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# WebMaster Series

## Boiler Controller Instruction Manual

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**W A L C H E M**

**WALCHEM CORPORATION**

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## Notice

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*WALCHEM Corporation warrants 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 and electrodes 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 WALCHEM Corporation and for the purposes disclosed in writing at the time of purchase, if any. WALCHEM Corporation's liability under this warranty shall be limited to replacement or repair, F.O.B. Holliston, MA U.S.A. of any defective equipment or part which, having been returned to WALCHEM Corporation, transportation charges prepaid, has been inspected and determined by WALCHEM Corporation to be defective. Replacement elastomeric parts and glass components are expendable and are not covered by any warranty.*

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## 1.0 INTRODUCTION



The WebMaster series boiler controller is multi-functional, but not all of the features mentioned are necessarily present in the controller you have received. All features can be added in the field.

Standard features include a direct sensor measurement of the system conductivity, a water meter (contact or paddlewheel) input, a blowdown relay and chemical feed/alarm relay (one of each for up to 4 boilers), and an RS-232 output to a computer.

Optional features include up to six digital inputs (for point level, metering pump flow feedback, or other use), up to eight 4-20 mA inputs (for drum level, corrosion monitors, water meters, or practically any other parameter), up to four 4-20 mA outputs (for retransmission of the conductivity, temperature or any 4-20 mA input signals), a modem card (for remote communications) and an Ethernet card (for connection to a LAN).

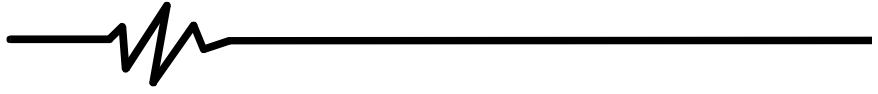
The Feed/Alarm relay may also be controlled by the 4-20 mA signal from any transmitter, using the analog input option mentioned above. Our innovative time proportional control of the conductivity gives you the ability to overcome flashing while still maintaining tight control of the boiler TDS.

Up to 32 controllers may be networked together.

The controller can log data and events, automatically generate reports on a periodic basis at a programmable frequency, and if equipped with a modem card, dial out in the event of an alarm condition. The alarm notification may be via phone to a pager or email.

Our revolutionary digital communications package allows you to change set points, manually activate or deactivate pumps and valves, upgrade software, receive reports and alarms, *from any PC that has Internet access. No proprietary software needs to be installed on the PC, only a web browser.*

## 2.0 SPECIFICATIONS



### 2.1 Measurement Performance

#### Contacting Conductivity

Range 0-10,000  $\mu\text{S}/\text{cm}$   
Resolution 1  $\mu\text{S}/\text{cm}$   
Calibration  $\pm 50\%$  of raw reading;  
scalable to read in ppm

#### Temperature

Range 0 to 392  $^{\circ}\text{F}$  (-18 to 200  $^{\circ}\text{C}$ )  
Resolution 1  $^{\circ}\text{F}$  (1  $^{\circ}\text{C}$ )  
Calibration single point; degrees C or F

### 2.2 Electrical

#### Inputs

**Input power** 100 – 120/220-240 VAC  $\pm 10\%$ , 12A, 50/60 Hz      **Fuse** 1.6A, 5 x 20mm

#### 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

Flow switch: 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)  $\pm 1.5\text{V}$   
Temp (isolated) 1K

#### Sensor OPTIONAL (3)

Signal (isolated)  $\pm 1.5\text{V}$   
Temp (isolated) 1K

## ***Outputs***

### **STANDARD**

Mechanical relays: At 115 VAC, 10 amp (resistive), 1/8 HP  
At 230 VAC, 6 amp (resistive), 1/8 HP

Bleed, Feed/Alarm Relays for Boilers A and C are fused together as one group, total current for this group must not exceed 5.5A

Bleed, Feed/Alarm Relays for Boilers B and D are fused together as one group, total current for this group must not exceed 5.5A.

The eight control relays switch line (mains) voltage (one N.O. and one N.C. contact) are provided.

An option for dry contact Feed/Alarm relays is denoted by model numbers with voltage codes -6 or -7

Digital: RS232

### **OPTIONAL**

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

## ***Agency Approvals***

UL	3111-1
CSA	C22,2 No.1010.1-92
CE Safety	EN 61010-1
CE EMC	EN 61326 Annex A*

Note: For EN61000-4-3, the WebMaster met performance criteria B.

\*Class A Equipment: Equipment suitable for use in establishments other than domestic, and those directly connected to a low voltage (100-240VAC) power supply network which supplies buildings used for domestic purposes.

## **2.3 Mechanical**

### ***Enclosure***

Material:	Molded Fiberglass
NEMA Rating:	NEMA 4X
Dimensions:	10" x 12" x 5-5/8" (25.4cm x 30.5cm x 14.5cm)
Display:	64 x 128 Pixel Backlit LCD Graphics Module
Operating Ambient Temp:	0 to 49° C (32-120°F)
Storage Temp:	-29 to 80°C (-20 to 176°F)
Weight	11.5lb (5.2kg)

### ***Contacting conductivity electrode***

Pressure:	0 to 250 psi (0 to 1.724MPa)
Temperature:	32 to 392°F (0 to 200°C)
Process connections:	¾" NPTM
Wetted Materials of Construction:	316SS, PEEK

## 2.4 Variables and their Limits

All menus shown may not be available. The menus that appear on your controller will vary with options installed and programmed.

### *Conductivity Input Menu*

Calibration Reminder	0 – 365 days
ppm Conversion Factor	0.5 – 1.0
Low Alarm Limit	0 to 10,000 (units defined by user)
High Alarm Limit	0 to 10,000 (units defined by user)

### *Temperature Input Menu*

Low Alarm Limit	0 – 392 degrees F (0 to 200° C)
High Alarm Limit	0 – 392 degrees F (0 to 200° C)

### *Water Meter Input Menu*

Volume per Contact	0 to 1000 (units of measure defined by user)
K Factor	0.001 to 20,000 (Pulses per Gallon or Liter)
Flow Rate at 4 mA	0 to 25,000 (units of measure defined by user)
Flow Rate at 20 mA	0 to 25,000 (units of measure defined by user)

### *PosiFlow Input Menu*

Alarm Time	0.1 to 10 minutes
Pump Volume per Stroke	0.001 to 10 ml

### *Level Input Menu*

Empty mA	0 to 20 mA
Full mA	0 to 20 mA
Full volume	0 to 100,000,000 (units defined by user)
Low Level Alarm Limit	0 to 100,000,000 (units defined by user)

### *Corrosion Menu*

Corrosion Rate = 4 mA	0 to 10,000 mils/year
Corrosion Rate = 20 mA	0 to 10,000 mils/year
High Alarm Limit	0 to 10,000 mils/year

### *Other 4-20 mA Input Menu*

Parameter = 4 mA	-100,000 to 100,000 (units defined by user)
Parameter = 20 mA	-100,000 to 100,000 (units defined by user)
Low Alarm Limit	-100,000,000 to 100,000,000 (units defined by user)
High Alarm Limit	-100,000,000 to 100,000,000 (units defined by user)

### *Blowdown Output Menu*

Set Point	0 to 10,000 (units defined by user)
Dead Band	0 to 10,000 (units defined by user)
Bleed Time Limit	0 = ∞, 1 to 1440 minutes
Hand Time Limit	0 = ∞, 1 to 1440 minutes
Interval between Samples	5 – 1440 minutes



Duration of Sample	1 – 60 minutes
Hold Time	30 - 600 seconds
Maximum Proportional Time	5 – 1440 minutes
Proportional Conductivity Band	0-10,000 (units defined by user)
First Sampling Stage	12:00 AM – 11:59 PM

***Feed Output Menu***

Volume makeup to trigger Feed	1 to 10,000 (units defined by user)
Feed Time per unit Volume	1 to 1440 minutes
Output Time Limit	0 = ∞, 1 to 1440 minutes
Hand Time Limit	0 = ∞, 1 to 1440 minutes
% of Bleed Time to Feed	1 to 100 %
Time Period	1 to 1440 minutes
% of Time Period to Feed	1 to 100 %
Set Point	Full scale range of 4-20 mA input
Dead Band	Full scale range of 4-20 mA input

***4-20 mA Output Menu***

(parameter selected) = 4 mA	Full scale range of the parameter
(parameter selected) = 20 mA	Full scale range of the parameter

*Full Scale Ranges are:*

Conductivity:	0 to 10,000 μS/cm
Temperature:	0 – 392 degrees F (0 to 200° C)

***Diagnostic Alarm Menu***

Auto Dial Delay Time	0 to 1440 minutes
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***Data Logging Menu***

Frequency of Logging	10 to 1440 minutes
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## 3.0 UNPACKING & INSTALLATION



### 3.1 Unpacking the Unit

Inspect the contents of the carton. Please notify the carrier immediately if there are any signs of damage to the controller or its parts. Contact your distributor if any of the parts are missing. The carton should contain a WebMaster series controller and instruction manual. Any options or accessories will be incorporated as ordered.

### 3.2 Mounting the Electronic Enclosure

The WebMaster series controller is supplied with mounting holes on the enclosure. It should be wall mounted with the display at eye level on a vibration-free surface, utilizing all mounting holes for maximum stability.

The enclosure is NEMA 4X rated, suitable for outdoor installation. The maximum ambient operating temperature is 120 degrees F (49 degrees C); this should be considered if installation is in a high temperature location.

The installation site should be in close proximity to grounded AC power, a sample of the cooling tower water, and phone line or Ethernet hub (if applicable).

Avoid locations that are in close proximity to sources of electrical noise (motor starters, power transformers, variable speed motor drives, radio transmitters, etc.), corrosive fumes or excessive moisture.

The enclosure requires the following clearances:

Top:	2"
Left:	10"
Right:	4"
Bottom:	8"

### 3.3 Installation

Once the WMB7000 series controller is mounted, the metering pumps may be located at any distance from the controller. The conductivity probe should be placed as close to the controller as possible, to a maximum distance of 250 ft. The cable **MUST** be shielded from background electrical noise.

#### *Important Installation Notes: (see figure 1)*

- 1. Make sure the minimum water level in the boiler is at least 4-6 inches above the skimmer blowdown line. If the skimmer line is closer to the surface, it is likely that steam will be drawn into the line instead of boiler water. The skimmer line must also be installed above the highest tube.**
- 2. Maintain a 3/4 inch minimum pipe ID with no flow restrictions from the tap for the boiler skimmer blowdown line to the electrode. If the ID is reduced below 3/4 inch, then flashing will occur beyond that point and the conductivity reading will be low and erratic. Minimize the usage of tees, valves, elbows or unions between the boiler and the electrode.**

3. A manual shut off valve should be installed so that the electrode can be removed and cleaned. This valve must be a full port valve in order to avoid a flow restriction. Keep the distance between the tap for the boiler skimmer line to the electrode as short as possible, to a maximum of 10 feet.
4. Mount the electrode in the side branch of a tee in a horizontal run of pipe. This will minimize entrapment of steam around the electrode and will allow any solids to pass through.
5. There MUST be a flow restriction after the electrode and/or control valve in order to provide back pressure. This flow restriction will be either a flow control valve or an orifice union. The amount of the flow restriction will effect the blowdown rate as well, and should be sized accordingly.
6. Install the motorized ball valve or solenoid valve per the manufacturer's instructions.
7. For best results, align the hole in the conductivity electrode such that the direction of water flow is through the hole.

### *Guide to Sizing Blowdown Valves and Orifice Plates*

#### **1. Determine the Rate of Steam Production in Pounds per Hour:**

Either read off the boiler name plate (water-tube boilers) or Calculate from horsepower rating (fire-tube boilers):

HP x 34.5 = lbs/hr. Example: 100 HP = 3450 lbs/hr.

#### **2. Determine the Concentration Ratio (BASED ON FEEDWATER)**

A water treatment chemical specialist should determine the desired number of cycles of concentration.

This is the ratio of TDS in the boiler water to TDS in the feedwater. Note that feedwater means the water that is fed to the boiler from the deaerator and includes makeup water plus condensate return.

Example: 10 cycles of concentration has been recommended

#### **3. Determine the Required Blowdown Rate in Pounds Per Hour**

Blowdown Rate = Steam Production / (Concentration Ratio - 1)

Example:  $3450 / (10 - 1) = 383.33$  lbs./hr

#### **4. Determine if Continuous or Intermittent Sampling is Required**

Use intermittent sampling when the boiler operation or loading is intermittent, or on boilers where the required blowdown rate is less than 25% of the smallest available flow control valve or less than the flow through the smallest orifice. See the graphs on the next page.

Use continuous sampling when the boiler is operating 24 hours per day and the required blowdown rate is more than 25% of the smallest applicable flow control valve or orifice. See the graphs on the next page.

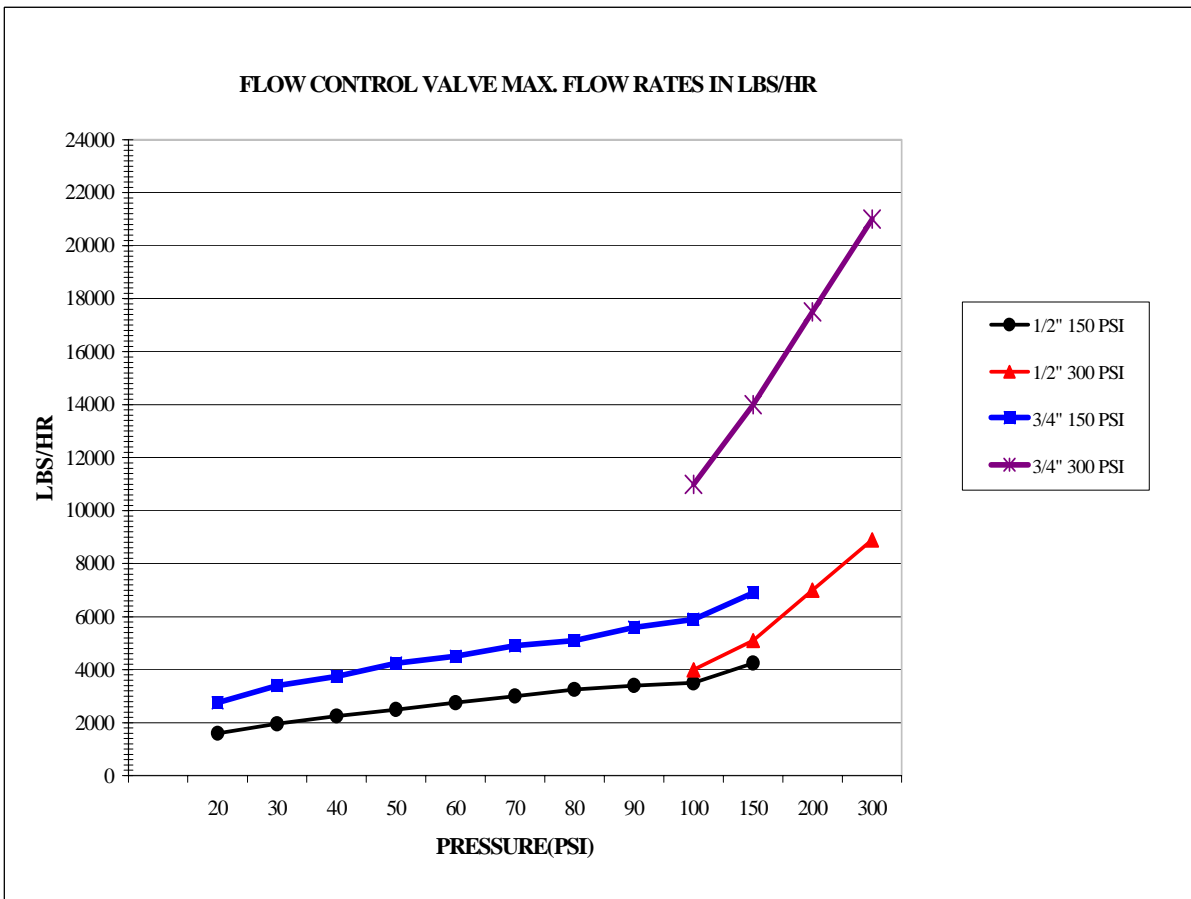
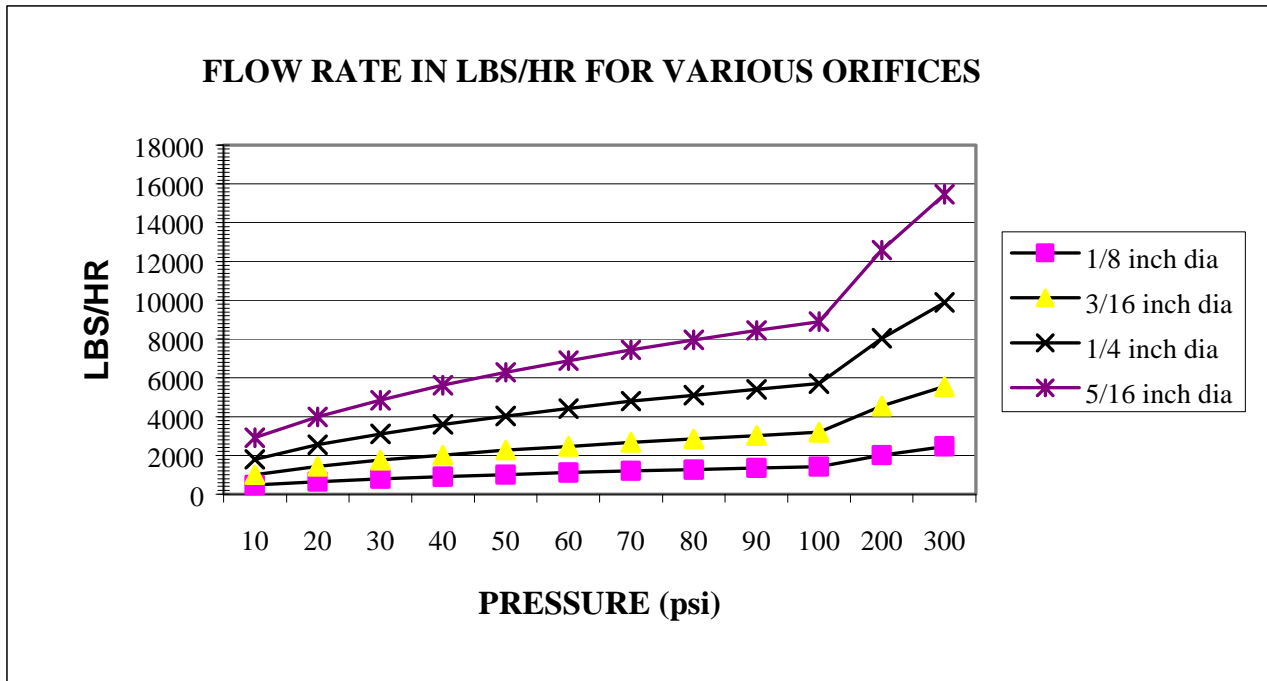
Use of a flow control valve will give you the best control of the process, since the flow rate can be easily adjusted. The dial on the valve also gives you a visual indication if the flow rate has been changed. If the valve clogs, it can be opened to clear the obstruction, and closed to the previous position.

If an orifice plate is used, you must install a valve downstream from the orifice in order to fine tune the flow rate and provide additional back pressure in many applications.







Example: An 80 psi boiler has a Required Blowdown Rate of 383.33 lbs./hr. The maximum flow rate of the smallest flow control valve is 3250 lbs./hr.  $3250 \times 0.25 = 812.5$  which is too high for continuous sampling. Using an orifice, the flow rate through the smallest diameter plate is 1275 lbs./hr. This is too high for continuous sampling.

**5. Determine the Orifice or Flow Control Valve Size for this Blowdown Rate**

Use the following graphs to select a flow control device:



### 3.4 Icon Definitions

Symbol	Publication	Description
	IEC 417, No.5019	Protective Conductor Terminal
	IEC 417, No. 5007	On (Supply)
	IEC 417, No. 5008	Off (Supply)
	ISO 3864, No. B.3.6	Caution, risk of electric shock
	Pending	Caution, High temperature, risk of burn
	ISO 3864, No. B.3.1	Caution

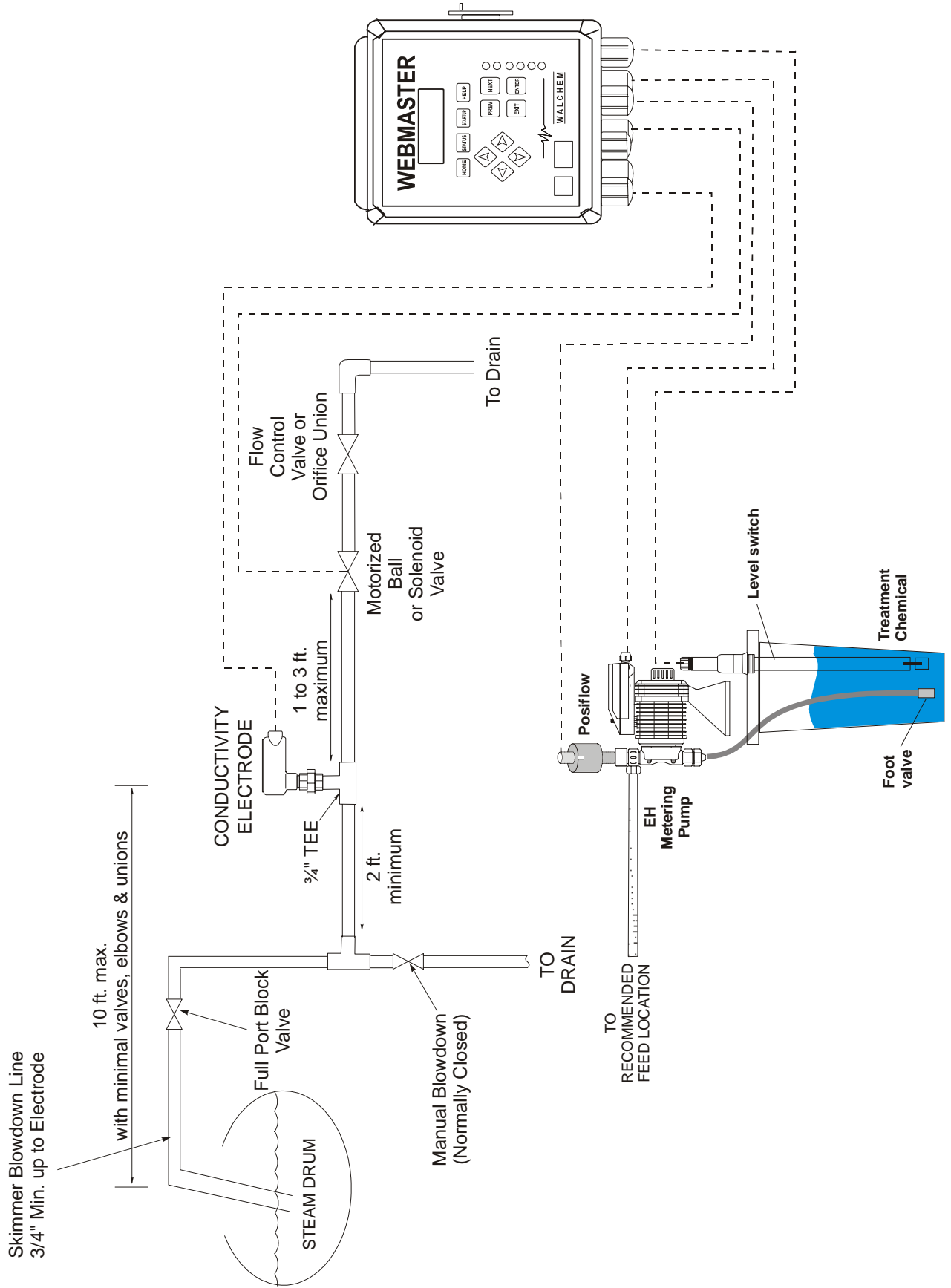


Figure 1a: Typical Installation Drawing, Intermittent Sampling

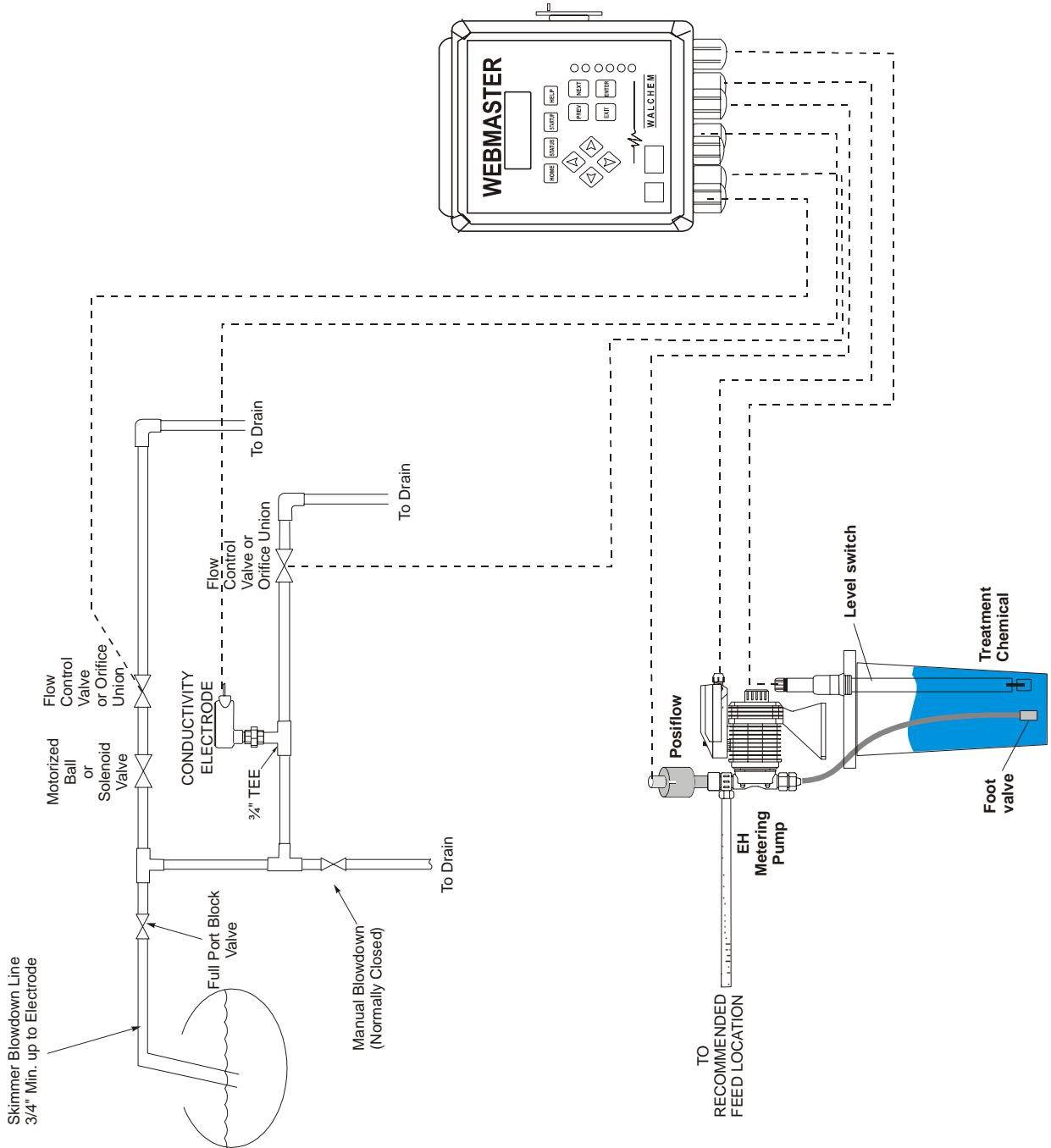


Figure 1b: Typical Installation Drawing, Continuous Sampling

### 3.5 Electrical Installation

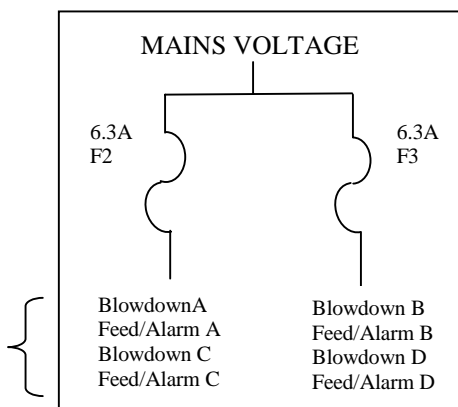
The WebMaster series controllers require the following voltages:  
100 –120/200-240 VAC± 10%, 50/60 Hz, 12 amperes maximum

The controller must be connected to its own 15 ampere breaker, close by, to act as an alternate power shutdown.

Your controller is supplied either factory prewired or ready to be hardwired. Depending upon your choice of options, you may be required to hardwire some or all of the input/output devices. Please refer to Figures 4 through 8 for wiring diagrams.

The output loads may be connected to pigtail (125V prewired) connections or terminal block (hardwired) connections. The total output current must not exceed 11 amps. The output relays are connected in two relay banks each fused at 6.3 amps. See figure on the right. Assess the steady state amps of all loads before connecting to controller.

Feed/Alarm relays are only fused for models with voltage codes 1, 4 or C.



**CAUTION!** There are live circuits inside the controller even when the power switch on the front panel is in the OFF position! The front panel must never be opened before power to the controller is REMOVED!

If your controller is prewired, it is supplied with a 10 foot, 14 AWG power cord with USA style plug and 8 inch, 18 AWG USA style receptacle cords for the powered relay outputs. A tool (#1 phillips driver) is required to open the front panel.



**CAUTION!** The electrical installation of the controller must be done by trained personnel only and conform to all applicable National, State and Local codes!

Note that if 4-20mA type water meters are selected, these are automatically assigned to Input 1 (for Boiler A water meter), Input 2 (for Boiler B water meter), Input 3 (for Boiler C water meter), and Input 4 (for Boiler D water meter). Make sure that the water meters are connected to the correct terminals on the analog input circuit board (see figure 8).



Note: Many of the inputs and outputs listed are optional and may not be present in your controller.

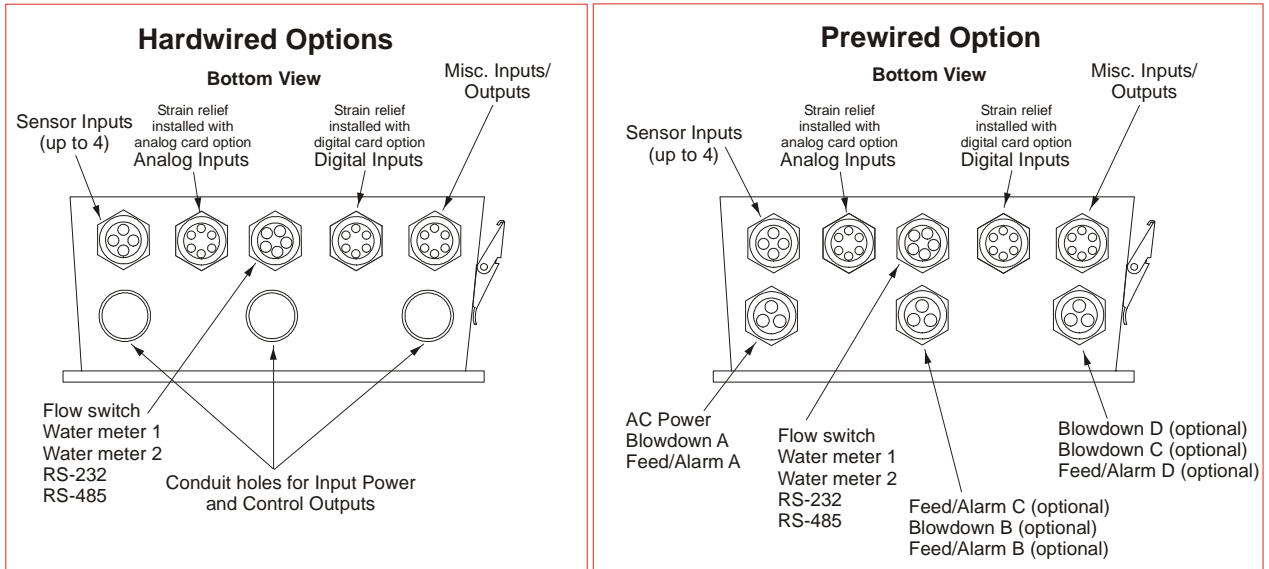


Figure 2: Conduit/Wiring Configuration

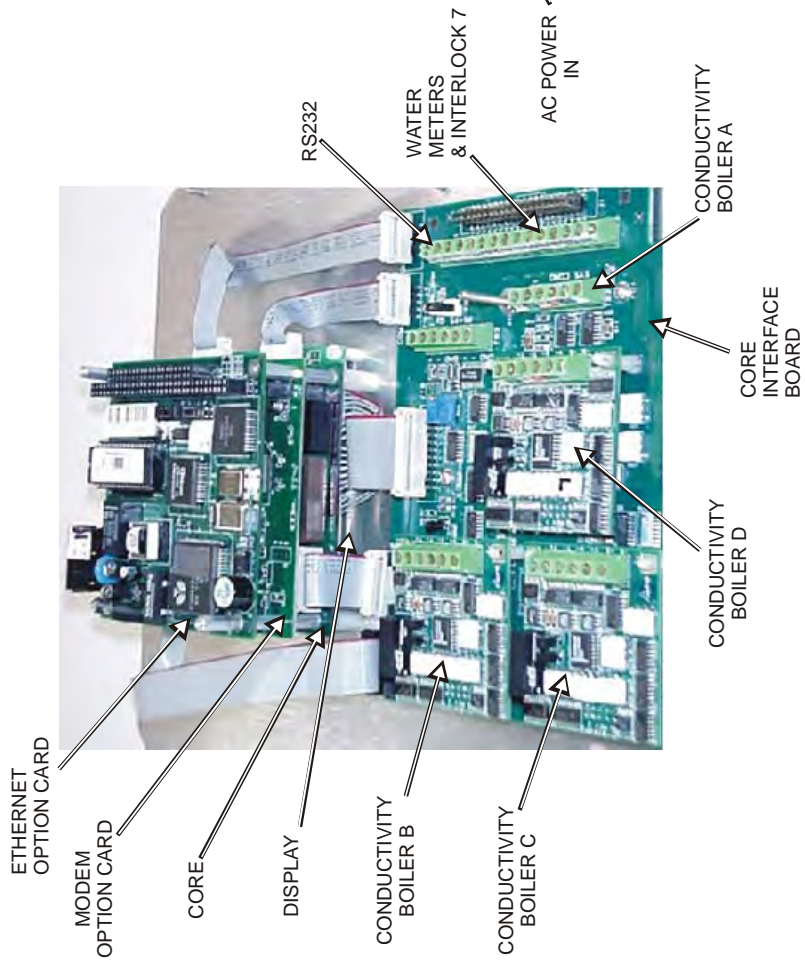
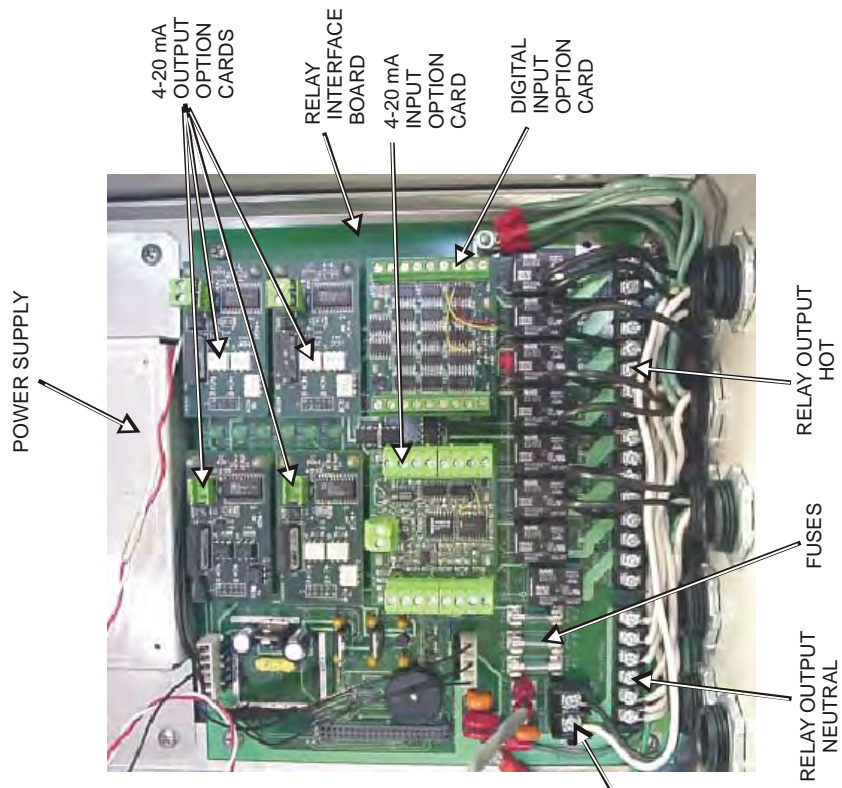


Figure 3: Identification of Parts

**Important: The mains power supply earth ground connection must be retained by separate nut.**

Note: For models with voltage codes 6,7 or E, the Feed/Alarm Relays are dry contact and the NC terminal shown will be labeled COM.

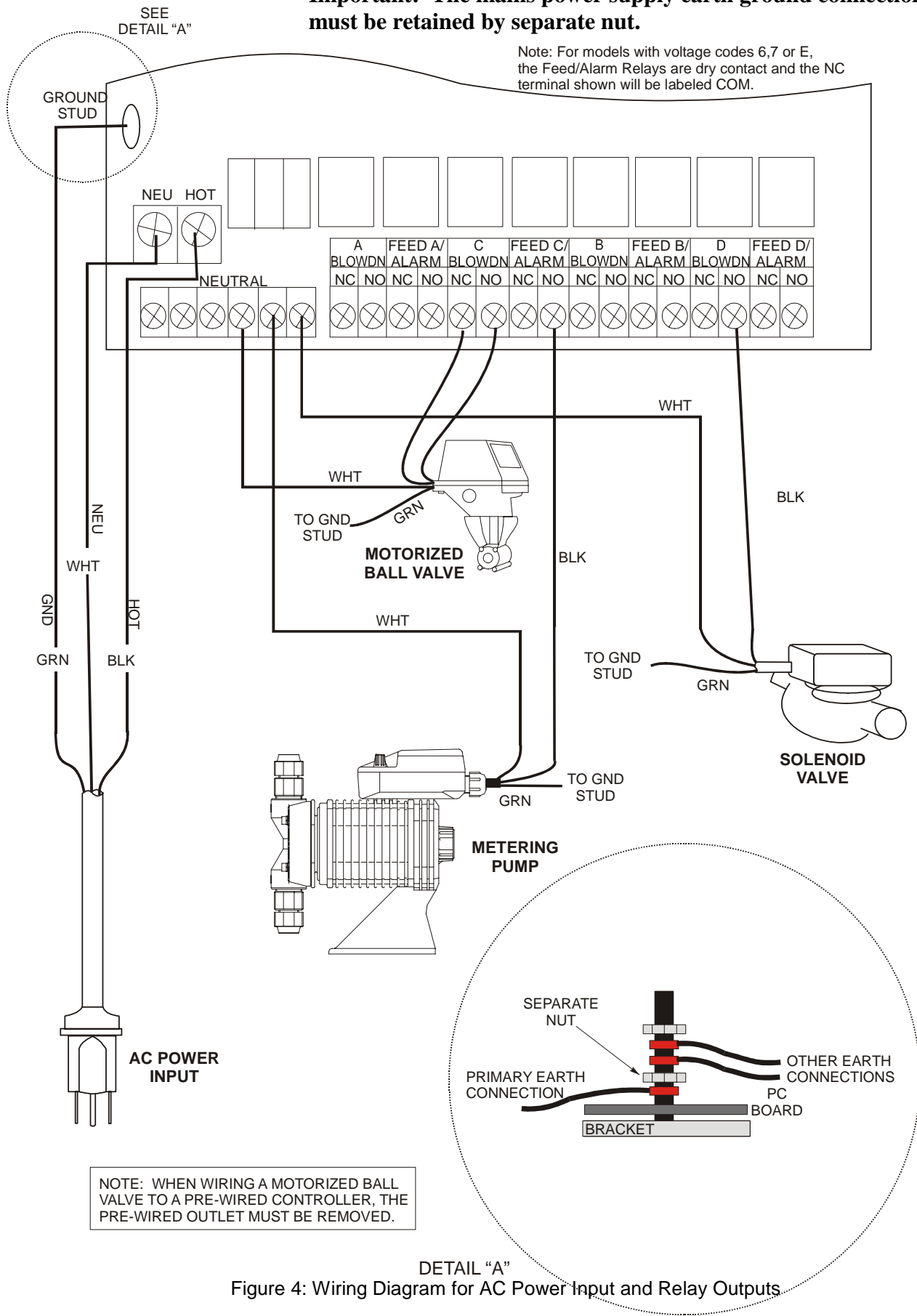


Figure 4: Wiring Diagram for AC Power Input and Relay Outputs.

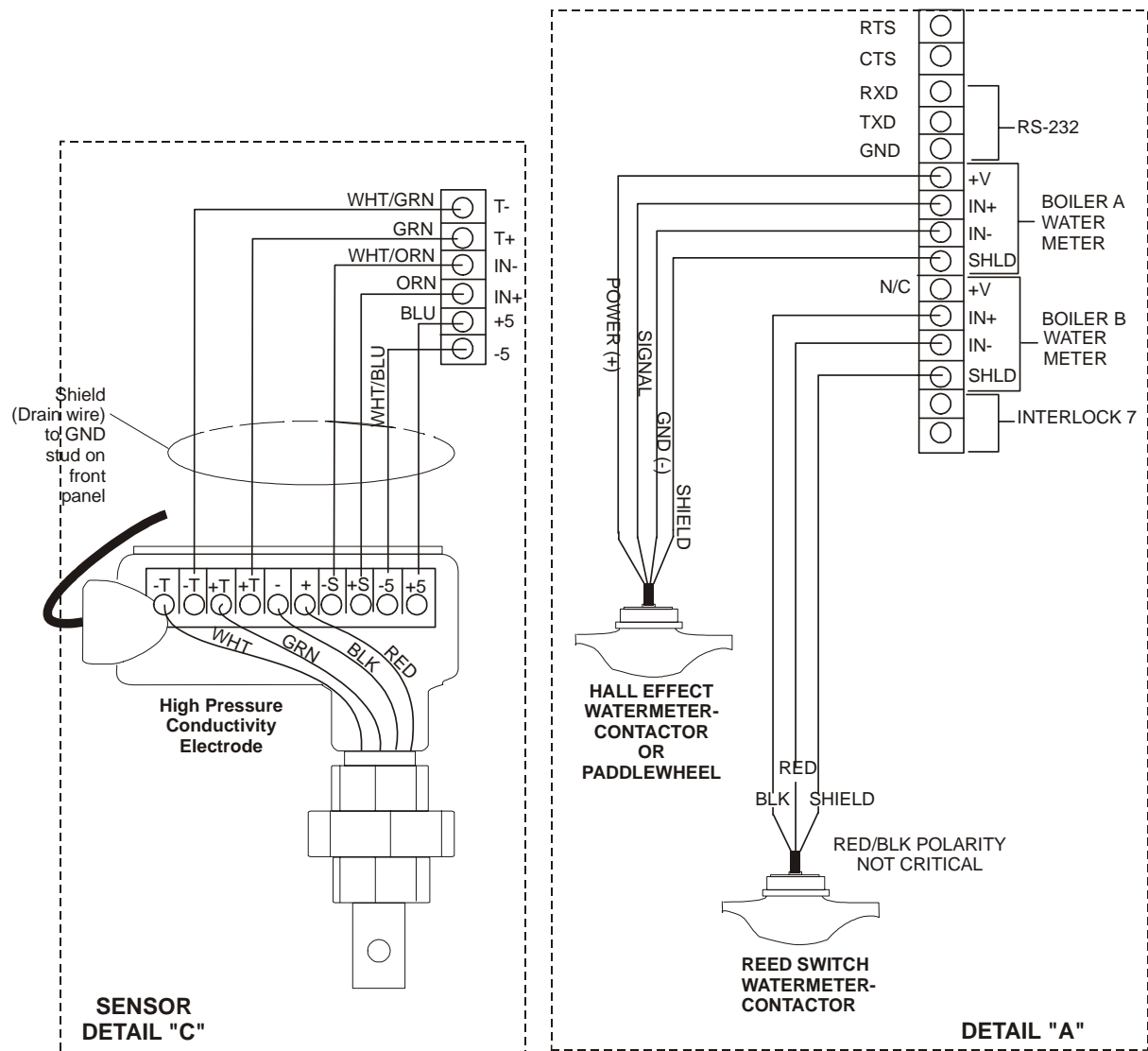
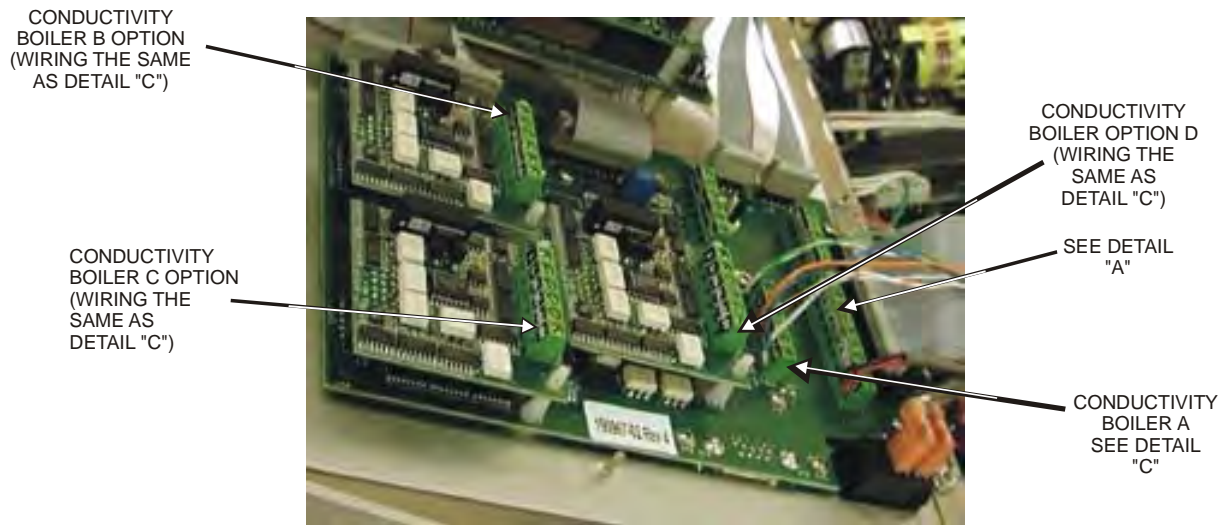
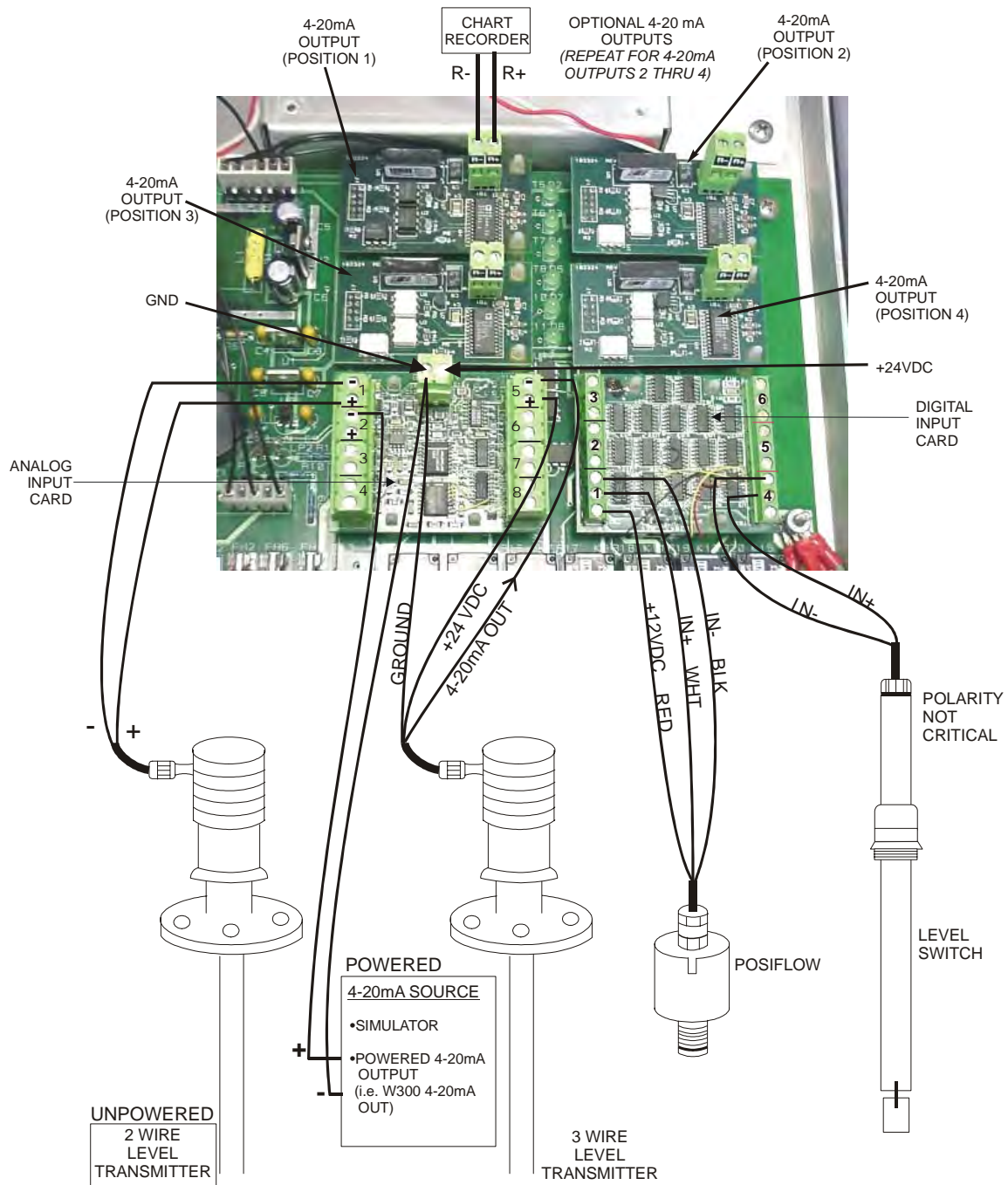


Figure 5: Wiring Diagram for Flow Switches, Water Meter Contactors and Sensors



**\* WARNING: DO NOT CONNECT A POWERED 4-20mA INPUT TO THE "+" TERMINAL! THE ANALOG INPUT BOARD WILL BE DAMAGED!**

**NOTE:** If 4-20 mA type water meters are to be used, the analog input option must be purchased, and the water meters must be connected as follows: Boiler A = AI #1, Boiler B = AI #2, Boiler C = AI #3, and Boiler D = AI #4.

**NOTE:** If you are controlling more than 2 boilers, and you will use a contacting water meter for each boiler, the digital input option must be purchased, and the water meters must be connected as follows: Boiler A = Boiler A position on the core interface board, Boiler B = Boiler B position on the core interface board, Boiler C = Input #1 on the digital input card, and Boiler D = Input #2 on the digital input card.

**NOTE:** If you are controlling more than 2 boilers, and you will use a paddlewheel water meter for each boiler, the digital input option must be purchased, and the water meters must be connected as follows: Boiler A = Boiler A position on the core interface board, Boiler B = Boiler B position on the core interface board, Boiler C = Input #5 on the digital input card, and Boiler D = Input #6 on the digital input card.

Figure 6: Wiring Diagram for Optional Digital Inputs, 4-20 mA Inputs and 4-20 mA Outputs



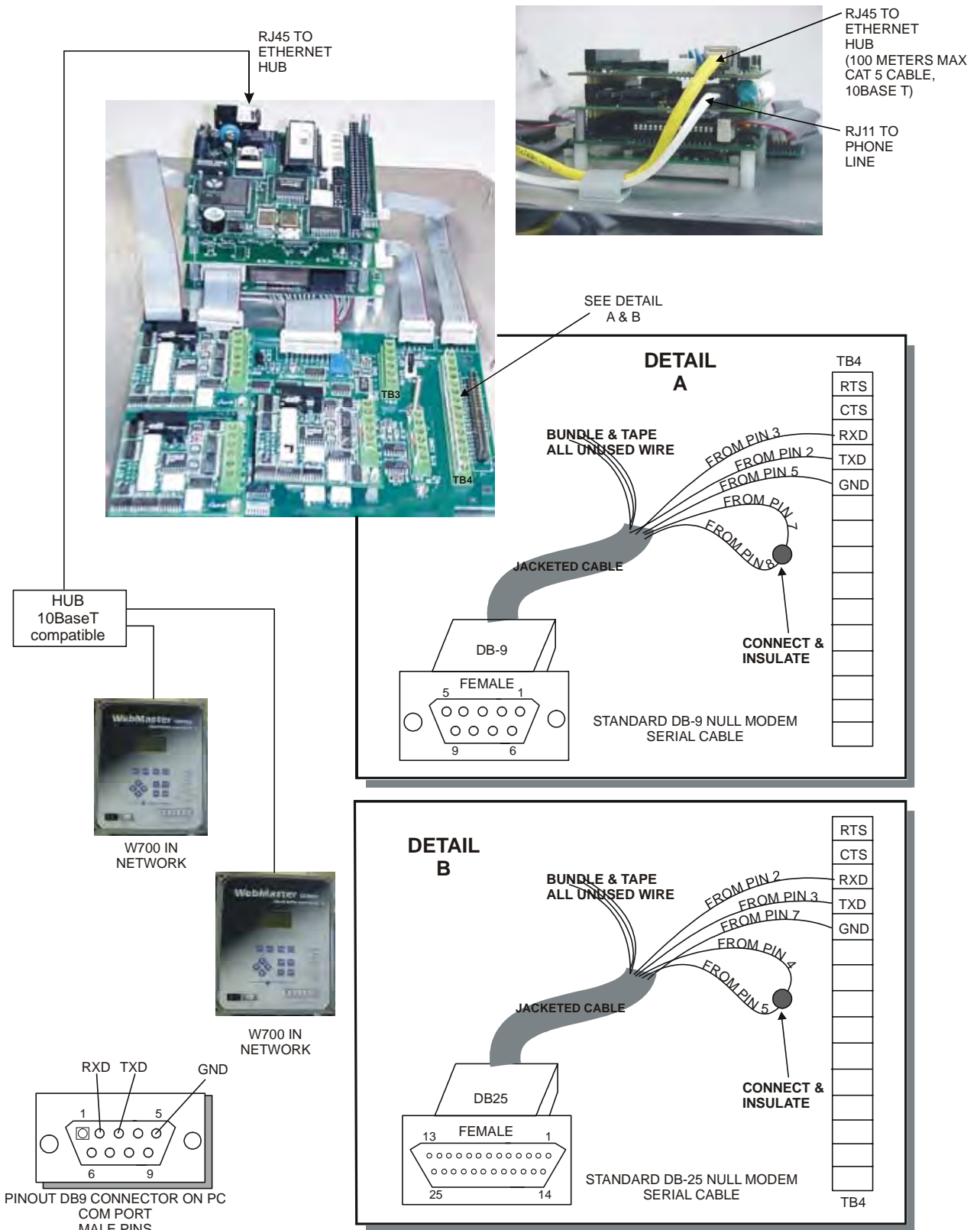


Figure 7: Wiring Diagram for Optional Digital Communications

# 4.0 FUNCTION OVERVIEW

## 4.1 Front Panel

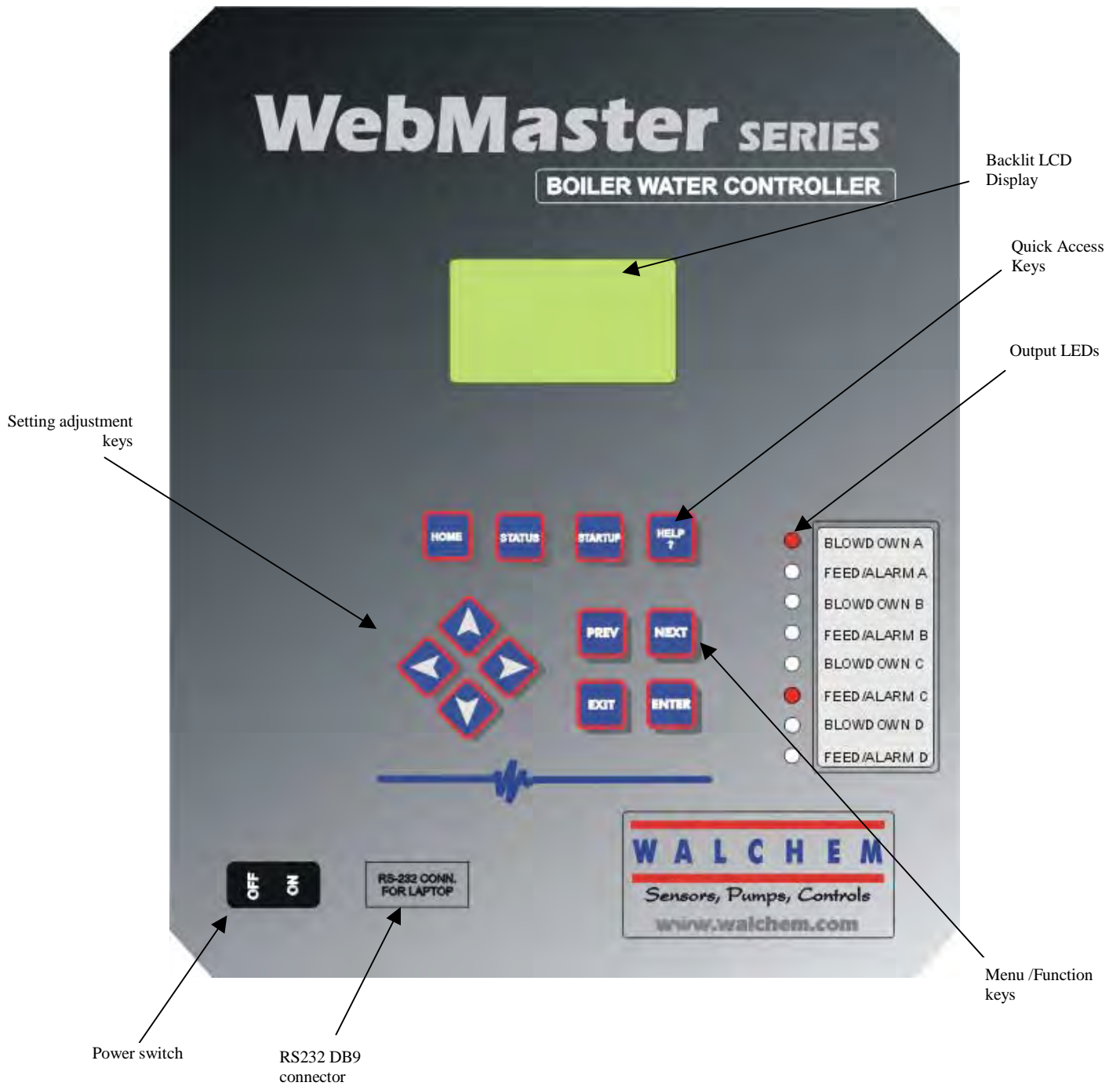


Figure 8: Front Panel

## 4.2 Display

When the WebMaster is first powered up, the backlight on the display will illuminate, the relay LEDs will flash, and within two minutes the display will appear and the controller will beep twice, indicating that it has booted up successfully. Be patient, the controller takes as long as a PC to boot up, approximately 2 minutes.

The Summary Screen will display the sensor inputs (Conductivity values for each boiler) and the most significant active alarm. Any additional alarms may be viewed by pressing the Down Arrow key.

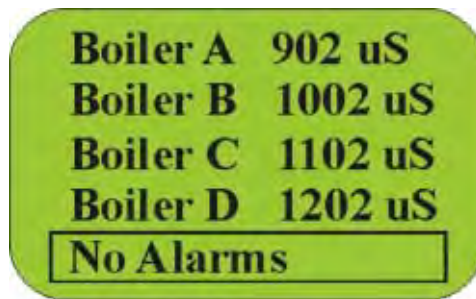


FIGURE 9 DISPLAY

## 4.3 Keypad

The keypad consists of 4 directional arrow keys (up, down, left and right), 4 menu/function keys (previous, next, exit and enter), and 4 quick access keys (home, calibrate, relays, and help).

The arrow keys are used to change settings (up and down) and move the cursor to a different location within that menu in order to change that setting (left and right).

The function keys are used to navigate through the different menu selections. The Next and Prev keys move you from menu to menu. The Enter key is used to enter a submenu, and to accept a new setting. The Exit key is used to back up one menu level. No matter where you are in the menus, pressing Exit enough times will bring you to the Summary Screen.

To change a numeric value, move the cursor to the digit you want to change by pressing the left or right arrow keys, then use the up or down arrow keys to change the value. Press the Enter key after all digits have been changed to enter the new value into memory. Similarly, to change an alphanumeric value, use the up or down arrow keys to change that character, and the left and right arrow keys to move to the next character. Press the Enter key after all characters have been changed.

The quick access keys bring you directly to frequently used or critical functions. The Home key will bring you directly back to the Summary Screen. The CAL key will bring you directly to the sensor calibration menus. The Relays key will bring you directly to menus that allow you to force the relays off or on. The Help key is under construction. Refer to Section 5.0 for details on use of the keypad for sensor calibration, relay control, setting communications parameters, etc.



## 4.4 Access Codes

The WebMaster series controller is shipped with the access codes at default values. In order to prevent against unauthorized tampering, you will need to change the access codes to your own values. See section 6.23 for details.

There are three levels of protection. If the *Master* password is used in the WebMaster Authentication page, then any set point can be changed. The default Master password is 2001. If the *Calibration* password is used in the Authentication page, then sensor calibrations will be allowed, but other changes will not. The default Calibration password is 2002. If the *Read Only* password is used the user will be able to look at any page, but will not be allowed to make any changes. The default Read Only is 2003.

The default user name is "webmaster." This can and should be changed in the Access Code page. See section 6.23 for details.

## 4.5 Initial Startup

Turn the power switch on. Be patient, the start up sequence will take about the same time as it takes a computer to boot up, approximately 2 minutes. At first the display backlight will blink and all output LEDs will light. Around 30 seconds later, the display backlight will come on, and the LEDs will shut off. Then the display will come up, and show you the % complete status of the start up process. After around 1 minute, the Summary Screen will appear. In 15 seconds, you will hear 3 beeps, and the controller is ready to go.

The WebMaster Series controllers have a wide range of capabilities, so the steps required preparing the site for installation would be different depending upon the capability you will be using.

**Currently the WebMaster has only limited functionality for the local display and keypad. A majority of the programming must be accomplished using a computer. You will be able to calibrate all sensor inputs, change access codes, and enter the information necessary to communicate with the WebMaster via an Ethernet connection (if an Ethernet card is installed in the controller) or via the modem over the Internet (if a modem card is installed in the controller). If neither of these communications options are installed, you must use a direct serial connection to a PC for programming.**

If you have a stand-alone controller with no communications, but you do have a computer to connect to the serial port on the front panel of the controller for programming, go to the section below called "Direct Serial Connection to the RS232 Port".

If you have a controller that is equipped with a modem, then you can take full advantage of the WebMaster. The controller is like a web server. Once you let Walchem know that you are an authorized user, and set up an Internet Service Provider (ISP) account for the controller, you can "surf" to the controller from any web connected computer to access data or reconfigure the controller. The controller can also contact you, by fax, email or pager, in case of trouble. In this case, a dedicated analog phone line that does not go through a company switchboard for the controller must be provided. For details, go to the section below called "Remote Modem Access: Shoulder Tap." The ISP information must be entered into the WebMaster via direct serial connection to the RS232 port, or via the local keypad before attempting a Shoulder Tap connection.

If you have not yet set up an ISP account and wish to program the WebMaster from a remote location, or if you just prefer the “old fashioned method” of direct modem-to-modem communication, go to the section below called “Direct Modem Access: Direct Tap.”

If you have an Ethernet card option installed, then the controller becomes another PC on the network. You can use your web browser software, enter the controller’s address (assigned by your network administrator) and access data or reconfigure the controller. You will need to have a network node nearby to connect your WebMaster controller. See the section below called “Ethernet Connection to LAN”.

You may also use the Ethernet card in your laptop to communicate with the Ethernet card in the WebMaster. This requires a special null cable and the Ethernet parameters must be programmed into the WebMaster using either direct serial to the RS232 port, or the local keypad. Refer to the section below called “Direct Ethernet (for a WebMaster not connected to the LAN).”

### ***Uploading Configuration Files***

You can save all of the set points from a previously programmed controller, and then upload the same set points into another controller. If you have already downloaded a configuration file from a previously programmed controller, you can upload that file to this controller in order to make all the set points the same. If you want to save the set points of this controller for use in future controllers, or want to program this controller using a stored configuration file, refer to section 6.21 for specific instructions.

See the appropriate section above, depending upon how you plan on uploading the configuration file; via a laptop connected to the front panel, via modem, via Ethernet connection, or via local PC connected to the RS232 port.

## **4.6 Communicating with the WebMaster**

### ***4.6.1 Direct Serial Connection to the RS232 Port***



A direct serial connection to the WebMaster can be made in two ways. A temporary connection can be made between a laptop and the front panel of the controller, or a permanent connection can be made between a PC and the RS232 terminal strip connection inside the controller.

#### **Equipment Required**

- A serial null modem cable (PC-AT) with the appropriate connectors to connect your computer to the WebMaster. If connecting temporarily to the front panel of the controller, this will be a DB9F connector. If connecting permanently to the terminal strip inside the controller, this will be tinned leads.
- An Internet-ready computer with the following capabilities: 100 MHz minimum processor speed, 40 MB minimum RAM, Windows operating system, and Windows Internet Explorer version 5.0 or higher web browser software.

### Features Required in the WebMaster

- Any WebMaster controller is capable of a direct serial connection.

### Utilities you need to set up on your computer

- A null modem driver, that is included with the controller, must be installed on your computer. Refer to the separate detailed instructions for this procedure.
- A Windows Dialup Networking Adapter must be created in order to establish a communication between the controller and your PC. Refer to the separate detailed instructions for this procedure.

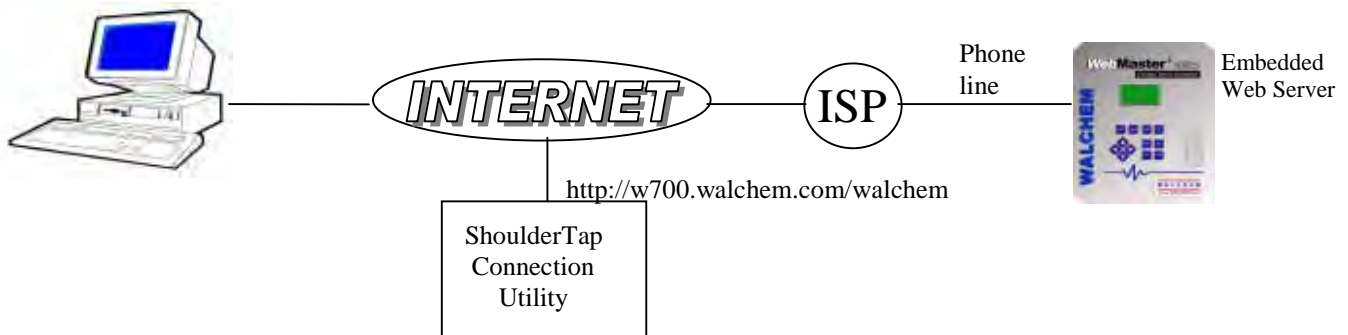
### Parameters that need to be programmed into the WebMaster

- The WebMaster is capable of this type of communication without any programming by the user prior to attempting the communication.

### Steps Required to Establish a Connection

- Install the null modem driver on your PC. This needs to be done only once for each PC that will be used to communicate with a WebMaster controller.
- Create the dialup networking adapter on your PC. This needs to be done only once for each PC that will be used to communicate with a WebMaster controller.
- Connect the null modem cable between the PC and the WebMaster.
- Use the dialup networking adapter to connect the PC to the WebMaster.
- Open Internet Explorer and type in the address 199.199.199.2. The sign-on screen for the WebMaster will come up.
- The sign-on screen of the WebMaster will come up. Type the User Name and Password (Access Code) in the text boxes and click the Submit button. The default user name is "webmaster" and the default passwords are "2001" for full access, "2002" for calibration only, and "2003" for read only. These defaults can and should be changed in the Access Code page.

## **4.6.2 Remote Modem Access: Shoulder Tap**



### Equipment Required

- An Internet-ready computer with the following capabilities: 100 MHz minimum processor speed, 40 MB minimum RAM, Windows operating system, and Windows Internet Explorer version 5.0 or higher web browser software.
- An active analog phone line, direct to the controller (without a PBX system in between) must be connected to the modem of the WebMaster.

- A dialup account must be established for the WebMaster with an Internet Service Provider (ISP). The connection will only be as reliable as the ISP. You should avoid small mom-and-pop ISPs unless you know that they can provide reliable connection to the Internet. Contact Walchem for recommendations.

#### Features Required in the WebMaster

- The WebMaster must have the modem option installed in order to communicate via Shoulder Tap.

#### Utilities you need to set up on your computer

- There are no special drivers, adapters or other software components required on the PC.

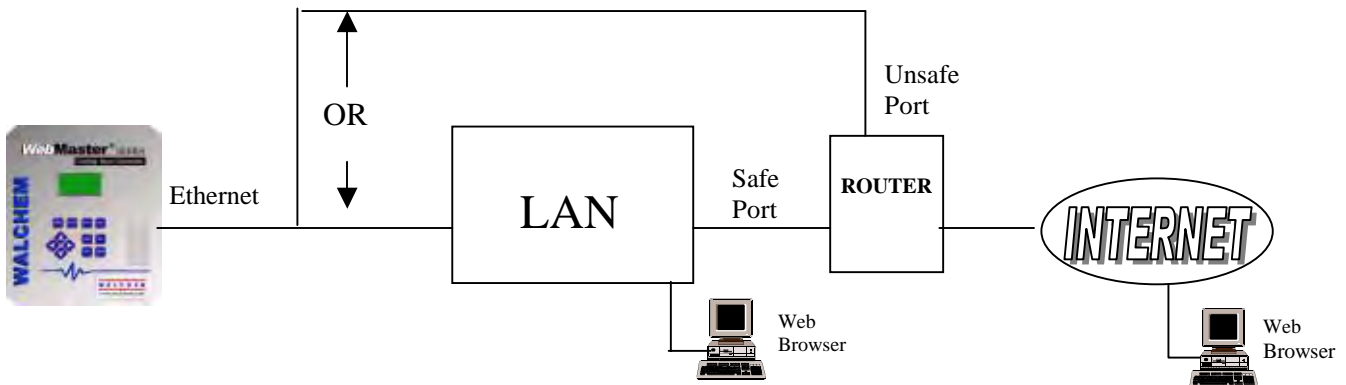
#### Parameters that need to be programmed into the WebMaster

- Prior to attempting a Shoulder Tap connection, the following information needs to be entered into the Communications page of the WebMaster, either via a direct serial connection, direct modem connection (Direct Tap) or via the local keypad. Some of this information needs to be provided to you by the Internet Service Provider (ISP) that the WebMaster will use to access the Internet.
- The controller's phone number.
- The local access phone number for the ISP. More than one access number may be entered.
- The ISP Username that the controller will use to connect to the ISP.
- The ISP Password that the controller will use to connect to the ISP.

#### Steps Required to Establish a Connection

- Connect your PC to the Internet.
- Enter the address <http://w700.walchem.com/walchem>.
- Click the link "Log onto WebMaster", which will bring you to the WebMaster Connection Utility Authentication Page.
- Enter the Connection Utility Username and Password and click the Submit button.
- Enter the phone number of the controller and click the Connect button. After a few minutes, the sign-on screen for the WebMaster will come up.
- The sign-on screen of the WebMaster will come up. Type the User Name and Password (Access Code) in the text boxes and click the Submit button. The default user name is "webmaster" and the default passwords are "2001" for full access, "2002" for calibration only, and "2003" for read only. These defaults can and should be changed in the Access Code page.

### 4.6.3 Ethernet Connection to LAN



#### Equipment Required

- An Internet-ready computer with the following capabilities: 100 MHz minimum processor speed, 40 MB minimum RAM, Windows operating system, and Windows Internet Explorer version 5.0 or higher web browser software.
- A connection between the PC and the local area network (LAN).
- An Ethernet connection between the WebMaster and the LAN.

#### Features Required in the WebMaster

- The WebMaster must have the Ethernet option installed in order to communicate via an Ethernet connection.

#### Utilities you need to set up on your computer

- There are no special drivers, adapters or other software components required on the PC.

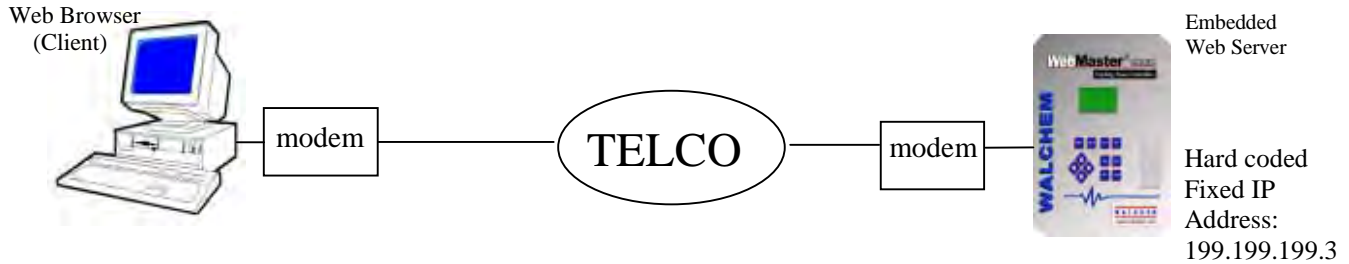
#### Parameters that need to be programmed into the WebMaster

- Prior to attempting an Ethernet connection, the following information needs to be entered into the Communication page of the WebMaster, either via a direct serial connection or via the local keypad. This information must be provided by the IT Administrator of the LAN.
- The Ethernet IP address of the WebMaster. If the controller will only be accessed by computers on the LAN then this may be a fake IP address. If the controller needs to be accessible by computers not on the LAN then this must be a real IP address.
- The Subnet Mask.
- The Gateway IP address.

#### Steps Required to Establish a Connection

- Open Internet Explorer.
- Type in the Ethernet IP address that has been assigned by the IT Administrator.
- The sign-on screen of the WebMaster will come up. Type the User Name and Password (Access Code) in the text boxes and click the Submit button. The default user name is "webmaster" and the default passwords are "2001" for full access, "2002" for calibration only, and "2003" for read only. These defaults can and should be changed in the Access Code page.

#### 4.6.4 Direct Modem Access: Direct Tap



##### Equipment Required

- An Internet-ready computer with the following capabilities: 100 MHz minimum processor speed, 40 MB minimum RAM, Windows operating system, modem and Windows Internet Explorer version 5.0 or higher web browser software.
- An active analog phone line, direct to the controller (without a PBX system in between) must be connected to the modem of the WebMaster.

##### Features Required in the WebMaster

- The WebMaster must have the modem option installed in order to communicate via Direct Tap.

##### Utilities you need to set up on your computer

- A Windows dialup networking adapter must be created. This dialup networking adapter is similar to but not identical to the one used in a direct serial connection. Refer to the separate detailed instructions for this procedure.

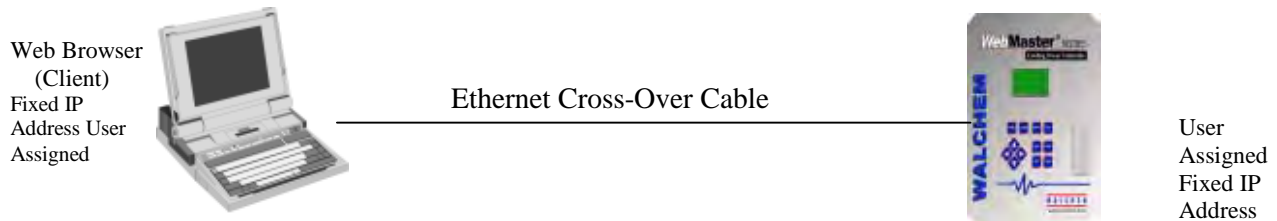
##### Parameters that need to be programmed into the WebMaster

- The WebMaster is capable of this type of communication without any programming by the user prior to attempting the communication.

##### Steps Required to Establish a Connection

- Create the dialup networking adapter on your PC. This needs to be done only once for each PC that will be used to communicate with a WebMaster controller.
- Use the dialup networking adapter to connect the PC to the WebMaster.
- Open Internet Explorer.
- Type in the address 199.199.199.3. The sign-on screen for the WebMaster will come up.
- The sign-on screen of the WebMaster will come up. Type the User Name and Password (Access Code) in the text boxes and click the Submit button. The default user name is "webmaster" and the default passwords are "2001" for full access, "2002" for calibration only, and "2003" for read only. These defaults can and should be changed in the Access Code page.

#### 4.6.5 Direct Ethernet (for a WebMaster not connected to a LAN)



##### Equipment Required

- An Internet-ready computer with the following capabilities: 100 MHz minimum processor speed, 40 MB minimum RAM, Ethernet card, Windows operating system, and Windows Internet Explorer version 5.0 or higher web browser software.
- A null Ethernet cable connection between the PC and WebMaster.

##### Features Required in the WebMaster

- The WebMaster must have the Ethernet option installed in order to communicate via an Ethernet connection.

##### Utilities you need to set up on your computer

- There are no special drivers, adapters or other software components required on the PC. However if your laptop is used on a LAN it is likely that you will have to change your network TCP/IP properties to use a specific IP address for your PC instead of obtain an IP address automatically. You will have to specify the IP address, as well as the Subnet Mask and Gateway IP address. Refer to the separate detailed instructions for this procedure.

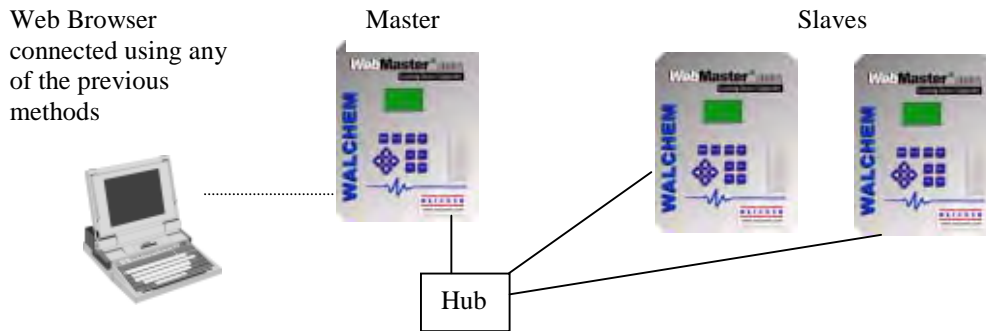
##### Parameters that need to be programmed into the WebMaster

- Prior to attempting an Ethernet connection, the following information needs to be entered into the Communication page of the WebMaster, either via a direct serial connection or via the local keypad.
- The Ethernet IP address of the WebMaster.
- The Subnet Mask.
- The Gateway IP address.

##### Steps Required to Establish a Connection

- Open Internet Explorer.
- Type in the Ethernet IP address that has been assigned to the WebMaster.
- The sign-on screen of the WebMaster will come up. Type the User Name and Password (Access Code) in the text boxes and click the Submit button. The default user name is "webmaster" and the default passwords are "2001" for full access, "2002" for calibration only, and "2003" for read only. These defaults can and should be changed in the Access Code page.

#### 4.6.6 Networking WebMaster Controllers via Ethernet



##### Equipment Required

- An Internet-ready computer with the following capabilities: 100 MHz minimum processor speed, 40 MB minimum RAM, Ethernet card, Windows operating system, and Windows Internet Explorer version 5.0 or higher web browser software.
- An Ethernet cable connection between each WebMaster using a hub or connection to LAN.

##### Features Required in the WebMaster

- Each WebMaster must have the Ethernet option installed. One must have the Master Capability software installed.

##### Utilities you need to set up on your computer

- There are no special drivers, adapters or other software components required on the PC to support networking. Refer to the previous sections for connecting to the master controller via RS232, Ethernet, or modem.

##### Parameters that need to be programmed into the WebMaster

- Prior to attempting an Ethernet connection, the following information needs to be entered into the Communication page of each WebMaster on the network, either via a direct serial connection or via the local keypad.
- The Ethernet IP address of the WebMaster.
- The Subnet Mask.
- The Gateway IP address.
- The master must be selected as the master, and the slaves selected as slaves.

##### Steps Required to Establish a Connection

- Connect to the master controller using one of the methods described in sections 4.6.1 through 4.6.5.
- The sign-on screen of the WebMaster will come up. Type the User Name and Password (Access Code) in the text boxes and click the Submit button. The default user name is "webmaster" and the default passwords are "2001" for full access, "2002" for calibration only, and "2003" for read only. These defaults can and should be changed in the Access Code page.
- Once connected to the master, you may connect to the slaves by clicking on the link under the heading of "Sub-Network".
- You must log onto each slave using its user name and password.



## 4.7 Startup

Once the controller has been set up for your application, start up is a simple process. Check your supply of chemicals, turn on the controller power, calibrate all sensors as necessary, supply the sensors with a flow of sample water, and it will start controlling.

## 4.8 Shut Down

To shut down the controller, simply turn off the power. All set points will be retained in memory.

## 5.0 OPERATION – Using Local Display and Keypad



On power-up, the WebMaster display will show the process values from the sensors, and the most important alarm message. If there is more than one alarm, then pressing the Down Arrow key will display the additional alarm messages.

Pressing the Enter key will display the Main Menu. The menu selections are:

- Input Summary
- Output Summary
- Alarms
- Calibration
- Relay Control (HOA)
- Communication
- Access Codes

Use the Next key to move the cursor down the list, or the Prev key to move the cursor up the list. Once the cursor is on the desired menu, press the Enter key to enter that menu.

### 5.1 Input Summary

The Input Summary menu displays the readings from all of the sensors, as well as any optional digital inputs, analog inputs, and water meters. Use the Next key to scroll down the list, or the Prev key to scroll up the list. There are no programmable parameters in this menu. No access code is required to enter this menu.

Press the Exit key to return to the Main Menu.

### 5.2 Output Summary

The Output Summary menu displays the state of the relays and the mA output of the optional 4-20 mA output cards. Use the Next key to scroll down the list, or the Prev key to scroll up the list. There are no programmable parameters in this menu. No access code is required to enter this menu.

Press the Exit key to return to the Main Menu.

### 5.3 Alarms

The Alarms menu displays all alarm messages. Use the Next key to scroll down the list, or the Prev key to scroll up the list. There are no programmable parameters in this menu. No access code is required to enter this menu.

Press the Exit key to return to the Main Menu.

## 5.4 Calibration

The Calibration menu is used to calibrate the sensor inputs, as well as any optional 4-20 mA inputs. The list of options displayed will depend upon what options are installed in your WebMaster. Not all of the menus described below will necessarily appear on your display. An access code will be required to enter this menu. Use the Arrow keys to enter the access code, then press the Enter key to continue.

The possible inputs to calibrate include:

- System Conductivity (for each boiler)
- System Temperature (for each boiler)
- 4-20 mA Input #1 through #8 (only if the optional 4-20 mA input card is installed)

The possible calibration choices will be displayed. Use the Next key to move the cursor down the list, or the Prev key to move the cursor up the list. Once the cursor is on the desired menu, press the Enter key to start the calibration procedure.

### *Conductivity Calibration – Standard Electrode*

“1 pt Process Cal – Calibrate” will be displayed. Press the Enter key to start the calibration. The reading from the system conductivity sensor will be displayed. Measure the conductivity of the system water using a hand held conductivity meter, and use the Arrow keys to enter the actual value. Press the Enter key to highlight ‘CONTINUE’, then press Enter again to put the new value into memory.

If you are controlling the conductivity by using Intermittent Sampling, then the controller will automatically open the blowdown valve for the duration of the calibration procedure.

If the calibration correction factor is within +/- 50% of the uncalibrated conductivity, the display will say “Cal Successful”. Press the Enter key to resume control of the conductivity.

If the calibration factor is outside of +/- 50% of the uncalibrated conductivity, the display will say “New value out of limits, Cal Fail”. The most likely cause of this is a dirty sensor. Refer to Section 6 for cleaning instructions. If cleaning fails to cure the problem, refer to Section 7 for troubleshooting help.

### *Temperature Calibration*

The current temperature reading will be displayed. Measure the actual temperature of the system water and use the Arrow keys to enter this value. Press the Enter key to highlight ‘CONTINUE’, then press Enter again to put the new value into memory.

If you are controlling the conductivity by using Intermittent Sampling, then the controller will automatically open the blowdown valve for the duration of the calibration procedure.

If the calibration factor is within +/- 15 degrees C (27 degrees F) the display will be “Cal Successful”, otherwise it will be “Cal Fail”.

### *4-20 mA Input 1-8 Calibration*

#### **Calibrate 4 mA**

Following the instructions for your 4-20 mA transmitter, supply the WebMaster controller with a 4 mA signal from the transmitter. You should verify that the transmitter is accurate by measuring the output with an ammeter. You can read the present value of the mA signal as measured by the

controller on the top line of the display. If the value is not exactly 4 mA, press the Enter key when the cursor is on “Calibrate 4 mA”. Once this is done, the controller will read the transmitter signal as exactly 4 mA.

The transmitter signal must be +/- 2 mA of the expected 4 mA value, or else the calibration will fail.

#### **Calibrate 20 mA**

Repeat this process, supplying the controller with a 20 mA signal from the transmitter, and press the Enter key when the cursor is on the “Calibrate 20 mA” to make the present value exactly 20 mA.

The transmitter signal must be +/- 2 mA of the expected 20 mA value, or else the calibration will fail.

### **5.5 Relay Control (HOA)**

This menu will present you with a list of each relay. To the right of the name of the relay will be an indication of the current state of the relay (OFF, or ON). To the right of this, the display will show either the time that the relay has been on, counting up (if the relay is responding to set point, and the time for the relay to shut off is unknown) or the time that has left to be on, counting down (if the relay has been activated by a timer, and the controller knows when it will shut off). Below the name of the relay will be the words “HAND” “OFF” and “AUTO”, each with a radio button to the left of the word. Use the Next key to move the cursor to the line containing the radio buttons. Use the Left Arrow and Right Arrow keys to move the cursor to the desired relay mode. Press the Enter key to change the mode of the relay.

If the relay is in the AUTO mode, then it will respond to the set points or other programmed parameters. This is the normal mode for the relay to be in.

If the relay is in the OFF mode, then the relay will be open regardless of whether the programming of the controller dictates that the relay should be ON or OFF. IF THE POWER TO THE CONTROLLER IS CYCLED OFF AND BACK ON, THE RELAY WILL REVERT BACK TO AUTO MODE.

If the relay is in the HAND mode, then the relay will be closed regardless of whether the programming of the controller dictates that the relay should be ON or OFF. If a Hand Time Limit has been programmed in the controller, the relay will shut off after this time has elapsed, and the mode will revert back to AUTO.

### **5.6 Communication**

This menu is used to enter the information required to communicate with the WebMaster using the modem option via the Internet, or using the Ethernet option. Once this information is entered, a remote PC may be used to configuring all or the set points that are unavailable with the keypad.

For Internet communications, it is also possible to do a manual test of the WebMaster’s ability to use its modem to dial a local Internet Service Provider (ISP) and connect to the Internet.

The display will show a list of the various parameters. Use the Next key to move the cursor to the line below the parameter. Use the Up and Down Arrow keys to change each character to the

correct number, letter, or symbol. Use the Left and Right Arrow keys to move the cursor to the next character. Press Enter once all characters have been changed to the desired values.

### **Dial-up ISP Username**

When the controller needs to dial out and connect to the Internet Service Provider, it needs to identify itself with a user name, so that the ISP knows that it has an account. Enter the user name here.

### **Dial-up ISP Password**

Similarly, the controller needs to identify itself with a password in order to connect with the ISP. Enter the password here.

### **Dial-up ISP Local Phone**

Enter the phone number for the controllers Internet Service Provider. This will be the phone number that it attempts to dial when getting on the Internet.

### **Controller Phone #**

When you need to communicate with the controller, you go to the Walchem web site, link to the WebMaster access page, and a call is made from our server to the controller to wake it up. Enter the phone number for the controller, exactly as it needs to be dialed by our server in the USA. If the WebMaster is installed within the USA or Canada, this may include the 1 prefix. If the WebMaster is installed in another country, it must include the 011 prefix, country code, and phone number.

When the cursor is on the pull down menu for the country code, use the UP or DOWN arrow keys to scroll through the list of countries. The correct prefix (1 or 011) will be selected automatically. Then press Next to move the cursor to the phone number and use the Arrow keys to change the number. Press Enter to accept the changes.

### **Dial ISP**

This menu is used to manually dial the WebMaster's ISP. Press the Enter key when the cursor is on this to start the process.

A new screen will appear. The first line will show the **Dial up Status**. This menu is informational only, and tells you what is happening with the dialup connection. Possible status messages include:

<u>Message</u>	<u>Explanation</u>
Off Line	The controller is not connected.
Dialing xxx-xxxx	The controller is dialing out to the ISP.
No Dial Tone	The controller can not dial out due to phone line or modem problems.
No phone number	There is nothing entered in the ISP Phone No. field.
Connecting to ISP	The controller is successfully negotiating a connection with the ISP.
On Line	The controller is now on the Internet.
Checking for Upgrade	The controller is communicating with our server to see if a software upgrade is available.
Connection Timeout in xxxxx sec	The Internet connection process is complete. The number of seconds displayed depends upon the value entered in the Dialup Connection Lifetime text box described below.

The second line is the **Dial up Dynamic IP** Address. This is informational, and tells you the last IP assigned to the WebMaster by its ISP the last time it connected. When the manual ISP Dial up process is successful, this number should change.

The third line is the date and time of the last successful connection with the ISP.

The bottom line will display “Dial ISP”, “Log Off” and “Cancel”.

Pressing the Enter key while the cursor is on “**Dial ISP**” will make another attempt to dial the ISP. Pressing the Enter key while the cursor is on “**Log Off**” will disconnect the WebMaster from the ISP. It is VERY IMPORTANT that you log off, or the controller will keep the connection on the Internet until the connection times out. It is possible that this programmable maximum connection time could be set for infinity, which could be expensive!

Pressing the Enter key while the cursor is on “**Cancel**” will stop the WebMaster from attempting the Dial up process.

### **Ethernet IP Address**

When a controller is attached to a network, your IT Administrator needs to assign it an Ethernet IP address. When you want to communicate with the controller from your PC on the network, you go to your Browser and type in the controller’s address.

### **Ethernet Subnet Mask**

When a controller is attached to a network, your IT Administrator must also assign the IP Subnet Mask. Enter this number here.

### **Ethernet Gateway**

When a controller is attached to a network, your IT Administrator must also assign the Gateway. Enter this number here.

## **5.7 Subnet**

This menu is used in setting up a Master controller in a network of up to 16 controllers on an Ethernet LAN.

**Subnet Key** is used to make a controller a Master in the field. After purchasing the Master capability from Walchem, you will be given a code to enter which will activate the Master capability. Use the arrow keys to enter the code and then press Enter.

**Detect Network** is used to have the Master detect all the slave devices that are connected to the same network. Press Next to highlight Detect Network, then press Enter. There will be no visual indication that the controller has completed this task, but it only takes a few seconds.

## 5.8 Access Codes

There are three levels of access code protection. If the *Master* password is used in the WebMaster, then any set point can be changed. If the *Calibration Level* password is used, then sensor calibrations will be allowed, but other changes will not. If the *Read Only* password is used the user will be able to look at any menu, but will not be allowed to make any changes.

In order to change the access code for each level of access, use the Next key to move the cursor to the space next to Present, and use the Arrow keys to make the characters match the present access code (you have to know the present code to change it). Press the Enter key to move the cursor next to New, then use the Arrow keys to make the characters match your new access code and press Enter.

The default user name is "webmaster" and the default passwords are "2001" for full access, "2002" for calibration only, and "2003" for read only. These defaults can and should be changed to assure security.

## 6.0 OPERATION – Using PC



These units control continuously as long as power is applied. This section describes how to set up the controller utilizing a PC. See Section 5.0 for instructions utilizing the controller keypad and display.

When you first access the controller, the Conductivity Input page will be displayed in the main frame of the browser, and the Name of the controller and Alarm Status will be displayed in the top frame. Links to each main menu page are located along the left side of the screen.

The menus are organized by inputs and outputs. Each input has menus for calibration, selecting units of measure, etc. as required. Each output has menus for defining the set points, maximum on-time, method of control, etc.

*Keep in mind when the controller is powered, it will be responding to default set points. As set points are changed, the controller will start using the new set points immediately. If it is undesirable for the controller to activate valves and pumps during the set up process, either disconnect them, or go to the “Hand-Off-Auto” menu for each output and force them “Off”.*

### 6.1 Menu Selection Links

Along the left side of your PC monitor will be links to the various menu pages.

The exact configuration of your WebMaster Series controller will determine which menus are available to you. Some menus only appear if an optional circuit board is installed. Others only appear if a certain option is selected in the Start Up menu. Below is a list of all possible Menu selections, and when they will appear.

#### **Menus that appear all the time:**

Start Up	Blowdown Output	Advanced Comms
System Summary	Access Codes	Graphing/Trending
Communications	Configuration File	Interlock Input
Help	Notepad	Walchem Home Page
Conductivity Input	Auto Reporting	
Temperature Input	Alarm Output	
Data Logging	Water Meter	

#### **Menus that appear only if a 4-20mA option board is installed:**

Corrosion  
Other Inputs  
4-20mA Inputs  
Level Inputs

#### **Menus that appear only if a digital input board is installed:**

Posiflow Input  
Digital Inputs  
Level Inputs

#### **Menu that appears only if one or more 4-20mA output boards are installed:**

4-20mA Outputs

#### **Menu that appears only if a software upgrade is available:**

Software upgrade

#### **Menu that appears only if a relay is designated as Feed:**

Feed Output

## 6.2 Start up Menu

(one for each boiler, some information applies globally to all boilers)

Select the option that you want for each of the sections on the page. When you click on the “Submit” button at the bottom of the page, your changes will take effect. If you move to another page without clicking “Submit” first, your changes will be lost!

### *Number of Boilers to Control*

Click on the radio button to the left of the number of boilers that will be controlled by this WebMaster.

### *Controller Name (Global for all boilers)*

Type the name that you want to use to identify the controller, up to 32 characters, in the text box. For example, “XYZ Corp, North Power Plant”

### *Controller Time and Date (Global for all boilers)*

Update the date and time by clicking the arrow on the pull-down list and selecting the correct values.

### *Controller Location (Global for all boilers)*

Type the name that you want to use to identify the controller, up to 32 characters, in the text box. For example, “New Boilerville, ND”

### *Boiler A Custom Name*

Type the name that you want to use to identify the boiler itself, up to 32 characters, in the text box. For example, “Firetube #1 ”

### *Controller Date Format*

Click the radio button that corresponds to the desired date format.

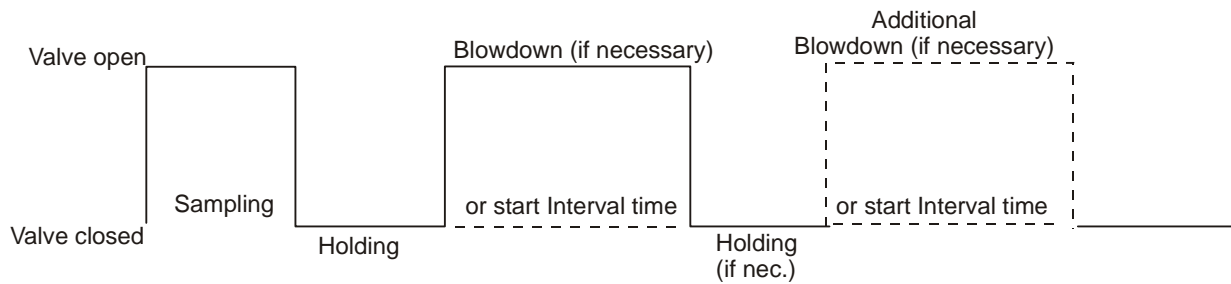
### *Boiler A Blowdown Relay Control Mode*

Click on the radio button of the option that you want to use.

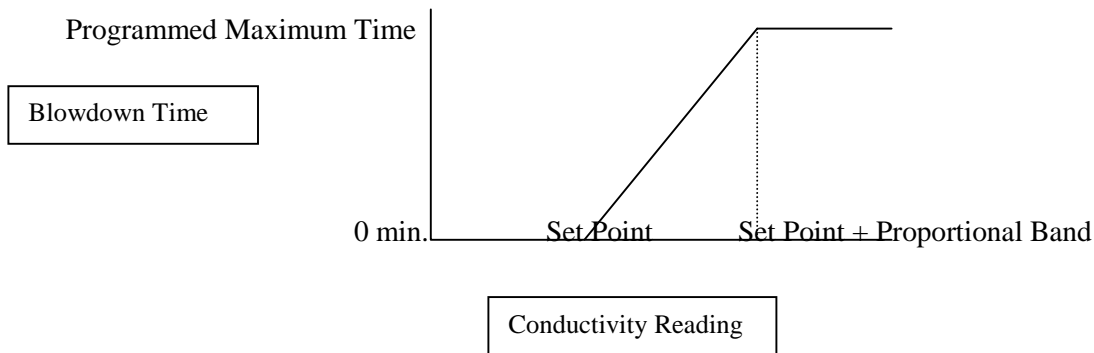
**Continuous Sampling** is the most commonly used blowdown mode, where the blowdown valve is opened based on the system conductivity. The sample is continuously flowing past the conductivity electrode.

**Intermittent Sampling** is used to open the blowdown valve at a user-defined frequency to check the conductivity. The valve opens for a programmable amount of time, closes, holds the sample for a programmable amount of time, and the controller checks the conductivity against the set point. If the conductivity is above the set point, the blowdown valve opens for a programmable amount of time. The valve closes, the sample is held again, and the conductivity is read again. If still too high, the timed blowdown occurs again. Once the held sample is below the set point, the controller will wait for the programmed interval between samples, then the cycle repeats:





**Time Proportional Intermittent Sampling** is the same as Intermittent Sampling described above, except that the blowdown time is calculated using the deviation of the conductivity reading from the set point, and a proportional band. In this control mode, the blowdown time is proportional to how high the conductivity reading is above the set point.



**2-Stage Intermittent Sampling** is the same as Intermittent Sampling described above, except that there are two distinct sample frequencies that occur at different times of the day. For example, if the steam load on the boiler is heavier during the day than at night, then the sample frequency can be set to be more frequent during the hours of heavier loading.

**2-Stage Time Proportional Intermittent Sampling** is the same as Time Proportional Intermittent Sampling described above, except that there are two distinct sample frequencies that occur at different times of the day. For example, if the steam load on the boiler is heavier during the day than at night, then the sample frequency can be set to be more frequent during the hours of heavier loading.

***Boiler A Blowdown Relay Control Direction***

Click on the radio button to set which direction the controller will correct the conductivity. Most systems will tend to rise in conductivity as water is evaporated from the boiler, so you would normally select “Force Lower”.

***Boiler A Feed/Alarm Relay Assignment***

Click on the radio button of the option that you want to use.

**Not Used** should be selected if nothing will be connected to the Feed/Alarm relay.

**Feed** should be selected if you plan to use the Feed/Alarm relay to feed a chemical. See below for the various chemical feed options.

**Alarm** should be selected if you plan to use the Feed/Alarm relay to alert local personnel to a problem with that particular boiler. Note that any alarm for any of the 4 boilers may still be sent by fax, pager or email without utilizing the relay for alarm function.

### ***Boiler A Feed Relay Control Mode***

Click on the radio button of the option that you want to use.

**Blowdown and Feed** mode will add chemical at the same time as the blowdown valve opens, for the same amount of time. A lockout timer will stop chemical feed if the feed time exceeds the programmed limit.

**Feed After Blowdown** mode will add chemical after the blowdown has finished, for a programmed percentage of the bleed time.

**Feed Based on Makeup Volume** mode will add chemical for a programmed amount of time after a specified volume of makeup water has entered the system. This option can only be used if a water meter is installed in the makeup water line.

**Feed as % of Time** mode will add chemical for a programmed amount of time, after a programmed amount of time has elapsed.

**Other (4-20 mA Input #5)** will activate the relay based upon the signal from a transmitter connected to 4-20 mA input number 5. This option is only possible if your controller is equipped with the analog input option card.

Note that for each boiler, the 4-20 mA input that is used to control the feed relay is different. Number 6 is for Boiler B, #7 for Boiler C, and #8 for Boiler D.

### ***Boiler A Water Meter Type***

Click on the radio buttons of the options that match your installation:

**Not Used** should be selected if you will not be using a water meter in conjunction with this boiler.

**Contact** should be selected if the water meter connected to the Boiler A terminal (see Figure 7) is a low frequency reed switch, microswitch, or Hall Effect type.

**Paddlewheel** should be selected if the water meter connected to the Boiler A terminal is a high frequency Hall Effect paddlewheel sensor.

**4-20 mA** should be selected if the water meter associated with Boiler A puts out a 4-20 mA signal. This must be connected to 4-20 mA input #1! The analog input option board is required for this type of meter!

**NOTE: If 4-20 mA type water meters are to be used, the analog input option must be purchased, and the water meters must be connected as follows: Boiler A = AI #1, Boiler B = AI #2, Boiler C = AI #3, and Boiler D = AI #4.**

**NOTE: If you are controlling more than 2 boilers, and you will use a contacting water meter for each boiler, the digital input option must be purchased, and the water meters must be connected as follows: Boiler A = Boiler A position on the core interface board, Boiler B = Boiler B position on the core interface board, Boiler C = Input #1 on the digital input card, and Boiler D = Input #2 on the digital input card.**

**NOTE: If you are controlling more than 2 boilers, and you will use a paddlewheel water meter for each boiler, the digital input option must be purchased, and the water meters must be connected as follows: Boiler A = Boiler A position on the core interface board, Boiler B = Boiler B position on the core interface board, Boiler C = Input #5 on the digital input card, and Boiler D = Input #6 on the digital input card.**

### ***Units of Measure(Global for all boilers)***

Click on the radio button corresponding to your preferred unit of measure.

**Liquid Units.** Select between using gallons, liters or cubic meters as the unit of volume for all measurements except the water meter totals. The unit of measure for water meters may be selected independently in the Water Meter page.

**Temperature Units.** Select between Fahrenheit and Celsius.

**Conductivity Units.** If you select “ppm” then all conductivity set points will be in parts per million. You will be asked to supply the conversion factor to use to convert from  $\mu\text{S}/\text{cm}$  to ppm, which is normally 0.667.

### ***4-20 mA Inputs (only appears if optional card is installed) (Global for all boilers)***

Click on the radio button which best describes the devices you have attached to the optional 4-20 mA input card for each input labeled 1 through 8. Make sure that you select the type of device that is actually wired to that terminal of the option card!

If you are using 4-20 mA water meters, go to the Water Meter Selection section of each Boiler’s Start Up Page, select “4-20 mA”, and then click on the “Submit” button at the bottom of the Start Up Page. This will automatically change 4-20 mA Input 1 to “Boiler A Water Meter” and, if applicable, change 4-20 mA Input 2 to “Boiler B Water Meter”, etc. Verify that the meters are actually wired to the correct terminals.

**Not Used** should be selected if nothing is connected to that input.

**Level** should be selected if a *continuous* level transmitter is attached to that output. For *point* level devices, which do not use a 4-20 mA signal, wire into and program with the Digital Inputs section.

**Corrosion** should be selected if a LPR corrosion-monitoring transmitter is connected to that input.

**Other** should be selected if the 4-20 mA transmitter connected to that input is anything other than the previously mentioned ones. Later when you get to the 4-20 mA Input Page, you will be able to name the input (for example, Phosphate or System Pressure) and also define the Units of Measure (like mg/l or psi).

### ***Digital Input Assignment (only appears if optional card is installed) (Global for all boilers)***

Click on the radio button that best describes the devices that you have connected to the optional digital input card for each input labeled 1 through 6. Make sure that you select the type of device that is actually wired to that terminal of the option card!

**Not Used** should be selected if nothing is attached to that input.

**Point Level** should be selected if a level switch is connected to that input.

**PosiFlow** should be selected if a metering pump feed verification device is connected to that input.

**Interlock** should be selected if any device that is intended to interlock any control outputs is connected to that input.

#### ***4-20 mA Outputs (only appears if optional card or cards are installed) (Global for all boilers)***

Click on the radio button that corresponds to the sensor measurement that you would like to retransmit as a 4-20 mA signal. The sensor choices are Conductivity and Temperature for each boiler, as well as any one of the 4-20 mA input channels.

Click on the “Submit” button to save the changes.

### **6.3 System Summary Menu**

There are no programmable parameters in the System Summary Menu page. Several tables will be displayed, with information on sensor readings, alarms, relay state, water meter totals, etc.

### **6.4 Conductivity Input Menu**

Select the option or type in the values that you want for each of the sections on the page. When you click on the “Submit” button at the bottom of the page, your changes will take effect. If you move to another page without clicking “Submit” first, your changes will be lost!

Certain menu sections will only be visible if you have selected certain options in the start up menu.

#### ***Boiler A Conductivity Menu (one will appear for each boiler)***

##### ***Conductivity Units***

Click on the radio button to select the units of measure that you want to use. You will have to click the “Submit” button at the bottom of the page to see more menus that relate to ppm if you change from  $\mu\text{S}/\text{cm}$  to ppm on this page.

##### ***Current Reading/Perform Calibration***

The *current reading* is a live reading of the calibrated conductivity of the sample. If you are using one of the Intermittent Sampling control modes, then this reading will be the last valid reading taken. It will only be a live reading for a few seconds at the end of the sample Holding stage.

To *Calibrate* the system conductivity, click on the “Perform Calibration” button and a new window will appear in your browser. The live conductivity reading will be displayed in the cell labeled “current value”. Measure the system conductivity with a previously calibrated hand held conductivity meter, and enter that measured value in the text box called “new value”. Click on the Submit button to change the calibration. Click the Close button to return to the Conductivity Input page.

If you are controlling the conductivity by using Intermittent Sampling, then the controller will automatically open the blowdown valve for the duration of the calibration procedure. It will use the same sampling time and hold time as during control.

### ***Reset Defaults***

Click on the Reset Defaults button to reset the sensor calibration to factory defaults. This should only be done as a last resort if you are unable to get the sensor to pass calibration and you have already eliminated the sensor, wiring and input circuit board as being the problem.

### ***Status***

This section is for information only, and lets you know if any alarm conditions exist. Possible status messages are; Normal (everything is OK), Sensor Error (the sensor signal is not valid), High Alarm, Low Alarm or Calibration Time. For Intermittent Sampling control modes, the status could be: Sampling (if the blowdown valve is open to provide a fresh sample), Holding (if the blowdown valve is closed and waiting for the appropriate time to pass before checking the conductivity of the sample) or Waiting (if the blowdown valve is closed and the controller is waiting for the next time to sample). For Boilers B, C and D, an error message for Circuit Board Failure is also possible. See section 8.1 for a complete description of error messages.

### ***Date of Last Calibration***

This section is for information only, and lets you know when the last calibration occurred.

### ***Calibration Reminder***

If you want to be reminded when the sensor needs calibration, for example every 30 days then type the desired number of days between calibration in the text box. A value of zero means you will never be reminded. The highest value allowed is 365 days.

### ***Self Test***

The Self Test is used to check the circuitry of the conductivity input. Click on the “Perform Self Test” button, and the controller will display either Pass or Fail, and also readings of a simulated conductivity and temperature. If the controller passes self test, and you are having problems reading the correct conductivity, then the problem must be with the sensor, wiring or installation.

### ***ppm Conversion Factor (only appears if ppm selected as the unit of measure)***

Type the value that you want to use to convert  $\mu\text{S}/\text{cm}$  to ppm into the text box. The range allowed is 0.5 to 1.0 ppm per  $\mu\text{S}/\text{cm}$ .

### ***Uncalibrated Reading***

This section is for information only, and shows the conductivity reading without any calibration. This is helpful in troubleshooting the conductivity sensor.

### ***High Alarm***

Type in the text box the conductivity (or ppm) above which you want a high alarm to occur.

### ***Low Alarm***

Type in the text box the conductivity (or ppm) below which you want a low alarm to occur.

## 6.5 Temperature Input Menu

Note: The temperature sensor detection is checked when the WebMaster is powered up. Make sure that the sensor connections are made prior to turning on the power.

### *Boiler A Temperature (one will appear for each boiler)*

#### **Current Temperature**

Displays a live reading of the temperature of the system water. If no temperature sensor is detected at power-up, this will be “Manual Temperature” and allow the temperature to be typed into the text box.

#### **Status**

Possible status messages are; Normal (everything is OK), Sensor Error (the signal is not valid), High Alarm, or Low Alarm. See section 8.1 for a complete description of error messages.

#### **Perform Calibration**

Click on the “Perform Calibration” button and a new window will open that read “To Modify the Current Value”, and displays the current reading and a text box in which to type the actual value. Measure the temperature of the sample with a thermometer, and type the actual value into the text box. Click the Submit button. The new value will be displayed. Click the Close button to close the calibrate window.

This menu will not appear if no temperature sensor is detected at power-up.

#### **Temperature Units**

Click on the radio button to select units of measure of either Fahrenheit or Centigrade.

#### **Uncalibrated Temperature**

Displays the temperature reading before correcting with calibration constants. This is helpful for troubleshooting.

This menu will not appear if no temperature sensor is detected at power-up.

#### **High Alarm**

In the text box, type the maximum temperature that you would reasonably expect to see for the water. This is helpful to detect a faulty or poorly calibrated temperature sensor.

This menu will not appear if no temperature sensor is detected at power-up.

#### **Low Alarm**

In the text box, type the minimum temperature that you would reasonably expect to see for the water. This is helpful to detect a faulty or poorly calibrated temperature sensor, or to detect a failure of the sample valve to open in Intermittent Sampling control modes.

This menu will not appear if no temperature sensor is detected at power-up.

Click on the “Submit” button to save the changes.

## 6.6 Water Meter Input Menu

(does not appear if the “Not Used” radio button is selected in Water Meter Selection section of the Start Up page)

### ***Boiler A Water Meter (one will appear for each boiler)***

#### **Type of meter**

Click on the radio button to select the type of water meter you have connected to the makeup water line, *Contact*, *Paddlewheel*, or *4-20 mA*. If you change the type of meter on this page, you must hit the “Submit” button in order to see the correct menus below.

Note that if 4-20mA type water meters are selected, these are automatically assigned to Analog Input 1 (for Boiler A water meter), Input 2 (for Boiler B water meter), Input 3 for Boiler C and Input 4 for Boiler D. Make sure that the water meters are connected to the correct terminals on the analog input circuit board (see figure 8).

If contacting water meters are used for Boilers C and D, then these must be connected to Digital Input 1 for Boiler C and Input 2 for Boiler D. If paddlewheel water meters are used for Boilers C and D, these must be wired to Digital Input 5 for Boiler C and 6 for Boiler D. Make sure that the water meters are connected to the correct terminals on the digital input circuit board (see figure 8).

#### **Total/Reset Total**

The Total displays the volume of makeup water to enter the system since the last time the totalizer was reset.

If you want to reset the total, click on the “Reset Total” button.

#### **Last Total Reset**

Displays the date and time that the totalizer was last reset.

**Rate** (only appears if the water meter type is selected as ‘4-20mA’)

Displays the current water flow rate through the water meter.

#### **Status**

Possible status messages are; Normal (everything is OK)

If the type of water meter is “4-20 mA”; Sensor Error (the sensor signal is not valid), Over Range (between 20 and 21 mA), Under Range (between 3.9 and 4.0 mA), or Circuit Board Failure. See section 8.1 for a complete description of error messages.

#### **Units**

Click on the radio button to select volume in units of *Gallons* or *Liters* or *Cubic Meters*. If you change the units in this screen, changes will not occur on the page until the “Submit” button is pressed.

#### **Volume per Contact (appears only if the Contact radio button is selected)**

Type the volume of water that needs to flow through the water meter before the meter sends a contact into the text box. The controller uses this information to update the totalizer.

**K Factor (appears only if the Paddlewheel radio button is selected)**

Type the K factor (number of pulses per unit volume) of your water meter into the text box. Consult the documentation for the water meter for information on what the K factor will be for your particular pipe size and installation. The K factor allows the controller to translate pulses from the meter into gallons or liters. Any value between 0.001 and 20,000 is acceptable.

**Flow rate at 4 mA (appears only if the 4-20 mA radio button is selected)**

Type the flow rate at which the water meter will send a 4 mA signal into the text box. This will generally be at 0 gallons or liters/minute. Any value between 0 and 25,000 is acceptable.

**Flow rate at 20 mA (appears only if the 4-20 mA radio button is selected)**

Type the flow rate at which the water meter will send a 20 mA signal into the text box. This will generally be at the maximum rated flow rate of the meter. Any value between 0 and 25,000 is acceptable.

Click on the “Submit” button to save the changes.

## 6.7 Level Input Menu

(only appears if a 4-20 mA input or digital input option card is installed, and a Level radio button is selected in the Start Up page)

Any digital or 4-20 mA input that has been defined as a level input will be set up in this menu. If there are level inputs that don't appear on this page, return to the Start Up page, and click on the “level” radio button for that input.

Click on the “Submit” button to save the changes.

### *Level (4-20 mA) Input Menu*

(only appears if a 4-20 mA input option card is installed, and a Level radio button is selected in the 4-20 mA Input section of the Start Up page)

**Input**

Displays which 4-20 mA inputs are defined as level inputs.

**Drum**

Type in the text box the name of the container the level sensor to the left is measuring.

**Volume**

This displays the current volume of chemical remaining in that drum.

**mA**

This displays the mA output of the level transmitter, before it is converted into a volume. This is helpful for troubleshooting.

**Status**

This displays whether the current drum level is “Normal” or in “Low Alarm”. Possible status messages for level transmitters are; Normal (everything is OK), Sensor Error (the sensor signal is not valid), Over Range (between 20 and 21 mA), Under Range (between 3.9 and 4.0 mA), Low Alarm or Circuit Board Failure.



**Full Tank Volume**

Type into the text box the volume contained by a full drum

**mA when tank “empty”**

Type into the text box the mA output that the level transmitter will send when the drum is empty.

**mA when tank “full”**

Type into the text box the mA output that the level transmitter will send when the drum is full.

**Low Alarm Limit**

Type into the text box the volume of chemical remaining in the container at which you want a low alarm to occur.

***Point Level Input Menu***

(only appears if a digital input option card is installed, and a level switch radio button is selected in the digital input section of the Start Up page)

**Input**

Displays which digital inputs are defined as level inputs.

**Drum**

Type in the text box the name of the container the level sensor to the left is measuring.

**Status**

Displays whether the drum is currently “Empty” or “Not Empty.” Possible status messages for point level switches are; Normal, Low Alarm or Circuit Board Failure. See section 8.1 for a complete description of error messages.

**Drum Empty when Contact is**

Click on the radio button that describes how your level switch operates. If the switch is closed when the drum is empty, select “closed”. If the switch is open when the drum is empty, select “open”.

Click on the “Submit” button to save the changes.

**6.8 Corrosion Input Menu**

(only appears if a 4-20 mA option card is installed, and a Corrosion radio button is selected in the 4-20 mA input section of the Start Up page)

***Input***

Displays which 4-20 mA inputs are defined as corrosion inputs.

***Corrosion Rate***

This displays the current rate of corrosion at the sensor.

***Present mA***

This displays the mA output of the corrosion transmitter, before it is converted into a corrosion rate. This is helpful for troubleshooting.

### ***Status***

This displays whether the current corrosion rate is “Normal” or in “High Alarm”. Possible status messages are; Normal (everything is OK), Sensor Error (the sensor signal is not valid), Over Range (between 20 and 21 mA), Under Range (between 3.9 and 4.0 mA), High Alarm or Circuit Board Failure. See section 8.1 for a complete description of error messages.

### ***4 mA =***

Type in the text box the corrosion rate at which the corrosion transmitter will send an output signal of 4 mA. Normally this will be zero mils per year. Any value greater than or equal to 0 is acceptable.

### ***20 mA =***

Type in the text box the corrosion rate at which the corrosion transmitter will send an output signal of 20 mA. Any value greater than or equal to 0 is acceptable.

### ***High Alarm Limit***

Type in the text box the corrosion rate at which you want a high alarm to occur. Click on the “Submit” button to save the changes.

## **6.9 Other Inputs**

### ***Input***

Displays which 4-20 mA inputs have been selected as “Other” in the 4-20 mA input section of the Start Up page.

### ***Name***

Type in the text box a name to describe the device connected to that 4-20 mA input (for example “Phosphate”).

### ***Present Value***

This displays the current reading of the device, using the mA signal from the device, the span of the 4-20 mA signal defined in “4 mA =” and “20 mA =” below, and the units of measure defined below.

### ***Present mA***

This displays the present raw mA signal from the device. This is helpful in troubleshooting.

### ***Status***

This displays whether the present value is “Normal”, or in a “Low Alarm” or “High Alarm” condition. Possible status messages are; Normal (everything is OK), Sensor Error (the sensor signal is not valid), Over Range (between 20 and 21 mA), Under Range (between 3.9 and 4.0 mA), High Alarm, Low alarm or Circuit Board Failure. See section 8.1 for a complete description of error messages.

### ***4 mA =***

Type into the text box the value that corresponds to a 4 mA output signal from the device. For example, if the phosphate analyzer sends out 4 mA at 0.00 mg/l of phosphate, type in 0.00. Any value between -100,000 and 100,000 is acceptable.

### ***20 mA =***

Type into the text box the value that corresponds to a 20 mA output signal from the device. For example, if the phosphate analyzer sends out 20 mA at 100 mg/l of phosphate, type in 100. Any value between -100,000 and 100,000 is acceptable.

### ***Units***

Type into the text box the units of measure that you want to use for the device connected to that input. For example, you could use “ppm”, “mg/l phosphate”, etc.

### ***Low Alarm Limit***

Type into the text box the value for that input below which you want a low alarm to occur. Any value between -100,000 and 100,000 is acceptable.

### ***High Alarm Limit***

Type into the text box the value for that input above which you want a high alarm to occur. Any value between -100,000 and 100,000 is acceptable.

## **6.10 PosiFlow Input Menu**

(only appears if a digital input option card is installed, and a PosiFlow radio button is selected in the digital input section of the Start Up page)

### ***Digital Inputs***

Displays which digital inputs have been defined as PosiFlow inputs in the start up page.

### ***Output***

Click on the arrow tell the controller that the PosiFlow device for the digital input shown to left is attached to the pump that you selected.

### ***Control-Output Status***

This column lets you know if the control output for the pump to which the PosiFlow device is attached is currently on or off.

### ***PosiFlow Status***

This column lets you know if the PosiFlow is sensing flow from the pump or not.

### ***Vol per Stroke***

Type in the text box the volume of chemical that the metering pump delivers each time it strokes the diaphragm. This information is used to totalize the volume of chemical delivered, by multiplying the volume per stroke by the number of strokes counted by the PosiFlow device.

### ***Alarm Time***

Type in the text box the amount of time that can pass between the output relay being activated and the PosiFlow device sensing a stroke of the pump. If the pump is set to deliver 10 strokes per minute, then the controller must wait a minimum of 6 seconds before activating the alarm.

### ***Total***

This column tells you the volume of chemical that has been delivered by the metering pump. This value is calculated by multiplying the volume per stroke by the number of strokes counted by the PosiFlow device.

### ***Last Reset Time***

This column gives you the date and time that the total was last reset.

### ***Reset Total***

Click on the “Reset Total” button to reset the value in the “Total” column back to 0.0.

## **6.11 Interlock Menu**

The Interlock feature allows you to use a contact closure to shut down certain control outputs. For example, a dry contact from a DCS could be sent when the boiler is shutdown for maintenance.

A digital input labeled “Interlock 7” is always available on the core interface circuit board. If any additional interlock inputs are required, then the controller must have the digital input option board installed.

### ***Input***

Displays which digital input has been selected as an Interlock input in the digital input section of the Start Up page.

### ***Outputs Interlocked***

Click on the check box in the chart of the relays that you want to be deactivated when the dry contact signal is received by the controller. Clicking once places a check in the box, clicking again removes the check from the box.

### ***Interlock when contact is***

Click on the radio button that describes how your Interlock switch operates. If the contact is open when you want the outputs to deactivate, click on “open”. Otherwise, click on “closed”.

Click on the “Submit” button to save the changes.

## 6.12 4-20 mA Input Menu

(only appears if a 4-20 mA input option card is installed, and an “Other” radio button is selected in the 4-20 mA Input section of the Start Up page)

This page is used to assign the purpose of each 4-20 mA input and to calibrate each input.

### *Status*

Possible status messages are Normal (everything is OK), Sensor Error (the sensor signal is not valid), Over Range (between 20 and 21 mA), Under Range (between 3.9 and 4.0 mA), High Alarm, Low Alarm or Circuit Board Failure. See section 8.1 for a complete description of error messages.

### *4-20 mA Input Assignment Menu*

This table is used to reassign the function of the device connected to the input. Click on the radio button that best describes what is connected to the input. If you assign the inputs on this page, you need to click on the Submit button to see the appropriate menu selections on the page. These are normally already defined in the Start up page.

**Not Used** should be selected if nothing is connected to that input.

**Level** should be selected if a *continuous* level transmitter is attached to that output. For *point* level devices, which do not use a 4-20 mA signal, wire into and program with the Digital Inputs section.

**Corrosion** should be selected if a LPR corrosion-monitoring transmitter is connected to that input.

**Other** should be selected if the 4-20 mA transmitter connected to that input is anything other than the previously mentioned ones. Later when you re-submit the 4-20 mA Input Page, you will be able to name the input (for example, Phosphate or System Pressure) and also define the Units of Measure (like mg/l or psi).

### *4-20 mA Input Calibration Menu*

This table is used to calibrate the 4-20 mA inputs.

Following the instructions for your 4-20 mA transmitter, supply the WMB7000 controller with a 4 mA signal from each transmitter. You should verify that the transmitter is accurate by measuring the output with an ammeter. You can read the present value of the mA signal as measured by the WMB7000 controller in the second column of the table. If the present value is not exactly 4 mA, click on the “Set 4 mA” button. You will be asked to verify that you want to change the calibration. Once this is done, the controller will read the transmitter signal as exactly 4 mA.

Repeat this process, supplying the WMB7000 controller with a 20 mA signal from each transmitter, and click on the “Set 20 mA” button in order to calibrate the controller.

Click on the “Submit” button to save the changes.

### 6.13 Digital Inputs Menu (only appears if the digital input option card is installed)

This page is used to assign the function of the devices attached to each digital input. These are normally already defined in the Start up page.

Click on the radio button to define each input as *Not Used*, *Point Level*, *PosiFlow*, or *Interlock*. Click on the “Submit” button to save the changes.

If you have more than 2 boilers, and have contact or paddlewheel water meter assigned, then these will consume digital inputs as well.

The actual programming of the various digital inputs will be done in the appropriate page; either the Level page, PosiFlow page, or Interlock page. Refer to those sections for instructions.

### 6.14 Blowdown Output Menu (one for each boiler)

This page is used to select the blowdown set point, alarms, etc. Which menus appear depends upon how items were selected in the Start Up page. If you make changes to the Blowdown Relay Control Mode, you will need to click on the “Submit” button in order to see all the necessary menus.

#### *Boiler A Blowdown Relay Control Mode*

Click on the radio button that describes how you want the controller to check and control the boiler water. Refer to the installation section (3.3) for instructions on determining which method is best for your application. The plumbing of the blowdown line needs to match what is required for the sampling mode!

If you change this selection while on this page, you will need to click the “Submit” button on the bottom of the page in order to see all the necessary menu sections. Click on the radio button of the option that you want to use.

**Continuous Sampling** is the most commonly used blowdown mode, where the blowdown valve is opened based on the system conductivity. The sample is continuously flowing past the conductivity electrode.

**Intermittent Sampling** is used to open the blowdown valve at a user-defined frequency to check the conductivity. The valve opens for a programmable amount of time, closes, holds the sample for a programmable amount of time, and the controller checks the conductivity against the set point. If the conductivity is above the set point, the blowdown valve opens for a programmable amount of time. The valve closes, the sample is held again, and the conductivity is read again. If still too high, the timed blowdown occurs again. Once the held sample is below the set point, the controller will wait for the programmed interval between samples, then the cycle repeats.

**Time Proportional Intermittent Sampling** is the same as Intermittent Sampling described above, except that the blowdown time is calculated using the deviation of the conductivity reading from the set point, the maximum blowdown time and a proportional conductivity band. In this control mode, the blowdown time is proportional to how high the conductivity reading is above the set point.

**2-Stage Intermittent Sampling** is the same as Intermittent Sampling described above, except that there are two distinct sample frequencies that occur at different times of the day. For example, if the steam load on the boiler is heavier during the day than at night, then the sample frequency can be set to be more frequent during the hours of heavier loading.

**2-Stage Time Proportional Intermittent Sampling** is the same as Time Proportional Intermittent Sampling described above, except that there are two distinct sample frequencies that occur at different times of the day. For example, if the steam load on the boiler is heavier during the day than at night, then the sample frequency can be set to be more frequent during the hours of heavier loading.

### ***Blowdown Status***

This menu is for information only, and displays whether the blowdown output is “Off” or “On” and if on, for how much time, as well as any alarm conditions. Possible status messages are; Off (continuous sampling, blowdown not occurring), Off/Manual (relay is forced off via Hand/Off/Auto selection), Off/Time counting down/Waiting (for Intermittent sampling, waiting for next sample), Off/Time Counting down/Holding (for intermittent sampling, holding the sample until it’s time to read it), On/Time counting up (for continuous blowdown based on conductivity), On/Time counting down/Blowdown (for intermittent sampling, time based blowdown), On/Time counting down/Sampling (for intermittent sampling, taking a sample) or On/Time counting down/Hand (for manual relay activation). Possible error messages are Timeout, No Flow, and Interlock. See section 8.1 for a complete description of error messages.

### ***Reset Timeout***

There is also a button called “Reset Timeout” which is used to reset the output if it has been activated for longer than the time limit imposed in the “Blowdown Time Limit” menu described below.

### ***System Conductivity***

This menu is for information only, and displays the current reading from the conductivity electrode.

### ***Set Point***

Type in the text box the conductivity (or ppm) value at which you want the blowdown valve to control. Any value between 0 and 10,000 is acceptable.

### ***Custom Name***

This menu allows you to rename the output if desired. Type the new name into the text box.

***Dead Band (only appears if Continuous Sampling has been selected)***

Type in the text box the conductivity (or ppm) value away from the set point at which the bleed valve will close. For example, if you are forcing the conductivity lower, your set point is 2000  $\mu\text{S}/\text{cm}$ , and your dead band is 100  $\mu\text{S}/\text{cm}$ , then the bleed valve will open at 2001 and close at 1900  $\mu\text{S}/\text{cm}$ . The purpose of the dead band is to prevent rapid cycling of the relay open and closed, which can shorten its life. The dead band should be set for the lowest value that still prevents the relay from chattering.

***Interval between Samples (only appears if Intermittent Sampling has been selected)***

Type the number of minutes that you want the controller to wait in between checking the conductivity of the system into the text box. Any value between 5 and 1440 minutes is acceptable.

For optimum performance, this time should be set so that under normal loading conditions the conductivity of the system exceeds the set point by the end of this time, but not by more than 10%.

If using two-stage intermittent sampling, this menu will appear twice, once for each time period.

***Duration of Sample (only appears if Intermittent Sampling has been selected)***

Type the number of minutes that you want the blowdown valve to open when checking the conductivity of the system in the text box. To conserve water, make this value as low as possible while still making sure that at the end of this time the sample is fresh, and is not water that has been sitting in the pipe since the last sample. Any value between 1 and 60 minutes is acceptable.

At the end of the sample duration time, the controller will Hold the sample for a programmed time (see below), then compare the system conductivity to the set point conductivity. If the set point has not yet been reached, the valve will open for the Blowdown Time, and repeat until the conductivity is back in range. At this point, the valve will close, and the controller will wait however long the Interval Between Samples time is, and then sample again.

***Hold Time (only appears if Intermittent Sampling has been selected)***

Type in the text box the number of minutes required for the held sample to come up to boiler pressure, and read the correct conductivity value. To determine the necessary hold time, set the hold time to a large value, and look at the live conductivity reading while keeping track of the elapsed time. Note the time that it takes for the live conductivity reading to reach its maximum stable value, and use this time for the hold time. Any value between 30 and 600 seconds is acceptable.

***Blowdown Time (only appears if Intermittent Sampling has been selected)***

Type the number of minutes that you want the blowdown valve to open if the conductivity is over the set point at the end of the hold time. This should be set to the time required to lower the conductivity by approximately the amount that it will be above the set point, and will need to be determined experimentally. Keep in mind that the controller will recheck the conductivity after the blowdown time has expired, and repeat the blowdown if the conductivity remains above the set point.

If using two-stage intermittent sampling, this menu will appear twice, once for each time period.



***Maximum Proportional Time (only appears if Time Proportional Intermittent Sampling has been selected)***

Type in the text box the maximum amount of time for the blowdown. This blowdown time will occur when the conductivity of the sample is more than the Proportional Conductivity Band from the set point conductivity (see below). It may take some trial and error to determine the best maximum blowdown time. You should estimate the time required to reduce the conductivity by the amount of the proportional conductivity band during normal steam loading conditions. Any value between 5 and 1440 minutes is acceptable.

For example, if you are operating the boiler at 1000  $\mu\text{S}/\text{cm}$ , and expect that the conductivity will never exceed 1200  $\mu\text{S}/\text{cm}$ , the proportional conductivity band should be set for 200  $\mu\text{S}/\text{cm}$ . If it takes 60 minutes of blowdown to drop the conductivity from 1200  $\mu\text{S}/\text{cm}$  to 1000  $\mu\text{S}/\text{cm}$ , set the maximum proportional time to 60 minutes.

If using two-stage intermittent sampling, this menu will appear twice, once for each time period.

***Proportional Conductivity Band (only appears if Time Proportional Intermittent Sampling has been selected)***

Type in the text box the conductivity (or ppm) value away from the set point at which the blowdown valve will stay open for the entire Maximum Proportional Time. As a starting point, you should take the highest conductivity that you expect to see in the boiler, subtract the set point, and use this value for the proportional conductivity band.

For example, you have a set point of 1000  $\mu\text{S}/\text{cm}$ , a maximum proportional time of 60 minutes, and a proportional conductivity band of 200  $\mu\text{S}/\text{cm}$  programmed into the controller. The controller will pull a sample, hold it, and then check the conductivity. If the conductivity is under 1000  $\mu\text{S}/\text{cm}$ , the controller will wait until the next sample. If the conductivity is 1200  $\mu\text{S}/\text{cm}$  or higher, the blowdown valve will open for 60 minutes. If the conductivity is 1100  $\mu\text{S}/\text{cm}$ , the blowdown valve will open for 30 minutes.

If using two-stage intermittent sampling, this menu will appear twice, once for each time period.

***1st Sampling Stage (only appears if two-stage intermittent sampling is selected)***

Click on the arrow of the pull down list to select the range of time for the first sampling frequency. During this time of day, the controller will open the solenoid valve to check the system conductivity at one interval (which is described below) while at other times of day, use a different interval between samples.

***Control Direction***

Click on the radio button to select between the normal “Force Lower” or “Force Higher”.

### ***Blowdown Time Limit (only appears if Continuous Sampling is selected)***

Type in the text box the maximum amount of time that the blowdown valve can be continuously open before the controller shuts the valve and activates a Blowdown Time Limit alarm. This is intended to prevent the blowdown valve from turning over the whole system if the conductivity input fails in such a way that it will never close the valve. For example, the conductivity may be stuck at a value above the set point, and can't respond to changes in conductivity.

Note that the blowdown valve will not open again until someone resets the timer!

It will take some experience to find out what the normal blowdown time will be. If the valve cycles open and closed under worst case loading conditions in 30 minutes, you may want to set the Blowdown Time Limit at 60 minutes.

### ***Hand Time Limit***

Type in the text box the maximum number of minutes that the blowdown output can be activated in the Hand mode. Any value between 0 and 1440 is acceptable. A value of 0 means the pump can be left on indefinitely. Click on the "Submit" button to save the changes.

### ***Blowdown Output Mode***

Click on the radio buttons to manually control the blowdown valve. The normal selection will be *Auto*, where the controller uses the various set points to open and close the valve. You can force the valve open regardless of the set points by selecting *Hand*, or force the valve closed regardless of the set points by selecting *Off*.

If you select *Off*, the valve will not open again until either *Hand* or *Auto* is selected, or power is shut of to the controller! If you select *Hand*, the valve will open until either *Auto* or *Off* is selected, or until the Hand Time Limit (programmed in the next menu) expires.

The *Off* mode is handy to prevent the valve from opening while you are changing set points. The *Hand* mode is handy to be able to test the valve, wiring, etc without needing to change set points.

### ***Event Log***

Click on the link to view the event log. The event log contains the date and time of each relay activation and deactivation. The data will be a 1 if the relay is closed and a 0 if the relay is open. The log also shows the state of the flow switch, with a 1 denoting flow, and a 0 denoting no flow.

A window will open to ask if you would like to open the file or save it to disc. Select the method you would like to use. The file is a .csv (comma separated variable) file that will open in a spreadsheet such as Excel.

## 6.15 Feed Output Menu (one for each boiler with Feed option selected)

### *Feed Mode*

Click on the radio button of the option that you want to use.

**Blowdown and Feed** mode will add chemical at the same time as the blowdown valve opens, for the same amount of time. A lockout timer will stop chemical feed if the feed time exceed the programmed limit.

**Feed After Blowdown** mode will add chemical after the blowdown has finished, for a programmed percentage of the blowdown time.

**Feed Based on Makeup Volume** mode will add chemical for a programmed amount of time after a specified volume of makeup water has entered the system. This option can only be used if a water meter is installed in the makeup water line.

**Feed as % of Time** mode will add chemical for a programmed amount of time, after a programmed amount of time has elapsed.

**Other (4-20 mA Input #5)** will activate the relay based upon the signal from a transmitter connected to 4-20 mA input number 5 (if Boiler A). This option is only possible if your controller is equipped with the analog input option card.

**Note that for each boiler, the 4-20 mA input that is used to control the feed relay is different. Number 6 is for Boiler B, #7 for Boiler C, and #8 for Boiler D.**

If you change the Feed Mode in this page, you must click on the Submit button to see all the correct menus for that mode on this page.

### *Status*

This displays the current status of the Feed Output, either “Off” or “On”, and if on, the time it has been on and any alarm conditions. Possible status messages are Off, Off/manual, On/Time counting up (for feed and blowdown, or Other 4-20 mA modes), On/Time counting down (for feed based on makeup volume, feed after blowdown, or feed as % of time modes) and On/Time counting down/Hand (for manual relay activation). Possible error messages are Timeout, No Flow, Interlock, or Pump Failure. See section 8.1 for a complete description of error messages.

### *Custom Name*

This menu allows you to call the output another name if desired. Type the new name in the text box.

### *Reset Timeout*

There is also a button called “Reset Timeout” which is used to reset the output if it has been activated for longer than the time limit imposed in the “Output Time Limit” menu described below.

### ***Time Period***

(only appears if Feed Mode is selected as Feed Based On % Time)

Type in the text box the time period you want to use. The time period effects how often the chemical feed occurs, and in conjunction with the % of period to feed, effects how long the pump will run. Any value between 1 and 1440 minutes is acceptable.

### ***% of Period to Feed***

(only appears if Feed Mode is selected as Feed After Blowdown or Feed Based On % Time)

Type in the text box the percentage of the blowdown time (if the mode is feed after blowdown) or the percentage of the time period (if the mode is feed based on % time) that you want the feed pump to run. Any value between 0.1 and 100% is acceptable.

For example, if you are doing feed after blowdown, and the blowdown valve is open for 10 minutes, and the % of period to feed is 50%, then the feed pump will run for 5 minutes. Similarly, if you are doing feed based on % time, and the time period is 60 minutes, and the % of period to feed is 10%, then out of every 60 minutes the feed pump will run for 6 minutes.

### ***Makeup Volume***

(only appears if Feed Mode is selected as Feed Based On Makeup Volume)

Type in the text box the volume of makeup water that needs to enter the system in order to trigger the chemical feed. Any value between 1 and 10,000 is acceptable.

### ***Time Per Unit Volume***

(only appears if Feed Mode is selected as Feed Based On Makeup Volume)

Type in the text box the amount of time for the chemical feed pump to run, once the previously specified volume of makeup water has entered the system. Any value between 1 and 1440 minutes is acceptable.

### ***Accumulator***

(only appears if Feed Mode is selected as Feed Based On Makeup Volume)

Displays the amount of totalized volume since the last time it was reset. A “Reset Total” button is available, which allows you to re-zero the accumulated total.

### ***% of Blowdown to Feed***

(only appears if Feed Mode is selected as Feed After Blowdown)

The chemical feed will occur after blowdown, for the specified % of the blowdown time. Type in the text box the desired % of the blowdown time for the feed pump to run.

### ***Set Point***

(only appears if Feed Mode is selected as Feed Based On Other 4-20 mA input)

Type in the text box the value at which you want the feed relay to close. When the control mode is based on a 4-20 mA input, the set point value is limited to the range of the 4-20 mA input. Click on the link called Scaling to set the range of the 4-20 mA input.”

### ***Dead Band***

(only appears if Feed Mode is selected as Other 4-20 mA input)

Type in the text box the value away from the set point at which the feed relay will close. For example, if you are forcing the inhibitor concentration higher, and your set point is 20 ppm and your dead band is 1 ppm, then the feed relay will close at 20 and open at 21 ppm. The purpose of the dead band is to prevent rapid cycling of the relay open and closed, which can shorten its life. The dead band should be set for the lowest value that still prevents the relay from chattering.

### ***Control Direction***

(only appears if Feed Mode is selected as Other 4-20 mA input)

Click on the radio button to select between “Force Lower” or “Force Higher”.

### ***Output Time Limit***

Type in the text box the maximum amount of time that the feed pump can be continuously running before the controller shuts off the pump and activates an Output Time Limit alarm. This is intended to prevent the pump from emptying an entire drum of chemical because of a problem elsewhere in the system.

Note that the feed pump will not run again until someone resets the timer! The time limit should be set at approximately twice the normal worst case on time.

### ***Feed Output Mode***

Click on the radio buttons to manually control the feed relay. The normal selection will be *Auto*, where the controller uses the various set points to open and close the relay. You can force the relay open (pump off) regardless of the set points by selecting *Off*, or force the relay closed (pump on) regardless of the set points by selecting *Hand*.

If you select *Off*, the pump will not run again until either *Hand* or *Auto* is selected! If you select *Hand*, the pump will run until either *Auto* or *Off* is selected, or until the *Hand Time Limit* (programmed in the next menu) expires.

The *Off* mode is handy to prevent the pump from running while you are changing set points. The *Hand* mode is handy to be able to test the pump, wiring, etc without needing to change set points.

### ***Hand Time Limit***

Type in the text box the maximum number of minutes that the feed output can be activated in the *Hand* mode. Any value between 0 and 1440 is acceptable. A value of 0 means the output can be left on indefinitely.

Click on the “Submit” button to save the changes.

### ***Event Log***

Click on the link to view the event log. The event log contains the date and time of each relay activation and deactivation. The data will be a 1 if the relay is closed and a 0 if the relay is open. The log also shows the state of the flow switch, with a 1 denoting flow, and a 0 denoting no flow.

A window will open to ask if you would like to open the file or save it to disc. Select the method you would like to use. The file is a .csv (comma separated variable) file that will open in a spreadsheet such as Excel.

## 6.16 4-20 mA Output Menu

(only appears if one or more 4-20 mA output option cards are installed)

### *Outputs*

Identifies the output card involved.

### *Sensor*

Click on the arrow to pull down the choices of which sensor measurement will be retransmitted as a 4-20 mA signal. The choices are Conductivity or Temperature for Boilers A through D, as well as any 4-20 mA input signal (only if the 4-20 mA input option is installed).

### *Sensor Status*

This column shows the status of the sensor that has been mapped to the 4-20 mA output. Possible messages include Normal, Unmapped, and Sensor Error.

### *Input Value*

This column shows the process value of the input that is mapped to the 4-20 mA output. This will be in units of conductivity, temperature or whatever the 4-20 mA input is using for units of measure.

### *Output Status*

This column shows the status of the 4-20 mA output. It will read Normal if the input value is between the two programmed values defining the 4-20 mA output, or Over Range if the input is above the 20 mA value, or Under Range if it is below the 4 mA value.

### *4 mA =*

Type in the text box the input value that you want to correspond to a 4 mA output by the option card.

### *20 mA =*

Type in the text box the input value that you want to correspond to a 20 mA output by the option card.

### *4-20 mA Loop Cal*

If the device connected to the controller's 4-20 mA output is not reading correctly, click on the Set 4 mA button and the controller will output a fixed 4 mA signal. The receiving device can then be calibrated to read correctly for a 4 mA signal. Then click the Set 20 mA button and the controller will output a fixed 20 mA signal.

Click on the Submit button to save the changes.

## 6.17 Alarm Output Menu

### *Alarm Condition*

In the left hand column, a list of all possible alarm conditions (one of each type of alarm for each boiler) will be displayed. Only the alarm conditions that are possible given how your controller is configured will appear. To the right of each type of alarm condition there will be a column labeled Critical Alarm with a choice of “Yes” or “No”. Click on the “No” radio button if you do not want that type of alarm to be considered critical.

If an alarm condition is selected as a critical alarm, then you have the option of being notified that the alarm condition exists, by triggering the alarm relay, sending an email, or calling a pager. The WebMaster will attempt to send the alarm message email five times at 5 minute intervals and will then stop trying, even if unsuccessful.

### *Alarm Relay Status*

This menu is for information only, and tells you if the alarm relay is currently on or off, and if it is on, for how much time. Possible status messages are Off, Off/Manual, On/Time counting up (indicating how long the alarm relay has been active) and On/Time counting down/Hand (for manual output activation).

### *Remote Alarm Action Status*

This menu is for information only, and displays the status of the remote alarm notification. The possible messages to display are:

Alarm Action Completed:	The last alarm notification has already occurred and no further action is pending.
Found New Alarm:	A new alarm has occurred and no notification has yet occurred.
Alarm Due in HH:MM:SS	The alarm delay time will be displayed with time counting down.
Taking action	The alarm notification about to occur.
Sending Email	If notification is via email, this will be displayed.
Sending Page	If notification is via pager, this will be displayed.

### *Critical Alarm Action*

Click on the check box to the left of the action or actions that you want to occur if a critical alarm condition exists. The controller can close or open the alarm relay, send a fax, send an email or dial a pager, or any combination of the above.

### *Auto Dial Delay Time*

In order to avoid being paged for an alarm condition that quickly corrects itself, you set a delay time for the alarm action. If the alarm condition still exists at the end of the delay time, then the alarm action will occur. If the alarm condition no longer exists at the end of the delay time, no notification will occur. Any value between 0 and 1440 minutes is acceptable.

### *Active When Relay Is*

Click on the radio button that describes how you want the alarm relay to act. The normal method is to close the relay when an alarm condition exists, but you can also open the relay.

### ***Output Mode***

Click on the radio buttons to manually control the alarm relay. The normal selection will be *Auto*, where the controller uses the various set points to open and close the relay. You can force the relay open regardless of the presence of an alarm condition by selecting *Off*, or force the relay closed regardless of the presence of an alarm condition by selecting *Hand*.

If you select *Off*, the alarm relay will not be triggered again until either *Hand* or *Auto* is selected! If you select *Hand*, the relay will be closed until either *Auto* or *Off* is selected, or until the Hand Time Limit (programmed in the next menu) expires.

The *Off* mode is handy to use as an alarm silence. The *Hand* mode is handy to be able to test the relay, wiring, etc without needing to force an alarm condition.

### ***Hand Time Limit***

Type in the text box the maximum number of minutes that the alarm output can be activated in the *Hand* mode. Any value between 0 and 1440 is acceptable. A value of 0 means the output can be left on indefinitely.

Click on the “Submit” button to save the changes.

### ***Log File***

Click the link to View Log File. The Alarm Log will tell you the status of any alarm emails that may have been sent. It will show you the date and time of the alarm, the method of alarm notification, whether it was successful at sending the message or not, and the type of alarm.

A window will open to ask if you would like to open the file or save it to disc. Select the method you would like to use. The file is a basic text file with a .log extension that may be opened in any word processing program (Word, Notepad, etc.).

### ***Event Log***

Click on the link to view the event log. The event log contains the date and time of each relay activation and deactivation. The data will be a 1 if the relay is closed and a 0 if the relay is open. The log also shows the state of the flow switch, with a 1 denoting flow, and a 0 denoting no flow.

A window will open to ask if you would like to open the file or save it to disc. Select the method you would like to use. The file is a .csv (comma separated variable) file that will open in a spreadsheet such as Excel.

## **6.18 Data Logging**

### ***Manual Data logging***

You may either download data files automatically, or manually. To download automatically, click the Disable radio button, and set up the schedule in the Auto Reporting page (See Section 6.19). To download manually, click the Enable radio button, then go to the bottom of the page and click the Submit Datalog Details button.

Note that if you have an automatic data log building, and you click the Enable radio button to download data manually, the filtered set of data previously gathered will be lost!



You will now see additional menus, which allow you to set the start date and end date of the manual log, as well as the frequency of logging data points. Type the desired values in the text boxes. You will also get a link on the bottom of the page, Manual Download, which will initiate the downloading process of this file. You will be presented with the standard Windows dialog box, asking you what the file should be named and where you want the file to go.

### ***Select the Measurements to Include in the Data Log File***

You will be presented with a list of all of the parameters that can be logged, including sensor readings, totalizers, drum levels, 4-20 mA inputs, etc. The contents of the list will vary depending on what options you have installed or programmed. Click the “Yes” radio buttons of the parameters that you want to log, and the “No” radio buttons of the parameters that you do not want to log.

Click on the “Submit” button to save the changes.

To download the active data log, click the “Active Download” link and another window will open. The WebMaster stores all parameters (used or not) every 20 minutes for 32 days, and this log contains everything. You will be presented with the standard Windows dialog box, asking you what the file should be named and where you want the file to go.

## **6.19 Auto Reporting**

There are two types of reports that may be sent to you automatically. One is a system summary report, which will contain all of the information that is found on the System Summary page. This includes sensor readings and 4-20 mA inputs with a 24 hour minimum, maximum and average calculated, relay status, point level status, flow switch status, water meter totals, and alarms. This report may be sent by email.

The other type of automatic report is a data log report. This report will email a data log file of any parameters that you selected in the Data Logging page. This file may be opened in a spreadsheet for graphing or other data manipulation. This report may be sent on a cyclical schedule or over a specific date range.

### ***System Status Reporting***

Click the appropriate radio button to enable or disable the system status report feature.

### ***Data Log Reporting***

Click the appropriate radio button to enable or disable the data log report feature.

### ***Log File***

Click on the link called Log to manually download the Report log. This log details the date and time of the report, which type of report was sent, how the report was sent (email via modem or email via Ethernet), if the report was sent successfully or not, and if not, what the problem was. You will be presented with the standard Windows dialog box, asking if you want to open the file or save it. If it's to be saved, it asks what the file should be named and where you want the file to go.

### ***System Status Reporting, Send Via***

Click the appropriate radio button to select whether the report should be sent by email.

### ***System Status Reporting, Status***

This menu is informational only, telling you when the next report is due to be sent.

### ***System Status Reporting, Reporting Mode***

Click the appropriate radio button to select a Daily, Weekly, Biweekly, or Monthly report frequency. Type the time of day for receiving the report in the text boxes, and use the pull down menus to select the desired day, and to select AM or PM.

**Important:** If this unit is part of a network of controllers, you must stagger the reports from each controller in the network to occur at least an hour apart. Failure to do so could result in lost reports!

### ***Report Testing***

Click the 'Send a Test Report Now' button to see if the report will be sent correctly. The email address entered in the Communications page will be used. If you haven't already entered this information, go the Communications page and do so before trying a test report.

### ***Data Log Auto Reporting, Reporting Mode***

Click the appropriate radio button to select either a Cyclical report schedule or a Calendar report schedule.

### ***Data Log Auto Reporting, Logging Frequency***

Type the frequency of the data points into the text box.

### ***Data Log Auto Reporting, Log Duration***

If you have selected a cyclical schedule, select a Daily, Weekly, Biweekly, or Monthly report frequency. Type the time of day for receiving the report in the text boxes, and use the pull down menus to select the desired day, and to select AM or PM.

If you have selected a calendar report, select the start date and time, and the end date and time.

**Important:** If this unit is part of a network of controllers, you must stagger the reports from each controller in the network to occur at least an hour apart. Failure to do so could result in lost reports!

### ***Opening a data log file***

To open the data log file using Excel, follow these steps:

Open Excel.

Click Open.

Change the "Look In" to the location of the log file.

Change the "Files of Type" from "Microsoft Excel Files" to "All Files".

Select the log file and click "Open".

A Text Import Wizard will appear. Select the file type as "Delimited" then click "Next".

Select the delimiter as "Comma" then click "Finish".

## 6.20 Graphing/Trending

Recent data may be viewed in a graphic format on-line without downloading it to a computer first, and without opening it in a spreadsheet.

At the top of the page, a selection of boxes will be displayed. Check the box of the parameter that you would like to see graphed. The choices will be any direct sensor input and any 4-20mA input that is being used. Then select the Time Span of the data by selecting it from the pull-down. The choices are Last Hour, Day, 7 Days, 14 Days and 32 Days.

Click the Submit button for the changes to take effect.

The graphs selected will be presented below.

## 6.21 Communications Menu

(only appears if either an Ethernet or a modem option card is installed)

### *Internet Dial Up Account*

#### **Controller ISP User Name**

When the controller needs to dial out and connect to the Internet Service Provider, it needs to identify itself with a user name, so that the ISP knows that it has an account. Type in the text box the user name that the controller will use.

#### **Controller ISP Password**

Similarly, the controller needs to identify itself with a password in order to connect with the ISP. Type in the text box the password that the controller will use. The password can also be changed here.

#### **Primary ISP Phone No.**

Type in the text box the first phone number for the controllers Internet Service Provider. This will be the phone number that it attempts to dial first.

#### **Secondary ISP Phone No.**

Type in the text box the second phone number for the controllers Internet Service Provider. This will be the phone number that it attempts to dial second, if the first number doesn't respond.

#### **Controller Phone No**

When you need to communicate with the controller, you go to the Walchem web site, link to the Webmaster access page, and a call is made from our server to the controller to wake it up. Type in the text box the phone number for the line to which the Webmaster is connected. Use the pull down menu to select the country where the controller is located.

### *Email*

#### **Email 1<sup>st</sup> Address**

When the Webmaster needs to send an email for notification of an alarm condition, or to send out a scheduled report, this is the first email address that it will use. Type in the text box the address to which you want the controller to send emails.

**Email 2nd Address**

If the emails need to be sent to more than one address, enter the second address in this text box.

**Email 3rd Address**

If the emails need to be sent to more than one address, enter the third address in this text box.

**Email 4<sup>th</sup> address**

If the emails need to be sent to more than one address, enter the fourth address in this text box.

***Cell Phone Text Message***

The email message above is in html format and will not be displayed correctly on a cell phone. The cell phone text message email will be truncated. Data log and summary reports are not sent to these addresses, only alarm emails.

**1<sup>st</sup> Address – 4<sup>th</sup> Address**

Type in the text box the addresses for a text message to be sent. Up to four addresses are available.

**SMTP IP Address**

In order for the controller to send an email, the email must first be routed to the SMTP IP address that the Internet Service Provider specifies. Obtain this address from your ISP and type it into the text box.

**Controller email Address**

The controller needs to be given an email address, which your ISP uses to identify the controller as having an account, so that the ISP will accept the email that the controller is sending, and route it to the intended recipient. Type in the text box the controller's email address.

**Send Email Via**

If you have both a modem card and an Ethernet card installed, click on the radio button of which you need to use to send an email notification of an alarm condition, or an automatic report.

***Pager*****Primary Pager No.**

If there is a pager that you want to be called in case of an alarm condition, type the telephone number in this text box.

**Primary Pager PIN**

Enter the primary pager's PIN number in this text box.

**Secondary Pager No.**

If there is another pager that should be used in an alarm condition, type the telephone number in this text box.

**Secondary Pager PIN**

Enter the PIN number for the secondary pager in this text box.

**PIN Delay**

Some pagers make you wait for a message to finish before prompting you to dial the PIN number. If the pager requires a pause before dialing the PIN number, type the number of seconds to wait between the answering service picking up and the PIN number being dialed. Any value between 1 and 60 seconds is acceptable.

**Controller ID**

When the controller calls a pager, it will leave a numeric message that is its phone number. You can have the controller dial some numbers attached to the end of the phone number to let you know that this is a controller calling and not some long-lost friend. Type in some code, for example \*999, that will remind you that it is a controller calling.

***Ethernet (LAN)*****Network Mode**

If you have purchased the software to allow networking of controllers via Ethernet, use the pull down arrow to select the role that this controller will serve on the network. If it is not part of a network of WebMaster controllers, select "Independent". If it is the Master, select "Master". If it is the Slave, select "Slave". Once the network mode has been selected, the power to the controller must be cycled in order for the change to take effect.

**Network Detection**

Click on the Detect Network button of the Master Controller and it will look at all of the devices that are connected to it, determine which devices are its slaves, and refresh the Sub-Network frame in the lower left corner of your browser with all of the slaves detected.

**Ethernet IP Address**

When a controller is attached to a network, your IT Administrator needs to assign it an Ethernet IP address. When you want to communicate with the controller from your PC on the network, you go to your Browser and type in the controller's address. Type that address into the text box.

**Ethernet IP Netmask**

When a controller is attached to a network, your IT Administrator must also assign the IP Netmask. Type the number assigned in the text box.

**Ethernet Gateway**

When a controller is attached to a network, your IT Administrator must also assign the Gateway. Type the number assigned in the text box.

***Direct Serial Connection (RS232)*****RS232 Serial IP Address**

In order to communicate with the controller via a laptop or nearby PC connected to the serial port on the front panel, you need to start your Browser software, and type in this address.

***Direct Modem Connection (Point to Point)*****Direct Modem IP Address**

This menu is information only and tells you the hard coded IP address for the controller when communicating to it via the direct modem to modem method.

## ***ShoulderTAP® Internet Connection***

### **Dialup Connection Status**

This menu is informational only, and tells you what is happening with the dialup connection. Possible status messages include:

#### **Message**

- Off Line
- Dialing xxx-xxxx
- No Dial Tone
  
- No phone number
  
- Connecting to ISP
  
- On Line
- Checking for Upgrade
  
- Connection Timeout in xxxxx sec

#### **Explanation**

The controller is not connected.  
The controller is dialing out to the ISP.  
The controller can not dial out due to phone line or modem problems.  
There is nothing entered in the ISP Phone No. field.  
The controller is successfully negotiating a connection with the ISP.  
The controller is now on the Internet.  
The controller is communicating with our server to see if a software upgrade is available.  
Once the Internet connection process is complete. The number of seconds displayed depends upon the value entered in the Dialup Connection Lifetime text box described below.

### **Dialup Dynamic IP Address**

This menu is informational only, and tells you the IP address of the last person to contact the controller.

### **Last Dialup Date and Time**

This menu is informational only, and tells you when the controller was contacted last. Click on the “Submit” button to save the changes.

### **Dialup Connection Lifetime**

This menu allows you to set a time limit on the Internet connection if no changes have been made. This will help control the cost of operating the controller if you forget to log off. Type in the text box the number of minutes that you want to pass by before disconnecting the Internet connection. Entering a connection lifetime of “0” means the connection will never timeout.

### **Manual Internet Dialup**

Click on the Connect button to manually test the WebMaster’s ability to successfully dial out and connect with your ISP. This is convenient on installation, or to troubleshoot Internet connection problems. The Dialup Connection Status field will display what is happening as described above. Once you see that the Dialup Connection Status is “On-line”, you may disconnect the controller from the Internet by clicking the Disconnect button.

## ***Modem Access Log***

Click on the link to view the modem access log file. You will be prompted to either open the file (.csv format, normally opened in a spreadsheet) from its current location or to save the file to disk. Make your selection. The file will display the date and time of all modem connections, the type of connection (ShoulderTap or Direct Modem) if the attempt was a success or a failure, and if it failed, what the failure mode was.

## 6.22 Advanced Comms

### *Internet Dialup Account*

#### **Wait for dial tone before dialing**

Click to place a check in the box if you want the modem to wait for a dial tone before calling out. In some countries the dial tone may not be recognized. If the modem will not recognize the dial tone, uncheck the box.

#### **Modem Baud Rate**

Click on the arrow of the pull-down to select different modem baud rates. The WebMaster modem is 38400. Normally there will be no reason to change the baud rate. The baud rate may be reduced if the controller is having problems at the higher speed due to poor phone line conditions. In the future, external modems may be supported that may not have the same baud rate.

#### **ISP Authentication Method**

Click on the arrow of the pull-down to select between Custom Script Authentication and ETS PAP Authentication. The custom scrip will work fine with many ISPs, however some ISPs require PAP protocol when the controller logs in. If this is the case, select ETS PAP.

#### **Use ASMTTP for email**

Click to place a check in the box if your ISP requires authenticated simple mail transfer protocol for its emails

### *Common Network Settings*

#### **DNS IP Address**

This text box contains the address of a valid Domain Name Server, which allows the WebMaster to send the emails using the name of the email server rather than the numeric SMTP IP address. This DNS IP address should never need to be changed, unless the server is experiencing problems.

#### **Modbus Key**

In order to activate the Modbus feature, a key code must be entered here. Contact the factory for more information. If you have purchased the controller with the Modbus feature, it will already be activated and no further action will be necessary.

#### **Subnet Key**

In order to activate the Sub networking feature, a key code must be entered here. Contact the factory for more information. If you have purchased the controller with the Sub networking feature, it will already be activated and no further action will be necessary.

### *Sub-Network Settings*

#### **Mapped Internet IP Address**

If you are accessing the master controller by using NAT to translate a real IP address to a fake IP address, then type the real IP address into this field of the master controller..

## ***ShoulderTAP® Internet Connection***

### **Dialup Connection Status**

This menu is informational only, and tells you what is happening with the dialup connection. Possible status messages include:

#### **Message**

- Off Line
- Dialing xxx-xxxx
- No Dial Tone
  
- No phone number
  
- Connecting to ISP
  
- On Line
- Checking for Upgrade
  
- Connection Timeout in xxxxx sec

#### **Explanation**

The controller is not connected.  
The controller is dialing out to the ISP.  
The controller can not dial out due to phone line or modem problems.  
There is nothing entered in the ISP Phone No. field.  
The controller is successfully negotiating a connection with the ISP.  
The controller is now on the Internet.  
The controller is communicating with our server to see if a software upgrade is available.  
Once the Internet connection process is complete. The number of seconds displayed depends upon the value entered in the Dialup Connection Lifetime text box described below.

## ***WaveComm Wireless Antenna Setup***

### **Antenna Setup**

Before attempting to run the antenna setup, make sure that the dialup status is “Off Line.” Click the Start Setup button. It will prompt you to verify that you really want to start the setup. Click Yes and the setup will begin. Click on End Setup when you have finished. The dialup status should return to “Off Line.”

### **Signal Strength**

This field will display the actual modem response string from the wireless modem.

### **Suggestion**

This field will tell you whether the signal strength is Good, or if its Bad and you should try to relocate the antenna.

## **6.23 Configuration Menu**

If many of your boiler applications are nearly identical, you can save a lot of time in the set up by downloading a typical configuration file to your hard drive, and later uploading the configuration file to another controller.

### ***Export UCF***

In order to transfer the User Configuration File (UCF) from the WebMaster to your computer, click the Export UCF link. You will be presented with the standard Windows dialog box to download a file. Click the radio button to Save this file to Disk, then click OK. Select the location where you want the file to be saved, change the name of the file if desired, then click Save. The file is only around 14KB, so it should be transferred relatively quickly. Click Close to close the dialog box.



The exact sequence of events and wording within the dialog box will vary depending upon the operating system (Windows 95, 98, NT, 2000, etc.) on your PC.

### ***Browse***

In order to transfer a previously saved UCF from your computer to this WebMaster, first click the Browse button to locate the file on your computer. A "Choose File" dialog box will open. Click on the correct file, then click Open.

### ***Import UCF***

Once the file name is displayed in the Browse text box, click the Import UCF button to transfer the file to the WebMaster.

## **6.24 Notepad**

The configuration Notepad gives you a place to make notes regarding any changes that you have made to the set points, to document calibrations, system upsets or anything else that you want to note. Simply type your message into the text box.

## **6.25 Access Code Menu**

There are three levels of access code protection. If the *Master* password is used in the WebMaster Authentication page, then any set point can be changed. If the *Calibration Level* password is used in the Authentication page, then sensor calibrations will be allowed, but other changes will not. If the *Read Only* password is used the user will be able to look at any page, but will not be allowed to make any changes.

In order to change the access code for each level of access, type the present password into the text box, then type the new password in the text box below. Type the new password again in the lowest text box to verify that the new password has been correctly entered.

The default user name is "webmaster" and the default passwords are "2001" for full access, "2002" for calibration only and "2003" for read only. These defaults can and should be changed to assure security.

### **Change User Log-in Name**

You may also change the user name for logging into the WebMaster. Type the new user name into the text box.

### **Download Access Log**

Click the link to View Log File. The Modem Access Log will tell you when the controller was accessed. It will show you the date and time of access, the method of access, the user name used, the IP address of the computer used for access, and the level of access code used (or that the attempt failed).

A window will open to ask if you would like to open the file or save it to disc. Select the method you would like to use. The file is a basic text file with a .log extension that may be opened in any word processing program (Word, Notepad, etc.).

## **6.26 Software Upgrades** (only appears if a newer revision of software is available)

Whenever you connect to the WebMaster via an Internet connection, it will check to see if any software upgrades are available. If there are, then the Software Upgrade page link will appear. Note that this can only occur if the controller is connected to the Internet, either through a modem or an Ethernet card.

If there is a newer version of software that you would like to load into your controller, then you can upgrade to the latest revision.

Click on the link “More Info on Software Upgrade” to see what features have been added.

Click on the link “Start Software Upgrade” in order to download the new version to the controller. Note: Control is suspended during a software upgrade. If the controller being updated is a slave on a network of WebMasters, both the master controller and the slave being updated will have control suspended during the upgrade process. Depending upon the extent of the changes and Internet traffic, the upgrade can take anywhere from 15 minutes to 2 hours to complete.

## **6.27 WebMaster Help**

The Help link is active whenever the controller is on-line on the Internet. This will bring you to an on-line copy of the instruction manual and eventually to an on-line troubleshooting guide. Note that if you are communicating to the controller via any other method, where it is not on the Internet, the help link will not be functional.

## **6.28 Walchem Home Page**

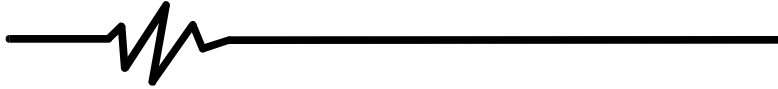
Click on this link to go directly to the Walchem web site, where you can find the latest instruction manuals, technical data sheets, email help, or to surf to another WebMaster.

## **6.29 Sub-Network**

Once you have created a network of two or more WebMaster controllers using Ethernet cards (see Figure 9 B for wiring), purchased the Master Capability software for the master controller, defined the master unit as the master and slave units as slaves (see section 6.27) in the Communications page, and given each controller unique Ethernet IP addresses in the Communications page, then the links under Sub-Network will be active.

To navigate between controllers on the sub-network, start by logging onto the master controller. This may be via RS232, Ethernet or modem. Once connected to the master, click on a link to the slave. The link will be given the custom name of the controller from the Startup page. The first time you connect to the slave in a given session, you will need to log on with that controller’s user name and password. After that, you will be able to bounce from one controller to another without logging on again.

## 7.0 MAINTENANCE



The WebMaster controller requires very little routine maintenance. The electronic enclosure only needs to be wiped down with a damp cloth to keep it clean. All other maintenance involves cleaning and calibrating sensors, described in detail below.



**CAUTION!** The W700 inner hinged face panel is secured with Phillips (#1) screws, which require a tool to open. No user adjustments are inside. This panel should only be opened by trained maintenance personnel.

### 7.1 Conductivity Sensor Cleaning and Calibration

#### Contacting Conductivity

The frequency of cleaning for the contacting conductivity electrode varies with each installation. The best way to determine the frequency is to compare the reading of the controller to the reading of a calibrated hand held instrument. When the two readings differ by an amount that you deem to be excessive (perhaps 5%), then it time to clean and recalibrate the electrode. The frequency should be every 2-3 months or so.

To clean the contacting conductivity electrode, close the isolation valves to stop sample flow. Remove the electrode from the pipe.

For loose coatings, wipe with a cloth. For removal of scale, dip in a dilute hydrochloric or gallic acid solution, and rinse.

For oils (including fingerprints!) wash with a detergent.

Replace the electrode in the pipe. Note that the conductivity electrode should be placed with the hole facing the direction of flow. Open the isolation valves, and inspect for leaks.

After cleaning, it is necessary to recalibrate the electrode. This is only accurate when the electrode is installed in the piping.

## 7.2 Replacing the Fuses

**CAUTION:** Disconnect power to the controller before opening the front panel!

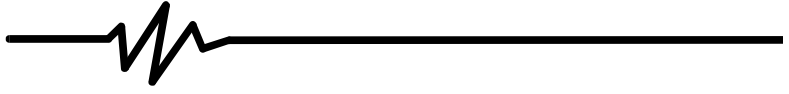
Locate the fuses on the relay interface board on the lower left side of the back of the controller enclosure. See figure 5, Identification of Parts. Gently remove the old fuse from its retaining clip. You can verify that the fuse has been blown by measuring continuity between the ends of the fuse using an ohmmeter. If it is blown, discard. Press the new fuse into the clip, secure the front panel of the controller, and return power to the unit.

**Warning!** Use of non-approved fuses can affect product safety approvals. Specifications are shown below. To ensure that UL/CSA and CE product safety certifications are maintained, it is recommended that a Walchem fuse be used.

<b>Fuse</b>		<b>Walchem P/N</b>			
F1	Protects Input	102833	5 x 20 mm	1.6 amp	250 V
F2	Protects Boiler B and Boiler D relay outputs	102834	5 x 20 mm	6.3 amp	250 V
F3	Protects Boiler A and Boiler C relay outputs	102834	5 x 20 mm	6.3 amp	250 V

Note: For models with voltage codes 6,7 or E, the Feed/Alarm relays are dry contact and are not fused.

## 8.0 TROUBLESHOOTING



### 8.1 ERROR MESSAGES

#### *Conductivity Calibration Failure*

This error message occurs after calibration of the conductivity sensor. A clean sensor should give a predictable signal in a solution of known conductivity. If the calibration adjusts the signal more than 50% away from the predicted value, the calibration will fail. A signal this far off indicates a problem with the reading, and is not normal.

#### **Possible Causes**

Dirty sensor.

Sensor cable disconnected.

Problem with hand-held instrument

Faulty sensor.

Faulty sensor interface circuit board  
(if Boiler A conductivity).

Faulty sensor option circuit board  
(if Boiler B, C or D conductivity).

#### **Corrective Actions**

Clean sensor as described in Section 7.1 above.

Reconnect cable.

Refer to the troubleshooting guide for the hand held instrument used to determine the system conductivity.

Replace sensor.

Replace the sensor interface board.

Replace the sensor option board.

#### *Blowdown Time Out*

This error message indicates that the blowdown relay output has been activated for an amount of time that exceeds the user-programmed maximum allowable time. The blowdown output relay will be forced off until the “Reset Time out” button found in the Bleed Output Page is clicked.

#### **Possible Causes**

Maximum blowdown time is set too low for the normal circumstances

System conductivity was higher than the normal.

Insufficient pressure differential.

Control direction is set incorrectly.

#### **Corrective Actions**

Go to the Blowdown Output Page and increase programmed value for the maximum blowdown time.

Go to the Blowdown Output Page and increase programmed value for the maximum bleed time until the conductivity is brought back down to normal levels.

Check for closed or broken valves, plugged lines, etc.

The normal control direction for a boiler is “Force Lower”. Go to the Blowdown Output Page and check the setting for the control direction.

Faulty blowdown valve.	Repair or replace valve.
Fuse blown.	Replace fuse (F2 for Boiler C or D, F3 for Boiler A or B).
Faulty blowdown valve wiring.	Correct wiring.
Faulty blowdown relay.	Replace the relay interface board.

### ***Feed Time Out***

This error message indicates that the feed relay output has been activated for an amount of time that exceeds the user-programmed maximum allowable time. The feed output relay will be forced off until the “Reset Time out” button found in the Feed Output Page is clicked.

#### **Possible Causes**

Maximum feed time is set too low for normal circumstances.

#### **Corrective Actions**

Go to the Feed Output Page and increase the programmed value for the maximum feed time to reflect normal circumstances.

You are feeding in proportion to bleed time, and bleed time is excessive.

See above troubleshooting for Bleed Time Exceeded.

You are feeding based on makeup volume, and you are getting false contacts.

Go to the Water Meter Input Page and verify that the makeup water total is increasing even when the makeup water is not flowing. Disconnect the water meter cable from the controller and verify that the feed makeup water total stops increasing. Route the water meter cable away from any AC voltage and make sure that the cable is shielded.

### ***System Conductivity High Alarm***

This error message indicates the conductivity reading exceeds the user-programmed maximum allowable value.

#### **Possible Causes**

Programmed value is too close to conductivity set point.

#### **Corrective Actions**

Go to the Conductivity Input Page and make sure that the high alarm limit is set at least 5% above the set point.

Blowdown line is plugged.

Clean blowdown line.

Control direction is set incorrectly.

The normal control direction for a boiler is “Force Lower”. Go to the Blowdown Output Page and check the setting for the control direction.

Faulty blowdown valve.

Repair or replace the blowdown valve.

Fuse blown.	Replace fuse (F2 for Boiler C or D, F3 for Boiler A or B).
Faulty blowdown valve wiring.	Correct wiring.
Faulty blowdown relay.	Replace the relay interface board.

### ***System Conductivity Low Alarm***

This error message indicates the conductivity reading is below the user-programmed minimum allowable value.

#### **Possible Causes**

Dirty conductivity electrode.

Sample is flashing to steam

Faulty conductivity electrode wiring.

Faulty conductivity electrode.

No sample flow.

Blowdown valve stuck open.

#### **Corrective Actions**

Clean and calibrate the conductivity sensor as described in Section 7.1 above. If calibration fails, see troubleshooting for Conductivity Calibration Failure above.

Close valve downstream from electrode. If the reading increases to normal, flashing is occurring. Look for obstructions upstream of the electrode, or increase backpressure downstream of the electrode.

Correct wiring.

Replace sensor.

Check all valves in blowdown line.

Repair or replace blowdown valve.

### ***Drum Level Low Alarm (one for each used)***

This error message appears if either a level switch or level transmitter is putting out a signal that indicates a low level of solution. This could mean that the level switch is either open or closed, or that the level transmitter is indicating a volume below the user-programmed low alarm limit.

#### **Possible Causes**

Low chemical level.

Level switch float is stuck.

Faulty level switch.

Incorrect setting of the low alarm limit for the level transmitter.

#### **Corrective Actions**

Replenish chemical supply.

Clean level switch.

Remove level switch from drum and verify that the switch opens and closes as the float is moved up and down.

Go to the Level Input Page and make sure that the Low Alarm Limit is set for the correct value.

Faulty level switch or transmitter wiring.	Correct wiring. Make sure that the level sensor is attached to the same input as the one which is defined for that drum in the Level Input Page.
Incorrect setting of “Drum empty when switch is open/closed” menu.	Go to the “Level Input Page and verify that the “Drum empty when switch is” menu is set for the proper selection. You can check the operation of the switch by measuring between the two wires with an ohmmeter. If there is continuity between the wires when the float is all the way down, the select “closed”.
Incorrect setting of the “Empty mA” menu.	Go to the Level Input Page and make sure that the Empty mA setting matches the actual mA of the transmitter when the tank is empty.
Faulty digital input option circuit board.	If the switch is functioning, and it is wired correctly, and the settings are correct, replace the digital input board.
Faulty 4-20 mA input option circuit board.	If the level transmitter is putting out a mA signal above the low alarm limit (as measured by an ammeter) and is wired correctly, replace the 4-20 mA input option board.

***Pump Failure (one for each monitored)***

This error message appears if contact closures from the PosiFlow flow monitor are expected but are not detected by the digital input option circuit board.

**Possible Causes**

Metering pump has lost prime.

Faulty metering pump.

Faulty metering pump wiring.

Faulty PosiFlow wiring.

Faulty PosiFlow sensor.

Blown fuse.

Faulty output relay.

**Corrective Actions**

Re-prime metering pump.

Repair or replace metering pump.

Correct wiring.

Correct wiring. Make sure that digital input the PosiFlow is connected to is defined as the expected pump PosiFlow input in the PosiFlow Page.

Replace PosiFlow sensor.

Replace fuse F3 for feed or biocides, F2 for pH, ORP or dispersant)

Replace relay interface board.



Faulty digital input option circuit board.

Verify that PosiFlow is making contact closures using an ohmmeter. If OK, and connected properly, replace digital input option board.

### ***Corrosion Monitor High Alarm***

This error message is caused by the 4-20 mA signal from the corrosion monitor exceeding the user-programmed value for the high alarm limit.

#### **Possible Causes**

The corrosion rate is too high.

The high alarm limit is set too low.

The corrosion monitor is not calibrated correctly.

The corrosion monitor is faulty.

#### **Corrective Actions**

Determine the cause for the high corrosion rate and correct it.

Go to the Corrosion Page and increase the high alarm limit.

Go to the Corrosion Page and make sure that the “4 mA =” and “20 mA =” values are set to the corrosion rates at which the corrosion monitor will put out 4 mA and 20 mA.

Repair or replace the corrosion monitor.

### ***Corrosion Monitor Sensor Error***

This error message is caused by the 4-20 mA signal from the corrosion monitor being less than 3.9mA or greater than 21 mA.

#### **Possible Causes**

Faulty transmitter.

Faulty wiring between transmitter and analog input option circuit board.

Faulty analog input option circuit board.

#### **Corrective Actions**

Make sure that the transmitter is functioning by measuring the output using an ammeter. If the output directly from the transmitter is less than 4 mA, the transmitter is the problem.

Repeat the measurement of the transmitter output at the 4-20 mA input option board terminal strip. If this is less than 4 mA, then the wiring is faulty. Also make sure that the wires are attached to the correct terminals as defined in the 4-20 mA Input Page. For example, if 4-20 mA Input 3 is defined as a corrosion input, make sure that the wires are connected to Input 3. Make sure that the + and – signals are connected to the correct terminals.

Replace the 4-20 mA input option board.

***“Other 4-20 mA Input” High Alarm (one for each, use name defined)***

This error message is caused by the 4-20 mA signal from a device other than a level transmitter, water meter, or corrosion monitor exceeding the user-programmed value for the high alarm limit.

**Possible Causes**

The process value being measured by the transmitter is out of specifications

The high alarm limit for the process being measured is set too low.

There is a problem with the transmitter that needs to be addressed by the manufacturer of the transmitter.

**Corrective Actions**

Determine the reason for the out of spec condition.

Increase the high limit in the Other 4-20 mA Input Page.

***“Other 4-20 mA Input” Low Alarm (one for each, use name defined)***

This error message is caused by the 4-20 mA signal from a device other than a level transmitter, water meter, or corrosion monitor being lower than the user-programmed value for the low alarm limit.

**Possible Causes**

The process value being measured by the transmitter is out of specifications.

The low alarm limit for the process being measured is set too high.

There is a problem with the transmitter that needs to be addressed by the manufacturer of the transmitter.

**Corrective Actions**

Determine the reason for the out of spec condition.

Decrease the low limit in the Other 4-20 mA Input Page.

***Conductivity Sensor Error***

This error message is caused by the signal from the conductivity sensor being outside of the normal range (input voltage outside  $-1.45$  VDC to  $+1.45$  VDC or a conductivity reading above 32,000 microS/cm). The bleed relay will be forced off. .

**Possible Causes**

The conductivity is extremely high (over 32,000  $\mu$ S/cm).

Faulty sensor interface (Boiler A) or sensor option circuit board (Boilers B-D).

**Corrective Actions**

Go to the Conductivity Input Page and check the uncalibrated conductivity reading. Compare this to a calibrated hand held instrument.

Go to the Conductivity Input Page and perform a self test. If this passes, then the problem is with the sensor or its wiring. If it fails, then disconnect the sensor from the circuit board and try the self test again. If it still fails, replace the circuit board.

Faulty conductivity sensor wiring.

Make sure that the sensor cable is connected properly, and there are no shorts in any extension cables. Also make sure that the sensor cable is not routed near any AC voltage wiring. Make sure that the cable is properly shielded.

Faulty conductivity sensor.

Replace sensor.

### ***Temperature Sensor Error***

This error message is caused by the temperature signal being outside the normal range (around 1,000-1,800 ohms for contacting sensors). The blowdown relay will be forced off.

#### **Possible Causes**

Faulty temperature sensor wiring (part of the system conductivity sensor).

#### **Corrective Actions**

Measure the temperature signal using an ohmmeter between the green wire and the green/white wire as close to the sensor as possible, with the wires disconnected from the terminal strip. This should be around 1,000 ohms at 78 F, 25 C for a standard electrode. If OK, check this again at the terminal strip of the circuit board. If OK, make sure that the wires are connected firmly to the correct terminals.

Faulty conductivity sensor.

If you measure resistance outside the acceptable range directly from the sensor, replace the sensor.

Faulty sensor interface (if system conductivity) or sensor option (if makeup conductivity) circuit board.

Go to the Conductivity Input Page and perform a self test. If this passes, then the problem is with the sensor or its wiring. If it fails, then disconnect the sensor from the circuit board and try the self test again. If it still fails, replace the circuit board.

### ***Conductivity sensor calibration time***

Normal condition; programmed calibration reminder time has elapsed

### ***Other 4-20 mA Input Sensor Error***

This error message is caused by a 4-20 mA input signal that is less than 3.9 mA or greater than 21 mA.

#### **Possible Causes**

Faulty transmitter.

#### **Corrective Actions**

Make sure that the transmitter is functioning by measuring the output using an ammeter. If the output directly from the transmitter is less than 4 mA, the transmitter is the problem.

Faulty wiring between transmitter and analog input option circuit board.

Repeat the measurement of the transmitter output at the 4-20 mA input option board terminal strip. If this is less than 4 mA, then the wiring is faulty. Also make sure that the wires are attached to the correct terminals as defined in the 4-20 mA Input Page.

Faulty analog input option circuit board.

Replace the 4-20 mA input option board.

### ***Boiler B, C or D Conductivity Board Failure***

This error message is caused by a failure of the controller to recognize that the option circuit board is connected. This error will force the blowdown relay off.

#### **Possible Causes**

Poor connection of the option board to the sensor interface board

Faulty sensor input board.

#### **Corrective Actions**

Remove the option board and inspect both mating connectors for corrosion or damage. Reinstall the option board.

Replace the sensor input board.

### ***4-20 mA Input Board Failure***

This error message is caused by a failure of the controller to recognize that the option circuit board is connected. If using a 4-20 mA type water meter, then bleed/feed output will be forced off.

#### **Possible Causes**

Poor connection of the option board to the relay interface board.

Faulty 4-20 mA input board.

#### **Corrective Actions**

Remove the option board and inspect both mating connectors for corrosion or damage. Reinstall the option board.

Replace the board.

### ***Digital Input Board Failure***

This error message is caused by a failure of the controller to recognize that the option circuit board is connected. If utilizing the Interlock feature, then any outputs that are set to deactivate in case of an Interlock condition will be forced off.

#### **Possible Causes**

Poor connection of the option board to relay interface board.

Faulty digital input board.

#### **Corrective Actions**

Remove the option board and inspect both the mating connectors for corrosion or damage. Reinstall the option board.

Replace the board.

### ***Modem Failure***

This error message is caused by a failure of the controller to recognize that the option circuit board is connected.

#### **Possible Causes**

Poor connection of the option board to the core board.

Faulty modem board.

#### **Corrective Actions**

Remove the option board and inspect both mating connectors for corrosion or damage. Reinstall the option board.

Replace the board.

### ***Ethernet Card Failure***

This error message is caused by a failure of the controller to recognize that the option circuit board is connected.

#### **Possible Causes**

Poor connection of the option board to the core board.

Faulty Ethernet board.

#### **Corrective Actions**

Remove the option board and inspect both mating connectors for corrosion or damage. Reinstall the option board.

Replace the board.

### ***Temperature High Alarm***

This error message is caused by the temperature signal from the conductivity sensor exceeding the user-programmed value for the high alarm limit.

#### **Possible Causes**

The actual water temperature is too high.

The programmed value is set too close to the normal operating temperature.

The temperature sensor has lost calibration.

Faulty circuit board.

Faulty temperature sensor.

#### **Corrective Actions**

Correct problem with boiler or sample cooler.

Go to the Temperature Input Page and increase the high alarm limit.

Go to the Temperature Input Page and calibrate the temperature.

Go to the Temperature Input Page and perform a self test. If the self test fails, then the sensor input board (if Boiler B-D) or the core interface board (if Boiler A) should be replaced.

If a successful calibration is not possible, the temperature sensor is probably faulty, and the sensor should be replaced.

## ***Temperature Low Alarm***

This error message is caused by the temperature signal from the conductivity sensor being below the user-programmed value for the low alarm limit.

### **Possible Causes**

The actual water temperature is too low.

There is no water reaching the sensor.

The programmed value is set too close to the normal operating temperature.

The temperature sensor has lost calibration.

Faulty circuit board.

Faulty temperature sensor.

Poor connection of temperature wires.

### **Corrective Actions**

Correct problem with boiler.

Check all valves, blowdown line.

Go to the Temperature Input Page and decrease the low alarm limit.

Go to the Temperature Input Page and calibrate the temperature.

Go to the Temperature Input Page and perform a self test. If the self test fails, then the sensor input board (if Boiler B-D) or the core interface board (if Boiler A) should be replaced.

If a successful calibration is not possible, the temperature sensor is probably faulty, and the sensor should be replaced.

Excessive resistance from extension cables or poor connections can lower the temperature reading. Clean & tighten all connections to the temperature sensor.

## 8.2 PROBLEMS THAT DON'T GENERATE AN ERROR MESSAGE

### *Submit buttons do not appear on any page*

You have logged in using a Calibration level or Read Only level password. Only the Master level password allows changes to be made.

### *Links to Boiler B, C or D pages do not appear*

The controller not detecting the input option board at power up causes this problem.

#### Possible Causes

No sensor input board is installed in the Boiler B, C or D position.

Loose option board connection.

Faulty sensor input board.

#### Corrective Actions

Install a sensor input board in the Boiler B, C or D position.

Remove power to the unit.  
Push board onto pins and turn power on.

This should cause a "Input Board Failure" error message but this can be cleared once the power is cycled. Replace the sensor input board.

### *Temperature calibration, high/low alarm menus missing from Temperature Input page*

The controller not detecting the temperature sensor (which is embedded in the conductivity sensor) at power up causes this problem.

#### Possible Causes

The conductivity sensor is not connected.

Faulty conductivity sensor.

#### Corrective Actions

Connect the system conductivity sensor and turn power on.

Measure the temperature signal using an ohmmeter between the green wire and the WHT/GRN wire as close to the sensor as possible with the wires disconnected from the terminal strip. If the reading is infinite ohms, replace the conductivity sensor.

### *Link to 4-20 mA Output page does not appear*

The controller not detecting any 4-20 mA output boards at power up causes this problem.

#### Possible Causes

No 4-20 mA output boards are installed.

Poor connection of the 4-20 mA output board.

#### Corrective Actions

Install one or more 4-20 mA output boards and turn power on.

Remove the option board and inspect both mating connectors for corrosion or damage  
Reinstall the option board on turn power on.

### ***Link to Level page does not appear***

The controller not detecting either a digital input board or an analog input board at power up causes this problem.

#### **Possible Causes**

No digital or analog input board is installed.

Poor connection of the option board.

#### **Corrective Actions**

Install the desired option board and turn power on.

Remove the option board and inspect both mating connectors for corrosion or damage  
Reinstall the option board on turn power on.

### ***Link to Digital Inputs page does not appear***

The controller not detecting a digital input board at power up causes this problem.

#### **Possible Causes**

No digital input board is installed.

Poor connection of the option board.

#### **Corrective Actions**

Install the digital input option board and turn power on.

Remove the option board and inspect both mating connectors for corrosion or damage  
Reinstall the option board on turn power on.

### ***Link to Analog Inputs page does not appear***

The controller not detecting an analog input board at power up causes this problem.

#### **Possible Causes**

No analog input board is installed

Poor connection of the option board

#### **Corrective Actions**

Install the analog input option board and turn power on.

Remove the option board and inspect both mating connectors for corrosion or damage  
Reinstall the option board on turn power on.

### ***Link to Software Upgrade page does not appear***

This is a normal situation if your WebMaster controller has the latest revision of software installed. When a new version of software becomes available, the link will appear, you will be able to see a description of the changes, and will have the option to download it if you want.



## 8.3 CONNECTION PROBLEMS

### *“The page cannot be displayed message” on your browser*

This is a standard Microsoft Internet Explorer message when a web page cannot be located.

#### Possible Causes

Connection has timed out.

Connection to your ISP has been lost.

#### Corrective Actions

Return to web site and reconnect to the WebMaster. Go to the Communications page and make the Dialup Connection Lifetime longer, if desired.

Reconnect to your ISP and then reconnect to the WebMaster.

### *Invalid Session message instead of a page loading*

#### Possible Causes

Session has timed out.

You’ve left the WebMaster pages to other Web sites and have been gone longer than 2 minutes.

#### Corrective Actions

Click the “log in” link, and log in again. Increase session timeout in the Access Code page if desired.

Click the “log in” link, and log in again.

### *Live data never loads*

#### Possible Causes

You selected “Work Offline”

You have changed pages before the first page has finished loading.

Your browser doesn’t support Java.

#### Corrective Actions

Establish an Internet connection.

Open a new browser session and type in the address from the original browser. Wait for it to finish loading before changing pages.

Use Microsoft Internet Explorer 5.0 and make sure that Microsoft VM is installed and activated (done in Tools, Internet options, Advanced tab).

### *Pages load slowly*

The time required for pages to load depend upon the amount of information contained in the page, the processing speed of your computer, the amount of RAM available in your computer, and the method of connecting (Ethernet, Internet, or direct serial connection). We recommend a minimum processor speed of 100 MHz, and minimum RAM of 40 MB.

If connecting over the Internet, then your modem speed and the amount of Internet traffic come into play as well. The WebMaster modem is 33K baud, so if your PC’s modem is 33K baud or higher, the numbers below should be valid, given light Internet traffic.

In general, this is what you should expect:

<u>Type of Page</u>	<u>Connection Method</u>	<u>Time to Load</u>
First page loading after log in	Ethernet	30-90 seconds
System Summary, 4-20 Input, Start Up, Datalog, Comms	Ethernet	7-25 seconds
Other pages	Ethernet	3-10 seconds
First page loading after log in	Direct Serial	30-90 seconds
System Summary, 4-20 Input, Start Up, Datalog, Comms	Direct Serial	22-35 seconds
Other pages	Direct Serial	7-14 seconds
First page loading after log in	Internet	30-90 seconds
System Summary, 4-20 Input, Start Up, Datalog, Comms	Internet	13-20 seconds
Other pages	Internet	4-8 seconds

## 9.0 SERVICE POLICY



The WebMaster Series Controllers have a 2-year warranty on electronic components and a 1-year warranty on mechanical parts (keypad, terminal strip and relays). Conductivity sensors and pH/ORP electrodes have a 1-year warranty *against manufacturing defects only*.

We stock replacement parts for immediate exchange after we have isolated the cause of a problem.

Factory authorized repairs that are received via next-day-air will be returned within 24 hours. Normal turnaround time for returns is two weeks.

Out of warranty repairs are done on a flat fee basis.