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**Differential Pressure Flow Meter**  
***DPMX Series***

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**Operation Manual**

**SURPASS INDUSTRY CO., LTD.**

3rd Edition  
(2014. 10)

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## 1. Read Before Use




### [About This Operation Manual]

- All users are required to carefully read and understand this manual before operation of the product.
  - Keep this manual in good condition, and retain it close at hand for quick consultation whenever necessary.
  - Use the product only as intended, and only as directed in this manual.
  - Cautionary notes in this manual must be fully understood and complied with at all times.
- 
- ◆ Strict observance of the above instructions is mandatory.
  - ◆ Failure to observe them may result in personal injuries or accidents.

### [Symbols in this Operation Manual]

Warnings and cautionary notes are provided in this manual to ensure this product is used correctly and to prevent personal injury and property damage.

The meanings of the WARNING and CAUTION symbols in this manual are as described below. Read and understand these notes before reading the rest of this manual.

 <b>WARNING</b>	This symbol indicates warnings which, if not observed, may cause death or severe injury to the user.
 <b>CAUTION</b>	This symbol indicates warnings which, if not observed may physically impair the user or damage surrounding objects.
 <b>Note</b>	This symbol indicates important information required to operate this product correctly.

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## 2. Product Overview

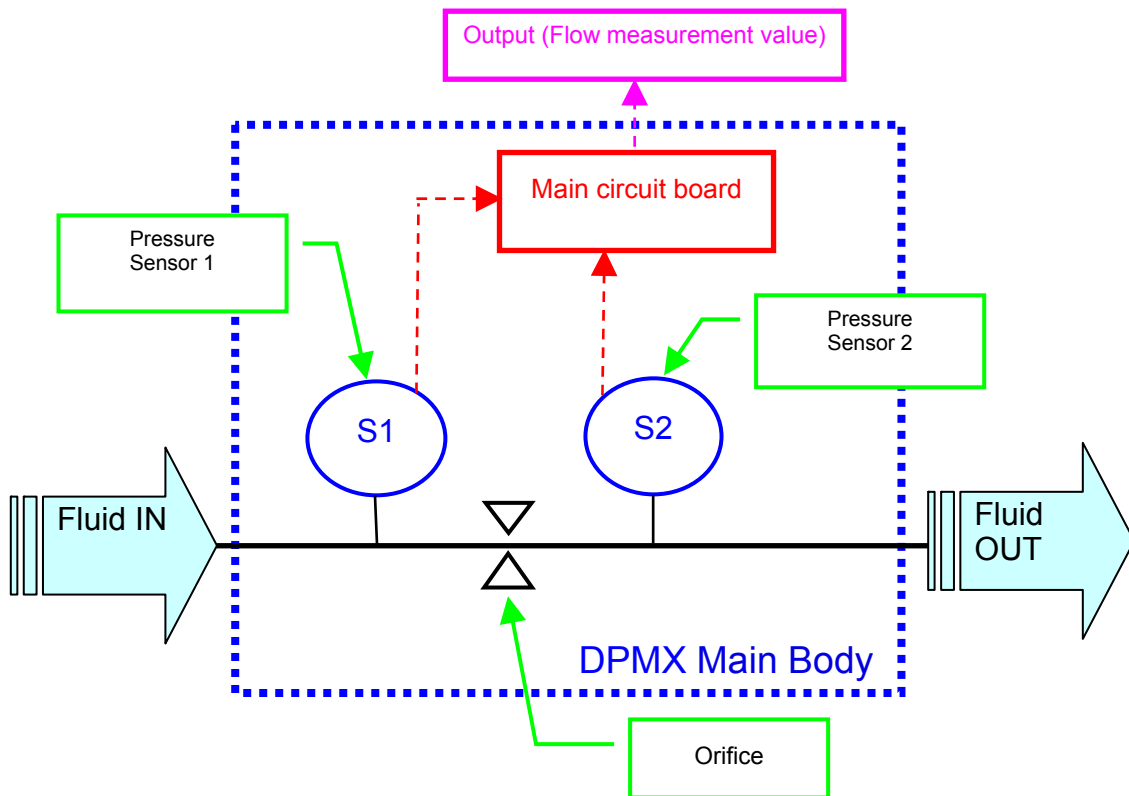
The "DPMX Series" is a differential pressure flow meter that makes high precision flow measurements of solutions like high purity chemicals and ultra pure water etc.

The material of the wetted parts is comprised of fluorine resin and can be used for various chemicals.

### [Features]

- (1) Detector/converter ⇒ "1 body type"  
Supports space-saving since a separate converter is not required.
- (2) The operating state of the device can be confirmed with the outputs of the LED indicators and external wiring.
- (3) Removal and installation of the cable from the main body is possible. ⇒ Installation/wiring work is made easier
- (4) External input zero adjustment function  
Zero adjustments can be performed using inputs from external wiring.
- (4) Button zero adjustment function  
zero adjustments can be performed by the main body's button controls.

### 2-1 Measurement Principle



When liquid is fed into the main body, pressure differences occur before and after the orifice.

The pressure difference is detected by sensors 1 and 2, and a signal is sent to the main circuit board, and a flow measurement is conducted by converting the flow of the pressure difference.

## 2-2 Specifications

### [Basic specifications]

Basic Model	DPMX	
Fluid used	Solutions like DI Water and chemicals	
Operating pressure range	50 to 400kPa (pressure range of quality assurance fluid) ※Minimum operating pressure: 40kPa	
Withstanding pressure	600kPa	
Temperature range of fluid	20 ~ 60°C	
Temperature range of environment	15 ~ 40°C	
Temperature range of quality assurance fluid	Calibration temperature ±5°C	
Calibration state at the time of shipment	◆ Calibration fluid temperature: 25°C ◆ Calibration fluid: DI Water	
Temperature range of calibration fluid	20 ~ 60°C	
Flow measurement precision	◆ When the flow calibration temperature is ±5°C ±2%F.S ( Pulsation of the liquid feeding pressure is within ±15kPa )	◆ For liquid temperature outside the range at left ±5%F.S ( Pulsation of the liquid feeding pressure is within ±15kPa )
Minimum pressure difference required ΔP	Refer to the separate sheet "Pressure difference-flow characteristics"	
Coupler type	Nippon Pillar Packing Co.,Ltd. Super 300 Type P Series	
Material of wetted parts	PFA, kalrez O-ring	
Installation position	Horizontal/vertical ( IN : down, OUT up ) Sideways ( The back of the base faces the wall ) * The back of the base excludes the upper part	
Protection level	IP65 compliant	

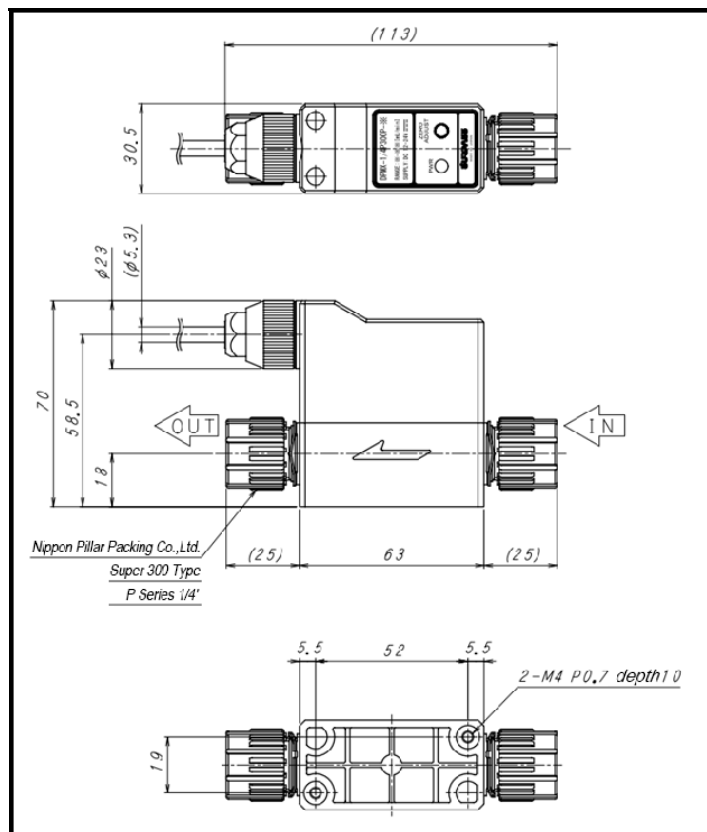
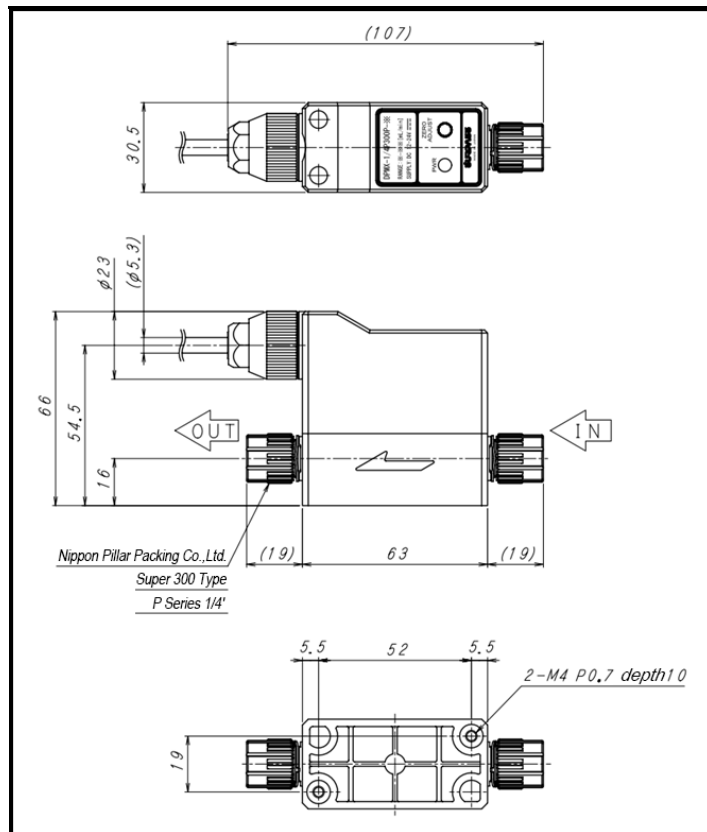
### [Electrical specifications]

Power		DC12~24±1V	
Current consumption		MAX : 80mA (12V) MAX : 45mA(24V)	
"Input/Output Specifications"	Input type	Flow rate zero adjustment	Contact input
		Pressure zero adjustment	Current output (4~20mA) / Voltage output (1~5V)
	Output type	Flow	Frequency pulse NPN open collector output
		Pressure (2nd pressure)	Current output (4~20mA) / Voltage output (1~5V)
	State	NPN Open Collector Output	
Alarm Type		Sensor error	
		Range over	
Cable specifications	Specifications	AWG26 8 core PVC coating	
	Length	2m	
RoHS		Supports RoHS	

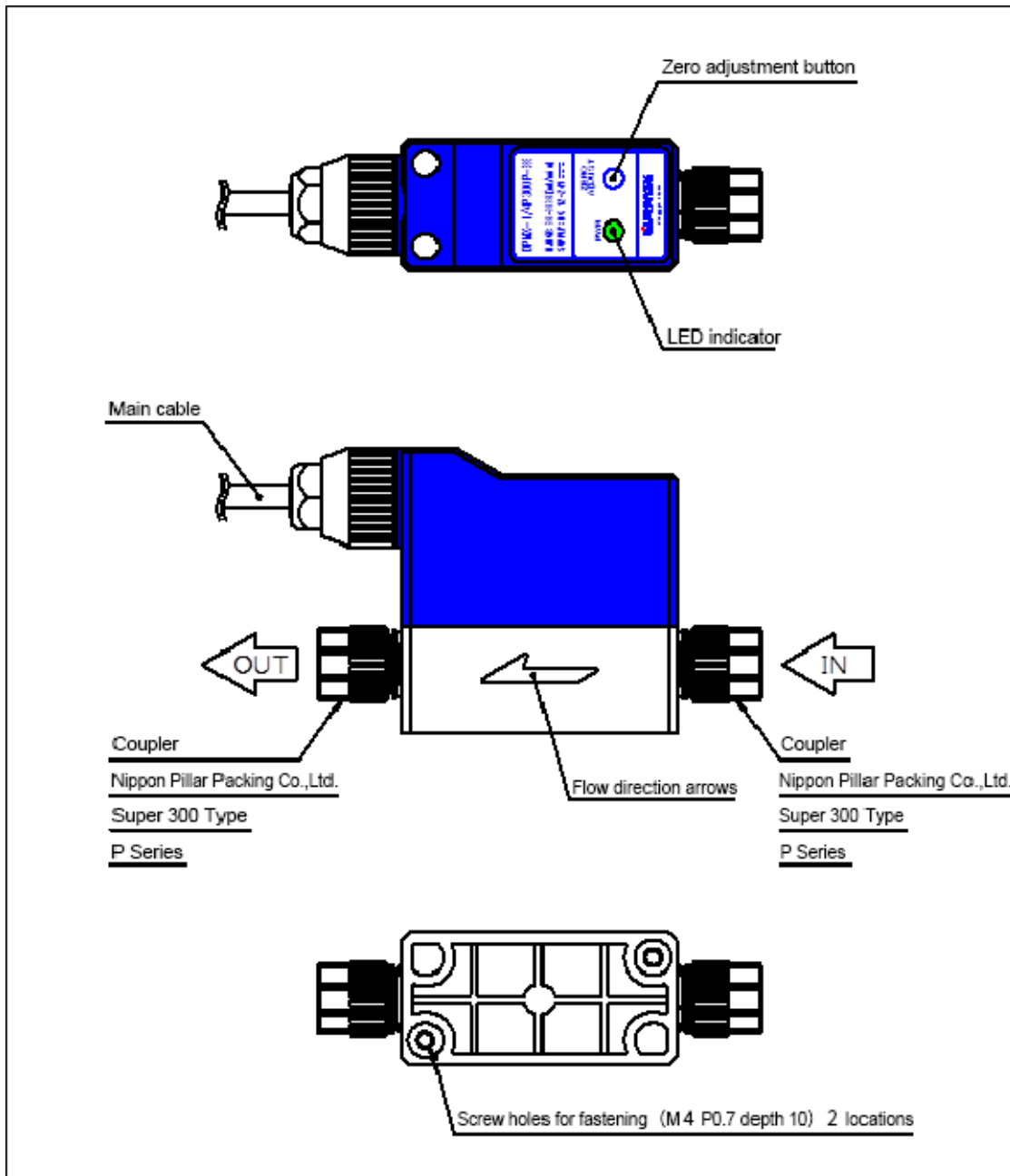
### ◆ DPMX Series Specifications Table

DPMX	—	Connection diameter	P300P	—	Flow range	Output type
(1)		(2)		(3)		(4)
(1)	DPMX	Basic Model				
(2)	1/4	Connection tube size: φ6.35×φ3.95				
	3/8	Connection tube size: φ9.53×φ6.35				
(3)		Flow range	Connection diameter			
			1/4	3/8		
	03	10~50mL/min	○			
	06	40~200mL/min	○			
	09	100~500mL/min	○			
	14	200~1000mL/min	○			
	20	500~2500mL/min		○		
	24	700~3500mL/min		○		
(4)	None	Current output (4~20mA)				
	D	Voltage output (1~5V)				

2-3 Outside Drawing



2-4 Functions of each part



Name	Description
Screw holes for fastening	Install/fix the device using fastening screw holes (M4 P0.7 depth 10) in 2 locations at the back of the base.
Flow direction arrows	Indicate the flow direction of liquids that are fed into the device.
Couplers	Connect the piping. The coupler types are Nippon Pillar Packing Co.,Ltd. Super 300 Type P Series.
Main cable	Cable used for power supply and external input/output. It is removable. (See P.12)
Zero Adjust button	Flow rate zero adjustments can be performed by the button controls

### 3. Installation • Piping • Wiring

#### 3-1 Installation

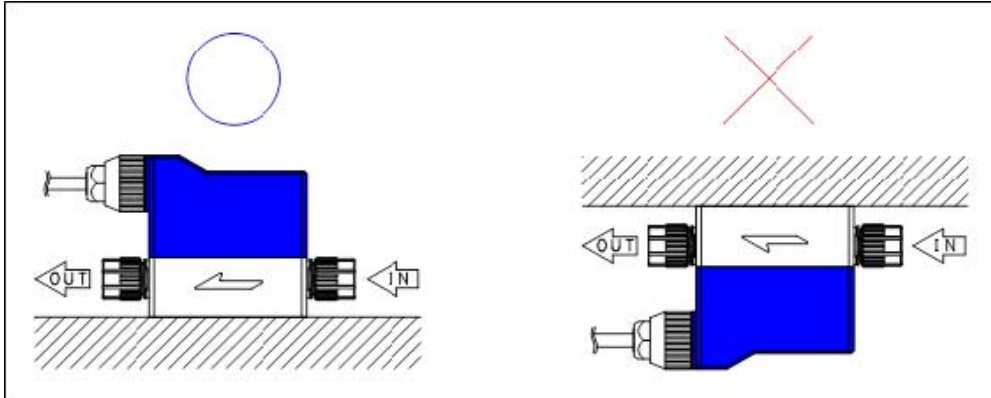
Fix the device using the fastening screw holes (M4: 2 locations) in the back of the main body's base.

##### ◆ Installation position

(1) Parallel

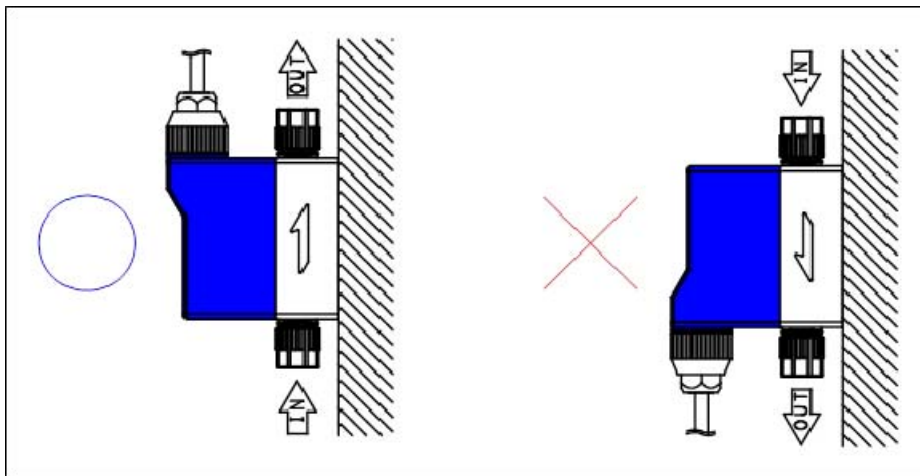
(2) Sideways: the back of the base is sideways (parietal) \*IN / OUT is in a horizontal state

\* The back of the base excludes the upper part. (Horizontal placement puts the top surface and the back side in a reverse state)



(3) Perpendicular

\* When installing in a perpendicular, place the direction of flow as "IN: down ⇨ OUT: up."



#### ⚠ Note

- Do not use the device in a state where the back of the base is positioned as the upper part (a horizontal position where the top surface and back of the base are in a reversed state). It will lead to performance deterioration.
- Install the device so that water/chemicals do not come in direct contact with the exterior of the main body. It will lead to a malfunction.
- Please install the product where it won't be subject to vibrations or impact. It will lead to a malfunction.



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## 3-2 Piping

Connect a tube to the main body's connections.

\* The couplers are Nippon Pillar Packing Co., Ltd. "Super 300 Type P Series."

### Note

- Regarding the construction/connection of the couplers, please refer to the operation manual of the coupler manufacturer.
- Please use tubes with the designated size and materials.
- Confirm the flow direction arrows indicated on the product and conduct the piping according to the proper flow direction. (Refer to P.6,7)
- Please make sure that curves in the piping do not apply excessive stress on the product.

### CAUTION

- Please do not operate the device in conditions outside the specification range. It will lead to a malfunctions and accidents.
- Please confirm the compatibility of the type of fluid to be used and the material of the product's wetted parts.
- This product is not explosion proof. Please do not use this product in areas where it will be exposed to combustible gases.  
There is a risk of fire or explosions.

### WARNING

- When using hazardous chemicals, always wear chemical-resistant protective equipment that covers the whole body (protective gloves, mask and clothing). There is a risk of bodily harm in the case of a sudden spurt of chemicals.
- When changing parts or conducting maintenance work, always cut the power and release the pressure from inside the piping.
- When removing the product from the piping connections, please take great care in ensuring that there is no pressure left inside the piping before removing the couplers.  
There is a risk of bodily harm resulting from a spurt of chemicals.

### 3-3 Wiring connections

#### ◆ Connecting the main cable

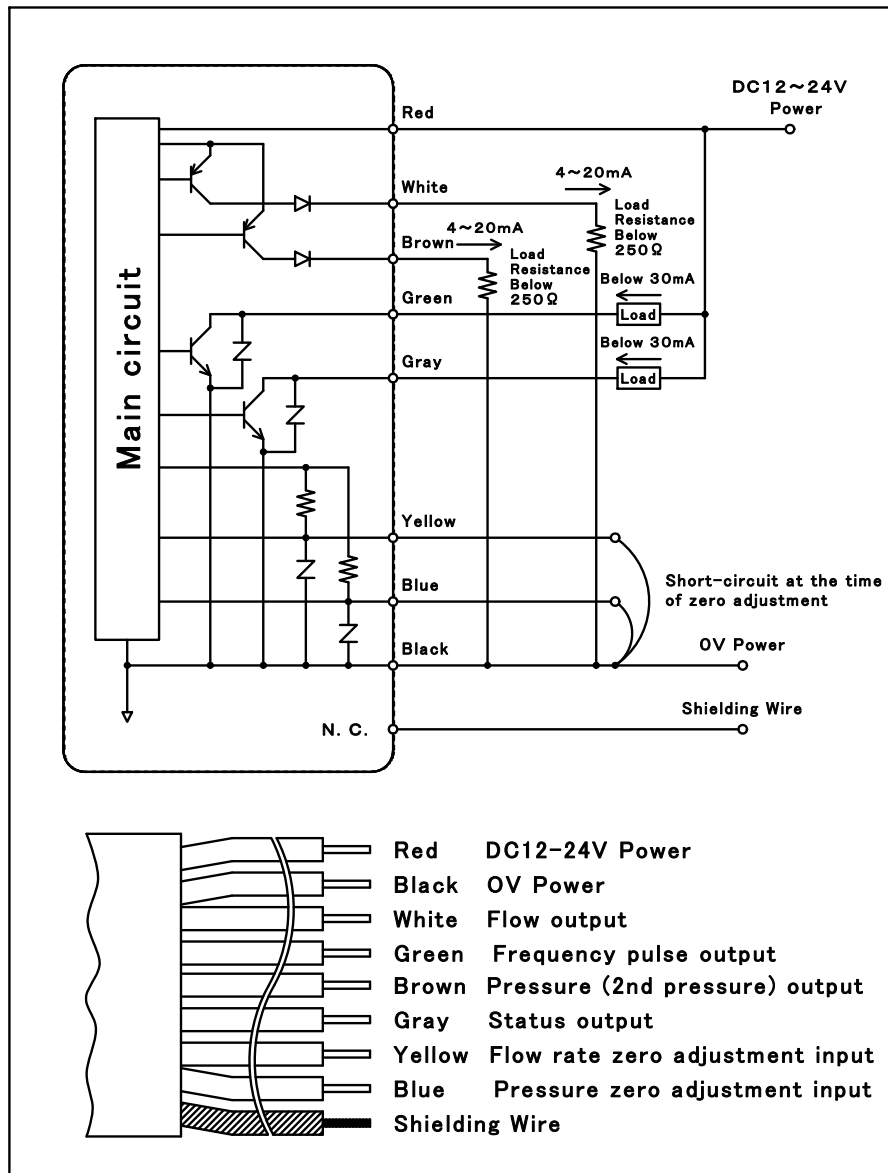
##### 1. Cable specifications

AWG#26×8C shield attached

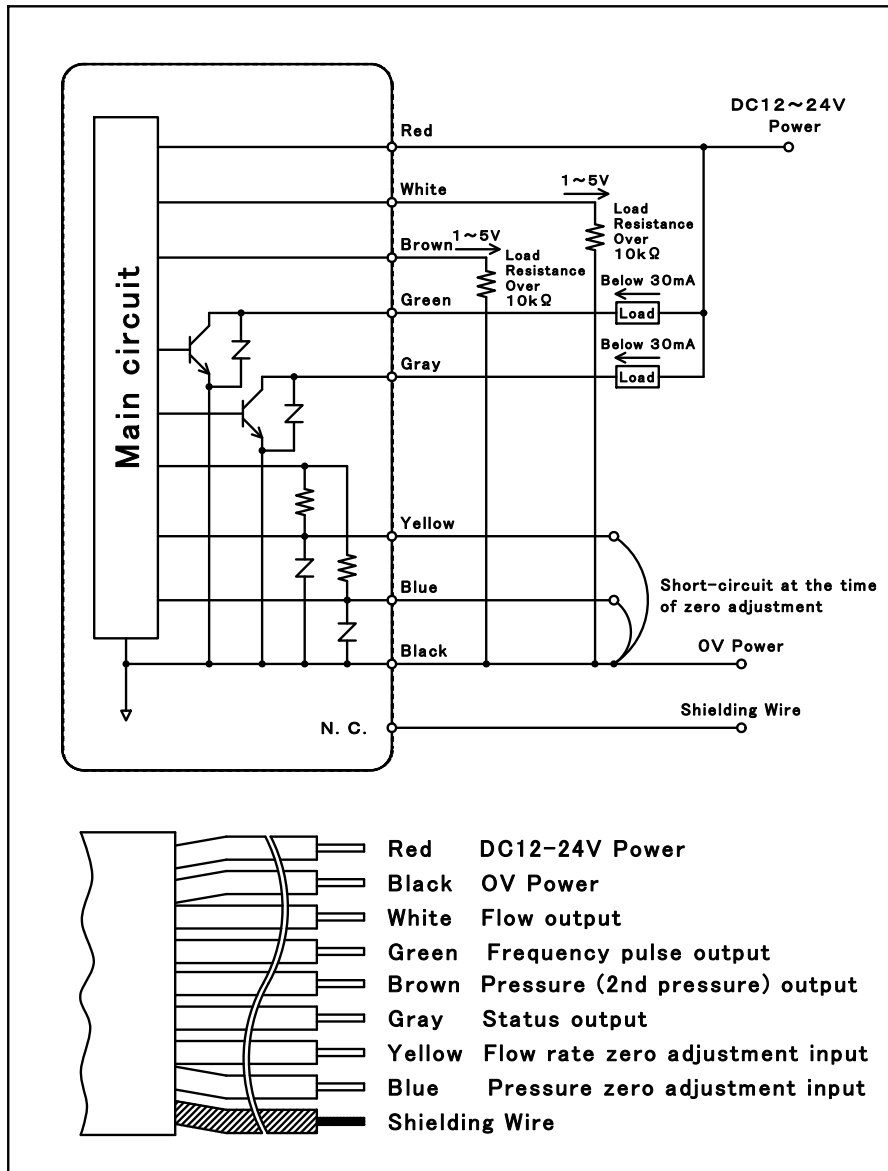
Item	Specifications
Size	AWG 26
Structure	7 line/0.16mm stranded wire
Number of cores	8 core
Core wire outer diameter	φ1.0
Outer diameter	φ5.3
Housing material	PVC coating
Standards	UL Style 20276

##### 2. Wiring diagram

Specifications of current output type



Specifications of voltage output type

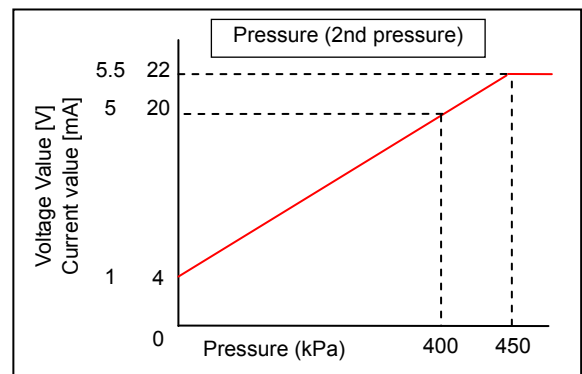
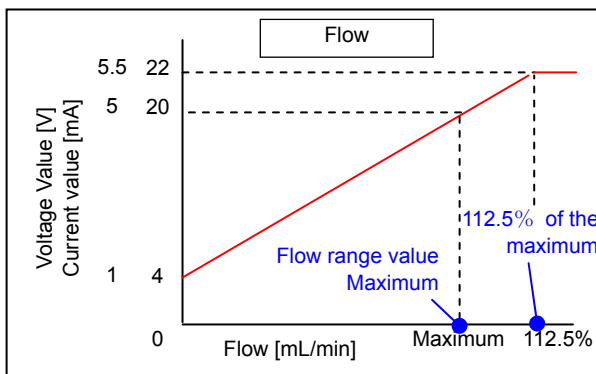


### 3. Input/Output Specifications

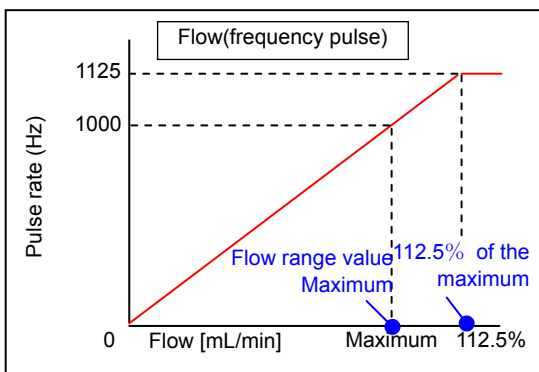
Input/Output	Type	Specifications	
Input	Flow rate zero adjustment	Contact input	
	Pressure zero adjustment		
Output	Flow	Current output: 4 ~ 20mA Load resistance: Below 250Ω	Voltage output: 1 ~ 5V Load resistance: Over 10kΩ
	Flow (frequency pulse)	NPN Open collector output Load rating: below DC30V/30mA Duty: 50% Pulse rate: 0 ~ 1000Hz	
	Pressure (2nd pressure)	Current output: 4 ~ 20mA Load resistance: Below 250Ω	Voltage output: 1 ~ 5V Load resistance: Over 10kΩ
	State	NPN open collector output Load rating: below DC30V/30mA	

### 4. Output scaling

Current value [mA]	4	20
Voltage value [V]	1	5
Flow [mL/min]	0	Maximum flow range value
Pressure (2nd pressure) [kPa]	0	400



Pulse rate (Hz)	0	1000
Flow [mL/min]	0	Maximum flow range value



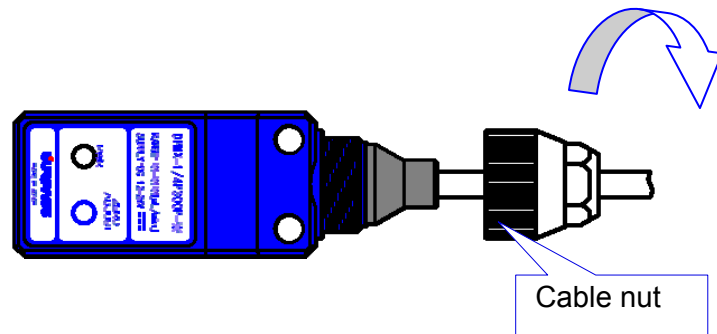
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### 3-4 Main cable removal, connection instructions

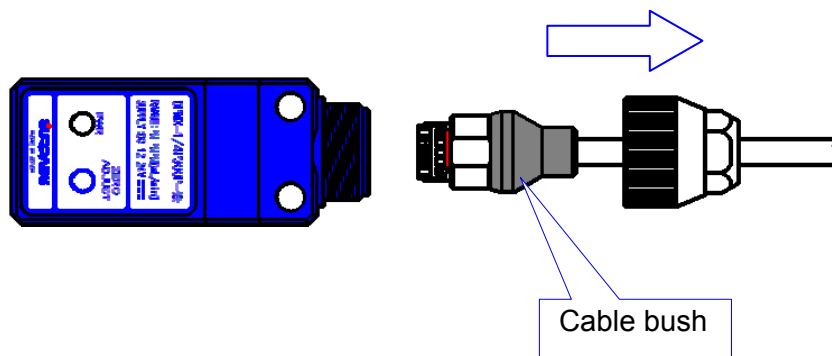
The main cable can be removed from the main frame.

#### ◆ Removal instructions

(1) Turn and loosen the cable nut in the illustrated direction and remove it.



(2) Grasp the cable bush and pull out the cable.

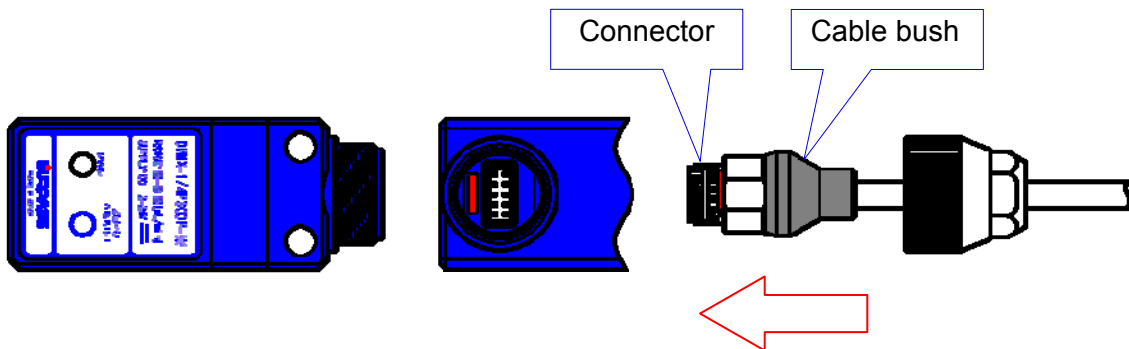


### **WARNING**

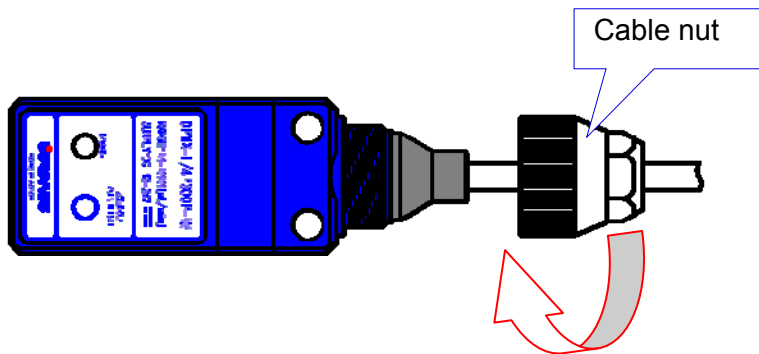
Never perform wiring work when power supply is on.

◆ Connection instructions

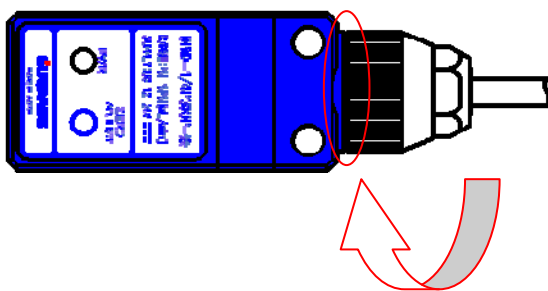
- (1) Grasp the cable bush and connect the connector to the main body.  
Insert the cable by positioning the red seals on the main body and the connector together.



- (2) Turn and loosen the cable nut in the illustrated direction and tighten it on the main body.



- (3) Securely tighten it until there is no space left between the main body and the cable nut.



<p><b>! Notes</b></p>	<ul style="list-style-type: none"><li>• Please always follow the removal and connection instructions. There is a risk that the cables will be damaged if the instructions are not followed.</li><li>• Tightly fasten the cable nuts so that the inner parts of the device are not exposed to the outside air.</li></ul>
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## 4. Usage

### 4-1 Preparations before use

#### ◆ Power activation

To warm up this device's sensors, please use the tool after more than 30 minutes has elapsed from the power activation.

After power has been activated in this device, the LED indicator lamp will light up in green.

#### ◆ Warming up the fluid temperature

Please feed sufficient fluid with the same temperature as the flow calibration temperature.

**\* If the electricity or fluids have not been warmed up enough, errors may occur in the flow measurements.**

### 4-2 Performing flow rate zero adjustment

After the electricity has been warmed up or reserve liquid has been fed, please conduct flow rate zero adjustment. (Please refer to P. 17~22 How to perform flow rate zero adjustment.)

**\* After installing this device and the piping connections have been completed, always perform flow rate zero adjustment when feeding liquid for the first time.**

**\* If flow rate zero adjustment is not performed, errors may occur in the flow measurements.**

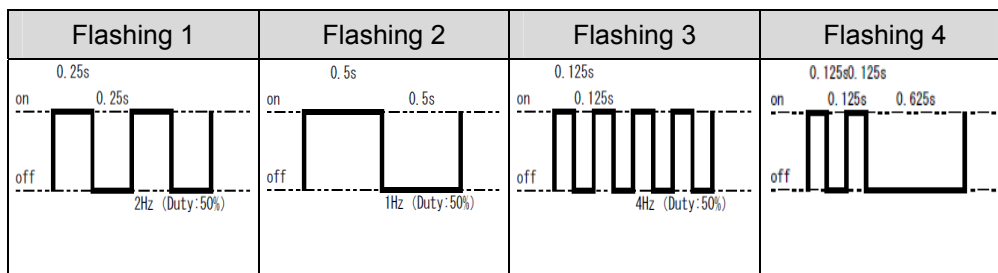
### 4-3 Flow measurement start

After the above instructions have been completed, start the operation.

### 4-4 Confirm operating state

The operating state of the device can be confirmed from the outputs of the LED indicators and status outputs. The following content listed in the graph below can be confirmed.

Operating state	LED indicator	Status output	Description
Normal times	Lit	ON	Flow measurements possible state
Zero adjustment underway (flow/pressure)	Flashing 1	OFF	Zero adjustment underway (flow/pressure)
Zero adjustment failure (flow/pressure)	Flashing 2 (5s)	OFF (5s)	Zero adjustment failure (flow/pressure)
Sensor error	Flashing 3	Flashing 3	Malfunction/breaking of pressure sensor
Range over	Flashing 4	Flashing 4	Pressure is 450 kPa or more



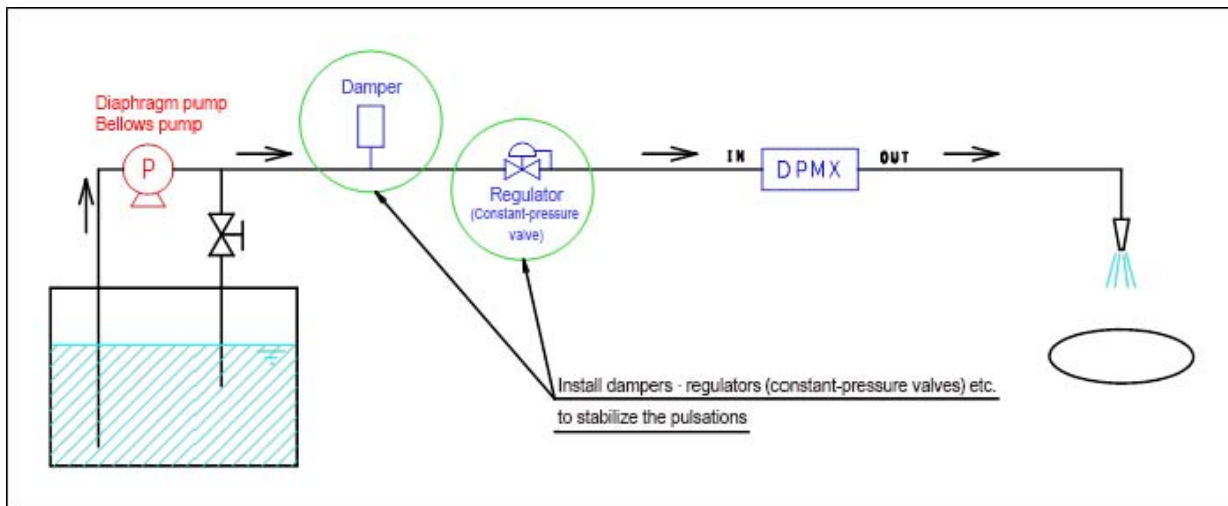
## 4-5 Precautions when operating

Please obey the following precautions in order to make full use of this device's functionality.  
The following will lead to performance deterioration and malfunctions.

[Caution 1]

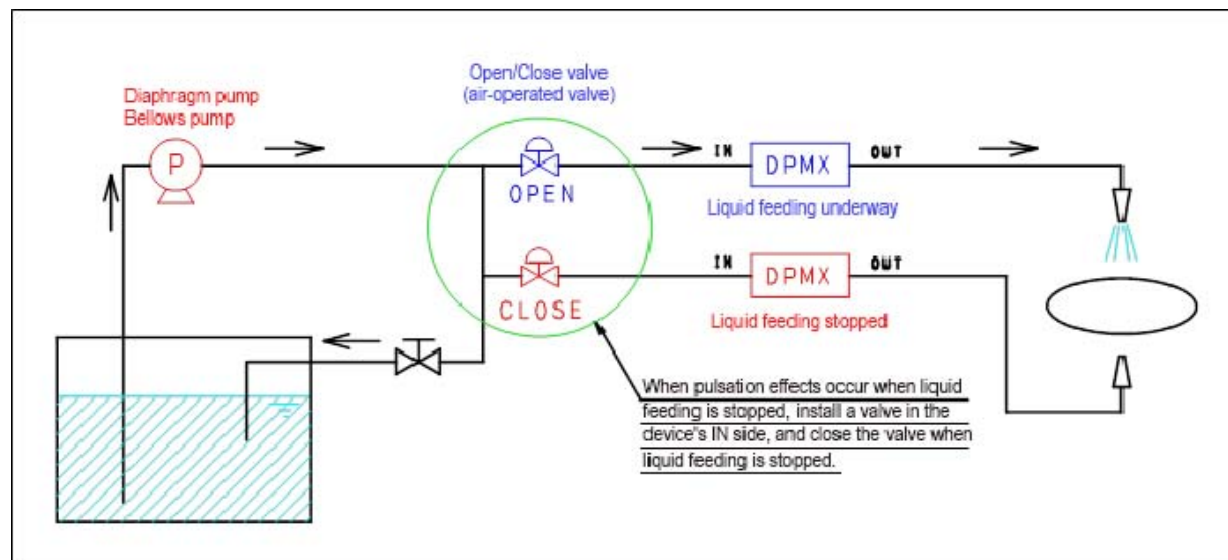
When sending solutions using diaphragm pumps/bellows pumps etc., measurement precision will deteriorate under feeding conditions where large pulsations occur.

Install the damper/regulator (constant-pressure valves) on the pump's discharge side, and stabilize the pulsations by reducing the feed pressure.



[Caution 2]

When liquid feeding is stopped and there are pulsation effects from the diaphragm pump/bellows pump etc., install an open/close valve (air-operated valve etc.) on the device's primary side (IN side) and close the valve on the primary side so it will not be affected by the pulsations. It will lead to output abnormalities.





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[Caution 3]

Please feed liquids under the piping conditions to prevent large amounts of air bubbles to flow inside the device's main duct.

Large amounts of air bubbles will lead to performance deterioration.

[Caution 4]

Please do not feed liquid with pressures exceeding the specifications. It will lead to a malfunction.

[Caution 5]

Do not use when the feed pressure condition is negative (gage pressure is "below 0kPa").

It will lead to output abnormalities and malfunctions.

[Caution 6]

After liquid feeding has been stopped for a long time (over 1 hour), when resuming flow measurements, please feed sufficient fluid with the same temperature as the flow calibration temperature.

[Caution 7]

When the load resistance of the device's OUT (2nd side) piping is large, there will be cases when the maximum flow in the specifications cannot be fed. Please refer to the attached sheet document "Pressure difference-flow characteristics" and confirm the piping conditions.

[Caution 8]

Please do not use the product under conditions where sudden flow temperature fluctuations may arise, as it will lead to damage.

## 5. Flow rate zero adjustment function

Flow measurement zero adjustment can be performed.

The adjustment can be performed using 2 methods; external input controls or button controls.

In the following cases, please perform the flow rate zero adjustment.

- When feeding liquid for the first time, or resuming use after the power has been turned OFF once.
- When changing the installation position (when changing from a horizontal installation ⇒ perpendicular installation etc.)
- When the actual flow rate error is large.

(In order to maintain the flow measurement precision for a long time, it is recommended that you perform flow rate zero adjustments regularly.)

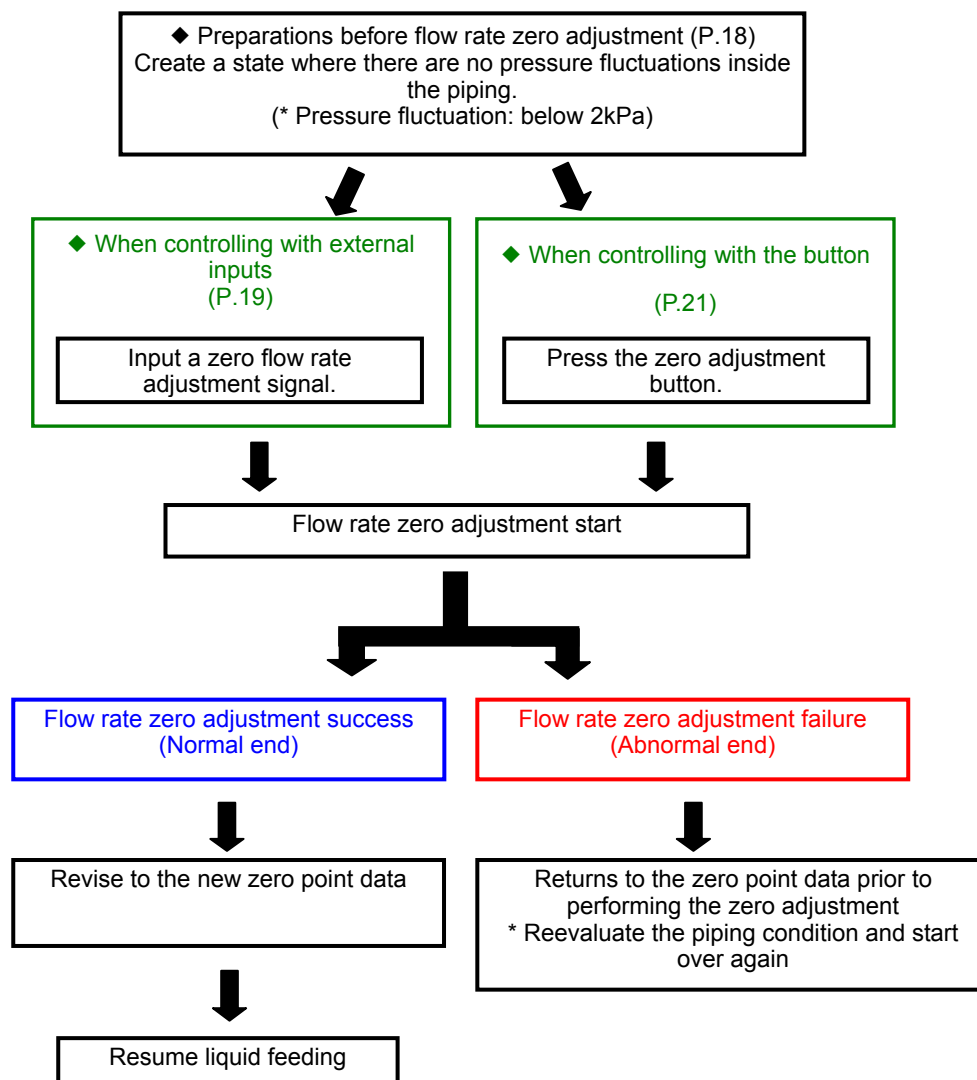
- When conducting a pressure zero adjustment.

### 5-1 Flow rate zero adjustment function overview

#### ◆ Operating conditions/specifications

Time required for the zero adjustment work	Roughly 10 seconds
Tolerance level of pressure fluctuations during zero adjustment	Below 2kPa
Zero adjustment differential pressure limit	Within $\pm 15$ kPa

#### ◆ Flow rate zero adjustment course (\* Refer to P.19, 21 for detailed instructions)

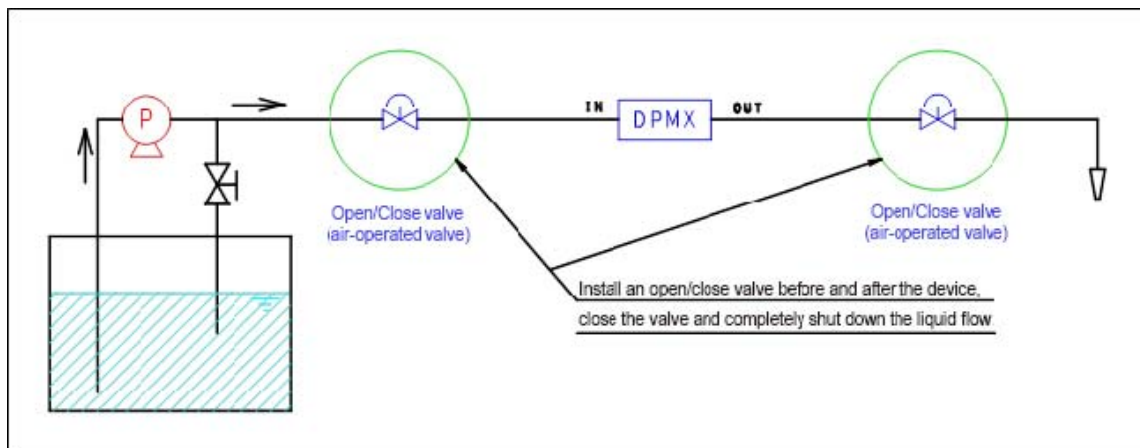


## 5-2 Preparations before flow rate zero adjustment

Please set up the device's piping according to the following conditions.

### ◆ Flow rate zero adjustment piping conditions

- (1) Please ensure there is sufficient fluid inside the piping.
  - (2) Please close the open/close valves (air-operated valves etc.) before and after the device to shut down the fluid flow, and completely shut down the pressure fluctuations inside the piping and the device.
- \* The pressure inside the piping may be pressurized or non-pressurized.  
(However, pressure values inside the piping must be within the 0~400kPa range)
  - \* Please perform the flow rate zero adjustment in the same installation position that the device will actually be using.
  - \* Flow rate zero adjustment cannot be performed when there are pressure fluctuations inside the piping.  
(Pressure fluctuation: below 2kPa)



- \* When flow rate zero adjustment is performed under piping conditions other than those listed above, proper zero adjustments cannot be performed.

### (Precautions)

If the piping from the device to the valve is long (over 1 m), the inner pressure inside the piping may be unstable at times. In this case, after closing the valves before and after the device, wait for 3 to 5 minutes before starting the zero adjustment.

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### 5-3 How to perform flow rate zero adjustment (1) When controlling external inputs

When preparations for (5-2) are complete, perform zero adjustment by controlling with external inputs. The procedure is as follows.

- (1) Short-circuit the flow rate zero adjustment input and OV power. (Short-circuit the yellow and black cables) At the same time, the status output turns OFF and zero adjustment begins.
- (2) After the flow rate zero adjustment input has been short-circuited for 10 seconds, open the flow rate zero adjustment input. Open the flow rate zero adjustment input.

\* Refer to P.20 for the flow rate zero adjustment (external input) input/output time chart.

#### ● In the case of a Normal end

If the status output turns ON at the same time the flow rate zero adjustment input is opened, the flow rate zero adjustment is a success.

The controller program zero point data will be overwritten by the new zero point data.

This completes the flow rate zero adjustment process. Resume liquid feeding to the device.

#### ● In the case of an Abnormal end

If the status output does not turn ON at the same time the flow rate zero adjustment input is opened, the flow rate zero adjustment is a failure. The status output automatically turns ON after 5 seconds.

The zero data will not be updated.

Please reconfirm the device's piping status and restart from the beginning.

\* Zero adjustment will end abnormally (zero adjustment failure) if the pressure inside the pipe changes during the process.

See P.18 for the piping conditions during flow rate zero adjustment.

#### ● In the case of a Forced termination

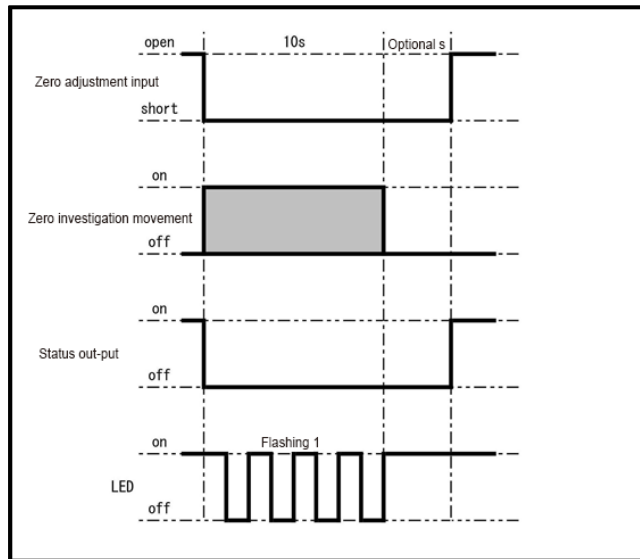
To force terminate the flow rate zero adjustment, please open the flow rate zero adjustment input before 10 seconds has elapsed.

After the flow rate zero adjustment input is opened and the status output is OFF for 5 seconds, it will automatically turn ON.

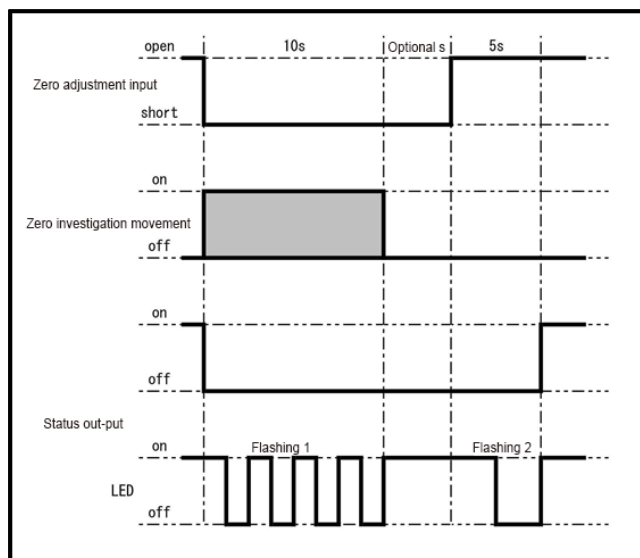
The zero data will not be updated.

5-4 Flow rate zero adjustment input/output time chart (1) When controlling from external inputs

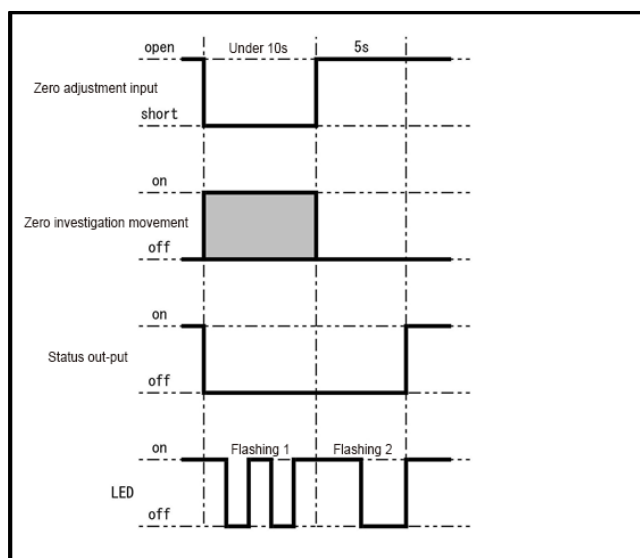
[Normal end (success)]



[Abnormal end (failure)]



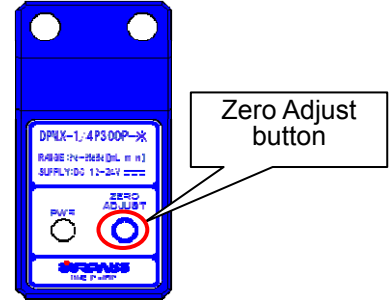
[Forced termination]



## 5-5 How to perform flow rate zero adjustment (2) When controlling with the button

(5-2) Perform zero adjustment by pressing the button after preparation (5-2) is complete.  
The procedure is as follows.

- (1) Press the zero adjustment on the top panel for 10 consecutive seconds.
- (2) After 10 seconds, the LED will start flashing in Flashing Pattern 1 and flow rate zero adjustment will automatically start at the same time.  
Release your finger from the button.



\* Refer to P.22 for the flow rate zero adjustment (button) input/output time chart.

### ● In the case of a Normal end

After the LED flashes in Flash Pattern 1, the flow rate zero adjustment is a success.  
The controller program zero point data will be overwritten by the new zero point data.  
This completes the flow rate zero adjustment process. Resume liquid feeding to the device.

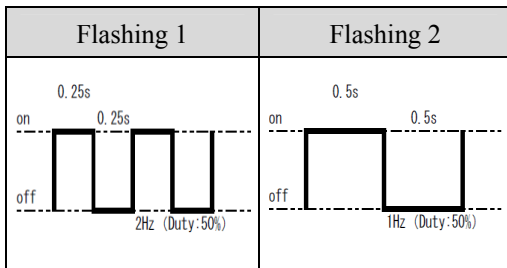
### ● In the case of an Abnormal end

After the LED flashes in Flash Pattern 2 after flashing in Flash Pattern 1, the flow rate zero adjustment is a failure.  
The LED will light up after 5 seconds.  
The zero data will not be updated.  
Please reconfirm the device's piping status and restart from the beginning.

\* Zero adjustment will end abnormally (zero adjustment failure) if the pressure inside the pipe changes during the process.  
See P.18 for the piping conditions during flow rate zero adjustment.

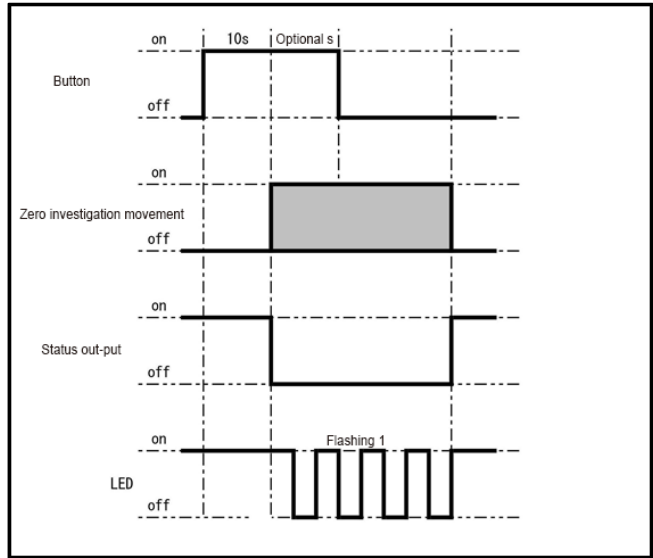
### ● In the case of a Forced termination

To force terminate the flow rate zero adjustment, please release the zero adjustment before 10 seconds has elapsed.

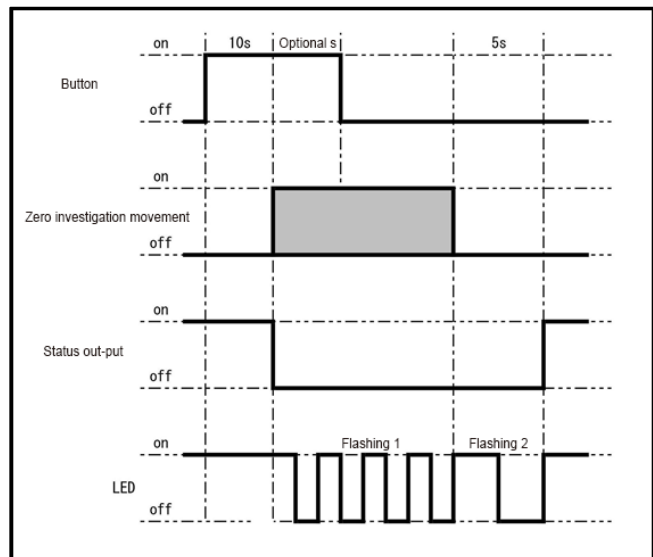


5-6 Flow rate zero adjustment input/output time chart (2) When controlling with the button

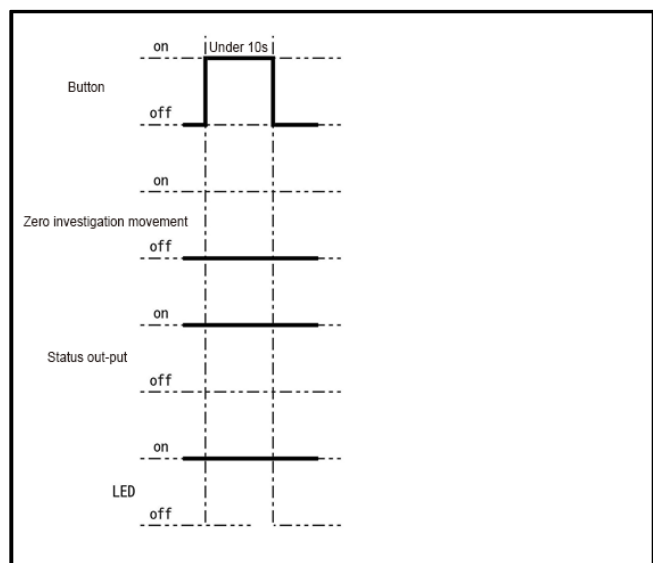
[Normal end (success)]



[Abnormal end (failure)]



[Forced termination]



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## 6. Pressure zero adjustment function

Flow measurement zero adjustment can be performed.

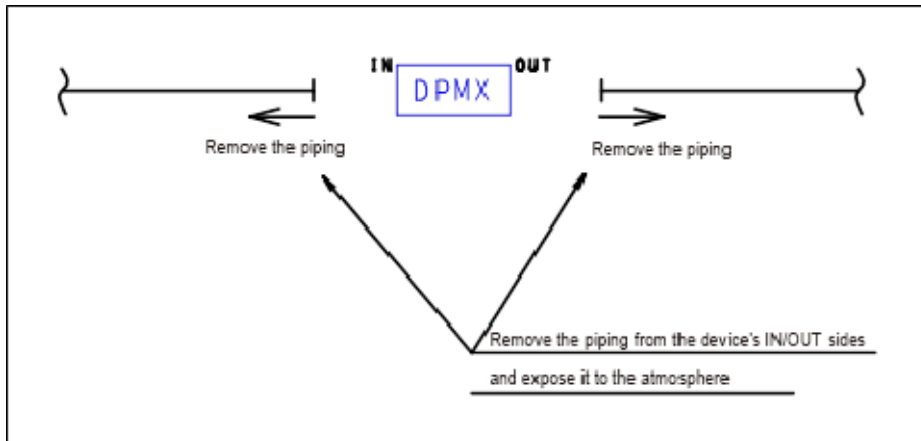
### 6-1 Preparations before the Pressure zero adjustment

Please set up the device's piping state as follows.

◆ Pressure zero adjustment piping conditions

Remove the piping connections from the device and open the IN/OUT port to the atmosphere (gate pressure 0kPa).

\* Flow rate zero adjustment cannot be performed when there are pressure fluctuations inside the piping.





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## 6-2 How to perform Pressure zero adjustment

When preparations for (6-1) are complete, perform zero adjustment by controlling with external inputs. The procedure is as follows.

- (1) Short-circuit the pressure zero adjustment input and OV power. (Short-circuit the blue and black cables)  
At the same time, the status output turns OFF and pressure zero adjustment begins.
- (2) After the pressure zero adjustment input has been short-circuited for 20 seconds, open the pressure zero adjustment input.

\* Refer to P.25 for the pressure zero adjustment input/output time chart.

### ● In the case of a Normal end

If the status output turns ON at the same time the pressure zero adjustment input is opened, the pressure zero adjustment is a failure. The status output automatically turns ON after 5 seconds. The controller program zero point data will be overwritten by the new zero point data. This completes the pressure zero adjustment process. Now, conduct the flow rate zero adjustment.



### Notes

After performing the pressure zero adjustment, always perform the flow rate zero adjustment. If the flow rate zero adjustment is not performed, errors may occur in the flow measurements.

### ● In the case of an Abnormal end

If the status output does not turn ON at the same time the pressure zero adjustment input is opened, the pressure zero adjustment is a failure. The status output automatically turns ON after 5 seconds. The zero data will not be updated. Please reconfirm the device's piping status and restart from the beginning.

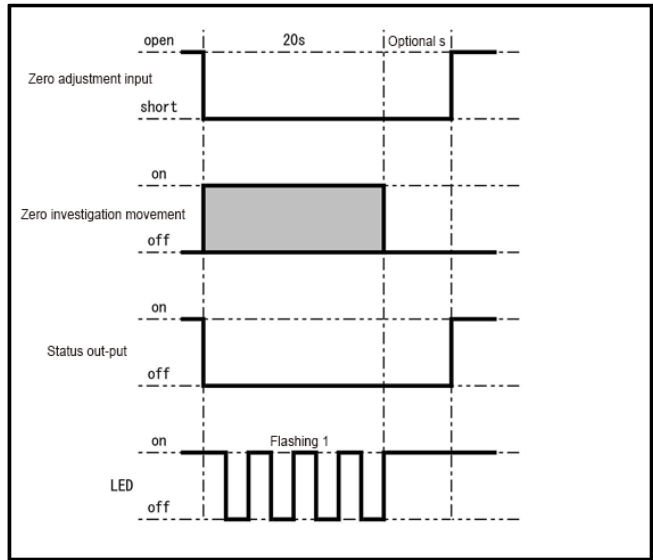
\* When performing pressure zero adjustment keep the device open to the atmosphere.

### ● In the case of a Forced termination

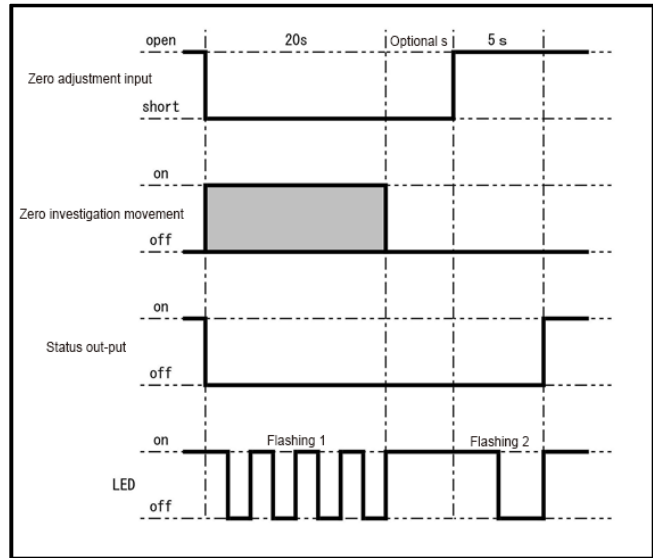
To force terminate the pressure zero adjustment, please open the pressure zero adjustment input before 20 seconds has elapsed. After the pressure zero adjustment input is opened and the status output is OFF for 5 seconds, it will automatically turn ON. The zero data will not be updated.

### 6-3 Operation and functions when critical alarm occurs

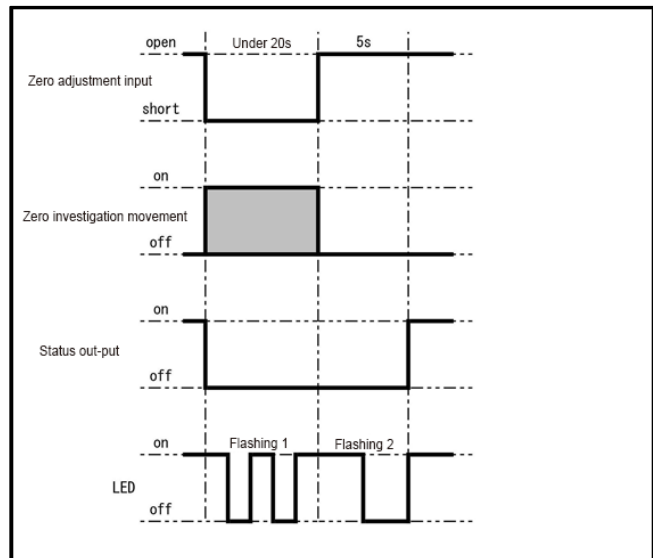
[Normal end (success)]



[Abnormal end (failure)]



[Forced termination]

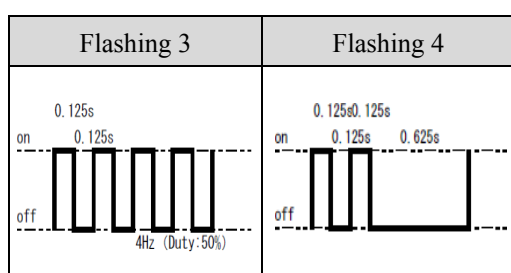


## 7. Alarm Details

### ◆ Alarm activate/cancel conditions

The detailed alarm content, activating/cancel conditions are as follows.

Alarm name	LED indicator status output	Activating conditions	Cancel conditions
Sensor error	Flashing 3	Malfunction/disconnection of the pressure sensor	Cannot be canceled
Range over	Flashing 4	When the feed pressure rises above 450kPa for over 10 seconds	When the feed pressure drops below 450 kPa, it is instantly canceled.



\* This product cannot be used while the sensor error is active.

## 8. Troubleshooting

The diagram below lists general trouble phenomena and countermeasures.

When troubles occur, confirm the content according to the list below and perform the countermeasures.

Phenomenon	Contents to check	Countermeasures
The power won't turn on	Is it wired properly?	Please wire properly while referring to the wiring diagram.
	Is the power supply voltage supplied?	Please supply the power voltage.
	Is the power voltage within the specifications range?	Please set the power voltage within the specifications range.
Flow measurements can't be made Flow measurements are unstable Flow rate is abnormal	Is it wired properly?	Please wire properly while referring to the wiring diagram.
	Is the fluid supplied?	Please supply the fluid within the pressure/temperature range of the specifications.
	Is the fluid supply pressure within the specification range?	
	Is the fluid temperature within the specifications range?	
	Are there large amounts of bubbles inside the piping?	Please use the device under piping/liquid feed conditions to prevent large amounts of air bubbles from generating/mixing inside the piping.
	Are pulsations generating in the fluid supply pressure?	When sending solutions using diaphragm pumps/bellows pumps etc., please install dampers and constant-pressure valves on the pump's discharge side to lower the pulsations.
	Is there a noise source (electromagnetic wave generating source) nearby?	Please distance the product from the noise source or shield the noise source.
	Are any foreign substances clogging up the orifice?	Please feed DI Water from the devices OUT side to remove any foreign substances clogging up the orifice.
Is flow rate zero adjustment being performed?	Please perform flow rate zero adjustment. (* Refer to P.17~22)	
Flow is being output even though liquid is not being fed.	Is flow rate zero adjustment being performed?	Please perform flow rate zero adjustment. (* Refer to P.17~22)
	Are pulsations generating in the fluid supply pressure (the device's primary pressure)?	To prevent pulsation effects occur when liquid feeding is stopped, install a valve on the device's primary side, and close the valve.
The error between the flow measurement and actual flow is large.	Is flow rate zero adjustment being performed?	Please perform flow rate zero adjustment. (* Refer to P.17~22)
	Is the fluid supply pressure within the specification range?	Please supply the fluid within the pressure/temperature range of the specifications.
	Is the fluid temperature within the specifications range?	
	Are there large amounts of bubbles inside the piping?	Please use the device under piping/liquid feed conditions to prevent large amounts of air bubbles from generating/mixing inside the piping.
	Are pulsations generating in the fluid supply pressure?	When sending solutions using diaphragm pumps/bellows pumps etc., please install dampers and constant-pressure valves on the pump's discharge side to lower the pulsations.
	Are any foreign substances clogging up the orifice?	Please feed DI Water from the devices OUT side to remove any foreign substances clogging up the orifice.

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## 9. Maintenance • Inspections

In order to ensure the stable use of the device over a long period, it is recommended that you perform regular inspections.

- ◆ Inspections of couplers/piping
  - Are any of the coupler nuts loose?
  - Tighten the couplers
  - Are any curves in the piping applying excessive stress on the product?
- ◆ Check the piping
  - Is the main cable broken or disconnected?

Inspect the product

- Is there any leakage from the exterior of the main body?
- Is it damaged?



### WARNING

- When using hazardous chemicals, always wear chemical-resistant protective equipment that covers the whole body (protective gloves, mask and clothing).  
There is a risk of bodily harm in the case of a sudden spurt of chemicals.
- When changing parts or conducting maintenance work, always cut the power and release the pressure from inside the piping.
- When removing the product from the piping connections, please take great care in ensuring that there is no pressure left inside the piping before removing the couplers.  
There is a risk of bodily harm resulting from a spurt of chemicals.



### CAUTION

- Please note that we will not be held responsible for any breakdowns/leakage of products or parts replaced or dismantled by other companies.
- If you have any concerns regarding maintenance work, please contact our company.

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## 10. Regarding the Warranty

SURPASS INDUSTRY CO.,LTD will guarantee the replacement of products with defects in its performance or materials resulting from the design or manufacturing of SURPASS INDUSTRY CO.,LTD, that have been approved by SURPASS INDUSTRY CO.,LTD in writing, for one year from the delivery date. This warranty does not cover any issues resulting from the mishandling, remodeling or operation of the product that is not in accordance with the instructions written in the operation manual, or any issues caused by usage of the product that does not adhere to the advice and instructions provided by SURPASS INDUSTRY CO., LTD.

We are not responsible for the compensation of any direct or indirect loss or damages, personal injuries or any other issues resulting from the usage of the SURPASS INDUSTRY CO., LTD product alone or in combination with other products, beyond the product's specification conditions. The SURPASS INDUSTRY CO., LTD. warranty's compensation is limited to the replacement of products.

Items pertaining to the following conditions will be charged.

- Any malfunction or damages resulting from usage of the product that is not written in the operation manual.
- Any malfunction or damages resulting from the careless use of the product.
- Any malfunction or damages resulting from the dismantling, remodeling or inappropriate adjustment or repairing of the product.
- Any malfunction or damages resulting from natural disasters, fire, or other inevitable causes.
- The replacement of expendable supplies and accessories.

<Contact us at the below:>

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