

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

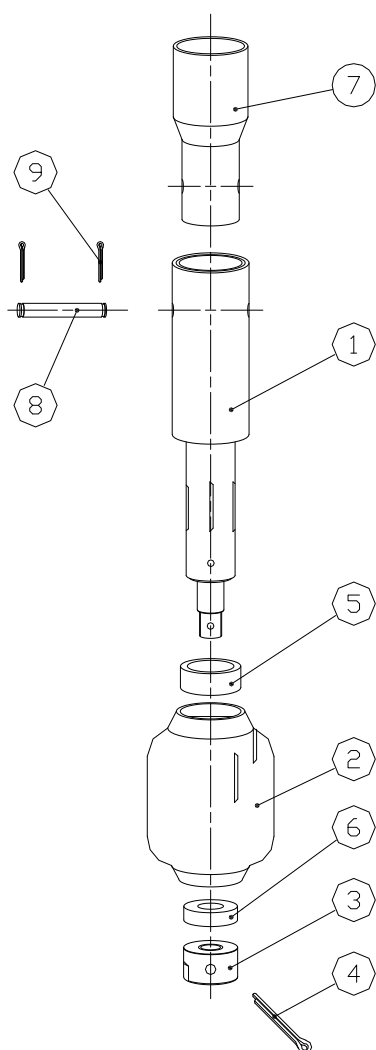
- (1) Installing the nozzle should be done after the piping system is completely installed and flushed.
 - Never install a nozzle during installation work of the plant or equipment.
 - Use piping and valves large enough to prevent the pressure from dropping.
 - Use new stainless steel pipes, as dust and y 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) [For **Type P** (Pin connection type)]

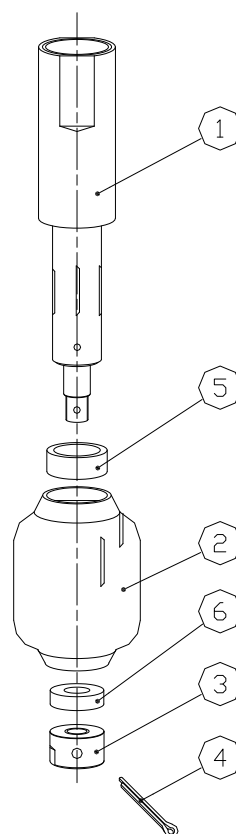
When welding the welded connecting pipe (part #7 on page 3) to a pipe, detach this part from the nozzle and weld it to the piping.
- (3) [For **Type N** (Thread connection type)]

When installing the nozzle, use a spanner/wrench on the flats of the connecting adaptor (part #1 on page 3) and tighten.
- (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 P (Pin connection type)



Type N (Thread connection type)

No.	Component	Material	Remark	No.	Component	Material	Remark
1	Connecting adaptor	S316L		6	Shaft bearing (lower)	PTFE	Consumable
2	Nozzle body	S316L		7	Welded connecting pipe	S316L	
3	Hub	S316L		8	Connecting pin	S316L	
4	Lock pin	S316L	Consumable	9	Side pin	S316L	Consumable
5	Shaft bearing (upper)	PTFE	Consumable				

- S316L stands for stainless steel 316L.
- Components Nos. 1–6 are assembled together before shipment.
- Components Nos. 7, 8, and 9 are shipped in pieces without assembling.

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, S303 stands for stainless steel 303.

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

(1) **[For Type N (Thread connection type) only]**

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

[For Type P (Pin connection type) only]

Pull out the side pins (#9), then remove the connecting pin (#8) to disassemble the connecting adaptor (#1) from the welded connecting pipe (#7).

[The following is common procedures to both. Type N and 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) Through-holes of the connecting adaptor (#1) and hub (#3) for the lock pin (#4) are different depending on nozzle codes. Be careful not to mix the parts, as the lock pin (#4) will not fit if the wrong parts are used.

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 so that through-hole of the connecting adaptor (#1) is coincident with that of the hub (#3).
- (6) Insert the lock pin (#4) into the holes of (5) and secure it by bending the tip of lock pin (#4) to prevent the nozzle assembly from falling off.

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) When installing the nozzle, screw in the nozzle by hand at first then tighten with a spanner.

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 (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"> • 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. 	<ul style="list-style-type: none"> • Check and clean the nozzle or pipe. • Replace the damaged part.
Liquid 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"> • Nozzle or pipe is cracked. • Nozzle or pipe is corroded. 		<ul style="list-style-type: none"> • Replace the cracked part. • Replace the corroded part.
Rotation failure	<ul style="list-style-type: none"> • Dust/foreign particles, damage on the nozzle. • Nozzle is clogged. • Shaft bearing(s) is scratched or damaged. 		<ul style="list-style-type: none"> • Clean the sliding surfaces, replace the damaged parts. • Clean the nozzle. • Replace the shaft bearing(s).
Irregular spray pattern	<ul style="list-style-type: none"> • Nozzle or pipe is clogged. • Nozzle is corroded. 		<ul style="list-style-type: none"> • Clean the nozzle or pipe. • Replace the corroded part.

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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