



TECHNICAL DATA
DOCUMENT

High-Pressure Safety Switch (HPS)

PSS31 Black · 3/8" BSP · 250V –
15A · Part #93656



KEY SPECIFICATIONS

IHC PART NUMBER
93656

MODEL
PSS31 Black (housing marked
PS31)

ACTIVATION PRESSURE
580 psi (Black O-ring)

FANMIST PROOF POINT
550 psi within 25 s

MAXIMUM PRESSURE
4,100 psi

PROCESS CONNECTION
3/8" BSP thread, brass

ELECTRICAL RATING
250 V · 15 A

CONTACTS
SPDT: Common / NO / NC leads

DIMENSIONS
≈ 1" × 3" × 1"

PLC CONNECTION
Omron PLC Input 1

Specifications

General Description

Every FanMist Pump Station includes a water high-pressure (safety) switch (HPS), a safety sensor that monitors pump pressurization. The HPS is plumbed on the high-pressure side of the pump. Its contacts close when system pressure rises past the switch's activation point, which sends a pressure-proven signal to PLC Input 1.

If pressure is not sufficient, or is temporarily lost, the red FAULT light comes on. If the condition lasts longer than the PLC's programmed time (550 psi within 25 seconds), the PLC automatically shuts the pump off. This protects the high-pressure pump from running unloaded or cavitating for more than 25 seconds, and shuts the system down after a line break or leak.

Part Identification



93656

High-pressure safety switch, **PSS31 Black**: 3/8" BSP brass pressure port, 250 V – 15 A SPDT contacts, factory 3-conductor lead. Black O-ring version, activation about 580 psi.

Technical Data

HPS · Part #93656

Model / color	PSS31 Black (housing marked PS31)
Switch type	Pressure-actuated, SPDT: Common, Normally Open, Normally Closed
Activation pressure	580 psi, set by the Black O-ring
Maximum pressure	4,100 psi
Process connection	3/8" BSP thread, brass port
Electrical rating	250 V · 15 A
Leads	Red = NC · Brown = NO · Blue = Common
Dimensions	About 1" × 3" × 1" ("Big" pressure switch body)
Location	Inside the Pump Station, on the high-pressure discharge plumbing at the pump head
Signal destination	Omron PLC, Input 1
Supplier / origin	MTM Hydro · made in Italy

O-Ring Activation Code

The O-ring color in the switch sets its activation pressure. The wetted portion measures a fraction of an inch, so activation is far below the maximum rating.

O-Ring	Activation
● Yellow	115 psi
● Blue	210 psi
● Red	360 psi
● Black	580 psi · FanMist

Order by color. Only the Black O-ring version (#93656) is correct for FanMist. A lower-pressure version would prove pressure too early and defeat the safety function.



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Component Identification & Location

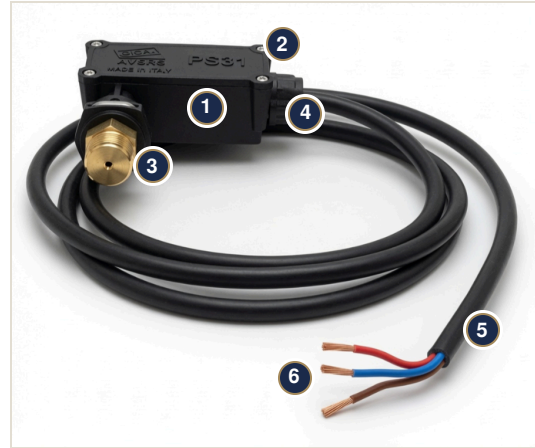


Figure 1 — HPS #93656 (PSS31 Black) with its factory 3-conductor lead.

COMPONENTS

- 1 Switch housing:** black body marked PS31, about 1" × 3" × 1"
- 2 Cover screws:** seal the switch housing
- 3 Brass pressure port:** 3/8" BSP thread into the high-pressure discharge. The O-ring inside sets the activation pressure
- 4 Cable gland:** strain relief and seal for the lead
- 5 3-conductor cable:** runs to the electrical panel
- 6 Leads:**
 - Red = Normally Closed (NC)
 - Brown = Normally Open (NO)
 - Blue = Common

Location in the Pump Station

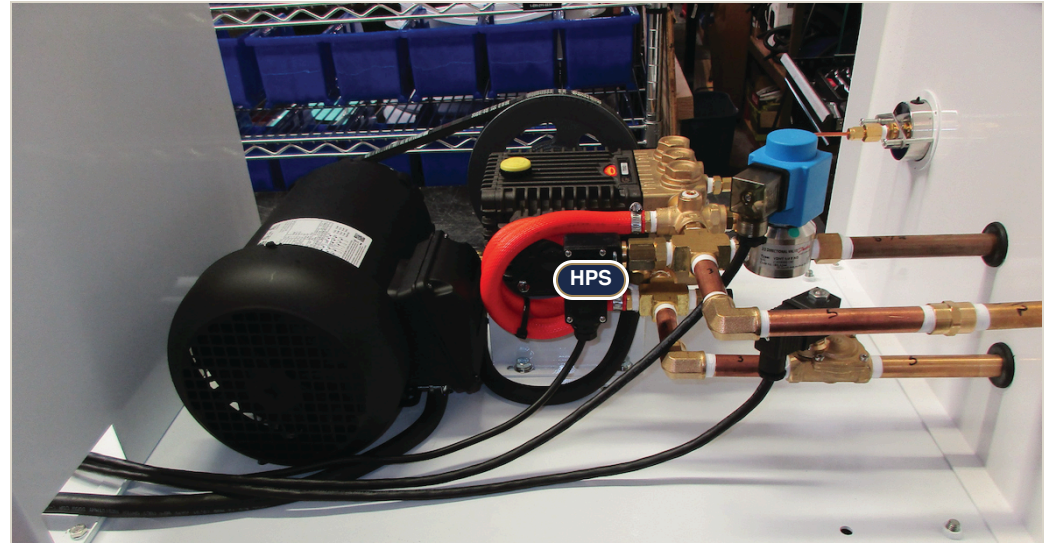


Figure 2 — Pump enclosure interior, water facilities end. The HPS (black housing, pinned) is mounted on the brass high-pressure discharge plumbing at the pump head, below the unloader valve. Its cable runs back to the electrical panel.

System Pressure Points

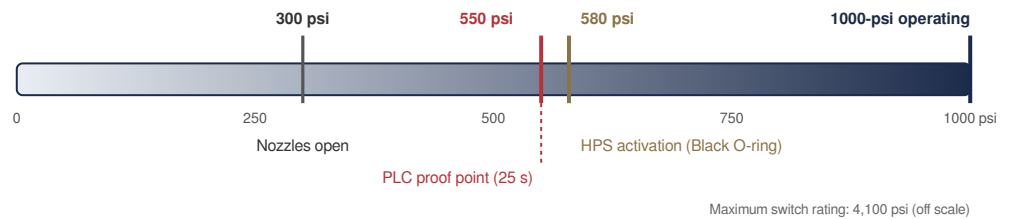


Figure 3 — Where the HPS fits among FanMist system pressures.

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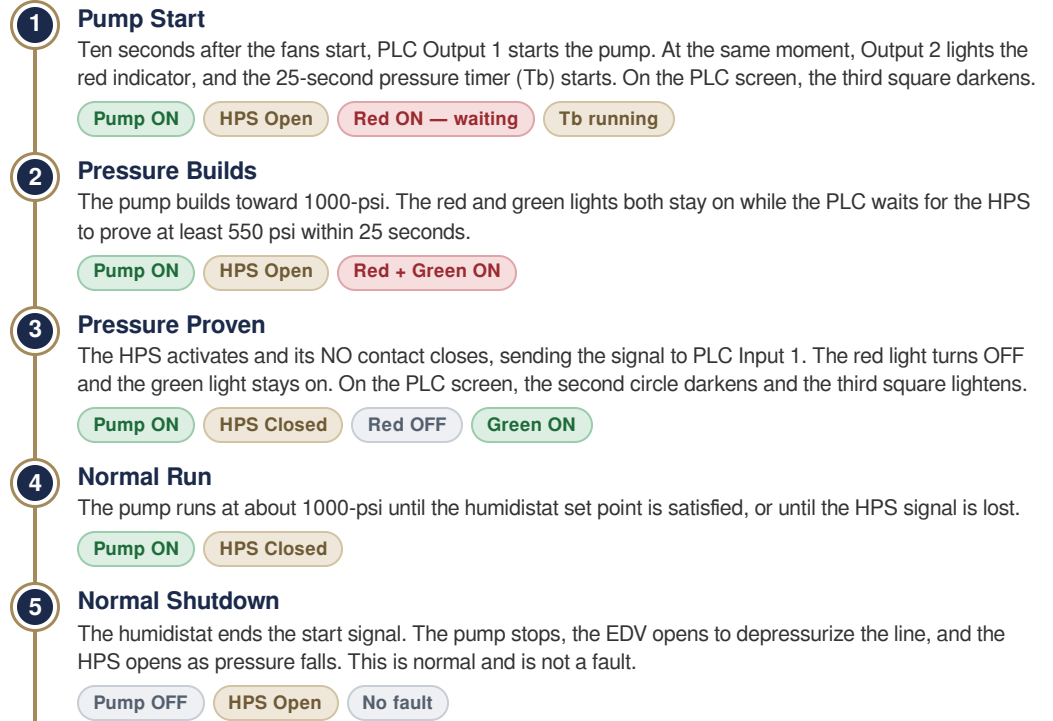
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PLC CONNECTION
Omron PLC Input 1

Operating Logic & Sequence

The HPS is the pressure-proving input to the Omron PLC. The PLC starts a 25-second timer (Tb) whenever the pump starts, and checks the HPS throughout pump operation. HPS position tags are shown in a neutral color, because an open switch is normal whenever the system is not pressurized.



Pump Faults OFF: Pressure Not Proven

If the HPS signal does not reach PLC Input 1 within 25 seconds, the system shuts down. The PLC squares other than the third one lighten in the normal off-sequence. The system **stays off until reset**: the first circle stays dark and the cube relay LED stays on, because the humidistat is still sending its start signal. No power goes to any system component, and the third square stays dark until the system is reset.



Pressure Lost While Running

If a line break or leak lets pressure drop below the switch point, the HPS opens, the red FAULT light comes on, and the system shuts down automatically. Whenever the system shuts down this way, check for leaks before restarting.

Indicator & PLC Screen Reference

Condition	Indicator Lights	PLC Screen
Pump started, waiting for the HPS	Red + Green ON	3rd square dark (HPS timer active)
Pressure proven (HPS closed)	Green ON, Red OFF	2nd circle dark · 3rd square light
HPS fault, not proven within 25 s	Red stays ON	1st circle dark · 3rd square stays dark until resets

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Electrical Integration & Settings

Wiring

The HPS is factory-wired inside the Pump Station between the PLC supply rail and **PLC Input 1** (see “HPS” on the 115V and 480V schematics in TDD IHC–TDD–WIR–1026–RevA). The switch has three leads, and two are used. FanMist needs a contact that **closes when pressure is proven**, so the Common and Normally Open leads are connected.

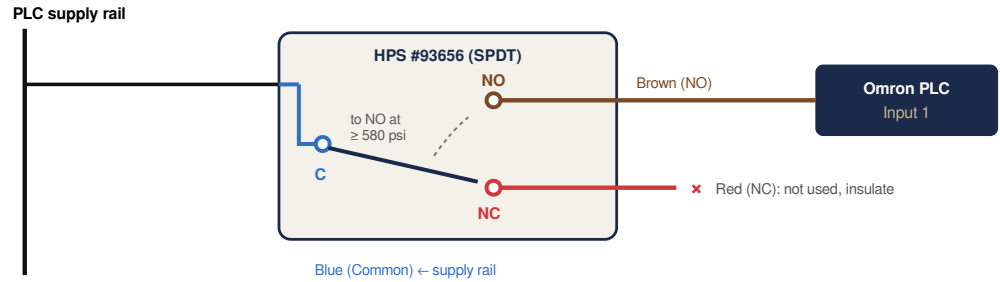


Figure 4 — HPS contact arrangement. Shown at rest (no pressure). At ≥ 580 psi the contact moves from NC to NO, so Common (Blue) and NO (Brown) complete the pressure-proven circuit to PLC Input 1. NC (Red) is not used.

Lead	Contact	FanMist Use
Blue	Common	Connected: PLC supply side
Brown	Normally Open (NO)	Connected: to PLC Input 1, closes when pressure is proven
Red	Normally Closed (NC)	Not used: insulate the end

When replacing the switch, match the connections of the switch you removed. The contacts are rated 250 V – 15 A, well above the PLC input signal.

PLC Pressure Timer (Tb)

Factory setting	25 s to prove ≥ 550 psi
Adjustable range	1–99 s, or longer
Initial start-up	The factory sets the overall limit at 60 s. Cycling the system ON/OFF several times may be needed to fill the supply lines.
Fault counters	Press ESC from the standard PLC operating screen

Resetting After an HPS Fault

1. Find and correct the cause of the pressure loss: a leak, low water, a clogged pre-filter, or poor water quality.
2. Check that there are no leaks before restarting.
3. Reset the PLC by turning the system start signal, or the pump switch, **OFF then ON**.
4. Confirm the gauge reaches 1000-psi and the red light goes out within 25 s.

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Replacement & Troubleshooting

Replacing the HPS

- 1 Make safe.** Turn the pump switch OFF and lock out/tag out electrical power. Depressurize the system (the EDV must open) and confirm zero pressure on the gauge.
- 2 Disconnect.** Note where the Blue (Common) and Brown (NO) leads land, and that the Red (NC) lead is unused. Then disconnect the leads from the panel.
- 3 Remove and install.** Unthread the switch from the 3/8" BSP port. Install the replacement **#93656 PSS31 Black**, making sure the Black O-ring is in place, and seal the threads.
- 4 Reconnect and test.** Land the Blue and Brown leads as before and insulate the Red lead. Restore power and run a cycle. The red light must go out within 25 s as pressure passes the switch point. Check the port for leaks.

Troubleshooting

Symptom	Possible Cause	Corrective Action
Red FAULT light, no pressure	Pump failed to reach 550 psi within 25 s: leak, low water, clogged filter or poor water quality	Check the lines and filter and test the water treatment. Correct the issue, then reset the PLC.
Pressure builds slowly, or the red FAULT light comes on	Restricted flow, or no water through the inlet solenoid	Verify the inlet pressure gauge reads 25–100 psi. Clean or replace the solenoid valve.
Pump runs but has no pressure or low pressure	Inlet solenoid not opening, a clogged pre-filter, or a leak	Clean or replace the inlet solenoid. Replace the pre-filter. Inspect the tubing for leaks.
Pressure drops, or slow pressurization	Leak at a Slip-Lok fitting, or damaged tubing	Inspect each fitting. Re-seat the tube or replace the fitting.
Shutdown during initial start-up	High-pressure lines not yet filled with water	Cycle the system ON/OFF several times to fill the lines (60 s start-up limit).
PLC does not reset after a fault	Fault counters not cleared	Press ESC on the PLC screen to view the counters. Turn the start signal OFF, then ON.
Gauge shows ≥ 550 psi but the red light stays on	No HPS signal at PLC Input 1: a lead or connection problem, a wrong O-ring version, or a failed switch	Lock out power. Check the Blue and Brown connections. Confirm the part is #93656 (Black). Replace the HPS if needed.

SAFETY: Never bypass or jumper the HPS. It is the system's protection against running the pump dry or unloaded, and against continued pumping after a line break. Maximum operating pressure is 1000-psi. Always lock out/tag out and depressurize before service.

For all system symptoms, see the standalone *FanMist Troubleshooting Guide*. Related TDDs: IHC–TDD–PLC–0926–RevA (Omron PLC) · IHC–TDD–WIR–1026–RevA (Wiring & Schematics) · IHC–TDD–ISV–1026–RevA (Inlet Solenoid Valve).