



00 TITLE PAGE & TABLE OF CONTENTS

FanMist

INSTALLATION & SPECIFICATIONS



This handbook provides step-by-step guidance for the professional installation of the FanMist Humidity Control System, from pump station placement through system startup — prepared in accordance with applicable U.S. industrial standards.

Designed for qualified installation professionals: licensed mechanical contractors and licensed electrical & plumbing technicians with technical support from Industrial Humidity Control LLC.

Requires a licensed contractor for all water and electrical connections. Maximum system operating pressure: 1000-psi.

CONTENTS

01 Safety & Warranty	2	08 Ball Valve Assembly	16
02 Overview	3	09 Mist-Ring & Nozzles	17-18
03 Pre-Installation Planning	4	10 Drain Line	19-20
04 Pump Placement – Electrical	5-6	11 Humidistat	21-22
05 Fan Mounting – Positioning	7-9	12 Water Treatment	23
06 High Pressure Tube – Fittings	10-14	13 Flushing Procedure	24-25
07 Drop Down Tube to Fans	15	14 System Startup	26



01 SAFETY & WARRANTY

Safety – The Practice of Prevention

LOCKOUT / TAGOUT (LOTO)

Always follow lockout/tagout procedures in accordance with OSHA 1910.147 before servicing any equipment. This includes isolating all hazardous energy sources (electrical, mechanical, hydraulic, pneumatic, chemical, or thermal), applying personal locks and tags, and verifying isolation before beginning work.

General Safety Requirements

- Read and follow all equipment labels, warnings, and instructions.
- Comply with all applicable local, state, and national codes and regulations.
- Use a licensed contractor for all water and electrical connections.
- Wear appropriate personal protective equipment (PPE) during installation and service work.
- Perform all recommended periodic maintenance.
- Maximum system operating pressure: 1000-psi.

FanMist Warranty

5 YEARS Pump Warranty

2 YEARS All Other Components

The warranty does not cover components subject to normal wear and tear or damage resulting from misuse, abuse, improper installation, or unauthorized modifications.

Repairs Outside the Scope of the Warranty

The following are not covered under warranty:

- Problems caused by improper maintenance, faulty installation, or unauthorized modifications.
- Shipping costs for returns or replacements.

Warranty Claims

If a defect in materials or workmanship is confirmed during the warranty period, IHC or the authorized vendor will repair or replace the affected component. IHC will first attempt to troubleshoot the issue with your maintenance team to provide the fastest possible resolution.

IHC and the vendor are not responsible for removal, reinstallation, or shipping costs, nor for any incidental or consequential damages. Liability is limited to the purchase price of the equipment.



02 OVERVIEW

FanMist System Overview

The FanMist System combines 1000-psi atomized water with 10,000 CFM high-velocity fan air to create a fine mist plume that evaporates rapidly above plant equipment and workspaces. The Pump Station PLC automatically controls the integrated pump and fan operation based on a humidistat RH% set-point located in the most representative area of the plant.

FACTORY PLC SETTINGS (PRESET & ADJUSTABLE)

- **High-Pressure Safety (HPS):** Pump stops and triggers a red fault light if it fails to reach 550 psi within 25 seconds. Manual restart required.
- **Pump/Fan Delay:** Fans start 10 seconds before the pump. On shutdown, the pump stops first; fans continue for 10 seconds to clear remaining mist.

10 MIN ON / 10 MIN OFF Pump/Fan Operating Cycle

1,500–2000 HRS Average Seasonal Runtime (Oct 15 – Apr 15)

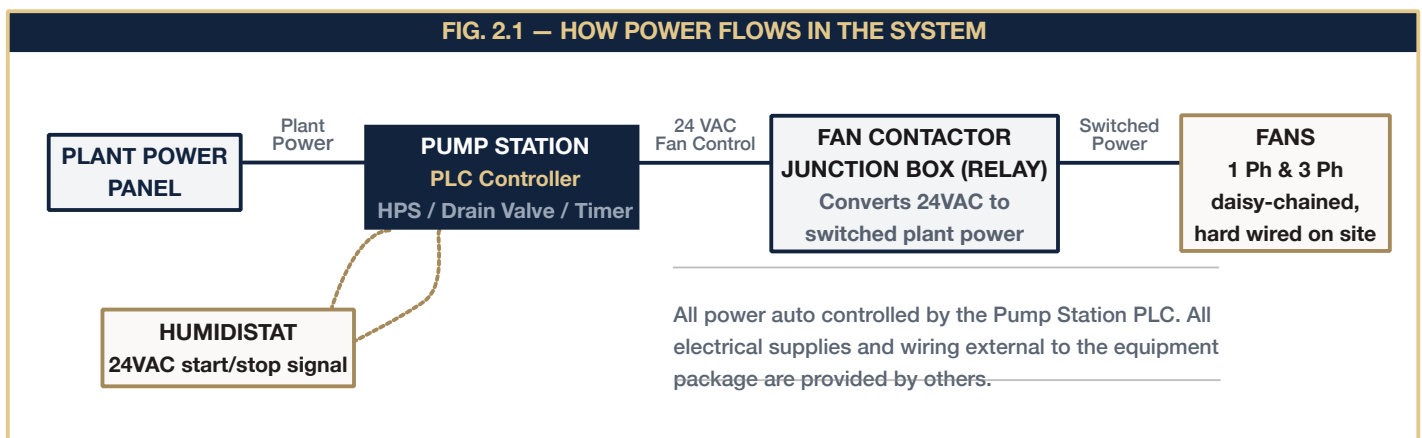
Core System Components

Stainless-Steel Nozzles — Nozzles open and close mechanically at 300 psi for rapid evaporation and instant closing. When the pump stops, the electric drain valve opens, depressurizing the system — instantly closing the nozzles — draining approximately 1/4 gallon of water.

Mist-Rings w/ Nozzles — Mounted on the face of the fans positioned throughout the plant.

High-Pressure Tube — Delivers 1000-psi water to all misting fans. Tubing using all Slip-Lok fitting connections,

FIG. 2.1 — HOW POWER FLOWS IN THE SYSTEM





03 PRE-INSTALLATION PLANNING

Site Assessment

Site Planning

Confirm specific requirements for the pump station, fans and humidistat and all planned equipment locations are compatible with the physical plant layout and site conditions.

Verify Equipment

Check and unpack all ordered equipment and confirm all equipment is on site ready for installation.

A complete equipment list with part numbers and descriptions is provided in the FanMist User Manual supplied with each project in order to cross reference what is delivered with what should be delivered as specified in the original quotation.

Verify Electrical Requirements

Identify equipment electrical requirements with available plant power supply locations. Verify plant power supply is matched correctly to the power requirements of the equipment to be installed.

Installation Workflow

ORDER OF INSTALLATION (RECOMMENDED ROUGH-IN SEQUENCE — ORDER MAY VARY)

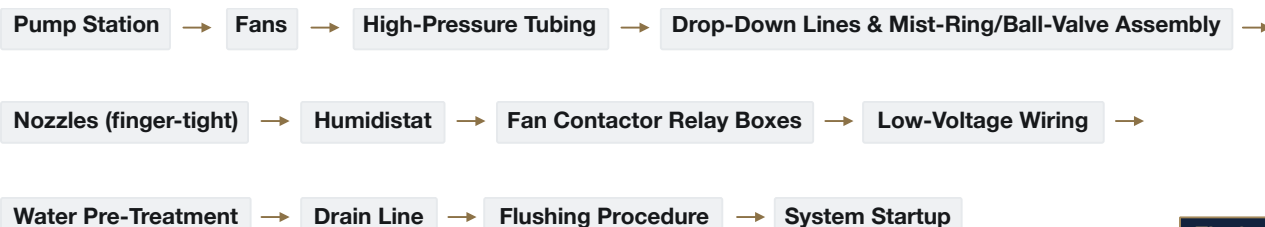


Fig 3.1

ADDITIONAL SUPPLIES (SUPPLIED BY OTHERS)

- Scissor lift or comparable lifting equipment for hanging fans and routing all high-pressure tube in the ceiling area from the pump station to the fans.
- Nylon-specific tube cutters (3/8" and 1/2"). Clean, straight, unfrayed cuts are essential for secure, leak-free Slip-Lok connections.
- Zip ties — 14–24" for main tube runs and drop-down lines; 4" ties for Mist-Rings secured to the fan face guard)
- 3/8" clear plastic tubing for the flushing procedure (see Procedures section).
- Vinyl steel-braided safety cable for fans, per local codes — generally not required but confirm locally.
- Bladder/expansion tank, if needed for drain line routing (see Drain Line section).
- Fan relay contactor boxes.



04 PUMP PLACEMENT – ELECTRICAL

SECTION PAGE
1 OF 2

Pump Station Specifications

1. **High-pressure pump** — Ranges from .1 gpm – 3.8 gpm
2. **Motor** — Ranges from 0.25 hp to 3.5 hp (with pulley drive)
3. **Electrical** — Available in single-phase or three-phase configurations
4. **PLC Controller** — Manages all pump and fan operations and system settings
5. **Electric Drain Valve (EDV)** — Releases line pressure to allow mechanical closing of nozzles
6. **Fuse protection** — Protects against power surges and spikes
7. **Unloader valve** — Maintains consistent 1000-psi system pressure (pressure regulator and bypass)
8. **Indicator lights and hour meter** — Provide visual status and runtime tracking
9. **High-pressure switch (HPS)** — Monitors system pressure and shuts down on sudden pressure loss
10. **Thermal relief valve** — Activates if water temperature exceeds 145°F
11. **24 VAC transformer** — Supplies power for humidistat and fan control
12. **Fan manual override toggle switch** — Allows independent testing of fans
13. **5 micron water supply prefilter** — Protects the pump and nozzles from debris
14. **Low-pressure inlet solenoid valve** — Maintains proper water volume and pressure to the pump
15. **Pump high-pressure output gauge** — Displays system pressure (mounted outside the enclosure)

Locating the Pump Station

The pump station should be installed in a climate-controlled mechanical room whenever possible. The ideal location is close to the area being humidified and should have: 1) Easy access to plant power & water supply; 2) Access to floor drainage; 3) Adequate working space.

24 – 30 Inches Minimum Clear Access
Space (Front & Sides)

37"L x 20"W x 48"H Footprint, Including
Pump Stand

CRITICAL REQUIREMENT — DRAIN LINE ROUTING

The pump drain line must be routed upward to a point at least 3 inches higher than the highest nozzle in the system. This prevents water from draining out of the high-pressure lines when the system is off. After reaching the high point, the drain line can be routed downward to a floor drain, bladder tank, or water treatment storage tank.

Installation Notes

- Install the pump station on a level surface.
- Complete all power wiring and strain relief connections before final positioning.
- Ensure the enclosure remains accessible for future maintenance and service.

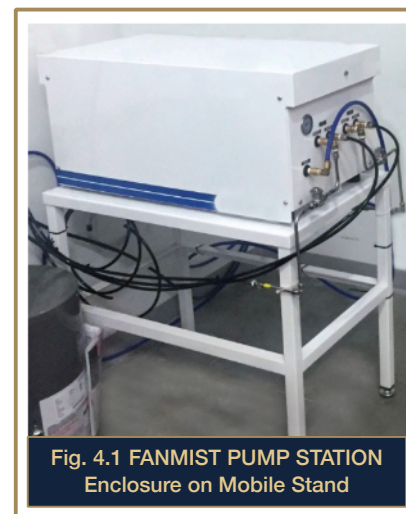


Fig. 4.1 FANMIST PUMP STATION
Enclosure on Mobile Stand



04 PUMP PLACEMENT – ELECTRICAL

SECTION PAGE
2 OF 2

Pump Controls

All FanMist system electrical power is controlled from the Pump Omron PLC located in the electrical portion of the pump enclosure. All settings are pre-programmed at the factory and can be reset. The PLC displays the startup sequence (see FanMist Manual Supplement).

PLC Primary Controls

25-SECOND PUMP PRESSURE-BUILD TIMER

Pump ON — must pressurize to 550 psi within 25 seconds or faults OFF.

10-SECOND FAN/PUMP DELAY

- **Fans ON:** Immediately when the humidistat start signal is received at the PLC.
- **Pump ON:** 10-second delay after the fans turn ON.
- **Pump OFF:** Immediately when the humidistat stop signal is received at the PLC.
- **Fans OFF:** 10-second delay after the pump turns OFF.



Fig. 4.2 OMRON PLC CONTROLLER
Located inside the Enclosure

Pump Station Wiring

Wiring provided by others.

Three-phase pumps require hard wiring from plant power supply. Single phase pumps include a three prong power cord – power supply with dedicated 20 amp breaker.

Wiring connections completed on site – all connection points labeled at the required terminal blocks. Strain reliefs (interior & exterior) provided for all wiring connections (helpful to unfasten the hardware holding the electrical panel and lay the panel flat for all final connections).

Pump Enclosure Access

Use three 1/4-20 pan head screws accessed from the lower side of the electrical panel (Phillips head screwdriver). Medium enclosures use two 1/4-20 hex head cap screws accessed from the bottom of the electrical panel (7/16 wrench).

All 24 VAC cable is provided by others.



Fig. 4.3 EXTERIOR STRAIN RELIEFS
FAN CONTROL / HUMIDISTAT



05 FAN MOUNTING – POSITIONING

SECTION PAGE
1 OF 3

Fan Specifications

PART #	DIA.	HP	PH	VOLTS	AMP	CFM
VBS36A	36"	1/2	1	115/230	6.2/3.1	10,050
VBS36CF	36"	1/2	3	230/460	3.1/1.5	10,000
VBS24A	24"	1/2	1	115/230	4.8/2.4	5,250
VBS243A	24"	1/2	1	230/460	2.6/1.3	5,470

Mounting Brackets

- VRSBR6-HDG (30" bracket for 36" diameter fan).
- VRSBR5-HDG (24" bracket for 24" diameter fan).

TABLE: EVAPORATION RATE (ER)

For Standard Sized (4' dia. X 22') Moisture Plume Output/Fan

FAN / MIST-RING & NOZZLE	CFM	LBS/HR/FAN	ER (CFM PER 1 LB _w)
36" Fan (MR27-14 w/ 7.94N)	10,050	111.16	90
36" Fan (MR24-12 w/ 7.94N)	10,050	95.28	105
24" Fan (MR18-8 w/ 7.94N)	5,470	63.52	86
36" Fan (MR15-6 w/ 7.94N)	5,470	47.64	115

Ideal Evaporation Rate (ER) = 80 CFM per 1 lb water, or higher.

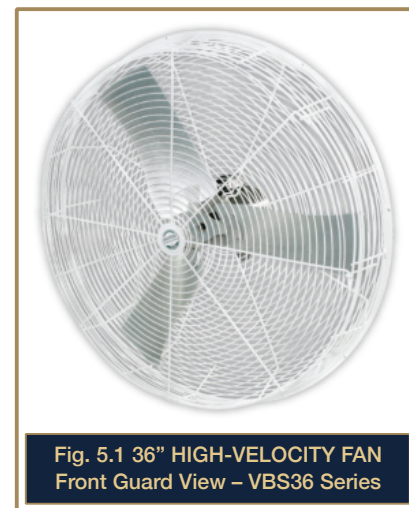


Fig. 5.1 36" HIGH-VELOCITY FAN
Front Guard View – VBS36 Series

Fan Mounting and Positioning

- Fans are mounted 10–15 ft above floor level on walls, columns, or hung from the ceiling where access allows quick and easy access for installation and maintenance.
- Allow moisture plumes directed into obstacle free air space with 4' diameter x 22' for complete accelerated evaporation.
- Fans pointing out over aiseways are ideal locations and most common locations for fans.
- Included mounting bracket may require further fabrication depending on the selected mounting location — see next page for example of center drilling hole for ceiling hung application.



Fig. 5.2 FAN WITH INCLUDED BRACKET
Generally mounted over aiseways



05 FAN MOUNTING – POSITIONING

SECTION PAGE
2 OF 3

Strategic Fan Placement

Locate fans in consideration of the plant's indoor mechanical air movement patterns. For best humidity migration, position fan moisture plumes upstream within the natural airflow so the atomized moisture travels downstream with the mechanically controlled air toward exhaust locations. This placement maximizes the hang time of the humidity before it is exhausted or diluted by infiltration of outside air.

Moisture Plume Positioning Guidelines

Position fan moisture plume (4-foot diameter × 22-foot- long) pointing in unobstructed airspace for full evaporation. Direct the mist plumes into ceiling areas with the least amount of product or equipment below — generally over aislesways

Humidity quickly equalizes throughout the entire space per Dalton's Law of Partial Pressures and Fick's Law of Diffusion.

Fan Bracket Preparation & Ceiling-Hung Mounting

Pre-Drill a 5/8" Center Hole in the Bracket Mounting Plate

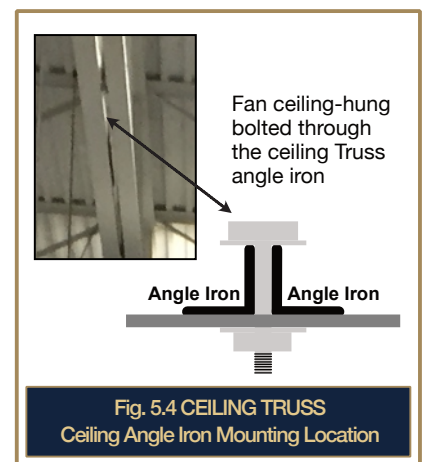
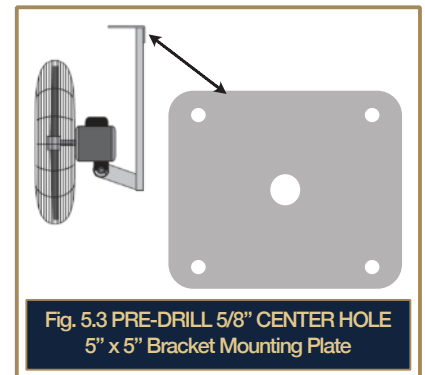
Fans mounted with the standard 30" bracket generally require a 5/8" drilled center hole to position and rotate fans to desired positioning angle (drilled hole by others).

*Remove the 2 drain plugs at the bottom of the motor to allow internal moisture drainage. Do **not** remove the plugs on the top side of the motor.*

Ceiling-Hung Mounting (Truss Angle Iron)

- 1 Align the Bracket**
Align the open center channel of the angle iron with the slotted holes in the fan bracket.
- 2 Hand-Tighten & Aim**
Insert a single 1/2" hex bolt with flat washer and lock nut through the bracket slot and the open center of the angle iron. Hand-tighten, then adjust the fan to the desired plume angle.
- 3 Fully Tighten**
Once aimed correctly, fully tighten the bolt and nut. Recommended hardware: 1/2" x 2 1/2" Grade 5+ hex bolt, 1/2" flat washer, 1/2" lock nut (not supplied with the fan).

Wall-Mount installation: point the fan at a minimum 30° angle, allowing 2' of clear air space between the fan and the wall.





05 FAN MOUNTING – POSITIONING

SECTION PAGE
3 OF 3

Power Supply to the Fan

All fans are hard-wired on site (no power cord is supplied with the fan).

Wiring Requirements

- Install a dedicated local On/Off fan switch to allow independent control of each fan during routine maintenance or service.
- Route the supply wiring to the fan motor with a drip loop to direct any accumulated condensation away from the motor housing.
- Connect the power supply according to the voltage, phase, and amperage shown on the motor nameplate.
- Use proper strain reliefs and follow all applicable local electrical codes.
- All controls to the fan are wired with low-voltage cable from the pump station routed to the contactor/relay boxes and perform the On/Off function of all fans in the system.



Fig. 5.5 LOCAL DISCONNECT SWITCH
Mounted to Structural Beam

Pre-Start Fan Testing & Remote Relay

Pre-Start Fan Testing

- Before final connection, pre-test the fan for correct rotation using the manual fan override toggle switch located on the Pump Station.
- After permanent wiring is complete, verify correct fan rotation direction again with the manual override toggle switch.

PRE-CHECKING FAN ROTATION IS CRITICAL

If the fan rotates backward, swap any two phase wires on the three-phase motors. Single phase motors cannot be reversed.



Fig. 5.6 RIB2401B RELAY
Remote Fan Contactor Box

Fans Powered with Remote Relay Switch Box

The FanMist Pump Station controls fan operation through a remote junction box (relay switch) containing a contactor for connecting plant power to the fans.

The 24 VAC control signal for the fan contactor coil must be inserted through the strain relief marked “Fan Control” on the Pump Station and connected to the labeled contact points inside the pump. The same 24 VAC signal must also be wired into the 24 VAC contact points inside the remote relay switch (junction) boxes (provided by others).



06 HIGH-PRESSURE TUBE – FITTINGS

SECTION PAGE
1 OF 5

Tube Specifications

1/2" HIGH-PRESSURE TUBE

Material — Black Nylon (Polyamide 12), semi-flexible, plasticized, heat stabilized
OD: .500" (+/- .004) **ID:** .375" (+/- .004") **Wall:** .062" (+/- .004")

Part #	Description
90550	500' Coil (Dimensions 24" x 24" x 12" – Weight 30 lbs)
90551	100' Coil
92680	1/2" Black Vinyl Coated Steel Wall Clamp

3/8" HIGH-PRESSURE TUBE

Material — Black Nylon (Polyamide 12), semi-flexible, plasticized, heat stabilized
OD: .375" (+/- .004) **ID:** .275" (+/- .004") **Wall:** .050" (+/- .004")

Part #	Description
93072	500' Coil (Dimensions 24" x 24" x 12" – Weight 30 lbs)
90063	100' Coil
92700	50' Coil
90025	25' Coil
92714	3/8" Black Vinyl Coated Steel Wall Clamp



Fig. 6.1 FANMIST HIGH-PRESSURE TUBE
500' Coil, Black Nylon (Polyamide 12)



Fig. 6.2 TUBING WALL CLAMP
3/8" & 1/2" Black Vinyl Coated Steel

Description of the FanMist High-Pressure Tubing System

The use of high-pressure flexible tubing is a deliberate industry-standard choice for optimized performance with fan misting systems. The key reasons are listed:

- Ease and speed of installation.** Flexible tube bends easily around corners with no special bending tools and can be cut to exact lengths on-site with simple tube cutters.
- Quick connect Slip-Lok fittings** for leak-free – minimal-tool assembly for ultimate convenience and versatility.
- Pressure rating and safety margin** for 1000-psi operation utilizes a 2500-2800 psi burst rating range for long-term applications.
- Corrosion resistance,** lightweight and low maintenance for the utility of long-term use.
- Cost-effectiveness and scalability** of tubing coils for large-scale installations.
- Pressure-preserving line design,** transitioning from 1/2" tube at the pump station to 3/8" tube to all fans in the system



Planning Tubing Runs from the Pump Station to All Fans

All FanMist high-pressure lines begin with 200-250' of 1/2" tube which reduces to 3/8" tube runs to the fans. 1/2" Tubing begins the high-pressure line from the pump outlet Slip-Lok 90° Swivel Elbow (part #'s 94131 or 94132).

Route the 1/2" tube directly to the ceiling area making a 90° bend to form a sweep or using a 90° elbow, then out to the Slip-Lok Three Way (part # 95704). The 1/2" tube will end at either a 1/2" Three Way Tee, splitting into two 1/2" (short) legs, reducing to 3/8" legs with Transition Fittings (part #'s 92854 & 92709).



Fig. 6.2
PUMP OUTLET
FITTING
1/2" Slip-Lok
90° Swivel Elbow

Tubing Transition Diagram

Fig. 6.3 TRANSITION FITTINGS
1/2" Tubing Transition from the Pump
Station to 3/8" Tube out to the Fans

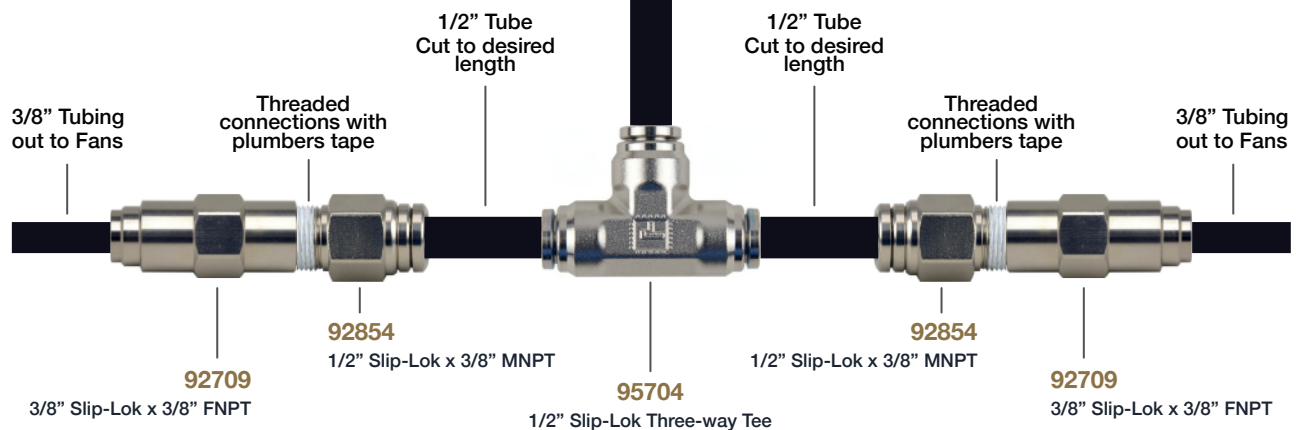


Diagram Notes

Shows the 1/2" Tubing from the Pump Station outlet routed to the 1/2" three-way tee, then dividing into two 1/2" short legs to the transition fittings, reducing to 3/8" tubing runs to the fans.

The positioning of the 1/2" three way tee shown is an example only — the tee can be oriented to allow the legs to run in the direction required.

If the transition is directly reducing to one 3/8" leg, the three way tee is not required — route directly to the transition fittings.

Utilize the 1/2" tube provided in the equipment package as fully as possible to either the three way tee or directly to the transition fittings.

All threaded connections to be completed with plumber's tape.



Preparing High-Pressure Tube

1 Techniques for Uncoiling – Handling the Strong Coil Memory

Unroll the coil fully in a straight line (or large figure-eight on the floor) and let it relax. Warm it up or lay it in the sun for a day or overnight before working with it. The 500' rolls (15" x 15" x 15" coil for 3/8", 24" x 24" x 12" for 1/2") have significant memory — giving them time to relax makes routing far easier and reduces kinking.

2 Work in Manageable Sections

Unroll only the length you need for the current run. Attach to fixtures or columns with zip ties every ten feet. One person works behind zip-tying while the lead person pulls the line taut and straightens it progressively. Tip for long runs: temporarily route the tubing through a straight length of larger conduit or PVC pipe to force it straight as you pull it through.

3 Avoid Cuts in the Line — Especially Around Corners

Instead, bend the tube to make a smooth sweep. Carefully plan tube runs to use Slip-Lok fittings as little as possible. Start with 1/2" tubing from the pump outlet to transition fittings, then step down to 3/8" for the final runs to fans. This preserves maximum line pressure to the last fan and keeps the system streamlined and watertight.

4 Preparing the Cut Edge

Always cut the tube with a Tubing Cutter designed for Nylon to maintain a straight, even cut. Lightly ease (deburr) the cut edge with a file or sandpaper before inserting into the quick-connect fittings.

IMPORTANT

Just a slight scratch on the tube end can damage the internal O-ring seal within the Slip-Lok fitting, causing a leak. O-rings are replaceable if needed.

5 Installing Tube to Walls and Ceiling Structures

The tube can be fixed to walls with the included vinyl-coated wall screw-type clamps (Part #'s 92714 & 92680) and/or run in the ceiling areas using zip ties every ten feet, attaching to ceiling trusses or other available ceiling support fixtures. 3/8" and 1/2" Vinyl Clamps are supplied in each FanMist equipment Parts and Maintenance Pak (zip ties are not supplied and must be provided by the installer).



Slip-Lok Fittings

Slip-Lok fittings are push-to-connect connectors designed for high-pressure nylon tubing. They enable fast, tool-free installation and easy service or reconfiguration. Limit the number of fittings used and always make straight, clean cuts before inserting tubing. Stainless steel or brass compression fittings may be used as an alternative.

Installing & Removing Tubing

To install: After cutting the tube, ensure the end is smooth and free of burrs. Push the tube straight into the Slip-Lok collar until it bottoms out against the internal stop. Tug firmly backward to engage the locking ferrule. The oversized internal O-ring will compress to create a leak-proof 1000-psi seal.

To remove: Place an open-end wrench against the outer collar and push the collar inward to release the ferrule. While holding the collar depressed, pull the tubing straight out. The fitting and O-rings can then be inspected and reused.

Replacing the Primary O-ring

The primary O-ring provides the watertight seal. It can become damaged over time by the internal ferrule teeth, resulting in leaks.

1. Pull the collar straight off the fitting body using a small flat screwdriver if needed for leverage.
2. Reach inside and carefully remove the old O-ring with a paperclip or small pick.
3. Insert the new O-ring into the groove, ensuring it seats evenly.
4. Slide the collar back onto the fitting until it snaps into place.
5. Re-insert the tubing fully until it bottoms out, then tug back firmly to lock.



Fig. 6.4 REPLACING THE O-RING
Slip-Lok Primary O-ring

Using the Backup Urethane O-ring

The backup urethane O-ring acts as a protective buffer between the ferrule teeth and the primary O-ring. It prevents damage to the sealing O-ring and helps extend fitting life.

Installation is optional but recommended if the fitting has previously leaked. Place the urethane O-ring onto the collar so it rests between the teeth and the primary O-ring location. After installing the new primary O-ring, slide the collar back onto the fitting until it snaps into place.



Fig. 6.5 BACKUP URETHANE O-RING
O-ring (Part #'s 93070 / 93082)



06 HIGH-PRESSURE TUBE – FITTINGS

SECTION PAGE
5 OF 5

Standard FanMist Slip-Lok Fittings & Parts Reference

Reference chart of standard Slip-Lok fittings, O-rings and adapters used throughout the FanMist high-pressure tubing system.

Part #	Description
 92702 • 95702 3/8" • 1/2"	Slip-Lok Coupling — joins two lengths of the same-diameter tubing (extending a run).
 92703 • 95703 3/8" • 1/2"	Slip-Lok 90° Elbow — changes direction 90° (use sparingly – bending tube preferred).
 92704 • 95704 3/8" • 1/2"	Slip-Lok Three-Way Tee — splits or combines flow (branching to multiple run lines or drop-down line to the fan).
 92927 • 92926 3/8" • 1/2"	Slip-Lok O-ring (Primary) — creates leak-proof seal between the tube and the stainless steel fitting body.
 93070 • 93082 3/8" • 1/2"	Slip-Lok O-ring (backup) — hard urethane; sits between the ferrule teeth and the primary O-ring as a protective buffer.
 92854	1/2" Slip-Lok x 3/8" Male NPT adapter — the main transition from 1/2" tubing (from a 1/2" Slip-Lok tee) to the 3/8" branch lines that feed the fans.
 92709	3/8" Slip-Lok x 3/8" Female NPT adapter — receives the male NPT threaded end of the 92854 adapter and continues the 3/8" tubing run to the fans.
 92707	3/8" Slip-Lok x 3/8" Male NPT adapter — two are required per Mist-Ring ball valve assembly; connects to each threaded port of ball valve (#92632).
 93163	3/8" Slip-Lok x 1/8" Male NPT adapter — receives the 3/8" tubing from the 92707 adapter and threads directly into the 1/8" NPT female port.
 92632	3/8" SS Ball Valve x 3/8" Female NPT Ports — installed on the ball valve assembly connecting the drop-down tube to the fan-mounted Mist-Ring.
 92592 • 94132 + 92707	Drain / Outlet / Inlet Fitting Sets — 92592 (Drain, Brass Street Elbow), 94132 (1/2" Outlet Swivel Elbow), each paired with a 92707 Slip-Lok adapter; 92707 alone serves the 1/2" inlet water line.

All threaded connections to be completed with plumber's tape.



07 DROP-DOWN TUBE TO FANS

Routing Tube to the Fan Connection

Each fan in the FanMist system connects to the ceiling-routed high-pressure line through its own dedicated drop-down tube, terminating at a ball valve assembly connected to the fan mist-ring. This connection allows each fan's mist-ring to be isolated and serviced individually without shutting down the rest of the system.

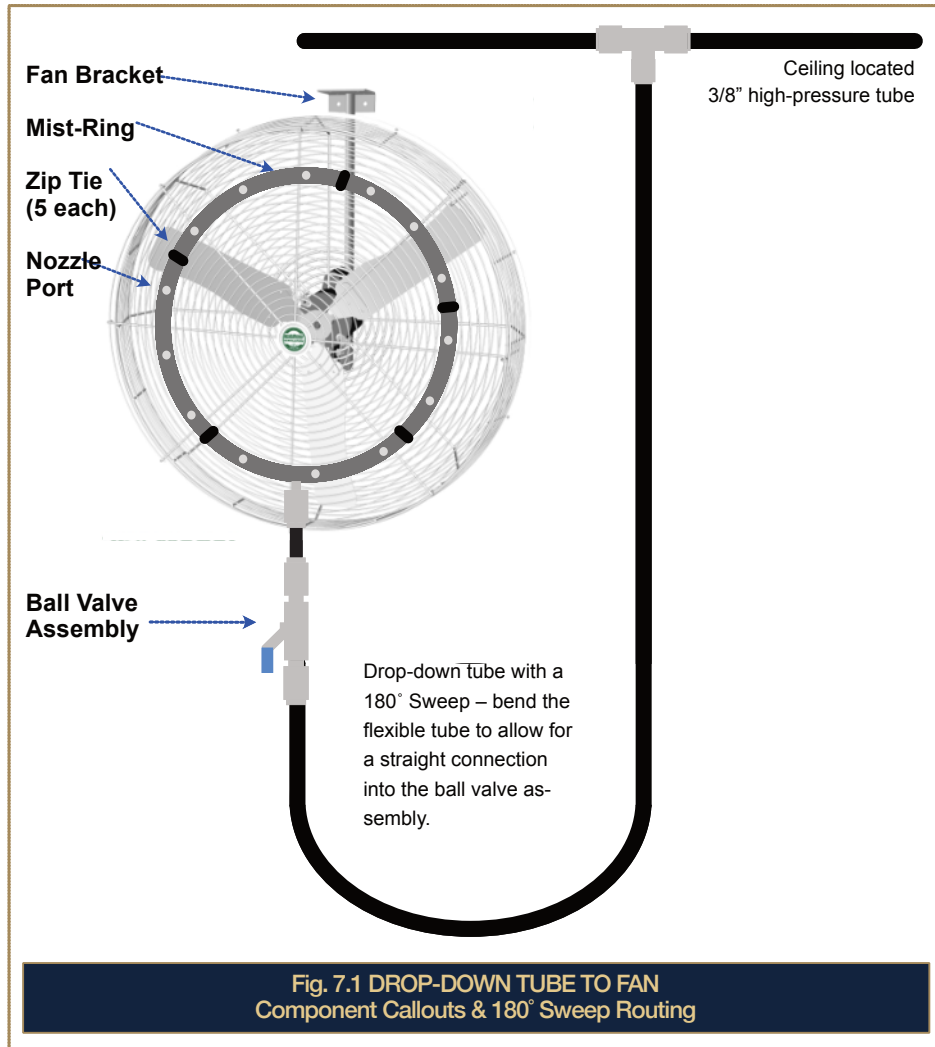


Fig. 7.1 DROP-DOWN TUBE TO FAN
Component Callouts & 180° Sweep Routing

DROP-DOWN TUBE SPECIFICATION

Material	3/8" Black Nylon high-pressure tube – same stock as the fan-run tubing (Section 06)
Length	Sized per ceiling height, plus allowance for the 180° sweep into the ball valve assembly
Support	Secured to the fan bracket or column with zip ties; no wall clamp required for short drops

Component Callouts

- **Fan Bracket** — mounts the fan to structural steel, angle iron or wall (Section 05).
- **Mist-Ring** — 3/8" stainless steel ring carrying the nozzle ports, centered on the fan face guard (Section 09).
- **Zip Tie (5 each)** — secures the Mist-Ring to the fan face guard at five points.
- **Nozzle Port** — 10/24 threaded port on the Mist-Ring receiving each nozzle (Section 09)
- **Ball Valve Assembly** — isolates water flow to this fan's Mist-Ring (Section 08).

Routing the Drop-Down Tube

The 3/8" drop-down tube for each fan begins at the ceiling-located 3/8" Slip-Lok Tee. Leave enough footage in the line to allow for a connection to the ball valve assembly with a flexible 180° bend in the tube as shown. Allow enough line for a straight connection into the ball valve assembly.

The ceiling tube at the last fan in the line does not use a Tee — instead, bend the tube with a 90° sweep to start the drop-down tube.

Uncoil and let the drop-down tube relax before routing (Section 06) to avoid kinking at the 180° sweep.

See Section 08 — Ball Valve Assembly for the fitting breakdown of this connection.

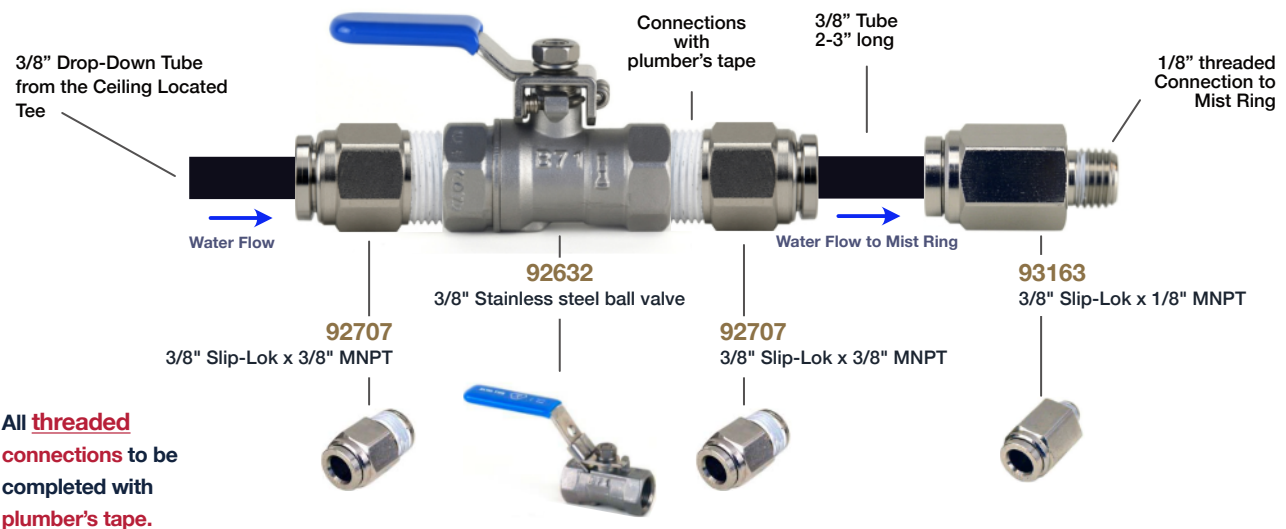


08 BALL VALVE ASSEMBLY

Completing the Drop-Down Tube Connection

The ball valve assembly connects the drop-down tube to each fan's Mist-Ring and allows water flow to be shut off at that fan independently of the rest of the system — used during the Flushing Procedure (Section 13) and for routine Mist-Ring service. Parts are shipped separately and assembled on site.

Fig. 8.1 BALL VALVE ASSEMBLY
The Components Assembled in Final Form to Complete the Drop-Down Line Connection to the Mist-Ring



Assembly Sequence

1. Ball Valve Threaded Connections: thread a 92707 adapter into each port of the 92632 ball valve using plumber's tape.
2. Thread the 93163 directly into the Mist-Ring's 1/8" NPT port using plumber's tape,
3. Insert a short length of 3/8" tube into the ball valve outlet-side 92707 collar, then join that short length into the collar of the 93163 adapter threaded into the Mist-Ring.
4. Insert the 3/8" drop-down tube from the ceiling tee into the inlet-side 92707 Slip-Lok collar — completing the drop-down line connection to the Mist-Ring.

IMPORTANT

Leave the Mist-Ring ball valve closed until directed by the Flushing Procedure (Section 13). Opening it before the system is flushed can force debris into the nozzles.



09 MIST-RING & NOZZLES

SECTION PAGE
1 OF 2

Mist-Ring

The Mist-Ring is a 3/8" diameter 304 stainless steel ring with precision-arc-welded nozzle ports, mounted to the face guard of each fan. It positions the nozzles evenly around the fan's air stream for a uniform moisture plume.

Installation Notes

- Center the Mist-Ring on the face of the fan.
- Secure with 5 zip ties (4" lengths) per fan.
- Position the Mist-Ring with the ball valve assembly at the bottom.
- Always flush Mist-Rings to clear any debris collected during installation (Section 13).

MIST-RING SIZE REFERENCE (BARE)

93704	12" diameter, 4 nozzle ports
93706	15" diameter, 6 nozzle ports
93718	18" diameter, 8 nozzle ports
93712	24" diameter, 12 nozzle ports
93711	27" diameter, 14 nozzle ports

MIST-RING WITH BALL VALVE ASSEMBLY (COMPLETE)

MR12-4	12" dia. 4 ports (93704 + Ball Valve Assembly)
MR15-6	15" dia. 6 ports (93706 + Ball Valve Assembly)
MR18-8	18" dia. 8 ports (93718 + Ball Valve Assembly)
MR24-12	24" dia. 12 ports (93712 + Ball Valve Assembly)
MR27-14	27" dia. 14 ports (93711 + Ball Valve Assembly)

Nozzles ordered separately – see Nozzles, this section



Fig. 9.1 MIST-RING INSTALLED
Secured with 5 zip ties – centered on the fan face guard

See Section 08 — The Ball Valve Assembly connects the ceiling drop-down tube on one end to the Mist-Ring port on the other, completing the high-pressure water path to each Mist-Ring secured to the face of the fan by zip ties.

Mist-Rings ship either bare or pre-paired with the parts to complete the ball valve assembly on site. Nozzles are not included with either option — order them separately per your sizing requirements.



09 MIST-RING & NOZZLES

SECTION PAGE
2 OF 2

NOZZLES

Nozzles are 303 stainless steel with ruby orifice inserts, delivering 1000-psi atomized water directly into the fan's air stream for rapid evaporation. All lbs/hr values for each nozzle are actual tested output capacity with the filters installed at 1000 psi.

NOZZLE SIZING — SPECIFICATIONS					
	Part #	Color	Orifice	Flow Rate	Output
	1.85N	Orange	0.065 mm 0.0025"	0.0037 gpm	1.85 lbs/hr
	2.64N	Black	0.085 mm 0.0033"	0.0053 gpm	2.64 lbs/hr
	3.97N	White	0.1 mm 0.0039"	0.008 gpm	3.97 lbs/hr
	5.29N	Red	0.15 mm 0.006"	0.011 gpm	5.29 lbs/hr
	7.94N	Blue	0.2 mm 0.008"	0.016 gpm	7.94 lbs/hr
	10.58N	Clear	0.3 mm 0.012"	0.021 gpm	10.58 lbs/hr



Nozzle
Cap with
"Ruby
Orifice
Insert"



Nozzle
Spring
Assembly
(300 psi
Cracking)



Anti-Drip
Body -
Bottom
Housing
10/24 UNC

Fig. 9.2 NOZZLE
(Exploded View)

Critical Construction Performance Features of the IHC Stainless Steel Nozzle

- **The Ruby Orifice Insert** — An extremely hard ultra smooth surface, precision bored, wear and mineral buildup resistant for a consistent fine and tight jet spray.
- **300-psi Cracking Pressure** — The internal spring mechanically opens and closes the nozzle at precisely a 300-psi threshold to produce a micro burst of fine water particles to maintain a high-performance atomizing regime for accelerated evaporation.
- **Seals** — NBR O-rings seat for elasticity and compression resistance performance.
- **5 Micron Filter** — Included with each nozzle on the male end of the nozzle.

INSTALLATION INSTRUCTIONS

Screw nozzles into Mist-Ring ports **finger-tight only** — over-tightening the nozzle can squeeze and rupture the O-Ring — do not use pliers or wrenches — the 5-micron filter remains installed (do not mistake filter as packaging).

MAINTENANCE & CLEANING PROCEDURE

Nozzles are easily disassembled for cleaning — unscrew nozzle cap — remove spring assembly — soak all pieces in a 50/50 warm water and vinegar solution, OR soak in Works™ toilet bowl cleaner for 1 minute — rinse — reassemble.



10 DRAIN LINE

SECTION PAGE
1 OF 2

Drain Line and the Electric Drain Valve (EDV)

The drain line is the discharge path for the Electric Drain Valve (EDV) — a Danfoss 2/2-way stainless steel solenoid valve (IHC Part #95001) mounted on the pump station's high-pressure manifold, immediately downstream of the pump discharge, and configured Normally Open (NO). The drain line and the EDV function as a single system: the valve is the switch, the drain line is the path that the switch depressurizes through. Neither performs its safety role without the other.

ENERGIZED — Pump Running

PLC holds the EDV coil ON, keeping the Normally-Open valve forced **CLOSED**. This lets the system build and hold 1000 psi for effective atomization.

DE-ENERGIZED — Shutdown or Power Loss

Coil OFF (pump stop, humidistat satisfied, or a power loss) — the valve fails open automatically. The drain line carries off ~1/4 gallon, pressure drops below 300 psi, and the nozzles close mechanically.

Critical Requirement — Ceiling Loop

Route the drain line into the ceiling and loop it 3" higher than the highest point in the high-pressure tubing before descending to its final destination. This loop prevents the gravity draining of all the water out of the lines — only the EDV's 1/4 gallon release is lost — keeping water in the lines for a more robust atomization on restart.

Routing Options for the Drain Line

- To a floor drain (traditional method)** — up into the ceiling, loop 3" above the highest line point, back down to the nearest floor drain. Simplest option when a drain is available.
- To a bladder (expansion tank)** — reclaims the EDV's release back into the pump's low-pressure supply via two one-way check valves, instead of sending it to waste. See Fig 10.5.
- To the RO storage tank** — routes directly into a Reverse Osmosis / water treatment storage tank, reclaiming the water for reuse in treatment.

EDV & DRAIN LINE SPECIFICATION

EDV Model	Danfoss EV220BSS (IHC #95001)
Configuration	Normally Open (NO), 2/2-way
Energized (Running)	Coil ON → Valve Closed
De-Energized (Stop/Loss)	Coil OFF → Valve Opens (fail-safe)
EDV Release Volume	~1/4 gallon per cycle
Nozzle Closing Pressure	300 psi
Minimum Ceiling Loop Height	3" above highest tube point

DRAIN



Fig. 10.1 DRAIN LINE CONNECTION
Located on the Front of the Pump Enclosure



Fig. 10.2 DANFOSS 2/2-WAY EDV
IHC Part #95001



Fig. 10.3 EDV LOCATION
Mounted on the Pump Output Line

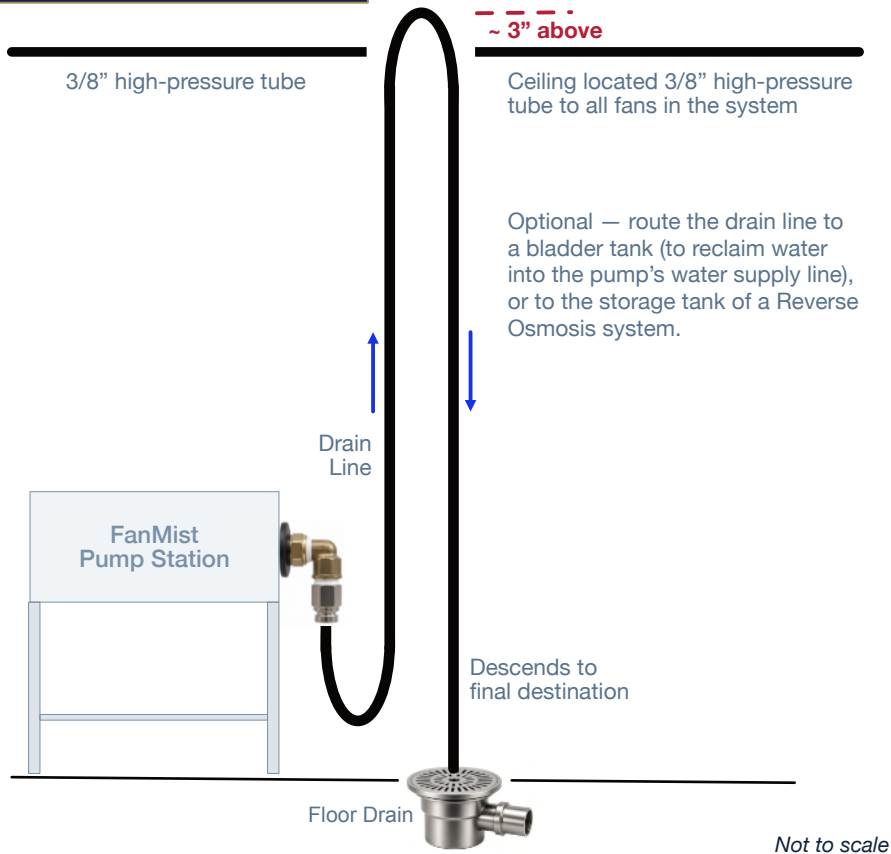


10 DRAIN LINE

SECTION PAGE
2 OF 2

Drain Line Routing Diagrams

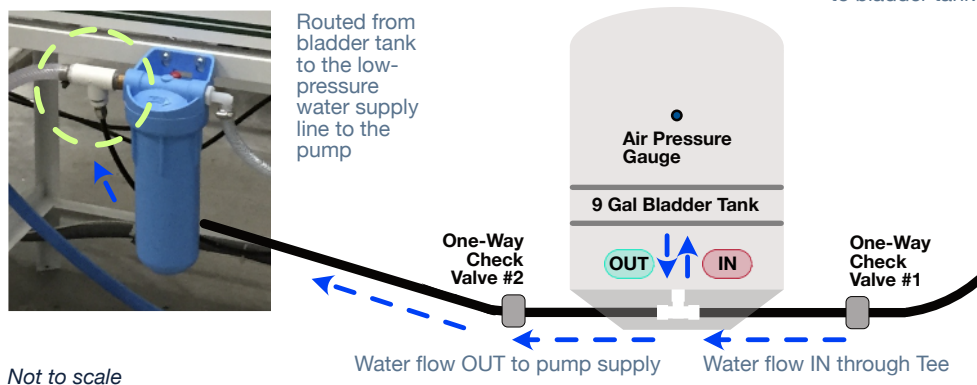
Fig. 10.4 DRAIN LINE ROUTING
(Traditional Method)



— IMPORTANT —

The drain line must be routed up into the ceiling area and looped ~3" higher than the highest point in the high-pressure lines before descending to its final destination. This loop is what keeps gravity from draining the entire system: instead of the full line volume flowing out through the open EDV, only the ~1/4 gallon released by the EDV's cycle is lost. The rest of the water stays in the high-pressure lines, primed and ready — so when the pump restarts, the nozzles atomize immediately and robustly rather than sputtering while the lines refill from empty.

Fig. 10.5 DRAIN LINE ROUTING
(To and Through the Bladder Tank)



Drain water flows from the ceiling through check valve #1 to the tee, then into the bladder tank, compressing the bladder and forcing stored water out. Since check valve #1 blocks backflow, that water routes back through the same tee and out check valve #2 into the incoming 1/2" supply line — reclaiming it into the pump's supply. The tee is a shared junction: flow direction there depends on the tank's pressure state.



11 HUMIDISTAT

SECTION PAGE
1 OF 2

Humidistat: Overview & Specifications

The humidistat is a Neptronic Model HRO20 with a built-in sensor — one unit per Pump Station, mounted in the most representative area of the plant at eye level. It continuously reads the ambient RH% and sends the start/stop signal that drives the Pump Station PLC Controller ON/OFF cycling.

Based on the RH% setpoint, the humidistat will read the humidity and send the required start signal to the PLC to initiate system startup. When the percentage of relative humidity (RH) decreases from setpoint by 3.1%, the system ON cycle is initiated until the “setpoint” is satisfied — then cycling OFF the system.

ABOVE SETPOINT — System Idle

Ambient RH is at or above the setpoint. No start signal is sent; the pump and fans remain OFF.

–3.1% BELOW SETPOINT — System ON

RH drops by 3.1% below setpoint — the humidistat sends the start signal. The ON cycle runs until the setpoint is satisfied, then cycles back OFF.

Installation — Location & Mounting

1. Locate at eye level, in an accessible spot that gives a realistic reading of the larger area.
2. Remove the captive screw joining the base and front cover; the cover separates from the base.
3. Pull the wires through the holes in the base.
4. Secure the base to the wall with the supplied wall anchors, then make the wire connections
5. Mount the cover onto the base and secure it with the screw.

HRO20 Control Dead Band — Winter Humidify Hysteresis

The Neptronic HRO20's control dead band (0.3–5.0 %RH, default 0.3%) is the gap between the humidity that starts the humidifier and the humidity that stops it — tighter holds RH closer to setpoint but cycles more, wider allows more swing for fewer starts, useful when cold infiltration causes humidity to sag faster than the humidifier recovers.

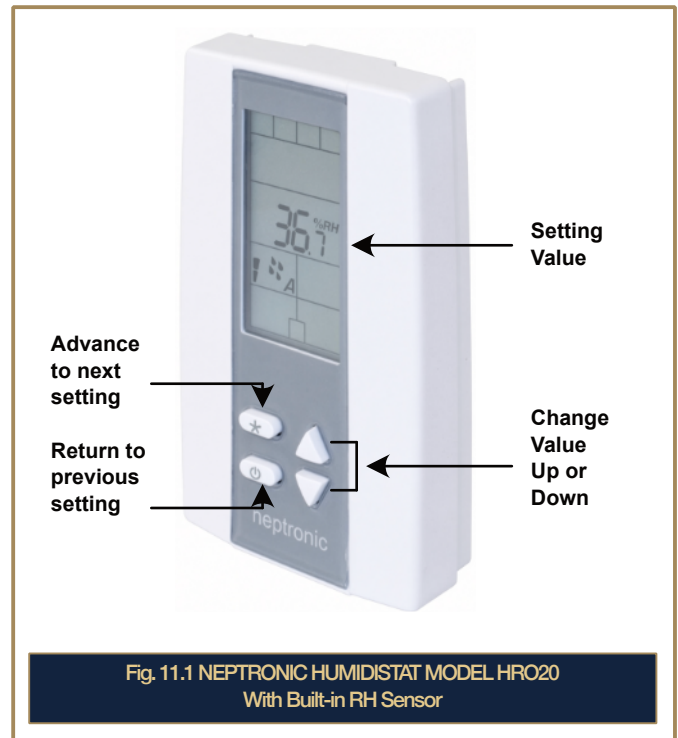


Fig. 11.1 NEPTRONIC HUMIDISTAT MODEL HRO20
With Built-in RH Sensor

To access the Humidity Setpoint:
Press both ▲ and ▼ keys twice.
Setpoint will be displayed for 3 seconds.

To adjust the Setpoint Up or Down:
Press the ▲ and ▼ keys while the setpoint is displayed.
Changes saved automatically.

Fig. 11.2 HUMIDITY SETPOINT ADJUSTMENT
How to Access and Adjust Setpoint %

HUMIDISTAT SPECIFICATION

Model	Neptronic HRO20
Power Supply	24 VAC
Setpoint Range	10%–90% RH (1% increments)
Sensor Precision	±3% or better
Proportional Band	2%–10% for control
Electrical Connection	18-gauge, 3 wire
Weight	0.3 lbs
Dimensions	2.85"W x 4.85"H x 1.0"D



11 HUMIDISTAT

SECTION PAGE
2 OF 2

Humidistat Wiring

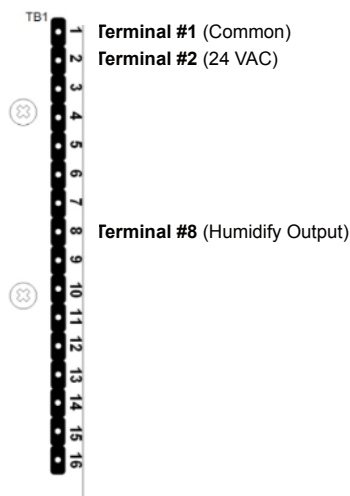
All wiring connections are completed in the electrical end of the pump enclosure. Wiring is provided by others running 24 VAC, 18-gauge, 3-wire cable from the humidistat connections to the pump enclosure's labeled terminal block. Only three of the humidistat's sixteen internal terminals are used.

HUMIDISTAT → PUMP ENCLOSURE TERMINAL MAP		
Humidistat Terminal Connections	Function	Pump Enclosure Connections (marked)
#1	Common	NEUTRAL
#2	24 VAC	HOT
#8	Humidify Contact Output (D01)	RELAY

Terminals 1-16 — Use Only 1, 2, & 8

The humidistat's internal terminal strip (TB1) has sixteen positions. Wire only terminals 1, 2, and 8 as mapped above — ignore all others.

View of Terminals #1-16 Inside Humidistat



Pump Enclosure Interior Connections Labeled

Inside the pump enclosure, the terminal block is labeled for each connection. Both circuits enter the enclosure through their own exterior strain-relief sleeve, labeled to match Figures 11.3-4.

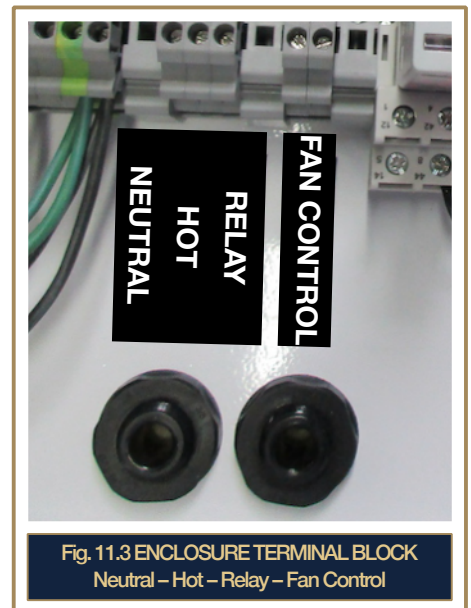


Fig. 11.3 ENCLOSURE TERMINAL BLOCK
Neutral – Hot – Relay – Fan Control



Fig. 11.4 EXTERIOR STRAIN RELIEFS
24 VAC Cable Entry



12 WATER TREATMENT

Sizing Incoming Water Supply

Size the incoming supply for continuous, uninterrupted flow to the inlet solenoid valve and pump — an undersized supply starves the high-pressure pump and faults out the pump which has to be restarted manually.

Water Flow

Maintain at least 1.5 times the rated pump capacity.

Water Pressure

25 psi or higher, 100 psi maximum.

Use Properly Treated Water

Critical for System Performance & Longevity

The FanMist system operates at 1000 psi through stainless-steel nozzles with very small orifices (0.15–0.30 mm). Even trace suspended solids or dissolved minerals cause nozzle clogging, reduced atomization, pressure fluctuations, premature pump wear, and shortened seal life. Proper water treatment protects the 5-year pump warranty and ensures reliable, drip-free operation.

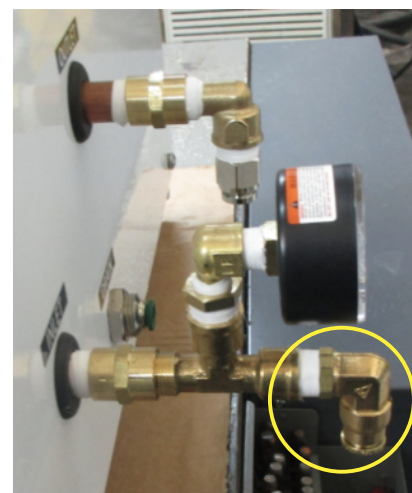


Fig. 12.1 INLET WATER SUPPLY CONNECTION
1/2" Slip-Lok Fitting

Two Forms of Treatment Are Required

1. Filtration of Suspended Solids (Particulate Removal)

- Supplied with the system: a 5-micron cartridge pre-filter (Part #92608) on the inlet low-pressure water line to the Pump Station, and a 5-micron filter in every nozzle (Part #51000).
- Action:** replace the pre-filter cartridge at every 500-hour maintenance interval, or annually at minimum.

2. Treatment of Dissolved Solids

Dissolved minerals (calcium, magnesium, iron, and total dissolved solids) cause two distinct problems that both need solving:

Scaling

Hard mineral deposits build up inside the pump, high-pressure lines, valves, and especially the nozzles — *Prevented by installing a water softener to reduce hardness.*

Air Dusting

Fine mineral particulates disperse into the air when hard or untreated water is atomized — *Prevented with Reverse Osmosis (RO) or equivalent upstream of the pump.*



Fig. 12.2 5-MICRON SEDIMENT PRE-FILTER
Cartridge Filter Housing, Part #92609

WATER SUPPLY & FILTRATION SPEC

Water Flow	1.5x pump cap.
Water Pressure	25–100 psi
Pre-Filter Cart.	5-micron #92608
Filter Housing	Part #92609
Nozzle Filter	5-micron #51000
Replace/Interval	500 hrs / annual
Scale Prev.	Water Softener
Air-Dust Prev.	Reverse Osmosis



13 FLUSHING PROCEDURE

SECTION PAGE
1 OF 2

Preparation for Flushing

Flushing is a mandatory procedure, performed after every piece of equipment is installed but **before** the system is started for the first time.

Why Perform the Flushing Procedure?

Flushing removes fines, debris, and installation residue from the pump, tubing, and Mist-Rings before any nozzles are threaded in. This prevents fouling of the nozzle filters and orifices, ensuring optimal 1000-psi atomization from the first startup.

Critical Safety Note

Do not run the system continuously at high-pressure until flushing is 100% complete.

On-Site Fabrication — Drop-Down Flushing Drain Lines

1. Cut the clear plastic tubing into two lengths, each long enough to reach a 5-gallon bucket on the floor from the top of the Mist-Ring.
2. Insert the female threaded end of a 6" nozzle extension wand into the 1/4" ID end of each plastic tube.
3. Secure each connection tightly with a zip tie per Fig 13.1.
4. These two fabricated drop-down drain lines are reused at every fan during flushing.



Fig. 13.1 FABRICATED DROP-DOWN FLUSHING DRAIN LINE
Clear 3/8" OD X 1/4" ID Tubing with 6" Nozzle Extension Wand

EQUIPMENT & SUPPLIES NEEDED (SOURCED LOCALLY)

- Scissor lift or equivalent, for access to each fan/Mist-Ring
- Several 5-gallon buckets, to capture flushed water
- ~40 ft of 3/8" OD x 1/4" ID clear plastic tubing (low pressure drain line)
- 6" Nozzle Extension SS wands, Part #94506 (Maintenance & Spares Pak) — one per drop-down line

Pre-Flushing Requirements

- ☐ System fully installed except nozzles: electrical, water treatment, water supply, drain line, Mist-Rings & ball valve assemblies all in place.
- ☐ Verify nozzles are not installed.
- ☐ Pump electrical OFF.
- ☐ All Mist-Ring ball valves closed.



13 FLUSHING PROCEDURE

SECTION PAGE
2 OF 2

Performing and Completing the Flushing Procedure

Team Roles — 3-person team recommended; 2-person minimum.

Person A — Pump Station

Operates the pump ON/OFF switch on command from Person B. Use cell phones, hand signals, or radios.

Person B — Scissor Lift

Works each fan in sequence: controls the ball valve, installs nozzle plugs & drain wands, installs final nozzles, signals Person A.

Person C — Floor

Positions and empties buckets under each fan as it's flushed.

AFTER ALL FANS ARE FLUSHED

- ☐ All nozzles are now installed finger-tight.
- ☐ Ball valves may remain closed and fans switched OFF until just before startup.
- ☐ Proceed directly to System Startup — this completes the flushing procedure.

Detailed Flushing Procedure Steps

1. Set the humidistat RH setpoint above room humidity (e.g., 55%+) and turn ON the water supply to the Pump Station.
2. Person B begins at the fan closest to the Pump Station and proceeds fan-by-fan in daisy-chain order until all fans are flushed.
3. For each fan, starting with the one closest to the Pump Station:
 - a. Insert nozzle plugs into all Mist-Ring ports (finger-tight) except the two top ports. Thread the two fabricated drop-down drain lines (with wands attached) into the top ports — finger-tight only.
 - b. Person C positions buckets under the drop-down drain lines.
 - c. Person B opens the Mist-Ring ball valve (confirm the fan is switched off).
 - d. Person B signals Person A to turn the pump switch ON.
 - e. Flush until 1.5–3 gallons total have passed through the two drain lines at full system pressure. Signal Person A to run the pump OFF, then close the ball valve.
 - f. Remove the wands and nozzle plugs (catch minor residual drainage with a towel). Install all nozzles into the Mist-Ring ports finger-tight only.
 - g. Leave the ball valve closed. Turn the fan electrical switch ON and move to the next fan.

Additional Benefit

Flushing naturally pressurizes the entire high-pressure system to 1000 psi with all lines connected. This is an early opportunity to detect and correct leaks at Slip-Lok fittings, transitions, adapters and ball valves before normal operation begins.

FLUSHING AT A GLANCE

Sequence	Fan-by-fan, daisy-chain order
Flush Volume	1.5–3 gal per fan
Nozzle Install	Finger-tight only
Pump Start Delay	~10 sec (PLC fan-delay)
RH Setpoint	Above room humidity (55%+)

Important Operational Note

Each time the pump starts, the PLC's fan-delay causes an approximate 10-second delay before full pressure is reached. Do not interrupt this delay.



14 SYSTEM STARTUP

Pre-Startup Checklist

- ☐ Incoming water supply to the pump is shut OFF.
- ☐ Pump electrical supply is properly connected — plugged in for single-phase; hard wired for three-phase.
- ☐ All humidistat wiring installed to labeled ports.
- ☐ 1/2" water supply line connected to Pump Station Slip-Lok inlet connection.
- ☐ Water treatment installed, tested (provided by others) and in "run" mode.
- ☐ Drain line from the EDV is routed to a ceiling point at least 3" higher than the highest tubing point, then plumbed to:
(A) the pump water supply line via bladder tank with check valves, (B) directly to a floor drain, (C) the water treatment storage tank.
- ☐ High-Pressure water lines to the fans completed.
- ☐ Electrical supply to all fans completed.
- ☐ Nozzles are installed in all nozzle ports, finger-tight only.
- ☐ Flushing Procedure completed (Section 13).

START

STOP

Startup Procedures

1. Turn incoming water supply ON; set the pump switch to ON.
2. Set the humidistat to a high enough setting to get the system to energize.
3. As the pump turns ON, verify the pressure gauge builds to 1000 psi — well under a minute.

The HPS shuts the system off if 550 psi isn't reached within 25 seconds; the factory startup limit is 60 seconds. On initial startup it may take several ON/OFF cycles to fill the supply lines with water.

4. If a line break or leak drops pressure below 550 psi, the HPS shuts the system down automatically. Check for leaks before restarting; to restart, cycle the pump switch OFF then ON.
5. Confirm the fan circuit energizes when the pump energizes. Fans turn ON first, with the pump following after a 10-second delay.
6. When the humidistat setpoint is satisfied, the system shuts down automatically; the EDV relieves line pressure without draining the lines.
7. On shutdown, the fans continue running for 10 seconds after the pump turns OFF.
8. After confirming ON/OFF operation, set the humidistat to the desired setpoint for continuous automatic operation.

Automatic Shutdown — High-Pressure Safety (HPS)

If system pressure drops below 550 psi from a line break or leak, the HPS shuts the system down automatically. Inspect for leaks before restarting. To restart: cycle the pump switch OFF, then back ON.

HPS Timing, At Startup vs. Running

Normal operation: must reach 550 psi within 25 seconds or the HPS trips.

Initial startup: limit extends to 60 seconds, since empty lines take longer to pressurize — cycling ON/OFF a few times is expected.

SYSTEM STARTUP AT A GLANCE

Target (Oper. Pressure)	1000 psi
HPS Trip Point	<550 psi
HPS Timing (Running)	25 sec
HPS Timing (Startup)	60 sec
Fan/Pump (Start Delay)	Fans first, pump +10 sec
Fan/Pump (Stop Delay)	Pump stops, fans +10 sec
Shutdown Trigger	Humidistat setpoint satisfied
Restart After HPS Trip	Check for leaks, cycle OFF/ON

This Completes the FanMist Installation Handbook

Sections 01-14 cover the full rough-in sequence, pump station through system startup. Keep this handbook on site for reference during service and maintenance.