

Instruction Manual
for
Integrated Spray Header with BIM Series Pneumatic Spray Nozzles
SPB or SNB Adaptor Type

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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.



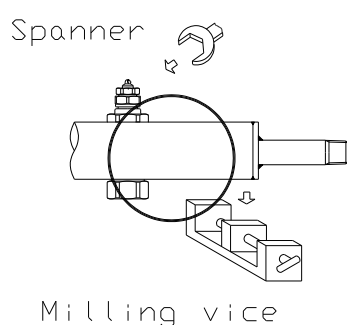
Ensure that the nozzle is firmly installed.

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

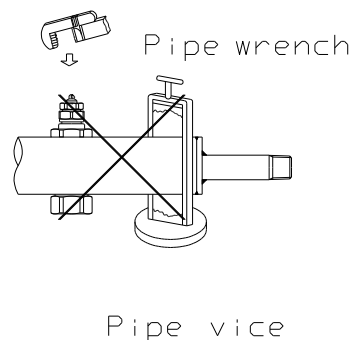
1. Suggestions & Cautions

- (1) Each nozzle is precision-made. The orifice of nozzle tip is a particularly important part and determines the spray characteristics, such as spray capacity, spray angle, and spray pattern distribution. Handle it with care.
- (2) The product may be heavy and need to be handled carefully.
For example, piping connections for air and water supply should be installed after the product has been installed.
- (3) Screw threads, edges and corners may be sharp. Wearing safety gloves is recommended.
- (4) Operate the products under the specified pressures.
If the pressure is not specified, refer to the provided flow-rate diagram.
- (5) Avoid damaging or scratching the nozzles. When replacing a nozzle tip or disassembling the product for maintenance, always use a spanner and milling vice. **DO NOT** use a pipe vice, pipe wrench or pliers.

Use these tools



DO NOT use



- (6) Spray ON/OFF control

Type SPB

This type has a built-in shutoff piston that operates on pilot air pressure. The spray is turned ON/OFF by turning the pilot air ON/OFF.

Use with pilot air pressure of 0.2 MPa or higher.

Timing diagram					
Compressed air			ON		
Pilot air	OFF	ON	OFF	ON	OFF
Liquid	Stop	Spray	Stop	Spray	Stop

Type SNB

This type has a built-in shutoff piston that operates on compressed air (spray air) pressure. The spray is turned ON/OFF by turning the compressed air ON/OFF.

Use with compressed air pressure of 0.2 MPa or higher.

Timing diagram					
Compressed air	OFF	ON	OFF	ON	OFF
Liquid	Stop	Spray	Stop	Spray	Stop

- (a) Supply of liquid

Set the liquid pressure to 0.1 MPa or higher.

If the liquid pressure is lower than 0.1 MPa, irregular and intermittent spray may be caused.

- (b) Stop the liquid supply when not spraying for a long time.

(7) 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 strainers to prevent clogged nozzles. Clogging will impact nozzle performance.

Type SPB

Only stopping the pilot air will not purge air from the pipe and thus will not lower the pressure enough to stop the spraying. To prevent this, use a 3-way solenoid valve for the pilot air pipe.

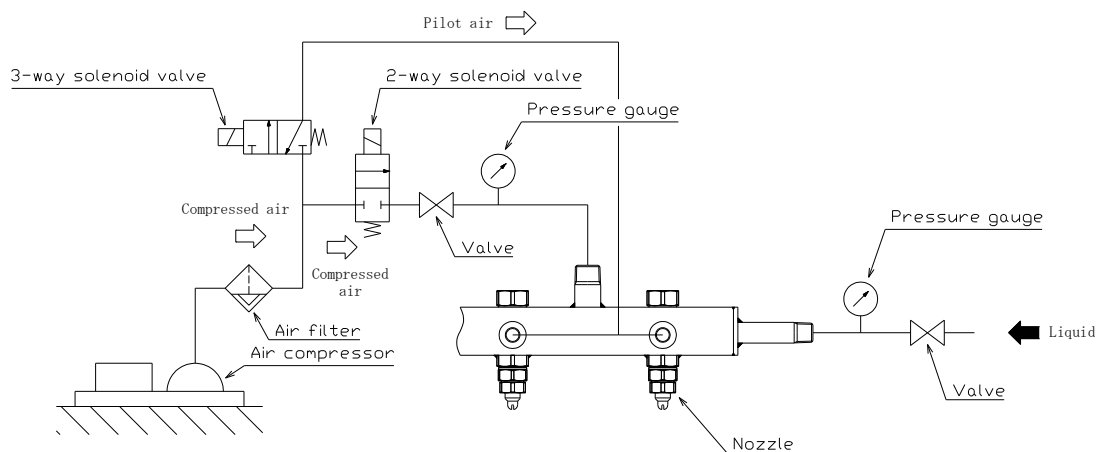


Fig. 1 Piping example using 3-way solenoid valve

Type SNB

When used with high liquid pressure, only stopping the compressed air will not lower the pressure enough to activate the shutoff piston, resulting in spraying only liquid.

To prevent this, use a 3-way solenoid valve for the air pipe.

If the pressure loss is too high due to the 3-way solenoid valve, use two 2-way solenoid valves with larger orifice diameters instead as shown below.

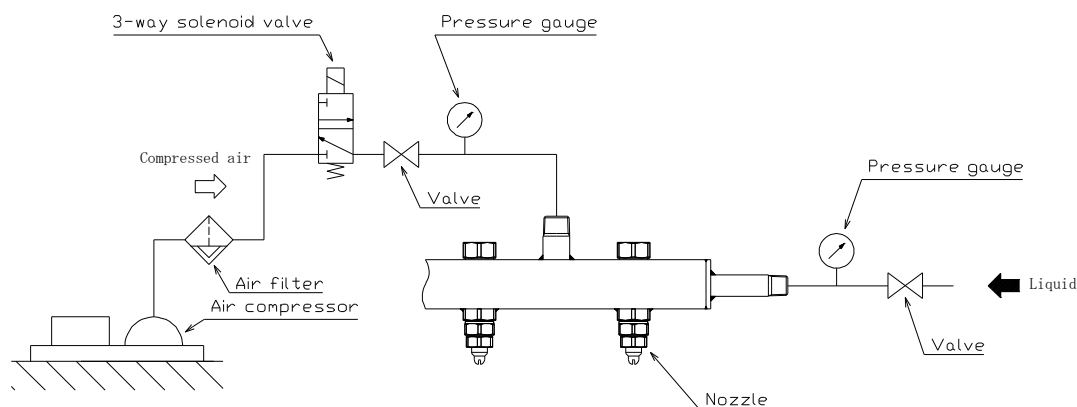


Fig. 2 Piping example using 3-way solenoid valve

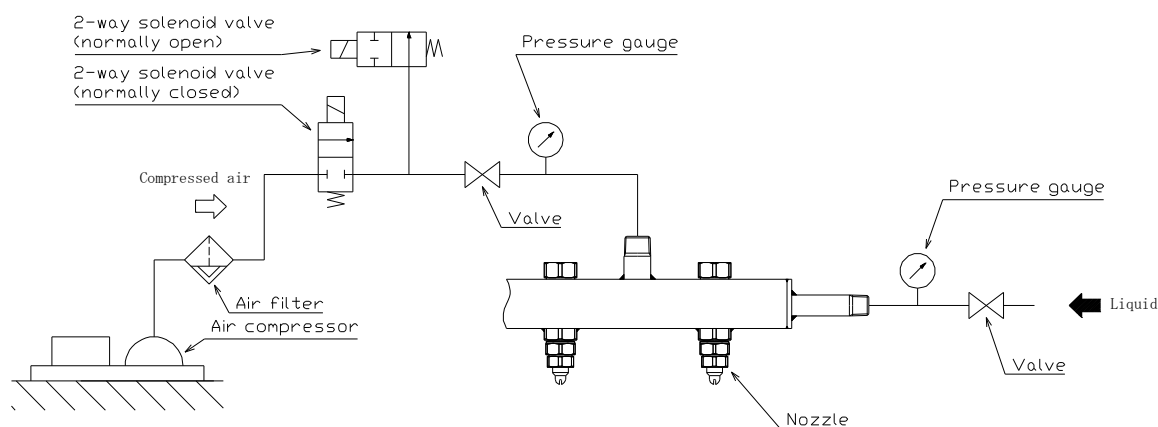


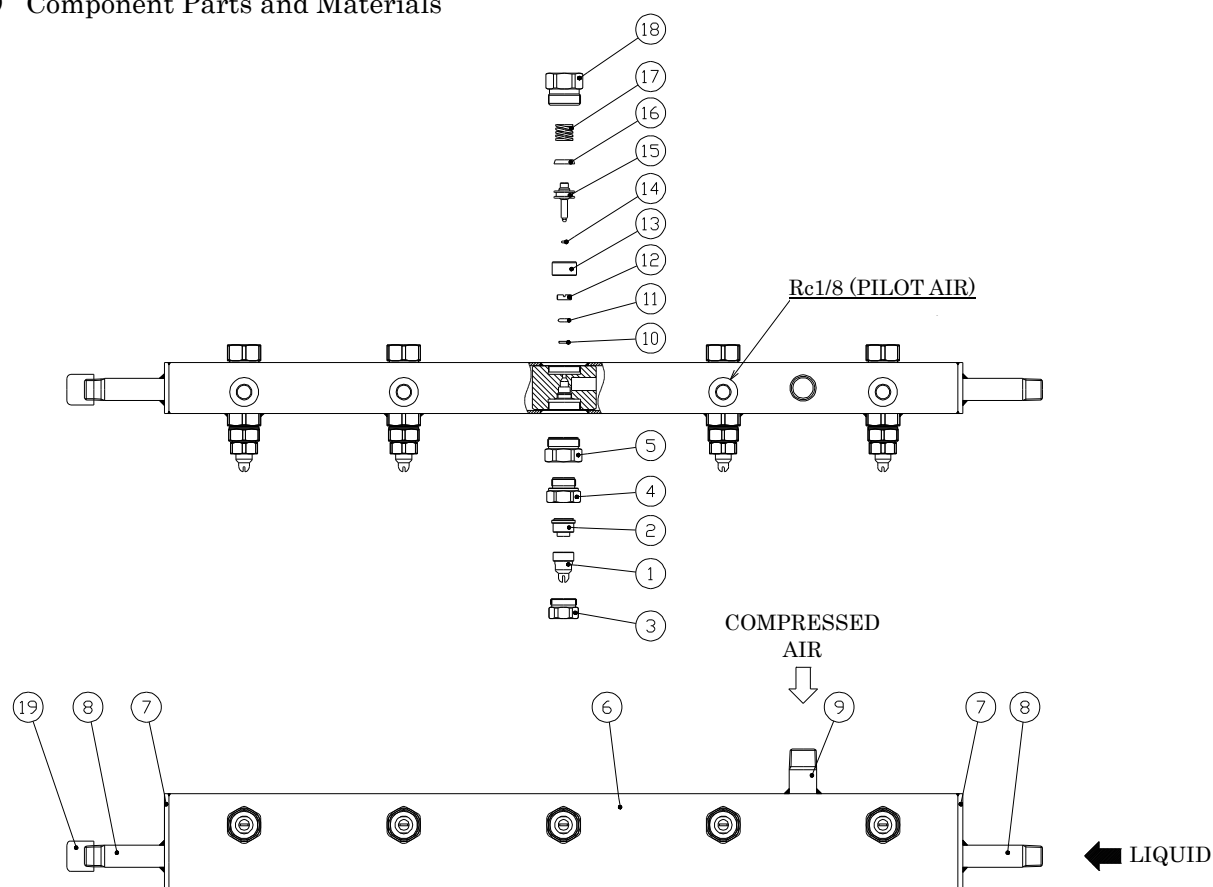
Fig. 3 Piping example using two 2-way solenoid valves

- (8) Prior to shipment all parts are firmly tightened. However, due to temperature changes during transport and especially if the nozzles are exposed to repeated heating and cooling during operation, parts such as screws may loosen and should therefore be inspected regularly. Take special care when screwing in and unscrewing to prevent damage.

Always apply an anti-seizing or sealing agent to the threads before assembly.

2. Components of Nozzle

(1) Component Parts and Materials



Part No.	Component	Material	Remark	Part No.	Component	Material	Remark
1	Nozzle Tip	S303	Consumable	11	O-ring (P4)	FKM	Consumable
2	Core	S303	Consumable	12	Lock Nut	S303	
3	Cap	S303		13	Sleeve	PTFE	Consumable
4	Nozzle Adaptor	S303	Consumable	14	O-ring	FKM	Consumable
5	Connector	S303		15	Piston	S303	
6	Rectangular Header	S304		16	Y-packing	NBR	Consumable
7	Plate	S304		17	Spring	S304	
8	Nipple	S304 equiv.		18	Spring Cap	S303	
9	Nipple	S304 equiv.		19	Cap	S304 equiv.	
10	Backup Ring	PTFE	Consumable				

Note:

(1) Consumables

The lifetime of a nozzle varies depending on the operational conditions.

Replace consumable parts when corrosion or pitting corrosion of a nozzle tip or other parts is found and/or nozzle performance significantly deteriorates.

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

(3) Type SNB has no pilot air inlets.

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

For example, S303 stands for stainless steel 303.

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

(1) Shut-off parts

- a. Hold the rectangular header (#6) in a milling vice and unscrew the spring cap (#18) with a spanner, then take out the spring (#17), piston (#15), O-ring (#14) and Y-packing (#16).

Necessary tools:

Milling vice

Spanner 21 mm (for BIM**02, 04, 075, 15, 22)

The recommended tightening torque is 40 N•m.

- b. Unscrew the lock nut (#12) with a flathead screwdriver and remove the O-ring P4 (#11) and backup ring (#10).

Necessary tool: Flathead screwdriver

If any of backup ring (#10), O-ring P4 (#11), O-ring (#14) and Y-packing (#16) is damaged, replace it with a new one.

(2) Nozzle

Hold the rectangular header (#6) in a milling vice and unscrew the connector (#5) with a spanner. Then hold the connector (#5) in a milling vice and loosen the cap (#3) with a spanner (do not remove the cap yet).

Unscrew the nozzle adaptor (#4) with a hexagon socket wrench, then remove the cap (#3), and take out the nozzle tip (#1) and core (#2).

Necessary tools:

Milling vice

Spanners and hexagon socket wrench (see the table 1 below)

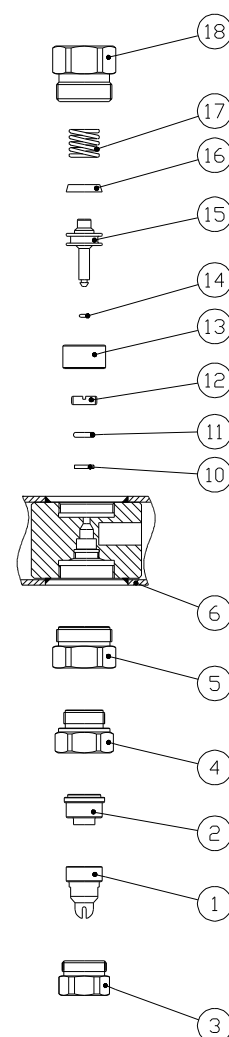


Table 1. Spanner size and tightening torque

Part	Air Consumption Code of BIM Series Nozzles		Necessary tool
	02, 04, 075	15, 22	
Cap #3	12 mm (15 N•m)	17 mm (25 N•m)	Spanner
Nozzle Adaptor #4	14 mm (30 N•m)	19 mm (40 N•m)	Hexagon socket wrench
Connector #5	21 mm (40 N•m)	21 mm (40 N•m)	Spanner

Recommended tightening torques are given in parentheses.

Note:

1. Make sure not to drop, damage or lose any of the small parts.
2. The nozzle tip and orifice are the most important and delicate parts. Take extreme care when handling them.
3. Nozzle adaptor (#4) is thin and fragile. To disassemble, first LOOSEN but DO NOT REMOVE the cap (#3), and remove the nozzle adaptor (#4) with a hexagon socket wrench. DO NOT use a spanner to remove the nozzle adaptor (#4).

4. Cleaning

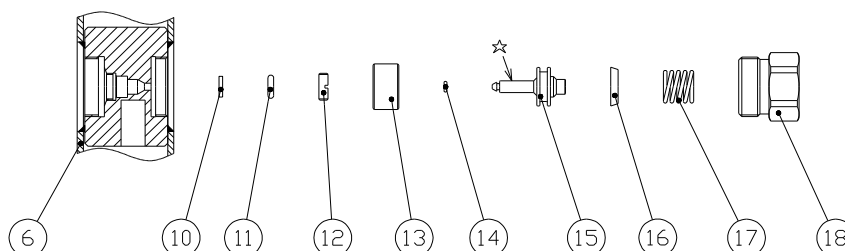
After the disassembly inspect each part for damages of any kind.

Using a brush, carefully remove dirt and debris from the metal parts. Take special care not to scratch or damage the nozzle orifice when cleaning the nozzle tip.

(1) How to clean the shut-off part

The most important parts of the shut-off mechanism and seal are the O-ring P4 (#11), O-ring (#14) and Y-packing (#16). Any flaw, dust or debris on these parts can cause a malfunction of the shut-off mechanism.

Inspect for any signs of damage and then remove any dirt with a cotton swab and soft cloth.

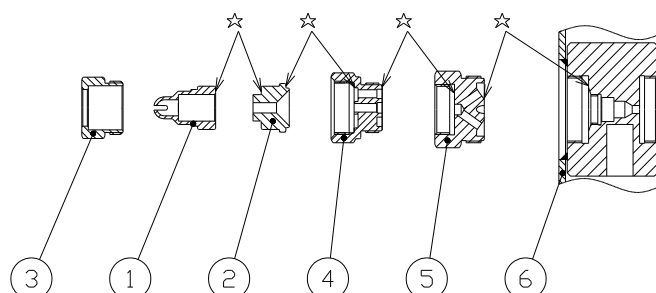


(2) How to clean the inside of the nozzle

a. Impurities are most likely to adhere to the air orifice of the nozzle adaptor (#4).

Pay special attention to check the condition of this part.

b. If you find any dust or debris in the orifice, carefully remove them with a brush, toothpick, or bamboo skewer. Clean the inside of each part thoroughly from any dirt and debris to maintain performance.



5. Assembly

Assemble in the reverse order of the 3. Disassembly on the previous page.

First, assemble the nozzle tip (#1), core (#2), cap (#3) and nozzle adaptor (#4) lightly, then attach the connector (#5). Use a hexagon socket wrench. DO NOT use a spanner as it may damage the nozzle adaptor (#4).

Note:

(1) Before assembly, confirm that the sealing surfaces indicated with ☆ above and the orifice are clean and undamaged.

(2) Pay attention to the orientation of the Y-packing (#16) when installing it to the piston (#15).

Fit the Y-packing with the groove side facing the tip of the piston as shown in Fig. 4.

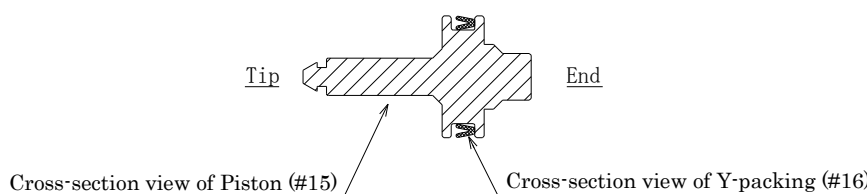


Fig. 4 Correct orientation of Y-packing

6. Maintenance

Check	Item	Check points
Daily	Spray	Visually check the spray pattern. If the nozzles are inside the equipment and cannot be seen, confirm that the spray pressure is normal.
	Pressure gauges and flow meters	Confirm that the air and liquid pressures and flow rate are correct during operation.
Periodically	Spray	Remove the nozzle from equipment and visually check the spray pattern.
	Appearance	Confirm that there is no corrosion or dust adhesion to the nozzle tip and orifice.
	Connection	Confirm that the cap and nozzle adaptor are screwed together tightly.

7. Troubleshooting

Troubles	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. • Liquid orifice and/or air orifice is clogged. • Piston does not work. 	<ul style="list-style-type: none"> • Check and clean the nozzle and pipe. • Replace the damaged part. • Clean the clogged part. • For SPB type, increase the pilot air pressure to 0.2 MPa or higher. • If increasing the compressed air pressure does not yield any results, replace the pipe and solenoid valve with larger ones to ensure an adequate air supply. • Replace the worn-out Y-packing.
Air leaks Liquid leaks	<ul style="list-style-type: none"> • Dust or debris on the piston or the sealing surfaces. • Damage or wear on the piston or the sealing surfaces. • Spring is missing. 		<ul style="list-style-type: none"> • Disassemble and clean the inside of nozzle. • Replace the damaged part. • Set the spring.
	<ul style="list-style-type: none"> • Some parts are loose or not tightened. • Seal failure between header and cap (#19). 		<ul style="list-style-type: none"> • Tighten the connections. • Disassemble, clean the sealing surface and re-assemble
	<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.
Intermittent spray	<ul style="list-style-type: none"> • Seal failure between nozzle tip, core, adaptor, and connector (air or liquid leaks due to dust/foreign particles adhered or damage on the surface indicated with ☆ on page 7). • Either air pressure is too high or liquid pressure is too low. • Seal failure between the piston and O-ring. 		<ul style="list-style-type: none"> • Clean the sealing surface. Replace the part. • Adjust the pressure. • Disassemble and clean the parts before re-assembly.
Irregular spray pattern	<ul style="list-style-type: none"> • Nozzle or pipe is clogged. • Nozzle tip is deformed. • Nozzle tip is corroded. • Dust or foreign particles adhered on the orifices. 		<ul style="list-style-type: none"> • Check and clean the nozzle and pipe. • Replace the deformed part. • Replace the corroded part. • Clean the part.

8. Disposal

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

9. Inquiries

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

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