

## ES Series (metal)

— Rotating Cleaning Nozzles for Tanks/Containers —

### Instruction Manual

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## Introduction

Thank you for purchasing the spray nozzle product 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 nozzle for best performance.

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



CAUTION

**Wear safety gloves.**

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



CAUTION

**Ensure that the nozzle/product is firmly installed.**

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



CAUTION

**Be aware of the nozzle temperature and do not perform maintenance until it has cooled down enough to avoid burns.**

## 1. Suggestions & Cautions

(1) Installing the nozzle should be done after the piping system is completely installed and flushed.

- Never install a nozzle during installation work of the plant or equipment.
  - 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 the pipe system thoroughly before installing nozzles to remove any debris that has collected during the construction and assembly to avoid clogging. This flushing should be done at or near the maximum flow rate, before the nozzle is attached to the piping, to thoroughly clean the system.
  - If a nozzle is clogged, its performance is impacted. Installing strainers help prevent nozzle clogging.
- Regardless of the type of cleaning liquid, whether it is one-time use or recirculated, it should always run through a #100 or finer mesh strainer.

(2) [To install **ES-P** (Pin connection type)]

First, weld the weld-on pipe connector (Part No. 7, see page 3) to the piping before assembly. Then, align the pin holes on the connecting adaptor (Part No. 1, with Nos. 1–6 assembled) and the weld-on pipe connector, and insert the connecting pin (Part No. 8) through the aligned holes. Insert the two side pins (Part No. 9) into the holes on the connecting pin and bend their tips to secure.

(3) [To install **ES-N** (Thread connection type)]

When installing the nozzle, first screw it in by hand, then use a spanner/wrench on the flats of the connecting adaptor (Part No. 1, see page 3) to fully tighten it.

(4) Nozzles may be heavy and need to be handled carefully.

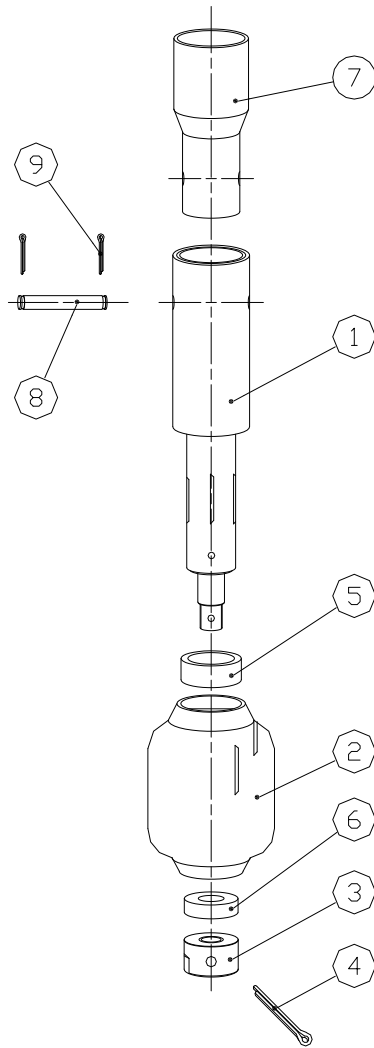
(5) Screw threads, edges and corners may be sharp. Wearing safety gloves is recommended.

(6) Operate the nozzle under the specified pressures. If the pressure is not specified, refer to the provided flow-rate diagram.

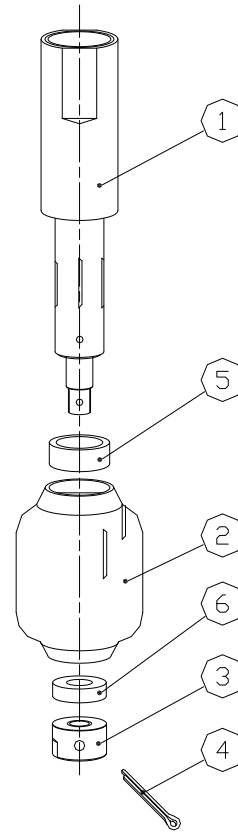
(7) Avoid damaging or scratching the nozzles. When disassembling the nozzle for maintenance, always use a spanner, adjustable wrench, and milling vice.

(8) Avoid sudden and/or drastic changes in liquid pressure to prevent the water hammer.

## 2. Components of Nozzle



**Type ES-P (Pin connection)**



**Type ES-N (Thread connection)**

No.	Component	Material	Remark	No.	Component	Material	Remark
1	Connecting Adaptor	S316L		6	Lower Shaft Bearing	PTFE	Consumable
2	Nozzle Body	S316L		7	Weld-on Pipe Connector	S316L	
3	Hub	S316L		8	Connecting Pin	S316L	
4	Lock Pin	S316L	Consumable	9	Side Pins (2)	S316L	Consumable
5	Upper Shaft Bearing	PTFE	Consumable				

- Part Nos. 1–6 are pre-assembled before shipment.
- Part Nos. 7–9 are supplied unassembled.

Note: (1) Consumables

The lifetime of nozzle components varies, depending on the operational conditions. Replace consumable parts when corrosion or wear of components is found and/or the nozzle performance deteriorates.

- (2) In the material code, "S" represents "stainless steel". For example, S316L stands for stainless steel 316L.

### 3. Disassembly (Please see the parts list on the previous page)

#### (1) [For Type ES-N (Thread connection) only]

Loosen the connecting adaptor (part #1) with an adjustable wrench or spanner and remove the nozzle from the piping.

#### [For Type ES-P (Pin connection) only]

Remove the side pins (part #9), then pull out the connecting pin (#8) to detach the connecting adaptor (#1) from the weld-on pipe connector (#7).

#### [The following procedures apply to both types: ES-N and ES-P]

- (2) Pull the lock pin (#4) out, loosen the hub (#3) with an adjustable wrench or spanner to remove it.
- (3) Keeping the parts (#1, 2, 5, 6) assembled and vertical as pictured on page 3, put the tip of the connecting adaptor (#1) on a level surface, push the nozzle body (#2) downwards to disassemble the nozzle body (#2) and lower shaft bearing (#6).
- (4) Hold the upper shaft bearing (#5) with fingers and pull it downwards to disassemble.

Note:

- (1) Be careful not to lose or damage these small parts.
- (2) Nozzle orifices and sliding surfaces are the most important parts. Take extreme care when handling them.
- (3) Disassembled parts should be kept free from dust and dirt. Do not expose them to physical shocks and/or vibration.
- (4) The positions of the through-holes in the connecting adaptor (#1) and the hub (#3) for the lock pin (#4) are specific to each nozzle. When disassembling, take care not to mix or interchange parts from different nozzles, as the lock pin (#4) will not fit properly if the holes are misaligned.

### 4. Assembly

- (1) Hold the connecting adaptor (#1) vertically, with the hub side up, over a level surface.
- (2) Keeping it level, attach the upper shaft bearing (#5) to the connecting adaptor (#1) with fingers. Be sure the upper shaft bearing is positioned correctly and securely.
- (3) Insert the connecting adaptor (#1) into the larger opening side of the nozzle body (#2).
- (4) Set the lower shaft bearing (#6) at the bottom of the nozzle body (#2).
- (5) Screw the hub (#3) onto the connecting adaptor (#1), then tighten it with an adjustable wrench or spanner until the hole in the hub (#3) aligns with the hole in the connecting adaptor (#1).
- (6) Insert the lock pin (#4) through the aligned holes from step (5), then bend the tip of the lock pin (#4) to prevent it from coming loose and ensure the nozzle assembly is securely retained.

Note:

- (1) Remove dust and foreign particles from the nozzle orifices and sliding surfaces with a soft brush. Be careful not to damage them.
- (2) For connecting the nozzle to piping, see step (2) [ES-P] or step (3) [ES-N] on page 2.

## 5. Maintenance

- (1) Visually inspect the nozzle for deformation and distortion.
- (2) Manually rotate the nozzle body/rotating part (#2) lightly to check the rotation.
- (3) If something is wrong with the rotation in step (2), the most common cause is foreign particles on the sliding surfaces. Follow steps (4) and (5) below to remove foreign particles on sliding surfaces.
- (4) According to the procedure of 3. Disassembly in the previous page, check the sliding surfaces with a magnifying glass and confirm they are free from foreign particles.
- (5) Use a soft brush or tweezers to carefully remove any foreign particles from the nozzle orifices and sliding surfaces.

Note: Trouble/malfunction of ES nozzles are caused mostly by foreign particles such as grit, dust, debris, scale, chips, and small metal cuttings.

## 6. Troubleshooting

Problems	Probable causes		Solutions
No spray is being created	Control	<ul style="list-style-type: none"> <li>• Controller is not switched on.</li> <li>• Valves are not opened.</li> </ul>	<ul style="list-style-type: none"> <li>• Switch it on.</li> <li>• Open the valves.</li> </ul>
	Nozzle	<ul style="list-style-type: none"> <li>• Nozzle or pipe is clogged.</li> <li>• Nozzle or pipe is clogged due to damage.</li> </ul>	<ul style="list-style-type: none"> <li>• Check and clean the nozzle or pipe.</li> <li>• Replace the damaged part.</li> </ul>
Liquid leaks	<ul style="list-style-type: none"> <li>• Some parts are loose or not tightened.</li> </ul>		<ul style="list-style-type: none"> <li>• Tighten the connections.</li> </ul>
	<ul style="list-style-type: none"> <li>• Nozzle or pipe is cracked.</li> <li>• Nozzle or pipe is corroded.</li> </ul>		<ul style="list-style-type: none"> <li>• Replace the cracked part.</li> <li>• Replace the corroded part.</li> </ul>
Rotation failure	<ul style="list-style-type: none"> <li>• Dust/foreign particles, damage on the nozzle.</li> <li>• Nozzle is clogged.</li> <li>• Shaft bearing(s) is scratched or damaged.</li> </ul>		<ul style="list-style-type: none"> <li>• Clean the sliding surfaces, replace the damaged parts.</li> <li>• Clean the nozzle.</li> <li>• Replace the shaft bearing(s).</li> </ul>
Irregular spray pattern	<ul style="list-style-type: none"> <li>• Nozzle or pipe is clogged.</li> <li>• Nozzle is corroded.</li> </ul>		<ul style="list-style-type: none"> <li>• Clean the nozzle or pipe.</li> <li>• Replace the corroded part.</li> </ul>

## 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:

H. IKEUCHI & CO., LTD.  
Daiichi Kyogyo Bldg., 1-15-15, Awaza, Nishi-ku,  
Osaka 550-0011 JAPAN  
Fax: +81-6-6538-4022  
Email: [overseas@kirinoikeuchi.co.jp](mailto:overseas@kirinoikeuchi.co.jp)  
<https://www.dry-fog.com/en/>