

Capital Controls[®] Series **3000** **Chloromatic™ Gas Control Valve**

The Series 3000 Chloromatic™ Intelligent Gas Flow Control Valve is designed to control chemical feed in water or wastewater applications. The valve is wall mounted, responds to multiple process signals from a water flow transmitter and/or chlorine residual analyzer and is integrated with a microprocessor-based controller.



Automatic control eliminates the need for continuous operator monitoring and manual adjustment of the gas feed rate with changes in flow or residual, especially where chemical discharge levels are regulated. And since manual system feed rates are based on peak process conditions, automatic feed will reduce gas consumption. The integrated microprocessor-based controller eliminates the need for a separate controller to regulate your gas feed system. The intelligent valve is field configurable for flow proportioning, residual, compound loop or feed forward control. Residual control is accomplished by a single-mode integral control loop with adjustable process lag time. All setup, tuning and control adjustment is achieved from the pushbutton panel.

Standard features include: built-in multiplier for feed forward control; automatic transfer from compound loop control when either the residual or flow signal is lost; bumpless transfer between manual and automatic control; digital vacuum fluorescent display; alarm indication; user configurable alarm contacts; control contact inputs and a flow transmitter output signal.

Features

- Microprocessor-based integral controller, preconfigured for easy operation
- NEMA 4X enclosure
- Valve operates at sonic conditions, no D/P regulator is required
- Electronically characterized valve plug with up to 11-point calibration for superb accuracy
- Capacities up to 3000 PPD (60 kg/h)
- Stepping motor for precise valve plug positioning
- Four gases: Chlorine, Sulfur Dioxide, Ammonia, Carbon Dioxide
- 4–20 mAdc gas flow rate output standard

The Series 3000 Valve incorporates a unique 11 point valve plug characterization feature that matches the valve plug characteristic to the gas flow rotameter. This insures a true gas flow retransmission signal to remote monitoring instruments such as a recorder or SCADA system without the need for auxiliary differential pressure devices; which eliminates the problem of dual flow indications not reading alike.

The valve may be mounted with either the valve body below or above the operator housing for ease of installation. A simple operator choice at the pushbuttons allows the display to indicate in the upright position in either mounting position.

Similar units of different materials may be used for feeding ammonia, carbon dioxide and sulfur dioxide gases. The maximum capacities for these feeders are approximately 50%, 75%, and 100% respectively of the chlorinator capacity.

The Series 3000 valve is used in conjunction with a vacuum regulator, gas flowmeter and an ejector to provide a complete system. (See Figure 1).

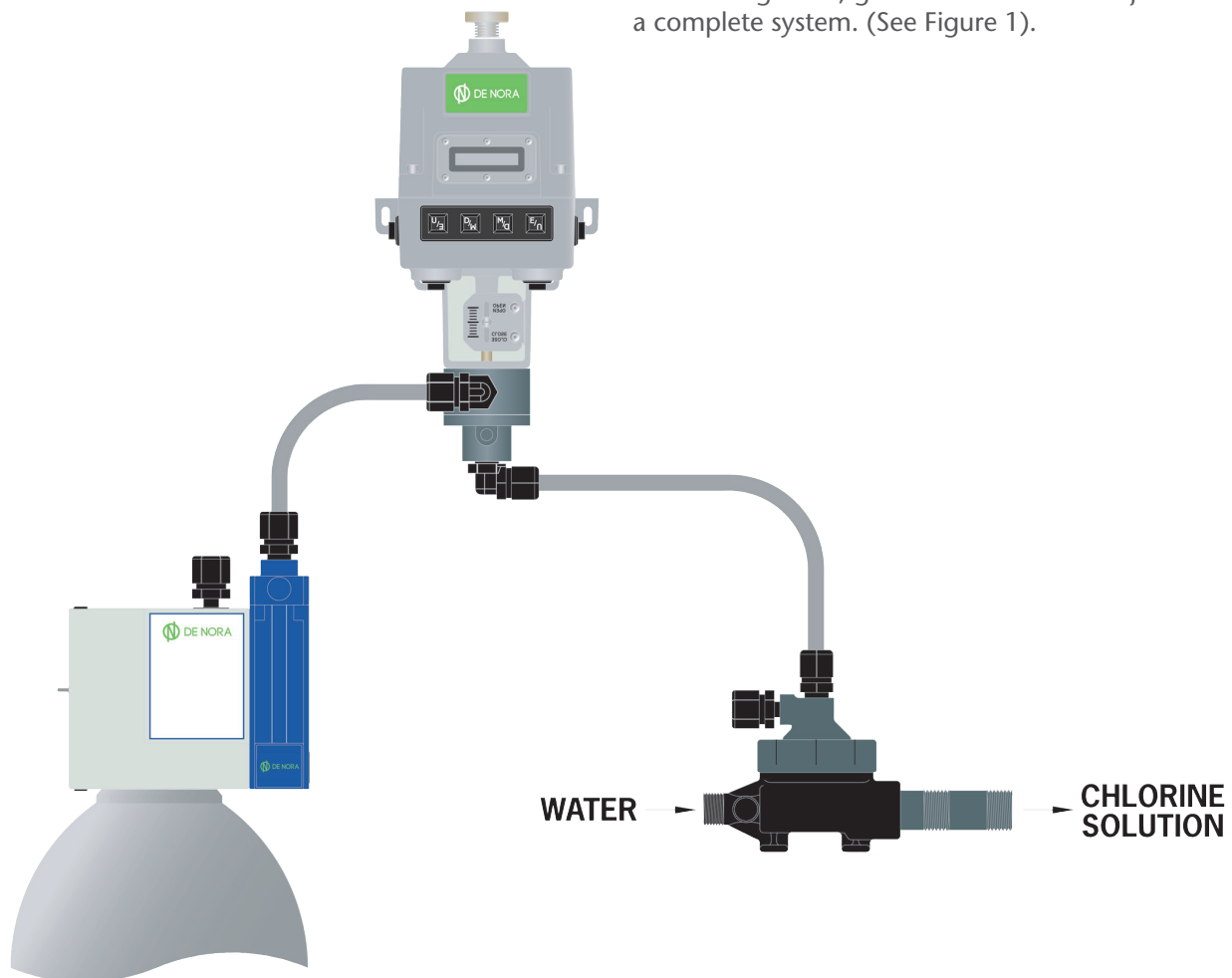


Figure 1



Operation

The unit has three major components, the metering valve, the electric operator and the microprocessor-based controller.

The control valve consists of a housing, a shaped precision plug and a corrosion resistant plastic seat. The plug is positioned by the valve operator to provide precise control of gas feed rates between 0.5 and 3000 PPD (10 g/h and 60 kg/h) under sonic flow conditions.

The control valve operator consists of solid state circuitry, a stepping motor, and a mechanism to position the control valve plug. The valve operator is designed to respond to flow and/or residual analyzer input signals, either 4–20 mAdc or 1–5 Vdc. The stepping motor provides precise control of the valve plug with 3200 positions over the full stroke length.

The microprocessor-based controller provides the control to take the input signals and control the valve as the chemical demand changes. The modes of controller operation include auto/manual; local/remote and control modes.

Auto/Manual: In auto, the valve is controlled by the control mode selected (see below). In manual mode the up/down pushbuttons on the front of the controller allow for manually positioning of the valve. A manual control knob (multi-turn) on top of the valve is provided to position the valve plug should power fail.

Local/Remote: In local, the set point is adjusted by accessing the “SP” parameter in the control function of the controller. In remote, it corresponds to a setpoint signal, provided from a remote source.

Control Modes:

- **Flow Proportional** – control is in direct proportion to a flow meter signal or a control signal from a SCADA system
- **Residual** – control is in response to the user set control level and the process residual analyzer signal
- **Compound Loop** – control is in response to both a process flow meter signal and the residual analyzer signal
- **Feed Forward** – control is achieved by an algorithm utilizing the flow meter and residual analyzer signals to proportion the gas feed based on their combined magnitudes. The choice of control modes are user configurable.



Technical Data

Quality Standards: ISO 9001 Certified

Approvals: Actuator - CE, CSA

Capacities: Standard maximum capacities are: 5, 10, 25, 50, 100, 200, 300, 500, 1000, 2000 and 3000 PPD (100, 200 and 500 g/h; 1, 2, 4, 6, 10, 20, 40 and 60 kg/h) of chlorine gas.

Process Connections:

- 5/8" inlet and outlet vacuum tubing connector up to 500 PPD (10 kg/h)
- 1" NPT Threaded inlet and outlet connections for 1000–3000 PPD (20–60 kg/h)

Power:

Voltage Requirements: 100–250 Vac; +10%/–15%

Frequency: 50–60 Hz

Quiescent Power Consumption: 12 VA maximum

Operating Power Consumption: 38.5 VA maximum

Electrical Characteristics:

Inputs:

- Residual analyzer and/or Flow Transmitter: two (2) 4–20 mAdc or 1–5 Vdc (field selectable) with dampening adjustable from 0–25.5 seconds (field selectable (isolated))
- Remote set point (local/remote): one (1) 4–20 mAdc or 1–5 Vdc (field selectable) (isolated)
- Vacuum switch alarm contact, one (1)
- Remote standby switch contact, one (1)

Outputs:

- **Relay contacts:** three (3) 5A resistive at 120 Vac SPDT field configurable for NO/NC.
- **Contacts field configurable for:** fault alarm (malfunction or power failure), auto/manual state, local/remote set point, residual HI, residual LO, set point deviation HI, set point deviation LO, water low flow, valve position HI, valve position LO, valve stall, standby, vacuum HI/LO.
- **Calibrated Gas Flow Transmission:** one (1) 4–20 mAdc, maximum load 1000 ohms (active); or loop powered 250 ohms @ 12 Vdc/12.00 OHMS @ 36 Vdc.

Electrical Connections: (6) 3/4 inch NPT Internally Threaded Conduit Entrances

Field Terminals: Up to 14 AWG

Environmental Limits:

Ambient Temperature: 40°F to 125°F (4°C to 52°C)

Shipping Temperature: -20°F to 125°F (-29°C to 52°C)

Control:

Modes of Operation:

- **Auto/Manual:** Auto - run by control mode, Manual - use up/down pushbuttons
- **Local/Remote:** Local - set point adjusted at controller, Remote corresponds to input signal
- **Control Modes:** Field selectable for flow proportional, residual, compound loop and feed forward
- **Dosage Control Output:** Input Ratio of 0.2:1 to 2.0:1
- **Manual Override:** Manual Control Knob (multi-turn) provided to position valve plug when dosage control is in "off" position or if power fails.

Display:

- 2X16 characters, vacuum fluorescent display
- Displays operational parameters as well as alarm conditions
- Four pushbuttons for display and parameter setup

Data Retention: Parameters and calibration profiling are stored in EEPROM

Valve Only - Physical Characteristics:

Outline Dimension: Approx. 16 inch H x 7-3/4 inch W x 8 inch D (41 cm H x 20 cm W x 21 cm D)

Weight: 15 lb. (6.8 kg)

Enclosure Classification: NEMA 4X; IP 66

Materials of Construction:

Main Housing & Cover: Cast aluminum with fusion bonded epoxy powder coat

Valve Plug: Silver, Kynar, PVC or Austenitic Stainless Steel (capacity and gas type dependent)

Orifice: Fluorosint (Mica filled Teflon)

CAPITAL CONTROLS®

Series 3000 Wall Panel with Chloromatic™ Intelligent Gas Control Valve

Easy to install, each Series 3000 wall panel feeder is factory tested and needs no field adjustment prior to start-up. Ten different flowmeter capacities ranging from 5 to 3000 PPD (100 g/h to 60 kg/h) provide versatility in meeting gas flow requirements.

The Series 3000 wall panel feeder includes the Capital Controls Series 3000 Chloromatic™ Intelligent Gas Flow Control Valve and gas flow indicator mounted on a corrosion-resistant, heavy-duty panel. The wall panel feeder can be provided with optional high and low vacuum switches. The control valve receives signals from a water flow transmitter and/or chlorine residual analyzer.

Physical Characteristics:

Outline Dimension:

- 500 PPD (10 kg/h) w/out vacuum switches; approx. 24" H x 20" W x 8" D (61cm H x 51cm W x 21cm D)
- 3000 PPD (60 kg/h) w/out vacuum switches; approx. 24" H x 24" W x 8.5" D (61cm H x 61cm W x 22cm D)
- 500 PPD (10 kg/h) w/vacuum switches; approx. 24" H x 20" W x 8" D (61cm H x 51cm W x 21cm D)
- 3000 PPD (60 kg/h) w/vacuum switches; 24" H x 24" W x 8.5" D (61cm H x 61cm W x 22cm D)

Weight:

- 500 PPD (10 kg/h) w/out vacuum switches; 30.24 lbs (13.7 kg)
- 3000 PPD (60 kg/h) w/out vacuum switches; 38 lbs (17.3 kg)
- 500 PPD (10 kg/h) w/vacuum switches; 36.84 lbs (16.7 kg)
- 3000 PPD (60 kg/h) w/vacuum switches; 46.5 lbs (21 kg)





Brief Specification

The Gas Flow Control Valve shall be stepping motor operated with the motor and electronic components mounted in a NEMA 4X enclosure. The valve shall be integrated with a microprocessor-based controller designed to control chemical feed. The valve shall be field configurable for flow proportioning, residual, compound loop or feed forward control. The compound loop control feature shall have the capability of automatic variable lag time adjustment. All setup, tuning and control adjustment shall be achieved from the pushbutton panel.

Standard features shall include: built-in multiplier for feed forward control; automatic transfer from compound loop control when either the residual or flow signal is lost; bumpless transfer between manual and automatic control, digital vacuum fluorescent display; alarm indication; user configurable alarm contacts; control switch inputs; and a 4–20 mAdc flow transmitter output signal.

The valve shall incorporate a unique 11 point valve plug characterization feature that matches the valve plug characteristic to the gas flow meter. This shall insure a true gas flow retransmission signal to remote monitoring instruments such as a recorder or SCADA system without the need for limited range auxiliary differential pressure metering devices. The valve shall operate under sonic gas flow conditions.

The valve shall be able to accept three (3) either 4–20 mAdc or 1–5 Vdc inputs. Inputs shall be field selectable, two (2) for flow transmitter and/or residual analyzer and one (1) for remote set point. There shall be two (2) contact inputs one shall be for vacuum switch alarm and the other for a remote standby switch.

The display shall be a 2-line, 16 character vacuum fluorescent display. Display shall display operational parameters as well as alarm conditions. The valve shall be powered by 100-250 Vac, 50-60 Hz and shall be auto-ranging. The valve shall be equipped with a manual control knob (multi-turn) available to position the valve plug when dosage control is in “off” position or if power fails.

The valve shall be capable of mounting with either the valve body below or above the operator housing for ease of installation. The display shall read upright for either mounting purposes. The valve shall be able to feed chlorine, sulfur dioxide, ammonia or carbon dioxide gases. The maximum feed rate (as chlorine) shall be 3,000 PPD (60 kg/h).

The intelligent gas flow control valve shall be De Nora Water Technologies Capital Controls® Series 3000 Chloromatic™ Valve.



Warranty and Capability

De Nora Water Technologies warrants its auto valves for eighteen (18) months from date of invoice, or twelve (12) months from date of installation.

De Nora Water Technologies is ISO 9001 certified to provide quality and precision materials. Disinfection technologies, water quality monitors and instrumentation for water and wastewater are areas of specialization. Over 35 years of industrial and municipal application experience in the water and wastewater industries is incorporated into the equipment design to provide high quality comprehensive solutions for the global market.



WATER MADE EASY

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