



Armstrong-Cool Fog Fogging Systems

Installation and Maintenance Manual

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Danger: Electrical Shock Hazard!
Disconnect Power to Control Panel Before Installing or Servicing

This bulletin should be used by experienced personnel as a guide to the installation and maintenance of Armstrong-Cool Fog Fogging Systems. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact Armstrong or its local representative if further information is required.

Installation

A. Minimum Factory Supplied Components:

Each Armstrong International, Inc.-Cool Fog System requires installation of the following factory supplied system components:

- 1) Pre-assembled fogger manifold bar(s) with Fogger Heads.
- 2) Control Panel
- 3) Water Regulating Valve Assemblies (remote or panel mounted)
- 4) Air Regulating Valve Assemblies (remote or panel mounted)
- 5) Pneumatically Operated Three Way Drain Valves. (remote or panel mounted)

B. Additional Components:

Additional installation of the following components, not supplied by Armstrong International, Inc. unless requested by customer, may also be required:

- 1) Humidity Sensor with Proportional Controller or On/Off Humidistat
- 2) Compressed Air System
- 3) Pressurized Water Source
- 4) Duct Fog Chamber
- 5) Pressurized Air and Water Lines
- 6) Air and Water Headers
- 7) Fog Eliminator

C. Factory Supplied Documentation:

Because each Armstrong-Cool Fog System is factory engineered, a set of installation documents for each project is generated. The following documents should be in the installer's possession prior to installation:

- 1) "Humidifier Schedule"
- 2) Fogger manifold bar(s) "Elevation View" Drawing
- 3) "Fog Chamber Side View" Drawing
- 3) "Fogger manifold bar(s)" Drawing
- 4) "Schedule of Connections"
- 5) "Control Panel" Drawing
- 6) "Control Panel Wiring" Drawing
- 7) "Air Valve Assembly" Drawing
- 8) Drawings for any other factory supplied options.

**Please read and save the instructions
and all installation documents!**

D. Fogger Manifold Bar(s) and Control Panel:

- 1) Determine Fogger manifold bar(s) installation location allowing maximum distance to the next downstream surface as shown in **“Elevation View”** and **“Fog Chamber Side View”** drawings.
- 2) Secure and fasten the fogger manifold bar(s).
- 3) Secure and fasten the control panel to a wall close to the fog chamber.

E. Air End:

Make Sure the Air Lines are Free of Debris Before Making Connections

- 1) Pipe supply air (see connection symbol **“G”** in **“Schedule of Connections”** sheet) from the main compressed air source to the air valve assembly (see **“Elevation View”** drawing).
- 2) Pipe supply air to the fogger manifold bar(s) (see connection symbol **“I”** in the **“Schedule of Connections”** sheet) from air valve assembly (see **“Air Valve Assembly”** drawing) to the air inlet connection of previously installed fogger manifold bar(s) (see **“Elevation View”** drawing).
- 3) Pipe instrument air line (see connection symbol **“C”** in **“Schedule of Connections”** sheet) from a clean dry compressed air source to the control panel (see **“Control Panel”** drawing).
- 4) Pipe fogger feedback tube (see connection symbol **“E”** in **“Schedule of Connections”** sheet) from the air line of top fogger manifold bar(s) to cool fog control panel (see **“Control Panel”**, **“Fogger Manifold Bar(s)”**, and **“Elevation View”** drawings).

F. Water End:

Make Sure the Water Lines are Free of Debris Before Making Connections

- 1) Pipe water supply line (see connection symbol **“W”** in **“Schedule of Connections”** sheet) from the main supply water source to the water valve assembly next to fogging chamber (see **“Elevation”** and **“Water Valve Assembly”** drawing).
- 2) Pipe fogger manifold bar(s) water supply (see connection symbol **“H”** in **“Schedule of Connections”** sheet) from water valve assembly to the water line of fogger manifold bar(s) (see **“Fogger Manifold Bar(s)”**, **“Water Valve Assembly”**, and **“Elevation View”** drawings).
- 3) Pitch water supply lines toward drain valve to insure proper drainage when system is off.
- 4) Pipe water drain line (see connection symbol **“O”** in **“Schedule of Connections”** sheet) from water valve assembly (see **“Elevation”** drawing) to the drainage location.

Check for Leaks in the Water Line

G. Electrical End:

Danger: Electrical Shock Hazard! Disconnect Power to Control Panel Before Installing or Servicing

- 1) Wire the 120 volt AC, 60 HZ power source (see connection symbol **“POWER”** in **“Schedule of Connections”** sheet) to control panel (see **“Wiring Diagram”** schematic).
- 2) Wire the control signal from the building automation system, humidity sensor and controller, or humidistat (see connection symbol **“A”** in **“Schedule of connections”** sheet) to the control panel (see **“Wiring Diagram”** schematic).
- 3) If a local control system is used, refer to the humidity controller or humidistat instructions for proper mounting and sensor wiring.

Identify Polarity of 4-20 mA Wires!!!

Ground All Wires!!!

General Start-Up

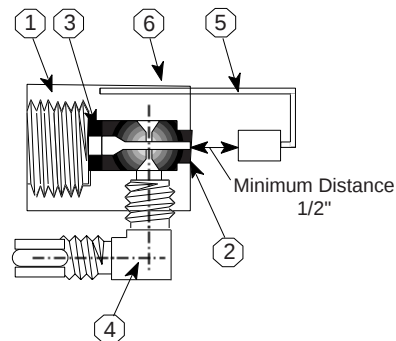
A. Preliminary Check List:

1. Air and water connections to control panel, water valves, and fogger manifold bar(s) are correct and leak proof.
2. Stable compressed air and water supplies are provided.
3. Instrument air is clean and dry.
4. Adequate air and water pressure is available.
5. All installation has been done according to the submittal drawings.
6. All wiring has been done according to the submittal drawings.
7. Air handlers are operating properly.
 - a. Air temperature at fogger manifold bar(s) is adequate.
 - b. Air CFM and FPM are correct.

B. Resonator Installation and Adjustment:

1. Install one resonator per fogger head allowing approximately 1/2" of clearance between the fogger head and the resonator face.
2. Align resonator so that the orifice of the fogger head is directly in front of the resonator face.

Note	Description	Material
①	Body (1.25" O.D.)	316 Stainless Steel
②	Orifice (2A)	316 Stainless Steel
③	Gland	Teflon
④	Water Connector	316 Stainless Steel
⑤	Resonator Assembly	316 Stainless Steel
⑥	Set Screw (Allen HD)	18-8 Stainless Steel



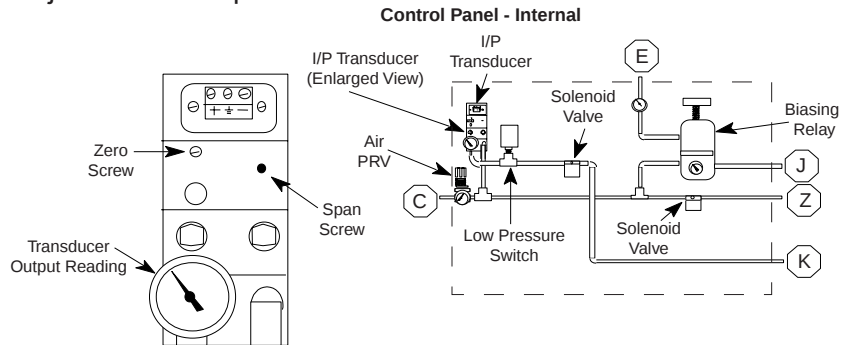
C. Transducer Adjustment:

(Please Note: This is for primary transducer only. For dual transducer-VDC systems, proceed to item “E” of this section for start-up procedure of the 2nd transducer)

1. BMS Signal (4-20 mA, 0-10 VDC, etc.):
 - a. Turn the panel power on.
 - b. Supply a 19.9 mA (or 9.9 VDC) to the transducer.
 - c. Using the “**SPAN**” screw, adjust the output of the transducer until a gauge reading of 10 psi higher than the maximum steady water pressure is achieved (e.g., maximum steady water pressure is 50 psi, the transducer maximum should be 50 + 10 = 60 psi).
 - d. Supply a 4.2 mA (or 0.2 VDC) to the transducer.

- e. Using the **“ZERO”** screw, adjust the transducer output until the panel is turned off. This condition should be achieved once the output of the transducer is close to 21 psi. Once the system is shut off, the **“FOGGERS ON”** light will go off.
- f. Repeat steps 2 to 5 until no more adjustment is required.

Note	Description
C	90 psi Min. CDA Supply
E	Feedback Signal
J	Water Regulator Signal
K	Air Regulator Signal
Z	Pneu. Signal To Ball Valve



2. Dual Input Controller Stand Alone (Optional):

- a. Turn the panel power on.
- b. Press on the **“DISPLAY”** bottom until the **“%”** light has been lit.
- c. Press twice (quickly) on the **“AUTO/MAN”** bottom on the controller’s face plate.
- d. Using the up arrow, increase the reading to 100%.
- e. Using the **“SPAN”** screw, adjust the output of the transducer until an 80 psi gauge reading is achieved.
- f. Using the down arrow, decrease the reading to 8%.
- g. Using the **“ZERO”** screw, adjust the transducer output until the panel is turned off. This condition should be achieved once the output of the transducer is close to 21 psi. Once the system is shut off, the **“FOGGERS ON”** light will go off.
- h. Repeat steps 4 to 7 until no more adjustment is required.

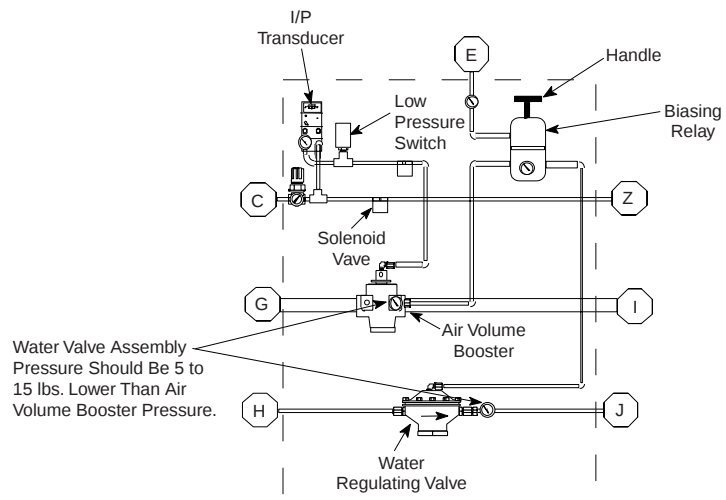
3. Single Input Controller Stand Alone (Optional):

- a. Turn the panel power on.
- b. Using a milliamp generator, provide a 19.9 mA signal to the transducer and follow general start-up procedure (refer to Section **“C”** of **GENERAL START-UP**)

D. Air-Water Differential Adjustment:

1. Supply a signal to the transducer until the air volume booster gauge reads 50 psi.
2. Observe the gauge reading on the water valve assembly. This reading should be 5 to 15 psi lower than the air volume booster's gauge reading.
3. Each system/project will have a factory recommended differential set point. If this is not evident in your Submittals please contact the Factory.
4. Adjust the differential by rotating the handle on the biasing relay: clockwise to decrease the differential or counterclockwise to increase the differential.
5. Verify that all fog is following the airflow direction. If back drafting is noticed, please refer to the troubleshooting, Section "A" TROUBLESHOOTING.

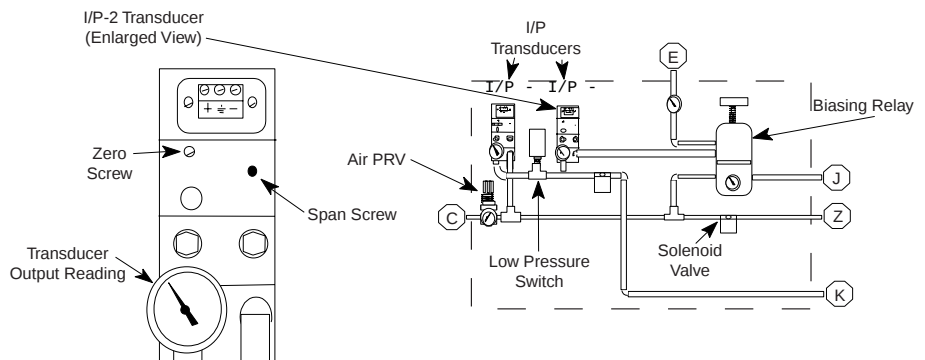
Note	Description
C	90 psi Min. CDA Supply
E	Feedback Signal
G	Air Supply to Panel
H	Water Supply to Panel
I	Air Supply to Header
J	Water Supply to Header
Z	Pneu. Signal to 3 Way Valve



E. Second Transducer Adjustment:

1. BMS Signal (4-20 mA, 0-10 VDC, etc.):
 - a. The first transducer must be already calibrated before working on the second transducer.
 - b. Supply a 16 mA (or 8 VDC) to the first transducer.
 - c. Using the "SPAN" screw, adjust the output of the second transducer until a gauge reading of 1 psi is achieved. There should be 1 psi increments until you reach 5 psi at 20 mA, or other factory specified set point.
 - d. Supply a 15 mA (or 7.5 VDC) to the first transducer.
 - e. Using the "ZERO" screw, adjust the second transducer until a gauge reading of 0 psi is achieved. Repeat steps 2 to 5 until no more adjustment is required.

Note	Description
C	90 psi Min. CDA Supply
E	Feedback Signal
J	Water Regulator Signal
K	Air Regulator Signal
Z	Pneu. Signal To Ball Valve



General Maintenance

A. Fogger assemblies and Fogger Manifold Bar(s):

1. Verify that the fog is following the airflow direction.
2. Verify the resonator face and the fogger head orifice are on the same line.
3. Verify that the air-water differential is correct (see **General Start-up Procedure, section D**).
4. Verify that both air and water pressures are stable.

B. Control Panel:

1. Verify that the air-water differential is maintained at the factory recommended set point (water lower than air pressure).
2. Replace any or all burned-out light bulbs and malfunctioning gauges.
3. Verify the calibration of the transducer (see **General Start-up Procedure, section C**).
4. For stand alone units only: verify the accuracy of the sensors.

C. Water Valve Assembly (If Applicable):

1. Verify that the drain is clear of debris.
2. Verify that the air-water differential is maintained at the factory recommended set point (water lower than air pressure).

Troubleshooting

A. Fog is Backdrafting on one or some Fogger Assemblies:

1. Hold the resonator and loosen the holding setscrew.
2. Slowly move the resonator (small increments) away from the fogger head.
3. Tighten the setscrew.
4. Verify fog is not backdrafting.
5. Repeat steps 1 to 4 until the back drafting has completely disappeared.

B. Only Air Comes Out of One or Some Fogger Assemblies:

1. Run the humidifier at full capacity (100%).
2. Check fogger heads for fog..
3. If no fog is appearing from the fogger assembly, turn the control panel off.
4. Disconnect and clean the fogger head as described in troubleshooting, section III.A.6.
5. Before reinstalling the fogger head, turn the panel power on and run the unit at full capacity (100%, **only for a few seconds**). This is to flush any debris in the water line.
6. Turn off the unit (power off).
7. Reinstall the fogger head.
8. Turn the panel power on.

C. Only Water Comes Out of One or Some Fogger Assemblies:

1. Run the humidifier at full capacity (100%).
2. Check fogger heads for fog.
3. If only water is appearing from the fogger assembly, turn the control panel off.
4. Disconnect and clean the fogger head as described in troubleshooting, section III.A.6.
5. Before reinstalling the fogger head, turn the panel power on and run the unit at full capacity (100%, **only for a few seconds**). This is to flush any debris in the airline.

6. Turn off the unit (power off).
7. Reinstall the fogger head.
8. Turn the panel power on.

D. Only Air Comes Out of One or Some Fogger Manifold Bar(s):

1. Verify that all water shut off valves to fogger manifold bar(s) are open.
2. Verify that the water line is free of debris. Flush water lines to free them from any debris.
3. If water valve assemblies are present, verify that water is passing through these valves. If not, refer to Section **J of TROUBLESHOOTING**.

E. Only Water Comes Out of One or Some Fogger Manifold Bar(s):

1. Verify that all air shut off valves to fogger manifold bar(s) are open.
2. Verify that the airline is free of debris. Flush airlines to free them from any debris.

F. Fogger Head (Removal of Debris) Cleaning:

1. Remove the resonator.
2. Remove compression fittings.
3. Remove the male connector from the back of the fogger head.
4. Remove sealing gland, orifice and slip seal.
5. Flush the fogger head and orifice with compressed air.
6. Place the slip seal back on the orifice and insert in the fogger head.
7. Place the sealing gland back in the fogger head.
8. Reinstall the male connector.
9. Reassemble the fogger head.
10. Reinstall the resonator (see **GENERAL START-UP** procedure, Section **B**).

G. Fog is too Wet or too much Compressed Air is Consumed:

1. Verify that the differential between air and water is 10 to 15 psi.
2. If not, refer to general start-up procedure for adjustment procedure.

H. One or Some Foggers have Water Dripping From Orifice/Head Joints:

1. Turn the panel power off.
2. Remove compression fittings.
3. Tighten male connector in the back of the fogger head (air inlet).
4. Reinstall the fogger head and attach the compression fittings.
5. Turn the panel power on and run the unit for a few minutes.
6. Verify fogger head. If problem persists, repeat steps 1 to 5.

I. Fogger Output at 100% Call has Diminished:

1. Verify air-water differential.
2. Check air and water pressures.
3. Adjust differential to Armstrong-Cool Fog's recommendations.
4. Contact Armstrong-Cool Fog.

J. One or Some Water Valve Assemblies are Always Fully Open:

1. For Brass Water Valves Only:
 - a. Verify the water pressure gauges are operational. Replace as needed.
 - b. If the problem persists, close the water shut off valve.
 - c. Remove the base of the water valve.
 - d. Remove the spring and stem.
 - e. Flush water for a few seconds (to clean the line of any debris).
 - f. Reinstall stem and spring and close the base of the water valve.
 - g. Open the water shut off valve.

- h. If the problem persists, close the water shut off valve and remove the water valve dome
- i. If the diaphragm is very rigid and/or water leaks through it, contact Armstrong-Cool Fog for a repair kit to replace the diaphragm.

2. For Stainless Steel Water Valves Only:

- a. Verify the water pressure gauge is operational. Replace as needed.
- b. If the problem persists, contact Armstrong-Cool Fog as soon as possible.

K. One or Some Water Valve Assemblies are Always Fully Closed:

- 1. Verify that all water shut off valves are fully open.
- 2. Verify the water pressure gauges are operational. Replace as needed.
- 3. If the problem persists, verify that the signal sent to the water valve from the control panel reaches the valve.
- 4. Verify that the water and signal lines are free of debris.
- 5. If the problem persists, contact Armstrong-Cool Fog as soon as possible.

L. All Water Valves are Always Fully Open:

- 1. Verify the water pressure gauges are operational. Replace as needed.
- 2. If the problem persists, verify that the signal line to the water valves and to the 3-way pneumatic ball valves are not installed in reverse. Verify submittal drawings.
- 3. Repeat troubleshooting, Section **J of TROUBLESHOOTING**.
- 4. If problem persists, contact Armstrong-Cool Fog as soon as possible.

M. All Water Valves are Always Fully Closed:

- 1. Verify that all water shut off valves are fully open.
- 2. Verify the water pressure gauges are operational. Replace as needed.
- 3. If the problem persists, verify that the signal sent to the water valve from the control panel reaches the valve.
- 4. Verify that the water and signal lines are free of debris.
- 5. If the problem persists, contact Armstrong-Cool Fog as soon as possible.

N. Some or All Drain Valves (Pneumatic Ball Type) do not Actuate:

- 1. Verify that the signal sent by the control panel reaches the ball valve.
- 2. Verify that all signal lines are free of debris.
- 3. If the problem persists, contact Armstrong-Cool Fog as soon as possible.

O. Some or All Electrical Solenoids (If Applicable) do not Actuate:

- 1. Verify that all solenoids are grounded (not short).
- 2. Verify that electrical signal is sent to the solenoids.
- 3. Verify that all water lines are free of debris.
- 4. If the problem persists, contact Armstrong-Cool Fog as soon as possible.

P. Control Panel does not Shut-Off at 0% Signal:

- 1. Verify that the DDC signal is 4 mA (0 VDC).
- 2. Verify that the compressed air pressure is 90 psi.
- 3. If compressed air is not adequate, increase the pressure until 90 psi is reached.
- 4. Otherwise, if transducer output gauge reading is above 21 psi, adjust the transducer (see **GENERAL START-UP procedure, Section C**).

Q. System Does Not Peak at 100% Signal:

- 1. Verify that the DDC signal is 20 mA (10 VDC).
- 2. Verify that the compressed air pressure is 90 psi.
- 3. If compressed air is not adequate, increase the pressure until 90 psi is reached.
- 4. Otherwise, adjust the transducer (see **GENERAL START-UP procedure, Section C**).

R. Air Escapes From Air Valve's Relief Port:

1. Close the air shut off valve.
2. Remove the base of the air valve.
3. Remove, clean and grease the stem and spring.
4. Flush air to remove debris from the air line (all lines should be clear of debris).