

Wallace & Tiernan® Gas Feed Systems

Series V-2000™ Select Chlorinator

SIEMENS

Introduction

Siemens Water Technologies V-2000™ Select Chlorinator has the benefit of more than 90 years of experience in gas dispensing technology. Designed to allow end users to choose only those items specifically required, it provides versatile and cost-effective selections without sacrificing the performance and quality of the full-featured V-2000™ Chlorinator.

It is available as a modular-mounted unit with a variety of configurations and capacities up to 10,000 lbs. (4,500 kgs.) per day, and as a more compact wall-mounted V-2000 select with identical reliability and performance. The wall-mounted unit has capacity up to 3,000 lbs. (1,350 kgs.) of chlorine per day.

Standard features include:

- Safe all-vacuum operation using accurate, reliable V-Notch gas flow control
- Large, 10" rotameters for the highest degree of readability
- Front panel lifts off for easy access to components requiring routine service
- Flexible control modes, from manual to fully automatic, utilizing a specifically designed disinfection controller
- Vacuum regulators with unique, integral double check valves that significantly minimize the possibility of venting gas to the atmosphere.
- Built-in, non-isolating, automatic switch-over for continuous operation and complete gas withdrawal from any container.



Key Benefits:

- Versatile floor-mounted or wall-mounted configuration provides for operator convenience and stable control platform
- Large 10" flowmeters for the highest degree of readability and accurate indication of feed rate
- Flexible control options from manual to sophisticated fully automatic systems

Features

The V-2000™ Select Chlorinator is intended for chlorine use only. It consists of three basic components: a control module for control and indication of gas feed rate; a vacuum regulating valve to reduce supply container pressure to a vacuum; and an injector to create the vacuum source for the entire system and mix the chlorine gas with the treated water.

V-Notch Gives Superior Gas-Flow Control

The V-Notch orifice consists of a precisely grooved plug sliding in a fitted ring. Any position of the plug in the ring results in a specific orifice size and corresponding feed rate. This results in accurate gas-flow control and excellent repeatability. Control ranges from manual to sophisticated automatic arrangements. The V-Notch resists sticking and corrosion: it's made of chemical-resistant, self-lubricating plastic.

Dedicated Automatic Controller

The Wallace & Tiernan® V-Notch Controller is designed specifically for chlorination/disinfection systems and is available in two arrangements. One is for flow-proportional-control systems, the other is for systems based on residual control for combined residual-flow-proportional control. The Controllers feature a user-friendly approach to all operator functions, and fast, easy calibration.

Vacuum Regulating Valves

Vacuum regulating valves are made of rugged plastics and metals to withstand full supply pressure. Manually operated valves contain a gas shutoff position to enable container changes without admitting air, dirt, or moisture to the control module and without shutting off the injector. These valves are factory-set to reduce gas pressure to optimum operating vacuum and can be serviced without disturbing the adjustments. Filters protect control components from impurities in the gas.

To ensure a continuous supply of gas being fed, automatic switchover from an empty container is achieved by a pair of optional vacuum-regulating valves. The valve on standby is held closed by a detent-type lockout. When the on-line supply is exhausted, system vacuum rises to a higher-than-normal level. This increased vacuum overcomes the latching force of the detent and the standby supply comes on line—along with the original supply. Feeding from both containers virtually assures complete emptying of the containers. [Automatic-switchover valves are available only with capacities to 3,000-lbs. (1,350 kgs.) of chlorine per 24 hours and are not for use with evaporators. A liquid-chlorine switchover system is available for evaporators.]

Injectors

The injectors used with V-2000™ Chlorinators are designed to create a powerful operating vacuum, and to save water and booster-pump horsepower.

$\frac{3}{4}$ - and 1-inch injectors are fixed throat, differential-type constructed from PVC. They have built-in double spring diaphragm and poppet check valves to protect against back flooding. Their design is such that, should operating

vacuum stop, a spring closes the diaphragm valve.

The differential-type, 2-inch injector can be PVC with an adjustable throat, or a bronze body injector is available for higher pressures with a Bellofram (water-pressure)-operated adjustable throat for start-stop operation. The 3- and 4-inch differential injectors are plastic and rubber-lined cast iron with adjustable throats. Adjustable throat injectors permit operation to be fine-tuned based on site hydraulic conditions. As these conditions change, for instance due to booster pump impeller wear, the injector can be adjusted to maintain proper performance.

Operation

In all V-2000™ Select Chlorinators, the system operates under a vacuum produced at the aspirator-type injector. Vacuum is transmitted to the control module and then to the vacuum-regulating valve by plastic pipe or tubing.

Gas enters the vacuum-regulating valve. Here a diaphragm senses vacuum on one side and atmospheric pressure on the other. Force on the diaphragm displaces a spring-loaded stem off of its seat. This tends to maintain the proper operating vacuum ahead of the control module and permits gas to flow toward the control module.

Still under vacuum, gas enters the control module. Its flow rate is measured as it passes through the rotameter and controlled at the V-Notch by changing orifice area. At this point, gas flow is controlled by a differential-regulating valve. This valve maintains a constant differential across the V-Notch. In the 10,000-lb. chlorinator, a combination vacuum-trimmer and drain-relief valve is included; it relieves to drain any water that might force its way past the ball check in the injector. Also, by trimming the powerful injector vacuum, this valve acts as an accessory to the differential-regulating valve.

Gas next passes to the injector. At the injector, metered gas is dissolved in the water stream. The resultant solution is discharged to the point of application

Control Methods

Feed rate of the V-2000™ Select Chlorinator is controlled by either interrupting the injector-water supply to shut off the chlorinator's operating vacuum or by changing V-Notch-orifice area (by positioning the v-grooved plug in its ring) while holding vacuum differential across the orifice constant.

Manual Control

Manual control is achieved by changing orifice area (V-Notch-plug position) via an adjustment knob on front of the chlorinator.

Start-Stop or Program Control

This type of control is achieved with simple implementation. The V-2000™ Select's Chlorinator operating vacuum is started and stopped by interrupting the injector water supply.

Direct mA Control

Direct 4-20 mA input control provides direct input from an external control device such as a flowmeter or SCADA System. See WT.040.050.000.IE.PS for more details.

SCU - Signal Conditioning Unit

The economical SCU gives automatic process control in response to one process variable, typically flow rate. Input flow scaling and output dosage adjustments allow independent scaling from 10 to 400%. See WT.040.100.000.UA.PS for more details.

PCU - Process Control Unit

The PCU is a full-feature setpoint controller. It provides automatic process control in response to two process inputs, typically flow rate and chlorine residual. The PCU can operate in different control modes including residual feedback and compound loop. For more information request publication WT.040.200.000.UA.PS.

Technical Data

Accuracy \pm 4% of indicated feed rate

Operating Range

Manual - 20:1

Automatic - 10:1

Control

Manual, remote manual, start-stop, and program. Also the following automatic modes: flow proportional, direct residual, and compound-loop.

Injector-Operating Water

Must be reasonably clean. Pressure and flow depend on injector size, chlorinator capacity, and backpressure at application point.

Maximum Injector-Water Pressure Pressure at Application Point

75 psi (5 bar) is the maximum allowable backpressure with flexible plastic pipe or hose. 75 to 160 psi (5-10.5 bar) requires high-pressure hose or rigid pipe for the solution line. A solution pump after the injector will allow application against higher pressure.

Connections

- 500-lb. (225 kgs.) module: Vacuum-regulating-valve inlet is a yoke connection to cylinder, header, or ton-container valve; outlet to control module is 1/2" female NPT pipe connection with threaded-compression fittings for 1/2" x 5/8" polyethylene tubing. Control module also has 1/2" female NPT with adapter for 1/2" x 5/8" tubing to injector. Injector water inlet is 1" female NPT, discharge is 3/4", 1", or 1 1/2" pipe or hose.
- 3,000-lb. (1,350 kgs.) module: Vacuum-regulating-valve inlet is 1" female NPT, outlet is reversible adapter for 1" female NPT or 1" female socket. Control module inlet is reversible adapter for 1" female NPT or 1" female socket (removal of adapter provides 1 1/2" female slip joint); outlet is 3/4" female slip-joint adapter (removal of adapter provides 3/4" female NPT). Vent is threaded-compression fitting for 1/4" x 1" tubing. PVC injector water inlet, 2" female NPT; discharge, 1 1/2" female pipe or 2" hose.
- 10,000-lb. (4,500 kgs.) module: vacuum-regulating-valve inlet is 1" female NPT; outlet is 1 1/2" female slip-joint connection Control module inlet and outlet are 1 1/2" female slip-joint connections. Vent is threaded-compression fitting for 1/4" x 3/8" plastic tubing. 3- and 4-inch injectors have 3" and 4" flanged pipe connections.

Maximum Injector-Water Pressure		
Injector Size	Back Pressure / Temperature	Back Pressure / Temperature
19.05 mm 3/4" PVC	300 psi / 100° F (20 bar / 38° C)	150 psi / 130° F (10 bar / 54° C)
25.4 mm 1" PVC	300 psi / 100° F (20 bar / 38° C)	150 psi / 130° F (10 bar / 54° C)
50.8 mm 2" PVC	125 psi / 100° F (8.3 bar / 38° C)	65 psi / 130° F (4.3 bar / 54° C)
50.8 mm 2" PVC	250 psi / 100° F (16.7 bar / 38° C)	125 psi / 130° F (8.3 bar / 54° C)
76.2 or 101.6 mm 3 or 4" Bronze	175 psi / 100° F (11.7 bar / 38° C)	90 psi / 130° F (6 bar / 54° C)

Capacities

Chlorinator Size	Chlorine capacity in lbs/24 hrs (Kgs/24 hrs)
500 PPD	3/10/20/30/50/75/100/150/200/250/300/400/500 1.3/4.5/9.0/13.5/22/34/45/68/90/110/136/180/225
3000 PPD	50/75/100/150/250/500/1,000/1500/2,000/3,000 22/34/45/68/112/225/450/675/900/1350
10,000 PPD	1,000/2,000/3,000/4,000/5,000/6,000/8,000/10,000 450/900/1,350/1,800/2,250/2,700/3,600/4,500

Electrical Requirements

Automatic arrangements require 115 volts $\pm 10\%$, 0.3 amp or 230 volts $\pm 10\%$, 0.15 amps, 115 volts, 50/60 Hz, 15 watts for heater at optional ton-container connection used with 200-lb. (90 kgs.) and 500-lb. (225 kgs.) vacuum-regulating valves and for heater on the 3,000-lb. (1,350 kgs.) and 10,000-lb. (4,500 kgs.) vacuum-regulating valves. There may be other accessories such as alarms and solution or booster pumps.

Overall Dimensions

Modules: 68 $\frac{1}{4}$ " H x 27 $\frac{1}{2}$ " W x 16" D
(1733 mm x 699 mm x 406 mm)

See Cat. Nos.: WT.025.054.100.UA.CN,
WT.025.054.102.UA.CN,
WT.025.054.104.UA.CN

Wall-Mount: 36-3/8" H x 27 $\frac{1}{2}$ " x 12 $\frac{1}{4}$ " D
(975 mm x 699 mm x 311 mm)

See Cat. No.: WT.025.054.106.UA.CN

Approximate Shipping Weights

Unit	lbs	kgs
Wall mounted unit	85 lbs	38.6 kgs
500 PPD unit	125 lbs	56.7 kgs
3000PPD unit	150 lbs	68 kgs
10,000PPD unit	200 lbs	90.7 kgs

Options

Side Panels

A pair of side panels is available to cover the structural support of the module.

Injector Vacuum Gauge

Provides operating vacuum status of the injector.

High-Low Vacuum Switch

A local or remote-mounted vacuum switch provides an alarm in the event of a high- or low-vacuum condition signifying loss of gas feed.

Gas Flow Transmitter

Non-inferential measurement of the rate of gas flow through any V-2000™ gas feeder. Consists of a NEMA 4X sensor transmitter with a 4-20 mA output directly proportional to gas flow. See publication WT.050.114.000.IE.PS.

Automatic Switchover

A pair of vacuum-regulating valves designed to switch to a fresh gas supply on an empty container. Liquid systems available for use with evaporators.

Ton-Container Kit

Adapts the vacuum-regulating valve for mounting on a ton container valve. It has a drip leg to trap initial spurts of liquid and a heater to evaporate them (200-lb and 500-lb. vacuum-regulating valves).

Related Accessories

Cylinder and ton-container valves, and connections; header valves with manifolding and connections; vent and injector inlet and outlet lines and clamps; main connections; alarms; solution and booster pumps; water-line solenoid valves; water-line pressure gauge; high-low vacuum switch and alarm; gas-line solenoid valves, safety equipment; on-line residual analyzers; residual test kits and instruments; chlorine detector; two-cylinder scales; evaporators; spare parts maintenance tools.

Chlorine Warning

All unattended chlorine containers and chlorination equipment should be continuously monitored for leaks. Sensitive chlorine detectors that will respond quickly to the presence of chlorine in the ambient air should be installed at each site. For more details see publication WT.050.130.000.UA.PS.

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