



CAPITAL CONTROLS

The Capital Controls AZTEC® A1000 Ammonia Monitor is reliable, accurate, on-line process instrument representing the latest technology in continuous ammonia monitoring. The microprocessor-based electronics include on-screen instruction and self diagnostics to make operation easy and user-friendly. The measurement is provided with an ion-selective ammonia gas-sensing electrode based on the ammonia method outlined in the 18th Edition of "Standard Methods".

The AZTEC® A1000 Ammonia Monitor features a large dot-matrix graphical display with automatic ranging capabilities from 0-1000 mg/l. Display resolution is up to 0.001 mg/l with an optional graphical viewing mode. Six adjustable alarm relays and a 4-20 mAdc output signal are standard. All user controls are provided through four membrane buttons on the display face.

Accuracy and reproducibility are obtained through a programmable, automatic two-point calibration feature. The monitor includes a dry heating block to raise the sample temperature. The sample pH and temperature are continuously monitored to ensure the integrity of the ammonia measurement. Sample flow and buffer addition is provided with a cartridge-type peristaltic pump.

The AZTEC® A1000 Ammonia Monitors are constructed of low-weight, corrosion resistant materials and are modular in design for serviceability and ease of maintenance. Minimal reagent consumption and user serviceability results in a low cost of ownership for the A1000 Ammonia Monitor. Each unit is pre-piped and pre-wired, requiring only field connection to service points. Visibility of all liquid processing components is provided with tinted window on the front of the analyzer. All controls are accessible from the front of the unit.

AZTEC® Ammonia Monitor Series A1000



- ◆ Ion selective ammonia sensing electrode
- ◆ Automatic high and low calibration
- ◆ Continuous on-line ammonia monitoring
- ◆ Microprocessor-based
- ◆ Dot-matrix graphical display
- ◆ Automatic ranging to 1000 mg/l
- ◆ Data logging and trending
- ◆ Separate electronics and liquid processing compartments
- ◆ On-screen instruction and self diagnostics
- ◆ Six programmable alarm relays
- ◆ Regulated sample temperature

Design Features

- ◆ **Unique sample conditioning system:** The sample stream and electrode are temperature controlled within an efficient, mechanical heat exchanger. Pre-conditioning of the sample reduces scale formation in the system and pH elevation releases the ammonia gas, which is sensed by the electrode
- ◆ **Automatic calibration:** Two-point autocalibration with ammonia standard solutions ensures a high degree of accuracy and reproducible results. The calibration can also be manually initiated.
- ◆ **Data logging and trending:** Statistics for up to 28 days; previous 7 days; or previous 24 hours are logged and can be viewed in graphical format
- ◆ **Automatic ranging from 0-1000 mg/l:** The monitor provides automatic ranging capabilities from 0-1000 mg/l without any hardware or software modifications
- ◆ **Ease of use:** On-screen instruction and self diagnostics provide visual data to efficiently configure, operate, and maintain the monitor. All components are visible behind a tinted window and are easily accessible from the front of the monitor.

- ◆ **Six programmable alarm relays:** Each relay is independently configurable to be high, low, latch (out of range), attention, or fail.
- ◆ **NEMA 4X:** The electronics enclosure is NEMA 4X for protection

Applications

Wastewater: Plant control by measurement of in-process ammonia

Chloramination: Optimization of the chloramine treatment process for drinking water

Effluents: Compliance monitoring of ammonia in discharge streams

River Sources: Intake protection for drinking water treatment plants

Industrial Control: Monitoring of industrial processes where proper levels of ammonia must be maintained

Principle of Operation

A sample is drawn from the sample chamber by the sample pump. Complexing agent (EDTA) and alkali (NaOH) are pumped into the sample line at a common introduction point and are mixed into the sample. The complexing agent minimizes the formation of scale and precipitate, and the alkali solution raises the pH of the sample to release the available ammonia. The conditioned sample is passed through the coils of the heat exchanger to raise the temperature and provide further mixing.

The heat exchanger consists of a heated aluminum block with tubing wrapped around channels in the block. The ion-selective ammonia gas-sensing electrode is mounted in the heating block to ensure temperature stability.

The conditioned sample is presented to the ammonia electrode and held in place by the liquid surface tension. At this point, the output of the electrode is converted by the microprocessor, to indicate the direct ammonia concentration as NH₃ or NH₃-N in ppm, mg/l, ppb, µg/l or in graphical format.

Next, the conditioned sample flows to the pH flow cell and is validated by the pH electrode. Finally, the sample flows to waste.

During calibration, the sample supply is isolated and the calibration standards are presented to the flow cell by sequencing of the electrically-actuated pinch valves. The two standards are measured and compared to the user-configurable standard values. The comparison normalizes the ammonia electrode for sample monitoring. Calibration frequency is user-programmable on a weekly basis or up to four times per day.

Technical Data

Series A1000

SAMPLE

Sample Flow: 200-500 ml/min at 5 psi minimum (10 psi maximum)

Sample Pressure: Minimum 5 psig

Sample Temperature: 32°F-120°F (0° 50°C)

Sample Supply: Continuous

Sample Limitations: Samples containing particles 100 microns (0.004 inches) in diameter and larger may require pre-filtration.

Accuracy: 5% of reading

Conditioned Sample: pH operating value greater than 10.5.

Temperature operating value 35°C ±0.2°C (96°F ±0.4°F).

Reagent Requirements:

Chemical Reagents:

Complexing agent (EDTA - di-sodium salt) and alkali solution

(NaOH - sodium hydroxide) in single, common container

Low ammonia standard solution

High ammonia standard solution

Reagent Consumption

2.5 liters/week of complexing solution/alkali mixture

50 ml/calibration cycle each low and high ammonia standard

solutions (1.5 liters/4 weeks at an automatic calibration

frequency of once per day)

INSTRUMENT

Electronics Enclosure: NEMA 4X industrial ABS enclosure

Sample/Drain connections:

Inlet: 1/4" (6 mm) O.D. hose connector

Drain: 3/8" (10 mm) O.D. hose connector

Shipping Weight: 35 lbs (15 kg)

Dimensions: 19 x 26 x 8" (485 x 660 x 205 mm)

Optional Accessories:

Recorder

Printer

Wedge-wire filter

GENERAL

Quality Standards: ISO 9001 Certified

Compliance: CE

Instrument Range: Automatic ranging from 0-1000 (mg/l) as NH₃ or NH₃-N

Display: 3" x 4" dot-matrix, graphical display

Data Logging: Up to 28 days; previous 7 days; previous 24 hours

Resolution: 0.001 mg/l for below 10 mg/l, 0.01 for 10-99 mg/l, 0.1 for 100-1000 mg/l

Configurable Residual Units: mg/l, ppm, ppb, or µg/l

Analyzer Location: As close as possible to the sample point

Autocalibration: Two-point, automatic, with optional manual initiation on a weekly basis or up to four times per day

Speed of Response: 90% step change within 5 minutes

Ambient Temperature: 32°F-140°F (0°C-60°C)

Languages: (American) English, U.K. English (for other languages, consult factory)

Power Requirements: Automatic power recognition from 85-264 Vac, 47-63 Hz, 1 phase (consult factory for 24 Vdc optional module)

Power Consumption: 75 Watts

Output Signal: Single 4-20 mAdc, 0-20 mAdc, or 0-10 mAdc isolated into 1000 ohms maximum

Digital Output: RS232/485 communication capabilities

Relay Contacts (Six): Each relay is independently configurable to be high, low, attention, or fail. There are also settings for hysteresis, delay, and action. Alarm contacts rated 5A @ 240 Vac, resistive load

Model Information Code

Model A1000.

A Compliance

01 - Standard Unit (CE)

C Documentation

01 - Standard

02 - QC2

B Language

01 - American English

02 - U.K. English

Warranty and Capability

Capital Controls offers a one (1) year limited warranty on the A1000 Ammonia Monitor.

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 Ammonia Monitor shall provide continuous on-line measurement of ammonia levels in a sample using an ion-selective ammonia gas-sensing electrode. The monitor shall provide automatic ranging for 0-1000 mg/l of (ammonia NH_3) (ammonia nitrogen $\text{NH}_3\text{-N}$) in water, within 5% of the reading. The microprocessor-based analyzer shall display the residual in mg/l, ppm, ppb, or $\mu\text{g/l}$. The monitor shall be a microprocessor-based instrument with a 3" x 4" dot-matrix graphical display housed in a NEMA 4X electronics enclosure. The monitor shall provide data logging and trending for up to 28 days; previous 7 days; or previous 24 hours. Display resolution shall be 0.001 mg/l for below 10 mg/l residuals, 0.01 mg/l for 10-99 mg/l, 0.1 for 100-1000 mg/l.

The sample conditioning within the monitor shall include the addition of an EDTA complexing solution and alkali solution at a common introduction point in the sample line. The conditioned sample shall be raised to a temperature of $95^\circ\text{F} \pm 0.4^\circ\text{F}$ ($35^\circ\text{C} \pm 0.2^\circ\text{C}$) by a flexible tubing loop within an aluminum block. The ammonia probe shall be mounted in the heating block and shall be raised to the same temperature as the sample. The sample pH shall be raised to a level greater than 10.5 pH and shall be measured with a pH probe to ensure sample integrity.

The sample, reagents, and standard solutions shall be moved through the monitor with a cartridge-type, four-roller peristaltic pump.

The monitor shall feature two-point, programmable automatic calibration with separate high and low ammonia standard solutions on a weekly basis or up to four times per day.

The monitor shall provide on-screen instruction and self diagnostics. All user controls shall be provided through four membrane buttons on the display face.

The monitor shall include six (6) adjustable alarm relays that are independently configurable to be high, low, attention, or fail. The monitor shall include settings for hysteresis, delay, and action. Alarm contacts shall be rated 5A @ 240 Vac, resistive load.

The monitor shall have universal power recognition from 85-264 Vac, 47-63 Hz, 1 phase power.

The monitor shall provide an isolated 4-20 mAdc or 0-20 mAdc into a maximum of 1000 ohms. The monitor shall have RS232/485 communication capabilities.

Design improvements may be made without notice.

Represented by:



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