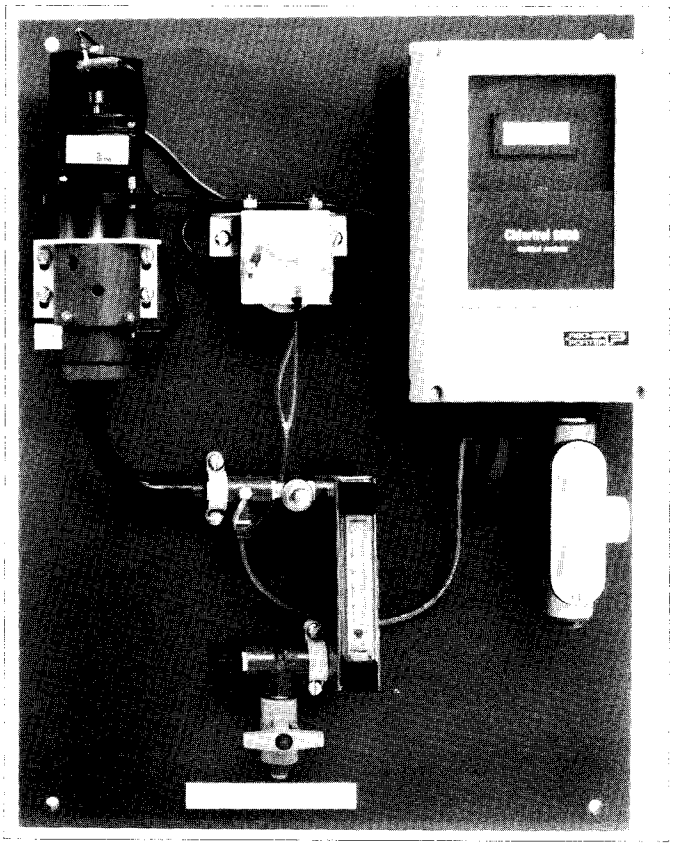
Chlortrol™
Formerly Fischer & Porter

ANALYTICAL INSTRUMENTS
Series 17B5000

CHLORTROL 5000™ Residual Chlorine Analyzer with Bare Electrode Cell



The CHLORTROL 5000™ Residual Chlorine Analyzer is an amperometric device designed to provide continuous measurement of the concentration of residual chlorine in water. The analyzer uses a flow-through measurement cell containing two dissimilar metal electrodes. As the water sample flows past the electrodes, a current is generated which is directly proportional to chlorine concentration. One of the electrodes is rotated by an electric motor which imparts a swirling velocity to the water sample. The electrode rotation at constant speed provides reproducible electrolytic conditions and makes the cell independent of sample flow variations. Inert plastic non-abrasive pellets in the cell keep the electrodes in a clean condition through scouring action. Either free or total chlorine residual may be measured by proper reagent selection.

A solid-state amplifier and signal conditioner converts the generated current signal to an isolated 4-20 mAdc output suitable for use with standard electronic secondary instruments. Necessary zero and span adjustments are part of the circuitry and automatic temperature compensation of the cell output is included to eliminate errors due to changes in sample water temperature. The operating range is field selectable, and RFI immunity is built in.

The analyzer is also supplied with a digital indicator to eliminate the need for additional instrumentation at the point of measurement, and is wall-mounted for operating and maintenance convenience. For systems with the analyzer and associated instruments contained in the same floor-mounted cabinet, refer to Specification 17SB5000.

DESIGN FEATURES

- Continuous Monitoring: Indicates and transmits residual chlorine level. May be used with a controller to control a chlorinator or sulfonator. Frees operator for other duties by eliminating the need for frequent laboratory testing.
- Response Time: Within 5 seconds.
- Reliability: Electrode surfaces are continuously cleaned by action of non-abrasive pellets. Automatic temperature compensation and RFI immunity are standard.
- Easy Maintenance: All components are easily accessible on the wall-mounted panel. Chemical supply lasts 60 days.
- Low Cost: No need for expensive cabinets and instrumentation. Reagent cost is minimized by automatic reagent feed system using either carbon dioxide or dilute acetic acid.

ENGINEERING SPECIFICATIONS

Measurement Principle: Amperometric type with bare electrodes

Type of Measurement: Free or total chlorine residual*

Operating Ranges: 0-0.23, 0-0.5, 0-1, 0-2, 0-5, 0-10, and 0-20 mg/L** (field selectable)

Sample Conditioning: For wastewater applications, where total chlorine residual is measured, a flushing "Y" strainer is provided for installation in the sample line, close to the analyzer.

Interferences: Turbidity and chemicals normally found in raw and treated waters do not effect cell operation. However, potassium permanganate and ozone do have an adverse effect.

Sample Requirements:
Temperature: 33 to 122°F (1 to 50°C)
Flowrate to Flushing "Y" Strainer:
5 to 10 gpm (18.9 to 37.9 L/m)
Flowrate to measuring cell:
100 cc/m
Pressure: Reasonably constant between 5 and 25 psig (34 to 172 kPa)

Temperature Compensation: A thermistor provides automatic signal compensation for changes in sample temperature.

Ambient Temperature Limits: 33 to 122°F (1 to 50°C)

Materials of Construction: All materials in contact with the water sample resist corrosion from chlorinated water, waste water, and added reagents. All electronics are housed in a glass-filled polyester case with a polycarbonate cover having a NEMA 4X (IP 66 per IEC529) rating.

Power Requirements: 110/120, 220/240 V ac ±10%, 50/60 Hz, at 8 watts max.

Meter Indication: Direct reading 3 1/2 digit LCD display with 0.5 inch (13mm) high characters

Output: 4-20 mA dc into 600 ohms max. with built-in signal isolation

Sensitivity: The analyzer will recognize and respond to residual changes as low as 0.001 mg/L chlorine.

Accuracy: ± 2% of span

Mounting: Wall

Reagent Containers: When acetic acid is used for pH control, one 8 gal (30L) opaque plastic container is furnished for free chlorine residual measurement. Two containers are furnished when total chlorine residual is measured. When CO_2 is used for pH control, one less container is furnished.

Shipping Information:
Weight: 79 lb (35.8kg)
Cubage: 12.8 ft^3 (0.36m^3)

** Refer to Bailey-Fischer & Porter TIB 70-7 entitled "Chlorine Chemistry" or "Handbook of Chlorination - 3rd Edition" by George Clifford White - Von Nostrand Reinhold Co., NY - 1992.*

*** 1 mg/L = 1 part per million*

MODEL NUMBER DESIGNATION

17B5 _ _ _ A _ _

CHLORTROL 5000
Analyzer with Bare Electrode Cell _____

Residual Measured (pH control)
Chlorine (Acetic Acid or CO_2) _____ 1
Seawater — Total Chlorine (Acetic Acid) _____ 2
Breakpoint — Free Chlorine (Acetic Acid) _____ 3

Power Supply
120V 50/60 Hz _____ 1
240 V 50/60 Hz _____ 2

Measurement Range, mg/L
0 to 0.25 _____ 1
0 to 0.50 _____ 2
0 to 1.0 _____ 3
0 to 2.0 _____ 4
0 to 5.0 _____ 5
0 to 10.0 _____ 6
0 to 20.0 _____ 7

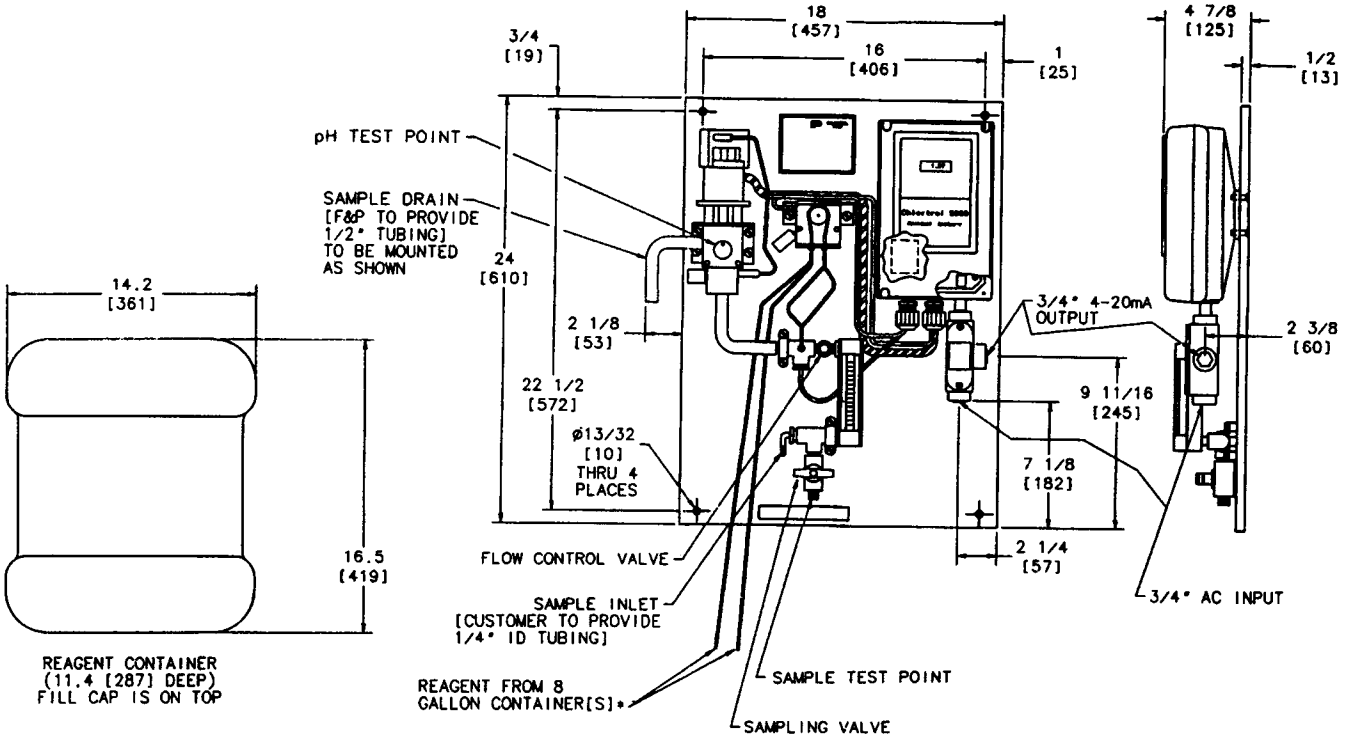
Type of Residual being Measured (pH Control)
Free Chlorine (Acetic Acid) _____ 1
Total Chlorine (Acetic Acid) _____ 2
Free Chlorine (CO_2) _____ 3
Total Chlorine (CO_2) _____ 4
Free Chlorine (CO_2) Dual pressure reducing station w/ rotameter provided _____ 5
Total Chlorine (CO_2) Dual pressure reducing station w/ rotameter provided _____ 6

Destination
Domestic _____ 1
Overseas _____ 2

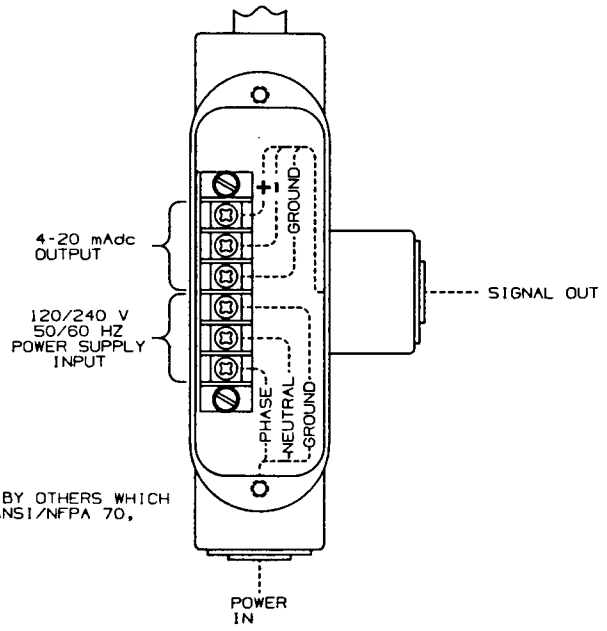
Dimensions

NOTES

1) ALL DIMENSIONS ARE IN INCHES. DIMENSIONS IN PARENTHESIS [ ] ARE IN MILLIMETERS [mm].
2) ALL DIMENSIONS ARE GUARANTEED ONLY IF THIS PRINT IS CERTIFIED.
3) THIS DRAWING IS A THIRD ANGLE PROJECTION AS SHOWN.
4) INSTRUMENT TO BE MOUNTED PLUMB AND SQUARE.



* THE NUMBER OF CONTAINERS AND REAGENT PUMPS PROVIDED, DEPENDS ON THE TYPE OF RESIDUAL BEING MEASURED, AND THE METHOD OF pH CONTROL (ACETIC ACID OR CO2).



DASHED LINES INDICATE WIRING BY OTHERS WHICH SHALL BE IN ACCORDANCE WITH ANSI/NFPA 70, THE NATIONAL ELECTRICAL CODE.

Equipment Description

The Residual Chlorine Analyzer shall be of the amperometric type for the measurement of (free) (total) chlorine residual over a range of 0 to____ mg/L, and be suitable for wall mounting.

The water sample to be analyzed shall flow through a glass tube rotameter having Kynar® end fittings, and direct reading scale. A needle valve shall be used to set the optimum sample flow rate. A thermistor shall be included to automatically compensate for varying water temperature, and a static mixer to insure that the reagents are thoroughly mixed before the sample enters the measuring cell. For wastewater installations, a flushing "Y" strainer shall be provided for field installation in the sample line near the analyzer.

The sampling cell shall contain two dissimilar metal electrodes which continually detect the chlorine concentration and generate a proportional current signal. The cell shall be provided with non-abrasive plastic pellets which are continually impelled against the electrodes to prevent any foreign material from adhering to the electrode surfaces. The noble metal electrode shall be rotated by a motor drive to provide the impelling force for the cleaning pellets and to eliminate the need for close control of sample flow rate.

The reagent feed pump shall be a motor-driven, peristaltic type, and shall pump the necessary chemicals. When Acetic acid is used for pH control, an 8 gal (30L) capacity plastic reagent container shall be provided for chemicals when free chlorine is being measured. Two 8 gal containers are provided when total chlorine is being measured. When full, this container shall hold a 60 day supply. Measurement with CO_2 for pH control requires one less container.

The following ranges shall be switch adjustable in the indicating transmitting instrument: 0-0.25, 0-0.5, 0-1.0, 0-2.0, 0-5.0, 0-10.0, and 0-20.0 mg/L. The transmitter shall contain a 3 1/2 digit LCD indicator with 1/2 inch (13mm) high characters, and all the electronic circuitry in a corrosion resistant enclosure having a NEMA 4X (IP 66 per IEC 529) rating. The circuit board shall be coated with Humiseal® having a minimum thickness of 0.002" to meet the requirements of MIL E-810, thus increasing corrosion resistance. Power supply shall be (120V) (240V) 50/60 Hz. The instrument shall have ambient temperature limits of 33 to 122°F (1 + 50°C) and RFI immunity from a 5 watt walkie-talkie at a one meter distance. The transmitted signal shall be 4-20 mAdc into 0-600 ohms, linearly proportional to the range selected. The measuring and transmitting system shall be traceable to "Standard Methods" without any calculated or inferred values.

A one month supply of chemicals shall be provided for the analyzer, except that carbon dioxide (CO_2) when used shall be provided by the customer.

All components of the analyzer shall be installed on a PVC panel for wall mounting. The chlorine residual analyzer shall be Series 17B5000 CHLORTROL 5000 as manufactured by Bailey-Fischer & Porter.

Optional Equipment

- Additional Chemicals - a one month supply is provided with each unit, except that CO_2 when used shall be provided by the customer.
- Amperometric Titrator for calibration
  B-F&P Surge Buster™
- Remote Indicator / recorder / controller

Ordering Information

- Model Number
- Type of residual
- Voltage and frequency
- Range in mg/L
- Free or Total chlorine residual
- Normal, seawater or breakpoint service
- Acetic acid or CO_2 for pH control
- If CO_2, with or without gas pressure reducing station
- Optional Equipment

Related Specifications

Bailey-Fischer & Porter manufactures several types of Chlorine Residual Analyzers and Systems.

Refer to Specification 17SB5000 for the CHLORTROL 5000™ and associated instrumentation contained in the same floor-mounted cabinet.

Refer to Specification 17PC1000 for the ANACHLOR II™ Residual Chlorine Analyzer which is a membrane type.

Refer to Specification 17SD4000 for the Z-CHLOR® Center Zero Dechlorination Control System, designed for use when the maximum chlorine residual permitted is low or even zero.

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HUMISEAL® is a registered trademark of Chase Corporation.
Z-CHLOR® is a registered trademark of Bailey-Fischer & Porter.

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