WDIS410 Series

**Wall Mount Disinfection Controllers**

**180507 Rev B Revised 5/23/2012**

**Part 1. General**

**1.1 Scope**

**A.**  This section describes the requirements for a disinfection controller with an automatically temperature compensated amperometric sensor.

**B.** Under this item, the contractor shall furnish and install the disinfection control equipment and accessories as indicated on the plans and as herein specified.

**1.2 Submittals**

**A.** The following information shall be included in the submittal for this section:

1. Data sheets and catalog literature for a micro-processor based disinfection controller and sensor.

2. Interconnection and dimensional drawings.

3. List of spare parts

**Part 2. Products**

**2.1 Wall Mount Disinfection Controller**

1. The wall mount disinfection control system shall consist of a control module that provides either on/off or time proportional control, and a disinfection sensor that provides measurement of oxidizers including chlorine, chlorine dioxide, ozone or Peracetic acid.

**B.** **Control Module:**

1. Enclosure: Polycarbonate, NEMA 4X, lockable hinged door with clear window.

Power: 100-240 VAC, 50/60 Hz, 8A Fuse: 1.0 ampere, 5 x 20 mm

1. Inputs:

Sensor: ± 2000 mV, preamplified

Interlock: Isolated dry contact closure (flow or level switch)

1. Outputs:

* Control 1 & 2 (on/off): Internally powered relays, 6 A (resistive), 1/8 HP
* Control 3, 4 & Alarm: Dry contact relays, 6 A (resistive), 1/8 HP.
* 4 – 20 mA (One or two optional): Fully isolated, internally powered, 600 ohm maximum resistive load.

1. Software features:

* The four control relays shall be configurable as high set point, low set point, high time proportional set point, low time proportional set point, high alarm, low alarm, out of range alarm, in range output, or probe wash.
* A fifth relay shall be a dedicated diagnostic alarm relay.
* A Generic sensor input selection shall be available allowing the use of any disinfection sensor with a linear mV output.
* A self test shall be available to verify the integrity of the control module’s sensor input circuitry.
* Manual activation of the relays shall be easily accomplished via the keypad.
* A maximum output on-time shall be available to prevent runaway control.
* Software upgrade file shall be transferable to the controller via USB memory stick.
* Optional datalog of conductivity, temperature and water meter totals in 10-minute increments over a two-month period.
* Optional event log with time-stamped relay on/off and flow/no-flow events.
* Optional configuration file import/export feature

**C. Sensor:**

1. Operating Principle: The oxidizer molecules diffuse through the membrane and in the acidic environment of the electrolyte fill solution, a redox reaction occurs at the electrodes in the sensor. The current generated by this reaction is converted to a robust voltage signal that is linear with the concentration of the oxidizer.
2. Materials of construction: Varies with sensor; PVC, FKM, Polycarbonate, Stainless Steel, silicone rubber.
3. Process connections: Flow cell with ¼” NPTF and ¾” NPTF fittings
4. Temperature range: Varies with sensor; 0 – 45, 50 or 55 degrees C.
5. Pressure range: 0 – 14.7 psig.
6. Power: ± 5 VDC, 5 mA.

**D. Controller and Sensor Performance**

1. Range: -2000 to 2000 mV
2. Accuracy: ± 1 mV (as calibrated).
3. Resolution: ± 92 V (1 mV displayed)

4. Maximum separation between the controller and the sensor shall be 1000 feet.

**E. Indication**

1. Graphic User Interface

A 2 line x 16 character backlit LCD display shall indicate the process value, a bar graph of the process value relative to set points, and the status of outputs and alarms.

Five LED lamps shall indicate the on/off status of the relay outputs.

**F. Equipment**

The wall mount disinfection controller shall be a Walchem WDIS410 series.

**Part 3. Operator Functions**

**3.1 Calibration**

1. The disinfection electrode calibration shall be either a one or two point calibration.
2. All set points shall be set through the 8 button keypad.
3. An access code shall be available to protect all set points and calibrations, while allowing the user to view any set point.

**3.2 Control Module Function Details**

1. The four control relays shall be configurable as high set point, low set point, high time proportional set point, low time proportional set point, high alarm, low alarm, out of range alarm, in range output, or probe wash.
2. The probe wash output feature shall provide relay activation up to 10 times per day, for a programmable amount of time, while ignoring the sensor reading for control purposes for a programmable amount of time.

**Part 4. Execution**

**4.1 Installation**

**A.** The disinfection sensor shall be installed in a location where it will always remain immersed in the sample.

1. The disinfection sensor shall be installed in its flow cell in a vertical orientation, with the measuring surface pointing down.

1. The disinfection sensor shall be installed in a location where there is good solution movement and where it will respond rapidly to chemical additions.
2. The disinfection sensor shall be continuously powered by the controller, in a flowing sample of water that always contains some level of the oxidizer being measured, discharging to open atmosphere.
3. The disinfection sensor cable shall be routed such that it is separated from any AC voltage by at least 6 inches.
4. If the sensor cable needs to be extended beyond the standard 10 feet, then 24 AWG, 3 twisted pair, shielded cable shall be utilized, to a maximum distance of 1000 feet.
5. If the optional 4 – 20 mA outputs or flow switch are installed, then 22-26 AWG, twisted pair, shielded cable shall be utilized, to a maximum distance of 3000 feet.

**Part 5. Warranty**

**5.1 Terms**

**A.** The manufacturer of the above specified equipment shall guarantee equipment of its manufacture, and bearing its identification to be free from defects in workmanship and material for a period of 24 months for electronics and 12 months for mechanical parts from date of delivery from the factory or authorized distributor under normal use and service and otherwise when such equipment is used in accordance with instructions furnished by the manufacturer and for the purposes disclosed in writing at the time of purchase, if any.

**B.** In the event a component fails to perform as specified and having been returned to the manufacturer transportation charges prepaid, and is proven defective in service during the warranty period, the manufacturer shall repair or replace the defective part. Replaceable elastomeric parts and membrane caps are expendable and are not covered by any warranty.

**Part 6. Options**

**6.1 Related Equipment**

1. 190851 Junction box for sensor cable extension.
2. 100084 Sensor extension cable, 24 AWG, 4 conductor, shielded.
3. 191349 Flow switch manifold.

**Part 7. Spare Parts**

**7.1 Recommended Spare Parts**

1. 103163 Fuse, 1 A, 250 VAC
2. 102864 Fuse, 6 A, 250 VAC
3. Membrane cap (p/n specific for each type of sensor)
4. Electrolyte (p/n specific for each type of sensor)

|  |  |  |  |
| --- | --- | --- | --- |
| **Measurement Performance (Controller)** | | **Mechanical (Controller)** | |
| Range | ± 2000 mV | Enclosure  NEMA Rating | Polycarbonate  NEMA 4X |
| Resolution | 92 V (1 mV displayed) | [Dimensions](file:///\\SERVER07\Shared\Data\Walchem\MANUALS\A&E%20Submittal%20Packages\WPH%20for%20ORP\wphdimen.htm) | 7.25" x 7.5" x 5.0" |
| Accuracy (Calibrated) | ± 1 mV (ORP) | Display | 2 x 16 character backlit liquid crystal |
|  |  | Ambient Temp. | (0 to 50C) |
|  |  | Storage Temp | -20 to 180F (-29 to 180C) |
|  |  | Shipping Weight | 10 lbs (approximately) |
|  |  |  |  |

|  |  |
| --- | --- |
| **Input Power** | 100-240 VAC, 50/60 Hz, 8A  Fuse: 1.0 ampere, 5 x 20 mm |
| **Input Signals** |  |
| Sensor | ±2000 mV |
| Interlock (optional) | Isolated, dry contact closure required (i.e., flow, level, etc.) |
| **Outputs** |  |
| Control 1, Control 2 (ON/OFF) | Internally powered relays switching line voltage |
|  | 6 A (resistive), 1/8 HP |
|  | All relays are fused together as one group, total current for this group must not exceed 6A |
| Control 3, Control 4, Alarm | Dry contact relays |
|  | 6 A (resistive), 1/8 HP |
| *Note:* The Alarm relay is non-programmable. Refer to the Main Menu diagram for the list of error conditions that trigger the alarm relay. | |
| 4 - 20 mA 1 or 2 (optional) | Internally powered |
|  | Fully isolated |
|  | 600 Ohm max resistive load |
|  | Resolution .001% of span |
|  | Accuracy ± 1% of reading |
| Sensor Power | ±5 VDC, 5 mA |

|  |  |
| --- | --- |
| **Agency Approvals** |  |
| UL | ANSI/UL 61010-1:2004, 2nd Edition\* |
| CAN/CSA | C22,2 No.61010-1:2004 2nd Edition\* |
| CE Safety | EN 61010-1:2001 2nd Edition\* |
| CE EMC | EN 61326-1:2006 |
|  |  |
| Note: For EN61000-4-6, EN61000-4-3 the controller met performance criteria B. | |
| \*Class A equipment: Equipment suitable for use in establishments other than domestic, and those directly connected to a low voltage (100-240 VAC) power supply network which supplies buildings used for domestic purposes. | |

Sensor Specifications

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Chlorine Dioxide | Peracetic Acid | Ozone | Free Chlorine/Bromine | Free Chlorine/Bromine – High pH Range | |
| Range (Nominal) | 0-20 mg/l | 0-2000 mg/l | 0-20 mg/l | 0-20 mg/l | 0-20 mg/l | |
| Range (WDIS) | 0 – 16.75 mg/l | 0 – 1675 mg/l | 0 – 16.75 mg/l | 0-13.25 mg/l | 0-12.5 mg/l | |
| Range (WM1,WIND) | 0 –10 mg/l | 0-10 mg/l | 0-10 mg/l | 0 –8 mg/l | 0-7.5 mg/l | |
| Resolution | 0.01 mg/l | 1 mg/l | 0.01 mg/l | 0.01 mg/l | 0.01 mg/l | |
| Sensitivity | Free Chlorine (5%), Ozone (2500%) | Ozone (250%), ClO2 (100%), H2O2 (0.5%) | ClO2 (6%) | HOCl (100%)  HOBr (100%)  Ozone  ClO2 (900%) | HOCl (100%)  HOBr (100%)  Ozone  ClO2 (100%)  HOCl with isocyanuric acid | |
| Flow Rate of Sample | 30 to 100 liters/hour (0.13 to 0.44 gallons/minute) | | | | | |
| pH Range of Sample | 1.0 – 11.0 | 1.0 – 7.0 | 2.0 – 11.0 | 6.8 – 8.0  (pH must be stable within +/- 0.10) | 4.0-12.0 | |
| Conductivity Range of Sample | 50 to 10,000 μS/cm | | | Up to 4% NaCl | 50 to 10,000 μS/cm | |
| Response Time | 30 sec | 3 min | 50 sec | 30 sec | 2 min | |
| Run-In Time | 60 min | 60 min | 60 min | 60 min | 120 min | |
| Calibration | Weekly | | | | | |
| Change Electrolyte | 6 months | | | | 3 months | |
| Change Membrane Cap | 1 year | | | | | |
| Electrical | | | | |
| Power Requirements | ± 5 VDC, 5 mA maximum | | | | | |
| Signal | 0 to -2000 mVDC | | | | | |
| Maximum Cable Length | 1000 ft (305 m) | | | | | |
| Cable Required | 2 twisted pair, 22 AWG, shielded, 35 pF/ft (Walchem 100084 or Belden 8723) | | | | | |
| Mechanical | | | | | |
| Operating Temperature | 0 to 55°C (32 to 131°F) | | 0 to 50°C (32 to 122°F) | 0 to 45°C (32 to 113° F) | | |
| Operating Pressure | 0 to 1 atm (0 to 14.7 psi) | | | | | |
| Storage Temperature | 0 to 50°C (32 to 122°F) | | | | | |
| Shelf Life | 3 years | | | | | |
| Flow Cell Inlet | ¼” NPTF | | | | | |
| Flow Cell Outlet | ¾” NPTF | | | | | |
| Wetted Materials of Construction | | | | | |
| Sensor | PVC, Polycarbonate, silicone rubber, stainless steel | | | PVC, Polycarbonate, silicone rubber | PVC, Polycarbonate, silicone rubber, stainless steel | |
| Flow Cell Body | Isoplast | | | | | |
| O-Ring | FKM | | | | | |

Dimensions

WDIS400 Panel Dims

W400 controller dims Horiz

WDIS410 SERIES TYPICAL INSTALLATION

WDIS Wiring Detail

|  |  |
| --- | --- |
| A | AC POWER, 8 AMPS MAXIMUM, 2 x 18 AWG PLUS GROUND OR LOCAL CODE |
| B | AC POWER, 6 AMPS MAXIMUM, METERING PUMP, 2 x 18 AWG PLUS GROUND OR LOCAL CODE |
| C | DISINFECTION SENSOR, 4 x 24 AWG PLUS SHIELD, 20 FT SUPPLIED |
| D | OPTIONAL FLOW SWITCH, 2 x 24 AWG PLUS SHIELD, 5 FT SUPPLIED |
| E | OPTIONAL 4-20mA OUTPUT, 2 x 24 AWG PLUS SHIELD |
| F | DRY RELAY CONTACT, 6 AMPS MAXIMUM (UNFUSED), ALARM DEVICE, WIRING DEVICE DEPENDENT, FOLLOW LOCAL CODE |

## WDIS Series Ordering Information

**WDIS410 -**

**Voltage output sensor USB**

**VOLTAGE**1 = 120 VAC, prewired w/ USA power cord & 6” pigtails

5 = Hardwired, cable glands

**OUTPUT**N = No data output

4 = One (1) Isolated 4-20 mA output

2 = Two (2) Isolated 4-20 mA outputs

**SENSOR (consult factory for other sensor types & ranges)**  
N = No sensor

1 = Free chlorine/bromine sensor with flow cell & 20 ft. cable

2 = Chlorine dioxide sensor with flow cell & 20 ft. cable

3 = Ozone sensor with flow cell & 20 ft. cable

4 = Peracetic acid sensor with flow cell & 20 ft. cable

5 = Free chlorine/bromine sensor with flow manifold & 5 ft. cable on panel

6 = Chlorine dioxide sensor with flow manifold & 5 ft. cable on panel

7 = Ozone sensor with flow manifold & 5 ft. cable on panel

8 = Peracetic acid sensor with flow manifold & 5 ft. cable on panel

A = Free chlorine/bromine sensor, extended pH range with flow cell & 20 ft. cable

B = Free chlorine/bromine sensor, extended pH range with flow cell & 5 ft. cable on panel

**USB FEATURES**N = Software upgrade capability only

U = Integrated datalogging, event/reset logging, and configuration file import/export

WDIS400_Sensor_Inputs

WDIS Inputs

WDIS410_OUTPUTS

WDIS Outputs