



TECHNICAL DATA
DOCUMENT

Unloader Valve / Pressure Regulator

Brass · External Bypass · 3/8" MNPT
· Part #93521



KEY SPECIFICATIONS

IHC PART NUMBER
93521

TYPE
Spring-loaded, pressure-actuated
unloader with external bypass

FACTORY SETTING
1000-psi / 70 bar (maximum)

PORTS
3/8" MNPT

BODY
Brass

SIZE / WEIGHT
≈ 4 × 3 × 3 in · ≈ 0.5 – 1 lb

MINIMUM PUMP FLOW
≈ ½ of rated flow

BYPASS DESIGN TARGET
30 – 40% excess pump capacity

LOCATION
Pump outlet (discharge) side

MEDIUM
Clean, treated water only

Specifications

General Description

The unloader valve is the **pressure regulator and bypass valve in one**. It is plumbed on the outlet side of the high-pressure pump, where it controls the pump's output pressure (typically 1000-psi). It also sends any excess water from the output back to the pump inlet.

It is a spring-loaded, pressure-actuated brass valve with an external bypass, in the Italian-style layout common on high-pressure misting pumps. The valve is factory-set to a maximum system pressure of **1000-psi (70 bar)**.

Part Identification



93521

Unloader valve / pressure regulator: brass, external bypass, 3/8" MNPT ports, factory-set to 1000-psi maximum. Fits all FanMist Pump Stations.

Technical Data

Unloader Valve · Part #93521

Function	Sets the pump discharge pressure and bypasses unused flow back to the pump inlet
Type	Spring-loaded, pressure-actuated regulator/unloader with external bypass
Factory setting	Maximum system pressure 1000-psi / 70 bar. Do not raise above this.
Body material	Brass
Ports	3/8" MNPT
Size	About 4 × 3 × 3 in
Weight	About 0.5 – 1 lb
Flow range	Bypasses unused flow so the pump can run down to about half of its rated flow
Medium	Clean water only (treated and 5-micron filtered)
Location	Pump Station interior, on the pump discharge at the pump head

Two Jobs, One Valve

- 1 Regulate pressure.** Holds the pump discharge at the factory setting (1000-psi) feeding the high-pressure lines and nozzles.
- 2 Bypass excess flow.** Water the nozzles don't use is routed back to the pump inlet, so the pump can run below its rated flow without over-pressurizing.

Do not adjust. The valve is factory-set. Raising it above 1000-psi can void the warranty.



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Component Identification & Location

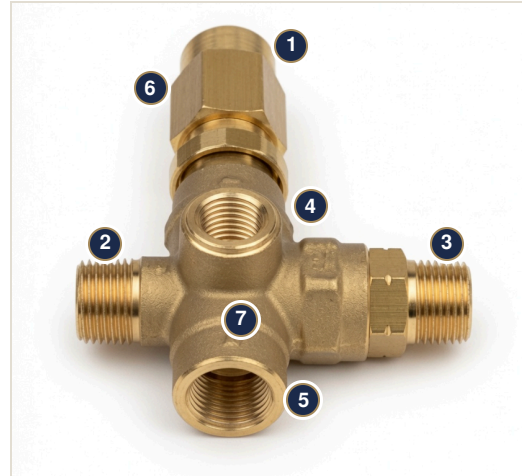


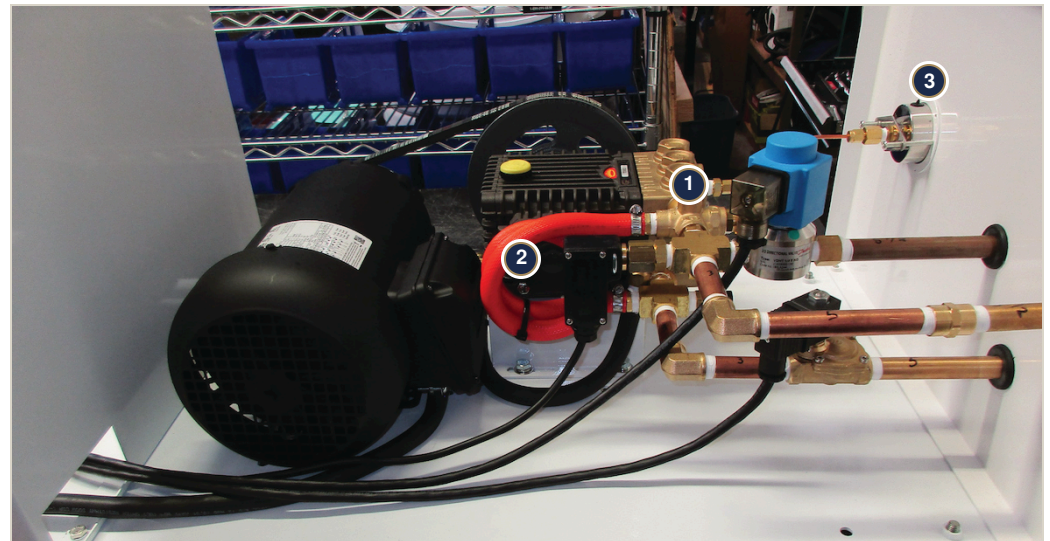
Figure 1 — Unloader valve #93521.

FEATURES

- 1 Male port, top: 3/8" MNPT
- 2 Male port, left: 3/8" MNPT
- 3 Male port, right: 3/8" MNPT, with hex nut
- 4 Female port, top face: auxiliary threaded port
- 5 Female port, front face: auxiliary threaded port
- 6 Upper hex section: wrench flats
- 7 Cast brass body: houses the spring-loaded regulating valve

Port connections: the pump discharge, regulated outlet and external bypass are connected at the factory. When replacing the valve, keep the same orientation and match each connection on the valve you removed.

Location in the Pump Station



- 1 Unloader valve (pressure regulator) on the pump head discharge
- 2 Orange high-pressure hose from the unloader valve
- 3 Pump output pressure gauge: read the regulated pressure here

Figure 2 — Pump enclosure interior, water facilities end.



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How the Unloader Works

The high-pressure pump always delivers its rated flow. The nozzles on the mist rings use only part of it. The unloader's spring holds a valve closed until discharge pressure reaches the factory setting. As pressure tries to rise above that point, the valve opens its external bypass and sends the unused water back to the pump inlet. Discharge pressure stays steady at about 1000-psi whatever the nozzle demand.

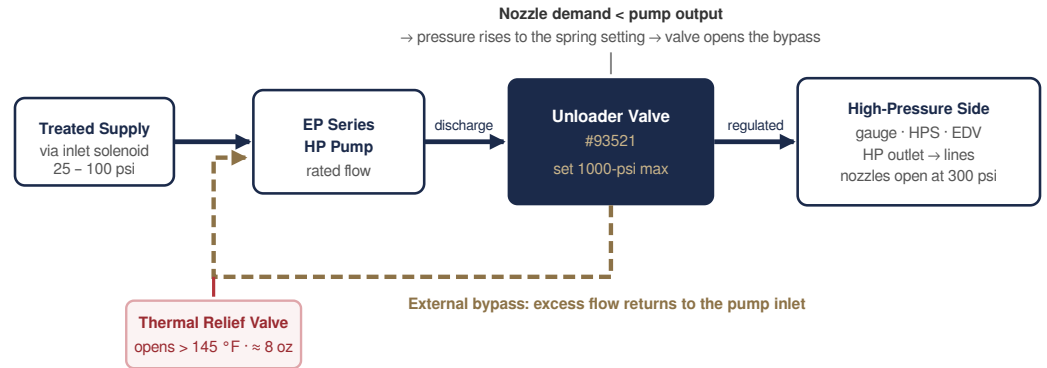


Figure 3 — Pressure and bypass circuit. Regulated water continues to the high-pressure side, and excess flow loops back to the pump inlet. The thermal relief valve protects the inlet if bypass water overheats.

On the Pressure Side

- Sets the pressure for atomization: 1000-psi at the nozzles, which open mechanically at 300 psi.
- Lets the HPS prove 550 psi within 25 s on every start.
- Read the regulated pressure on the pump output pressure gauge.

On the Bypass Side

- Water the nozzles don't use recirculates instead of building excess pressure.
- Recirculated water warms with time. Heavy, sustained bypass raises inlet temperature.
- More bypass shortens the service life of the valve and pump.



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Bypass, Pump Sizing & Thermal Protection

FanMist pumps are sized for the total moisture required plus extra capacity for possible future needs. The unloader bypasses the difference. The more water it bypasses, the warmer the recirculated water gets and the harder the valve and pump work. Pump sizing is the main control on bypass.

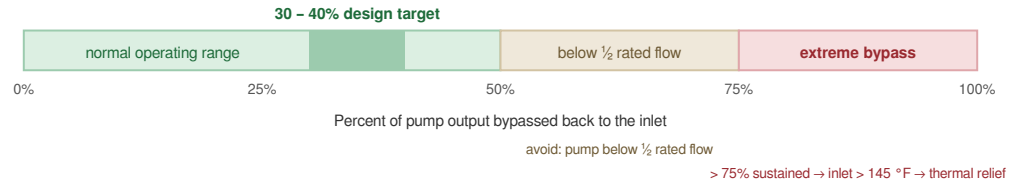


Figure 4 — Bypass operating zones for the unloader and pump.

Sizing Guidance

Design target	30 – 40% excess pump capacity
Minimum flow	The unloader lets the pump run down to about ½ of its rated flow
Extreme bypass	More than 75% bypass for an extended time overheats the inlet supply
Service life	More bypass means shorter valve and pump life

Worked Example

A **1 gpm (500 lbs/hr)** pump is specified when the plant actually needs **0.5 gpm (250 lbs/hr) up to 0.75 gpm (375 lbs/hr)** of moisture. This avoids conditions that would test the limits of the thermal relief valve through extreme pump bypass.

Thermal Protection

Every pump includes a **thermal relief valve** on the bypass circuit. It opens if the water supply to the pump goes above **145 °F**, usually because of extreme bypass within the pump (more than 75% for an extended time).

1. Inlet water goes above 145 °F.
2. The thermal relief valve opens and dumps enough water to cool the inlet supply, usually about 8 oz.
3. The valve closes and waits until the water temperature goes above 145 °F again.

Frequent thermal relief discharge means the pump is bypassing too much. Reduce bypass by sizing the pump correctly for the load, and improve inlet water cooling.

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Settings, Service & Troubleshooting

Pressure Setting

- Factory-set to a **maximum system pressure of 1000-psi (70 bar)**.
- **Do not raise the setting** above 1000-psi. Doing so can void the warranty and overstress the system.
- Check it on start-up: the pump output pressure gauge should build to 1000-psi well under a minute after the pump starts.

Service

- The unloader is spring-loaded. Unstable pressure usually means debris or worn seals.
- Clean the valve, or replace it with #93521.
- Keep water treated and filtered. The valve is rated for clean water only.

Replacing the Unloader

- 1 Make safe.** Turn the pump switch OFF and lock out/tag out power. Depressurize the system (the EDV must open) and confirm zero pressure on the gauge.
- 2 Mark and remove.** Mark each connection (pump discharge, regulated outlet, bypass) and note the valve's orientation, then unthread the valve.
- 3 Install.** Seal the threads on the new #93521 and install it in the same orientation, reconnecting each line to the same port. Do not adjust the factory setting.
- 4 Test.** Restore water and power and run a cycle. Confirm 1000-psi on the output gauge, the red light out within 25 s, steady pressure and no leaks.

Troubleshooting

Symptom	Possible Cause	Corrective Action
Unstable or fluctuating pressure	Debris in the unloader or worn internal seals	Clean the unloader, or replace the valve (#93521). Check water treatment and the 5-micron pre-filter.
Pressure fluctuations (system-wide)	Clogged pre-filter, scale in the lines, or leaks	Replace the pre-filter, flush the system and check for leaks.
Thermal relief valve discharges often	Inlet water above 145 °F from excessive bypass	Reduce bypass (size the pump correctly). Improve inlet water cooling.
Gauge reads above 1000-psi	Factory setting changed, or the valve is sticking	Do not operate above 1000-psi. Restore the factory setting or replace the valve. Contact IHC: 765-702-4083.
Pressure will not build to 1000-psi, or the red FAULT light comes on	Restricted inlet supply, leaks, or a stuck-open bypass	Verify the inlet gauge reads 25–100 psi and the inlet solenoid opens. Inspect Slip-Lok fittings. Clean or replace the unloader.
Pump runs hot, or water feels warm at the inlet	Sustained heavy bypass: pump oversized for the load	Review load against pump capacity (30–40% excess target). Confirm that all nozzles and ball valves are open.

For all system symptoms, see the standalone FanMist Troubleshooting Guide. Related TDDs: IHC–TDD–EPS–0926–RevA (EP Series Pumps) · IHC–TDD–HPS–1026–RevA (High-Pressure Safety Switch) · IHC–TDD–ISV–1026–RevA (Inlet Solenoid Valve).