

# Wallace & Tiernan® Liquid Feed System LVN-2000 Liquid V-Notch

## Overview

Wallace & Tiernan continues to be the leader in the chemical feed and disinfection of potable water, wastewater and industrial process applications. With over 94 years of experience in the design and manufacture of chemical feed and disinfection products, using the collective expertise of the research and development centers around the world, it continues to produce safe and reliable methods of controlling the addition of chemicals to water sources. Designed to meet the global needs for feeding sodium bisulphite and sodium hypochlorite, the LVN-2000 Liquid Chemical Feed System is no exception.

## Main Features

- Reliable sodium hypochlorite feeding unaffected by out-gassing or the air-binding concerns of conventional metering pumps
- Smooth flow of solution; no pulsing output
- Choice of standard injector or Water Champ® Chemical Induction System to provide operating vacuum
- Capacities up to 139.5 lph (528 gph) with operating range as high as 20:1
- Direct reading or percent scale, visual indication of chemical feedrate with optional flow/no-flow alarm on high capacity
- Flexible control modes – manual to fully automatic control schemes
- Integral differential regulating valve to maintain a constant dosage even during pressure fluctuations with the injector
- Space saving, wall-mounted panel for simple installation and ease of access for maintenance
- Few moving parts for low maintenance and minimal spares demand

## Key Benefits:

- Reliable Sodium Hypochlorite feeding
- Choice of chemical induction systems
- Flexible control modes
- Simple to install and maintain
- Low maintenance costs



## Features

### Complete Liquid Feed System

The LVN-2000 liquid chemical feed system can handle the majority of chemicals used in water or wastewater treatment processes. It is ideal for solutions of sodium hypochlorite that have a tendency to out-gas, resulting in loss of feed with conventional metering pumps. The LVN-2000 uses a vacuum source such as an injector or a Water Champ® induction mixer to draw the chemical from the supply tank to the point of application. Utilizing the Wallace & Tiernan® V-Notch control valve, reliable feedrates can be maintained with either manual or automatic control schemes utilizing the proven controllers. A flowmeter provides accurate indication of feedrate with a percent or direct reading scale (GPH and LPH). An optional high/low alarm is available on high capacity systems.

### Wallace & Tiernan® V-Notch

The V-Notch variable orifice, field proven in thousands of installations worldwide, provides reliable and consistent chemical feed at any capacity requirement. Any position of the precision-machined grooved plug in the annular seat allows a specific feed rate through a corresponding orifice size. The result is accurate chemical feed control and excellent repeatability. By controlling this V-Notch either through simple manual operation or sophisticated automatic control systems, the LVN-2000 Liquid Chemical Feed System offers a host of options to provide an uninterrupted supply of chemical to maintain continuous disinfection and treatment.

### Differential Regulating Valve

A differential regulating valve maintains the proper vacuum differential across the V-Notch orifice. This maintains the set flow rate regardless of the changes in the supply tank fluid level and/or variations in the available vacuum at the injector. This mode of differential regulation is reliable and results in a stable output.



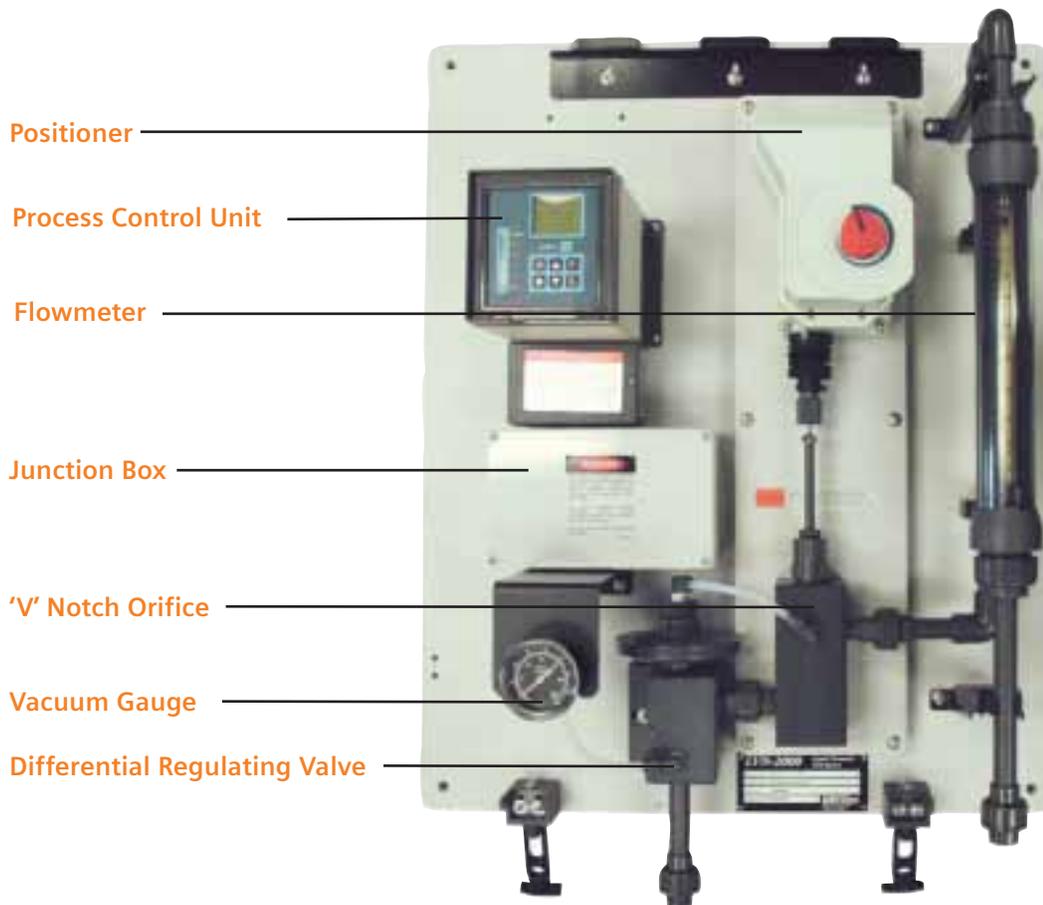
## Operation

The LVN-2000 Liquid Chemical Feed System consists of a V-Notch variable orifice and positioner, flow meter, vacuum regulator and a dedicated control unit (can also be remote) all mounted on a compact, panel for wall mounting. A removable cover is provided.

A vacuum is generated using an injector and booster pump arrangement or a Water Champ® Chemical Induction System that draws chemical through the LVN-2000 liquid chemical feed system from the chemical storage tank to the point of application. A vacuum regulating valve maintains a constant vacuum to the V-Notch orifice regardless of fluctuations in the vacuum supply. Visual indication of flow is provided by the integral flowmeter, calibrated in percent or direct reading, dual-scaled in both gal/hr and liters/hr. An optional

high/low alarm switch is available. The V-Notch variable orifice is controlled by the plug positioner with a full 76.2 mm ( 3") of travel to provide a wide range of adjustment of flow, with excellent repeatability. The plug positioner can be operated either manually or automatically.

The LVN-2000 system can be set to perform a wide variety of disinfection or dechlorination control functions based on flow and chlorine/sulfite residual inputs, with a choice of controllers available. As a result, dosing of sodium hypochlorite or sodium bisulfate, is achieved with high accuracy and reliability.



## Control Methods

Feed rate of any LVN-2000 System is controlled by either one or both of these methods: interrupting the injector-water supply to shut off the operating vacuum; changing V-notch-orifice area (by positioning the v-grooved plug in its ring).

### Manual Control

Manual control by changing orifice area (V-Notch-plug position) via an adjustment knob on the positioner.

### Start-Stop or Program Control

This type of control is achieved with simple implementation. The operating vacuum is started and stopped by interrupting the injector water supply with a solenoid valve or motorized valve wired into the control circuit of a pump, switch, controller, or timer.

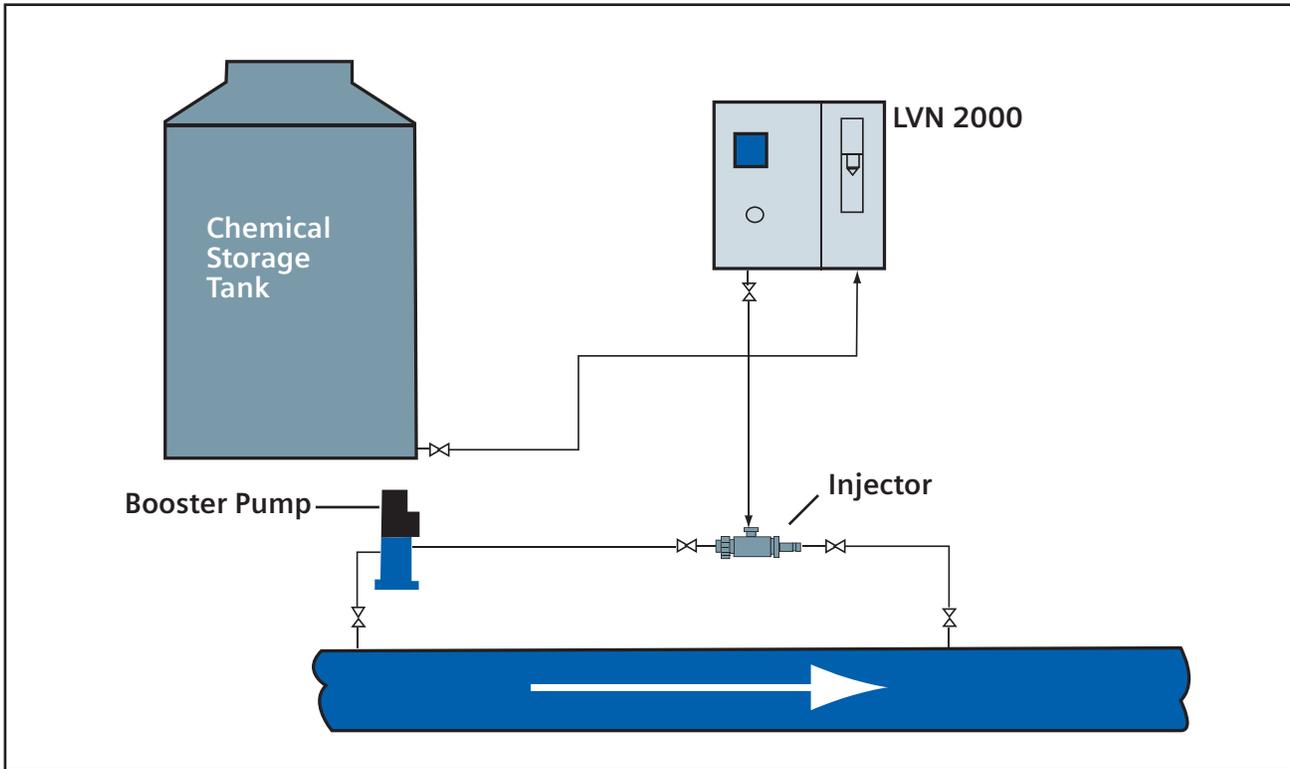
### SFC-SC Flow Proportional control

The economical SFC-SC gives automatic process control in response to one process variable, typically flow rate. Housed in a NEMA® 4X enclosure, it features an 8-character alphanumeric LCD display with 6-button keypad and menu-driven operator prompts for simple operation, setup and calibration. Input flow scaling and output dosage adjustments allow independent scaling from 10 to 400%. See publication WT.050.590.020.IE.PS for more details.

### SFC-PC Process Controller

The SFC-PC is a full feature setpoint controller. It provides automatic process control in response to two process inputs, typically flow rate and chlorine residual. The SFC-PC can operate in any of four different control modes including residual feedback, compound loop, dual signal feed forward and flow proportional. Easy operation, set up and calibration using intuitive menu navigation makes sophisticated control function simple. Housed in a IP65 (NEMA® 4X) enclosure. For more information request publication WT.050.590.010.IE.PS.





Reference WT.490.100.200.UA.CN for typical installation.

### Operation Standard Injector Version

The injectors used in the Liquid Chemical Feed system employ the proven Wallace & Tiernan® vacuum principle. The only motive power required to cause a flow of chemical through the equipment is the passage of a stream of water passing through the injector, which in effect is a very carefully designed restriction in the pipe that causes the pressure head to be almost completely converted to velocity head, creating an area of negative pressure at the point of greatest restriction. As a result the chemical is drawn under vacuum through the LVN-2000 and then mixes with the motive water. The resulting solution is conveyed to the point of application.

Two sizes of injector are used within the system. For capacities up to 35 lph (132 gph) a standard 1-inch injector is used. For capacities from 35 -139 lph (132-528 gph) a special high-capacity injector is used.

### High Hardness Water

In applications where the process water has a hardness of over 30mg/l of CaCO<sub>3</sub>, there are associated problems of scaling at the injector when dosing sodium hypochlorite. This can be dealt with in a number of ways. These include the provision of water softeners, or the installation of standby injectors or a Water Champ® chemical induction system.

The process water volume and hardness will have a distinct effect on the type and cost of operation of anti-scaling devices used. We will be pleased to advise on the correct method to help prevent scale build-up.



Typical Injector

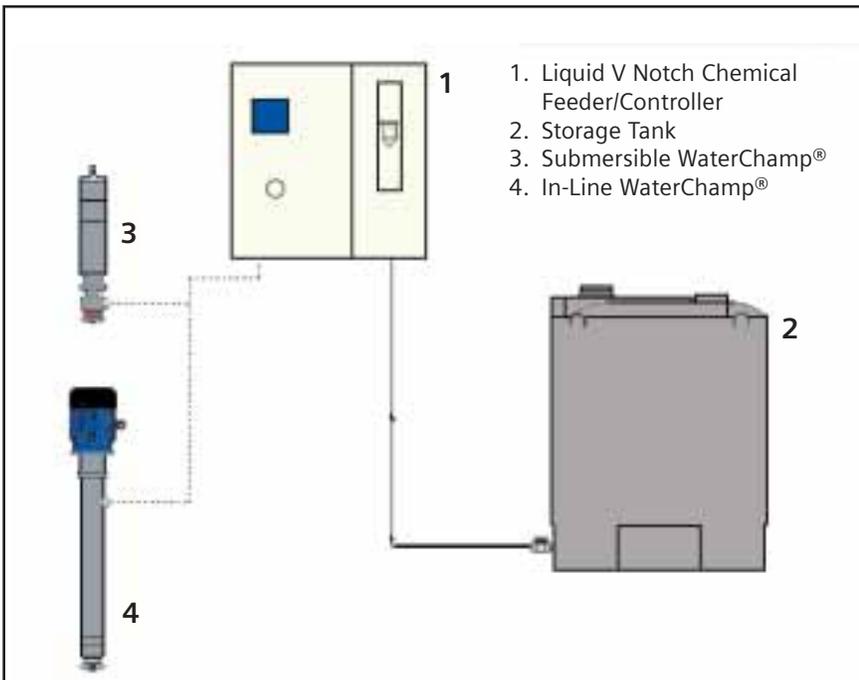
## Water Champ® Chemical Induction Mixer

As a way of preventing scale build-up, the use of a Water Champ® induction system provides a near perfect, instantaneous mix of chemical into a large bulk or flow of water. It can either be submersed in an open tank or introduced through a fitting in an enclosed main while in service and achieves highly effective mixing even within limited spaces or distances optimizing plant equipment layouts. This enables the provision of tighter system control loops and also gives major energy and chemical cost savings as a result.

The typical Water Champ® chemical induction unit comprises of a motor driven open propeller. This creates a vacuum in the chamber directly above the propeller. This vacuum is transmitted to the LVN-2000, by a vacuum line similar to remote injector systems. The chemical is dispersed directly into the process stream without the necessity of dilution water.

At a rotational speed of 3450 rpm, the aerofoil-designed propeller blasts the chemical molecules into the process stream in excess of 914.5 meters/min ( 50 ft/sec). This velocity component can be either directed downwards, developing a zone of influence across the conduit or, in some applications, horizontally to achieve greater zone diffusion in the process areas to be treated.

The energy released provides an instantaneous mix throughout its zone of influence. Even when installed just below the surface of the process water, the mix is so effective that there will be no off-gassing effect regardless of the chemical flow or the depth of channel.



## Technical Information Technical Data

### Chemicals:

Sodium Hypochlorite; Sodium Bisulphite

Sodium Hypochlorite

Capacities LPH(GPH)

8 (2), 16 (4), 24 (6), 40 (11), 80 (21), 120 (32), 200 (23), 400 (106), 500 (132), 850 (225), 1350 (357), 2000 (528)

Sodium Bisulphite

Capacities LPH(GPH)

6(1.6), 13(3.4), 20(5), 31(8), 55(15), 109(29), 322(85), 615(162), 1400(370), 1700(450)

### Operating Range:

10:1: 6.0 LPH -1998 LPH (1.6 GPH-528 GPH)

### Voltage:

Controller requires 120 volts +/- 10% (200 mA) or 230 volts +/- 10% (100 mA), 50/60 Hz, single phase. There may be other requirements; solenoid valves for start-stop service, booster pumps

### Operating Vacuum:

254 - 457 mm ( 10-18 inches) Hg

### Ambient Temp:

2°-52° C (35° to 125° F)

### Liquid Temp:

21° C (70° F) base temp. instrumentation calibrated

### Material:

ABS cover, Polypropylene Back Panel

Wetted materials: PVC, Viton, glass

### Inlet & outlet:

1/2" Socket 7.6 lph - 400 lph (2 gph-106 gph)

1" Socket 500 lph-2000 lph (132 gph-528 gph)

### Control Modes:

Manual control, start-stop or program, flow proportional, direct residual and compound loop control

### Flow meter:

Standard with all units, Glass tube 254 mm (10") LPH (GPH) scale Accuracy: ± 8% F.S.

### Flow meter Options:

High & Low alarm output (Contacts

100 VDC max; 1 amp max; 10 VA max resistive load)

### Vacuum Gauge:

Standard, mounted on the back panel

### Vacuum switch:

Optional. Contains two s.p.s.t. contacts rated 5 amps at 250 V

### Maximum Static Lift:

1 meter (3.3 feet) from center line of control valve

### Injector:

consult factory

### Installation:

Indoor installation is recommended. See

WT.490.100.200.UA.CN, WT.490.100.202.UA.CN and

WT.490.100.204.UA.CN

### Accessories:

Injector-water and injector outlet lines and clamps; main connections; solenoid valves; water line pressure gauge; booster pump; injector vacuum gauges; anti-siphon valves; check valves; residual analyzers; residual test kits; spare parts

### Overall dimensions:

Wall mount 686 mm W X 838 mm L X 279 mm H ( 27" W X 33" L X 11" H).

See WT.490.100.100.UA.CN.

### Shipping Weight:

22.6 kgs (50 lbs)

Due to continual product development and improvement, certain specifications may change without prior announcement.