

CAPITAL CONTROLS

Capital Controls' Series 1870E chlorine residual analyzer technology has been independently tested and proven to be a reliable analyzer for continuous, accurate residual analysis.

The amperometric-based instrument is designed to continuously analyze free or total chlorine, chlorine dioxide, iodine, bromine or other oxidants for water, wastewater, cooling water and other process water applications.

Series 1870E features a field selectable monitoring range from 0-0.1 to 0-20 mg/l. The analyzers incorporate a constant, direct-drive electrode cleaning system which eliminates signal drift and the need for frequent recalibration. Internal high and low set points are standard.

The analyzer's reagent and sample are gravity fed with the analyzer wet end, eliminating the need for metering pumps. Extra large gold and copper electrodes are used for maximum signal strength. Sample temperature variations are compensated within the measuring cell, thereby providing consistent residual values.

Series 1870E analyzers are constructed of corrosion-resistant materials. Each unit is pre-piped and pre-wired requiring only field connection to service points. All components and controls are accessible from the front of the unit to permit ease of observation of solution level, sample flow, electrode cleaning system and adjustment of set points.

Chlorine Residual Analyzer Series 1870E



- ◆ Continuous on-line operation
- ◆ High-reliability
- ◆ Field-proven
- ◆ Multiple ranges — selectable up to 20 mg/l
- ◆ High and low alarm points
- ◆ Automatic cleaning system
- ◆ Direct measurement of free or total chlorine
- ◆ High/low band control for chemical feed systems
- ◆ Highly accurate low level readings

Applications

- ♦ **Wastewater:** Feed-forward dechlorination control; Effluent monitoring
- ♦ **Industrial wastewater:** Effluent control
- ♦ **Power Industry:** Effluent monitoring to meet NPDES and M.O.E. discharge limits
- ♦ **Drinking water disinfection:** In-plant and finished water monitoring and control
- ♦ **Food and beverage:** Zero verification after carbon filtration
- ♦ **Pharmaceuticals:** Zero verification after carbon filtration; simplification of validation procedures
- ♦ **Swimming pool disinfection:** Accurate control of chlorine residual
- ♦ **Cooling water monitoring and control:** Control of slime and algae in piping and heat exchangers and throughout the tower

Design Features

- ♦ **Gravity feed reagent:** Provides the analyzer with a sample pH of 4.5-4.8 which increases the stability and strength of the generated signal
- ♦ **High and low alarm set points:** Monitor and control chlorine and other residual oxidants within a concentration band by using high and low alarm set points that are easily adjusted on the front panel. LED lights indicate an alarm has occurred. A latching contact option is available to provide band control for high-low feed control systems
- ♦ **Large cell:** The extra large gold and copper electrodes provide maximum signal strength
- ♦ **Automatic cleaning:** A continuous direct-drive cleaning system maintains a constant level of electrode cleanliness
- ♦ **Ease-of-use:** All components and controls are accessible from the front of the unit to permit ease of observation of solution level, sample flow, electrodes and adjustment of set points
- ♦ **Accurate:** The 1% accuracy of the unit is ideal for monitoring and control of water, wastewater and industrial process water
- ♦ **Mounting:** Easy mounting is accomplished through the mounting panel where all components are attached. Units can also be supplied in a floor or wall cabinet
- ♦ **NEMA 4X:** The electronics enclosure is NEMA 4X for protection

Principle of Operation

A sample liquid is delivered to the constant head weir at an approximate rate of 500 ml/minute. The excess overflows to drain. (Figure 1).

The sample then passes through the annular space between the two fixed electrodes in the sensing cell. As it passes, a small DC current is generated in direct linear proportion to the amount of residual present in the sample. The residual value is displayed on the digital indicator in mg/l.

The surfaces of both electrodes are kept clean by the continuous action of PVC spheres agitated by a motor-driven rotating striker. This constant cleaning eliminates signal drift and recalibration,

and provides an accurate residual measurement. A thermistor compensates for sample temperature variation.

The liquid reagent is stored in a single bottle and fed from a constant head reservoir through a rotary valve. This configuration adds the precise amount of solution during each valve rotation. The reagent bottle supplies 7 days of use before refilling is required. An optional reagent feed system may be adapted for pH buffering using carbon dioxide gas for water treatment applications.

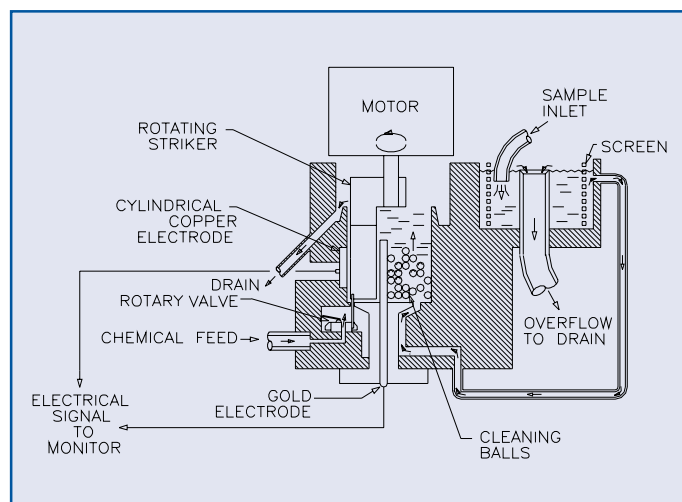


Figure 1 - Series 1870E Flow Diagram

Technical Data

Series 1870E

SAMPLE

Sample Flow: 500 ml/minute

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

Speed of Response: 4 seconds from sample entry to display indication. 90% of full scale response within 1½ to 2 minutes

Ambient Temperature: 32°F to 120°F (0°C to 50°C)

Sample Supply: Continuous. Where sample interruption may be required, provision must be made to keep electrodes wet

Sample Limitations: Samples containing high concentrations of metal ions or certain corrosion inhibitors may effect analyzer operation. At low residual levels (less than 0.1 mg/l) variations in sample dissolved oxygen level may affect the residual reading. Consult factory for specific applications.

Accuracy: 0.003 mg/l or ±1% of range whichever is larger. (see sample limitations)

Analyzer Location: As close as possible to sample point

STANDARD EQUIPMENT

Wall Mounted

1 Residual analyzer with 7-day reagent bottle and digital indicator

2 Relay contacts

10 feet (3 meters) 5/16" sample tubing

3/4" drain connection hose clamp

Floor or Wall Cabinet Mounted

1 Residual analyzer with 7-day reagent bottle and digital indicator pre-piped and pre-wired

2 Relay contacts

REAGENT REQUIREMENTS

Residual	Reagent
Chlorine (Free)	pH Buffer (or CO ₂ gas)
Chlorine (Total)	pH Buffer (or CO ₂ gas) & potassium iodide
Chlorine Dioxide	pH Buffer & glycine
Bromine	pH Buffer & potassium iodide
Iodine	pH Buffer
Other oxidants	Consult factory

GENERAL

Quality Standard: ISO 9001

Compliance: CE

Instrument Range: Field selectable 0-0.1, 0-0.2, 0-0.3, 0-0.5, 0-1, 0-2, 0-3, 0-5, 0-10, 0-20 (mg/l) (Others available, consult factory)

Resolution: 0.001 mg/l (1 ppb) for 0-2 mg/l and below; 0.01 mg/l (ppm) for 0-3 mg/l and above ranges

Electrodes:

Measuring: Gold

Reference: Copper

Power Requirements: 120 Vac, 60 Hz, or 240 Vac, 50 Hz, single phase

Power Consumption: 16 VA

Set Point Control: Internal high and low set points, adjustable 0-100% of range

Relay Contacts (Two):

10 amps at 120 Vac, resistive load

10 amps at 24 Vdc, resistive load

5 amps at 240 Vac, resistive load

Output Signal: Isolated 4-20 or 0-20 mAdc into a maximum of 800 ohms or 0-50 mVdc

Displays: 3½-digit LCD

Electronics Enclosure: NEMA 4X

Shipping Weight:

Wall Mounted: 14 lbs. (6.4 kgs)

Wall Cabinet Mounted: 16 lbs. (27 kgs)

Floor Cabinet Mounted: 100 lbs. (45 kgs)

Overall Dimensions: 9 15/16" (252 mm) W x 16" (406 mm) H x 5 3/8" (135 mm) D

Warranty and Capability

Capital Controls offers a one (1) year limited warranty on all residual analyzers.

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 residual analyzer shall continuously analyze a water sample in an amperometric type of cell and produce a current proportional to the free or total chlorine residual in the sample. The range of the analyzer shall be field selectable for 0 to 0.100, 0.200, 0.300, 0.500, 1.000, 2.000, 3.00, 5.00, 10.00, 20.00 mg/l. The residual analyzer shall be a wall panel mounted design with a NEMA 4X electronics enclosure. The electrodes shall be fixed and shall be continuously cleaned by the action of small spheres moved in a spatial action between the surfaces by a motor-operated striker.

Automatic temperature compensation shall be provided. The sensing cell shall consist of fixed gold and copper electrodes. The isolated output signal shall be 4-20 or 0-20 mAdc into a maximum of 800 ohms, or 0-50 mVdc. The cell shall be kept clean by a motor direct-driven plastic striker agitating small PVC spheres against both electrodes to keep dirt and other interfering substances from the face of the electrodes and eliminate signal drift. The cleaning operation shall be continuous. Separate high and low set points shall be provided and shall be adjustable from the front of the unit from 0-100% of the range. Each set point shall have a corresponding light on the face of the unit. A latching contact option shall provide band control.

The analyzer shall operate from a 110/120 Vac, 60 Hz or 220/240 Vac, 50 Hz single phase power supply.

Liquid reagent shall be gravity fed from a single bottle, constant head reservoir through a rotary valve. The unit shall have a specified accuracy of 0.003 mg/l or $\pm 1\%$ of range, whichever is larger.

The residual analyzer shall be Capital Controls Series 1870E.

Design improvements may be made without notice.

Represented by:



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