



TOP VALVE O&M Manual

High Pressure: 2,413 kPa (max)

Back Pressure and Pressure Relief Valves

Please Note:

This instruction manual provides detailed information and instructions that must be read, understood and followed to ensure that the equipment is installed, operated and serviced in an appropriate manner. Failure to do so before using may result in hazardous consequences and/or improper operation.

Note:

See Gauge Installation Instructions: Before removal of gauge plug, to avoid thread damage. (Gauge port is optional)

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Introduction

The following instructions are to provide information on the Installation, operation and maintenance of Top Valve, diaphragm style Back Pressure and Pressure Relief Valves. The valves are designed to improve the performance and safe operation of most pumps used for metering applications.

Various materials of construction are available dependent on the requirements of the application and the type of fluids being transferred.

The valve(s) are factory set at 690 kPag (100 PSIG) with a field adjustment range of 345 – 2,413 kPag (50-350 PSIG). Other factory set pressure ranges (within the range of the valve) is available upon request.

Special Features of TOP VALVE:

- Aluminium top with 316 stainless steel, Hastelloy C or Alloy 20 wetted construction
- Viton diaphragm
- Turn down pressure adjustment limits pressure to 2,413 kPag (350 PSIG)
- (Optional) Built-in matching material gauge port plug is easily removed for gauge option
- Rectangular shape designed for ease of installation
- Specially designed spring provides consistent pressure adjustments through the range 345 – 2,413 kPag (50-350 PSIG)
- Valve top specially designed for mounting clamp to help reduce pipeline stress when required
- Built-in downstream manual air release, for ease of pump priming
- Built-in anti-siphon

Back Pressure Valve

Diaphragm Back Pressure Valves serve two primary functions. The first is to provide a constant discharge pressure on the pump, which improves the performance, efficiency and consistency of the delivered volume. Secondly, the valve performs as an anti-siphon mechanism against positive or negative pressures in the downstream line. The valve is designed to allow for the venting of air into the downstream pipeline. This provides for easier priming of metering pumps that function under a suction lift. This is accomplished by a simple adjustment of the handle.

The valve comes complete with a gauge port, pre-plugged at the factory or can be ordered complete with gauge to suit application. This eliminates the need to install extra fittings in the line to accommodate the addition of a gauge for the purpose of reading and setting of pressure.

Caution:

The gauge port is solely for the installation of the gauge and cannot be used for the bleeding or venting of the system. Improper operation and/or hazardous consequences could result. (see gauge installation instructions)

Reason for Selection and Use

Metering pumps having an atmospheric discharge system pressure of less than 138 kPa (20 psi) will benefit from the installation of a back pressure control valve. Metering pumps in general require downstream back pressure to ensure smoother function of the discharge check assemblies, which enhances the accuracy of the discharge flow.

Pressure Relief Valves

Diaphragm Pressure Relief Valves are designed to relieve excess line pressure that exceeds the set pressure of the valve. This protects the system piping from overpressure that could result in hazardous leakage and/or damage to the pump and other system components.

The Pressure Relief Valves are normally recommended to be set between 34 and 69 kPag (5 and 10 PSIG) above the system operating pressure.

The valve is of an in-line flow through design with bottom NPT (or BSP) relief port for piping back to supply tank or feed side of pump.

Two port valves are also available – designed to be installed on a branch from the main flow. These valves have only an inlet and a relief port.

The valve comes complete with a gauge port, pre-plugged at the factory or can be ordered complete with gauge to suit application. This eliminates the need to install extra fittings in the line to accommodate the addition of a gauge for the purpose of reading and setting of pressure.

Caution:

The gauge port is solely for the installation of the gauge and cannot be used for the bleeding or venting of the system. Improper operation and/or hazardous consequences could result. (see gauge installation instructions)

Reason for Selection and Use

When using motor driven metering pumps, a pressure relief valve should always be installed on the downstream side of the pump to protect the system from over pressure which can cause pipe leakage and/or rupture.

Installation and Maintenance

Back Pressure Valves

Back pressure control valves are installed on the discharge line of the pump. The valve should be located within 600 mm of the pump discharge to ensure check valve seating. When pumping to a process line without an injection valve, the back pressure valve should be installed as close as possible to the injection point to prevent siphoning.

When used in conjunction with a pressure relief valve, always locate the back pressure valve on the downstream side of the relief valve.

The valve is supplied from the factory pre-set at 690 kPag (100 psig). To increase the pressure setting, back off the lock nut located beneath the colour coded handle. Turn the handle clockwise to increase pressure setting or counter clockwise to reduce pressure setting. Approximately one (1) full turn of the handle is equal to 345 kPag (50 psig).

If maintenance is required on the valve:

1. Ensure that the valve is properly isolated from the line, not under pressure and properly flushed of chemical before proceeding to disassembly.
2. Turn knob on the top of valve, counter-clockwise until all spring pressure is released before proceeding to undo retaining nuts, to remove top of valve for diaphragm replacement.
3. All working components ie. diaphragm, spring can be accessed by removing the four retaining nuts located on the top of the valve.
4. When replacing the diaphragm, ensure the diaphragm is fitted in the centre of the body diaphragm cavity. The installed diaphragm also functions as the body seal. Torque nuts to 7 Nm when reassembling.

Pressure Relief Valves

Pressure relief valves are installed on the discharge line of a pump and should be located as close as possible to the metering pump. The valve is of an in-line flow through design with a bottom NPT (or BSP) relief port for piping back to the supply tank or feed side of the pump.

Some valves are 2 port design that are intended to be installed on a branch.

Never install shut-off/isolation valves between pump discharge and in-line pressure relief valves. When using in conjunction with a back pressure control valve, always install back pressure valve downstream of pressure relief valve. The relief port on the pressure relief valve should be piped back to the feed tank or suction side of the pump (see typical installation schematics).

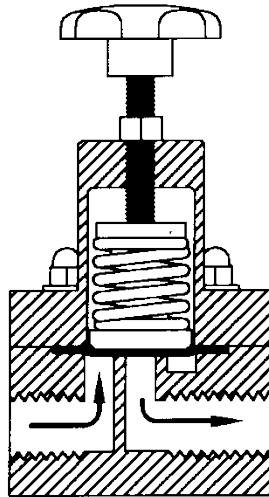
Gauge Installation Instructions

For the convenience of pressure setting and reading, there is a plugged gauge port provided, if the valve has not been ordered complete with gauge. Before using a ¼" Hex key to remove the plug and follow the Caution stated below.

Caution:

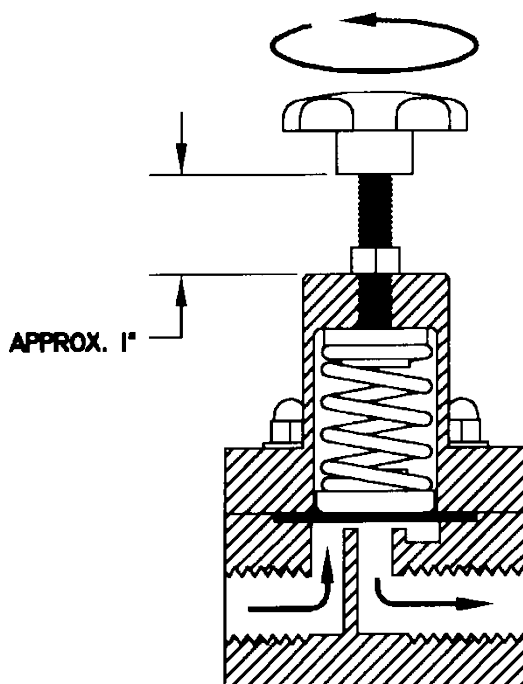
Before removing the optional gauge port plug to install a gauge, ensure that the discharge line is not under pressure and lines are flushed with water prior to proceeding. Ensure that the gauge you are using is chemical resistant to the fluid before installing.

Manual Air Release



**DIAPHRAGM POSITION AT
50 PSI BACK PRESSURE**

The valve is shipped with a factory set pressure of 690 kPag (100 psig). The diagram to the left shows a cut away view of the position of the diaphragm on the seat.



**AIR RELEASE POSITION WITH
HANDLE BACKED OFF**

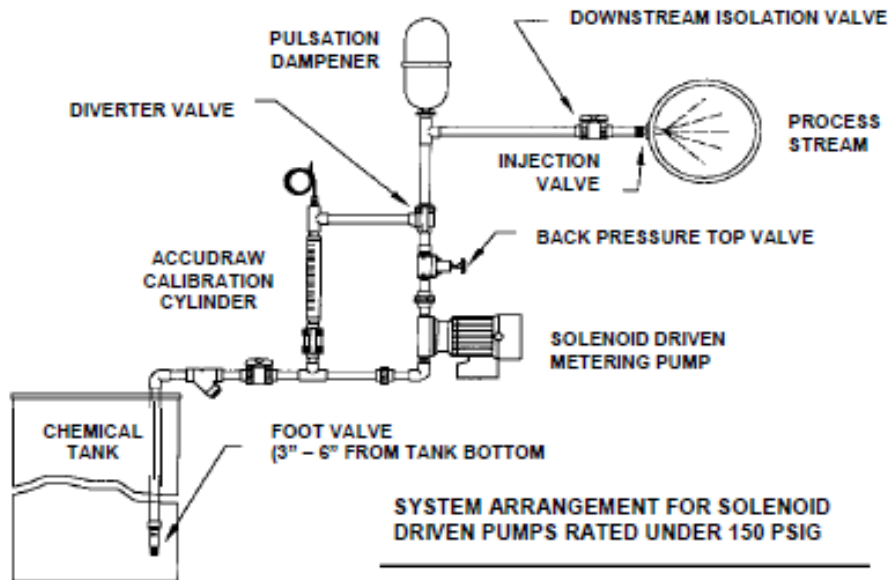
To adjust the valve to relieve air or gas downstream:

1. Back off lock nut located beneath the colour coded handle.
2. Turn handle counter clockwise until approximately 1 inch of thread is exposed.
3. At this adjustment, the spring has relieved all tension from the diaphragm allowing air or gas to be vented downstream.

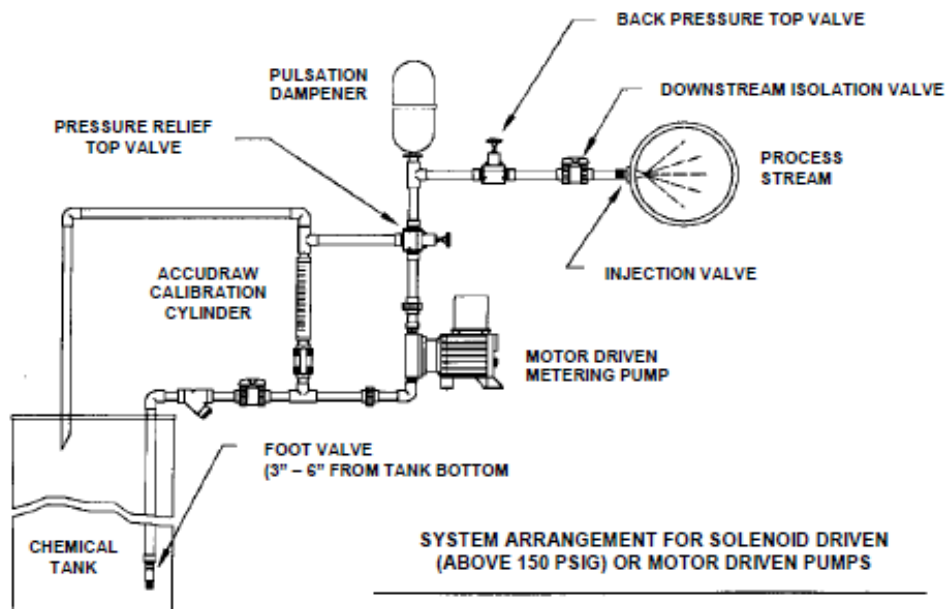
Typical Installations

The installations below are typical installation examples only. Consult your engineering department for the appropriate installation for your application or call the factory for advice.

Example A: Solenoid Driven Pumps Rated Under 1000 kPag (150 psig)



Example B: System arrangement for solenoid driven (above 150 psig) or motor driven pumps.



Fluid Characteristics

Subject: Flow capacity through TOP VALVE, back pressure and pressure relief valves. Under continuous flow conditions: @ 345 kPa (50 PSI) with ambient temperature water.

Valve Size (Inch)	USGPM		Valve Size (DN)	L/H
1/4"	4		8	908
1/4" / 1/2"	4		8 / 15	908
1/2"	6		15	1363
3/4"	8		20	1817
1"	14		25	3179
1-1/2"	25		40	5678
2"	40		50	9084

Note:

Capacities will increase with pressure. (If pressure is doubled, flow rate will approximately double.) For capacities of valves with pulsating flow use approximately 1/3 of the above given flow rates.