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Thank you for purchasing a water supply flowmeter BF 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.

SAFETY PRECAUTIONS

For safe and correct use of flowmeter

In this instruction manual, the following symbol marks are used for safe and correct use of the flowmeter:



: Indicates general contents of handling precautions.



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.



If a modification, etc. of this product is made by the user regardless of our position, it may spoil the guarantee of safety or prevent demonstration of prescribed function by the instrument. In case there is any need of such modification, please contact either the dealer from whom you purchased your instrument or the nearest branch office of our company.



Warning

On the measured liquid

Use your flowmeter for the liquids indicated on the nameplate & delivery specification sheet.

- Use for any liquid other than the specified ones may cause injury or material damage with splashing of liquid by leakage due to corrosion from inside the flowmeter.
- For a specified liquid ordered simply as "X solution" or with a chemical symbol only, no guarantee of corrosion resistance can be provided for our product. Check well the corrosion resistance of the material used for this product against the liquid concerned.

Use within the specified pressure & temperature range.

- Any use in excess of those pressure or temperature may cause injury or material damage with splashing of broken pieces or liquid resulting from destruction of the flowmeter body or measuring unit.

Use a flowmeter approved for high-pressure gas service or of certified explosionproof construction type.

- For a service dealing with high-pressure gas liquid or inflammable gas liquid, use a flowmeter approved for high-pressure gas service or of certified explosionproof construction type, intrinsically safe explosionproof construction type, etc.
Use of a model with general construction may cause explosion or fire, eventually leading to injury of persons or material damage.

Take protective measures against burning.

- When using a high-temperature liquid (40°C or over), the main body and the radiating fins get very hot, presenting a risk of burning. Be sure to take protective measures against burning,

On maintenance & inspection

Release internal pressure, and fully remove the residual liquid.

- If the service liquid is a harmful or corrosive material, it may cause injury or material damage at the time of inspection by disassembling of the flowmeter.

 **Caution**

On the piping

Provide a bypass piping.

- There is a risk of material damage due to breaking of some internal component parts of the flowmeter produced with flushing in the early period of operation or discharge of air from inside the piping.

Install in a place protected against vibrations or displacement of piping.

- If you install the piping in a place with a lot of vibrations or a risk of displacement of piping, it may lead to destruction of the flowmeter body, causing injury or material damage with splashing of broken pieces or liquid.

Install the piping in a place not subject to any impact pressure.

- If a valve for instantly closing the piping is installed in an immediate vicinity on the upstream or downstream side of the flowmeter, it may lead to destruction of the flowmeter body by impact pressure due to water hammer, etc., causing injury or material damage with splashing of broken pieces or liquid.

Install a strainer also on the downstream side.

- To avoid inflow and mixing into process liquid of broken pieces of internal component parts, install a strainer also on the downstream side as required. Mixing of broken pieces in the process liquid may cause material damage.

On the control system (case of a type with transmitter)

Supplement a control output function other than this instrument.

- There is a risk of loss of safety and/or process specifications due to operating error or interruption of control signal. When using this instrument 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.

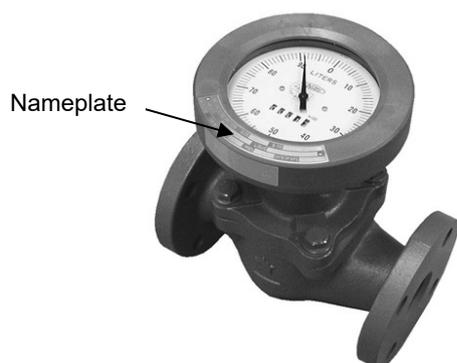


General handling precautions

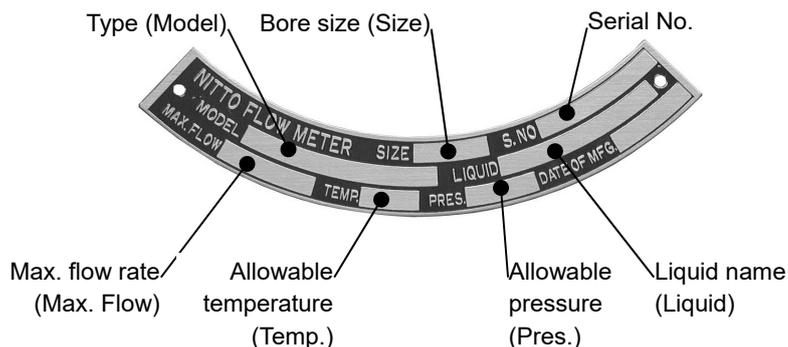
※ Verification of type and specifications

This instrument is assembled, adjusted and delivered individually according to its specifications. Please check the type and specifications on the nameplate attached to the counter section, etc. to make sure that the specifications are conformable to your order. (The shape and place of mounting of the nameplate varies depending on the type of instrument.)

[Mounting position of nameplate]



[Contents of indication on nameplate]



※ Precautions regarding execution of heat preservation work

For any liquid of properties freezing or solidifying in the piping or liquid requiring liquid temperature preservation, etc., execute heat preservation work for the flowmeter, the strainer and the piping.

(Precautions to take about execution of work)

- Check for leak of liquid before starting the heat preservation work.
- For the flowmeter and the strainer, execute in a way to allow easy maintenance & inspection and disassembling. In the execution, avoid putting a cover on the portion of specifications or cautions such as nameplate, caution plate, etc.
- Avoid executing heat preservation for the counter of the flowmeter. However, under environments in which the ambient temperature comes in the range of -30 ~ -10°C, perform heat preservation for the purpose of heat insulation.

※ Precautions regarding outdoor installation

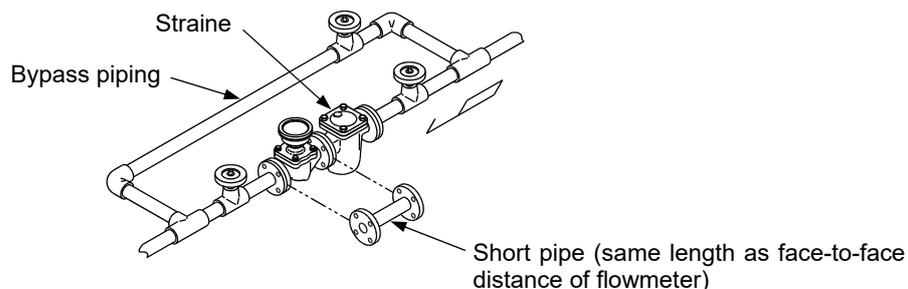
In case you install the flowmeter in a place where the counter section is exposed to rain water or direct sunshine, provide a guard for protection against rain or sunshine. Take protective measures against salt damage, especially for use in a place where salt damage is feared.

※ Precautions regarding wire connection (case of a type with transmitter)

- Cut off power supply for protection against electric shock before starting a wiring work. For the wiring, also refer to the instruction manual and wiring diagram of the converter-receiver.
- The flowmeter is provided with one same model No. in combination with the converter-receiver of our make. Check the matching before the wiring, and connect at one same number.
- To avoid induction trouble, install the wires away from other high-voltage cables or high-voltage circuits. Especially, install the signal line and the power line, etc. individually away from each other, and adopt a single-point grounding for the grounding.

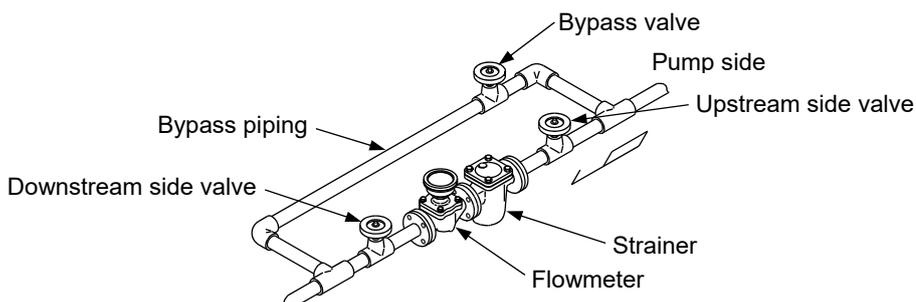
※ Execution of flushing

Remove the flowmeter and, after installing a short pipe of the same length as the face-to-face distance of the flowmeter, perform flushing, to remove dust, weld refuse, etc. due to piping work completely. After that, clean the strainer element, and install the flowmeter normally.



※ Liquid introducing procedure at start of operation

In the early part of operation, the air inside the piping is discharged at high speed, and there may be cases where the internal rotor, etc. is damaged with a high-speed operation. To prevent such accident, open the respective valves little by little and discharge air sufficiently.



[Valve opening/closing procedure]

- ① Upstream & downstream side valves ⇒ Fully close.
- ② Bypass valve ⇒ Fully open.
- ③ Introduce liquid.
- ④ Upstream side valve ⇒ Open slightly.
- ⑤ Downstream side valve ⇒ Open slightly.
- ⑥ Bypass valve ⇒ Turn slowly to fully closed position.
- ⑦ Upstream & downstream side valves ⇒ Open slowly up to a proper flow rate in the specified flow rate range.

After that, check for any leak in various parts and check for any unusual noise or vibrations of the flowmeter.

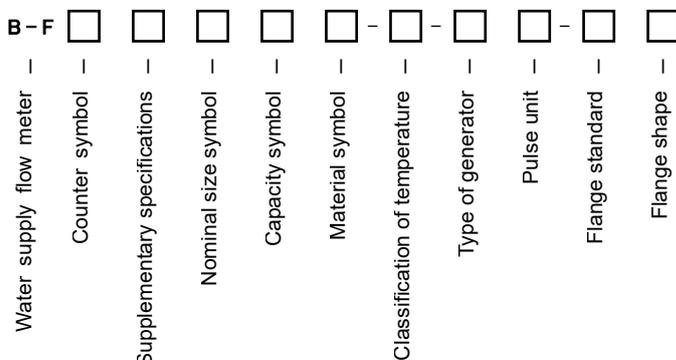
※ Precautions regarding storage

- Packing style for storage: Pack and store in the state of packing same as or close to that in which the product was delivered from us.
- Place of storage: Place of normal temperature and humidity protected against rain water.
- Storage of flowmeter after use: Wash the inside of the liquid end sufficiently well, dry with air purge, etc. and cover the entire instrument for storage.

1. Outline

This water supply flowmeter is an impeller type flowmeter best suited for measurement and control of cold water, hot water and very hot water used for cooling & heating, water supply to boilers and in chemical & water treating plants. It realized a compact and lightweight construction while incorporating a strainer in it. It also enables mounting of a variety of signal transmitters.

2. Type symbols



● : Standard; ○ : Manufacturable; × : Non-manufacturable

Type	Specification code		Specifications	20A	25A	25B	40A	40B	50A	50B
B-F			Water supply flow meter	●	●	●	●	●	●	●
Counter symbol	C		Pointer and direct-reading type	●	●	●	●	●	●	●
			With unit pulse output	○	○	○	○	○	○	○
		H	DA conversion pulse output	○	○	○	○	○	○	○
		Z	Digital zero-reset and direct-reading type	○	○	○	○	○	○	○
Supplementary specifications	F		Without adiating fin	●	●	●	●	●	●	●
			With adiating fin	○	○	○	○	○	○	○
		X	Flameproof enclosure type	○	○	○	○	○	○	○
Nominal size symbol	20		Nominal size: 20A	●						
		25	Nominal size: 25A		●	●				
		40	Nominal size: 40A				●	●		
		50	Nominal size: 50A						●	●
Capacity symbol	A		Volume small	●	●		●		●	
		B	Volume large			●		●		●
Material symbol	FB		Main body: FCD450, Internal structure:SCS13/CAC406, Fanwheel: C5191P	●	●	●	●	●	●	●
		F7	Main body: FCD450, Internal structure:SCS13/SUS304, Fanwheel: SUS304	×	○	○	○	○	○	○
		S7	Main body: SCS13, Internal structure:SCS13, Fanwheel: SUS304	×	○	○	○	○	○	×
		Nominal size 20A can use only material symbol FB. Nominal size 50A can use only material symbol FB,F7 and material of internal structure set for material symbol FB is only CAC406 available and for material symbol F7 is only SUS304 available								
Classification of temperature	LS2		allowable temperature: 110 °C or less (standard specification)	●	●	●	●	●	●	●
			allowable temperature : Over 110°C but no higher than 200°C	○	○	○	○	○	○	○
Type of generator	R		Without pulse output	●	●	●	●	●	●	●
			Reed switch (contact) pulse	○	○	○	○	○	○	○
		M	High frequency(no contact) pulser	○	○	○	○	○	○	○
Pulse unit <small>Note) The pulse units available for output are restricted depending on: (1) pointer specifications, and (2) type of generator. Refer to "Output Pulse Unit Table".</small>	2		Without pulse output	●	●	●	●	●	●	●
			0.01 L/p	○	○	○	○	○	○	×
			0.1 L/p	○	○	○	○	○	○	○
			1 L/p	○	○	○	○	○	○	○
			10 L/p	○	○	○	○	○	○	○
			100 L/p	○	○	○	○	○	○	○
			1 m ³ /p	×	○	○	○	○	○	○
Flange standard	20		JIS 10K	●	●	●	●	●	●	●
			JIS 20K	○	○	○	○	○	○	○
Flange shape	R		FF flange	●	●	●	●	●	●	●
			RF flange	○	○	○	○	○	○	○

3. Installation procedure

3. 1 Cautions regarding place of installation

Select a place satisfying the following conditions for installing this flowmeter:

- (1) Place subject to little vibrations.
- (2) Place protected against rain and dew.
- (3) Place with little dust.
- (4) Place with little moisture.
- (5) Place with little corrosive gas.
- (6) Place not subject to any violent fluid pulsations.
- (7) Place with little electromagnetic noise.
- (8) Place easy to inspect.
- (9) Place protected against direct sunshine.
- (10) Batch pumps such as plunger type, diaphragm type, etc. are liable to produce pulsations in the fluid, eventually leading to damage to rotor or instrumental error. Install an air chamber or accumulator to eliminate pulsations completely.

3. 2 Precautions to take before installation

Flushing: Before installing the flowmeter, completely remove dust, welding refuse, etc. produced with piping work.

3. 3 Precautions to take at start of operation

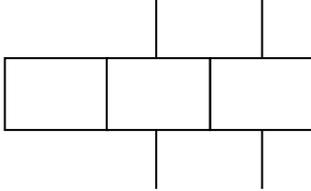
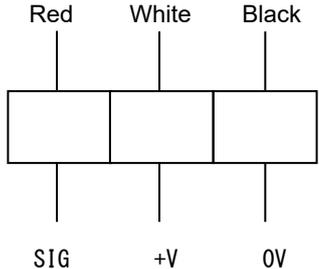
At the start of operation, the air in the piping is discharged at high speed. Open the valve slowly to avoid damage due to high-speed operation to the rotor inside.

3. 4 Piping procedure

- (1) Install the piping in a way not to apply any piping pressure to the flowmeter.
- (2) Install on the outlet side of the pump.
- (3) Fit the arrow mark given on the lateral face of the flowmeter to the direction of inflow of the fluid.
- (4) As for mounting posture, mount in the posture specified at the time of placing of order or the posture indicated in the delivery specification sheet.
- (5) When using the flowmeter at a tank head, give a head larger than the pressure loss of the flowmeter.
- (6) When using a liquid packing, etc., take care to prevent the liquid packing, etc. from protruding into the pipe.
- (7) Do not wind any insulating material around the radiating fin of the flowmeter equipped with radiating fins (high temperature specification type).
- (8) Change of direction of dial plate
The direction of dial plate can be decided freely at a position of 90°, to facilitate inspection (see disassembling drawing).
Take 4 bolts (16) for dial unit, adjust and fix the dial plate. (Turn without lifting the unit because the gears are engaged.)

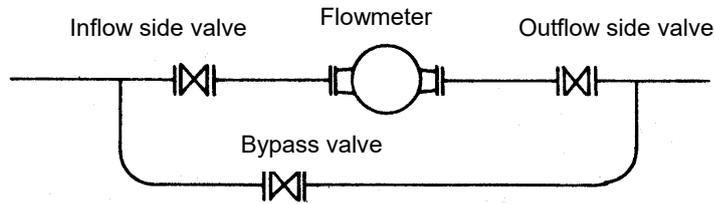
3. 5 Wiring procedure

A flowmeter with pulse generator shall be connected according to the instructions given on the following table:

Type of generator	Reed switch pulse	High-frequency pulse DA conversion pulse
Terminal layout drawing	 <p style="text-align: center;">Receiver</p>	 <p style="text-align: center;">SIG +V 0V</p>

3. 6 **Example of installation**

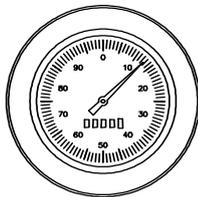
Install a bypass piping as indicated below in case it is difficult to stop water supply, considering cleaning by disassembling of the strainer or inside of the flowmeter.



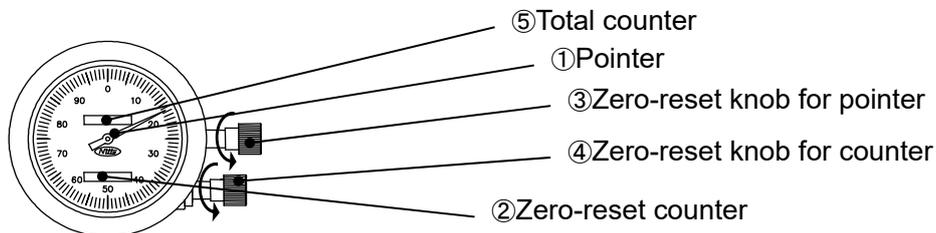
4. **Functions & operating method**

4. 1 **Indicating function**

- Totalizing type The pointer turns clockwise according to the measured flow rate, to count the integrated value.



- Totalizing zero-reset type (B-FZ type) Provided with 2 counters, one continuously totaling the flow rate and the other resettable to zero together with the pointer.



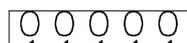
- (1) Resetting the pointer to zero
Turn the ③ zero-reset knob for pointer to the left while pushing it in gently, adjust the pointer to zero position and stop it there.
- (2) Resetting the zero-reset counter to zero
Turn the ④ zero-reset knob for counter to the left, adjust the counter to "00000" and stop it there.

- ⚠ Caution :
- a . Do not make any zero resetting operation during a measurement of flow rate. Be sure to make this operation while the counter is at stop.
 - b . The total counter ⑤ cannot be reset to zero

Caution for zero resettable counter

After reset to zero, 1st digit does not count up because of backlash of the counter, even though pointer turns 1 revolution.
In this case, please note following points.

- (a) To reduce the gap of numbers, please turn till the head of "1" can be seen like below figure when reset to zero and please release counter zero reset knob.

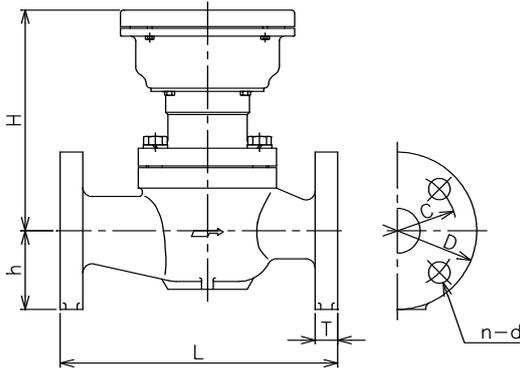
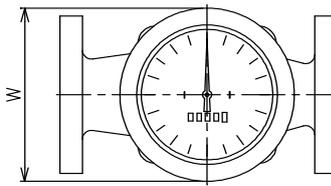
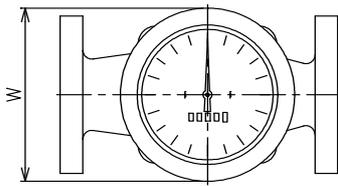


6. Disassembling procedure

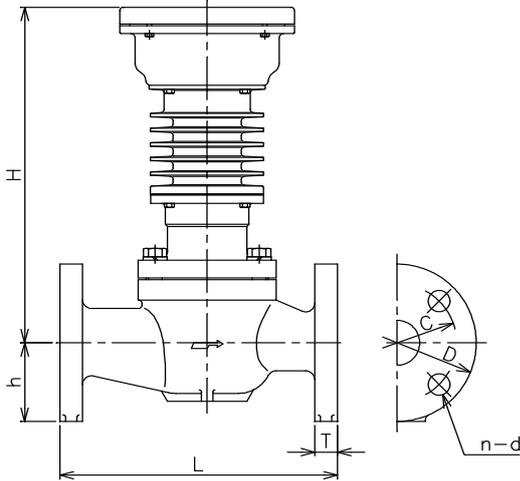
In case there is any trouble during use of the flowmeter, disassemble the flowmeter by the following procedure (see disassembly drawing):

- (1) Remove the dial unit bolts (16), and separate the body and the counter from each other. Check if the gears at the center turn.
- (2) For disassembling the counter, remove the bolt fastening the glass ring, separate the dial case and the glass ring from each other, and extract the (push-in) pointer. And, loosen 2 screws and remove the scale plate (9), and the dial base plate fastening screw will come into sight. Loosen this screw and take out the entire inner gears. Check if the gears turn lightly.
- (3) For disassembling the body, take care to avoid application of water pressure. If you remove the body bolt (15), you can separate the main body (1) and the head cover set (5) from each other. Remove the packing (3), and take out the internal structure set (2). At that time, take care not to lose the knock pin. Check if the impeller turns lightly in the internal structure set.
- (4) In case the impeller does not turn lightly, wear of bearing, etc. is suspected. Replace any defective parts. There is a match mark in both the upper and lower internal structures. Fit the mark in reassembling the flowmeter.
- (5) The drive set (4) is fixed with screw to the head cover set (5). Remove the screws for disassembling. Check if the drive gears, etc. turn lightly and if the gear transmission is smooth. If the gears do not turn, wear of bearing, etc. is suspected. Replace any defective parts.
- (6) If the strainer is clogged with foreign matters, a big pressure loss is produced and the flow becomes poor. Remove the strainer from the piping and wash it regularly.
- (7) The reassembling shall be made carefully in the order opposite to that of disassembling. Apply a very small amount of lubricating oil to the bearings (counter). Tighten well the fastening screws & bolts.

7. Appearance drawing



General application



High-temperature application

●General application

Nominal size & volume symbol	Flange standard	L	h	H	Counter dia. W	D	t	C	n	d	Approx. weight (kg)
20A	JIS 10K	225	50	190.5	172 (154)	100	18	75	4	15	8.5
	JIS 20K										
25A	JIS 10K	225	62.5	190.5	172 (154)	125	18	90	4	19	9.0
	JIS 20K						20				
40A	JIS 10K	245	70	199	172 (154)	140	20	105	4	19	12.7
	JIS 20K						22				
50A	JIS 10K	245	77.5	199.5	172 (154)	155	20	120	4	19	13.5
	JIS 20K						22		8		
50B	JIS 10K	250	77.5	202.5	172 (154)	155	20	120	4	19	15.0
	JIS 20K						22		8		

●High-temperature application

Nominal size & volume symbol	Flange standard	L	h	H	Counter dia. W	D	t	C	n	d	Approx. weight (kg)
20A	JIS 10K	225	50	288 (388)	154	100	18	75	4	15	9.5
	JIS 20K										
25A	JIS 10K	225	62.5	288 (388)	154	125	18	90	4	19	10.0
	JIS 20K			20							
40A	JIS 10K	245	70	297 (397)	154	140	20	105	4	19	13.7
	JIS 20K			22							
50A	JIS 10K	245	77.5	297 (397)	154	155	20	120	4	19	14.5
	JIS 20K			22			8				
50B	JIS 10K	250	77.5	300 (400)	154	155	20	120	4	19	16.0
	JIS 20K			22			8				

- Note
- 1) The diameter W of the counter for general application may be the dimension in () depending on the material of the counter.
 - 2) In the case of a type with generator, the shape and dimension of the counter will be changed.
 - 3) In the case of a type with 2-stage radiating fins, the height H will become the dimension in ().
 - 4) This table of dimensions indicate the case of FB and F7. The dimensions may be changed depending on the material.

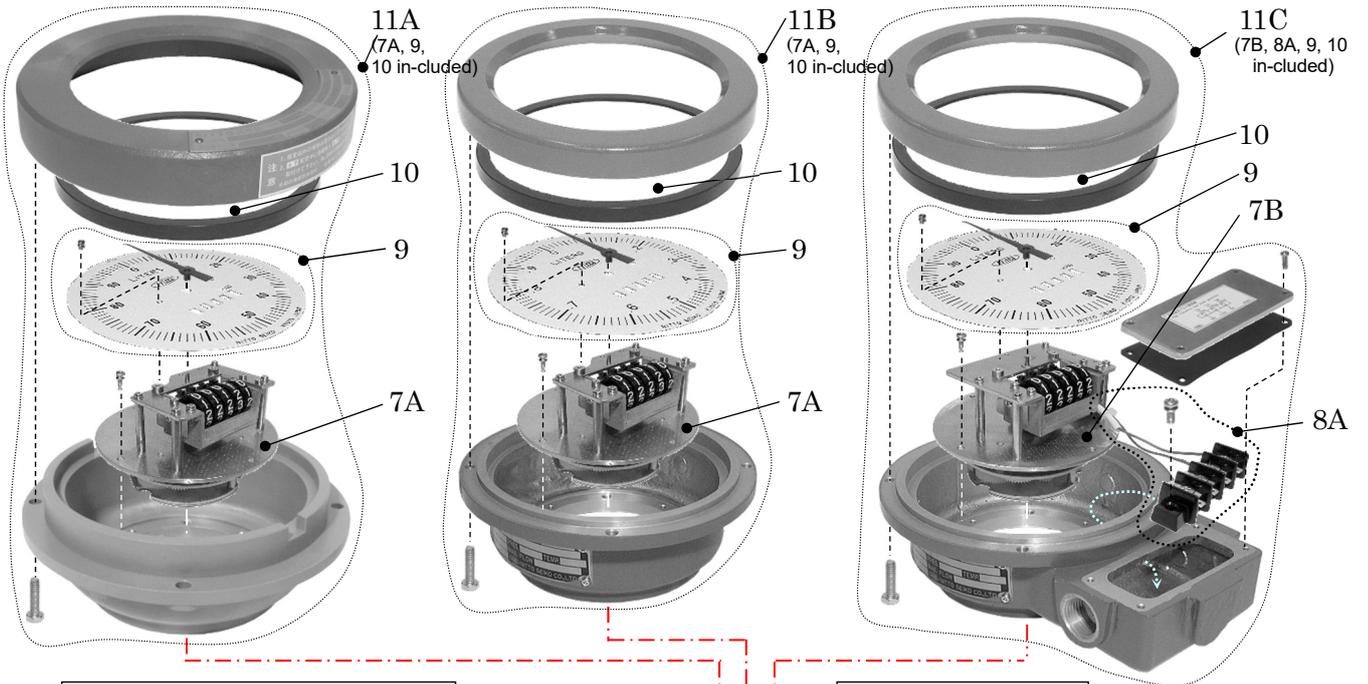
8. Disassembly drawing

Counter

Field totalization type (Type None: Standard specifications)

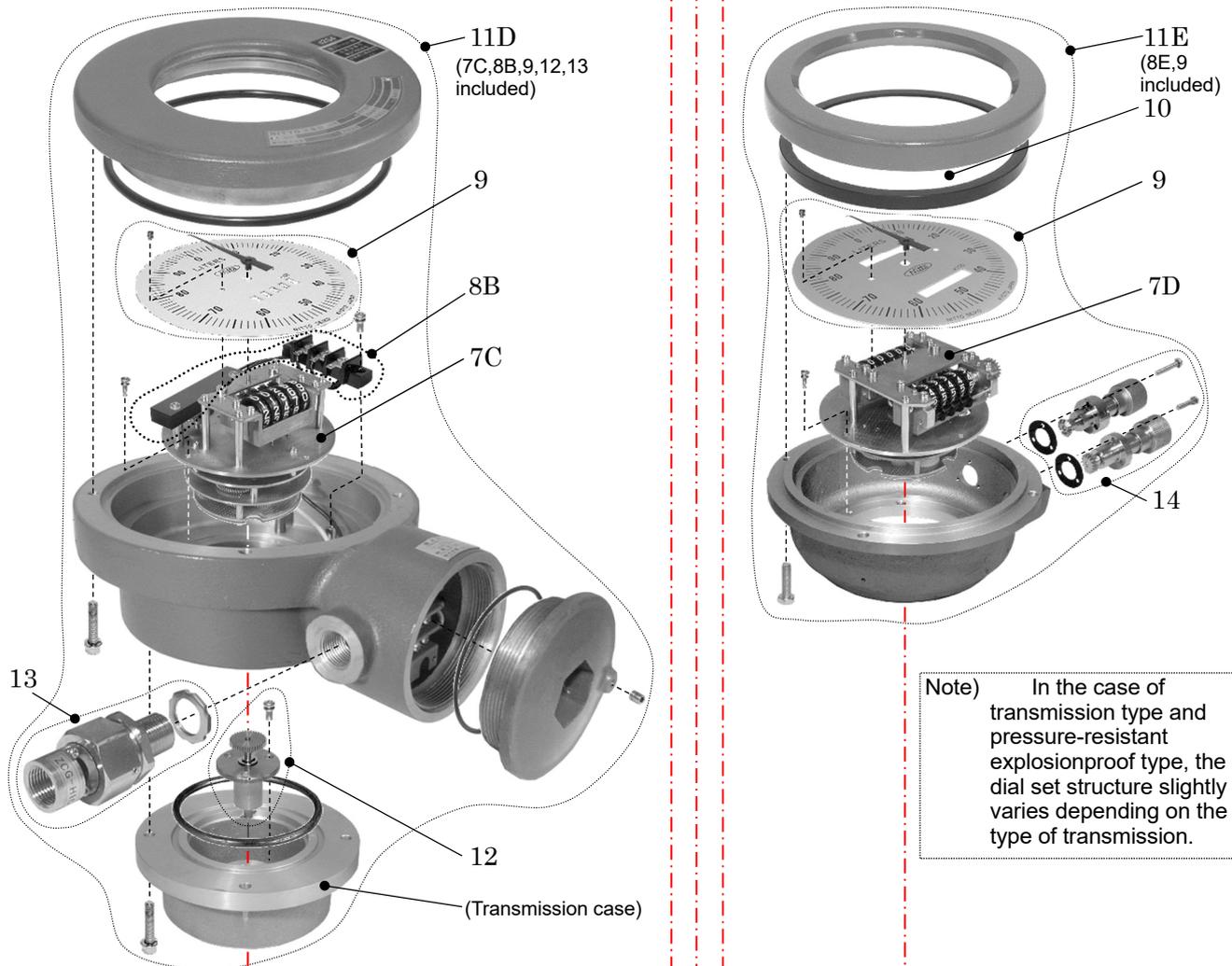
Field totalization type (Type None: High-temperature specifications)

Transmission type (Type C or H)



Pressure-resistant explosionproof type (Type CX)

Zero-reset type (Type Z)



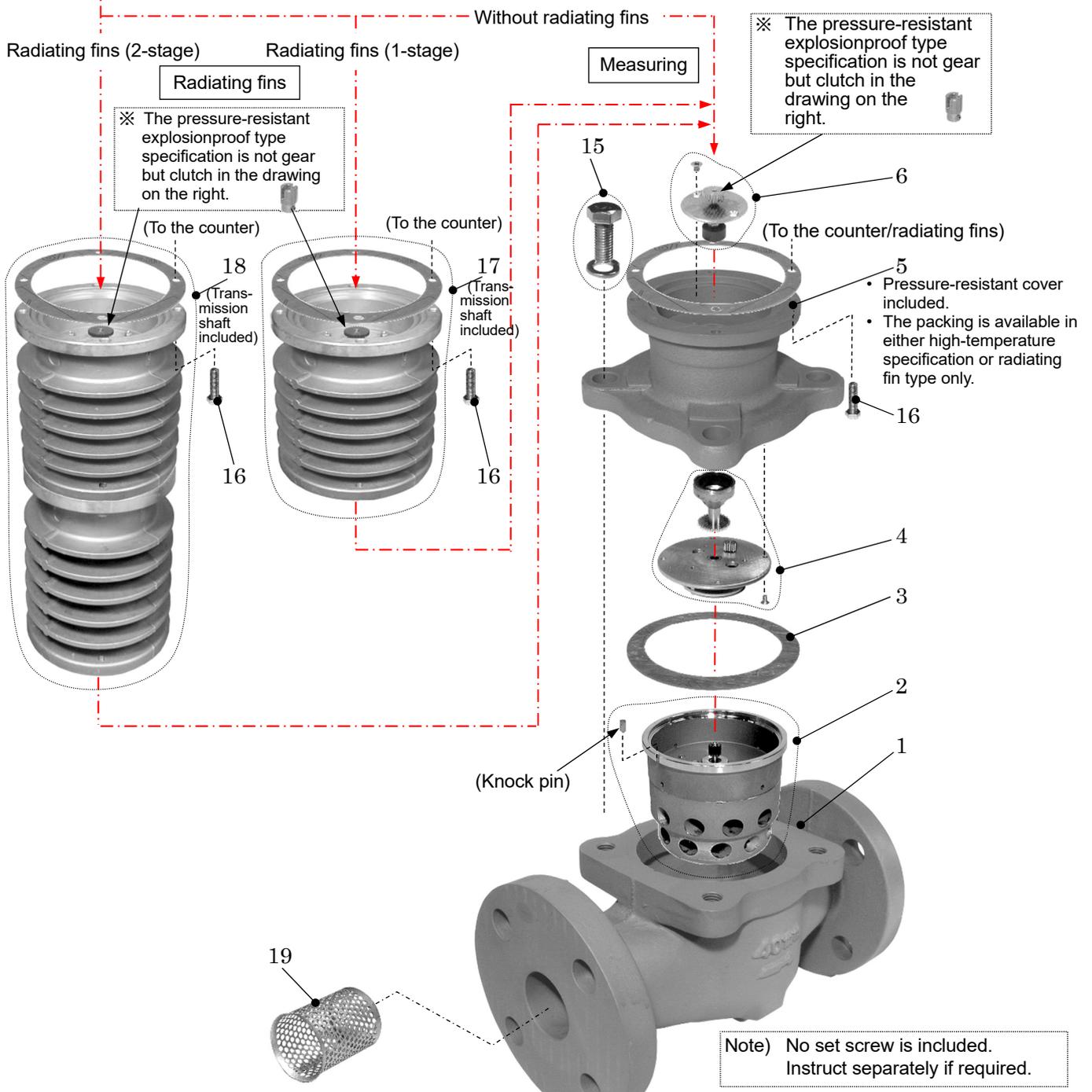
Note) In the case of transmission type and pressure-resistant explosionproof type, the dial set structure slightly varies depending on the type of transmission.

Note) Set screws are not included. Please instruct separately if necessary.

To radiating fins & measuring unit

Radiating fins · Measuring unit

From the counter



No.	Parts name	Q'ty	No.	Parts name	Q'ty	No.	Parts name	Q'ty
1	Main body (19 included)	1	7D	Dial set, type Z	1	11E	Counter set, type Z (7D, 9, 10, 14 included)	1
2	Internal structure set	1	8A	Sensor set, type C, H	1	12	Transmission gear set	1
3	Packing	1	8B	Sensor set, type CX	1	13	Pressure-resistant packing fixture	1
4	Drive set	1	9	Scale plate (pointer included)	1	14	Knob set, type Z	1
5	Head cover set (pressure-resistant cover included)	1	10	Glass set (packing included)	1	15	Body bolt	4
6	Upper magnet set	1	11A	Counter set, without type: Standard specification (7A, 9, 10 included)	1	16	Dial bolts	4
7A	Dial set - without type	1	11B	Counter set, without type: High-temperature specification (7A, 9, 10 included)	1	17	Radiating fin set, 1-stage (transmission shaft included)	1
7B	Dial set, type C-H	1	11C	Counter set, type C-H (7B, 8A, 9, 10 included)	1	18	Radiating fin set, 2-stage (transmission shaft included)	1
7C	Dial set, type CX	1	11D	Counter set, type CX (7C, 8B, 9, 12, 13 included)	1	19	Built-in strainer	1

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】](#) [【Inquiry Form】](#)
Website: <https://global.nittoseiko.com/> .