PUMPING TRAP

GL81E-A

USER'S MANUAL

MIYAWAKI INC.

SAFETY GUIDE

Introduction

The model GL81E-A is a pumping trap that can transport low pressure condensate into a higher location/pressure line.

In order to get maximum benefit from this product, be sure to read this manual before installing it.

- **Keep the Manual readily available after reading it so that you can use it at any time as needed.**
- **If a question arises or a malfunction occurs while you are using the product, refer to this Manual.**
- **Do not to use this product at higher pressures than the specified maximum allowable pressure PMA (PS) or at temperatures higher than the specified maximum allowable temperature TMA (TS).**
- **Do not directly touch the product during operation. You may get burns or injured.**
  Before you touch the product, check the temperature.

The following warnings and cautions are shown at appropriate places in this manual.

Warning	Failure to observe this type of precaution may lead to serious injury or death.
Caution	Failure to follow this type of precaution can lead to injury or damage to equipment and property.

Contents

1 Specifications and markings

⚠ Warning

Be sure not to use this product at higher pressures than the specified maximum allowable pressure PMA (PS) or at temperatures higher than the specified maximum allowable temperature TMA (TS).

The following items are displayed on the name plate or the side of the product. Check each item to avoid misuse of the product.

(1) Body design conditions: PN16
(2) Maximum allowable pressure PMA (PS): 1.6 MPa (16 bar, 232 psig) @100°C (212°F)
(3) Maximum allowable temperature TMA (TS): 220°C (428°F) @ 1.48 MPa (14.8 bar, 215 psig)
(4) Maximum operating pressure (PMO): 1.05 MPa (10.5 bar, 153 psig).
(5) Maximum operating temperature (TMO): 185°C (365°F)
(6) Size: Inlet = flanged DN80 (3") Outlet=flanged DN50 (2")
available flange standards: PN16, ASME/JPI class150#RF, JIS 16KFF
Vent line = threaded DN25 (1" Rc)
Motive medium pressure line = threaded DN15 (1/2" Rc)
(7) Year of production :
The two leftmost digits in the four-digit or nine-digit “S. No.” are the last two digits of the year of production.

For more details regarding dimensions and other specifications, refer to the catalog.

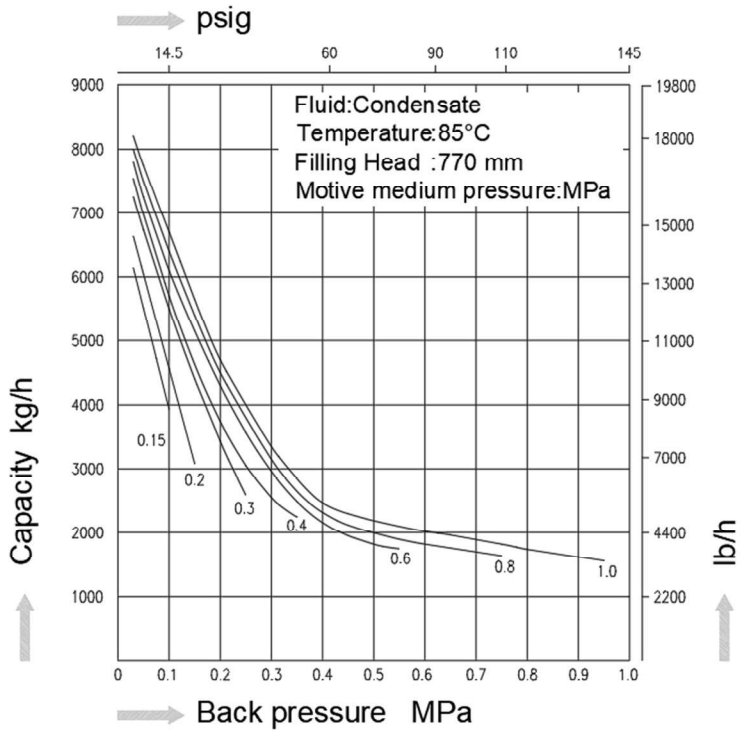
Classification according to PED 2014/68/EU Fluid group 2

CE 0035

The model GL81E-A fully complies with the requirements of the European Pressure Equipment Directive 2014/68/EU. It belongs to the category II of the PED.
The product will carry the CE marking and the conformity with the PED will be confirmed by issuing a declaration of conformity.

Flow Capacity Charts

Motive medium: Saturated Steam

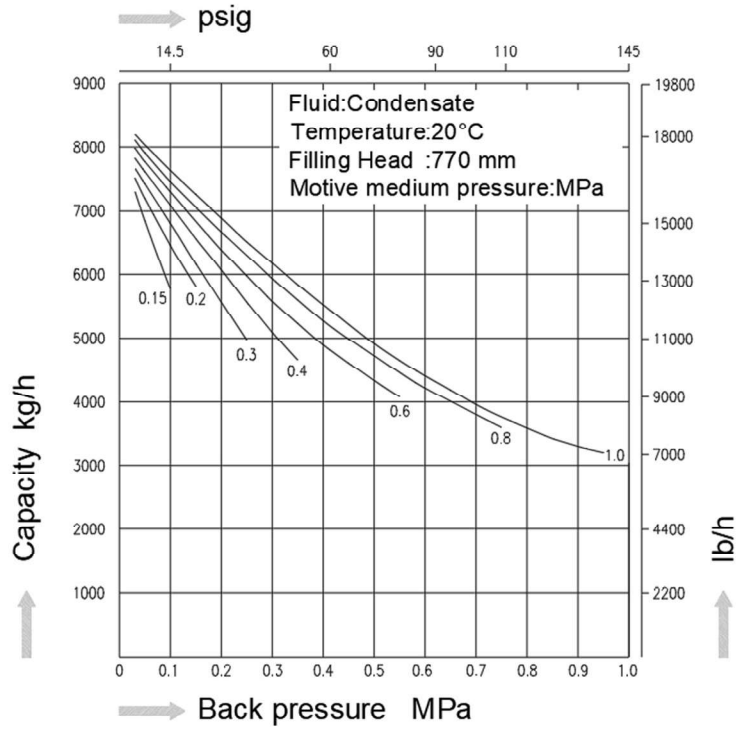


Note:
To achieve the rated flow rates, the GL81E-A must be installed with the check valves as delivered by MIYAWAKI.

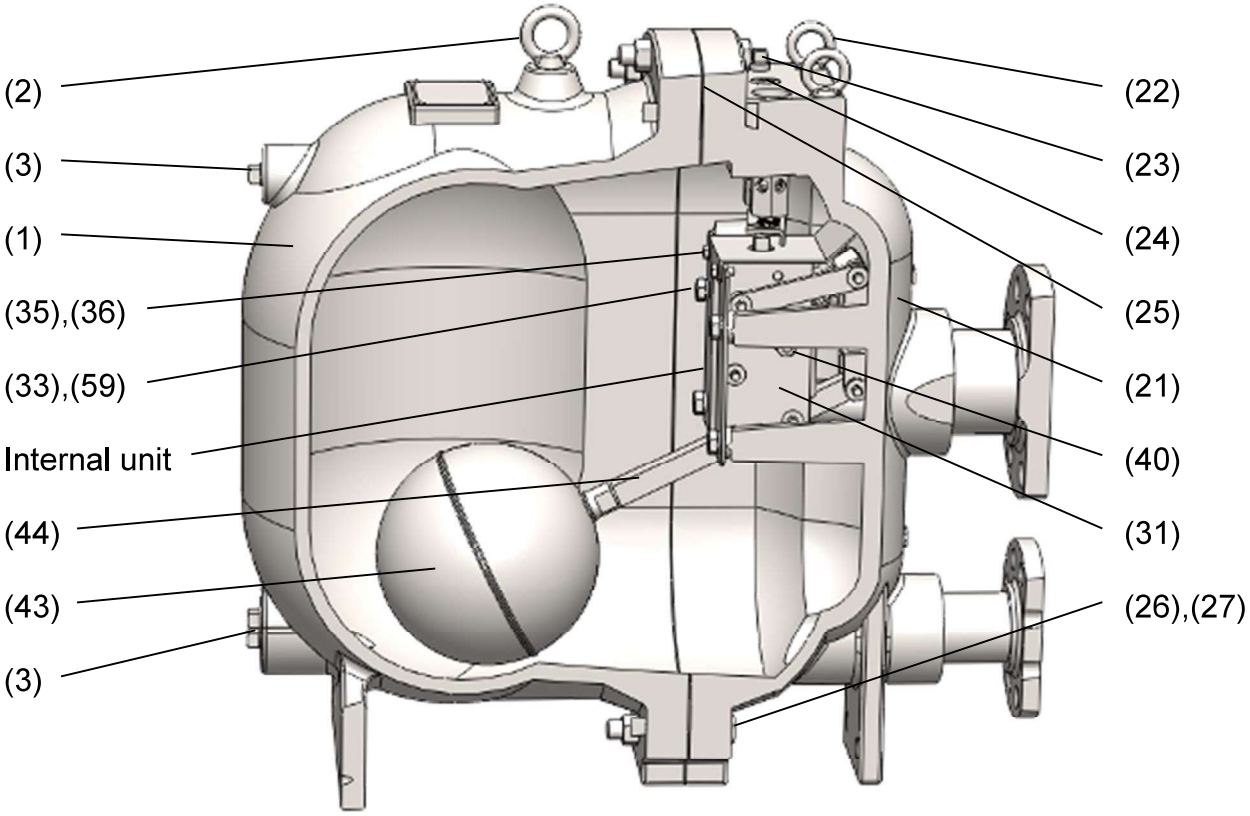
To obtain capacities of other filling heads than that of 770 mm, use the correction factors listed below and calculate the capacity by using the factors for other filling heads.

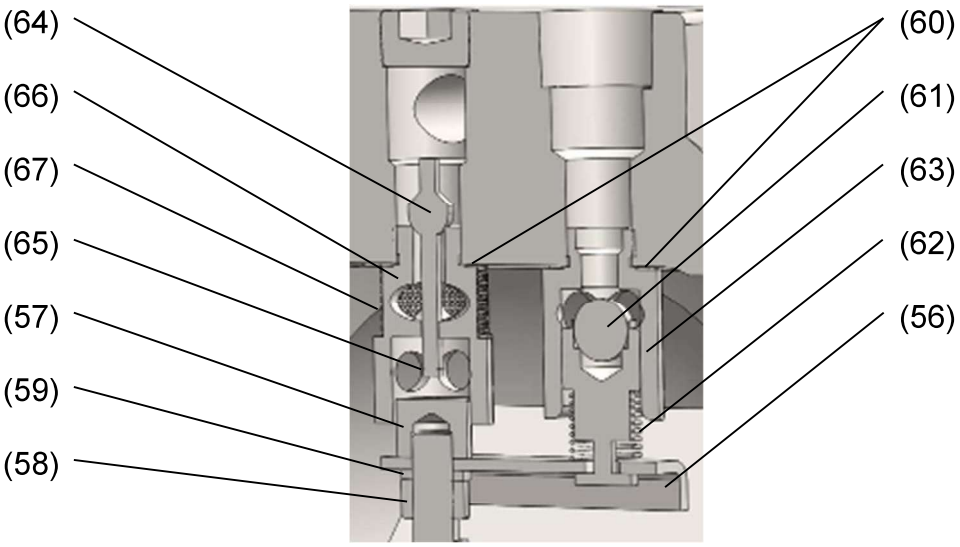
Filling head		Correction factor
mm	inch	
150	5.9	0.66
270	10.6	0.77
370	14.5	0.82
570	22.4	0.92
770	30.3	1
970	38.2	1.01
1270	50.0	1.03

Motive medium: Air



2 Construction details





1. Body
2. M12 eyebolt
3. DN15 plug
21. Cover
22. M10 eyebolt
23. DN10 plug
24. DN20 tapered screw plug
25. Cover gasket
26. M16 bolt
27. M16 nut
31. Frame
33. M12 bolt
35. M6 bolt
36. M6 spring washer
40. M10 nut
43. Float
44. Float lever
56. Plate (B)
57. Nut cap
58. M12 nut (fine-thread)
59. M12 spring washer
60. Seat gasket
61. Vent valve
62. Spring (B)
63. Vent valve seat
64. Motive valve
65. C-ring
66. Motive valve seat
67. Screen

3 Precautions before installation

Caution

To use the pumping trap, you need as components of the piping system inlet and outlet check valves, a Y-type strainer for the motive fluid, a condensate receiver tank, inlet and outlet isolation valves and an isolation valve for the motive fluid. If steam will be used as motive fluid, the installation of a steam trap is necessary. A gate valve is recommended for isolation valve. Use connection fittings (e.g., union, flange) for the connection with the pumping trap.

(1) Pumping trap installation

- A pumping trap can be either installed in an open system and a closed system.

  ① **Open system:**

  In case of an open system the vent line of the pumping trap is connected with the vent line of the receiver tank in order to vent air and steam to the atmosphere.
  If the temperature of the condensate is above 100°C (212°F), flash steam built up in the upstream condensate line or in the receiver tank will be vented to the atmosphere.
  In an open system the influence of pressure changes at the upstream side will be reduced. It will be easier to stabilize the operation of the system.

  ② **Closed system:**

  In case of a closed system the vent line of the pumping trap is connected with the condensate receiver tank or with the heat exchanger which are vented through an air vent.

- To allow the condensate to flow into the pumping trap, a filling head* between the condensate receiver tank and the pumping trap is required. Install the GL81E-A below the receiver tank (Recommended filling head: more than 770 mm).
  * "Filling head" is the distance between the top of the pumping trap and the bottom of the receiver tank.

- Install the vent line vertically, and then connect it to the vent line of the receiver tank.

- It is recommended to install the motive fluid line near the pumping trap for easy maintenance. Then connect it to the motive valve inlet of the pumping trap.

(2) Receiver tank

While the pumping trap discharges condensate, condensate produced in the equipment cannot flow into the pumping trap. Thus condensate produced in the equipment during the pump discharge cycle will be accumulated at the upstream side of the pumping trap.

To prevent the accumulation of condensate in the equipment (heat exchanger etc.) a condensate receiver tank should be installed between the pumping trap and the equipment to hold the condensate temporarily.

The receiver tank must be sized to allow a sufficient volume for condensate storage and sufficient area for flash steam building up from the incoming condensate.
(Refer to Table 1)

Table 1 Recommended Receiver Tank Sizing

Size (Diameter)	Length
350 mm	910 mm

It is also recommended to create a U-shaped water seal of at least 300 mm and to connect it with the overflow pipe of the receiver tank as shown in the drawing (open system) in page 7.

(3) Condensate inlet and outlet lines

Install an inlet check valve and valve in the condensate inlet line heading to the pumping trap from the receiver tank.
Install also a check valve at the outlet side of the pumping trap in the condensate outlet line heading to the condensate return line.
The condensate outlet line should be installed to assist in moving the condensate in the direction of downstream. Finally, install the condensate outlet line upward heading to the condensate return line where the condensate may be safely and effectively removed.

Install a valve between the outlet check valve and the condensate return line to allow the isolation of the pumping trap before performing any maintenance.

(4) Motive fluid

Steam, air and nitrogen gas can be used as motive fluid. But, in a closed system steam is used as motive fluid.

Install a Y-strainer and a steam trap on the motive steam supply line. (If air or nitrogen gas is used as motive fluid, a steam trap should not be installed.)

The steam trap outlet line should be connected to the receiver tank.

(5) Vent line

The vent line of the pumping trap should be installed vertically towards the atmosphere. If the vent line is installed horizontally, it should have a downward slope sufficiently to move any condensate towards drain points where the condensate may be safely and effectively removed.

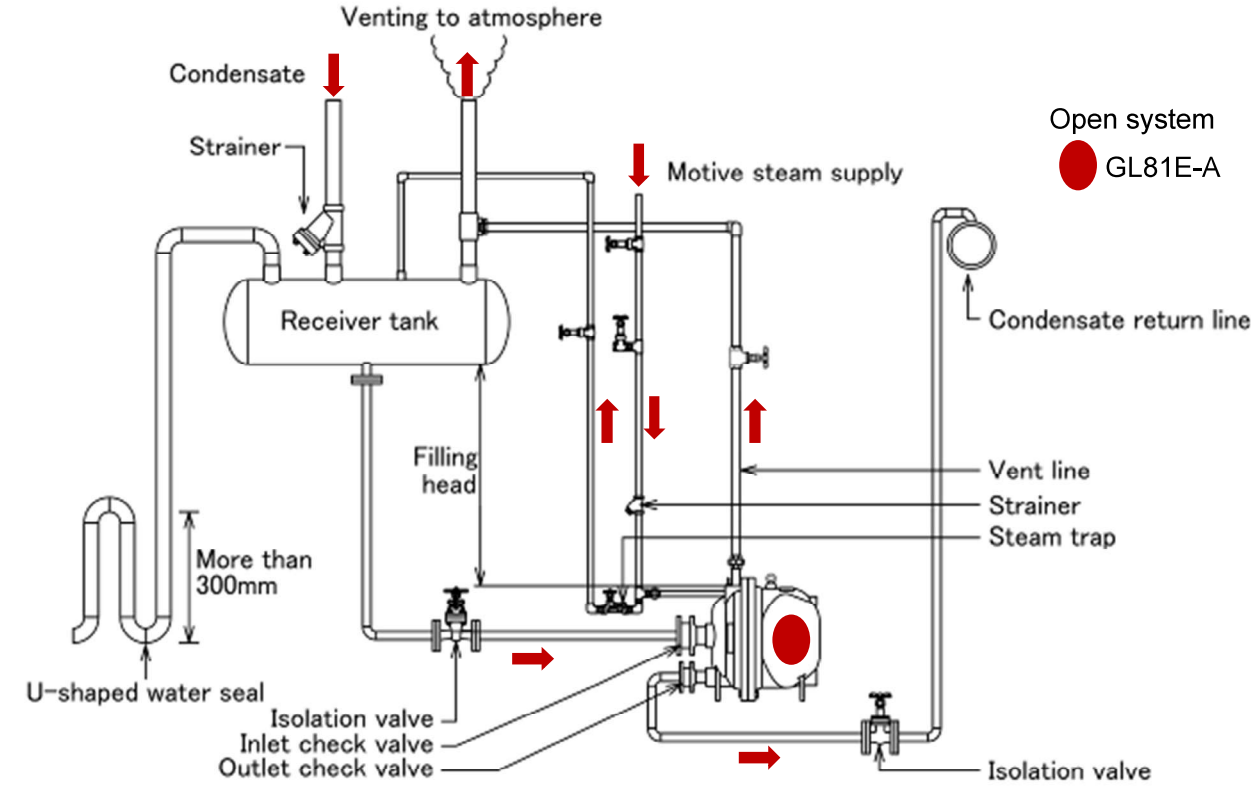
In case of open system, the vent line of the pumping trap should not be immersed into water. It must be connected to the receiver tank or a safe atmosphere vent line.

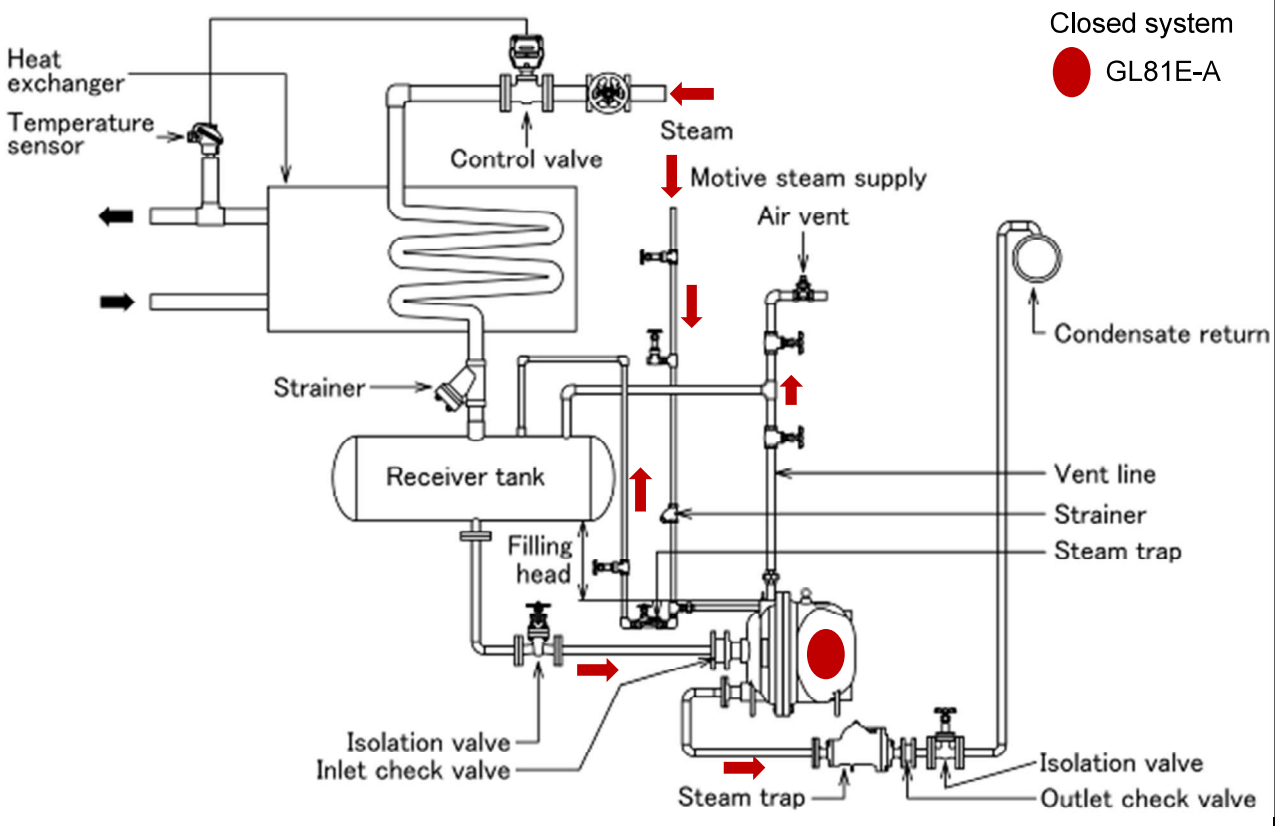
In case of closed system, the vent line should be connected to the gas phase section of the equipment (heat exchanger etc.) or to the receiver tank as balance line.

(6) Closed system

When the pumping trap inlet pressure is higher than the pumping trap outlet pressure, install a steam trap on the outlet side of the pumping trap to prevent any leakage of steam.

Example
of Installation





4 Installation

Warning

Pay very careful attention when working in hazardous environments. There is a risk of explosion and the possibility of dangerous gases leaking. Always check whether the pipeline contains flammable, high pressure or high temperature materials before starting to work.

- Make sure that valves are installed on both the upstream and downstream lines.

Caution

- **Before installing the product, open both the valves to blow out any debris or dirt inside the pipeline.**
- **After blowing out the line, before starting to work, close the valves and allow time for the temperature to drop to a safe working temperature. At the time, check if there is any leakage from the valves.**
- **When installing the product, be sure to leave clearance for maintain it.**

(1) Remove the dust-proof seals affixed on the pipe connections of the pumping trap and accessories (such as check valves).

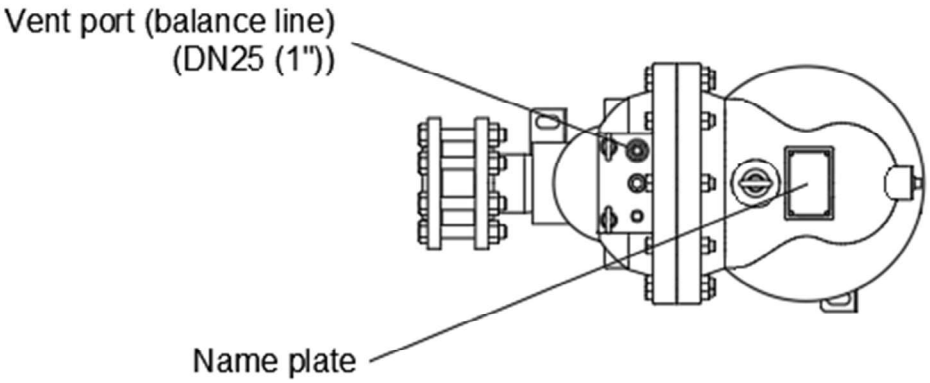
(2) Installing the condensate inlet, outlet and the motive fluid line horizontally. And, install the vent line vertically so that the name plate is on the top side. Install the pumping trap below the receiver tank, thereby allowing condensate to flow into the pumping trap easily.

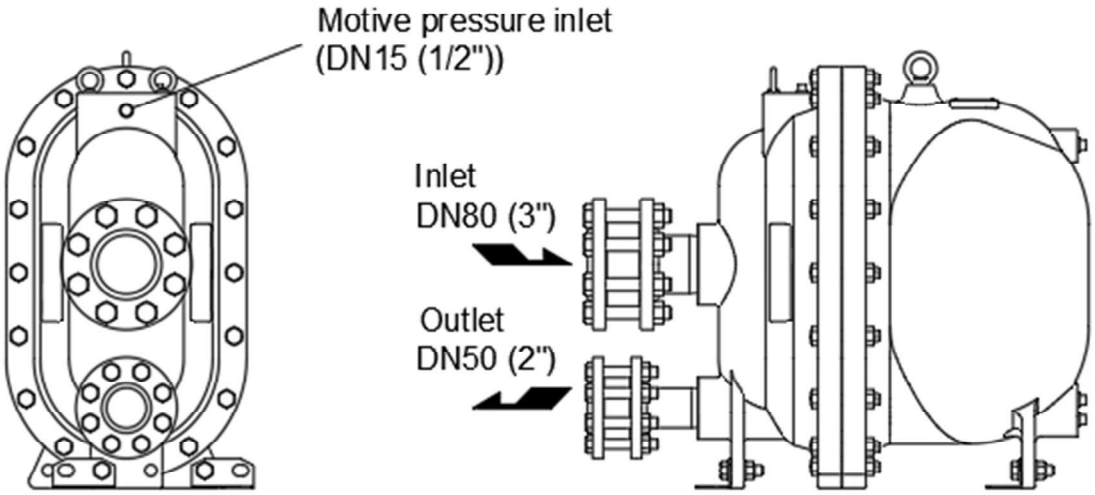
(3) Install the motive fluid line DN15 (1/2” Rc) and vent line DN25 (1” Rc) correctly. The GL81E-A does not work if they are connected wrongly.

(4) Install check valves on both the condensate inlet and outlet lines. Check the flow direction indicated on the side of the check valve body.

(5) Install a Y-type strainer on the motive fluid supply line of the pumping trap.

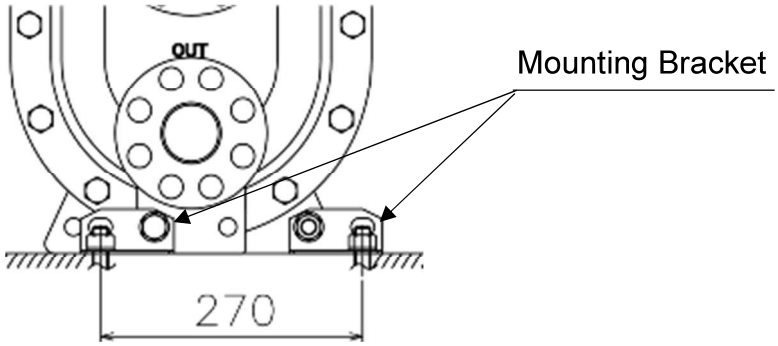
(6) Create a u-shaped water seal of at least 300 mm when connecting the overflow line. Check if steam does not leak when the pumping trap is in stable operation. If necessary, pour water directly into the overflow line from the water outlet line using a hose.

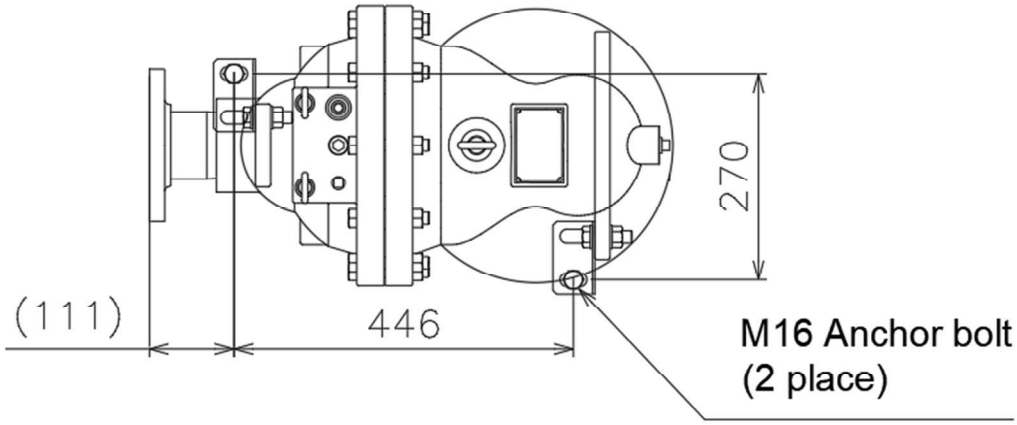

Vent port (balance line)
(DN25 (1"))
Name plate


Motive pressure inlet
(DN15 (1/2"))
Inlet
DN80 (3")
Outlet
DN50 (2")

○Product fixing method

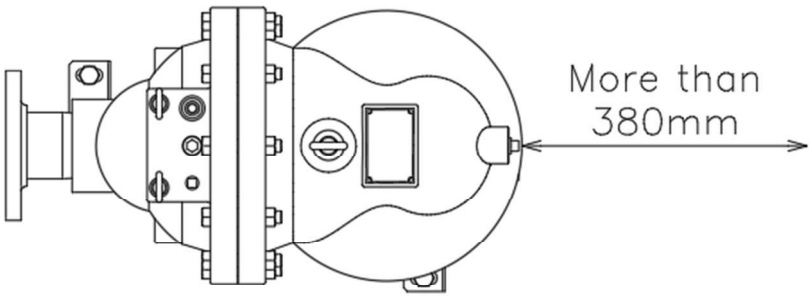
Anchor bolt mounting position





Attach the mounting bracket (accessory) in the direction of the above figure so that the body can move backward (direction opposite to the inlet and outlet lines).

○Maintenance space



Secure maintenance space for disassembly / assembly /replacement.

5 Operating procedures

Caution

- **Make sure the piping is connected securely.**
- **Open and close the valves slowly and securely.**
- **Make sure that the proper connection of the motive fluid inlet (DN15 (1/2")) and vent line (DN25 (1")) pipes.**
- **Make sure the installation of the check valves in the proper direction.**

○ Procedure to start operation

1) Open the valve in the condensate outlet line of the pumping trap.
2) Open the valve in the vent line slowly.
3) Open the valve in the motive supply line slowly.
4) Open the valve in the condensate inlet line of the pumping trap to allow condensate to flow in.
5) When condensate is filling the body of the pumping trap, the pumping trap is ready to operate. At that time, check to make sure that no abnormalities occur.
   The pumping trap operates cyclically, and a clicking sound can be heard when the operation process is switched.
6) When overflow line is installed, make sure that water seal prevents from steam leakage when the pumping trap is in stable operation.
   If necessary, pour water into the overflow line.

○ Procedure to stop operation

1) Close the valve in the condensate inlet line of the pumping trap.
2) Close the valve in the motive supply line.
3) Close the valve in the vent line.
4) Close the valve in the condensate outlet line of the pumping trap.

6 Maintenance

Caution

- **When replacing parts, make sure that the replacement parts are supplied by Miyawaki.**
- **When the assembly/disassembly is being performed, check that the pressure inside the product equals to the atmospheric pressure and allow time for the temperature to drop to a safe working temperature. (When the product operates with high temperatures and pressures, it may cause fluid ejection and serious injuries.)**
- **Before removing the pumping trap cover, close the valves in the condensate supply and discharge, motive supply, and vent lines. And then make sure that the pumping system is completely isolated from other connections.**
- **Make sure that the pumping trap is completely relieved of any residual internal pressure before breaking any connections.**
- **Make sure that any residual internal pressure in the motive supply line is relieved before removing the internal unit.**
- **Because the cover gasket is an expanded graphite gasket, do not apply paste such as an anti-seize lubricant. The sealing can not be maintained.**

The pumping trap performance deteriorates gradually over time due to wear, corrosion, or dirt accumulating around the internal parts. To keep the condensate discharge system and equipment working well, periodic maintenance of the pumping trap is essential.

○ Periodic inspection

(External)

- Check that the pumping trap and connections have no leakages.
- Check that a clicking sound can be heard when the operation process is switched.
- Check that condensate does not build up (for the open system, check that condensate does not overflow from the receiver tank).
- Check that each bolt and nut are tightened properly.
  If you find it corroded or cracking, replace it.

(Internal)

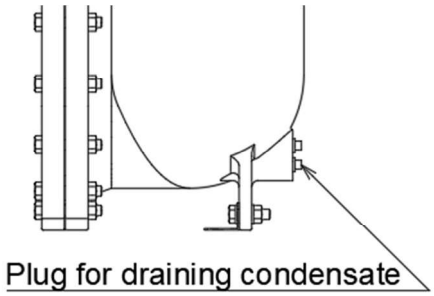
- Check that the motive valve and vent valve open and close smoothly by moving the float up and down.
- Check that there is no abnormal wear and adhesion of foreign substances on the shaft and sliding section.
- Check that the float is not damaged and not filled with water.
- Check that each bolt and nut are tightened properly. If you find it corroded or cracking, replace it.

○ Disassembly and Assembly

When a pumping trap fails, it is necessary to clean the internal parts and replace damaged parts. To repair the pumping trap follow the instructions below.

Removing the body

1) Remove the DN15 (1/2") plug (3) at the bottom of the body and drain the residual condensate inside the pumping trap.



2) Remove the cover bolts (26) (width across flats: 24) and remove the body (1). At this time, be careful not to damage the sealing surfaces of the body (1) and cover (21) and remove the cover gasket (25) that is attached.

When you remove the body, be careful to prevent the float from colliding with the body.

Removing the float

Hold the flat section (thickness: 19 mm) of the float lever (44) and the fitting (width across flats: 19 mm) of the float (43) with a torque wrench, and remove the float by loosing the screw.

Removing the internal unit

Remove the M12 bolt (33) (width across flats: 19) for the internal unit and remove the internal unit from the cover.

Disassembling the valve seat section

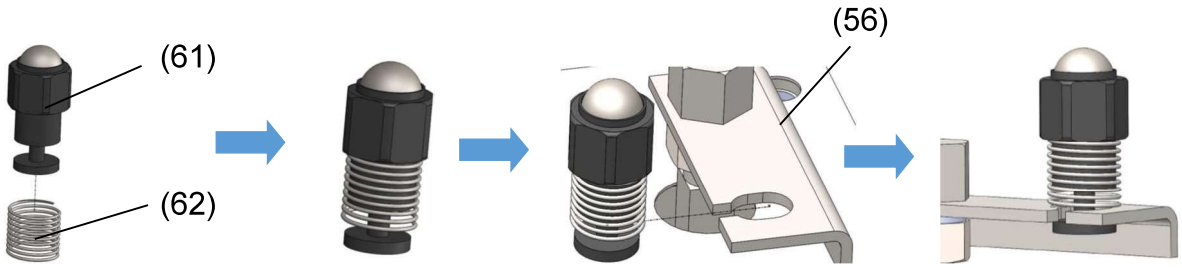
1) Remove the vent valve seat (63) and the motive valve seat (66) (width across flats: 30 mm).
2) When you remove the motive valve seat (66), the screen (67) comes off at the same time.

Inspection, cleaning, and parts replacement

By following the instructions in “8. Troubleshooting,” take appropriate measures such as cleaning, and, if necessary, replacing parts with new ones.

Assembling

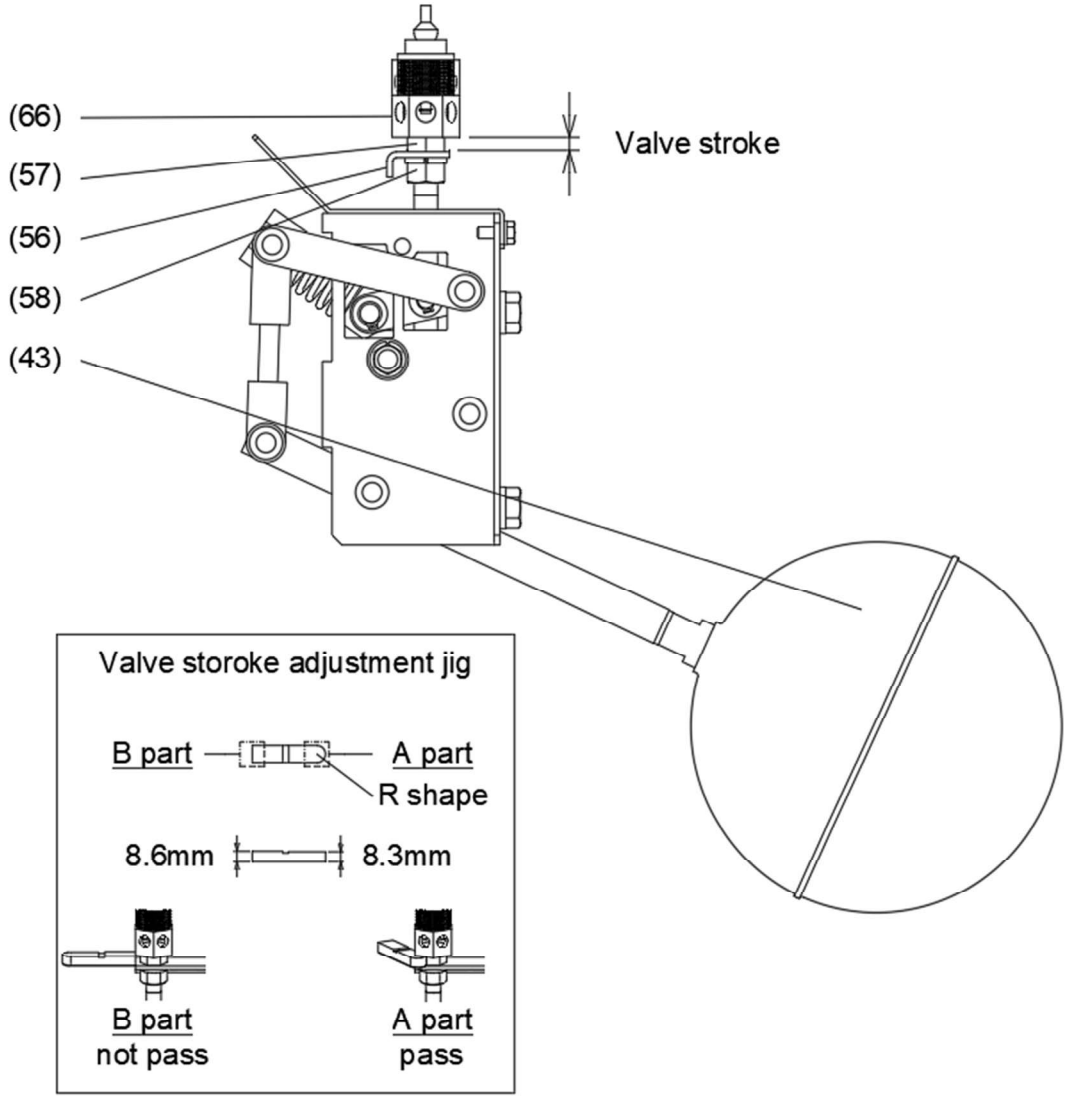
1) After inspection, cleaning, or parts replacement, reassemble the parts by following the disassembling procedure in reverse order.
2) When you install the motive valve seat (66), insert the screen (67) and seat gasket (60) and tighten it.
3) Lift up the internal unit and install the internal unit while adjusting the position so that the nut cap (57) fits into the motive valve seat (66) and the vent valve (61) fits into the vent valve seat (63).
   Be careful that the vent valve (61) does not come from the plate (B) (56).
   * If the vent valve (61) is detached from the plate (B) (56), insert the vent valve (61) into the spring (B) (62) and, slide the vent valve with the spring (B) (62) into the key hole of the plate (B) (56), as illustrated below.



4) Fit the M12 spring washers (59) to the M12 bolts (33) for the internal unit and attach the internal unit to the cover (21). At this time, be sure to tighten the bolts properly to avoid uneven tightening.

5) Adjust the valve stroke of the internal unit with a valve stroke adjustment jig.
Adjust the position of the plate (B) (56) with the M12 nut (58) and the nut cap (57) so that A part (R shape、Thickness 8.3) of the adjustment jig passes through the gap between the plate (B) (56) and the motive valve seat (66), and B part (Thickness 8.6) of the adjustment jig does not pass through the gap. After the adjustment, tighten the M12 nut (58) and the nut cap (57).

* A spanner with width across flats of 19 mm is required to screw the nut cap (57); use a thin spanner of thickness 4 mm or less because the gap is narrow.
The valve stroke adjustment jig and the thin spanner are attached to the delivery of spare parts.

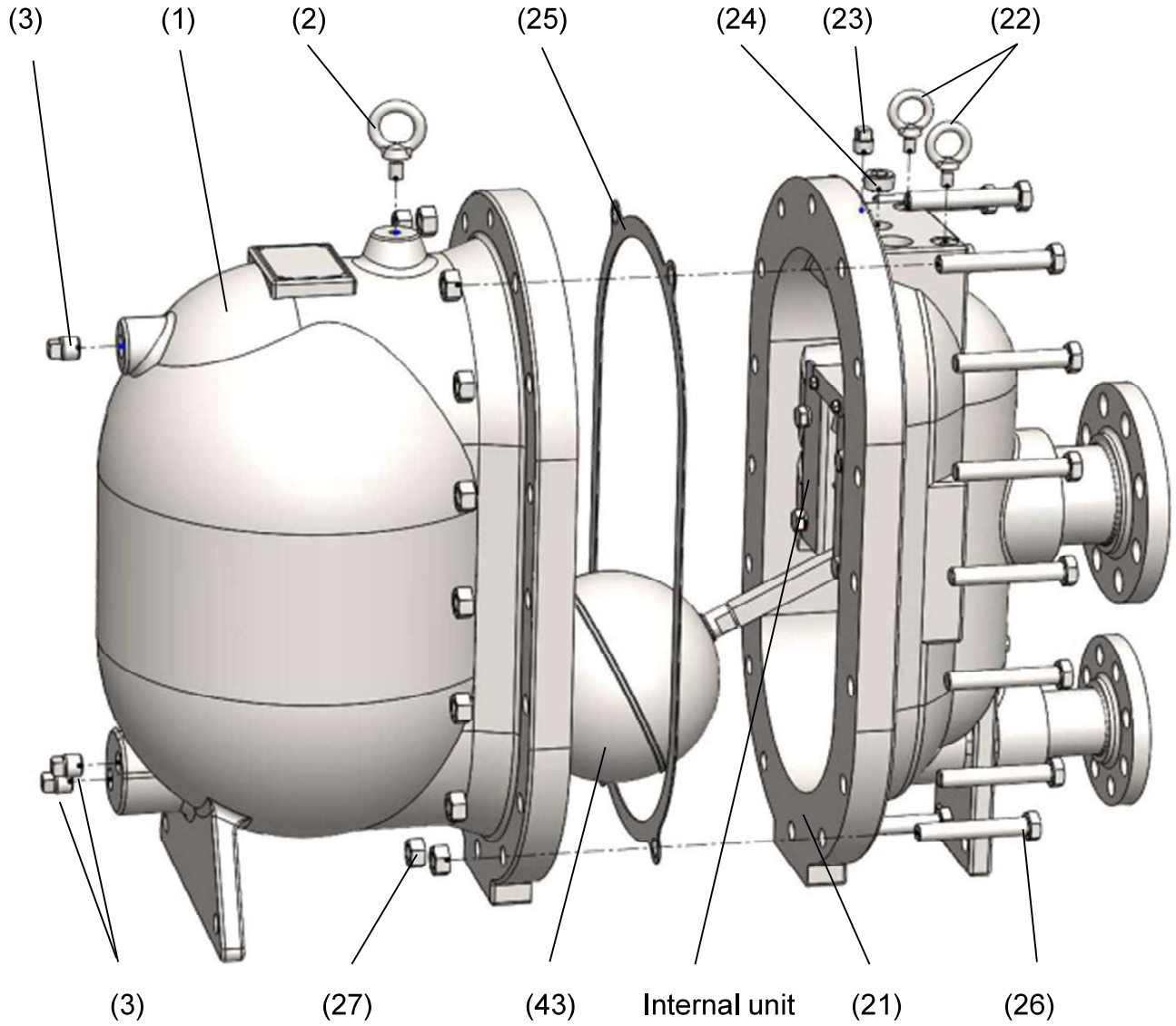


6) Attach the cover gasket (25) and the body (1) to the cover (21). Use a new cover gasket (25). At this time, be sure to tighten the cover bolts (26) properly to avoid uneven tightening.
7) Apply a small amount of an anti-seize lubricant on the threads. (Be careful not to apply it excessively.)

* The following table shows the torque specifications for each parts.

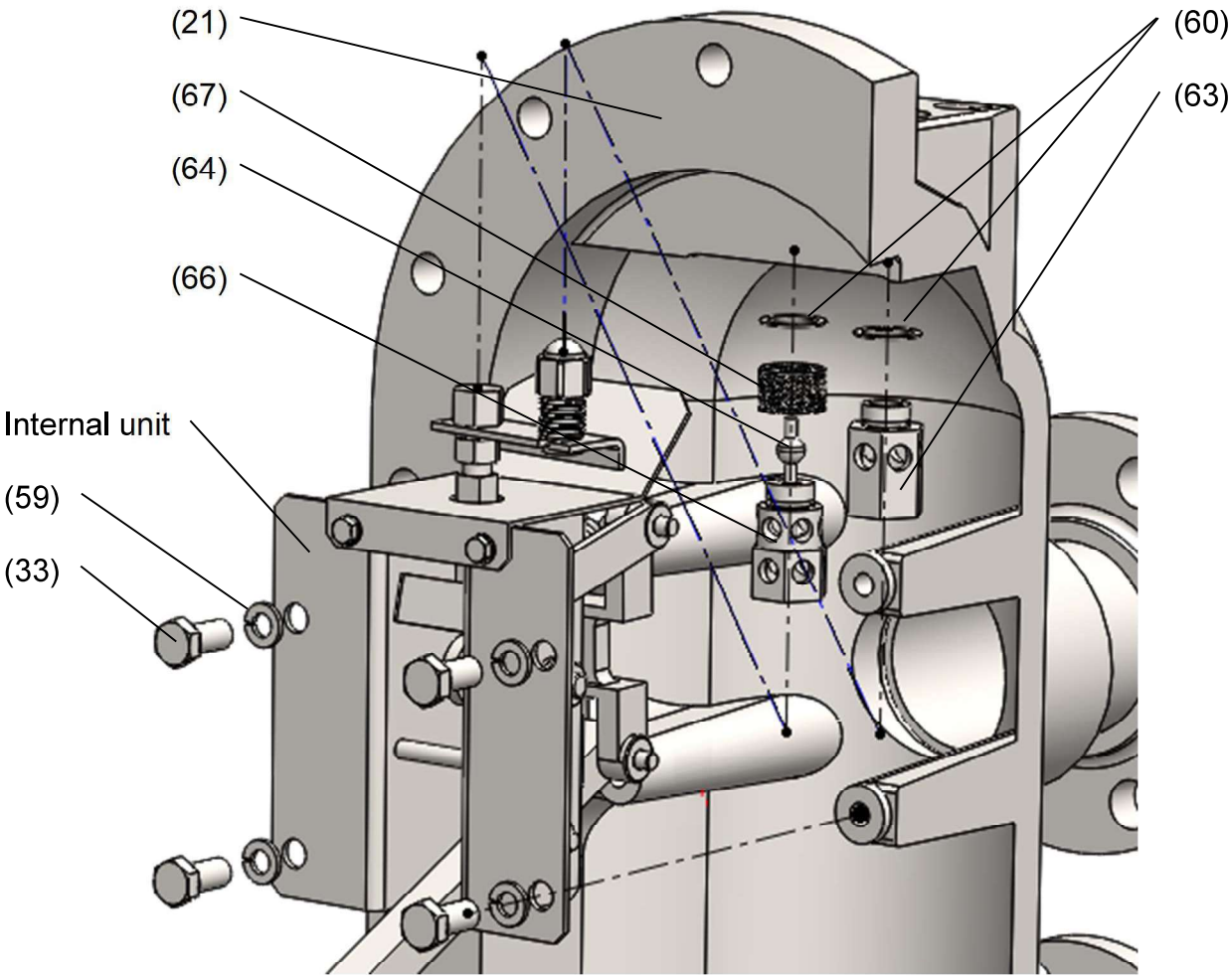
Part	Tool	Width across flats	Torque
M16 bolt, Nut (26),(27)	Torque wrench	24 mm	180 N·m
M12 Bolt (33) for the internal unit	Torque wrench	19 mm	30 N·m
M6 bolt (35)	Torque wrench	10 mm	3.6 N·m
M10 nut (40)	Torque wrench	17 mm	25 N·m
Float (43)	Torque wrench	19 mm	20 N·m
Nut cap (57)	Thin spanner (thickness 4 mm or less)	19 mm	-
M12 nut (58)	Torque wrench	19 mm	30 N·m
Vent valve seat (63)	Torque wrench	30 mm	80 N·m
Motive valve seat (66)	Torque wrench	30 mm	80 N·m

7 Exploded view



1. Body
2. M12 eyebolt
3. DN15 plug
21. Cover
22. M10 eyebolt
23. DN10 plug
24. DN20 tapered screw plug
25. Cover gasket
26. M16 bolt
27. M16 nut
43. Float

● Internal unit



21. Cover
33. M12 bolt
59. M12 spring washer
60. Seat gasket
63. Vent valve seat
64. Motive valve
66. Motive valve seat
67. Screen

8 Troubleshooting

Phenomenon	Cause	Action
The pumping trap does not work when the operation is started.	The motive pressure supply line is closed.	Open the valve to supply the motive fluid to the pumping trap.
	The condensate inlet line is closed.	Open the valve of the condensate inlet line.
	The condensate outlet line is closed.	Open the valve of the condensate outlet line.
	The check valve is installed in the wrong direction.	Make sure the arrow on the body matches the flow direction of the fluid.
	The back pressure is too high.	Find and remove the cause of an increase in back pressure, if possible. Otherwise, adjust the motive pressure higher than the back pressure. (Make sure the motive pressure should not be over the specified maximum operating pressure.)
	Air locking occurs in the vent line.	In open systems, make sure the vent line including the receiver tank is connected to the atmosphere. In closed systems, install a thermostatic air vent at a higher point in the vent line.
The pumping trap appears to cycle normally (a periodic audible exhaust is observed), but overflow occurs in the system.	The filling head is not sufficient.	Check the required filling head in “1. Specifications” and adjust the pumping trap position, if possible.
	The motive pressure is not sufficient.	Check the motive pressure setting and the maximum back pressure during operation. Compare the data with the capacity chart, increase the motive pressure if necessary. (Make sure the motive pressure should not be over the specified maximum operating pressure.)
	The flow rate on the condensate inlet line is limited.	Check that sufficiently sized fittings are used. If there is no problem, clean the strainer and check whether all valves are fully open.

Phenomenon	Cause	Action
The pumping trap appears to cycle normally (a periodic audible exhaust is observed), but overflow occurs in the system.	The check valve on the condensate inlet line is stuck open.	Remove the check valve, check for debris and clean the seat surface.
	The check valve on the condensate outlet line is stuck open.	Remove the check valve, check for debris and clean the seat surface.
	The motive valve is not operating properly.	The motive valve is worn. Safely remove the cover unit and check the motive valve. Replace it with a new one, if necessary.
	The capacity of the pumping trap is insufficient.	Check the operating condition of the pumping trap and verify the capacity. Increase the pipe size or the check valve size. Install an additional pumping trap as required.
Overflow occurs in the system and the pumping trap does not cycle normally. (A periodic audible exhaust is not observed.)	The motive pressure is not sufficient.	Check the motive pressure setting and the maximum back pressure during operation. Comparing to the capacity chart, increase the motive pressure as required. (Make sure the motive pressure should not be over the specified maximum operating pressure.)
	The condensate outlet line is closed.	Open the valve in condensate outlet line.
	The motive mechanism has failed. Example: Damaged float, damaged spring	Remove the body and check internal parts for damage. Replace it with new one, if necessary.

For tightening torque specified for additional tightening, refer to the tightening torque table in “6. Maintenance.”

9 Warranty

9.1 Warranty period

The warranty period is 18 months after shipment or 12 months after installation, whichever occurs first.

9.2 Details of the warranty

If the product stops working correctly within the warranty period, we will repair or replace the product free of charge if the cause of the trouble is not one of the following items.

1) The precautions described in this manual were not observed.
2) User's errors or mistakes such as an inappropriate installation or incorrect handling, or an excessively large impact caused by dropping
3) Problems caused by devices or equipment other than ours, or a disallowed use environment
4) When a repair or modification has been performed by anyone other than us or people who are authorized to make such repairs
5) Intrusion of salt or other substances that promote significant rust or corrosion or problems from fluids that contain the same substances
6) Consumable parts such as Packing, Gasket, O-ring, Diaphragm, Oil free bush etc.
7) Attachment or accumulation of foreign matter in the pipe, such as dust and scale.
8) Problems from fires, natural disasters, or other force majeure which is not our responsibility

9.3 Warranty limitation

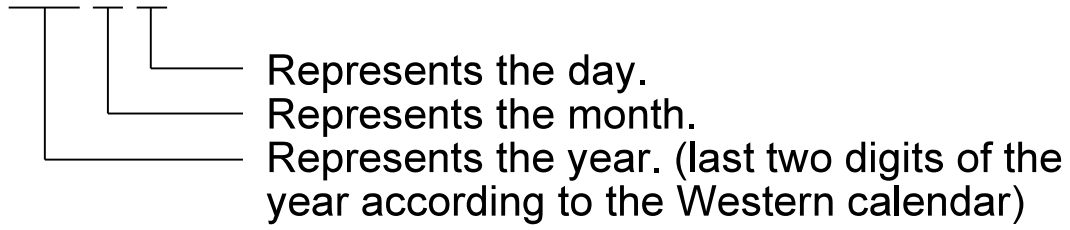
The remedy available under the warranty shall not exceed the sales price of the products delivered, for any cause whatsoever.

10 Serial number (S. No.) designation

The following 4-digit or 9-digit 'S. No.' is displayed on the product.

- For 4-digit display

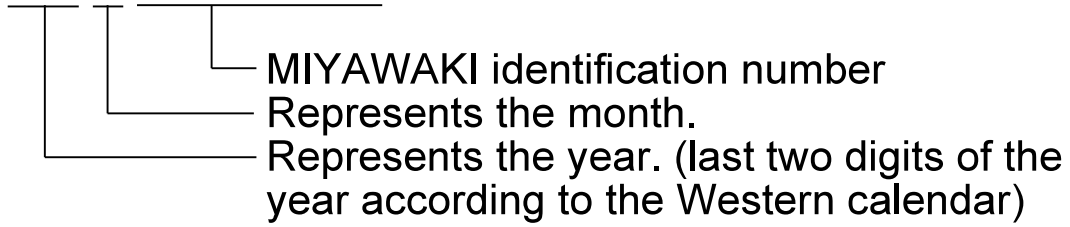
S. No. □□□□



Example of serial number designation
1711 → Jan 1, 2017
29XM → Oct 21, 2029

- For 9-digit display

S. No. □□□□□□□□□



Example of serial number designation
17112C020 → Jan , 2017
29X05M050 → Oct , 2029

Month designation system

Month	1	2	3	4	5	6	7	8	9	10	11	12
Symbol	1	2	3	4	5	6	7	8	9	X	Y	Z

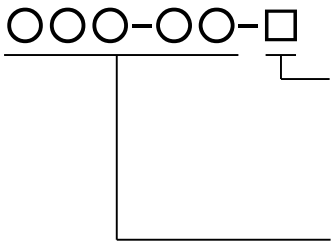
Day designation system

Day	1	2	3	4	5	6	7	8	9	10	11	12
Symbol	1	2	3	4	5	6	7	8	9	A	B	C

Day	13	14	15	16	17	18	19	20	21	22	23	24
Symbol	D	E	F	G	H	J	K	L	M	N	O	P

Day	25	26	27	28	29	30	31
Symbol	Q	R	S	T	U	V	W

11 Guidance for reading special product name



Special symbol:□
Symbol apply only to special product
(Please refer to table 1 for details)
English letter after ““-“

Model symbol:
Product model number

Table 1 Symbol description

Suffix	Special contents
A	Trap for high-pressure gas installed property (only for Gas Trap)
C	Blow valve attached
K	Change of gasket
L	Special face to face dimension
M	Change of parts material
P, T	Change of operating pressure, temperature, condensate capacity, etc
R	Change of screen mesh
V	Change of air vent
X	Other than mentioned above or complex of special contents above

- For any questions about the product that you purchased or about the details in this user’s manual, please contact the following.
-
- Some special specifications of the product may found to be different from the ones in the user's manual. If you have any question, please contact MIYAWAKI, our local authorized agent, or the company where you purchased the product.
- In the interest of the development and improvement of our products, MIYAWAKI Inc. reserves the right to change the specification of the products without prior notice.

MIYAWAKI INC.

If you need any assistance regarding this manual, please contact MIYAWAKI INC.'s International Sales Dept. or its local representative.
By scanning QR Code, you can access inquiry form.

MIYAWAKI INC.
INTERNATIONAL SALES DEPT.
2-1-30, Tagawakita, Yodogawa-ku, Osaka, 532-0021, Japan
Tel: +81-6-6302-5549
www.miyawaki-inc.com/en e-mail: export@miyawaki-inc.co.jp

EU Importer and Authorized representative:

MIYAWAKI GmbH

Birnbaumsmühle 65, 15234 Frankfurt (Oder), Germany
Tel: +49-335-4007-0097
www.miyawaki.de e-mail: info@miyawaki.de

China Importer and Authorized representative:

MIYAWAKI WEST Co., Ltd

Room 902, Building 8, Huaqing Chuangzhi Park, No.3 Qingyan Road, Huishan District, Wuxi City Jiangsu Province, China
Tel: +86-510-8359-5125
www.miyawaki-inc.com.cn e-mail: mywkwest@miyawaki-inc.com.cn

808143-01 2407
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