

Z-CHLOR[®] CENTER ZERO DECHLORINATION ANALYZER CONTROL SYSTEM

The Z-CHLOR[®] Center Zero Dechlorination Analyzer Control System measures the chlorine and sulfite residuals in a sample stream of water or wastewater, and controls the dechlorination process through a powerful microprocessor-based controller. All components of the system are mounted in a fiberglass cabinet. The System is capable of measuring and controlling chlorine residuals down to zero ppm chlorine through a precisely controlled unique biasing system which introduces a small constant quantity of chlorine into the sample prior to analysis. In this way, the chlorine residual analyzer is always provided with a chlorinated sample.

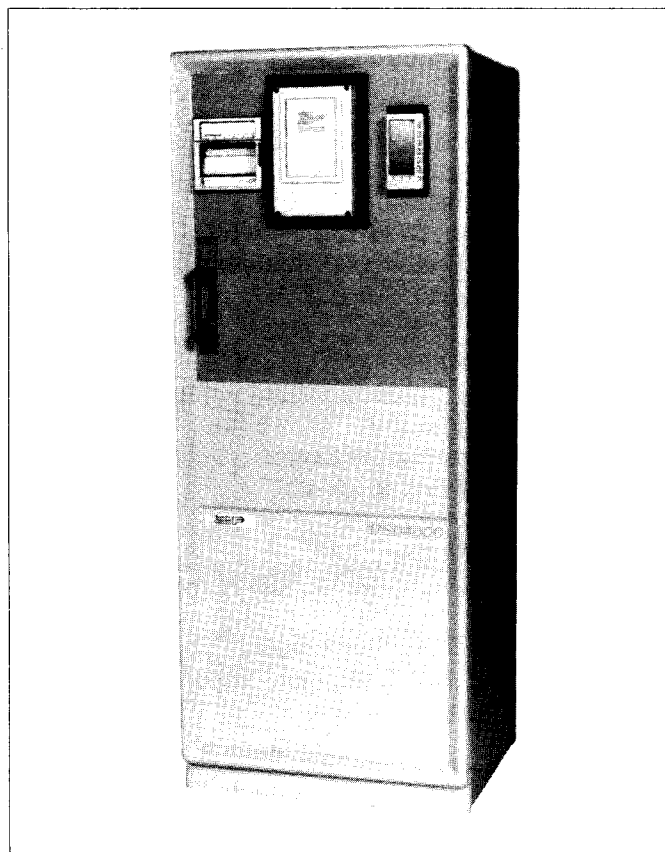
The heart of the Z-CHLOR[®] control system is the microprocessor-based controller mounted on the cabinet face. It contains specifically designed control logic keyed to the dechlorination process. It includes a multi-stage alarm system to alert operating personnel to residuals which are above or below the desired levels. An override system is activated should the residual levels reach the maximum permitted by the Plant Discharge Permit.

The control system features a dot matrix display which provides operating personnel with all data necessary for proper operation. This is accomplished through use of multiple displays which present the data in an easily understood format.

The Z-CHLOR[®] System is available with two options: a residual recorder, mounted on the front of the cabinet, and a cleaning system to keep the sampling line to the Z-CHLOR[®] in a clean condition, free of slime and algae growth, which would otherwise reduce the level of chlorine residual reaching the analyzer.

DESIGN FEATURES

- A series of displays provide operating personnel with the information they require.
- Utilizes time-proven, unique "Center Zero" feed back control concept.



Z-CHLOR[®] with Optional Circular Chart Recorder

- Continuously monitors the chlorine or sulfite residual in a sample stream of water or wastewater being discharged from a plant.
- State-of-the-art microprocessor-based controller handles control of the sulfonator to maintain the residual at a preselected value.
- Setpoint may be a positive chlorine residual value, zero chlorine residual value or positive sulfite residual value, to meet the plant discharge requirement.
- Optional recorder provides a permanent record that the plant is meeting discharge requirements for chlorine residual.
- Multistep alarm system warns operating personnel in steps of increasing severity of abnormal conditions.
- Override control system is triggered should the residual reach the maximum permitted value.

ENGINEERING SPECIFICATIONS

GENERAL

The system consists of a chlorine residual analyzer, control system, biasing pump, flow regulator and solenoid valve, all mounted in a free-standing fiberglass cabinet. A "Y" strainer (flushing type) is provided for installation in the sampling line.

Chlorine Residual Analyzer:

Refer to Specification 17B5000

Sample Requirements:

Temperature: 33 to 122° (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/min

Pressure: Between 5 and 25 psig

(34 to 172 kPa)

Ambient Temperature Limits:

33 to 122°F (1 to 50° C)

Power Requirements:

120 V ac \pm 10%, 50/60 Hz, 700 W max.

Signal Input:

4-20 mA dc from Plant Effluent Flow Transmitter.

4-20 mA dc from Sulfonator, proportional to sulfur dioxide gas flow.

Signal Output:

4-20 mA dc isolated to Sulfonator automatic control valve.

4-20 mA dc to any remote instrumentation.

RS485 and MicroLink™ Data Highway communications capabilities.

(6) Contact Closure Outputs rated at 3 A
120 V for external alarm stations.

(3) Contact Closure Outputs rated at 3 A
120 V for an external optional cleaning chemical pump and solenoid.

Accuracy:

\pm 5% of full scale over the full range from chlorine to sulfite residuals.

Circular Chart Recorder (optional):

Refer to Technical Bulletin 1392

Strip Chart Recorder (optional):

Refer to Technical Bulletin 2342

CLEANING SYSTEM

The Cleaning System (optional) incorporates an external chemical pump, housed in a weatherproof enclosure,

for use feeding sodium hypochlorite when the length of sample line going to the analyzer exceeds 5 feet. A corrosion-resistant solenoid is included when the hypochlorite injection point is into the sampling pump suction. Locate the chemical pump and solenoid at the beginning of the sample line. This option will help to maintain the inside of the sample line free from slime and algae build-up. In operation, the chemical pump and solenoid are automatically activated for several minutes (field adjustable) during every eight hour period. A bottle of 5% sodium hypochlorite (bleach) is required for this system. The controller provides all operating controls for the Cleaning System including holding the output to the Sulfonator at a constant level during cleaning.

OPERATOR DISPLAYS ON DOT MATRIX SCREEN

The main displays are depicted on pages 4 and 5. Numbers 1 through 11 are standard. Number 12 is optional.

ALTERNATE DECHLORINATION AGENTS

While sulfur dioxide is the most widely used dechlorination agent, Z-CHLOR® may be used to control a chemical feed pump for sodium bisulfite or other reducing agent solution. In this case, Displays No. 3 and No. 4 may be eliminated.

OPTIONAL EQUIPMENT

- Additional electrolyte and biasing solution (a one-month supply is provided as standard)
- Amperometric Titrator for system calibration
- Cleaning System
- Residual Recorder (circular chart or strip chart)

SODIUM HYPOCHLORITE

The sodium hypochlorite for the optional Cleaning System is not included by Bailey-Fischer & Porter, and should be provided by the user of the equipment.

ORDERING INFORMATION

- Model Number
- Application (water pollution control plant effluent, cooling water discharge, etc.)
- Range (1.0 mg/L chlorine to 0 to 1.0 mg/L sulfite) (2.0 mg/L chlorine to 0 to 2.0 mg/L sulfite)
- 24-hour or 7-day charts for optional Circular Chart Recorder
- Acetic Acid or CO₂ for pH control
- If CO₂ — with or without gas pressure reducing station
- Optional Equipment

MODEL NUMBER DESIGNATION

	17SD4	1	C		
Z-CHLOR® Center Zero Dechlorination Analyzer Control Sytem	17SD4				
Front Cabinet Mounted Instruments					
Controller		10			
Controller and Circular Chart Recorder		20			
Controller and Strip Chart Recorder		30			
Power Supply					
120V ac, 50/60 Hz		1			
Measurement Range, mg/L (pH Control)					
1.0 Chlorine to 0 to 1.0 Sulfite (Acetic Acid)				1	
2.0 Chlorine to 0 to 2.0 Sulfite (Acetic Acid)				2	
1.0 Chlorine to 0 to 1.0 Sulfite (CO ₂)					
Customer supplies dual pressure reducing station with rotameter				3	
2.0 Chlorine to 0 to 2.0 Sulfite (CO ₂)					
Customer supplies dual pressure reducing station with rotameter				4	
1.0 Chlorine to 0 to 1.0 Sulfite (CO ₂)					
Dual pressure reducing station with rotameter by Bailey-Fischer & Porter				5	
2.0 Chlorine to 0 to 2.0 Sulfite (CO ₂)					
Dual pressure reducing station with rotameter by Bailey-Fischer & Porter				6	
Cleaning System for sampling line					
Not required (sampling line must be less than 5 feet long)					X
Required (without solenoid). Select when hypochlorite injection is into sampling pump discharge line.				1	
Required (with solenoid). Select when hypochlorite injection is into sampling pump suction line.				2	

EQUIPMENT DESCRIPTION

The Dechlorination Analyzer System shall include an amperometric analyzer for measuring the chlorine or sulfite residual in a sample stream of dechlorinated plant effluent or discharge water.

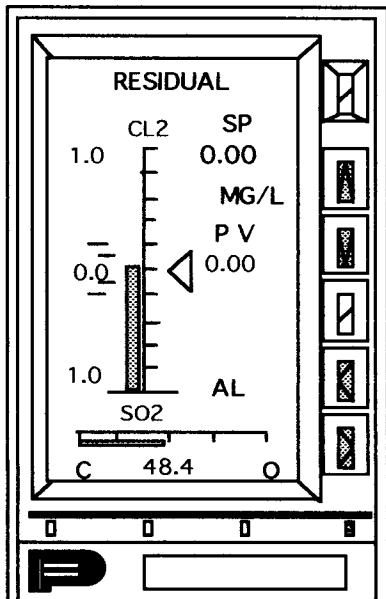
A biasing system shall be incorporated to continuously feed a small constant quantity of dilute sodium hypochlorite into the sample stream prior to analysis, insuring that the measuring cell always receives a sample containing chlorine residual.

The system shall be housed in a floor-mounted fiberglass cabinet, pre-piped and wired by the manufacturer. In addition to the analyzer and biasing system, the system shall include a flow regulator and solenoid valve, and an electronic microprocessor-based controller which shall have multiple functions. It shall receive 4-20mA dc signals from the analyzer transmitter, effluent flow transmitter, and the sulfonator flow rate transmitter. It shall compare the measured residual with an operator-established set point, and send a 4-20mA dc signal to the Sulfonator automatic valve to vary the feed rate of sulfur dioxide, in order to maintain a constant residual.

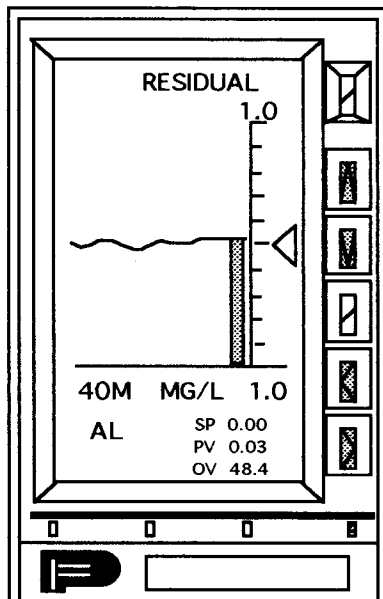
The range of the analyzer shall be from (1.0) (2.0) mg/L chlorine residual to (1.0) (2.0) mg/L sulfite residual with zero residual at 50% of span. It shall be provided with a

30-day supply of electrolyte for the measuring cell. The set point shall be adjustable over the entire span. The system shall have six sets of contacts for external alarms. These shall be adjustable and rated at 3A at 120V. Three additional contacts shall be available and used to control operation of the optional external chemical pump and solenoid. The system shall be capable of limiting the output on falling and rising signal levels to guard against overfeed or underfeed of sulfur dioxide.

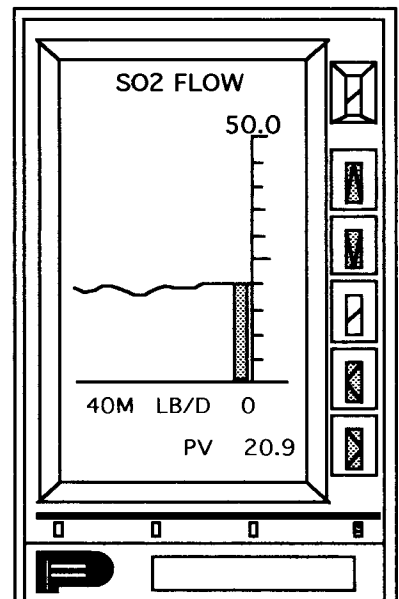
The system shall incorporate a dot matrix display on multiple screens to include: digital and bar graph displays of residual, set point and output to the sulfonator; adjustable time trends (between 1 and 40 min) for recording of residual, sulfur dioxide and water flow; totalization of sulfur dioxide and water flow; controller tuning parameters; adjustable alarms for first stage high and low and second stage high and low; deviation between set point and residual; low water flow (all alarms shall flash when in the alarm condition); adjustable high and low output signal limiters; adjustable time periods for the flushing cycles. The system shall have both RS485 and MicroLink™ Data Highway communications capabilities. An optional residual recorder shall be provided (10 in. diameter circular chart) (4 in. strip chart), mounted on the front of the fiberglass cabinet. An external cleaning system shall be provided when the sample line exceeds 5 ft. in length. The System shall be Bailey-Fischer & Porter Series 17SD4000.



DISPLAY 1: CONTROL POINT
CL2/SO2 RESIDUAL

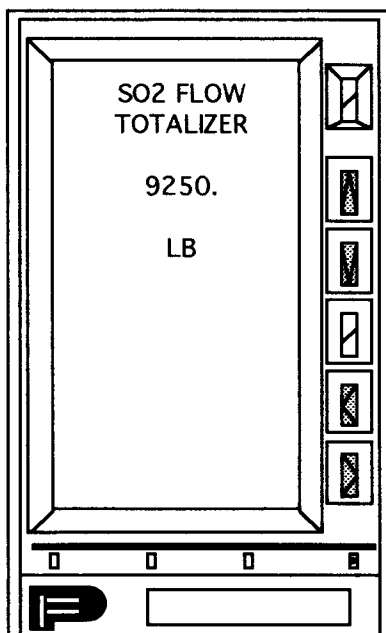


DISPLAY 2: TREND
CL2/SO2 RESIDUAL

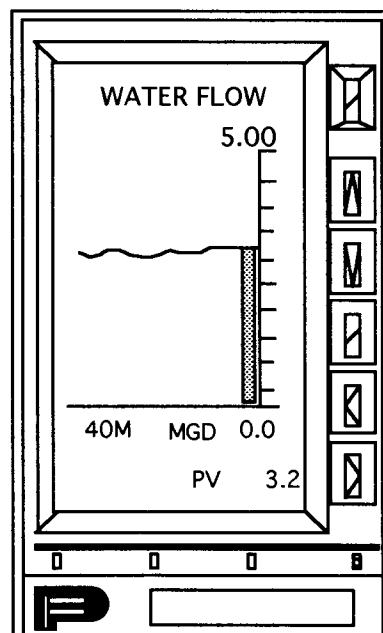


DISPLAY 3: TREND
SO2 FLOW

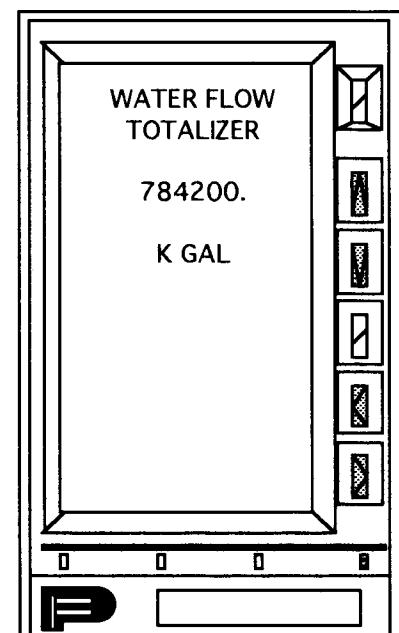
Display 1 - Main display showing digital and bar graph Set Point (SP) in mg/L, digital and bar graph process variable (PV) in mg/L, A for Automatic Control, M for Manual Control, L for Local SP and R for Remote SP. Controller output is shown in % with C for SO₂ valve closed, and O for SO₂ valve open. The horizontal dash marks show the first stage and second stage alarm settings. **Display 2** - Trend of Residual with adjustable duration up to 40 min. OV is output to SO₂ valve in %.



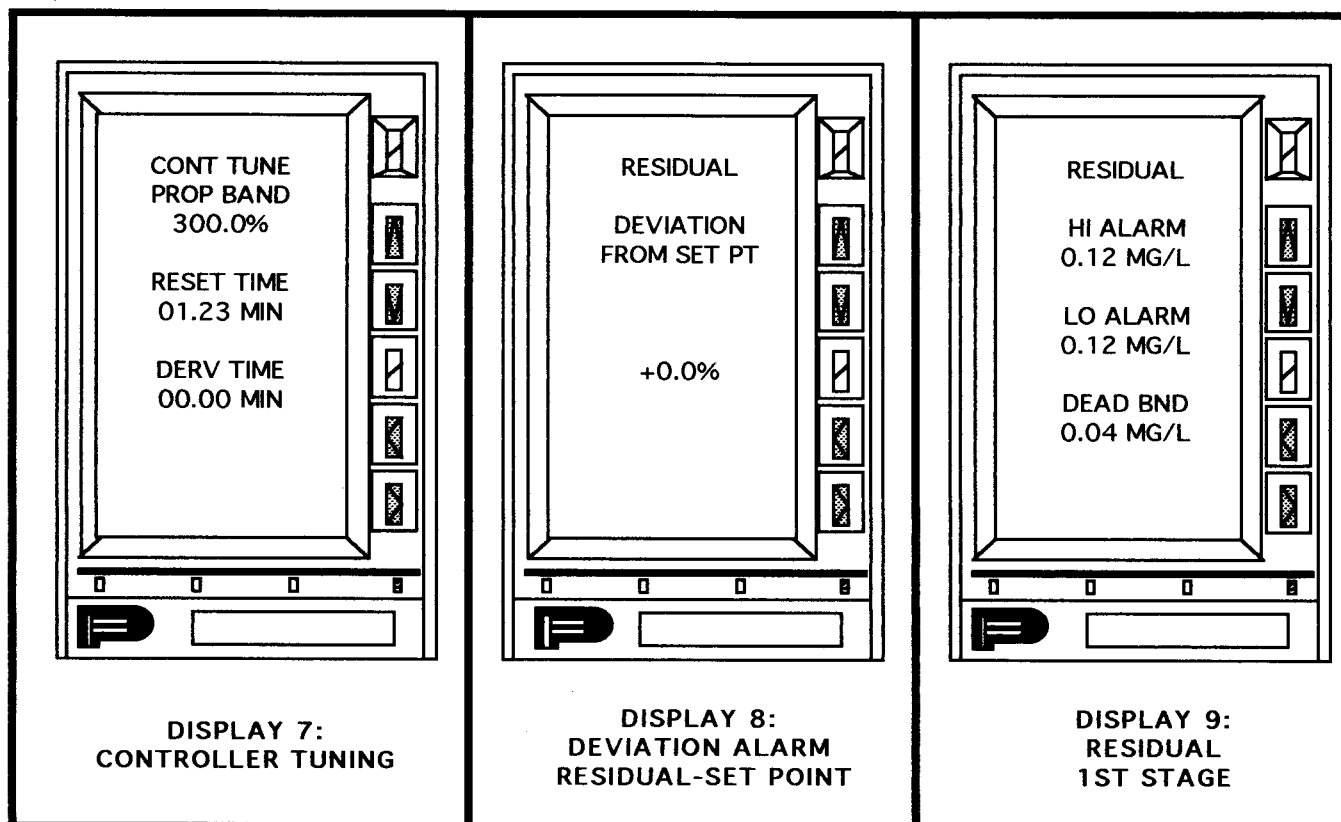
DISPLAY 4:
TOTALIZED FLOW
SO2



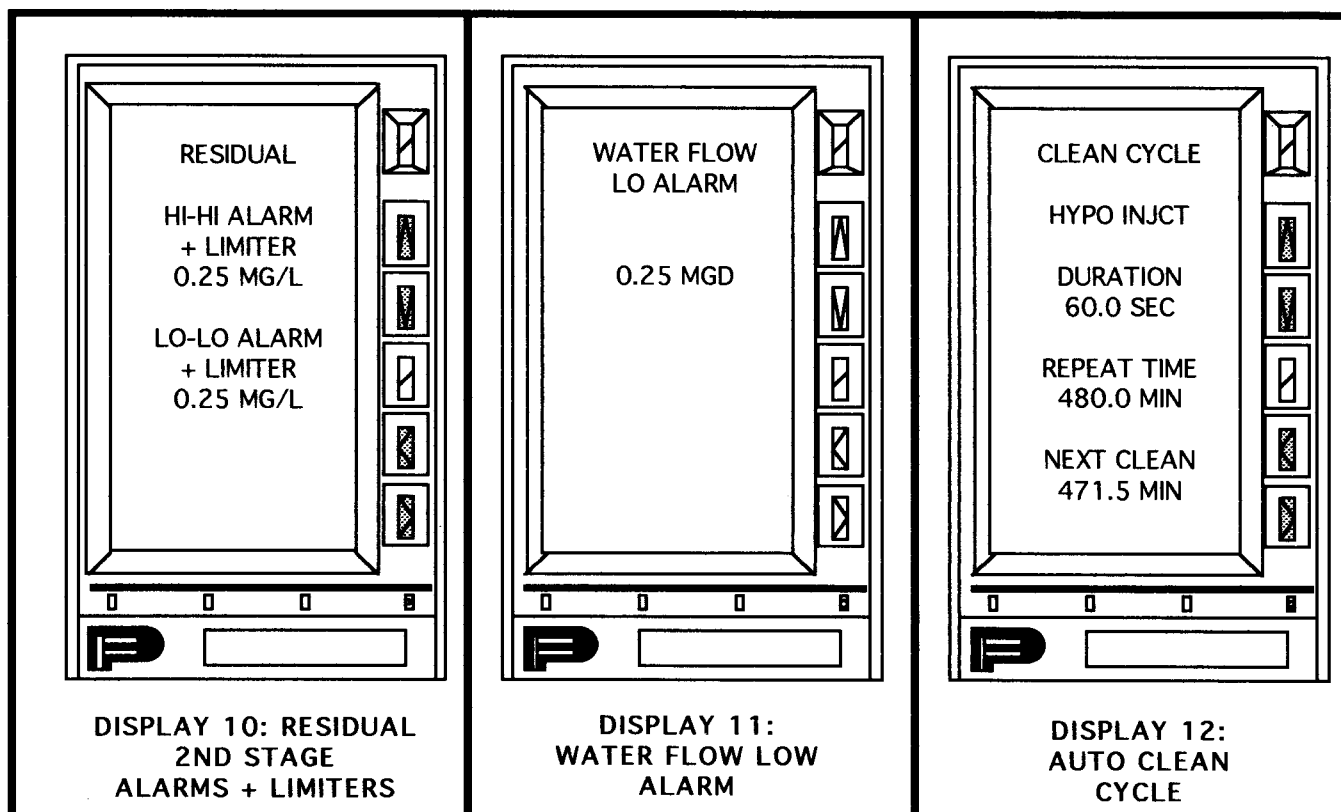
DISPLAY 5: TREND
WATER FLOW



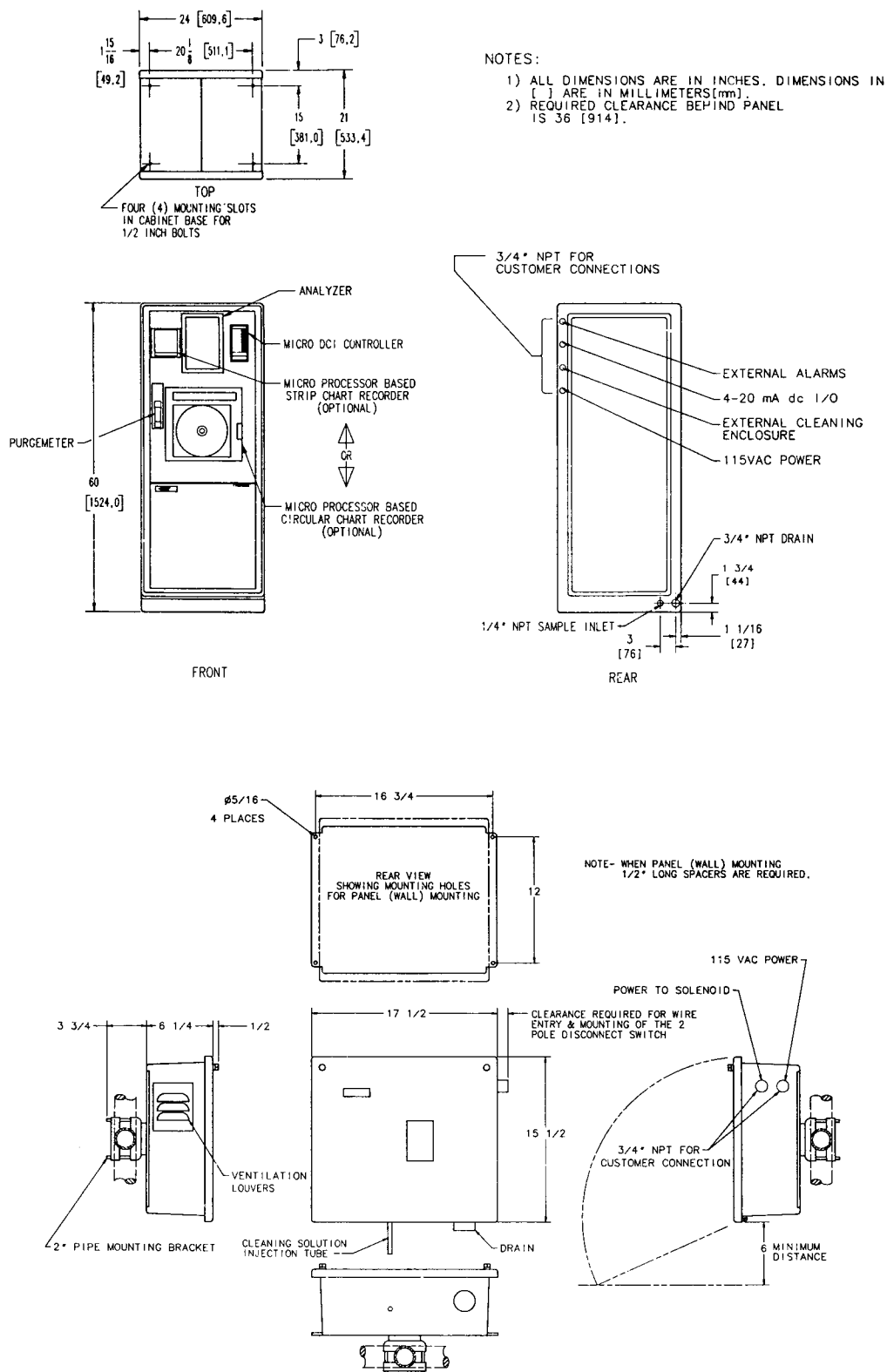
DISPLAY 6:
TOTALIZED FLOW
WATER



Display 8 - Showing residual deviation from SP (+ or -). **Display 9** - Showing first stage high and low alarm values and deadband. **Display 10** - Showing second stage high and low alarm/limiter values. **Display 11** - Showing value of Water Flow low alarm. **Display 12** - Showing duration and frequency of Hypochlorite cleaning cycle.



DIMENSIONS and CONNECTIONS



CLEANING SYSTEM ENCLOSURE

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