

WMB8000 Series
WebMaster Multi I/O Boiler Controllers

Part 1. General

1.1 Scope

- A. This section describes the requirements for a multiple input/output boiler controller.
- B. Under this item, the contractor shall furnish and install the multi I/O boiler 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 the WebMaster multi I/O boiler controller and sensors.
 - 2. Interconnection and dimensional drawings.
 - 3. List of spare parts

Part 2. Products

2.1 Multi I/O boiler controller

- A. The multi I/O boiler control system shall be a capable of measuring conductivity and temperature of up to four boilers. The conductivity sensors shall be a contacting style. All sensors shall have integral signal conditioning. Additional inputs shall include an interlock, two water meter inputs, eight optional 4-20 mA inputs and six optional digital inputs. Outputs shall include eight mechanical relays, and four optional 4-20 mA outputs. Digital communications shall be via USB, Ethernet, and/or optional modem. Up to 16 controllers may be networked together over Ethernet. Integration with DCS, SCADA system or building energy management systems shall be possible using the optional Modbus TCP/IP feature. The controller shall be accessible via the Internet for configuring, data logging, and control of relay outputs. The controller shall provide notification of alarm conditions via relay, pager, and/or email.

B. Control Module:

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

2. Power: 100-240 VAC \pm 10%, 50/60 Hz

3. Inputs:

Input signals STANDARD

Water meter Contactor: Isolated dry contact (relay, reed switch or Hall Effect) 0-10 Hz, 50 msec minimum width

Paddlewheel Water Meter: Isolated dry contact (relay, reed switch or Hall Effect) 0-300 Hz, 1.5 msec minimum width

Interlock: Isolated dry contact (relay, reed switch or Hall Effect) 0-10 Hz, 50 msec minimum width

Input signals OPTIONAL

Digital Inputs (1-4) Isolated dry contact (relay, reed switch or Hall Effect) 0-10 Hz, 50 msec minimum width

Digital Inputs (5-6) Isolated dry contact (relay, reed switch or Hall Effect) 0-300 Hz, 1.5 msec minimum width

Point Level Switch: Isolated dry contact (relay, reed switch or Hall Effect)

Flow Feedback: Isolated dry contact (relay, reed switch or Hall Effect)

Analog Inputs (1-8) 4-20 mA: 2-wire or 3-wire, internally powered by 24 VDC, 25 ohm input resistance, 1000 ohm maximum load.

Sensor STANDARD (1) Signal (isolated) \pm 1.5V, Temp (isolated) 1K

Sensor OPTIONAL (3) Signal (isolated) \pm 1.5V, Temp (isolated) 1K

4. Outputs:

STANDARD

Mechanical relays: At 115 VAC, 10 amp (resistive), 1/8 HP

At 230 VAC, 6 amp (resistive), 1/8 HP

R1-R4 are fused together as one group, total current not to exceed 5.5A

R5-R8 are fused together as one group, total current not to exceed 5.5A

Relays may switch mains voltage or may be dry contact, according to model number. Powered relays have NO and NC terminals available. Only powered relays are fused.

Digital: USB, Ethernet 10 Base T

OPTIONAL

4-20 mA (1-4): Isolated, 500 ohm maximum resistive load, internally powered

5. Software features:

Conductivity control relays shall feature adjustable control direction and dead band.

Chemical feed shall be selectable from blowdown and feed, feed as a percentage of blowdown, feed as a percentage of time, and feed based on a water meter contactor input.

A self test shall be available to verify the integrity of the control module's sensor input circuitry.

A reminder for electrode calibration shall be available.

Control of a cooling tower, boiler, closed loop, or process shall be possible using a single controller.

Manual activation of the relays shall be easily accomplished via the keypad, or a PC.

A maximum output on-time shall be available on the control relays to prevent runaway control.

Any relay may be reconfigured to any one of a number of control algorithms, responding to the signal from any input desired.

The optional analog inputs shall be configurable for level sensors, corrosion monitors, or any other type of transmitter, providing appropriate units of measure and scaling.

The optional digital inputs shall be configurable for level switches, chemical feed verification switches or generic interlock operation.

Status reports and data files shall be sent automatically via email on either a cyclical basis or for a specific date range.

The controller set points may be entered by downloading them from one controller, and uploading them into another controller.

Access to the controller shall be possible using an USB connection, Ethernet, direct modem-to-modem, via the Internet, or via the local display and keypad, simultaneously if desired.

No proprietary software shall be required on the user's computer to communicate with the controller, or to view or change set points.

The controller software shall be able to be upgraded remotely via the Internet.

C. Sensors:

Contacting Conductivity

1. Operating principle: The conductivity sensor shall be driven with a low voltage AC signal, and the return signal voltage will vary with the conductivity of the intervening solution. The temperature sensor within this sensor compensates for the effect of temperature on the conductivity signal.
2. Materials of construction: 316 SS, PEEK
3. Process connections: $\frac{3}{4}$ " NPT
4. Temperature range: 32-392 F, 0-200 C
5. Pressure range: 0-250 psi

D. Controller and Sensor Performance

1. Range: 0 to 10,000 S/cm conductivity
2. Accuracy: 1 S/cm conductivity
3. Resolution: 1 S/cm conductivity
4. Maximum separation between controller and sensor shall be 250 feet

E. Indication

1. Graphic User Interface

A 64 x 128 Pixel Backlit LCD Graphics Module display shall indicate the process values, and the status of outputs and alarms.

Eight LED lamps shall indicate the on/off status of the control outputs.

F. Equipment

The multi I/O boiler controller shall be a Walchem WebMaster WMB8000 series.

Part 3. Operator Functions

3.1 Calibration

- A.** The conductivity electrode calibration shall be a one point calibration, utilizing a solution of a known conductivity.
- B.** Three levels of access codes 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

- A.** The conductivity control outputs shall be on/off control with adjustable dead band.
- B.** There shall be five options for blowdown control: continuous sampling, intermittent sampling with fixed blowdown time, intermittent sampling with blowdown time proportional to the deviation from set point, and the above intermittent sampling modes with two distinct frequencies of sampling based on the time of day.
- C.** The conductivity control directions shall be selectable.
- D.** The inhibitor chemical feed output shall be on/off control with four choices of feed modes.
- E.** All control relays shall have limit timers to prevent runaway control.

Part 4. Execution

4.1 Installation

- A.** The sensors shall be installed in a location where they will always remain immersed in the sample.
- A.** The sensors shall be installed in a location where there is good solution movement and where they will respond rapidly to changes

- B. The sensor cables shall be routed such that they are separated from any AC voltage by at least 6 inches.
- C. If the sensor cable needs to be extended beyond the standard length, then 24 AWG, 3 twisted pair, shielded cable shall be utilized.
- E. If the optional 4 – 20 mA output or water meter contactor are installed, then 22-26 AWG, twisted pair, shielded cable shall be utilized.
- F. The sample line shall be tapped from the skimmer line of the boiler, and be a minimum of $\frac{3}{4}$ " pipe up to the location of the sensor, with sufficient back-pressure provided by a valve or orifice plate downstream of the sensor, to prevent flashing at the sensor.

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 sensors and 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 glass components are expendable and are not covered by any warranty.

Part 6. Options

6.1 Related Equipment

- A. Solenoid valve or motorized ball valve for blowdown control
- B. Flow control valve or orifice plate for providing back-pressure and to control rate of blowdown
- C. Water meter for makeup flow
- D. Level switch or level transmitter for chemical level monitoring
- E. Metering pumps for chemical feed

F. Sample cooler with pressure reduction for systems over 250 psi.

Part 7. Spare Parts

7.1 Recommended Spare Parts

- A. 102833 Fuse, F1, 1.6 amp
- B. 102834 Fuse, F2 and F3, 6.3 amp
- C. 190768 Electrode, conductivity