

Instruction Manual for Pneumatic Slit Spray Nozzles

| Series | Remark |
|--------|----------------------|
| PSN | Stainless steel body |

| | |
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H. IKEUCHI & CO., LTD.

Preface

Thank you for purchasing the Spray Nozzle from H. Ikeuchi & Co., Ltd.

This manual gives detailed instructions for the basic handling, maintenance and cautions of the product.

Please be aware that due to continuing efforts to improve our products, some details in this manual may differ from the actual product.

After reading, keep this manual handy for quick reference.

Safety Precautions

Prior to use, read this manual carefully and familiarize yourself with the proper operation of the product for optimal performance.

H. Ikeuchi & Co., Ltd. takes no responsibility for any accidents and/or injuries resulting from improper handling, installation and/or operation.



Wear safety gloves.

Screw threads, edges and corners may be sharp and could cause injury.



Ensure that the nozzle is firmly installed.

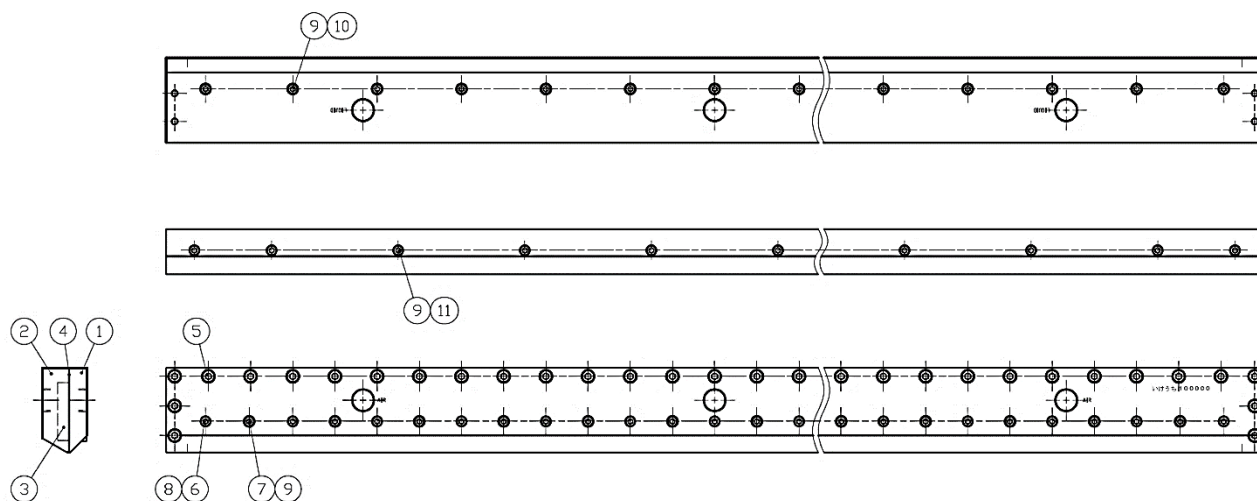
Loose screws may cause the nozzle to come off during operation and lead to serious accidents.

1. Suggestions & Cautions

- (1) Nozzles are precision-made products. The slit opening is a particularly important part and determines the spray characteristics, such as spray capacity and spray pattern distribution. Handle it with care.
- (2) Nozzles may be heavy and need to be handled carefully.
For example, piping connections for air and liquid supply should be installed after the nozzles have been installed.
- (3) Screw threads, edges and corners may be sharp.
Wearing safety gloves is recommended.
- (4) Operate the nozzles under the specified pressures.
If the pressure is not specified, refer to the provided flow-rate diagram
- (5) Precautions to prevent liquids from back-flowing:
To start operation: Open the air supply first, then the liquid.
To stop operation: Shut off the liquid first, then the air.
- (6) Air and liquid piping
 - Use piping and valves large enough to prevent the pressure from dropping.
 - Use new stainless steel pipes as dust and debris in old pipes may clog the nozzles. Never use pipes that can rust.
 - Even new pipes may have chips, seal tape or other debris inside. ALWAYS flush pipes thoroughly before installing nozzles to remove any debris that could cause clogging.
 - Install pressure gauges in front of the nozzle to adjust air and liquid pressures appropriately. Installation of a valve is also recommended.
 - Install filters to prevent clogged nozzles. Clogging will impact nozzle performance.
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2. Components of Nozzle

(1) Components and Materials



| No. | Component | Material | Quantity | Remarks | No. | Component | Material | Quantity | Remarks |
|-----|--------------------------------------|----------------|----------|------------|-----|--------------|----------------|----------|------------|
| 1 | Body plate (Air inlet side) | S304 | 1 | | 7 | Bolt (M4x10) | S304 equiv. | 17 | |
| 2 | Body plate (Liquid inlet side) | S304 | 1 | | 8 | O-ring (P4) | FKM | 18 | Consumable |
| 3 | Orifice plate | S304 | 1 | | 9 | O-ring | FKM | 47 | Consumable |
| 4 | Packing | PE | 1 | Consumable | 10 | Bolt (M4x10) | S304 equiv. | 18 | |
| 5 | Bolt (M5x12) | S304 equiv. | 39 | | 11 | Bolt (M4x10) | S304 equiv. | 12 | |
| 6 | Bolt (M4x8) | S304 equiv. | 18 | | | | | | |

Note:

(1) Consumables

The lifetime of a nozzle varies, depending on the operational conditions. If there is a significant change in the nozzle performance, consumable parts should be replaced.

(2) Dimensions and materials may differ depending on product codes.

(3) In the material code, "S" represents "stainless steel".

For example, S304 stands for stainless steel 304.

(4) The quantities shown in the above table are for a nozzle length of 1,000 mm and are for reference only.

3. Disassembly (please refer to the parts list on the previous page)

Clogging of the slit orifice causes uneven spray dispersion and unstable spraying.

If the nozzles becomes clogged, use a clearance gauge (feeler gauge) with a thickness equal or smaller to that of the nozzle slit to remove the clog.

Use only a straight clearance gauge. Do not use a bent or broken gauge to avoid damage to the slit orifice. Use the clearance gauge carefully and slowly.

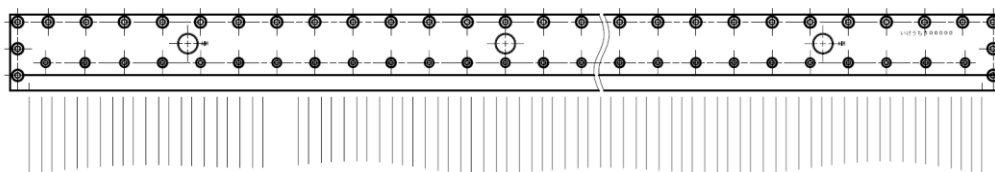


Fig. 1. Distorted spray from clogged nozzle

If it is not possible to remove the clog with a clearance gauge, please contact your supplier or IKEUCHI.

If maintenance is to be performed by yourselves, disassemble and clean the nozzle following the procedure below. (If it is difficult to check the performance after maintenance, request your supplier or IKEUCHI.)

Necessary tools: 3 mm and 4 mm Allen wrench/hexagon wrench

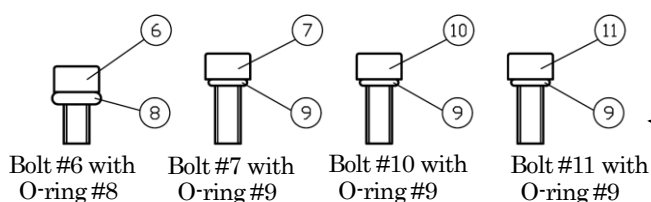
(4 mm Allen wrench for bolts #5, 3 mm for the other bolts)

- (1) Place the nozzle on a flat, even surface with the bolts #5 head side up. To avoid damage or deformation of the nozzle, DO NOT use any vise or similar tools to hold the slit nozzle.
- (2) Unscrew the bolts #5, #6, and #7 to remove the body plate #1.
- (3) Unscrew the bolts #11.
- (4) Unscrew the bolts #10 and remove the orifice plate #3.
- (5) Carefully clean out any dust or foreign particles from the inside with a cloth. Make sure not to damage the tip of the slit.

4. Assembly (please refer to the parts list on the previous page)

Ensure that any foreign matter has been removed from the surface and inside of the slit opening with a cloth before reassembling.

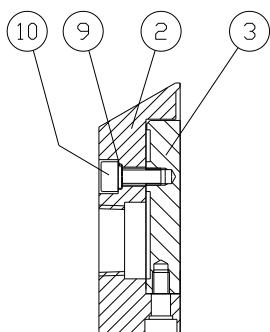
- (1) Put O-ring #8 on bolt #6, and O-ring #9 on bolts #7, #10, and #11.



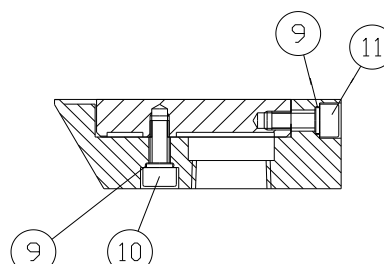
Slip O-ring all the way to the head.

There is NO O-ring for bolt #5.

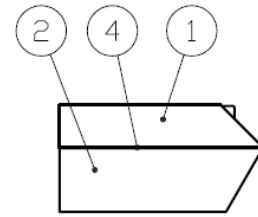
- (2) Insert the orifice plate #3 into the body plate #2. Then lightly screw in bolt #10 with O-ring #9.



- (3) Screw in bolt #11 with O-ring #9. Then tighten bolt #10 with a torque wrench at a torque of 5 N·m. (Necessary tool: 3 mm torque wrench)

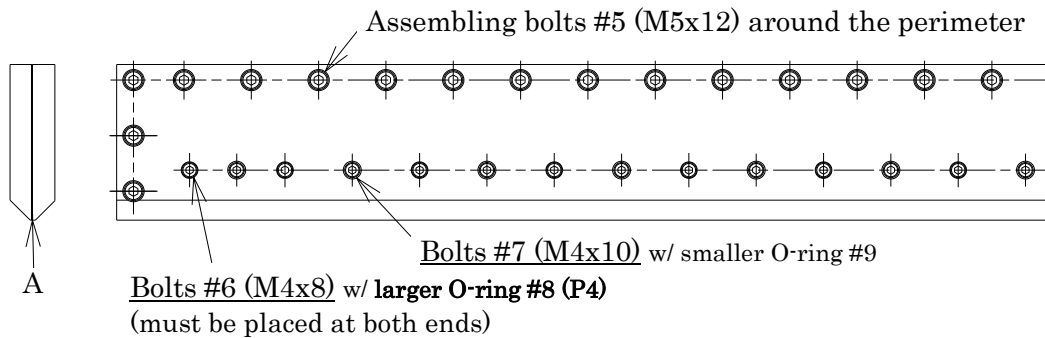


- (4) Carefully place packing #4 on top of body plate #2, and then place body plate #1 on top of them. Alternate bolts #6 and #7, placing them in the bolt holes of plate #1. Bolts #6 must be placed at both ends. Lightly screw bolts #7 into the body plates. Do not tighten them yet! This will be explained in step (6).



Bolts #6 and #7 are slit adjustment bolts. Tightening bolt #6 widens the slit opening while tightening bolt #7 narrows the slit opening.

Necessary tool: 3 mm Allen wrench (hexagon wrench)



- (5) After lightly tightening the assembling bolts #5 (M5x12), make sure that the edges (A) of body plate #1 and #2 align and that packing #4 is positioned correctly. Then, fully tighten the assembling bolts #5.

Necessary tools: 4 mm Allen wrench, 4 mm torque wrench

Recommended tightening torque: 6 N·m

- (6) While supplying air from the air inlet at a pressure of 0.1–0.2 MPa, adjust bolts #6 and #7 to set the slit opening width within $\pm 10\%$ of the designed width. The slit opening width must be wide enough for a "pass through check gauge" to pass through smoothly, but a "no-pass through check gauge" cannot pass through at all (see chart below). Make sure that each adjustment bolt has tension on it. Without this tension, the slit may expand when air pressure is applied. It may also cause loosening of the bolts and leakage.

Necessary tools: 3 mm Allen wrench, clearance gauge

| Designed slit opening width | Pass through check gauge | No-pass through check gauge |
|-----------------------------|--------------------------|-----------------------------|
| 0.05 | 0.04 | 0.06 |
| 0.1 | 0.08 | 0.12 |
| 0.15 | 0.13 | 0.17 |

| | To widen the slit opening width | To narrow the slit opening width |
|----------------------|---------------------------------|----------------------------------|
| Bolt #6 w/ O-ring #8 | Tighten | Loosen |
| Bolt #7 w/ O-ring #9 | Loosen | Tighten |

The pitch of the M4 screw is 0.7 mm, and the slit opening width can be adjusted in increments of 0.01 mm by turning the screw 5 degrees.

- (7) It takes about an hour to disassemble, clean and reassemble the nozzle. Check the slit opening to make sure it is straight and even, before installing the nozzle in the equipment.

Note:

- Make sure not to drop, damage or lose any of the small parts.
- The slit opening is the most important part of the nozzle. If it is damaged, the spray pattern will be split or disrupted. Take extreme care when handling the nozzle.

5. Maintenance

| Check | Item | Check points |
|--------------|---------------------------------|---|
| Daily | Spray | Confirm that the spraying pressure is normal. |
| | Pressure gauges and flow meters | Confirm that the air and liquid pressures and flow rate are correct during operation. |
| Periodically | Spray | Feel the spray pattern on your hand to check for split or uneven distribution. |
| | Appearance | Confirm that there is no damage and dust adhesion to the slit opening. |

Maintenance intervals vary depending on the operating conditions.

6. Troubleshooting

| Trouble | Probable Cause | | Solution |
|----------------------------|--|---|---|
| No spray is being created | Control | <ul style="list-style-type: none"> • Controller is not switched on. • Valves are not opened. | <ul style="list-style-type: none"> • Switch it on. • Open the valves. |
| | Nozzle | <ul style="list-style-type: none"> • Nozzle or pipe is clogged. • Nozzle or pipe is clogged due to damage. • Slit opening, liquid orifice and/or air orifice is clogged. | <ul style="list-style-type: none"> • Check and clean the nozzle or pipe. • Replace the damaged part. • Disassemble and clean the nozzle. |
| Liquid leaks, Air leaks | <ul style="list-style-type: none"> • Some parts are loose or not tightened. | | <ul style="list-style-type: none"> • Tighten the connections. |
| | <ul style="list-style-type: none"> • Loose bolts on the nozzle. • O-ring is damaged. • Improper assembling of the nozzle. | | <ul style="list-style-type: none"> • Tighten the bolts. • Replace the damaged part. • Reassemble the nozzle. |
| | <ul style="list-style-type: none"> • Nozzle or pipe is cracked. • Nozzle or pipe is corroded. | | <ul style="list-style-type: none"> • Replace the cracked part. • Replace the corroded part. |
| Irregular spray pattern | <ul style="list-style-type: none"> • Slit opening, liquid orifice and/or air orifice is clogged. • Dent on the slit. • Dust or foreign particles adhered on the nozzle. | | <ul style="list-style-type: none"> • Disassemble and clean the nozzle. • Replace the damaged part. • Clean the nozzle. |

7. Disposal

Disposal should be practiced according to the regulations and codes of local authorities, or ask a disposal professional.

8. Inquiries

For spare parts or any trouble, contact your supplier or the following:

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