Manual No. AE04E-1R_210607E

Dry Fog Humidifiers

AKIMist® "E"

04E

Instruction Manual

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"The Fog Engineers"
H. IKEUCHI & CO., LTD.

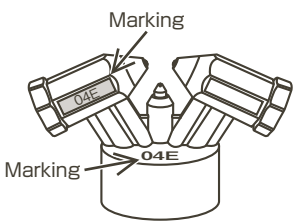
1 Introduction

Thank you for purchasing the AKIMist®"E" Dry Fog Humidifier.

Please read this Instruction Manual carefully for information about the construction and use of the AKIMist®"E" Dry Fog Humidifier in order to ensure optimal performance.

After reading, please keep this manual close to the AKIMist®"E" system for easy reference.

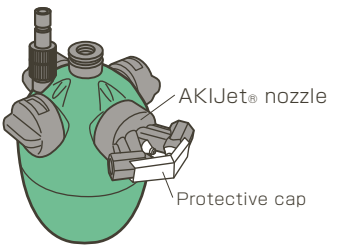
Be sure to confirm the nozzle type mounted on your AKIMist®“E” before use.
Nozzles for the AKIMist®“E” 04E type are marked “04E” on the nozzle body.
The operating pressure range differs by nozzle type.



2 List of Enclosed Items

★Check that all the items below are enclosed.

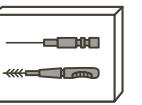
AKIMist®"E"



Liquid Coupler (Socket)

This socket will be included in the optional pipe connection kit if you purchased it.

Special Cleaning Kit for AKIJet® nozzles



Page 16 shows how to use this cleaning kit.
To place an order, use the code #226647.

- The number of nozzles mounted differs by AKIMist®"E" model No.
  - AE-1: Nozzle 1 pc.
  - AE-2: Nozzles 2 pcs.
  - AE-3: Nozzles 3 pcs.
  - AE-4: Nozzles 4 pcs.
- 3 stop plugs are included with each AKIMist®"E" unit.
- Protective caps are placed on the nozzles, as well as the air and water inlets of the AKIMist®"E" to prevent damage during shipment. Please remove before use.

3 Precautions

WARNING

Keep air pressure at 0.2–0.5 MPa (29–73 psi) and water pressure at 0.05–0.2 MPa (8–29 psi).

AKIMist® "E" may detach from pipes under high pressure. Use a pressure regulator to keep the air pressure within the appropriate operating range.
Water may leak under high pressure. Use a pressure regulator to keep the water pressure between 0.05–0.2 MPa.
The recommended setting is at approximately 0.1 MPa.
(Please see page 34 Water pressure range.)

WARNING

Never disassemble while air and water valves are open.

Before disassembling, close both air and water valves.
If water valve is open, water will leak. It is dangerous to disassemble while air and water valves are open.

WARNING

Never use under the following conditions.

Temperature exceeding 60℃ (140°F)
Direct exposure to sun or rain

WARNING

Clean AKIMist®"E" with soft cloth and neutral detergents.

Never use a scrubbing brush, polishing powder, lacquer, or thinner.

WARNING

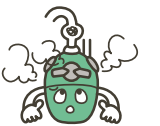
Make sure stop plugs ⑦' are properly fixed to the upper body ① and never remove them during operation.

If the plug ⑦' is loose, air leaks and AKIMist®"E" may not function properly. (Note: No Plug ⑦' for AE-4.)

CAUTION

If one of the AKIJet® nozzles is clogged, the other nozzles may not spray properly.

Clean AKIJet® nozzles as shown on pages15-19.



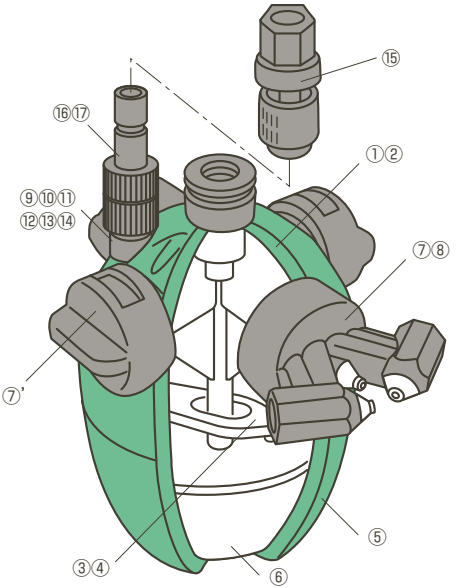
CAUTION

Never disassemble AKIMist®"E" except for maintenance.

CAUTION

Do not remove nozzle protective caps until installation is completed. They protect the nozzle tips during installation.

4 Construction and Component Parts

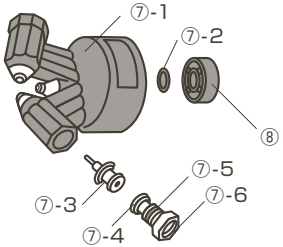


No.	Description	Materials (*1)	Code No.
①	Upper Body	PP, S303	#208638 [①-④]
②	Top Cover	PP	
③	Valve Lever	PP	
④	Lever Pin	S304	
⑤	Lower Body	PP	#205890
⑥	Float	PP	#205888
⑦	AKIJet®04E Nozzle	See next page	#259681
⑦'	Stop Plug	PPS	#208662
⑧	Packing for Body	FKM	#243353
⑨	Needle Valve	S303	#208642 [⑨+⑩]
⑩	Valve Seat	NBR	
⑪	Liquid Nipple	S303	#214724
⑫	O-ring	NBR	#211782
⑬	Strainer Holder	S303	#269608
⑭	Strainer Screen	S316	#17973
⑮	Liquid Coupler (Socket)	POM, S304, NBR	#15778
⑯	Liquid Coupler (Plug)	S303	#216627 [⑯+⑰]
⑰	O-ring	NBR	

Materials S303/S304/S316's "S" means stainless steel in this manual.

Note: No Stop Plugs are included for AE-4.

AKIJet® Nozzle Assembly (Part No. ⑦)

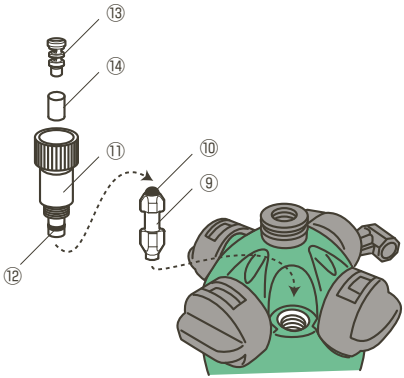


Note: Strainer ⑦-2 is pressed in Nozzle Body ⑦-1 and is not detachable.

No.	Description	Materials	Code No.
⑦-1	Nozzle Body	PPS, OPF-W®*, S303	[⑦-1+⑦-2] #259684
⑦-2	Air Strainer	S304, S316	
⑦-3	Nozzle Tip	S303	**04E Nozzle Tip Assembly** [⑦-3–⑦-6] #267037
⑦-4	Packing	FKM	
⑦-5	O-ring	FKM	
⑦-6	Hand-screw Plug	PPS	
⑧	Packing for Body	FKM	#243353

*OPF-W® is the registered trademark of Osakazyushi hanbai Co.,ltd.

Nipple and Valve Assembly (Parts Nos.⑨–⑭)



5 Before Installation

①Ensure there is enough compressed air

AKIMist®"E" with one nozzle consumes about
36 L/min, Normal of compressed air.
Supply enough compressed air to produce Dry Fog,
in order to avoid wetting of floor and machines.

②Use stainless-steel pipes

Never use pipes that may rust,
or nozzles will clog.

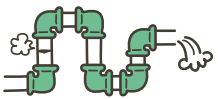
③Use clean air and water

Supply clean air and clean water
free of impurities.

CAUTION Make sure there are no loose connections or cracks in pipes and plastic hoses!

④Select appropriate air pipes

Pipes that are too thin, too long or have too many bents may cause a loss in air pressure and prevent the forming of Dry Fog.
For very long and bent pipes, it is recommended to use pipes one size larger, to make up for a drop in pressure.

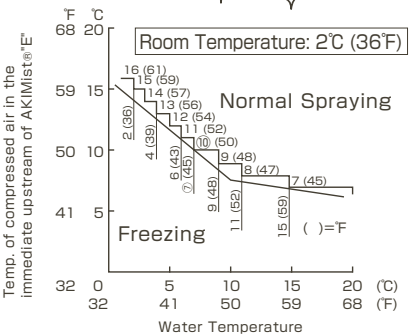


⑤Keep piping clean

Rust, dirt and debris clog AKIJet® nozzles.
Purge all pipes before use.
Purge air pipes with clean water.

⑥Prevent nozzle freezing

In a cold environment, AKIJet® nozzles can freeze because of adiabatic expansion.
Refer to the chart on the right for compressed air and water temperatures to keep the nozzles from freezing when the room temperature is 2℃ (36℉).
For example: At a room temperature of 2℃ (36℉) and a water temperature of 7℃, the temperature of the compressed air will need to be 10℃ or higher to prevent the nozzles from freezing.

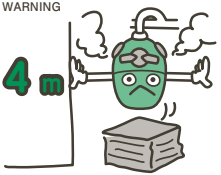


6 Installation

①For installation

Layout

WARNING



Make sure no wall or pillar is within four meters (13 ft) in front of spraying nozzles. Nothing should be placed under the AKIMist®"E".

Install the AKIMist®"E" upright.

As main parts are made of plastic, handle AKIMist®"E" gently

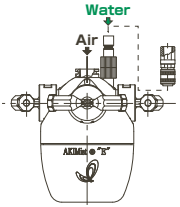
WARNING

Do not hold the AKIMist®"E" in place with the water hose. The AKIMist®"E" should be held in place with the air connection.

Avoid screwing too tight.

②Air Line (Connect to the air inlet first.)

WARNING Mounted in the center on the top is the air inlet (1/4″).
If connected wrong, water will leak from the nozzles.

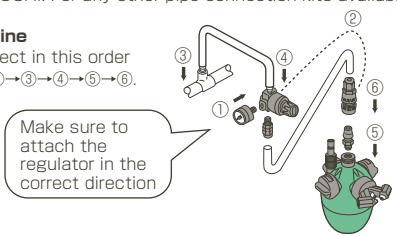


③Water Line

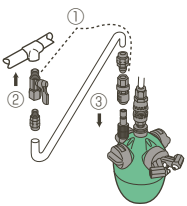
WARNING The smaller inlet (1/8″) is for the water supply.

Instructions below show how to assemble a standard pipe connection kit available for purchase from IKEUCHI. For any other pipe connection kits available, see the manual for that kit.

②Air Line
Connect in this order
①→②→③→④→⑤→⑥.



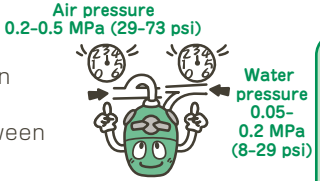
③Water Line
Connect in this order
①→②→③.



Note:
- Pipe connection kits are optional and available for purchase.
- For details, refer to a separate manual for each pipe connection kit.
- Remove the protective caps from the air and water inlets before installation.

④Operation

- Keep the air pressure between 0.2–0.5 MPa (29–73 psi).
- Keep the water pressure between 0.05–0.2 MPa (8–29 psi).



WARNING

Tap water pressure often increases at night.
If the water pressure is over 0.2 MPa, water will leak.
Make sure to install a pressure regulator to keep the water pressure below 0.2 MPa (29 psi).

When you detach the AKIMist®"E" for maintenance…

… close the air and water valves…

… disconnect the water hose first…

…then disconnect the air hose.

Note:
Before re-installing, make sure the air and water valves are closed. First connect the air hose, then the water hose.

⑤Storing

The AKIMist®"E" should be stored in a dry and dust-free location when not in use for extended periods of time. Before storing, drain the water, disassemble the AKIMist®"E" and clean the nozzles, then put it back together.

7 Operation

★Inspect equipment periodically!

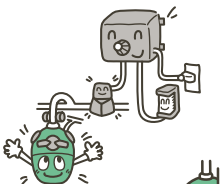
Perform maintenance on the compressor and air/water purification equipment according to their instruction manual.

★Quick spray ON/OFF

Install a solenoid valve immediately before the AKIMist®"E" for quick ON/OFF.
In case a solenoid valve cannot be installed near the AKIMist®"E", install an air relief circuit.
*See page 25 ⑨Selecting Ancillary Devices for an air relief circuit.

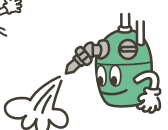
★Automatic humidity control!

Install a humidity controller, which maintains the required humidity automatically.



★Aim Dry Fog at specific area where humidity needs to be raised!

The AE-UT adapter, available for purchase separately, allows for the spray direction to be adjusted as needed, both horizontally and vertically. It can easily be attached and removed by hand.

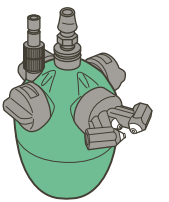


8 Maintenance

WARNING For safety, close both air and water valves before any maintenance.

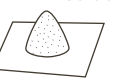
★Disconnect the AKIMist®"E" from the pipes to perform maintenance in a safe place.

★Tools required for maintenance


AKIMist®"E"


Flat-head screwdriver


Soft cloth


Neutral detergent

①Disassembling AKIMist®"E"

① Close the air pressure regulator to stop the air.

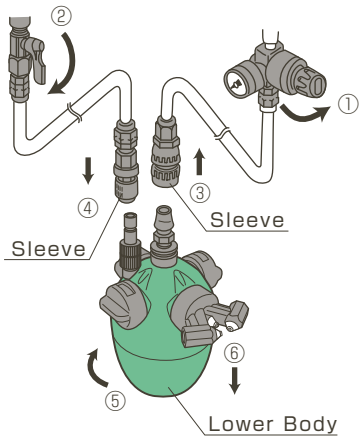
② Close the valve to stop the water.

③ Disconnect the air coupler by pulling the sleeve up.

④ Disconnect the water coupler by pushing the sleeve down.

⑤ Turn the lower portion of body (lower body) clockwise.

⑥ Pull down the lower body.

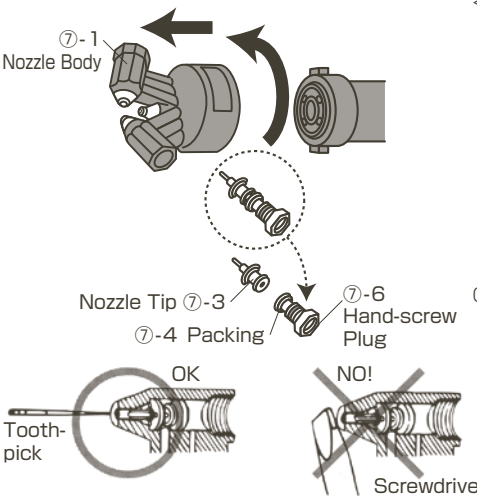


Note:

- For details of connecting/disconnecting the air and water couplers, please refer to the pipe connection kit manual.
- Be careful as the lower body contains water.

<Assembling> Reverse the disassembly procedure.

②Cleaning AKIJet® with Enclosed Cleaning Kit



<How to disassemble an AKIJet® nozzle>

① Turn the nozzle body ⑦-1 counterclockwise to detach the nozzle assembly.

② Turn the hand-screw plug ⑦-6 counterclockwise to remove it.
The nozzle tip ⑦-3 will be removed at the same time.*

③ Pull the nozzle tip ⑦-3 off the hand-screw plug ⑦-6 by hand.

Caution:

- Be careful not to lose the small parts.
- Never remove the packing ⑦-4 from the hand-screw plug ⑦-6, it is impossible to reassemble.
- The nozzle tip is the most important and delicate part. Any damage to the tip can harm the performance of the nozzle.

*If the nozzle tip is left inside the nozzle body, use something soft like a tooth-pick to push the tip out and never use a screwdriver or a hard metal tool.

Here is a quick video on cleaning of AKIMist nozzles. →

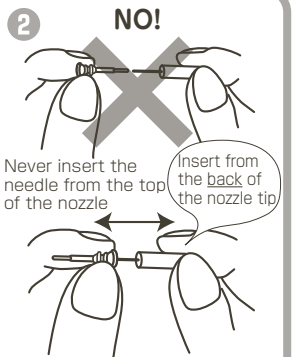
Open the cleaning kit and take out the needle and brush after step ❶.

❶

Gently wipe the nozzle tip with a cloth moistened with neutral detergent.

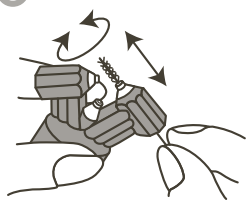
The nozzle tip, especially the extreme tip and orifice, is the most delicate part. Rough handling can damage the plastic tip and harm the nozzle performance.

❷



Always push the needle through from the back of the nozzle tip to remove dirt and debris, then purge with compressed air.

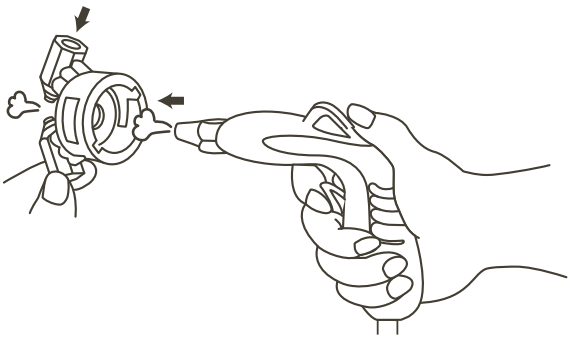
❸



Insert the brush into the nozzle body as shown, twist it inside and push in and out several times to remove dirt and debris. Then, purge with compressed air.

If dirt and debris are hard to remove, wet the brush with neutral detergent and repeat the process.

4



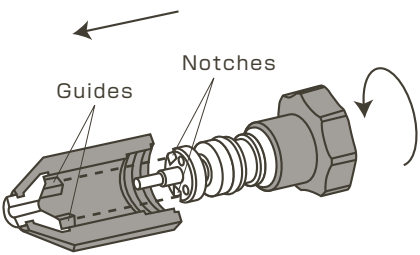
Purge the middle hole and the nozzle tip insertion area with compressed air.

<How to assemble AKIJet® nozzle>

First attach the nozzle tip ⑦-3 to the plug ⑦-6, and screw them into the nozzle body ⑦-1.

Make sure the two notches of the nozzle tip slide over the guides inside the nozzle body, then screw it in.

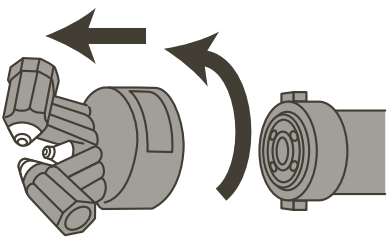
If the nozzle tip does not fit, stop twisting, reassemble and try again.



CAUTION

- The nozzle tip is very thin and delicate. Be careful not to hit it on a hard object or surface.
- If there seems to be resistance or something inside the nozzle body, stop screwing, pull out the nozzle tip, and clean the nozzle body again. Do not force the nozzle tip in.
- Do not use a broken or damaged nozzle tip, this will cause coarse atomization and water leakage.

③Cleaning Air Strainer



① Twist AKIJet® nozzle counterclockwise to detach it from the adaptor.

② To clean the air strainer ⑦-2 in the nozzle, wipe off dust with a soft cloth.

Note:
The air strainer ⑦-2 is fixed inside the nozzle body ⑦-1 and is NOT detachable.

<How to connect the nozzle to the adaptor>
Fit the grooves of the nozzle over the guides of the adaptor, push the nozzle down, and then twist it clockwise until tight.

④Component Service Life

Components		Code No.	Estimated Service Life
Packing for Nozzle	⑦-4	#208659	Two years
O-ring for Nozzle	⑦-5		
Hand-screw Plug	⑦-6		
FKM Packing for Body	⑧	#243353	Five years

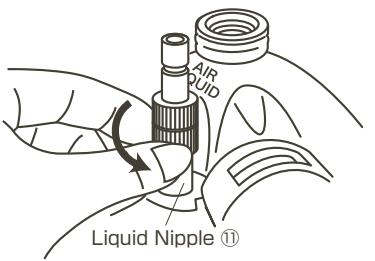
Note:

- Service life varies depending on operational conditions.
- It is recommended to replace parts ahead of the end of service life.
- Parts ⑦-4, ⑦-5, and ⑦-6 are sold as one component (Code #208659).

⑤Cleaning Water Strainer

AKIMist® "E" has a water strainer installed in the liquid nipple.

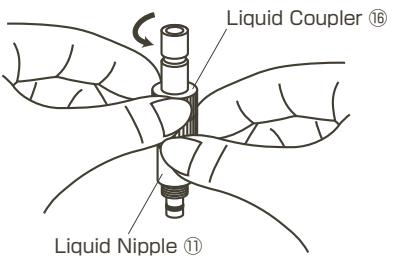
❶ Remove Liquid Nipple.



Hold the humidifier body firmly and turn the liquid nipple ⑪ counterclockwise to remove.

The liquid nipple ⑪ will come off with the liquid coupler ⑯ attached.

❷ Remove Liquid Coupler.



Hold the liquid nipple ⑪ and turn the liquid coupler ⑯ counterclockwise to remove.

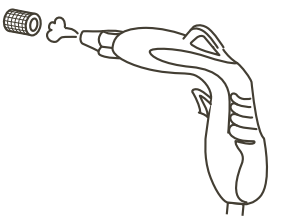
❸ Remove Strainer.

With a flat-head screwdriver unscrew the strainer from inside the liquid nipple.

*Outside of strainer screen may be dirty.

*Be careful not to lose strainer.

❹ Clean Strainer Screen.



Purge the strainer screen ⑭ with compressed air or wash with water until clean.

⑥Cleaning Liquid Nipple and Needle Valve

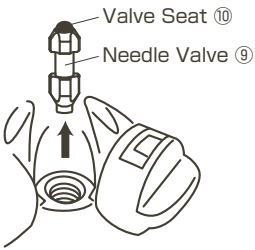
The needle valve is located under the liquid nipple, inside the upper body of the humidifier.

❶ Cleaning Liquid Nipple

Remove any dirt on the thread of the liquid nipple with a tooth-pick and/or compressed air.

Wipe the top part of the liquid nipple, which is in contact with the needle valve, with a soft cloth and purge with compressed air.

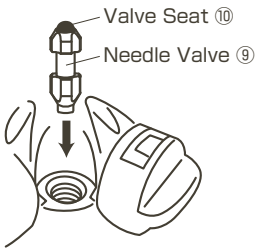
❷ Cleaning Needle Valve



Remove the needle valve, with the valve seat, from the humidifier body for cleaning. Wash with water or wipe with a soft cloth, then purge with compressed air.

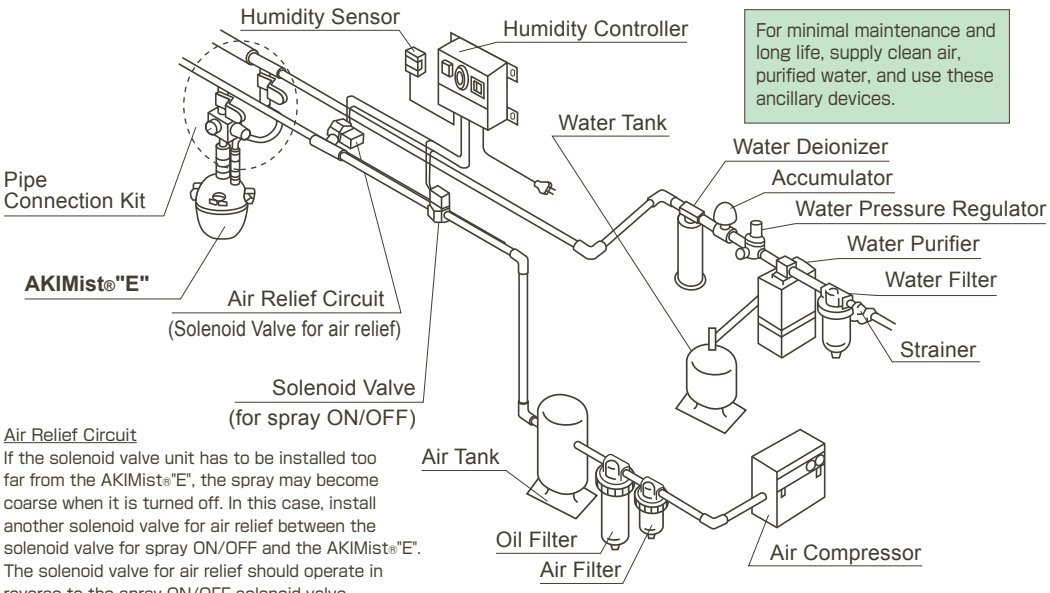
⑦Reassembling Water Strainer and Needle Valve

Insert the needle valve, with the valve seat, into the upper body of the humidifier and reverse the disassembly instructions on pages 21 and 22.



Use caution with the needle valve direction when inserting as shown above.

9 Selecting Ancillary Devices



For minimal maintenance and long life, supply clean air, purified water, and use these ancillary devices.

Air Relief Circuit

If the solenoid valve unit has to be installed too far from the AKIMist®"E", the spray may become coarse when it is turned off. In this case, install another solenoid valve for air relief between the solenoid valve for spray ON/OFF and the AKIMist®"E". The solenoid valve for air relief should operate in reverse to the spray-ON/OFF solenoid valve.

☆For easy installation	Pipe Connection Kits We have two types of connection kits: Hanging down type that comes with or without a plate; and Wall mounting type.	Please see pages 29 and 30.
☆Must be installed	· Air Compressor · Air Filter (Filtration: 0.3 μm) · Oil Filter (Filtration: 0.3 μm) · Air Tank · Water Strainer (150 mesh) · Water Filter (Filtration: 5 μm) · Water Pressure Regulator	For supply of clean compressed air. For removal of foreign particles from compressed air. For removal of oil mist, dust and moisture contents from compressed air. For stable air supply. For removal of foreign particles from water. For water filtration. For control of proper water pressure.
☆For easier maintenance	· RO Water Purifier	For removal of calcium, magnesium and silica from water.
☆For high grade purified water	· Water Deionizer (using ion-exchange resin)	For high grade purified water in clean room.
☆For automatic humidity control	· Humidity Controller · Solenoid Valve Unit	For maintaining desired relative humidity.

10 Ancillary Devices

Humidity Controller

• Maintain desired humidity any time, day or night.

[Compact Digital Type]

(RHC-C11)

- Digital display of present humidity and target humidity.
- Compact size to fit anywhere.
- Includes a humidity sensor.
- Accuracy: ±3%
- Voltage: 100–240 VAC

[Digital Type]

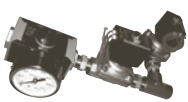
(RHC-D)

- Digital display of present humidity and target humidity.
- A single controller can control up to four zones spread over a wide area individually.
- Accuracy: ±3%
- Voltage: 100–110 VAC or 200–220 VAC

Humidity Sensor

- For sensing humidity and transmitting a signal to the controller.

Solenoid Valve Unit



- A solenoid valve and reducing valve are bundled together as a unit. For automatic on-off control of air and water, use with humidity controller.

Water Filter

- For removal of foreign particles over 5 μm.
- Available in a variety of sizes

Air Filter

- For removal of moisture contents and dust over 0.3 μm from compressed air to make air clean.
- Available in a variety of sizes

Oil Filter

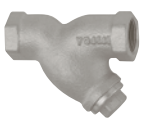
- For removal of oil mist, dust and moisture contents over 0.3 μm from compressed air with micro-fiber.
- Filter element must be replaced if differential pressure increases to 0.1 MPa.
- Available in a variety of sizes

Water Pressure Regulator

- For control of water pressure.

  Set pressure: 0.01-0.2 MPa

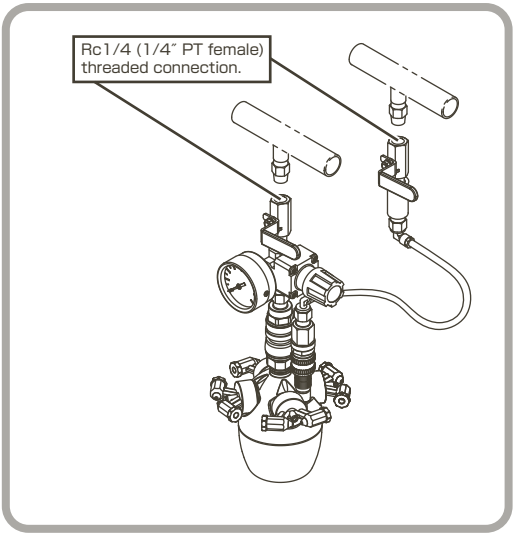
Water Strainer



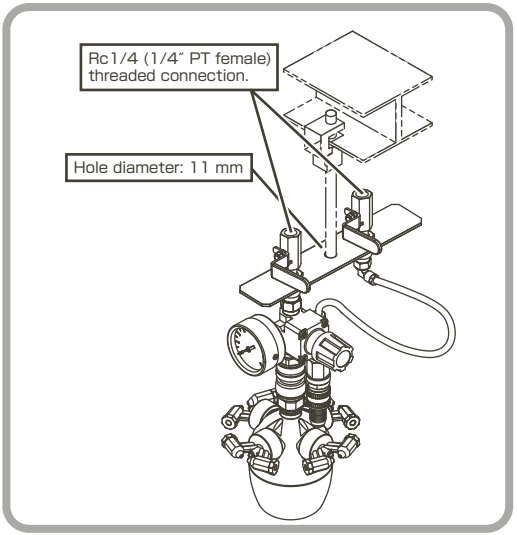
- For removal of foreign particles over 0.1 mm from water. (Mesh size 150)

11 Optional Pipe Connection Kits for Easy Installation

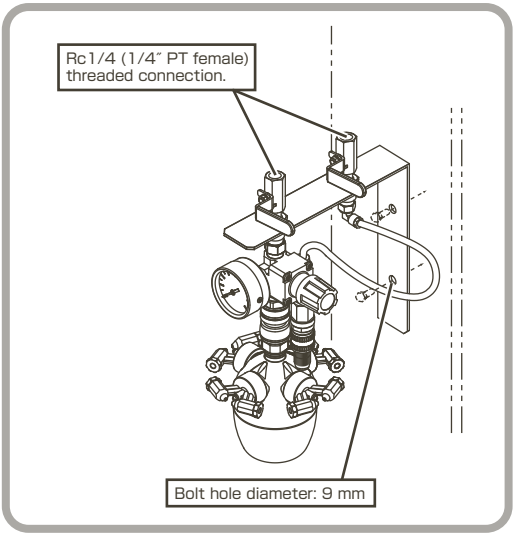
□Hanging-down (NP) Kit without plate



□Hanging-down Kit



□Wall Mounting Kit



12 Troubleshooting

If you have trouble, stop air and water supply and check the following.

Troubles	Probable Causes	Solutions
1. No spray or stops spraying after a short time	1) Air pressure is too low.	Set air pressure to 0.2–0.5 MPa (29–73 psi).
	2) Stop plug ⑦' is loose.	Tighten stop plug ⑦' properly.
	3) Pressure regulator is not functioning properly.	Check flow direction of pressure regulator.
	4) Solenoid valve is not functioning properly.	Check power source, wiring, and flow direction of solenoid valve or replace.
	5) Strainer in liquid nipple is clogged.	Clean strainer screen ⑭ (See p.21–22).
2. Irregular or intermittent spray	6) Packing ⑦-4 inside the nozzle is improperly seated.	Replace a set of Part# ⑦-4–⑦-6 (CODE #208659) (see p.6, 15–18, 20).
	7) Nozzle is clogged.	Clean nozzle (see p.15–18).
	8) Packing between nozzle and adaptor is improperly set or worn.	Set packing ⑧ properly or replace.
	9) Nozzle orifice is frozen.	Install air heating equipment.
3. Liquid dripping from nozzle orifice	1) Dust around the nozzle orifice.	Clean the nozzle orifice (see p.15–18).
	2) Liquid pressure is too high.	Reduce liquid pressure below 0.2 MPa [29 psi] (see p.11).
	3) Nozzle tip is deformed.	Replace tip assembly (see p.6, 15, 18).
	4) Solenoid valve is not installed near AKIMist® "E".	Install solenoid valve immediately before AKIMist® "E", or install an air relief circuit.

Troubles	Probable Causes	Solutions
4. Spray is coarse	1) Air and liquid connection is reversed.	Connect correctly (see p.10).
	2) Stop plug ⑦' is loose.	Tighten stop plug ⑦' properly.
	3) Air piping is inadequate, twisted or throttled.	Make sure the pipe size is correct, and that there are no twists or throttles (see p.8).
	4) Air pressure is too low.	Set air pressure to 0.2–0.5 MPa (29–73 psi).
	5) Air filter on air pipe is clogged.	Clean or replace air filter.
	6) Air strainer ⑦-2 is clogged.	Clean or replace air strainer (see p.19).
	7) Solenoid valve is clogged.	Clean or replace solenoid valve.
	8) Nozzle tip is deformed.	Replace tip assembly (see p.6, 15, 18).
5. Coarse spray or liquid dripping when stopping	1) Solenoid valve is not installed near AKIMist®"E".	Install solenoid valve immediately before AKIMist®"E", or install an air relief circuit.
6. Liquid dripping from humidifier body	1) Liquid pressure is too high.	Reduce liquid pressure below 0.2 MPa [29 psi] (see p.11).
	2) Needle valve ⑨, with valve seat ⑩, not functioning properly.	Make sure the needle valve is set properly, or replace it (see p.24).
	3) Liquid nipple ⑪ is loose.	Tighten liquid nipple properly.
	4) O-ring ⑦-5 in inside nozzle is improperly set or worn.	Replace tip assembly (see p.6, 15, 18).

If the above solutions do not work, please contact your local distributor.

13 Maintenance and Inspection

Maintain all equipment according to their instruction manuals.

Inspection Cycle	Inspection Item	Content
Daily	1) Air pressure gauge	Confirm that air pressure is 0.2–0.5 MPa (29–73 psi) when spraying.
	2) Air filter	Check drain water volume and confirm it is within upper limit.
	3) Solenoid valve	Confirm that ON/OFF control of solenoid valve is working correctly. Also check humidity controller operation at the same time.
Periodical	1) Elements of air filter and oil filter	Clean with neutral detergent once a month.
	2) Element of water strainer	Clean with water and purge with compressed air once a month.
Off-season	1) Purge compressed air and water from pipes	Air and water must be purged at end of usage season.
	2) Elements of air filter and water strainer	Before and after use, wash and purge them with compressed air. Check there is no rust before use.
	3) Purge all pipes	Before and after use, purge them with compressed air.

★Consumable Parts

Components	Estimated service life
Elements of air filter and oil filter	Two (2) years
Element of water strainer	Four (4) years
Diaphragm of pressure regulator	Two (2) years
Plunger of solenoid valve	Five (5) years

14 Specifications

*at air pressure of 0.3 MPa

Model No.		Unit	AE-1 (04E)	AE-2 (04E)	AE-3 (04E)	AE-4 (04E)
Number of nozzle(s) mounted		*piece*	1	2	3	4
Dimensions [width x height]		*mm (")*	109 × 110 (4.0 × 4.3)	125 × 110 (5.0 × 4.3)		
Weight	Net	*g (lb)*	290 (0.64)	300 (0.66)	310 (0.68)	320 (0.71)
	Loaded		310 (0.68)	320 (0.71)	330 (0.73)	340 (0.75)
Spray volume*		*L/hr (GPH)*	3.0 (0.79)	6.0 (1.58)	9.0 (2.38)	12.0 (3.17)
Air consumption*		*L/min, Normal (SCFM)*	36 (1.34)	72 (2.67)	108 (4.00)	144 (5.34)
air compressor motor power		*kW [per unit]*	0.4	0.75	1.5	

Max. of 4 AKIJet® nozzles can be mounted on one AKIMist®"E".

Air Pressure Range 0.2–0.5 MPa (29–73 psi)

- Humidifier's required air pressure.
  Please use within given pressure range. Exceeding pressure range causes coarse and/or irregular spray.

Water Pressure Range 0.05–0.2 MPa (8–29 psi)

- Humidifier's required water pressure.
  Please use within given pressure range. Exceeding pressure range causes water leaks and irregular spray.
- Even when set within the given range, supply water pressure may exceed this range due to water and operating conditions. The recommended setting is about 0.1 MPa (15 psi).

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