

TECHNICAL DATA
DOCUMENT

FanMist System
Wiring &
Schematics

Pump Station · Humidistat · Fan
Relay · 115V–480V Schematics



KEY SPECIFICATIONS

PUMP STATION SUPPLY
115V 1Ph · 230V 1Ph
230V 3Ph · 480V 3Ph

PUMP BRANCH CIRCUIT
Dedicated 20 A breaker

INTERNAL PROTECTION
10 A breaker + fused circuits

CONTROL VOLTAGE
24 VAC (internal transformer)

CONTROLLER
Omron 10 I/O PLC

HUMIDISTAT CABLE
18 AWG · 3-wire

FAN CONTROL CABLE
18 AWG · 2-wire

FAN MOTORS
½ HP · 1Ph 115/230V
or 3Ph 230/460V

FAN RELAY
RIB2401B (1Ph) · RIB243P (3Ph)

System Electrical Overview

The FanMist system is automatically controlled by the Omron PLC inside the Pump Station. Plant power feeds the Pump Station on a dedicated circuit. The Pump Station sends 24 VAC to the Neptronic humidistat and receives the start/stop signal back. When humidity is called for, the PLC sends a 24 VAC on/off signal to the fan contactor relay box(es). Each relay box switches plant power out to the fans.

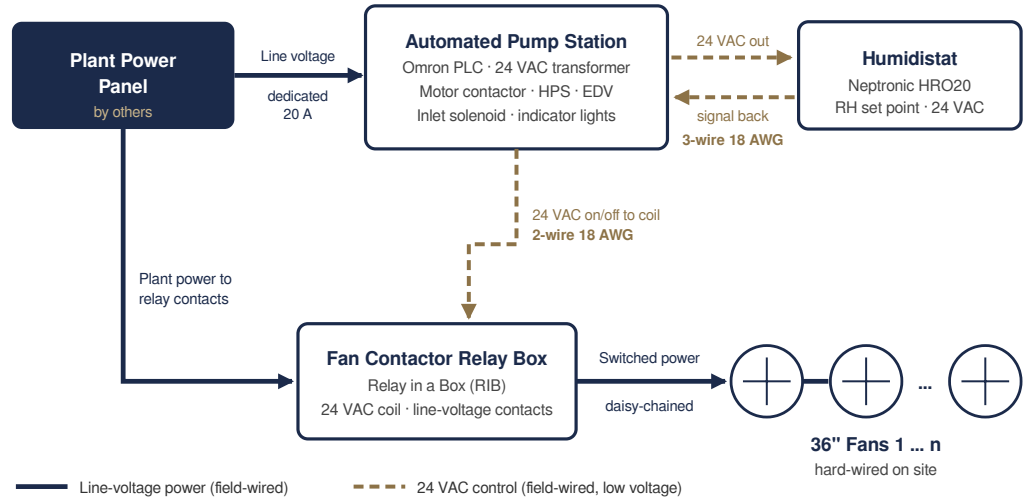


Figure 1 — How power flows in the FanMist system. All power is controlled automatically by the Pump Station PLC.

Scope of Supply

Factory-Wired (inside the Pump Station)	Field-Wired (provided by others)
Omron PLC, 24 VAC transformer and cube relay	Plant power to the Pump Station on a dedicated 20 A breaker
Circuit breaker, fuses and motor start contactor	18 AWG 3-wire cable: Pump Station ↔ humidistat
High-pressure safety switch (HPS)	18 AWG 2-wire cable: Pump Station → fan relay box(es)
Inlet solenoid valve and electric drain valve (EDV)	Fan relay box(es) and plant power to the relay contacts
Indicator lights, hour meter and fan override toggle switch	Fan power wiring, a dedicated on/off switch at each fan, and drip loops
Labeled terminal blocks and exterior wiring sleeves	Strain reliefs on all incoming wiring (interior & exterior)

Note: All electrical supplies and wiring outside the equipment, and not specifically listed in the equipment package, are provided by others. All 24 VAC cable is provided by others. All field wiring must meet local electrical codes and be installed by a qualified electrician.

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Field Wiring Runs & Connection Points

Four field-wired runs complete a FanMist installation. The two low-voltage runs (B and C) enter the Pump Station through the labeled exterior sleeves on the electrical end of the enclosure.

Run	From → To	Voltage	Conductor	Notes
A	Plant panel → Pump Station electrical connection sleeve	115V or 230V 1Ph; 230V or 480V 3Ph	1Ph: three-prong cord (supplied) 3Ph: hard-wired	Dedicated 20 A breaker. Match the voltage on the Pump Station name plate.
B	Pump terminals NEUTRAL – HOT – RELAY → HRO20 terminals 1 – 2 – 8	24 VAC	18 AWG, 3-wire	Enters through the “Humidistat” sleeve. See page 4.
C	Pump terminals FAN CONTROL → fan relay box 24 VAC coil	24 VAC	18 AWG, 2-wire	Enters through the “Fan Control” sleeve. See page 5.
D	Plant panel → relay box contacts → fans	Per the fan motor name plate	Sized by the electrician for total fan load	Daisy-chained to the fans. Add an on/off switch and a drip loop at each fan. See page 6.

Pump Station Electrical End



Figure 2 — Electrical exterior end of the Pump Station enclosure.

- 1 Fan exhaust outlet

2 Name plate: serial number, manufacturing date & electrical data

3 Manual fan override toggle switch

4 Analog hour meter

5 Pump on/off power supply switch

6 Indicator lights: amber MAINT · red FAULT · green RUN

7 24 VAC fan contactor sleeve (Run C)

8 24 VAC humidistat connection sleeve (Run B)

9 Pump electrical connection sleeve (Run A, 480V 3Ph shown)

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Pump Station Power Wiring

Supply Requirements

- **Three-phase pumps** must be hard-wired from the plant power supply.
- **Single-phase pumps** come with a three-prong power cord.
- Power the pump from a **dedicated 20 A breaker**.
- Make all pump wiring connections on site, inside the pump, at the labeled terminal blocks.
- Install strain reliefs, interior and exterior, on all wiring entering the Pump Station.

Accessing the Electrical Panel

For the final connections, it helps to unfasten the hardware holding the electrical panel and lay the panel flat.

Enclosure	Fasteners	Tool
Large	Three ¼-20 pan head screws, reached from the lower side of the electrical panel	Phillips screwdriver
Medium	Two ¼-20 hex head cap screws, reached from the bottom of the electrical panel	7/16" wrench

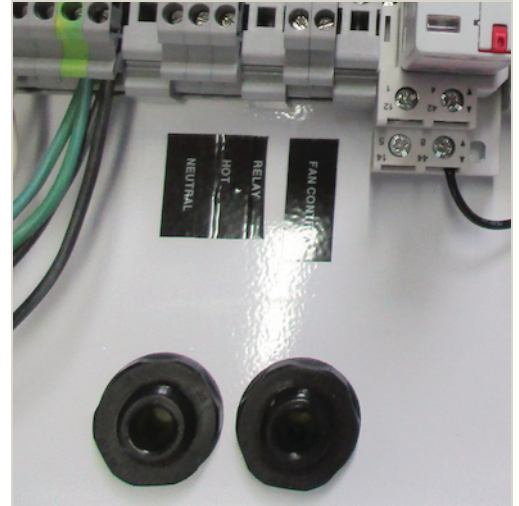


Figure 3 — Interior terminal blocks labeled NEUTRAL – HOT – RELAY (humidistat) and FAN CONTROL, with the interior strain reliefs below.

Electrical System Protection

Device	Rating / Location	Function
Main circuit breaker	10 A, inside the pump	Protects the entire pump electrical system.
Circuit fuses	On the electrical panel (1.5 A shown on the 115V schematic; 0.6 A / 0.6 A on the 480V schematic)	Protect individual circuits. Spare fuses come in a plastic bag inside the pump box.
Transformer	2:1, with a fuse on the secondary supply	The fuse protects the transformer and the components it feeds from surges and spikes. If secondary power suddenly stops, check the fuse.
Step-down transformer (480V only)	Part #93301 · 150 W · 480 × 230	Steps 480V down to 230V for the control circuits. Used on 480V stations only.

Safety: Always lock out/tag out power and depressurize the system before service. Maximum operating pressure is 1000-psi.

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Humidistat Wiring

The Neptronic HRO20 humidistat, with its built-in sensor, is the overall system control (one per Pump Station). It reads the relative humidity (RH) of the surrounding air and signals the Pump Station PLC to turn the system on and off. When RH falls 3.1% below the set point, the humidistat starts the ON cycle. The system runs until the set point is satisfied, then cycles OFF.

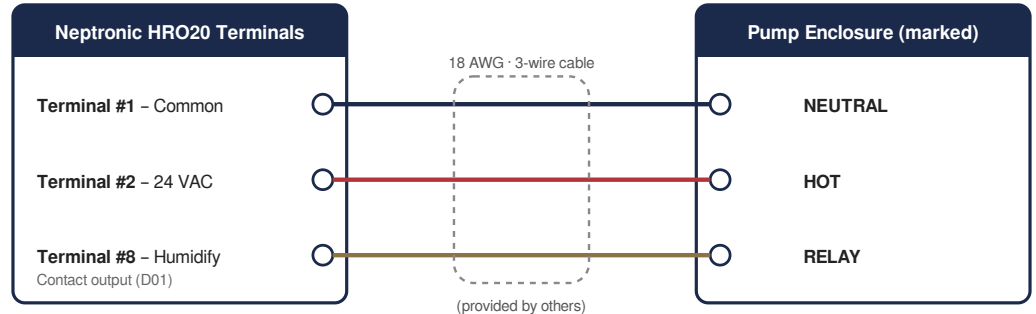


Figure 4 — Humidistat to Pump Station terminal connections. Use only terminals 1, 2 and 8 of internal terminals 1–16. Ignore all others.

Wiring Procedure

1. The electrician provides 24 VAC, 18 gauge, 3-wire cable for all connections.
2. Route the cable into the pump enclosure through the exterior sleeve marked **HUMIDISTAT**, with strain reliefs inside and out.
3. Land the wires on the pump terminal block marked **NEUTRAL – HOT – RELAY**.
4. At the humidistat, connect **#1 → NEUTRAL**, **#2 → HOT**, **#8 → RELAY**.
5. When terminal #8 closes, it sends hot 24 VAC to the cube relay in the pump, which gives the PLC its start signal.

Location & Mounting

Mount at eye level, in an accessible spot that gives a realistic reading of the larger area. Remove the captive screw to separate the front cover from the base. Pull the wires through the holes in the base, secure the base to the wall with the supplied anchors, make the connections, then refit the cover and screw.



Figure 5 — Neptronic HRO20

HRO20 Specifications

Power supply	24 VAC
Set point range	10%–90% (1% steps)
Sensor precision	± 3% or better
Proportional band	2%–10%
Electrical connection	18 gauge, 3-wire
Dimensions	2.85"W × 4.85"H × 1.0"D
Weight	0.3 lbs

Set point: press both arrow keys twice to show the set point for 3 seconds. Press the up or down arrow while it is shown to adjust. Changes save automatically.



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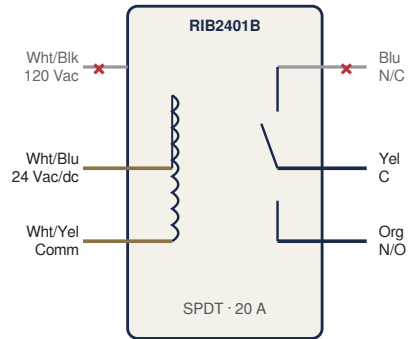
Fan Control & Relay in a Box

The Pump Station controls the fans through a remote junction box (relay switch) that contains a contactor connecting plant power to the fans. Run the 24 VAC control signal for the contactor coil through the strain relief marked **FAN CONTROL**. Connect it to the pump contact points labeled **FAN CONTROL**, and to the 24 VAC contact points inside the remote relay box(es), which are provided by others. Use **18 gauge, 2-wire** cable.



RIB2401B · Single-Phase Fans

Power relay, 20 A SPDT, 24 VAC/dc / 120 VAC coil, NEMA 1 housing. **Controls 1 up to 2 fans.**



RIB243P · Three-Phase Fans

Power relay, 20 A 3PST-N/O, 24 VAC/dc coil, NEMA 1 housing. **Controls 1 up to 8 fans.**

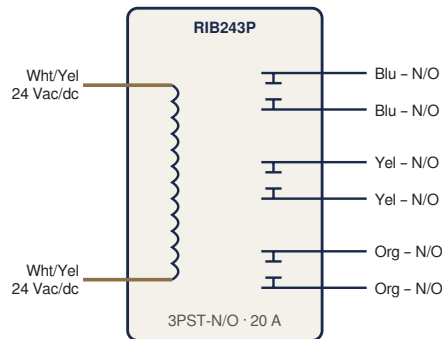


Figure 6 — Relay in a Box wiring for single-phase (top) and three-phase (bottom) fans. Source for all “Relay in a Box” models: alpscontrols.com

Additional Relay Options

- **Dry contact input relays:** 24 VAC to multiple fans. Gives excellent 24 VAC signal control across long wire runs.
- **Wireless RIB relays:** use the same dry contact input idea, with one transmitter and any number of receivers that “listen” for the signal.



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½ HP · 1Ph 115/230V

or 3Ph 230/460V

FAN RELAY

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Fan Power Wiring

FanMist 36" high-velocity cage fans are hard-wired on site (no power cord included). Switched plant power comes out of the fan relay box and is daisy-chained to each fan. Wire every fan to the supply voltage on its motor name plate.

Fan Part #	Dia.	HP	Ph	Volts	Amps	RPM	CFM	Relay
VBS36A	36"	½	1	115/230	6.1/3.09	844	10,050	RIB2401B
VBS36CF	36"	½	3	230/460	2.6/3.1	846	10,000	RIB243P

Power Supply to the Fan

- Install a dedicated on/off fan switch at each fan.
- Run the wire to the motor with a **drip loop**, so any moisture that collects drains away from the motor.
- Wire the supply voltage to match the motor name plate. Check for correct fan rotation using the manual fan override toggle switch on the Pump Station.
- Local codes may require a safety cable on each fan.



Figure 7 — 36" fan with mist ring

Motor Orientation

- Always mount the fan with the **capacitor on top**.
- Remove the **2 drain plugs at the bottom** of the motor so moisture inside the motor can drain. Do not remove the plugs on the top side of the motor.

Fan Override Toggle Switch

The toggle switch on the outside of the pump enclosure runs the fans **only**, separately from the pump. Use it to test the fans after installation and to check rotation. Inside the Pump Station, the toggle sends 24 VAC hot directly to the FAN CONTROL terminals, bypassing PLC output 0 (see the schematics on pages 7–8). At all other times, the PLC runs the fans automatically in sequence with the pump.

Fan sequencing: fans start 10 seconds before the pump. At shutdown, the pump stops first and the fans run 10 more seconds to clear the remaining mist.



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HUMIDISTAT CABLE

18 AWG · 3-wire

FAN CONTROL CABLE

18 AWG · 2-wire

FAN MOTORS

½ HP · 1Ph 115/230V
or 3Ph 230/460V

FAN RELAY

RIB2401B (1Ph) · RIB243P (3Ph)

Wiring Schematic — 115V 1Ph Pump Station

Also applies to 230V 1Ph: the white wire becomes blue, and the station has a double fuse block.

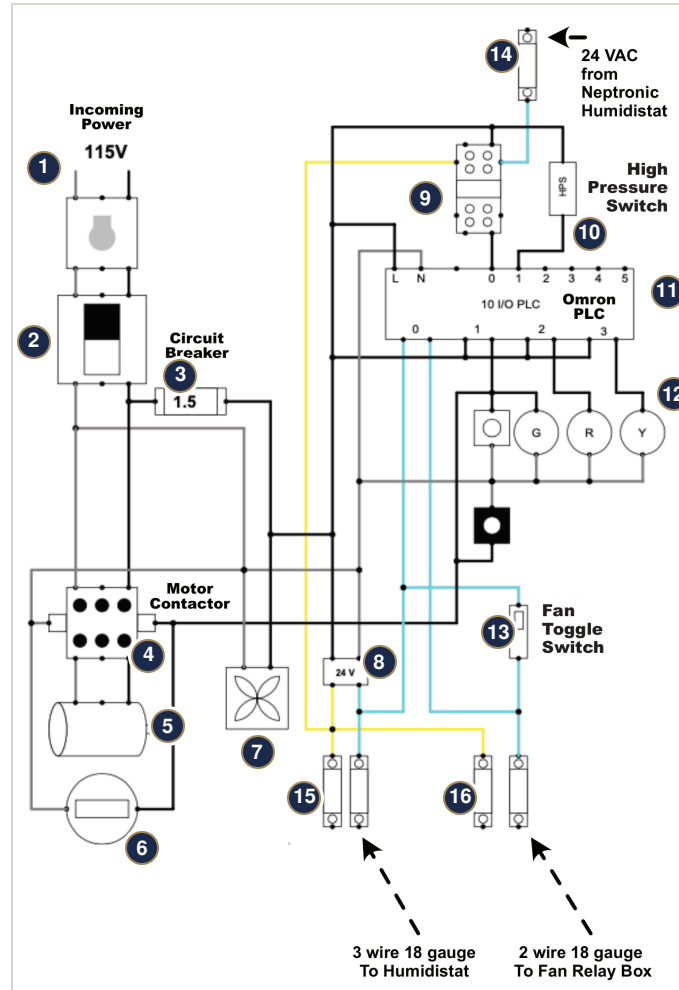


Figure 8 — Pump Station wiring schematic, 115V single-phase. Field connections are the 3-wire 18 gauge run to the humidistat and the 2-wire 18 gauge run to the fan relay box.

Flow of Voltage

1. Incoming voltage passes through the circuit breaker and fuse to the top of the motor start contactor, where it stops until the contactor closes.
2. From the fuse, it powers the 24V transformer, the enclosure fan and the PLC, and loads the top of the cube relay.
3. The 24V transformer supplies 24 VAC to the Neptronic humidistat. The yellow common leg feeds the fan relay and the cube relay. The hot leg waits to be passed through by the Neptronic and the PLC.
4. When the Neptronic sends hot 24V to the cube relay, the relay closes and gives the PLC its start signal.
5. Following the PLC sequence, relay “0” closes and sends hot 24V to start the fans. Relay “1” then closes. This opens the inlet solenoid valve, closes the drain valve and energizes the contactor coil to start the motor.

Wire Color Key

- Blue** — hot leg of 115/230V 1Ph
- Black** — hot leg of 115/230V 1Ph
- Gray (white wire)** — on 230V 1Ph, the white wire becomes blue
- Yellow** — common leg of 24V
- Turquoise** — hot leg of 24V

COMPONENTS

- 1 Incoming power, 115V 1Ph
- 2 Circuit breaker
- 3 Fuse, 1.5 A
- 4 Motor start contactor
- 5 Pump motor
- 6 Analog hour meter
- 7 Enclosure cooling fan
- 8 24 V transformer
- 9 Cube relay (start signal)
- 10 High-pressure switch (HPS)
- 11 Omron 10 I/O PLC
- 12 Indicator lights G · R · Y
- 13 Fan override toggle switch
- 14 24 VAC in from humidistat
- 15 Humidistat terminals (3-wire)
- 16 Fan relay terminals (2-wire)

PLC TIMER SETTINGS

- T1 & T2 set to 10 s
- T1** = 10 s on-cycle: fans on, pump delayed 10 s
- T2** = 10 s off-cycle: pump off, fans delayed 10 s
- Tb** = 25 s: the pump must reach 550 psi at the HPS within 25 s, or the system cycles OFF



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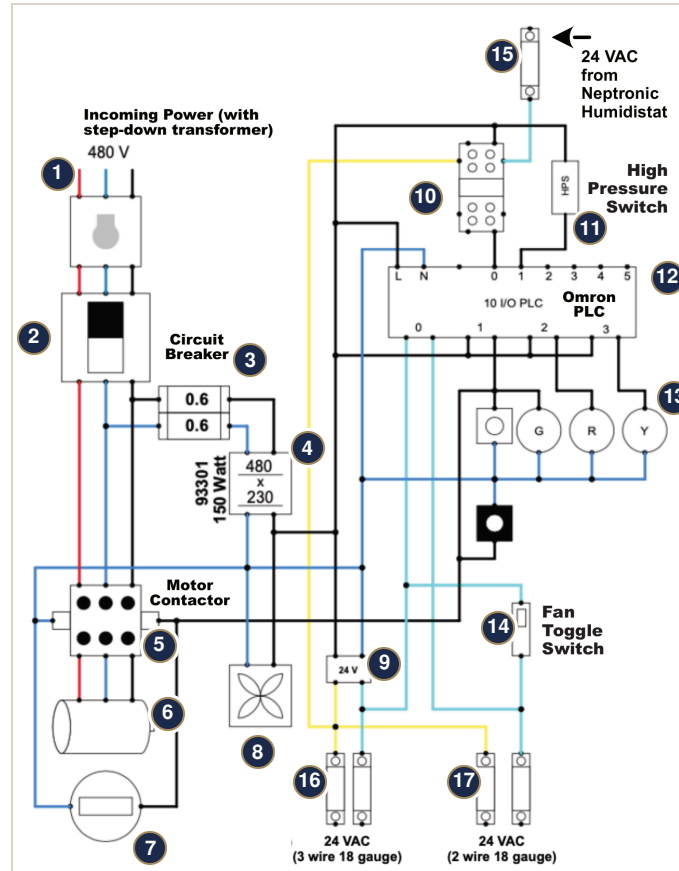
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FAN RELAY

RIB2401B (1Ph) · RIB243P (3Ph)

Wiring Schematic — 480V 3Ph Pump Station

Also applies to 230V 3Ph, except for the added step-down transformer, which is required on 480V only.



COMPONENTS

- 1 Incoming power, 480V 3Ph
- 2 Circuit breaker
- 3 Fuses, 0.6 A / 0.6 A
- 4 Step-down transformer #93301, 150 W, 480 × 230
- 5 Motor start contactor
- 6 Pump motor
- 7 Analog hour meter
- 8 Enclosure cooling fan
- 9 24 V transformer
- 10 Cube relay (start signal)
- 11 High-pressure switch (HPS)
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T2 = 10 s off-cycle: pump off, fans delayed 10 s

Tb = 25 s: the pump must reach 550 psi at the HPS within 25 s, or the system cycles OFF

Figure 9 — Pump Station wiring schematic, 480V three-phase with step-down transformer. Field connections are the 24 VAC 3-wire 18 gauge run to the humidistat and the 24 VAC 2-wire 18 gauge run to the fan relay box.

Flow of Voltage

1. Incoming voltage passes through the circuit breaker and fuses to the top of the motor start contactor, where it stops until the contactor closes.
2. From the fuses, it goes through the step-down transformer (480V only). It then powers the 24V transformer, the enclosure fan and the PLC, and loads the top of the cube relay.
3. The 24V transformer supplies 24 VAC to the Neptonic controller. The yellow common leg feeds the fan relay and the cube relay. The hot leg waits to be passed through by the Neptonic and the PLC.
4. When the Neptonic sends hot 24V to the cube relay, the relay closes and gives the PLC its start signal.
5. Following the PLC sequence, relay “0” closes and sends hot 24V to start the fans. Relay “1” then closes. This opens the inlet solenoid valve, closes the drain valve and energizes the contactor coil to start the motor.

Wire Color Key

- **Red** — hot leg of 230/480V 3Ph
- **Blue** — hot leg of 115/230V 3Ph
- **Black** — hot leg of 115/230V 3Ph
- **Yellow** — common leg of 24V
- **Turquoise** — hot leg of 24V

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Control Sequence & PLC I/O

PLC Inputs & Outputs

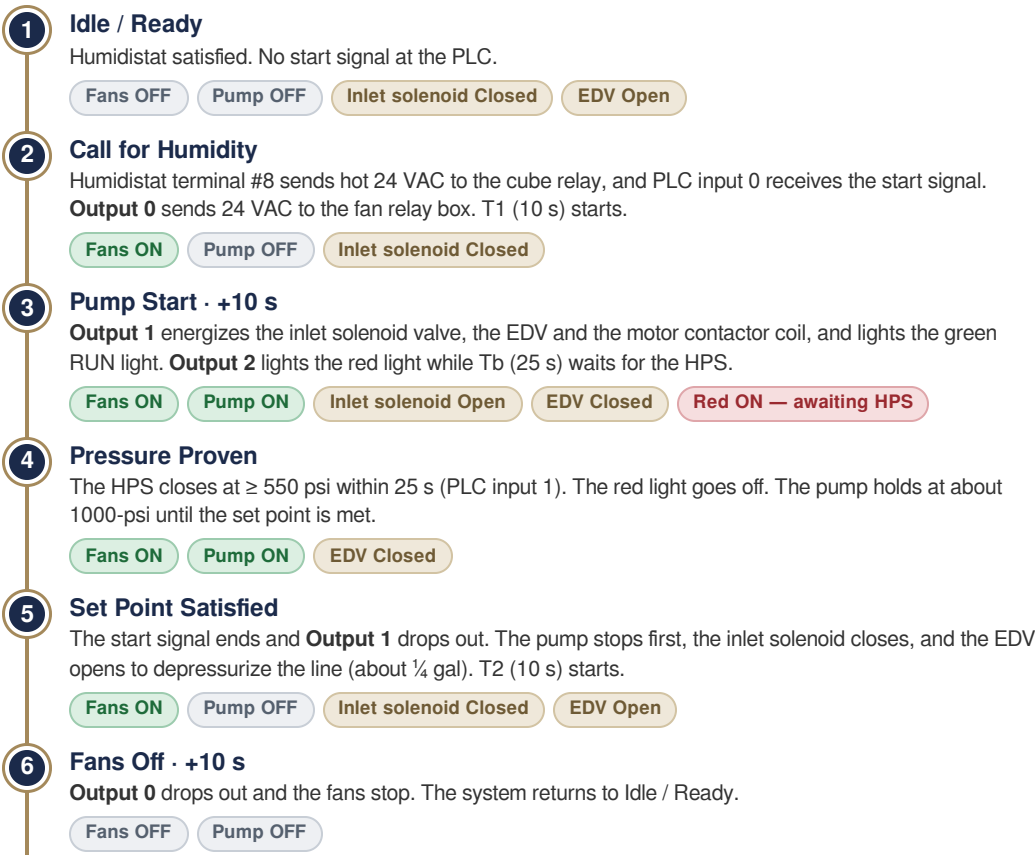
Terminal	Wired To
L · N	Fused supply power
Input 0	Cube relay contact: start signal from the humidistat
Input 1	High-pressure switch (HPS), proven at 550 psi
Output 0	24 VAC hot to the FAN CONTROL terminals (fans)
Output 1	Inlet solenoid valve · EDV · motor contactor coil · green RUN light
Output 2	Red FAULT light
Output 3	Amber MAINT light (500 hours)

Line-Voltage Loads on Output 1

Device	Type	Part #
Inlet solenoid valve	3/8" brass, NC	93368 (115V coil) 93596 (230V coil)
Electric drain valve (EDV)	Danfoss, NO, DIN plug	95001
Motor start contactor	Coil energizes the pump	—

The solenoid coil voltage must match the station supply (115V or 230V). Energizing the EDV **closes** it to hold pressure. De-energizing it **opens** it to relieve pressure.

Operating Sequence



Pressure Fault

If the HPS does not prove 550 psi within 25 s, the PLC shuts the system down and the red FAULT light stays on. Correct the cause (leak, low water, clogged pre-filter, inlet solenoid not opening). Then reset by turning the start signal or the pump switch OFF → ON. Press ESC on the standard PLC screen to see the fault counters.

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Electrical Startup Checklist

- ☐ The pump power supply is connected (plugged in for 1Ph, hard-wired for 3Ph) on a dedicated 20 A breaker.
- ☐ Strain reliefs are installed, inside and outside, on all incoming wiring.
- ☐ The humidistat is wired #1/#2/#8 → NEUTRAL/HOT/RELAY with 18 AWG 3-wire cable.
- ☐ FAN CONTROL is wired to the relay box coil with 18 AWG 2-wire cable.
- ☐ Plant power is wired to the relay contacts and out to the fans, with a switch and drip loop at each fan.
- ☐ Fan rotation has been checked with the fan override toggle switch.
- ☐ The humidistat is set above the current RH so it calls for the test run.
- ☐ Start: fans come on first, the pump follows 10 s later, and the gauge reaches 1000-psi (550 psi within 25 s).
- ☐ Stop: the pump stops first, the EDV relieves pressure, and the fans stop 10 s later.
- ☐ The humidistat is set to the desired RH set point for automatic operation.

Electrical Troubleshooting

Symptom	Likely Cause	Corrective Action
Pump will not start	No 24 VAC signal from the humidistat	Check #1/#2/#8 → NEUTRAL/HOT/RELAY. Confirm the set point is above current RH. The cube relay LED should light on a call.
Fans do not run	No 24 VAC to the contactor, or no plant power at the relay	Check the 2-wire FAN CONTROL run and the relay coil leads. Check plant power at the relay contacts. Test with the override toggle.
Fan turns the wrong way	Supply not wired to the motor name plate	Have a qualified electrician correct the wiring per the name plate. Retest with the override toggle.
Whole pump is dead	Plant breaker, 10 A internal breaker or pump switch off	Check the dedicated 20 A plant breaker, the pump's 10 A breaker and the pump on/off switch.
Control power suddenly lost	Transformer secondary fuse blown	Check and replace the secondary fuse. Spare fuses are bagged inside the pump box.
Red FAULT light, pump stops	HPS not proven at 550 psi in 25 s	Check for leaks, low water or a clogged pre-filter. Correct the cause, then reset OFF → ON.
Inlet solenoid makes no click	No coil voltage, or a failed DIN plug or coil	Meter 115V/230V at the coil prongs on a call. No voltage means a wiring or PLC output fault. Replace the coil or DIN plug (93368 / 93596).
Nozzles drip after shutdown	EDV not opening	Confirm the EDV opens and drains about ¼ gal. Check its DIN connector and coil.

For the full symptom – cause – corrective action listing, see the standalone FanMist Troubleshooting Guide.

CRITICAL: Stop the pump immediately if you see vibration, hear unusual noise, or find pressure fluctuations or leaks. Always lock out/tag out power and depressurize the system before service.