

Wallace & Tiernan® Gas Feed Systems

Series 60-225 Direct Feed Ammoniator

The Wallace & Tiernan® Direct-feed Ammoniator is a control device that meters gaseous ammonia directly into water under positive pressure. A manual model treats relatively uniform water flows. For varying flows, an automatic model is available. It contains a Wallace & Tiernan® Automatic Gas Feed Controller and Actuator. The controller gives closed-loop flow proportional control according to a primary flowmeter signal. Dosage rate is set manually. Both models offer nine capacities between 10 and 2000 pounds (4.5 - 907 kgs) of ammonia per 24 hours.

System Features

- Capacities to 2000 lbs/24 hrs, choice of nine different rotameters.
- No operating water required, can feed into open channels or pipelines up to 15 psi (1 bar).
- Technologically advanced electronic controller for automatic operation.
- Simple interconnection with other modular units without the need for external wiring and piping.
- Modular design presents a high-tech appearance.
- Ammonia diffusers specifically designed to minimize scale formation.

Effective Disinfection with Chloramines

Chloramines (chlorine-and-ammonia compounds) are recognized by the EPA as a primary disinfectant for THM control. The Series 60-225 Direct Feed Ammoniator provides an effective and economic method for ammonia application.

Capacities to 2000 lbs/24hrs

Ammoniators are available in two capacity ranges: low (10 - 100 lbs/4.5 - 45 kgs per 24 hours) and high (200 - 2000 lbs/90 - 907 kgs per 24 hours). Units can be converted to any other capacity in their range by changing the meter and control rod in both arrangements and the metering orifice in the automatic version.

Key Benefits

- No operating water, no softened water required
- Effective disinfection with chloramines
- Minimal scale formation with the use of specifically designed diffusers
- Easy to install and maintain
- Simple capacity changes
- Manual or automatic control options



Product Sheet

System Features (cont.)

No Operating Water, No Water Softening

Wallace & Tiernan® Direct-Feed Ammoniators require no operating water. There is no need for water softening. The ammonia gas container supplies the operating pressure.

Precise Feed Rates

A diaphragm valve maintains a constant back pressure on the system. This damps out pressure variations at the discharge to keep feed rates constant.

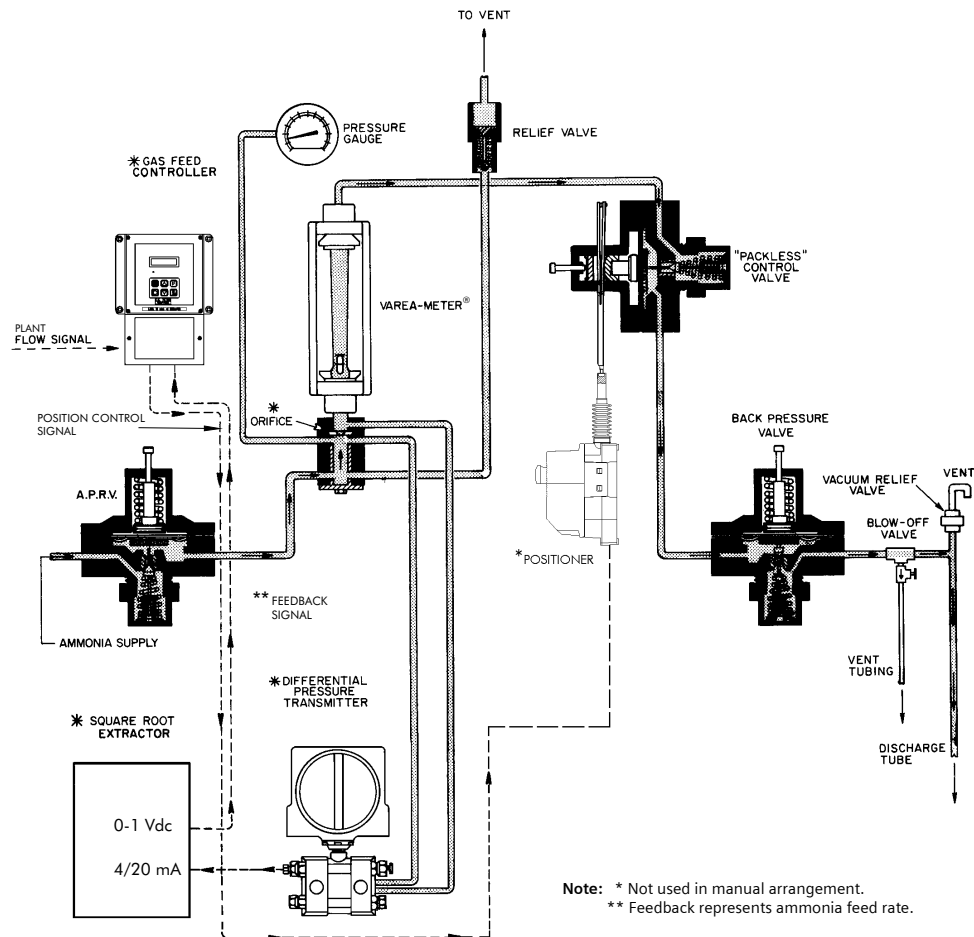
Easy to Install and Maintain

In the automatic version, installation requires only piping and electrical connections to a coded terminal strip. The manual-control model requires no electricity. Materials of construction are corrosion-resistant plastics and alloys; the cabinet is structural foam ABS. All valves have sealed diaphragms; there are no stem-packing problems.

Design and Operation

In all Wallace & Tiernan® Direct-Feed Ammoniators the system operates under positive pressure supplied by the ammonia gas container. Gas enters the system at a pressure reducing valve which regulates line pressure to 25 psi (1.6 bar) on low capacity models, 40 psi (2.6 bar) on high capacity models. A gauge on the front panel reads out this operating pressure. A vent with a relief valve prevents system pressure from exceeding 100 psi (6.6 bar). Gas then passes through a glass tube Varea-Meter® flowmeter, which indicates flow directly in pounds per 24 hours. Next is a sealed-diaphragm, spring-loaded control valve. For manual control, a knob on the front panel sets the valve opening (feedrate) via a rack and pinion. The valve opening is adequate to give wide operating range and ease of feedrate adjustment. Gas next passes through a backpressure valve which maintains a constant 18 psi (1.2 bar) backpressure on the system.

Gas is then fed directly into the water through either an open-well diffuser or a main-connection diffuser depending on the application point. These diffusers are specially designed to minimize scale formation and clogging at the discharge point and to minimize backflowing of the ammoniator during shut-down.



Automatic Arrangement

The automatic ammoniator contains, in addition to the gas-flow system described above, a measuring orifice, differential-pressure transmitter, Automatic Gas Feed Controller and, an actuator. They give closed-loop, automatic control of ammoniator feedrate.

The controller is in a NEMA 4X enclosure. It contains electronics for linear flow proportioning as well as feedback control to maintain the desired ammonia feedrate. The controller has an eight-character alphanumeric LCD display which indicates either plant flow input or ammonia feedrate in percent. The input can be scaled from 10 to 400% by a flow factor and output can be scaled by a dosage factor from 10 to 400%. The controller can be wall or module mounted. The actuator, also rated NEMA 4X, positions the control valve in the ammoniator. It contains a bi-directional motor with a mechanical manual override for local manual control. There are also three customer alarm contacts in the positioner for high limit, low limit, and motor disengaged for indication of manual override.

Actuator input is a 115 or 230-volt switched signal from the controller. The controller accepts 4-20mA flow input.

The measuring orifice, ahead of the rotameter, creates a pressure drop of 50 inches of water at 100% gas flow. This drop is measured by the d/p transmitter and converted to a 0-1 VDC signal proportional to gas flow. This signal is compared to the flow input signal by the controller. Any difference is converted to an error signal used to drive the bi-directional AC positioner motor. This is geared to a mechanism that positions the gas-control valve until ammonia flow is at the required feedrate.

Technical Data

Accuracy: Control accuracy is $\pm 4\%$ of full scale.

Repeatability: $\pm 1\%$ of full scale.

Linearity: $\pm 0.5\%$ of full scale.

Operating Range: 10:1 manual; 5:1 automatic.

Capacities: Rotameters for 10, 20, 30, 50, 100, 200, 300, 500, 1000 and 2000 lbs of ammonia per 24 hours.

(Rotameters for 4.5, 9, 14, 23, 45, 90, 136, 227, 454 and 907 kgs of ammonia per 24 hours.)

Control: Manual or flow-proportional automatic by a closed loop, information-feed back system.

Operating Power: From ammonia-container pressure. No operating water required.

Application Point: Any main or pipeline, open tank, well or channel. Two types of ammonia diffusers are available: open-well type, maximum capacity of 2000 lbs per 24 hours; main-connection type with corporation cock, maximum capacity 750 lbs per 24 hours. (Two required for 1000 lbs per 24 hours capacity; Four required for 2000 lbs per 24 hours capacity.)

Pressures: Maximum at point of application, 15 psi (1 bar); operating, 25 - 40 psi (1.7 - 2.7 bar); ammonia supply, 60 - 275 psi (4 - 18.3 bar). Vents at 100 psi (6.7 bar).

Ambient Temperature Limits:

50° to 120° F (10° to 49° C).

Connections: Ammonia supply, 3/4" straight pipe thread; ammonia discharge and vent, 1/2" straight pipe thread.

Electrical: two 3/4" conduit connections.

Automatic Arrangement

NEC Compliance

(Automatic Arrangement)

Wiring is run in liquid-tight flexible conduit; junction boxes comply with NEC volume requirements; terminal strips meet NEMA requirements for space between connections. Thus the Series 60-225 Ammoniator complies with National Electrical Code, Chapters 2 and 3 and NEMA Standards, publication ICS-1970, parts ICS-1-110, Enclosures, and ICS-1-1111, Spacings (editions in effect at time of printing).

Electrical Requirements: Controller, 120 volts $+10\%$ (0-3 amps) or 240 volts $+10\%$ (0-15 amps), 50/60 Hz, single phase; actuator is powered by controller.

Enclosure Ratings: Controller, NEMA 4X; actuator, NEMA 4X.

Line-Voltage Effect: Maximum 1% full-scale-output change per 10% change in line voltage. Line voltage above or below nominal suspends operation, but the controller returns to normal operation on restoration of nominal line voltage.

Alarm Contacts: (Available in Electric Actuator Only) Actuator has high limit, low limit (for no flow), and actuator motor-disengaged relays available as standard. Contacts N.O., rated 5 amps at 250V.

Calibration Drift: Maximum is 0.2% of full scale per year.

Speed of Response: Completes a step change in input within 75 seconds.

Temperature Effect: Maximum is $+0.01\%$ of full scale per degree C over a range of -18 to 50 degrees C.

Dosage: Output signal is scaled from 10 to 400%

Flow Scaling: Flow input signal is scaled from 10-400%.

Flow-Proportional Inputs: 4-20 mA.

Mounting: Controller is usually at the ammoniator but is available for wall or control panel mounting. Maximum distance from the ammoniator is 500 ft. with 20-gauge wire; greater distances possible with heavier wire.

Accessories

Optional items not furnished with a Wallace & Tiernan® Ammoniator but necessary to complete an installation: auxiliary cylinder valves; ammonia connections; gaskets; ammonia supply and discharge lines; vent line; fittings for discharge line. Also available are container scales, evaporators, shutoff valves, and automatic-switchover systems. Acutec™ 35 Ammonia Gas Detector Monitor (See Publication WT.050.130.000.UA.PS)

Overall Dimensions: Ammoniator, 68-1/4" H x 27-1/2" W x 16" D (1734mm H x 698mm W x 406mm D).

Shipping Weight: Ammoniator and items furnished, 250 lbs (113 kgs).

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