QS1062R	80	85	30	10	R3/8
QS1562R	90	89	30	14	R1/2
QS2062R	120	98	40	18	R3/4
QS2562R	130	103	40	23	R 1

Local indication type (Wafer)



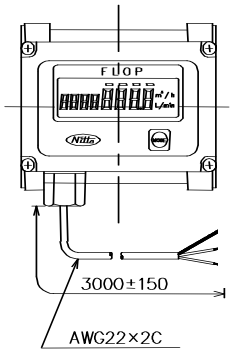


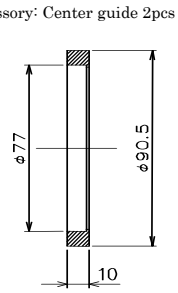


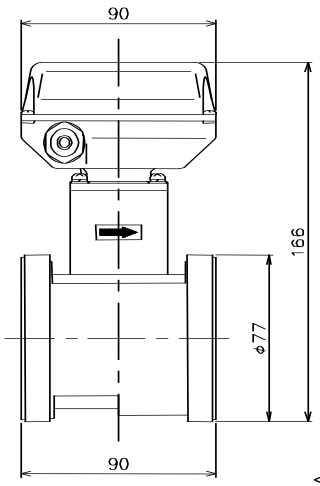


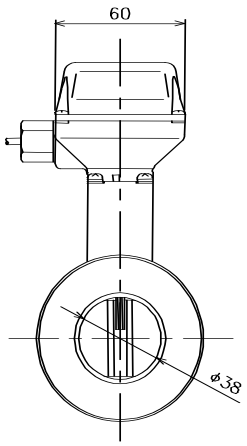
<Model: QS4020W>

Local indication with output type (Wafer)



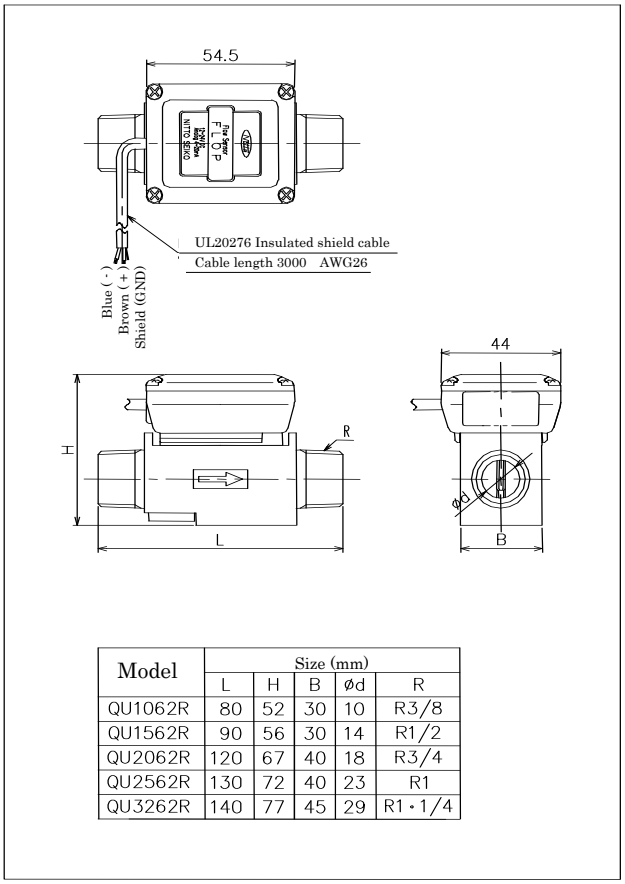






<Model: QS4022W>

Remote control type (Screw joint)



Model	Size (mm)				
	L	H	B	ød	R
QU1062R	80	52	30	10	R3/8
QU1562R	90	56	30	14	R1/2
QU2062R	120	67	40	18	R3/4
QU2562R	130	72	40	23	R1
QU3262R	140	77	45	29	R1・1/4

4. Installation

4.1 Piping design

Select a place satisfying the following conditions for correct measurement.

(1) Installation place
- Place easy to inspect
- Place protected against direct sunshine
- Place protected against rain and dew
- Place with little corrosive gas
- Place with little dust
- Place with little electromagnetic noise
- Place subject to little vibration

(2) Prevention of noise
Select a place not close to any power source such as motor, transformer, etc. as it may cause noise interference to the FLOP.

(3) Working space
A working space is required for such works as mounting, wiring, inspection, etc. Select a place where a sufficient space can be secured for it.

(4) Earth ground
Make sure to wire an equivalent for D-class earth work with ground resistance of 100 Ω or less to the earth ground terminal on the side of transmitter in case of remote control type.

(5) Mounting posture
Perform piping design so that the liquid may always be filled with inside the detecting portion of FLOP.

(6) Throttle valve, branch valve, temperature sensor
Make sure to install such equipment at downstream side of FLOP, otherwise it affects to accuracy.

4.2 Installation

4.2.1 Precaution for installation

(1) Take care not to drop or add any excessive impact.

(2) Make the flow direction of measured liquid being match to arrow mark on the measuring part of FLOP.

(3) Install the flow direction from Bottom to Top when vertical piping in order to avoid two-layer flow.

(4) Do not face transmitter to bottom when install horizontal piping.

(5) Avoid to install to pipe with vibration.

(6) Do not hold a transmitter but support a sensor, when install.

(7) Carry out flushing to remove dust before operation. Make sure to flush through by-pass pipe, through short pipe instead of FLOP, or install strainer (more than 60 mesh of filter) to upstream of FLOP.

(8) Operation flow rate shall not exceed 110% of maximum flow rate. It causes damage of detector.

4.2.2 Precaution for piping

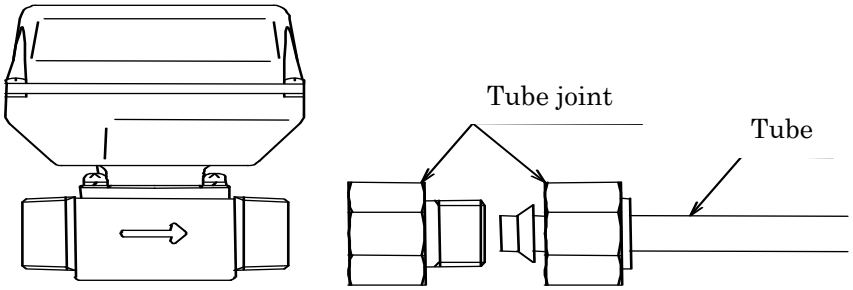
(1) Straight piping is required more than 7D on upstream (more than 10D in case of 40mm size), and more than 5D on downstream of FLOP.

(2) Make sure to install strainer (more than 60 mesh of filter), if dust can be included in the measured liquid.

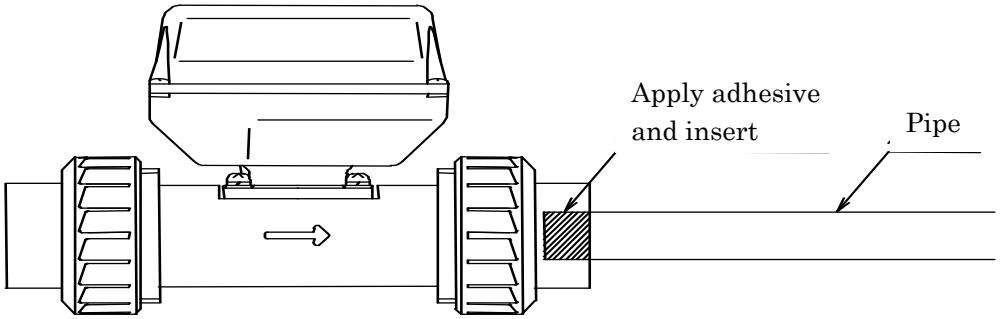
(3) Provide a bypass piping. Piping shall be considered for flushing at initial operation, maintenance, and inspection.
(4) Center of pipe shall be matched not to give piping stress.
(5) When using liquid packing or thread seal tape, etc., take care to prevent the liquid packing or thread seal tape, etc. from protruding into the pipe.
(6) In case of union joint, fixing the union nut shall be not by pipe wrench but by hand.
(7) Abnormal pressure such as water-hammer cause of damage of vortex detector, so that take care of the piping and valve operation.

4.2.3 Piping example

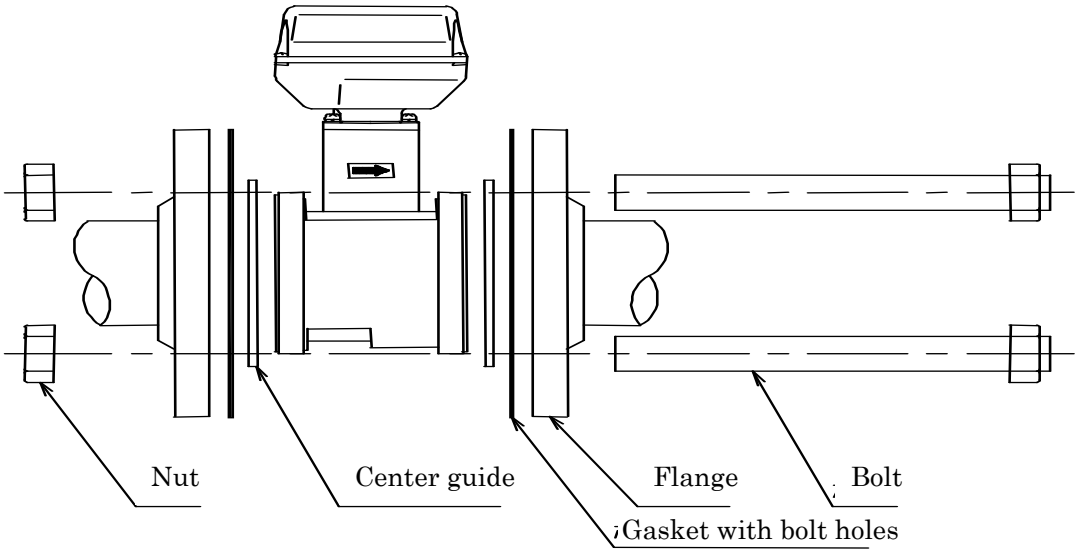
<Screw joint>



<Union joint>



<Wafer>



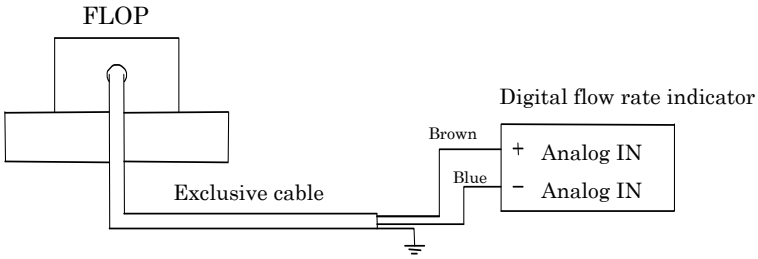
5. Wiring

5. 1 Wiring

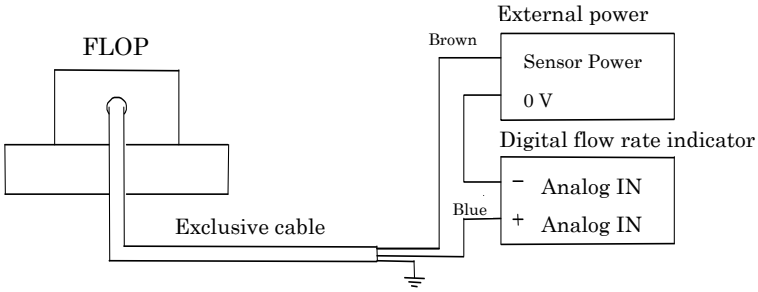
- Use shielded cable to prevent malfunction. The ground shall be connected to earth at a single point.
- 4-20mA output wire shall not be bundle with large current wire, and shall not be wired in parallel. It causes of malfunction.
- Do not install near the noise source.

(1) Remote control type

① To connect digital flow rate indication with sensor power.

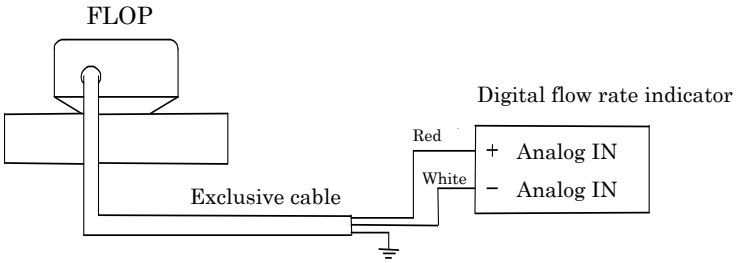


② To connect digital flow rate indication without sensor power.

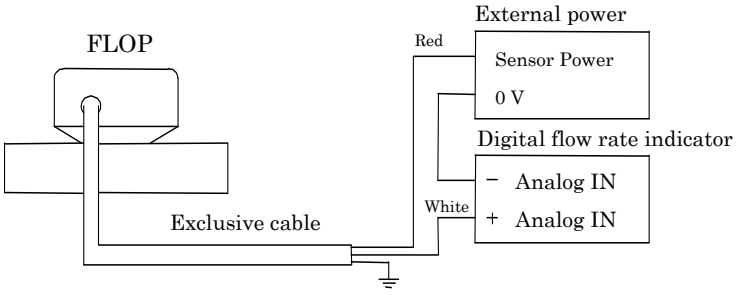


(2) Local indication with output type

① To connect digital flow rate indication with sensor power.

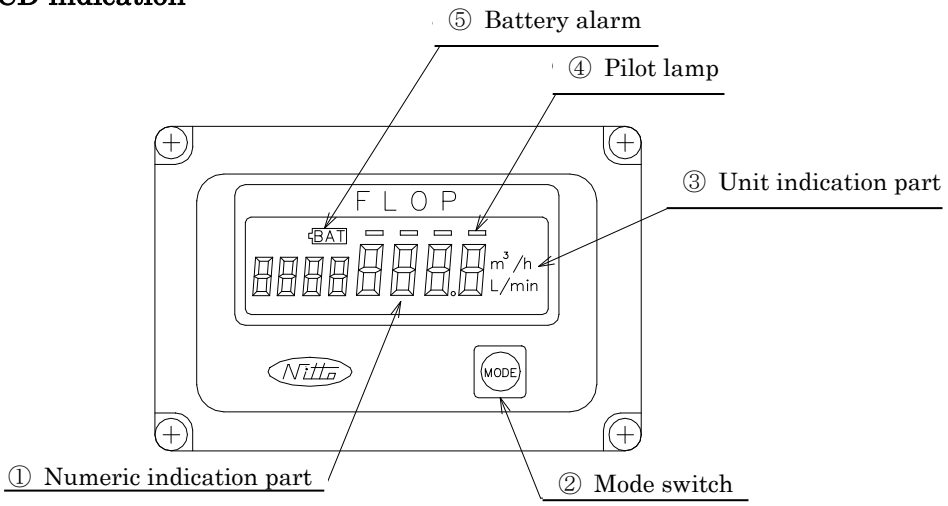


② To connect digital flow rate indication without sensor power.



6. Operation

6. 1 LCD indication



① Numeric indication part
Indicates total value or momentary flow rate

② Mode switch
Change indication article

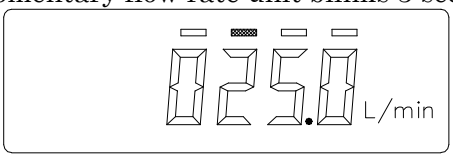
③ Unit indication part
Indicate unit of indicating mode

④ Pilot lamp
During measurement, lamp turns on from left to right next by next.
(4 lamps blink at same time when flow rate become 110% of Max flow rate)

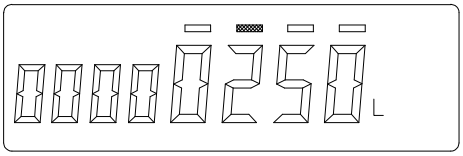
⑤ Battery alarm
It blinks when battery is low.
* Local indication with output type does not have this function.

6.2 Mode

Mode 1: Indicate momentary flow rate.
Momentary flow rate unit blinks 3 seconds after changing indication mode.

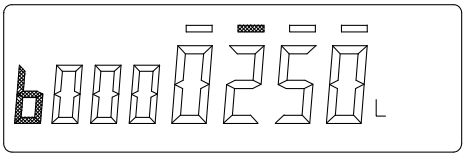


Mode 2: Indicate total value.
Total value unit blinks 3 seconds after changing indication mode.
Press the reset switch on the circuit board in the case, and reset to zero.



Mode 3: Indicate total value at batch processing.

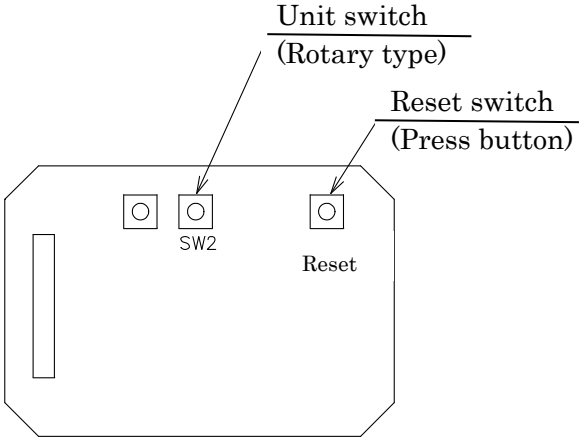
[b] blinks at the most left side digits. Press Mode switch more than 6 seconds, and reset to zero. Release the switch and start to count.



6.3 Change unit

Set by unit switch (SW2) on the circuit board in the case, according to the following table when indication unit change.

- After setting, unit changes within 2 minutes.
- Do not move any other switch or adjuster on the circuit board.
- After setting, please make sure to fasten the screw 4 corners on the case.



SW2	0	1	2	3	4	5	6	7	8	9
Flow rate	L/min	L/min	L/min	L/min	m^3/h	m^3/h	m^3/h	m^3/h	L/min	L/min
Total	1L	0. 1L	0. $01m^3$	0. $1m^3$	1L	0. 1L	0. $01m^3$	0. $1m^3$	1L	0. 1L

***** 1 decimal place for L/min, and 2 decimal places for m^3/h

(In case of 40A size, without decimal point for L/min and 1 decimal place for m^3/h)

7. Maintenance

7. 1 Trouble shooting

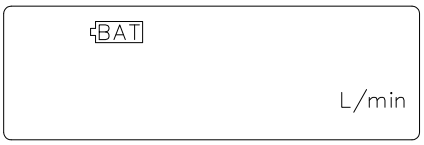
Symptom	Check point
Not turn on the indication symbol	Battery is correctly installed or not. Wiring is correct or not.
Not output 4-20mA DC	Wiring is correct or not.
Flow rate Zero state even flowing liquid. (Showing 0 L/min, or output 4 mA DC)	Flow direction is matching with arrow mark. Foreign material is adhering to vortex generating body or not. Operation flow rate is within the capacity or not.
Large shift of momentary flow rate or output value even flow is stable.	Foreign material is adhering to vortex generating body or not. Operation flow rate is within the capacity or not.
Indicate or output other than zero state even liquid does not flow.	Affected by noise or not. Affected by vibration or not.

7.2 Battery replacement

(Except for remote control type and local indication with output type)

- Loosen the screws 4 corners on the case, and open up. Take off the battery keep band, and set the battery. (Please make sure the terminal positive and negative.) Always lock by battery keep band after put the battery in.
- When battery alarm is blinking, battery shall be replaced as soon as possible. Recommended battery is AA lithium battery and its life is approximately 2 years. Other kind of battery such as alkaline or manganese is also available, however, the battery life will be shorter. Avoid to use different kind of battery together. It causes battery leak or damage.
- Battery replacement shall be carried out within 60 seconds when using for total value checking, and total value data can be kept. However, we recommend to write down the total value for the safety.
- When battery become much lower, it become stand-by state, and do not measure. In this case measured total value may lost. When it does not show total value after replace the battery, press the reset switch and turn to the initial state.

<Stand-by state>



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.

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

【Website】 【Inquiry Form】