NITTOSEIKO
Taking new steps forward together

OIL METER

INSTRUCTION MANUAL

MNV16151 25.07

BR13-3　BRC13-3
BR20-2　BRC20-2
BR25-2　BRC25-2

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Thank you for purchasing an oil meter BR of our make this time. This instruction manual explains various cautions necessary for operation of this flowmeter. The user is kindly requested to read through this manual so that this flow meter may be used correctly and in safety for a long period of time to his satisfaction.
For any inquiry about this flow meter or order of spare parts, please let us know the type and the serial No.

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

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

: Symbol for calling attention.

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.

1. Handling precautions

This instrument is inspected sufficiently in the factory before delivery. On receipt of the delivery of this instrument, check well the appearance of the instrument to make sure that there is no damage in it. In this section are described precautions necessary for the handling of the instrument. Please read this section carefully before using the instrument. For any inquiry about the 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.

1.1 Precautions regarding measured liquid

Warning

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

Warning

Use in the range of specified working pressure and temperature.
If you use the instrument at any higher pressure or temperature, it may cause breaking of flow meter body or measuring unit or injury or material damage with splashing of broken pieces or liquid.

Warning

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

1. 2 Precautions regarding place of installation

Caution

Avoid place with large temperature gradient or large temperature fluctuations.

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

Caution

Avoid installing in any corrosive atmosphere.

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

1. 3 Precautions regarding piping

Caution

Provide a bypass piping.

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

Caution

Install in a state free from any vibrations or displacement of piping.

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

Caution

Install the piping at a position not subject to any impact pressure.

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

Caution

Provide a strainer also on the downstream side.

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

1. 4 Precautions regarding control system

Warning

Supplement a control output function other than the output of this product.

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

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

1.5 Precautions regarding transportation & storage

Pack the flow meter for the storage.

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

Select a place satisfying the following conditions for the storage:

- Place protected against rain or water.
- Place subject to little vibrations or shocks.
- Place with following temperature & humidity conditions during storage:

  Preferably a place with normal temperature & humidity (Approx. 25℃ & 65%).

  Temperature : -10 ～ 60℃

  Humidity : 5 ～ 80%RH (without dew condensation)

Caution

Clean well the flow meter.

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

2. General description

A high performance oil meter which realizes smallness in size, lightness in weight and easiness in operation is used for the measurement of fuel oil (for small boiler, burner, central heating) in heat piping industry.

3. Installation procedure

1. Precautions on place of installation

Select a place satisfying the following conditions for installing this flow meter:

(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.

2. Precautions to take before installation

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

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.

4. Piping procedure

(1) Install the piping in a way not to apply any piping pressure to the flow meter.

(2) Install on the outlet side of the pump.

(3) Be sure to provide a strainer for this flow meter. The strainer shall be installed on the upstream side of the flow meter as close to the flow meter as possible.
Clean the strainer element (net) regularly. If there is a lot of dust in the fluid, provide a supplementary strainer of coarse mesh on the upstream side.

(4) Fit the arrow mark given on the lateral face of the flow meter to the direction of inflow of the fluid.

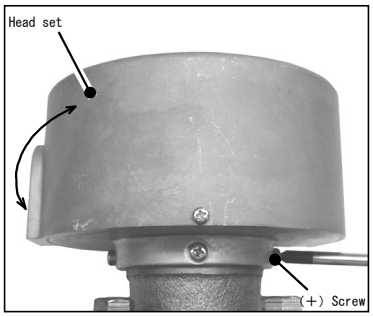
(5) When using the flow meter at a tank head, give a head larger than the pressure loss of the flow meter.

(6) When using a liquid packing, etc., take care to prevent the liquid packing, etc. from protruding into the pipe.

(7) Install in the specified posture.

(8) Do not wind any insulating material around the cooling fin of the flow meter equipped with cooling fins.

(9) Changing the dial plate position:
when necessary to change the dial plate position, remove four pcs. of plus(+)head screws from the unit as shown in the right photo and rotate the unit of head set for 90° or 180° to the desired position without removing the unit, and fix it at the position.



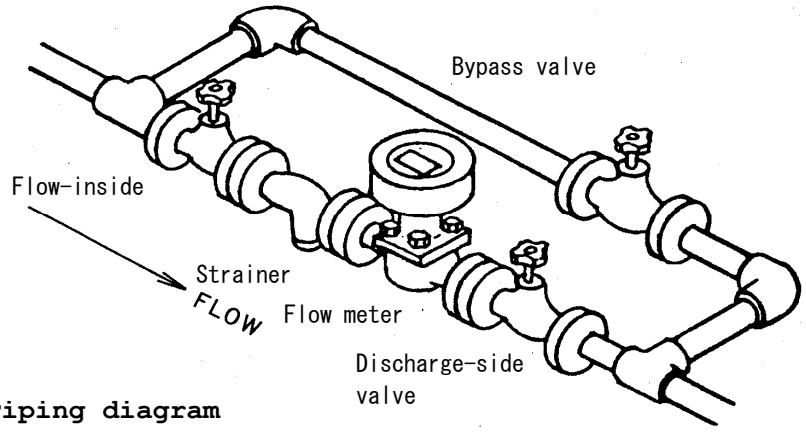
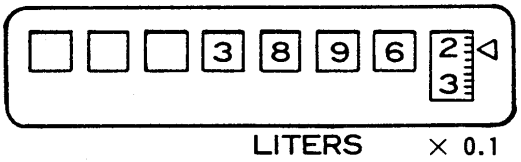


Fig.1 Piping diagram

4. How to read integrating value

The counter is provided with eight digits.

The unit of last digit figure is 0.1L and one graduation shows 0.02L.



Integrating amount : 3896.22L

The flow rate is given by measuring the rotation speed of counter per unit hour.

This measurement requires a stopwatch, etc.

(Example) Final integrating value measured 490.00L Measurement

−) Initial integrating value 480.00L time: 41sec.

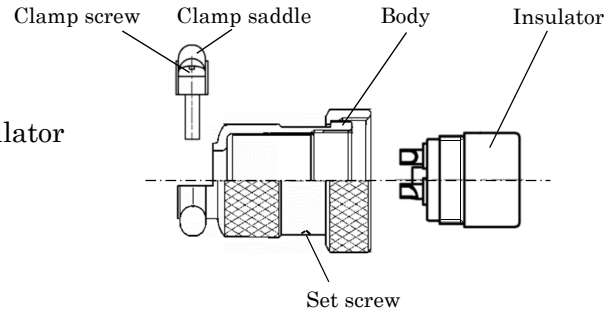
(Balance) 10.00L

$$\text{Flow rate} = \frac{10.00\text{L}}{41\text{sec.}} \times 3,600 \fallingdotseq 878\text{L/h}$$

5. Wiring procedure

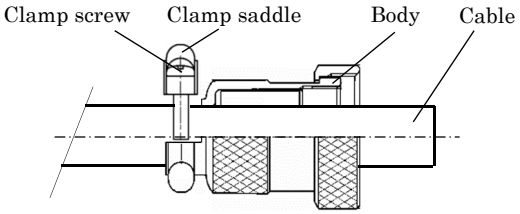
Please conduct wiring to the metal connector in case of output function type.

(1) Disassembling metal connector



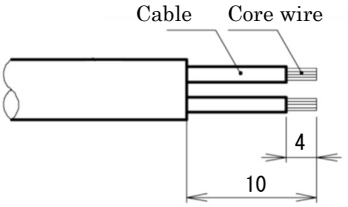
・Take off the set screw and remove Insulator
・Take off the clamp screw and remove the clamp saddle

(2) Put the wire



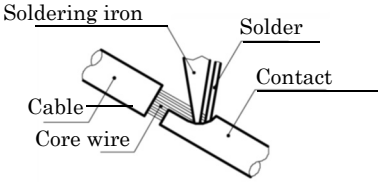
・Put the wire through the parts.

(3) Cable processing



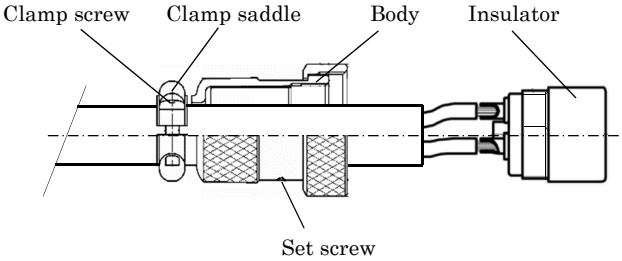
・Process the cable
・Pre-soldering to the core wire

(4) Soldering



・Insert core wire into the solder-pot in contact.
・Pour solder into contact while heating by solder iron as right figure, and fill the gap between contact and core wire

(5) Assembling



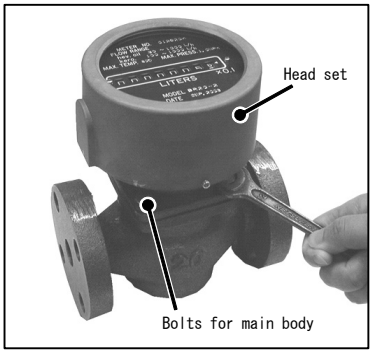
・Fix the insulator and fasten the body
・Fasten the set screw
・Fix the clamp saddle by fastening clamp screw.

6. Maintenance & inspection

Symptom	Cause	Remedy
The liquid passes, but totalizing counter don't move.	No rise of inflow side pressure. Opened bypass valve. Clogged strainer.	Check the piping system. Clean the strainer element.
	No rotation of rotor due to dust, scale, etc. in the measuring unit. Breaking of rotor and eccentric bearing. Adherence or crystallization of liquid.	Disassemble and inspect the measuring unit according to the disassembling procedure of flow meter. Clean, lubricate or replace parts.
	Disengagement of gears in the counter unit. Loose set screw of gears in the counter unit. Galling of shaft and bearing in the counter unit. Breaking of transmitting mechanism parts in the counter unit.	Clean, lubricate or replace parts.
	Excessive liquid temperature, pressure, etc. beyond allowable range.	Use within the range indicated on the dial plate.
Excessively large totalized volume of flow meter against actual liquid volume. (Accuracy on plus side)	Mixing of air in the liquid.	Eliminate air by installing an air separator, etc.
	Empty piping before and after the flow meter.	Take protective measures against penetration of air into the piping.
Excessively small totalized volume of flow meter against actual liquid volume. (Accuracy on minus side)	Small flow rate.	Use in the flow rate range of specifications.
	Wear or breaking of measuring unit parts. Adhesion of dust, scale, etc. to the measuring unit.	Disassemble and inspect the measuring unit according to the disassembling procedure of flow meter. Clean or replace parts.
	Heavy rotation of counter unit.	Clean, lubricate or replace parts.
Disagreement between totalized value of flow in the counter unit and value of output pulse generated by the pulse generator. Abnormal waveform of output signals.	Defective engagement or damage of transmission gears and clutch.	Clean, lubricate or replace parts.
	Defective wire connection with totalizer, etc.	Repair defective parts of the wiring.
	Defective pulse generator.	Replace pulse generator.

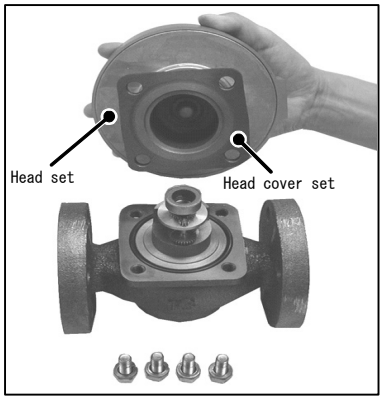
7. Disassembling procedure

＊Be careful that some constructions and shapes might be different from the standard-type due to the difference of the size (inlet/outlet diameter)

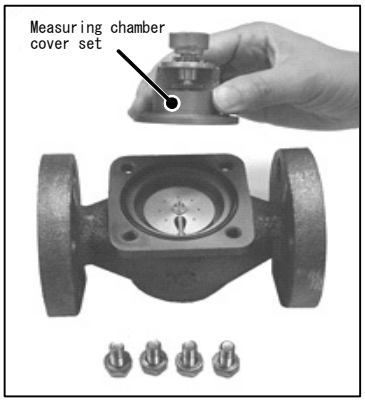


（1）Remove four bolts of the body to separate head set as one unit.
In this case, be sure that the fluid pressure is not applied.

Size
(13A)

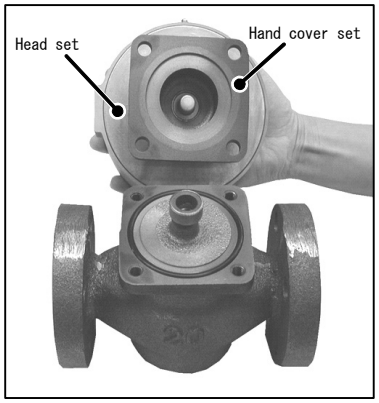


（2）Pull out the head cover set and head set upward together.

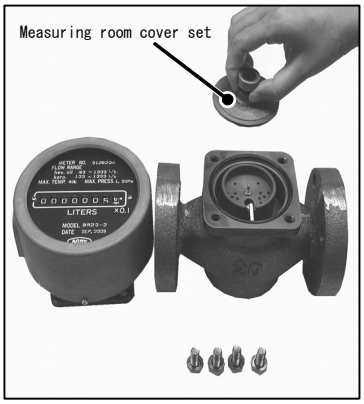


（3）Pull out the measuring chamber cover set upward.

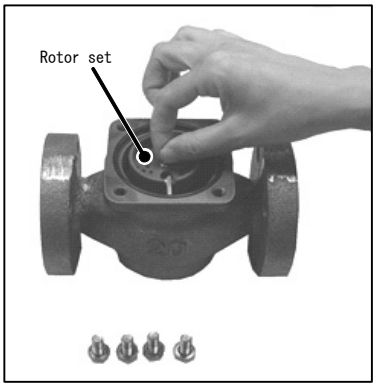
Size
(20A and 25A)



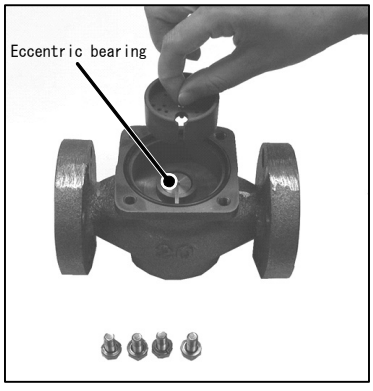
（2）Pull out the head cover set and head set upward together.



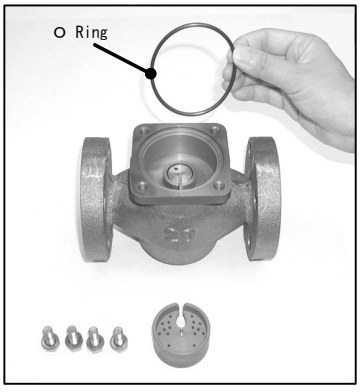
（3）Pull out the measuring chamber cover set upward.



（4）Make sure that the rotor set rotates lightly.



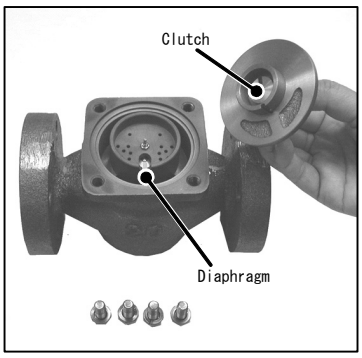
（5）Clean the measuring chamber cleanly with cleaning oil, etc. before re-assembling it.
Insert the center shaft of rotor into match mark position of eccentric bearing.



（6）Clean the O-ring thoroughly.

<Re-assembling>

Reverse the above procedure to re-assemble the instrument.

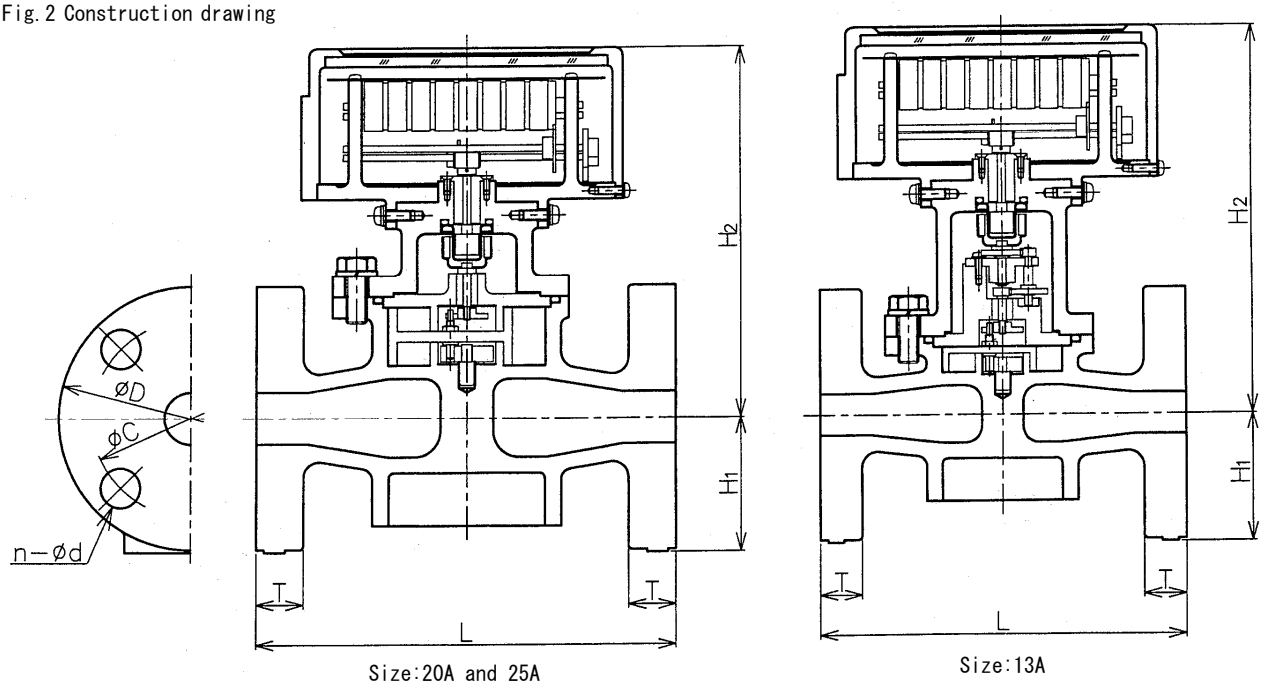


* CAUTION

（１）Be sure to tighten the screws completely.

（２）In setting the measuring chamber cover set, be sure to align the diaphragm with the groove of the cover, and the center shaft of rotor with the groove of the clutch.

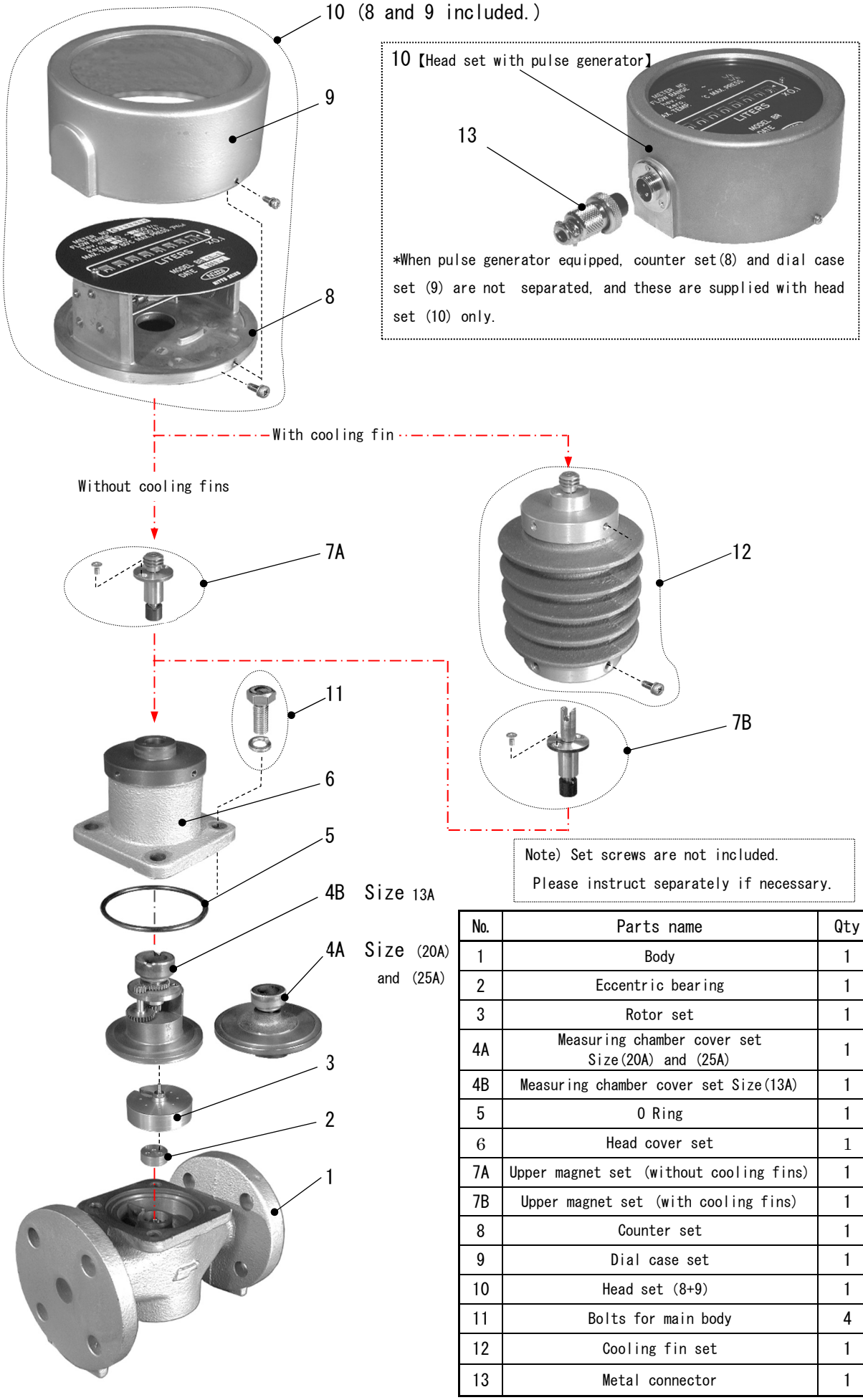
Fig.2 Construction drawing



<Table of external dimensions>

TYPE	L	H1	H2	D	C	T	n × d
ＢＲ１３－３	１４０	４８	１４８	９５	７０	１６	４×１５
ＢＲ２０－２	１６０	５２	１４１	１００	７５	１６	４×１５
ＢＲ２５－２	２２０	６４	１６４	１２５	９０	１８	４×１９

8. Disassembly drawing



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

No.	Parts name	Qty
1	Body	1
2	Eccentric bearing	1
3	Rotor set	1
4A	Measuring chamber cover set Size(20A) and (25A)	1
4B	Measuring chamber cover set Size(13A)	1
5	O Ring	1
6	Head cover set	1
7A	Upper magnet set (without cooling fins)	1
7B	Upper magnet set (with cooling fins)	1
8	Counter set	1
9	Dial case set	1
10	Head set (8+9)	1
11	Bolts for main body	4
12	Cooling fin set	1
13	Metal connector	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: https://global.nittoseiko.com/

【Website】 【Inquiry Form】