

**Single Pipe Density, Tapless
Venturi, Flow Nozzle,
Orifice Flange Assembly**

Model NZ11/NZ99

User's Manual

NOTICE

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While the information in this manual is presented in good faith and believed to be accurate, Azbil Corporation disclaims any implied warranty of merchantability or fitness for a particular purpose and makes no express warranty except as may be stated in its written agreement with and for its customer.

In no event shall Azbil Corporation be liable to anyone for any indirect, special or consequential damages. This information and specifications in this document are subject to change without notice.

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1 : Attention on Safe

- Please use this “operation manual” correctly on reading well before using a product.
- Usage of this product, it is for preventing beforehand the human harm and the property damage of notes which were shown here. Moreover, in order to show the magnitude of the harm and damage which are assumed to be generated by the mistaken handling, and the grade of stringency, it has classified into two, a “warning” and “cautions.” All are the important contents related safely. Please be sure to follow that.



CAUTION

When warning handling is mistaken, the contents it is assumed to be that the condition of risk of a user getting death or seriously injured arises are shown.



WARNING

When cautions handling is mistaken, the contents it is assumed to be that the condition of risk of a user getting slightly injured or only a property damage occurring arises are shown.

1. This user's manual are described the operation for following products.
 - Single pipe density meter (Model NZ99)
 - Tapless venturi (Model NZ11)
 - Flow-nozzle
 - Orifice flange assembly

Herein after These are described to be sensors.

2. About each above mentioned sensor, if a structure becomes large-sized, it may become the weight of 20 kg or more. In this case, the certified person in heavy load handling needs to conduct or handle it, and please perform transfer, packing, etc. of the above mentioned product. The summary of the weight for every body size is as in the following listing.

	Single pipe density meter (Model NZ99)								
Nominal size (in.)	50	80	100	150	200	250	300	350	400
Weight (kg)	18	24	29	47	65	86	108	160	196

	Tapless venturi (Model NZ11)								
Nominal size (in.)	50	80	100	150	200	250	300	350	400
Weight (kg)	17	19	23	42	65	99	129	171	213

	Flow-nozzle								
Nominal size (in.)	50	80	100	150	200	250	300	350	400
Weight (kg)	1	3	6	20	48	94	160	-	-

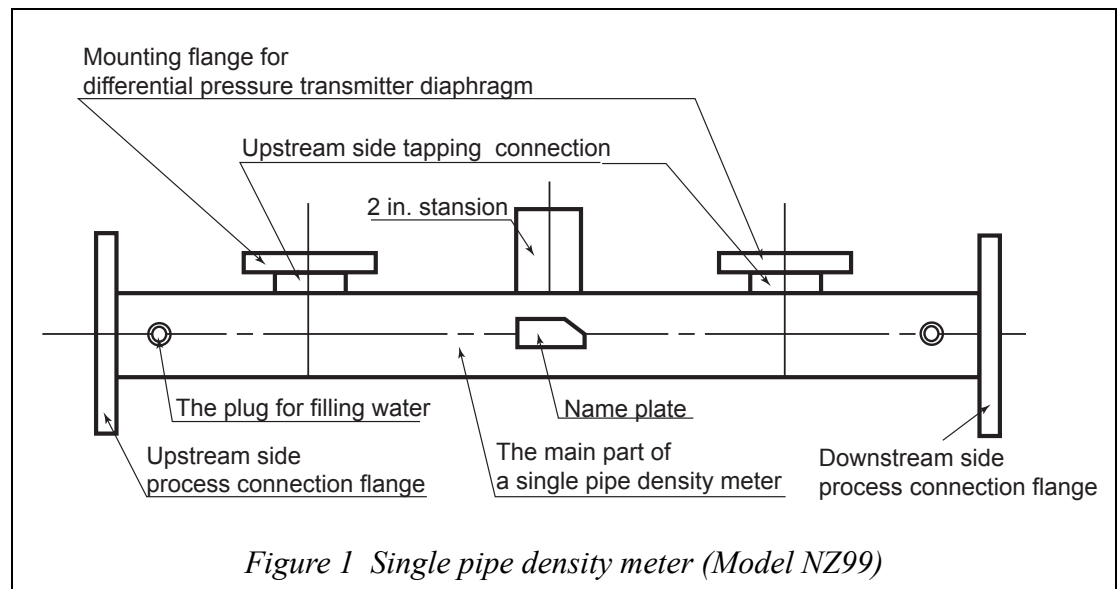
	Orifice flange assembly								
Nominal size (in.)	50	80	100	150	200	250	300	350	400
Weight (kg)	15	25	41	80	125	210	250	300	-

2 : Name of Parts

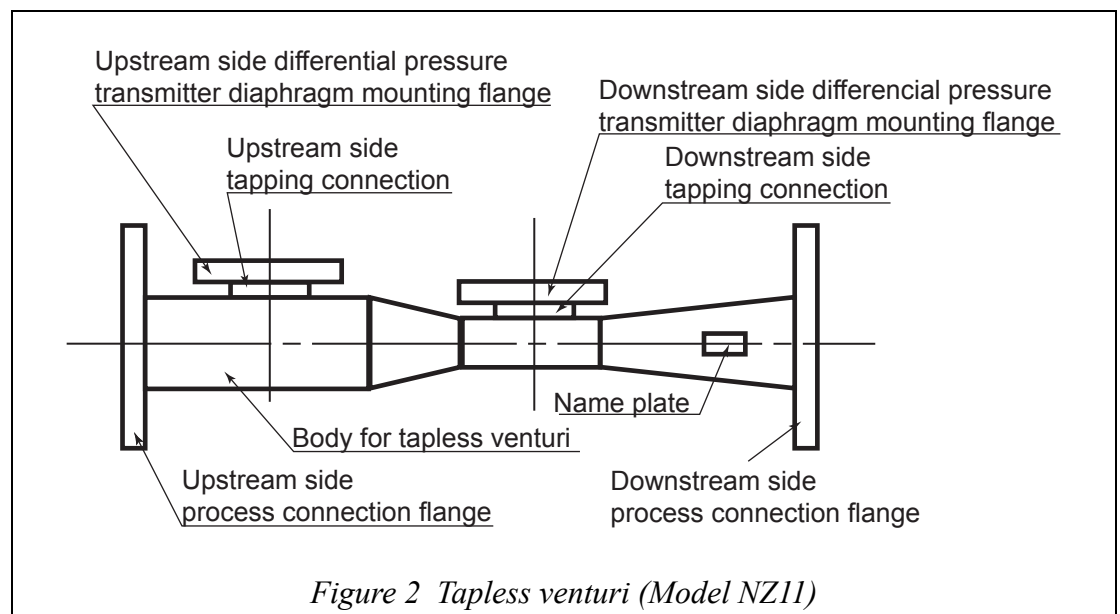
Please read well before use it about the name and term of a single pipe density meter Sensor and a flow type sensor (herein after “sensor”).

In addition, in the case of an orifice or a flow nozzle, there is a impulse pipe which connects a differential pressure transmitter to it etc., but since it is out of scope of our company, so it is not describe in here.

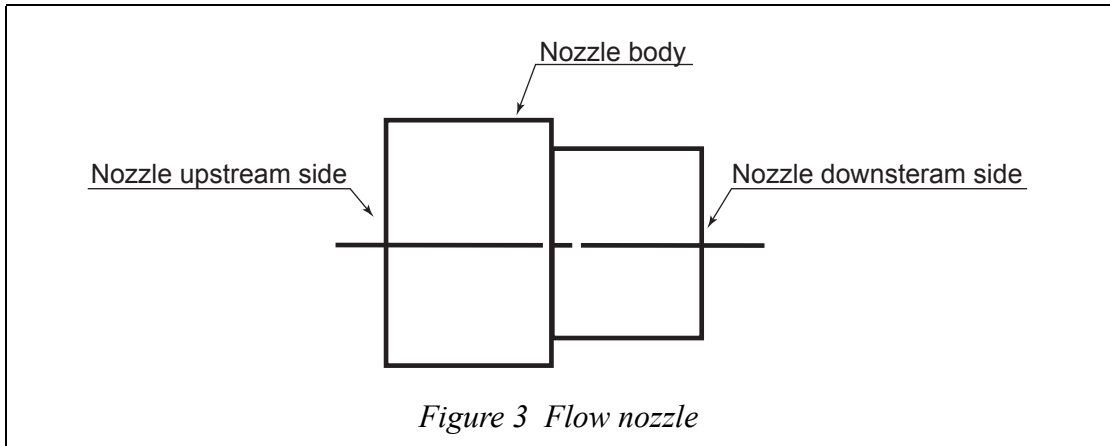
Single pipe density meter (Model NZ99)



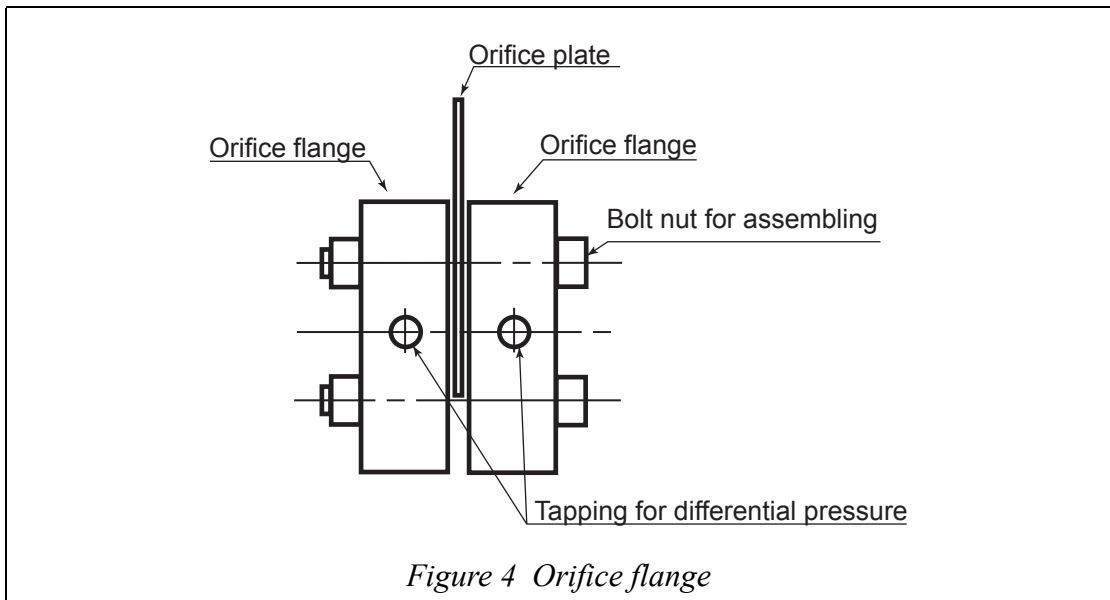
Tapless venturi (Model NZ11)



Flow nozzle



Orifice flange



3 : Confirm specification of Sensor and storage

Unpacking

A sensor is a precision mechanical equipment. In order to prevent an accident and damage, please handle carefully. Please confirm whether in the unpacking, the following are contained.

- The sensor and attached parts which were purchased

Specification confirm

Please verify check that fluid conditions, and TAG No. and product Specification model number to be used have. The nameplate for a product is equipped at the location shown in the following figure.

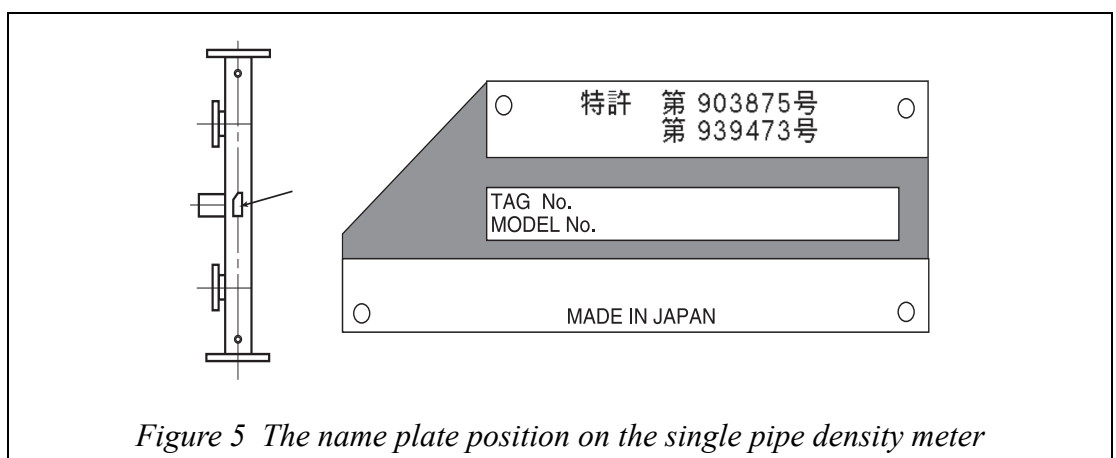


Figure 5 The name plate position on the single pipe density meter

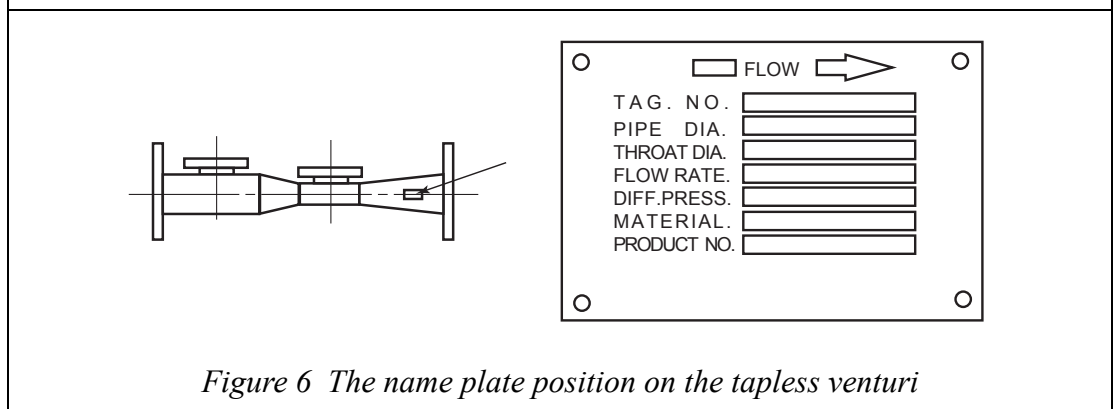


Figure 6 The name plate position on the tapless venturi

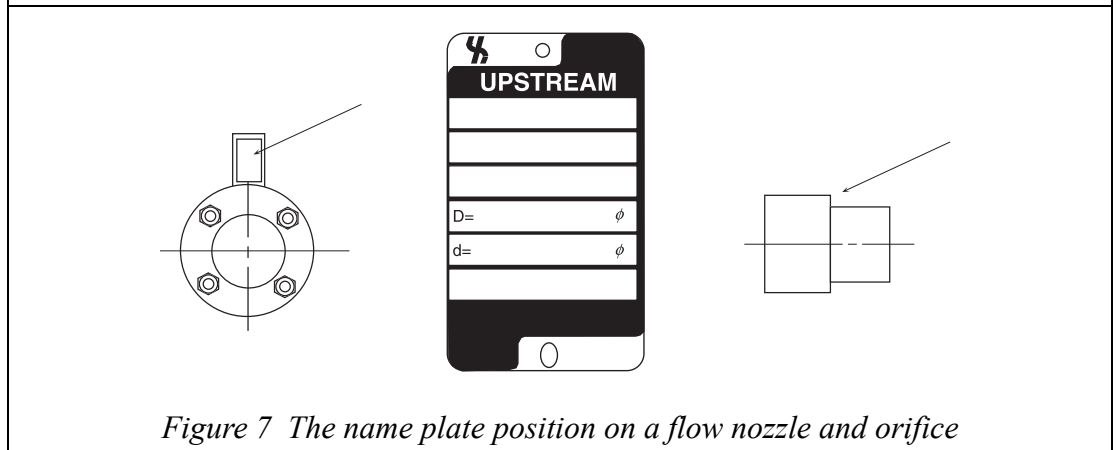


Figure 7 The name plate position on a flow nozzle and orifice

Attention about storage

Please keep the following notes when the purchased sensor is stored.

- Please store the sensor packed up with the carton box in indoor under conditioned normal temperature and humidity.
- As a rule when the sensor packed up with the wooden frame is also stored in indoor under conditioned normal temperature and humidity, in case of store it at outdoor, cover with the polyethylene sheet for goods after a unpacking and a Specification Confirm to prevent the rain water permeation.
- Store of the sensor used once should follow the following procedure.
 - (1) The fluid which adheres or remains inside the body of a sensor is flushed and dried.
 - (2) A rust protection is performed when there is a possibility that the sensor section may rust.
 - (3) Please protect with a flange cap etc. so that a crack does not reach a piping connection part such as a flange face, welding face.

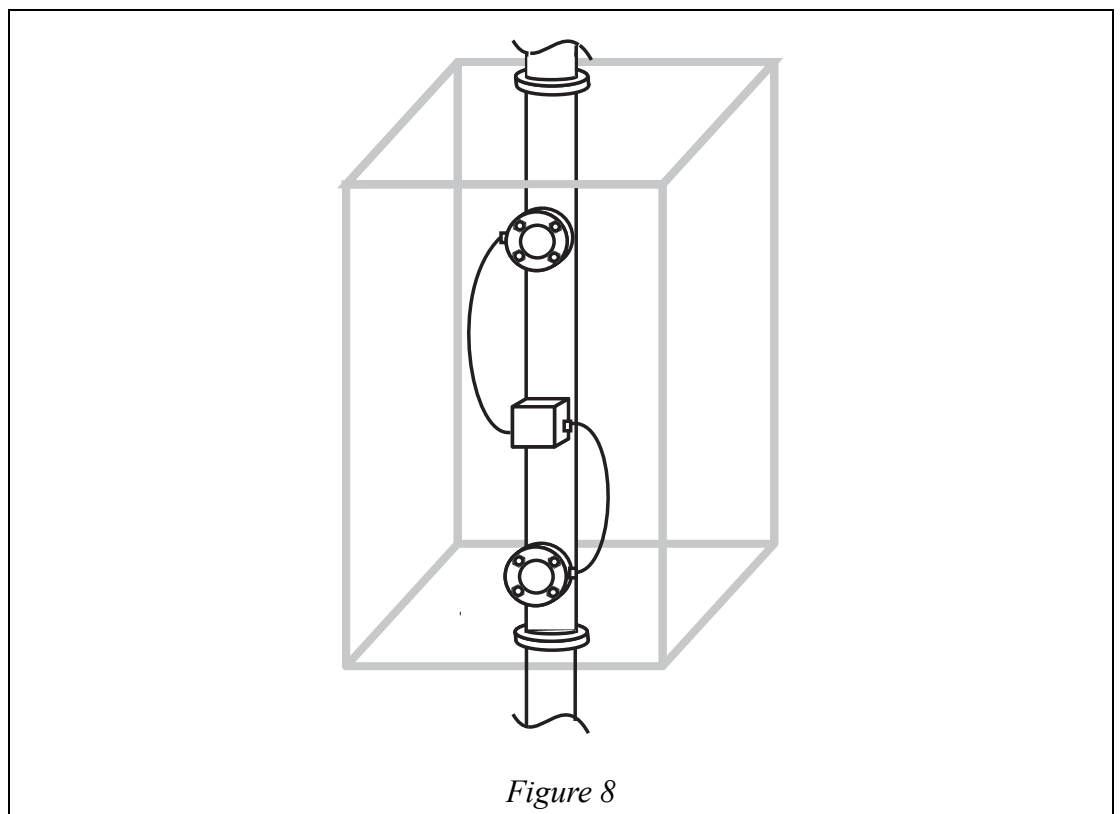
4 : Installation

Installation environment

Please take care the following points for the installation of a purchased sensor.

CAUTIONS

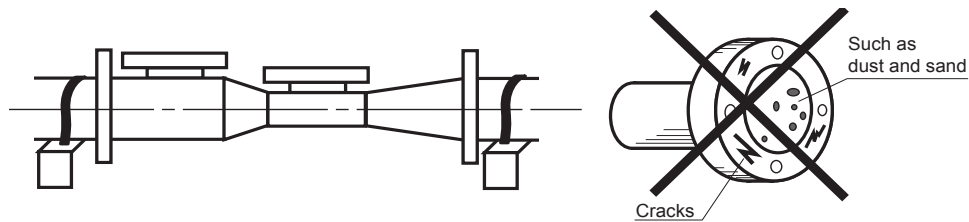
- Please arrange the space for installation of a sensor which can perform operation and a Maintenance easily and safely.
- By the weight of a sensor, and operation, piping should take into consideration the support to the sensor itself, or support of order piping not to receive excessive loading.
- Please arrange a fence and a cover around to the sensor which is faced and installed in transit, if there is a possibility that an outsider may contact.
- Please do not install to a place with the danger of submersion by rain water etc., being buried by snow coverage, and a freeze.
- When a sensor faces from radiant heat, please arrange the a Varier board etc. to protect it.
- In the case of damage from salt water or a corrosive atmosphere, please implement the cure against corrosive protection.
- In maintain a sensor, in order to prevent an unexpected accident, Please be sure to wear safety goggles, a custody glove, safety shoes, etc. as a protector.



The Confirm before installation, please keep the following notes.

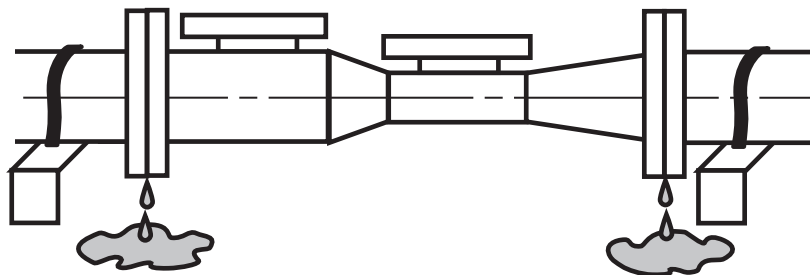
CAUTIONS

- Please confirm that there is no damage (the body section and accessories) in a sensor.
- Please confirm that there is no damage on by the side of a piping connection flange or welding piping.
- Please confirm that the temperature depression after welding When the piping side is performing flange welding etc.
- A piping side flange should bevel the edge section.
- Please also carry out foreign material abatement of the dust, the sand, the welding spatter, etc. inside piping, and cleaning inside a sensor. Mixing of a foreign material is damage on the diaphragm section of a differential pressure transmitter, and It becomes the degradation factor for constant measurement accuracy of a density or a flow rate.
- Please confirm that the support to piping before and after installation of a sensor should come out enough. The weight of a sensor is added and it becomes the cause of the leakage from a flange connection.



WARNING

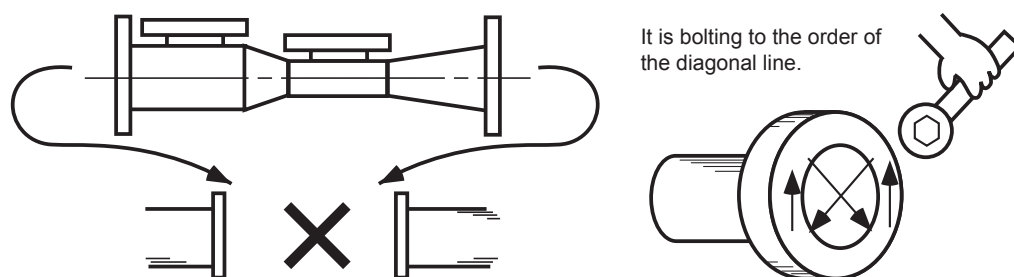
A possibility of becoming the big causality of an accident by demagog or leakage the sensor of those other than a rated pressure or connection standard.



Installation work

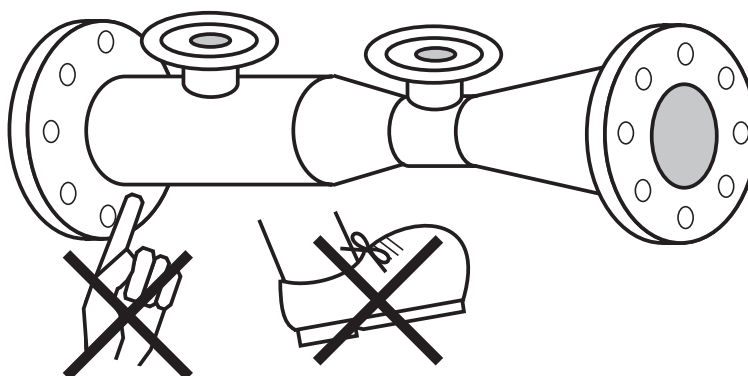
⚠ CAUTION

- When the piping installation before and after a sensor is completed, please confirm that the centering of piping has come out correctly. Uncentering of piping gives distortion to a sensor and causes fluid leakage from a connection faces (gasket section).
- Please confirm that center to center dimension of piping flanges is suitable dimension to the gasket thickness plus the center to center dimension of a sensor.
- When you install a piping flange with a sensor with a bolt nut, please bind tight in order of the diagonal line and do not carry out unbalanced bind tight. There is a possibility of becoming the cause of leakage of a fluid.
- The bolt nut for piping flanges should be used suitable one to corresponding to a flange rating standard the gasket for piping flanges. There is a possibility of becoming the causality of external disclosure of a fluid.
- Please use the new gasket for piping flanges corresponding to the quality, and temperature and a flow and pressure requirement of a fluid. It becomes the causality of external disclosure of a fluid by gasket fracture etc.



⚠ WARNING

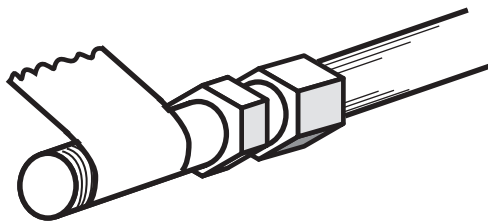
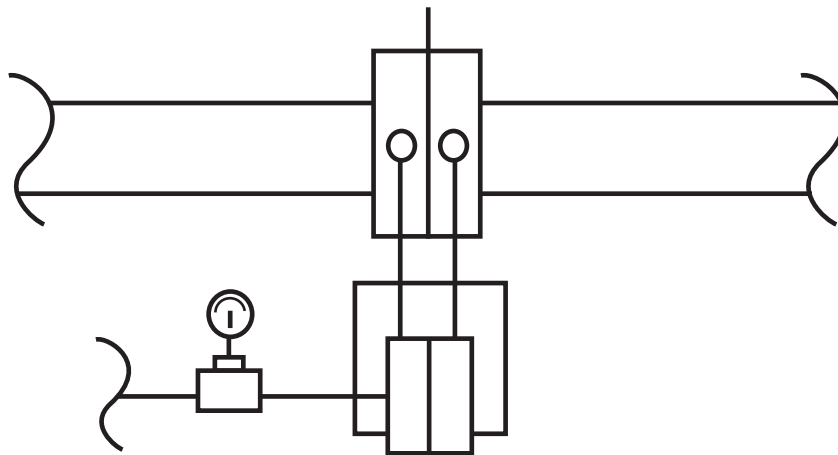
- In case you install a sensor in piping, please insert neither a hand nor a leg by any means between the bottom of the main part of a sensor, or a flange. There is a possibility of getting injured in a Disconnect of a finger or a leg.
- Please replace the remains fluid in existing piping to washing or a safe fluid on the occasion of maintenance or the sensor installation after modification. There is a possibility of the accident resulting in injury or death by the remains fluid.



Air piping and an electrical work

CAUTION

- Please design air piping as a diameter selection which does not cause a pressure drop at the time of operation of a differential pressure transmitter.
- The bend section of air piping should have enough allowance (Use the special tool for bending works) and should band together with parallel running pipings.
- In accordance with an electric equipment technical standard, electrical-work qualified personnel should perform wiring work.
- The connection of a cable should choose a cable gland packing which suited outer diameter of the cable in according to facility conditions.
- Please do not use a seal tape for air piping. the piece of a tape is getting it blocked, there is a possibility of becoming the trouble cause that operation of a differential pressure transmitter.
- Wiring work should avoid and perform rainy weather and the condition of high humidity. Permeation of the moisture to the inside of a connector or a terminal box generates rust cause and a short circuit.
- The seal section of a cable screw or the conduit tube needs to carry out certainly, and must not have permeation of moisture.

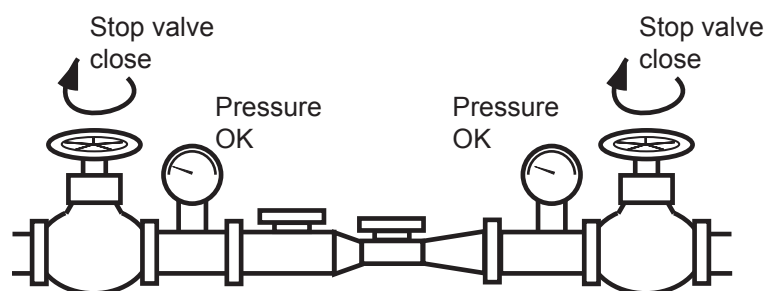


5 : Decomposition Assembly

Decomposition

WARNING

- When you remove a sensor, please confirm that the pressure in piping has fallen to atmospheric pressure strength, and start work. There is a possibility of the accident resulting in injury or death by jet of a fluid.
- In case you remove a sensor, please washing and displacement in a sensor. There is a possibility of the accident resulting in injury or death by the remains fluid for piping.



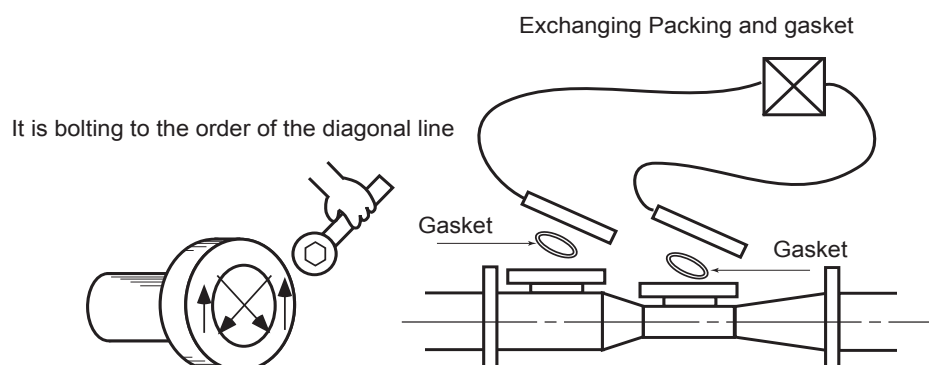
Assembly

CAUTIONS

- Please bind bolting of the bolt nut for piping flanges tight with torque uniform by turns on the diagonal line.
- Please use new packing and a new gasket in the case of main part section attachment. Reusing of the old packing and gasket become causes of fluid leakage.

WARNING

The blemish and corrosion of a bolt nut should cause a sensor section fluid leak, and since there is possibility of a accident resulting in injury or death, please exchange them for a new one.



6 : Maintenance Check Up

A Maintenance check up should keep the following notes.



WARNING

- When the leakage of a fluid is discovered from a sensor, please do not approach a sensor until the safety is confirmed. Depending on the description of a fluid, there is a possibility of a big accident or a accident resulting in injury or death.
- Please process appropriately the old parts generated in removal and a Maintenance of a sensor as an industrial waste. If it burns easily or disposes, it will become the causality of environment pollution.

1. Single pipe density meter, flow nozzle, orifice

- (1) When removing a diaphragm after measuring, high temperature liquids (black liquor etc.).

Single pipe density meter (a flow nozzle, orifice)

When the close of the stop valve of the upstream and remove the diaphragm of a differential pressure transmitter, it is a possibility to remain high temperature steam in the piping. Please confirm and remove safely as a grade loosened a little, without removing all diaphragm bolts, looking at a situation. When a pressure is low, please remove a diaphragm after rounding off by waste close etc. and stopping the steamy blow down.

- (2) 2 in. pipe stanchion for differential pressure transmitter.

It is not manufactured so that a heavy load may be attached. Please do not install except a differential pressure transmitter. A worker must not ride on this 2 in. pipe stanchion. There is possibility of instrument damage or a accident resulting in injury or death.

- (3) 1½ in. plug

- Even if it removes a plug, mud may be got blocked and inner liquid may not flow out. If it pokes at the nose of cam of a driver etc. and mud is removed, muddy water will blow off suddenly. The specific gravity of muddy water is heavy, a plug cannot reinstalled. Please install and fully open a ball valve etc. remove mud, if it blows off, will be close a ball valve carefully etc. and deal with it.
- Please do not look into a plug with the naked eye. Muddy water may blow out suddenly.

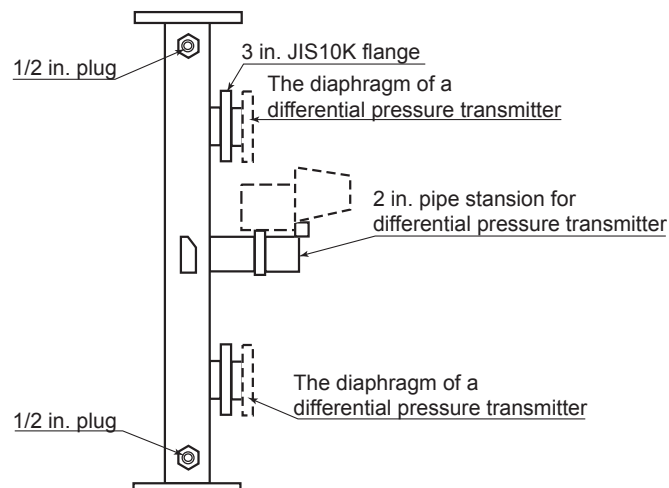


Figure 9

2. Tap Less Flowmeter

- (1) When removing a diaphragm after measuring high temperature liquids (black liquor etc.).

When the close of the stop valve of the upstream and remove the diaphragm of a differential pressure transmitter, it is a possibility to remain high temperature steam in the piping. Please confirm and remove safely as a grade loosened a little, without removing all diaphragm bolts, looking at a situation.

When a pressure is low, please remove a diaphragm after rounding off by waste close etc. and stopping the steamy blowdown.

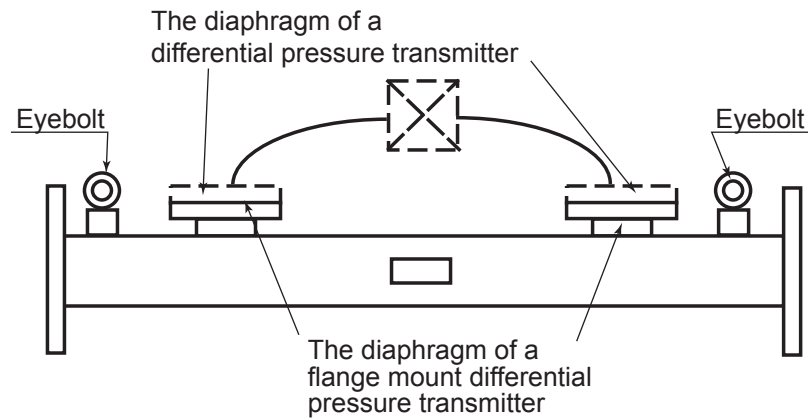


Figure 10

Terms and Conditions

We would like to express our appreciation for your purchase and use of Azbil Corporation's products.

You are required to acknowledge and agree upon the following terms and conditions for your purchase of Azbil Corporation's products (system products, field instruments, control valves, and control products), unless otherwise stated in any separate document, including, without limitation, estimation sheets, written agreements, catalogs, specifications and instruction manuals.

1. Warranty period and warranty scope

1.1 Warranty period

Azbil Corporation's products shall be warranted for one (1) year from the date of your purchase of the said products or the delivery of the said products to a place designated by you.

1.2 Warranty scope

In the event that Azbil Corporation's product has any failure attributable to azbil during the aforementioned warranty period, Azbil Corporation shall, without charge, deliver a replacement for the said product to the place where you purchased, or repair the said product and deliver it to the aforementioned place. Notwithstanding the foregoing, any failure falling under one of the following shall not be covered under this warranty:

- (1) Failure caused by your improper use of azbil product (noncompliance with conditions, environment of use, precautions, etc. set forth in catalogs, specifications, instruction manuals, etc.);
- (2) Failure caused for other reasons than Azbil Corporation's product;
- (3) Failure caused by any modification or repair made by any person other than Azbil Corporation or Azbil Corporation's subcontractors;
- (4) Failure caused by your use of Azbil Corporation's product in a manner not conforming to the intended usage of that product;
- (5) Failure that the state-of-the-art at the time of Azbil Corporation's shipment did not allow Azbil Corporation to predict; or
- (6) Failure that arose from any reason not attributable to Azbil Corporation, including, without limitation, acts of God, disasters, and actions taken by a third party.

Please note that the term "warranty" as used herein refers to equipment-only-warranty, and Azbil Corporation shall not be liable for any damages, including direct, indirect, special, incidental or consequential damages in connection with or arising out of Azbil Corporation's products.

2. Ascertainment of suitability

You are required to ascertain the suitability of Azbil Corporation's product in case of your use of the same with your machinery, equipment, etc. (hereinafter referred to as "Equipment") on your own responsibility, taking the following matters into consideration:

- (1) Regulations and standards or laws that your Equipment is to comply with.
- (2) Examples of application described in any documents provided by Azbil Corporation are for your reference purpose only, and you are required to check the functions and safety of your Equipment prior to your use.
- (3) Measures to be taken to secure the required level of the reliability and safety of your Equipment in your use

Although azbil is constantly making efforts to improve the quality and reliability of Azbil Corporation's products, there exists a possibility that parts and machinery may break down. You are required to provide your Equipment with safety design such as fool-proof design,*1 and fail-safe design*2 (anti-flame propagation design, etc.), whereby preventing any occurrence of physical injuries, fires, significant damage, and so forth. Furthermore, fault avoidance,*3 fault tolerance,*4 or the like should be incorporated so that the said Equipment can satisfy the level of reliability and safety required for your use.

*1. A design that is safe even if the user makes an error.

*2. A design that is safe even if the device fails.

*3. Avoidance of device failure by using highly reliable components, etc.

*4. The use of redundancy.

3. Precautions and restrictions on application

3.1 Restrictions on application

Please follow the table below for use in nuclear power or radiation-related equipment.

	Nuclear power quality*5 required	Nuclear power quality*5 not required
Within a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Cannot be used (except for limit switches for nuclear power*7)
Outside a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Can be used

*5. Nuclear power quality: compliance with JEAG 4121 required

*6. Radiation controlled area: an area governed by the requirements of article 3 of "Rules on the Prevention of Harm from Ionizing Radiation," article 2 2 4 of "Regulations on Installation and Operation of Nuclear Reactors for Practical Power Generation," article 4 of "Determining the Quantity, etc., of Radiation-Emitting Isotopes," etc.

*7. Limit switch for nuclear power: a limit switch designed, manufactured and sold according to IEEE 382 and JEAG 4121.

Any Azbil Corporation's products shall not be used for/with medical equipment.

The products are for industrial use. Do not allow general consumers to install or use any Azbil Corporation's product. However, azbil products can be incorporated into products used by general consumers. If you intend to use a product for that purpose, please contact one of our sales representatives.

3.2 Precautions on application

you are required to conduct a consultation with our sales representative and understand detail specifications, cautions for operation, and so forth by reference to catalogs, specifications, instruction manual, etc. in case that you intend to use azbil product for any purposes specified in (1) through (6) below. Moreover, you are required to provide your Equipment with fool-proof design, fail-safe design, anti-flame propagation design, fault avoidance, fault tolerance, and other kinds of protection/safety circuit design on your own responsibility to ensure reliability and safety, whereby preventing problems caused by failure or nonconformity.

- (1) For use under such conditions or in such environments as not stated in technical documents, including catalogs, specification, and instruction manuals
- (2) For use of specific purposes, such as:
 - * Nuclear energy/radiation related facilities
[When used outside a radiation controlled area and where nuclear power quality is not required]
[When the limit switch for nuclear power is used]
 - * Machinery or equipment for space/sea bottom
 - * Transportation equipment
[Railway, aircraft, vessels, vehicle equipment, etc.]
 - * Antidisaster/crime-prevention equipment
 - * Burning appliances
 - * Electrothermal equipment
 - * Amusement facilities
 - * Facilities/applications associated directly with billing
- (3) Supply systems such as electricity/gas/water supply systems, large-scale communication systems, and traffic/air traffic control systems requiring high reliability
- (4) Facilities that are to comply with regulations of governmental/public agencies or specific industries
- (5) Machinery or equipment that may affect human lives, human bodies or properties
- (6) Other machinery or equipment equivalent to those set forth in items (1) to (5) above which require high reliability and safety

4. Precautions against long-term use

Use of Azbil Corporation's products, including switches, which contain electronic components, over a prolonged period may degrade insulation or increase contact-resistance and may result in heat generation or any other similar problem causing such product or switch to develop safety hazards such as smoking, ignition, and electrification. Although acceleration of the above situation varies depending on the conditions or environment of use of the products, you are required not to use any Azbil Corporation's products for a period exceeding ten (10) years unless otherwise stated in specifications or instruction manuals.

5. Recommendation for renewal

Mechanical components, such as relays and switches, used for Azbil Corporation's products will reach the end of their life due to wear by repetitious open/close operations.

In addition, electronic components such as electrolytic capacitors will reach the end of their life due to aged deterioration based on the conditions or environment in which such electronic components are used. Although acceleration of the above situation varies depending on the conditions or environment of use, the number of open/close operations of relays, etc. as prescribed in specifications or instruction manuals, or depending on the design margin of your machine or equipment, you are required to renew any Azbil Corporation's products every 5 to 10 years unless otherwise specified in specifications or instruction manuals. System products, field instruments (sensors such as pressure/flow/level sensors, regulating valves, etc.) will reach the end of their life due to aged deterioration of parts. For those parts that will reach the end of their life due to aged deterioration, recommended replacement cycles are prescribed. You are required to replace parts based on such recommended replacement cycles.

6. Other precautions

Prior to your use of Azbil Corporation's products, you are required to understand and comply with specifications (e.g., conditions and environment of use), precautions, warnings/cautions/notices as set forth in the technical documents prepared for individual Azbil Corporation's products, such as catalogs, specifications, and instruction manuals to ensure the quality, reliability, and safety of those products.

7. Changes to specifications

Please note that the descriptions contained in any documents provided by azbil are subject to change without notice for improvement or for any other reason. For inquires or information on specifications as you may need to check, please contact our branch offices or sales offices, or your local sales agents.

8. Discontinuance of the supply of products/parts

Please note that the production of any Azbil Corporation's product may be discontinued without notice. After manufacturing is discontinued, we may not be able to provide replacement products even within the warranty period.

For repairable products, we will, in principle, undertake repairs for five (5) years after the discontinuance of those products. In some cases, however, we cannot undertake such repairs for reasons, such as the absence of repair parts. For system products, field instruments, we may not be able to undertake parts replacement for similar reasons.

9. Scope of services

Prices of Azbil Corporation's products do not include any charges for services such as engineer dispatch service. Accordingly, a separate fee will be charged in any of the following cases:

- (1) Installation, adjustment, guidance, and attendance at a test run
- (2) Maintenance, inspection, adjustment, and repair
- (3) Technical guidance and technical education
- (4) Special test or special inspection of a product under the conditions specified by you

Please note that we cannot provide any services as set forth above in a nuclear energy controlled area (radiation controlled area) or at a place where the level of exposure to radiation is equivalent to that in a nuclear energy controlled area.

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Model NZ11/NZ99
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