

CAPITAL CONTROLS®

ADVANCE™ Gas Feeders

Series FX4000

Capital Controls® new and improved Series FX4000 gas feeders are floor cabinet mounted, vacuum operated and designed to conveniently house a combination of gas feed equipment and controls. The cabinets enclose the gas flow control components and are constructed of ABS with a textured, easily maintained finish.

Easy to install for indoor installation, each Series FX4000 cabinet is factory tested and needs no field adjustment prior to start-up. Eleven different flowmeter capacities ranging from 10 to 10,000 PPD (200 g/h to 200 kg/h) provide versatility in meeting gas flow requirements.

Manual Series FX4000 gas feeders consist of a cabinet, vacuum regulator and an ejector, or chemical induction unit. When automatic control is required Capital Controls® automatic valve, mounted in the cabinet responds to control signals from the CAPTROL® controller. The controller receives signals from a water flow transmitter and/or chlorine residual analyzer. If multiple feed points are required, gauged meter assemblies and additional ejectors are provided. Automatic switchover is built into the vacuum regulator to provide uninterrupted service.



- Worldwide standard for gas feeder technology
- Safe, reliable all-vacuum operation
- New, improved, textured design
- Front access to internal components
- Superior materials of construction
- Variable capacities up to 10,000 PPD (200 kg/h)
- Microprocessor based automatic controls
- Accurate gas metering of chlorine; sulfur dioxide; ammonia or carbon dioxide
- Versatile vacuum regulator mounting
- Automatic switchover gives uninterrupted service



APPLICATIONS

For process water, waste treatment and water treatment in the municipal or industrial marketplace

Disinfection: potable water, municipal wastewater

Chloramination: potable water

Dechlorination: textiles, wastewater effluent

Cooling water: control of slime and algae in piping, heat exchangers and cooling towers

Irrigation systems: slime and algae control

Process water: chemical and pharmaceutical manufacture, food (washdown, canning, bleaching, taste and odor control)

Cyanide, chromium removal: metal finishing wastes

Zebra mussel control

Design Features

Modern Design: Superior materials of construction provide durability, textured finish resists fingerprints and dirt.

Reliable: Over 35 years experience with all vacuum operation; integral venting system.

Safe: Remote vacuum regulator mounting enhances safety of installation.

Versatile: Cylinder, ton container, wall or manifold vacuum regulator mounting in units up to 500 PPD (10 kg/h). Unit can be provided as manual or with automatic control. Variety of ejectors available for all applications.

Automatic Switchover: For capacities up to 500 PPD, each vacuum regulator is provided with a built-in switchover function to permit uninterrupted flow of gas. For capacities greater than 500 PPD a separate, independent vacuum operated switchover module can be provided.

Technologically Advanced: The CAPTROL® controller provides microprocessor-based control, fully field configurable with gas flow output signal. The controller accepts a signal from the flow sensor and/or residual analyzer. An automatic linearized gas feeder control valve is provided for reliable control.

Convenient: Controls are located at eye level and are front panel adjustable, with an easily removable front bezel for access to internal components. Saves valuable floor space in new and existing facilities.

Ease of installation: Simplicity of design and modularized components minimize installation time. Factory assembled, prewired, pre-piped (where necessary) and tested requiring only utility connections.

OPERATION

Vacuum Regulator

Water flowing through the ejector venturi, creates a vacuum which opens the check valve in the remote ejector. The vacuum is carried through the vacuum line to the vacuum regulator where the differential pressure causes the inlet valve on the vacuum regulator to open, initiating gas flow. A spring opposed diaphragm in the vacuum regulator, regulates the vacuum. The gas passes under vacuum through the cabinet mounted flowmeter and rate control valve. A differential pressure regulator (for automatic systems and 2000 PPD/40 kg/h and above systems) maintains a constant differential across the rate control valve. Gas flows through the vacuum line and to the ejector where the gas is thoroughly mixed with the water and applied as a solution. (Figure 1)

The system is completely under vacuum from the ejector to the vacuum regulator inlet safety valve. If the water supply to the ejector stops or vacuum is lost for any reason, the spring loaded inlet safety valve immediately closes and isolates the pressure gas supply. If the gas source is depleted, the unit seals to prevent moisture from being drawn back into the gas source. When more than one feed point is desired multiple meter assemblies and ejectors can be supplied.

For capacities up to 500 PPD uninterrupted gas feed is accomplished using the built-in switchover within each vacuum regulator. For larger gas feed capacities (up to 4000 PPD [75 kg/h]) a separate switchover module can be provided. Gas flows under vacuum from the regulator in service until the source is depleted. The automatic switchover then occurs which automatically switches service to the standby source. The standby supply will not be accessed until the supply in service is exhausted.

Chemical Induction Units

Capital Controls® CHLOR-A-VAC® Series 1420 chemical induction units offer improved chlorination and dechlorination through the high-efficiency mixing of gaseous chemical with process water. This translates into operating and chemical cost savings.

CHLOR-A-VAC® units produce a vacuum when process water passes through water inlet ports and through a venturi. The high vacuum and recessed impeller create great turbulence and complete chemical mixing.

A chemical induction unit in lieu of an ejector should be considered for the following applications: contact basins, headwater, return sludge processes, clarifier inlets, collection basins, equalization tanks and clear wells. (See Bulletin 130.0001)

TECHNICAL DATA

General

Capacities: Standard metering tubes are available with the following capacities 10, 25, 50, 100, 200, 500, 1000, 2000, 4000, 6000, 8000 and 10,000 PPD (200 g/h, 0.5, 1, 2, 4, 10, 20, 40, 75, 120, 150, and 200 kg/h) of chlorine gas. To determine feed rates for other gases, multiply each chlorine value by:

- 0.95 for sulfur dioxide
- 0.50 for ammonia
- 0.78 for carbon dioxide

Flowmeter: The minimum feed capacity for every gas flowmeter is 1/20th of the maximum capacity for manual units and 1/10th of maximum capacity for automatic units.

Accuracy: Within $\pm 4\%$ of maximum flowmeter capacity.

Electrical Requirements: 120/240 Vac, 60/50 Hz, single phase

Dimensions: 64" (1627 mm) H X 31(784 mm) W X 20" (502 mm) D

Model Information Code

Model **F X 4 0**

Floor Cabinet Gas Feeder

Control Mode _____

0 - Manual

4 - Automatic

Capacity (Chlorine) _____

1 - 100 PPD (2 kg/h)

2 - 200 PPD (4 kg/h)

3 - 500 PPD (10 kg/h)

4 - 2000 PPD (40 kg/h)

5 - 8000 PPD (150 kg/h)

6 - 10,000 PPD (200 kg/h)

Gas _____

C - Chlorine

A - Ammonia

B - Carbon Dioxide

S - Sulfur Dioxide

Automatic Control

For variable flow and demand conditions, automatic gas flow control is recommended. An automatic valve is provided to open and close in proportion to a signal received from the controller (Figure 2). The controller receives electrical input signals from a flow meter and/or residual analyzer, causing the controller to automatically reposition the control valve to maintain the desired gas feed rate or chlorine residual.

The CAPTROL® microprocessor controller is field configurable for three chlorination and two dechlorination control modes:

Flow: Proportioning valve position to process flow.

Residual: Single, integral action, opening valve based on residual set point.

Compound Loop: Simultaneous proportioning valve position to a combination of flow proportioning and residual control. If one signal is lost, the controller automatically proportions based on remaining signal.

Feed Forward: Valve position control directly proportional to flow signal multiplied by residual signal, provided by built-in multiplier.

Automatic floor cabinet units include: controller, automatic linear gas feeder control valve with electronic manual adjustment switch, manual bypass valve and differential pressure regulator. Controller may be remote mounted.

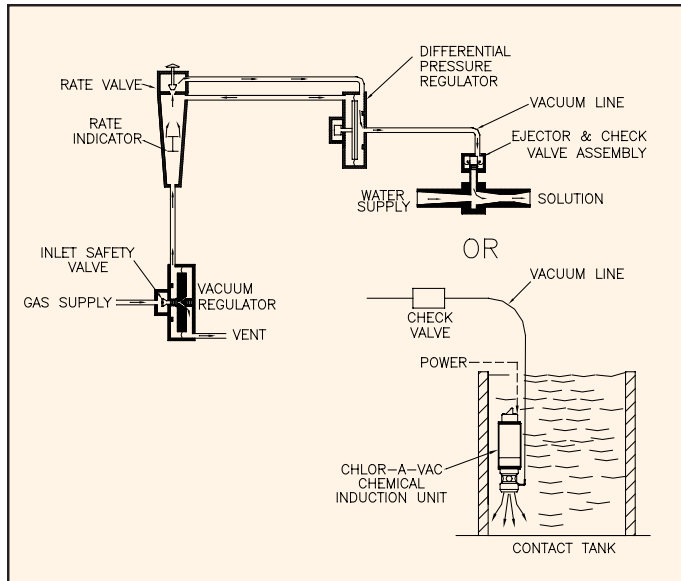


Figure 1 - Manual Gas Feed System

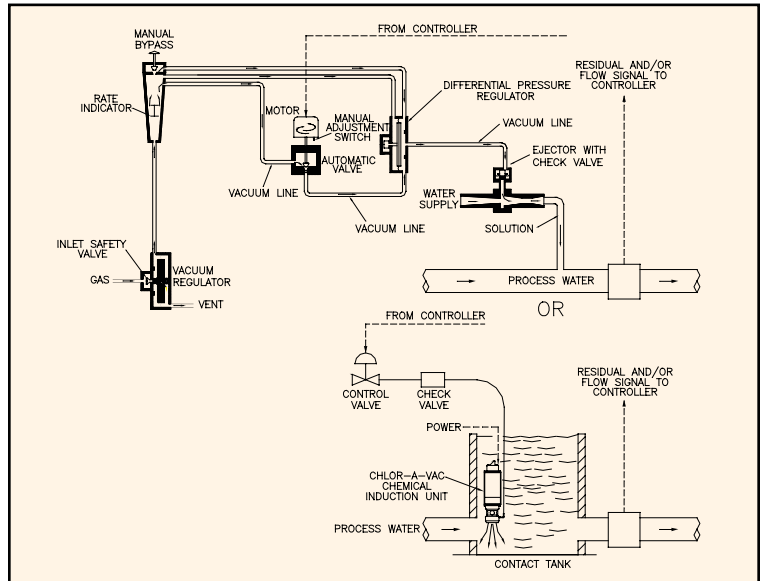


Figure 2 - Automatic Gas Feed System

Warranty and Capability

Capital Controls® offers a one (1) year limited warranty on Series FX4000 equipment.

Capital Controls® 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.

Brief Specification

The floor cabinet mounted gas feeder shall be provided with a maximum capacity of 10,000 PPD (200 kg/h) chlorine gas per day. The gas feeder shall be vacuum operated and shall convey the gas under vacuum from the vacuum regulator to the ejector/check valve assembly to maintain complete system safety.

The gas feeder shall be housed in a floor cabinet of pressure formed plastic and structural foam plastic construction. The cabinet front shall be removable to permit access to the internal components. All utility inlets and outlets shall be bulkhead connections mounted in the rear and all electrical connections shall be made to one terminal box. The cabinet shall house a dual scale (English/metric) gas flowmeter and an automatic control valve and be sized for an operating maximum capacity of 10,000 PPD/200 kg/h. The cabinet shall also include a manual gas flow control valve, differential pressure regulator, and vacuum gauge. The automatic controller shall be remote mounted from the floor cabinet. The vacuum regulator shall be mounted remotely from the cabinet.

All components carrying chlorine gas shall be made of materials suitable for wet or dry gas service. All springs shall be of Hastalloy C tantalum alloy. The cabinet mounted gas feeder shall be Capital Controls® Series FX4000 or equal. The automatic valve plug shall be of materials suitable for the specified gas.

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