



**PULSAFEEDER
MODEL 3210**

**MICROPROCESSOR-BASED
CONDUCTIVITY CONTROLLER**

INSTALLATION & OPERATION MANUAL

SERIAL #: _____

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1 1.0 Introduction

The PULSAblue 3200 Series is a microprocessor based, menu driven, water treatment controller designed for use in cooling towers, chill loops, boilers and condensate systems. The PULSAblue 3200 Series provides for conductivity tracking and control, flow monitoring and chemical injection. The PULSAblue 3200 Series can be operated with or without the use of the conductivity input. The PULSAblue 3200 Series is NTL/CSA, and CE approved.

The PULSAblue 3200 Series uses the latest in microprocessor capability, giving the user a high level of application flexibility. A large illuminated graphics screen, multiple inputs, and an intuitive menu characterize this new technology.

Security features allow full access to programming features or restrict access to viewing only. An operator password can help ensure that only authorized personnel will operate the system.

The PULSAblue 3200 Series is user-friendly with a graphical screen, numeric keypad, LEDs for power, alarm and relay status. It accepts multiple inputs and is easily configured. It's a combination of reliability, accuracy, security and simplicity.

1.1 FEATURES

- Controller can be used for Cooling towers, Chill loops, Boilers, and Condensate systems
- Removable power cord and receptacles for conduit installations. Enclosure is rated NEMA 4X
- Four user configurable relays for conductivity control and chemical addition. These relays can be configured in multiple ways including scheduled feed for biocide addition
- Two (2) water meter inputs, two drum switch inputs, conductivity input, flow switch input, 4-20 mA output and remote conductivity input via 4-20 mA are all standard features.
- Designed with a single circuit board for high reliability and lower cost.
- Large open shallow enclosure for easy wiring.
- Ball valve delay feature allows accurate control of motorized ball valves.
- Heavy-duty stainless steel domed numeric keypad and illuminated graphical display allow for quick and easy programming. Steel domed switches improve the tactile sensing and life expectancy of the keypad.
- The PULSAblue 3200 Series controller stores all setpoints, calibration values, and relay configurations in an EEPROM. An EEPROM does not require a battery to retain information, so if power is lost these values will be retained for years. The 3200 Series includes a capacitive backup device to retain information such as water meter totals, and clock and calendar information. The capacitive backup device will never need to be replaced and will hold data approximately 1 day after each power failure.

1.2 BENEFITS

- Easy to program, the PULSAblue 3200 Series Controller uses an intuitive menu and programs identical to the PULSAblue 3300 Series controllers.
- Controller can be removed from a cooling tower and be placed in another type of application when used with the appropriate conductivity sensor and plumbing assembly.
- No add-on options. 4-20mA output, 4-20mA input, and biocide features are standard.

2 Specifications

Conductivity range

50-10,000 μS for Cooling Towers; 500-8000 μS for Boilers; 10-100 μS for condensate.

Conductivity sensor

2 electrode

Conductivity Resolution

$\pm 10 \mu\text{S}$ (conductivity < 5000 μS)
 $\pm 100 \mu\text{S}$ (conductivity > 5000 μS)

Temperature comp.

Automatic (except boiler sensors)

Accuracy & repeatability

$\pm 1.0\%$ of scale

Deadband/Setpoint

User programmable

Auto/Manual outputs

Menu selectable

Keypad

16 tactile steel-dome push buttons

Display

Illuminated 128 x 64 pixel LCD

Drum Switch Inputs

2 digital contact inputs

Water meter inputs (2)

Contact head, paddle wheel or turbine

Timer

Max. blowdown time exceeded.
 Relay run time exceeded .

Input Signal

One 4-20 mA, non-isolated, internally powered Input.

Output Signal

One 4 – 20 mA, isolated or non-isolated optionally powered output for conductivity.

Output relays

3 selectable use, 1 blowdown

Relay ratings

3A each, 10A total

Power

120/240 VAC 50/60 Hz 6W

Ambient temp

32° - 140°F (0 - 60°C)

Storage temp

-4° - 150°F (0 - 60°C)

Sensors/Plumbing	Cooling Tower	Boiler	Condensate
Max Pressure	140 psi (9.65 bar) @100°F	600 psi (41.3 bar)	70 psi (4.8 bar)
Max Temp	140°F (60°C)	486°F (252°C)	392°F (200°C)
Min flow	1 gpm (3.785 Lpm), 5 gpm max	Varies w/orifice plate	1 gpm (3.785 Lpm)

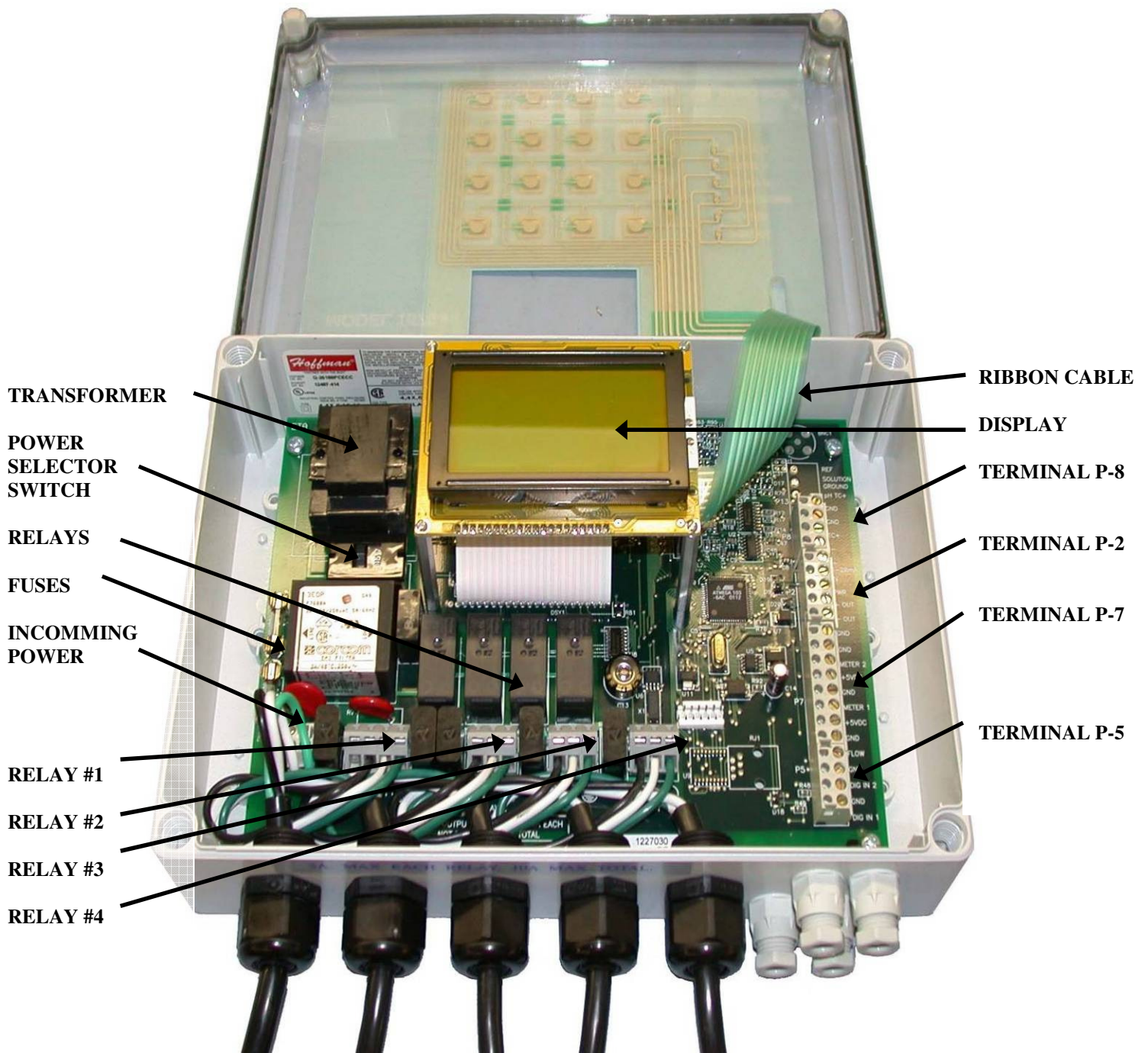


Figure 1: PULSablue 3200 Series Enclosure

3 Unpacking, Mounting and Installation

3.1 Unpacking

Inspect the shipping carton for obvious external damage. Note on the carrier's bill-of-lading the extent of the damage, if any, and **notify the carrier**. Save the shipping carton until your PULSAblue 3200 Series controller is started up.

- ☎ **If shipping damage has occurred, call the Pulsafeeder Customer Service Department at (800) 333-6677 and return the controller to the factory in the original carton.**

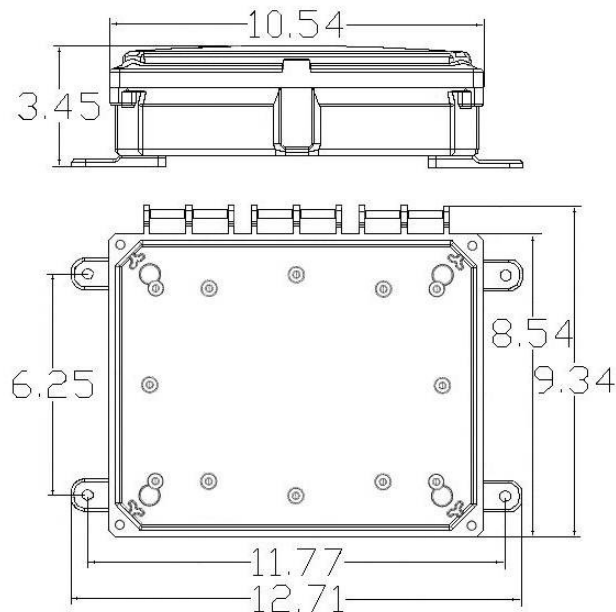
3.2 Mounting the Enclosure

The PULSAblue 3200 Series is supplied with four mounting holes in the enclosure and four mounting feet. The PULSAblue 3200 Series can be mounted to a panel or to a flat non-vibrating wall. There are two methods for mounting the enclosure to a wall or a panel.

The first method is to insert the mounting feet into the hole at each corner of the enclosure and use screws to attach the feet to the panel or wall.

The second method is to remove the front of the enclosure from the controller and insert screws through the holes at each corner of the enclosure.

The dimensions of the enclosure in inches are:



The PULSAblue 3200 Series has a shipping weight of less than 5 lbs.

4 Plumbing Installation

4.1 Cooling Tower Plumbing

PLUMBING MATERIALS

- Inlet plumbing can be ¾ inch (1.9 cm) PVC, CPVC, or iron pipe.
- Provide at least 1 gpm (3.79 Lpm) to the sensor. A 4-psi (0.3 bar) differential pressure from take-off to injection is sufficient. If flow is marginal, consult your Pulsafeeder Factory Representative. The maximum recommended flow is 5 gpm (18.93Lpm).
- Outlet plumbing can be ¾ inch (1.9 cm) PVC, CPVC, or iron pipe. PVC, CPVC Schedule 80 is recommended for strength and sunlight protection.
- If iron pipe is used, install a PVC union to relieve the stress on the plumbing.
- The sample line inlet should be plumbed downstream of the recirculating pump and upstream of the heat exchanger. This line brings the sample water into the sensor plumbing for conductivity measurement. If the Pulsafeeder flow switch plumbing assembly is used, this flow of water also pushes the flow switch float up to activate the relay outputs of the controller.

NOTE: FOR YOUR CONVENIENCE, INCLUDE A PULSAFEEDER PULSABLUE 9102 SAMPLE LINE SHUT-OFF VALVE AND A SAMPLE VALVE SPOUT (AS SHOWN) IN THE INLET FLOW PLUMBING.

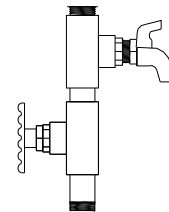


Figure 2:

PULSAbLue 9102 Valve & Spout

- The sample line outlet flow (solution/sample line) should be plumbed to the tower return line or the tower basin, where you can insert your chemical feed system. Refer to the suggested installation drawing in the back of this manual for an example of a typical installation.
- Remember to install isolation and bypass valves so that maintenance can be performed.

WARNING: NEVER INJECT CHEMICALS UPSTREAM OF THE CONTROLLER FLOW CELLS!



If you have questions or need assistance, call Pulsafeeder Technical Service Department at (800) 333-6677, Monday-Friday, 7:30 a.m. - 5:00 p.m. EST.

WARNING: SOME CHEMICALS MAY HAVE TO BE INJECTED DIRECTLY INTO THE COOLING SYSTEM WATER LINE AND NOT INTO THE SAMPLE LINE. CONTACT YOUR WATER TREATMENT SPECIALIST FOR SPECIFIC RECOMMENDATIONS.

NOTE: IF THE SOLUTION/SAMPLE LINE IS RETURNED TO THE COOLING TOWER RETURN LINE, USE A CORPORATION STOP (PULSAFEEDER PULSABLUE 9160), A SOLUTION LINE INJECTOR OR A DISPERSING PIPE . THIS AIDS CHEMICAL-WATER MIXING AND ENHANCES WATER TREATMENT CONTROL CAPABILITIES.

4.2 Boiler Plumbing

There are two methods of automatic control of the conductivity in a boiler; sample/cycle and continuous sample. To decide if you should use continuous sample or sample/cycle control, determine your blowdown rate requirement. If your boiler requires greater than 1000 pounds per hour of blowdown to maintain conductivity then the continuous sample method should be used. If your blowdown requirement is less than 1000 pounds per hour, the sample/cycle method is appropriate.

The PULSAblue 3200 Series can be used for either sample/cycle control or continuous sample control of the conductivity in the boiler. The installation drawing in the back of this manual shows how to plumb the boiler sample line so that it can be used as sample/cycle or continuous sample.

To prevent steam flashing and damage to the controller refer to the installation drawing in the back of the manual and notes below.

- Use piping from the boiler skimmer line as the sample and blowdown line.

NOTE: DO NOT USE THE BOTTOM BLOWDOWN OUTLET AS THE SAMPLE OR AUTOMATIC BLOWDOWN LINE.

- The maximum allowed wire distance between the controller and the sensor is 20 ft unless the 4-20 mA input is used.
- If using conduit between the sensor and controller, allow a place for water to escape if the sensor leaks. This will help prevent water damage to the controller.
- Use orifice plates or globe valves to prevent steam flash. The orifice plates or the globe valve should be mounted within 5 feet of the sensor. Orifice plates (or globe valve) and the sensor must be installed horizontally (as shown in the drawing).
- The sensor should be located at least two feet **below** the water level in the boiler.
- Ensure that there are no restrictions between the skimmer line and the orifice plates (or globe valve) and all valves upstream of the boiler sensor are fully open.
- Be sure to provide isolation valves in the sample line to allow for maintenance of the sensor.

NOTE: DO NOT RUN THE SENSOR WIRING IN THE SAME CONDUIT AS THE MOTORIZED VALVE WIRING.

4.3 Condensate Plumbing

Pulsafeeder recommends that the conductivity sensor be mounted per the drawing in the back of this manual. The sensor is mounted vertically to remove any air bubbles, which may otherwise collect around the sensor tip. Avoid connections in “dead leg” sections of pipe. An air pocket around the electrode tips will cause erroneous readings. The sensor electrodes should be in direct contact with the process flow.

4.4 Sensor Mounting

The conductivity sensor should be mounted in the horizontal position (except for the condensate sensor). When using the plumbing with the Flow Switch, be sure that the dome is in the upright position. Avoid connections in “dead leg” sections of pipe. An air pocket around the electrode tips will cause erroneous readings. The sensor electrodes should be in direct contact with the process flow. The water flow should be in the upward direction for cooling tower sensor and the condensate sensor. The flow should be in the downward direction for the boiler sensor.

5 Electrical Installation

5.1 Incoming Power 115/230 VAC

The PULSAblue 3200 Series can be powered from either 115 VAC or 230 VAC at 50/60 Hz. There is a power selector switch located in the upper left-hand corner of the control board. To select the appropriate voltage, simply slide the switch from one position to the other with a small screwdriver.

The PULSAblue 3200 Series controller comes with a power cord and female molded receptacles for the blowdown valve and chemical pumps. The power cord and receptacles are rated for 115VAC. If the controller will be powered by 230 VAC, the power cord and receptacles will need to be removed and the incoming power and the relay outputs will need to be hard-wired.

The incoming power is connected to terminal block P1 at the bottom left corner of the control board. There is a hot or line input (L1), a neutral input (N) and an earth ground input (⊕). Refer to the drawing in the back of this manual for wiring instructions.

5.2 Relay Outputs

The relay outputs are of the same voltage as the power input. Ensure that the devices that are to be connected to the relay outputs are of the same voltage rating or damage will occur.

The relay outputs are wired to the female molded receptacles. The molded receptacle on the far left is relay #1 and the molded receptacle on the far right is relay #4. If 115 VAC is used simply plug your devices into the molded receptacles. If 230 VAC is used, remove the receptacles and hard-wire your devices to the relay outputs.

Relay #1 has both a normally open and normally closed contact. This is designed for use with a motorized blowdown valve. The normally open (NO) contact is connected to the open connection of the valve and the normally closed (NC) contact is connected to the close connection of the valve. The other three relays only have a normally open contact. Each relay output has a neutral (N) connection and an earth ground connection (⊕) connection.



To operate the terminal blocks to remove or add wiring, insert a small screwdriver into the slot above each wiring connection and pry upward while removing or inserting the wire.

Refer to the drawing in the back of this manual for wiring instructions.

5.3 Flow Switch Wiring

The PULSAbblue 3200 Series has a flow switch input. The purpose of the flow switch input is to disable the relay outputs on a loss of flow in the system. The flow switch input requires a digital contact. Any digital contact rated for 24 VDC and 500 mA may be used, such as a relay driven by the recirculating pump. Pulsafeeder manufactures a flow switch plumbing assembly for use with the PULSAbblue 3200 Series.

If a flow switch is not used then a jumper must be installed across the flow switch connections. Refer to the drawings in the back of this manual for wiring instructions.

5.4 Sensor Wiring

The PULSAblue 3200 Series uses the Pulsafeeder two electrode conductivity sensors. These sensors can be wired directly or a 4-20 mA device can amplify them. The maximum recommended wiring distance for sensors without a 4-20 mA device to amplify them is 20 feet.

Direct wired sensors are wired directly to the P8 terminal block on the upper right corner of the control board. Refer to the drawing in the back of this manual for wiring instructions for each of the available Pulsafeeder conductivity sensors.

Sensors that are amplified by a 4-20 mA device are wired to terminal block P2. The PULSAblue 3200 Series controller powers this 4-20 mA device. Refer to the drawing in the back of this manual for wiring instructions for the 4-20 mA input.

5.5 Water Meters

The PULSAblue 3200 Series will accept two water meter inputs. These inputs can be configured for make-up, make-up Second Source, Bleed, or Chill Loop make-up. Refer to the water meter manufacturer's manual for plumbing information.

The 3200 Series controllers will work directly with the following types of meters: dry contacting head meters, Seametrics open collector output meters, Signet 2535 and 2540 paddle wheel meters, and the Autotrol 1 inch and 2 inch meters. Contact Pulsafeeder for other types of water meters. The water meters are wired to terminal block P7 on the right-hand side of the control board. Refer to the drawing in the back of this manual for wiring instructions.

5.6 Drum Switch Inputs

The PULSAblue 3200 Series will accept two drum switch inputs. The drum switches are wired to terminal block P5. The drum switch input requires a digital contact. Any digital contact rated for 24 VDC and 500 mA may be used. Refer to the drawing in the back of this manual for wiring instructions.

5.7 4-20 mA Output Wiring

The PULSAblue 3200 Series has one 4-20 mA output for conductivity. This output can be isolated or non-isolated, externally powered or internally powered. If the 4-20 mA output is internally powered then it is non-isolated. If the 4-20 mA output is externally powered then it is isolated.

The 4-20 mA output is wired to terminal block P2 on the right-hand side of the control board. Refer to the drawing in the back of this manual for wiring instructions.

5.8 4-20 mA Input Wiring

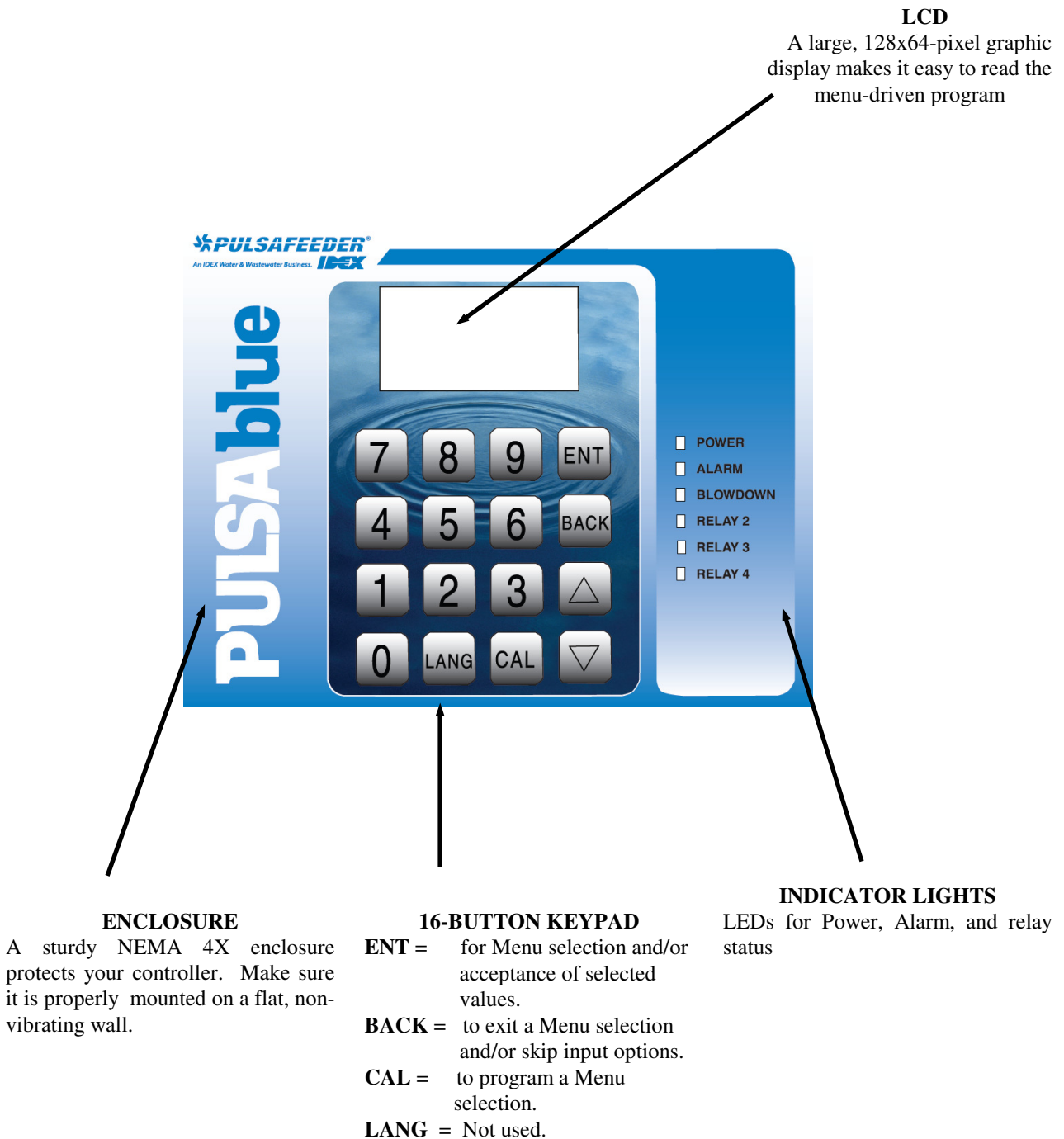
The PULSAblue 3200 Series can accept a 4-20 mA input as the conductivity input. The conductivity sensor is wired to a 4-20 device and the device is wired to terminal block P2 on the right-hand side of the control board. This input is a non-isolated input and the controller powers it. Refer to the manufacturer instructions for wiring of the 4-20 mA device.

A PULSAblue 3205 conductivity controller with a 4-20 mA output works very well as the 4-20 mA input device for the PULSAblue 3200 Series conductivity.

Refer to the drawing in the back of this manual for wiring instructions.

6 Functional Overview

Figure 3: PULSAbblue 3200 Series Front Panel with Display



6.1 Display

The PULSAbblue 3200 Series uses an illuminated 128x64-pixel LCD digital display for ease of viewing. It has multiple lines to display information such as the conductivity reading, alarms, relay status, relay configuration, clock, flow rates and total flow for both water meters, and menu selections.

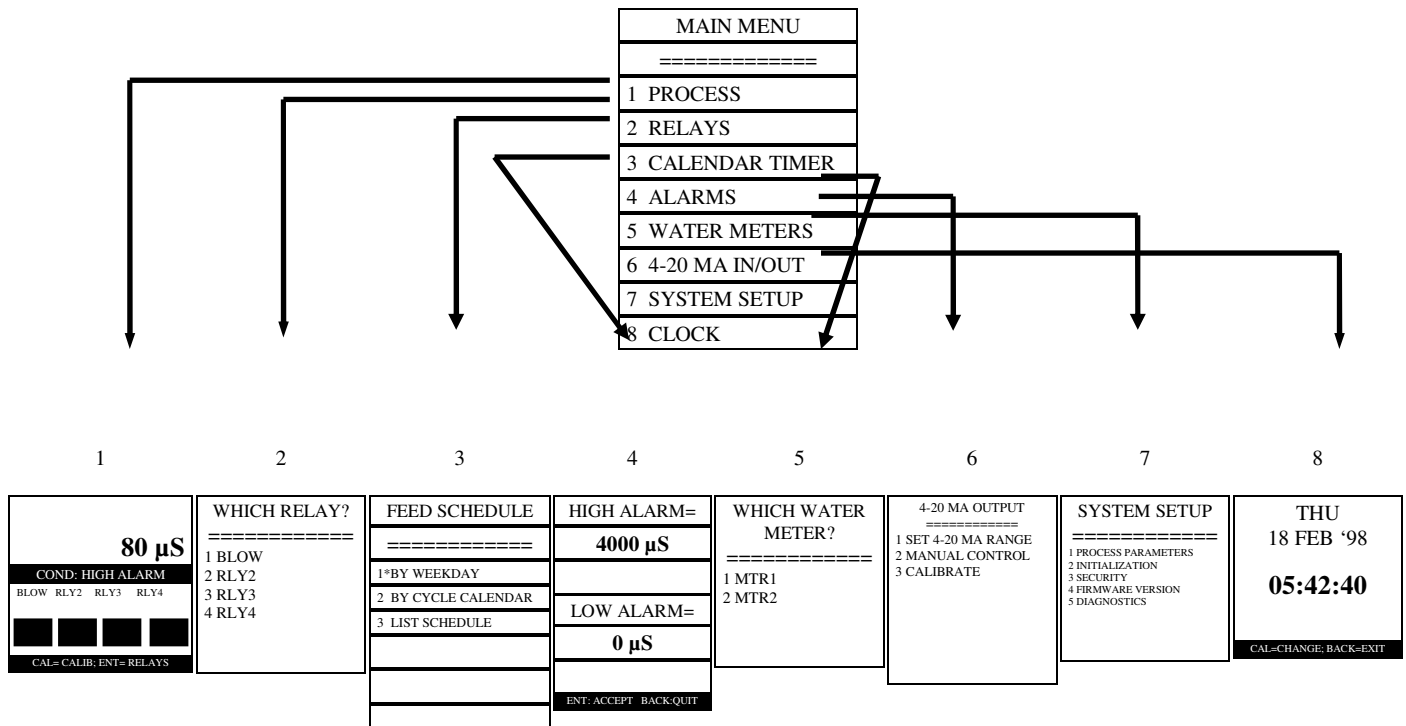
6.2 Keypad

The PULSAbblue 3200 Series uses a 16-key steel-domed numeric keypad for ease of programming. The keys have the following functions:

ENT	To accept a setting or to enter a screen.
BACK	To exit a screen or to access the main menu.
CAL	To calibrate the controller.
LANG	Not used.
UP arrow	To move about in the menu.
DOWN arrow	To move about in a menu.
Number keys	To input a value or to select a menu item.

6.3 Menu

The PULSAbblue 3200 Series is programmed and calibrated by the use of a menu. The complete **Main Menu** has 8 available options that can be accessed in the **Technician Level**. However, a list of only six options can be viewed at one time. Use the **↑** and **↓** keys to scroll through the options. As an introduction, here is a graphic overview of the first level of each option in the **Main Menu** to see how it operates. Complete details of each option are provided later in this manual.



6.4 Security Levels

The PULSAblue 3200 Series has a security level to prevent tampering of the controller. This security level is called View Only. When the controller is in the View Only security level, the menu is locked out. There are two things that can be done while in View Only; the relays can be operated manually and all of the process screens can be viewed.

There is a password associated with the view only security level. The default password is 2222. If the controller is in the view only mode just press 2222 on the keypad. This password can be changed in the main menu.

7 Starting Up the Controller

Once the Installation is complete it is time to start up the controller.

Initiate sample flow to the controller by opening the sample line isolation valves. Check for leakage.

Power up the controller by either turning on the circuit breaker or plugging the power cord into a 120 VAC receptacle.

It is best to initialize the whole controller to remove any settings that may be in the memory before programming the controller. Refer to section 6.5.7.1 of this manual to initialize the controller.

If conductivity will not be used with this controller, disable the conductivity input. Refer to section 6.5.7.1.4 of this manual.

If the conductivity input will be coming from a 4-20 mA device enable the 4-20 mA input by following section 6.5.6.2.

If conductivity is used and it is not coming from a 4-20 mA device set up the cell constant and temperature compensation for the sensor. Follow sections 6.5.7.1.1 and section 6.1.7.1.2 respectively.

If this controller will be used in a boiler application, enable the anti-flashing in section 6.5.7.1.3.

Set the clock by following section 6.5.8.

Set the high and low conductivity alarms by following section 6.5.4.

Configure the relays for operation by following section 6.5.

Calibrate the conductivity by following section 6.3

Verify operation of the controller before leaving the area.

8 Operation of the Controller

8.1 Process Screen

The screen that is used the most in the 3200 Series controller is the Process Screen. Below are the process screen views. The process screen has three sections. The top section shows the conductivity reading. The alarm bar is the middle section and appears between the top and bottom sections. It is solid in appearance and flashes showing the current active alarms in sequence if there are multiple alarms. The bottom section has user selectable

1 - DATE SCREEN

0 μs
ALARM BAR
3 MAR '98
11:55:04
PRO=CALIB; ENT=RELAYS

* There are many different screens available in the **PROCESS** screen. These screens allow you to view the units settings (incl. time setting, relay set-ups, flow rates, total flow, etc.) without the danger of altering them. Access these screens by using the **↑** and **↓** keys to scroll through the available screens.

* Press “**ENT**” to manually enable a relay for testing or troubleshooting purposes.

* Press “**PRO**” to calibrate the conductivity.

2 - ALL RELAY SCREEN

0 μs
NO FLOW
BLOW RLY2 RLY3 RLY4
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
PRO=CALIB; ENT=RELAYS

5 - RELAY 2,3,4 SETTINGS

0 μs
HIGH CONDUCTIVITY
RLY4:
DISABLED
<input type="checkbox"/>
PRO=CALIB; ENT=RELAYS

8 - MTR1 FLOW RATE

0 μs
LOW CONDUCTIVITY
MTR1 FLOW RATE=
0
PRO=CALIB; ENT=RELAYS

3 - BLOW SETPOINT SCREEN

0 μs
OPENED TC
BLOW:SETPOINT=
2500 μs
PRO=CALIB; ENT=RELAYS

6 - MTR1 TOTAL FLOW

0 μs
DRUM LEVEL #2
MTR1 TOTAL FLOW=
0
PRO=CALIB; ENT=RELAYS

9 - MTR2 FLOW RATE

0 μs
RELAY #3 TIMEOUT
MTR2 FLOW RATE=
0
PRO=CALIB; ENT=RELAYS

4 - RELAY 2 SETTINGS

0 μs
BLOWDOWN TIMEOUT
RLY2: BY MTR2 METER
FEED AFTER GALS/LTRS=
0 FOR 00:00 MM:SS
PRO=CALIB; ENT=RELAYS

7 - MTR2 TOTAL FLOW

0 μs
SHORTED TC
MTR2 TOTAL FLOW=
0
PRO=CALIB; ENT=RELAYS

When conductivity is disabled the top half of the screen will look like this.

<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
BLOW RLY2 RLY3 RLY4

8.2 Manual Operation of the Relays

All four of the relays can be operated manually. To manually operate the relays:

Go to the **Process** screen. Press “**ENT**”. You will be taken to a screen that looks like:

AUTO-MANUAL (5 MINS.)	
(1) BLOW	<input checked="" type="checkbox"/>
(2) RLY2	<input type="checkbox"/>
(3) RLY3	<input type="checkbox"/>
(4) RLY4	<input type="checkbox"/>
Press 1-4; BACK=EXIT	

Press “1-4 “ to manually change the state of that particular relay. If the relay is already on, pressing that number will turn it off. A five-minute countdown timer will start. After five minutes has expired the relay will return to automatic control. A relay that is in manual control will stay in manual control until the five minutes expires even if this screen is exited. The five-minute timer helps to prevent damage to the system if a relay is left in manual. **WARNING: Manual control overrides everything including the flow switch input. Use care when operating relays manually with no flow in the system.**

8.3 Calibration of Conductivity

The conductivity requires periodic calibration. Calibration is usually required after cleaning the sensor.

Calibration should always be performed with the sensor in the piping assembly with good flow past the sensor. It is necessary to have an accurate reading of the blowdown water to properly calibrate the controller. A hand-held conductivity meter that tests the sample works well for this purpose. If a meter that measures ppm is used, refer to the conductivity vs. ppm chart in section 6.3.1 and convert the ppm to an approximate conductivity value.

If the conductivity sensor is connected to a 4-20 mA device, follow the manufacturer instructions for calibrating that device.

If the conductivity sensor is directly wired to the 3200 Series controller follow these instructions for calibration

For cooling towers, condensate and continuous sample boilers

- Ensure that the controller is operating with good flow past the sensor.
- Take a sample of the water and measure with a hand-held conductivity tester.
- From the **PROCESS** screen, press “**CAL**” to enter the calibration screen. Use the keypad to input the conductivity reading from the hand-held. Press “**ENT**”.
- Take another hand-held sample to verify calibration.

For sample/cycle boilers

- Manually energize the blowdown relay. Allow the water to flow past the sensor for a minimum of 60 seconds.
- Take a sample of the water and measure with a hand-held conductivity tester.
- From the **PROCESS** screen, press “**CAL**” to enter the calibration screen. Use the keypad to input the conductivity reading from the hand-held. Press “**ENT**”.
- Take another hand-held sample to verify calibration.
- Restore the blowdown relay to automatic control.

8.4 Main Menu

The **MAIN MENU** of the 3200 Series looks like this:

MAIN MENU	
=====	
1	PROCESS
2	RELAYS
3	CALENDAR TIMER
4	ALARMS
5	WATER METERS
6	4-20 MA IN/OUT
7	SYSTEM SETUP
8	CLOCK

The **MAIN MENU** can be accessed from the **PROCESS** screen by pressing “**BACK**”. If “**BACK**” is pressed and the **MAIN MENU** does not appear, the controller is probably in the **VIEW ONLY** security mode. If the controller is in the **VIEW ONLY** security mode, enter the **TECHNICIAN** security password to be able to access the **MAIN MENU**.

To move about in the menu screen use the **↑** and **↓** keys to highlight the desired option and press “**ENT**” or simply press the number key for the desired option.

Use the “**ENT**” key to accept a setting or to enter a screen. Use the “**BACK**” key to reject a setting or to exit a screen. From anywhere in the menu, pressing “**BACK**” will take you one step closer to the **MAIN MENU**.

Each of the **MAIN MENU** options are discussed in detail later in this manual.

9 Configuring the Relays

To access the relay configuration screen from the **MAIN MENU**, press “**2**” or highlight **RELAYS** and press “**ENT**”. The following screen will appear.

WHICH RELAY? =====
1 BLOW
2 RLY2
3 RLY3
4 RLY4

Select the relay that you want to program.

9.1 Configuring the Blowdown Relay

The blowdown relay can be configured to operate based on a setpoint or based on a water meter input. When the blowdown relay is selected for programming the following screen will appear.

BLOWDOWN RELAY =====
1 BASED ON SETPOINT
2 BASED ON VOLUME

Blowdown can be configured based on a setpoint or based on volume.

9.2 Based On Setpoint

To set up the blowdown relay to operate based on a setpoint, select based on setpoint. The following screen will appear.

BASED ON SETPOINT =====
1 SETPOINT VALUES
2 WHEN TO BLOWDOWN
3 BOILER TIMERS
4 BALL VALVE DELAY

9.3 SETPOINT

In the **SETPOINT VALUES** screen you will set the **SETPOINT**, the **DEADBAND** and the **EXCESS BLOWDOWN TIME** alarm.

The **SETPOINT** is the conductivity value that you are trying to maintain. Check with your water treatment engineer to determine the conductivity setpoint for your system needs.

Follow these instructions to establish the controller's setpoint:

- Press "1" or highlight **SETPOINT VALUES** and press "ENT".
- Use the keypad numbers to enter the proper conductivity setpoint and press "ENT". When finished, you will automatically be moved down to the deadband.

9.4 DEADBAND

After the setpoint is established, the controller's deadband must also be set. "Deadband" refers to the amount of conductivity above and below the setpoint—a range within which the controller will not react. Due to continuous fluctuations in the conductivity level, it is necessary to have this deadband range or stable readings will be difficult to obtain. The Deadband should be a small percentage of the setpoint. Half the deadband amount will be automatically put above the setpoint, and the other half below it.

For example, a conductivity setpoint of 1,000 μS with a deadband of 100 μS would result in the BLOWDOWN relay opening at 1,050 μS and closing at 950 μS .

- Use the keypad numbers to enter the proper deadband setpoint and press "ENT". When finished, you will automatically be switched to the **EXCESS BLOWDOWN TIME** alarm screen.

EXCESS BLOWDOWN TIME

The **EXCESS BLOWDOWN TIME** alarm is designed to notify the operator of a problem in the blowdown system such as, a clogged strainer or the blowdown valve did not open. The blowdown timeout function is strictly a visual alarm feature displayed on the 3200 Series series controller—it **will not close the blowdown valve**. If a relay is configured as an alarm relay, the **EXCESS BLOWDOWN TIME** alarm will energize the alarm relay. To disable this function, simply program 0 hours, 0 minutes.

- Use the keypad numbers to enter the time in hours and minutes before this alarm will appear and press "ENT".

9.5 When to Blowdown

Most applications for cooling towers and boilers will blowdown *above* the setpoint. There are some chill loop systems, however, where a reverse setpoint method is preferred. That is, blowdown occurs *below* the setpoint. In these applications the user will apply a chemical pump to the bleed outlet and feed a chemical to raise the conductivity of a chiller loop. If using this method be sure that the high conductivity alarm is set as high as possible.

- In the **WHEN TO BLOWDOWN** screen, select either "1" **ABOVE SETPOINT** or "2" **BELOW SETPOINT**.

9.6 Boiler Timers

For cooling tower, condensate and continuous sample boiler applications, these timers must remain at zero. In boiler applications where the sample/cycle method is used, times will be entered. A typical sample time is 2 minutes with a cycle time of 1 hour. A short sample time is desired to prevent excessive loss of water and heat. Once the sample time is set, it should never have to be changed again. The cycle time may need to be adjusted based on the steaming rate and make-up water quality.

If in the sample/cycle mode, the conductivity does not rise to the setpoint, the cycle time is probably set for too short of a time and will need to be adjusted to a longer period of time. If the conductivity is always above the setpoint, the cycle time is probably set at too long of a time and will need to be adjusted to a shorter period of time.

The sample time is set in minutes and seconds and the cycle time is set in hours and minutes. Pulsafeeder recommends that you consult your water treatment professional for more information on using these settings.

9.7 Ball Valve Delay

Motorized ball valves require a few seconds to open and close. If the valve is commanded to close before it completes the process of opening, it may enter a state where it is half-open. The ball valve delay feature prevents this from occurring. To use this feature, determine how many seconds it takes to open and close the valve. Use the longest time and round up 1 second. Use this value as your Ball valve delay time. This delay time will also be observed when manually operating the BLOWDOWN relay.

Recommended Delay Times

Valve	Delay Time
Solenoid	0 Seconds
Worcester Actuator	8 Seconds

9.8 Based on Volume

To program the blowdown to be based on volume, select "2" **BASED ON VOLUME** in the **BLOWDOWN RELAY** screen. The following screen will appear.

BASED ON VOLUME
=====

1 BLOWDOWN VOLUME
2 BALL VALVE DELAY

There are two methods available to blowdown based on volume, **TIME LIMITED** and **VOLUME LIMITED**.

With **TIME LIMITED**, the blowdown relay will be on for a specified amount of time after a specified amount of make-up has been received.

With **VOLUME LIMITED**, the blowdown relay will be on until a specified amount of blowdown is met.

After selecting **BLOWDOWN VOLUME**, another screen appears. This screen is the **HOW TO BLOWDOWN** screen. The two choices are: **1 TIME LIMITED** and **2 VOLUME LIMITED**.

If **TIME LIMITED** is selected:

- Select the water meter you want to base blowdown on by pressing "1" for **MTR1**, pressing "2" for **MTR2**, or pressing "3" for the sum of **BOTH** water meters.
- Use the keypad numbers to enter the proper water volume and press "ENT". You will automatically be moved down to the amount of time to blow down in minutes and seconds. Enter the amount of time to blowdown and press "ENT".

If **VOLUME LIMITED** is selected:

- The next screen that appears is **MAKEUP WATER METER?** Select the meter to which your makeup meter is wired and press "ENT".
- Use the keypad to enter the volume of makeup after which you want to blowdown then press "ENT".
- Input the volume of blowdown that you want to blow down then press "ENT".
- The next screen is the **EXCESS BLOWDOWN TIME ALARM** screen. Enter the amount of blowdown time before the **EXCESS BLOWDOWN TIME ALARM** will occur then press "ENT". **This alarm will close the blowdown valve** and it will give an alarm indication on the display. The alarm time is set in hours and minutes. To disable this feature, enter "00:00".

9.9 Configuring Relays 2,3,4

Below is the **RELAY OPTIONS** screen. The asterisk (*) next to one of the options tells you how that relay is configured to feed. Relays 2,3, and 4 can be programmed in each of the methods shown on the RELAY OPTIONS screen.

```
          RLY2
          =====
          1*DISABLED
          2 SETPOINT
          3 WATER METER
          4 PERCENT BLOWDOWN
          5 PERCENT OF TIME
          6 CALENDAR TIMER
          7 ALARM RELAY
```

9.10 Disabled

Relays 2, 3, and 4 can be disabled. When a relay is disabled, it will not energize.

- From the **RELAY OPTIONS** screen press “**1**” **Disabled** to disable the relay.

9.11 By Setpoint

Relays 2, 3, and 4 can be configured to operate based on a setpoint. Refer to section 6.5.1.1 for a description of the setpoint and deadband.

When relays 2, 3, or 4 are configured for setpoint control, **the timeout alarm will shut off the relay when the timeout time expires.**

9.12 Setpoint Values

- From the **RELAY OPTIONS** screen press “**2**” **SETPOINT** to configure the relay as a setpoint relay. This will take you to the **BASED ON SETPOINT** screen.
- Press “**1**” **SETPOINT VALUES**. Use the keypad to enter the **SETPOINT**, press “**ENT**”. Enter the **DEADBAND** value, press “**ENT**”. This will take you to the **TIMEOUT** screen.
- Enter a time for the **TIMEOUT** alarm. The **TIMEOUT** alarm will turn off the relay. Enter “**00:00**” to disable this feature.

9.13 When to Feed

- From the **BASED ON SETPOINT** screen press **"2" WHEN TO FEED**. Select **"1" ABOVE SETPOINT** or **"2" BELOW SETPOINT**. Refer to section 6.5.1.1 **WHEN TO BLOWDOWN** for a description of above setpoint and below setpoint.

9.14 By Water Meter

Relays 2, 3, and 4 can be configured to operate for a specified amount of time based on a specified amount of flow through the water meter inputs. MTR1, MTR2 or the sum of BOTH water meter inputs can activate the relay.

- From the **RELAY OPTIONS** screen press **"3" WATER METER**.
- Select either **MTR1** or **MTR2** or **BOTH** as the trigger for the relay.
- Use the keypad to enter the amount of flow before the relay is activated. Press **"ENT"**.
- Enter the amount of time that the relay will be activated. Press **"ENT"**.

9.15 By Percent of Blowdown Time

Relays 2, 3, and 4 can be activated by a percent of the time that the blowdown was on. The relay will activate after the blowdown shuts off. For example, if 50% is entered and the blowdown relay is on for 10 minutes, the relay will be energized for 5 minutes.

- From the **RELAY OPTIONS** screen, press **"4" PERCENT BLOWDOWN**.
- Use the keypad to enter a percent of blowdown time to activate this relay. Press **"ENT"**.

9.16 By Percent of Time

The Percent of Time feature allows you to feed chemical strictly based by a percent of time. This relay control scheme works in patterns of 20-second time blocks. A relay is on for some multiple of 20 seconds and off for some multiple of 20 seconds. Below is a chart showing some of the operation times for Percent of Time.

Percent	On Time	Off Time
1%	20 Sec	1980 Sec (33m)
5%	20 Sec	380 Sec (6m20S)
10%	20 Sec	180 Sec (3 m)
25%	20 Sec	60 Sec
33%	20 Sec	40 Sec
50%	20 Sec	20 Sec
66%	40 Sec	20 Sec
75%	60 Sec	20 Sec
90%	180 Sec (3 m)	20 Sec
95%	380 Sec (6m20S)	20 Sec
99%	1980 Sec (33m)	20 Sec

Note: In the case of “33%”, once every 66 minutes, the “off” time would extend an extra 20 seconds to make up for the accumulation of the odd % value vs. a 24 hour clock, since the percent of time is based on a 24HR clock in 20 second increments. The same could be said for the “66%” timer, except it will remain “ON” for the additional 20 seconds every 66 minutes.

To determine the total amount of chemical fed over a 24 hour period, multiply the percent of time by the number of hours a day that your controller is operating, then multiply by your chemical pump flow rate per hour.

For example:

We select 10% of the time, our controller operates 24 hours a day and our chemical pump flow rate is 1 gallon per hour.

$$10\% \times \frac{24 \text{ hours}}{\text{Day}} \times \frac{1 \text{ gallon}}{\text{Hour}} = \frac{2.4 \text{ Gallons}}{\text{Day}}$$

- From the **RELAY OPTIONS** screen press **"5" PERCENT OF TIME**.
- Use the keypad to enter the percentage of time desired. Press **"ENT"**.

9.17 By Calendar Timer

The feed schedule is used to feed chemicals such as biocides on a time of day basis. Setting up the feed schedule is a two-part process. The first part is to configure the relay so that it will operate by feed schedule. The second part of the process is to configure the feed schedule. The feed schedule is covered in section 6.5.3.

- From the **RELAY OPTIONS** screen press "6" **CALENDAR TIMER**.

The controller will respond with the following screen.

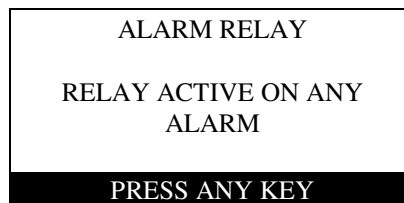


The relay has been configured to operate based on a feed schedule but, the relay will not activate because the feed schedule has not been programmed yet.

9.18 As an Alarm Relay

Relays 2, 3, and 4 can be configured as alarm relays. Any alarm will cause the relay to activate. These alarms include: HIGH CONDUCTIVITY, LOW CONDUCTIVITY, OPENED TC, SHORTED TC, DRUM LEVEL #1, DRUM LEVEL #2, BLOWDOWN TIMEOUT, RELAY #2 TIMEOUT, RELAY #3 TIMEOUT, RELAY #4 TIMEOUT, and the NO FLOW alarm.

- From the **RELAY OPTIONS** screen press "7" **ALARM RELAY**. The controller will respond with the following screen.



NOTE: A relay that is configured as an alarm relay will be activated any time any alarm including the "NO FLOW" alarm is present.

9.19 Setting up the Calendar Timer

Refer to section 6.5.2.6 to configure a relay to feed based on the calendar timer before continuing with this section.

To get to the Calendar Timer menu:

- From the **MAIN MENU** press **"3" Calendar Timer**. You will see the following screen:

```
FEED SCHEDULE
=====
1*BY WEEKDAY
2 BY CYCLE CALENDAR
3 LIST SCHEDULE
```

The feed schedule can be programmed to feed chemicals by either **WEEKDAY** or by a **CYCLE CALENDAR** basis.

BY WEEKDAY is used to feed chemicals by the weekday name, i.e. Monday, Tuesday,

Wednesday etc.. This is a seven-day schedule. At the end of the week, the schedule starts

over again. To configure the feed schedule to feed by weekday:

- From the **"CALANDER TIMER"** screen, press **"1" BY WEEKDAY**.

BY CYCLE CALENDAR is used to feed chemicals by a schedule other than one that is seven days long. **BY CYCLE CALENDAR** can be used to feed the same chemical every day or up to 28 days between feedings. The operator specifies the number of days in the cycle calendar. After the cycle calendar is completed, the schedule starts over again. This method of feeding is particularly useful when feeding two biocides on alternating weekly basis. To configure the feed schedule to feed by cycle calendar:

- From the **"CALANDER TIMER"** screen, press **"2" BY CYCLE CALENDAR**.
- Use the keypad to enter the number of days in your cycle then press **"ENT"**. Remember the maximum number of days allowed is 28.
- Use the keypad to enter which day today is in your cycle. E g. today is day number 5 in my 14 day cycle. Then press **"ENT"**.

After selecting whether the feed schedule will be fed by **WEEKDAY** or by **CYCLE CALENDAR** it is time to actually program the schedule. To enter the actual feed schedule or to edit the feed schedule from the feed schedule screen above:

- Press **"3" LIST SCHEDULE**. This will take you to a list of all scheduled feeds as shown in the screen on the next page.

NOTE: The maximum number of scheduled feeds is 12 (twelve) total.

NOTE: ALL TIMES ARE IN HOURS AND MINUTES

FEED SCHEDULE			
=====			
1	01	03:00	RLY2
2	00	00:00	
3	00	00:00	
4	00	00:00	
5	00	00:00	
6	00	00:00	

- If there are no scheduled feeds, select the first schedule and press "ENT". If you are editing the schedule, select the schedule that you want to edit and press "ENT".

Below is an example screen for programming a chemical feed. Before programming a chemical feed, you need to configure Relay 2, 3, or 4 to be a feed schedule relay.

RELAY (ARROWS)	: NONE
CYCLE DAY	: 0
START TIME	: 00:00
COND SETPOINT	: 0
BLOW DURATION	: 00:00
FEED DURATION	: 00:00
LOCKOUT TIME	: 00:00
<UP><DOWN>ENT: ACCEPT	

- To program the schedule use the keypad to enter the values in the above screen. Press "ENT" to move to the next item.

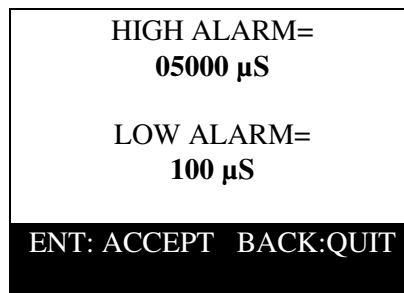
RELAY	is which relay you want to program (you must configure a relay to be a feed schedule relay first). Use the arrow keys to select the available relays.
CYCLE DAY or DAY	is the day you wish to actuate the feed schedule relay.
START TIME	is the time you want to start the feed schedule sequence.
COND SETPOINT	is a pre-bleed setpoint. This would typically be lower than the normal conductivity setpoint. Because the bleed valve will be disabled during a scheduled feed, a pre-bleed will help prevent a build up of tower conductivity. 0 μ S will disable this feature. This feature has no effect when conductivity is disabled.
BLOW DURATION	if the COND SETPOINT is not met within this time, the blowdown will stop and the feed schedule relay will be actuated. If conductivity is disabled, this is the amount of time the controller will blow down during the pre-bleed sequence. Inputting 0:00 will disable this feature. Pulsafeeder recommends that some time be entered if pre-bleed is used.
FEED DURATION	is the amount of time the feed schedule relay will be on.
LOCKOUT TIME	after the feed schedule relay is done, an additional lockout time for the BLOW, 2, 3, and 4 relays can be programmed. The lockout time prevents the other relays from operating until this time expires. Setting this time to 0:00 will disable this feature.

9.20 Alarms

The PULSABlue 3200 Series is equipped with both high and low conductivity alarms. This menu option allows you to program the specific values for these alarms. When a conductivity alarm is received, it will appear as a flashing message in the middle of the display and any configured alarm relays will be activated. Consult your water treatment specialist when determining the proper High and Low Alarm values for your system.

To get to the alarm settings:

- From the **MAIN MENU** press "4" **ALARMS**. Use the keypad to enter a value for the high alarm. Press "ENT".
- Use the keypad to enter a value for the low alarm and press "ENT".
-



HIGH ALARM=
05000 µS

LOW ALARM=
100 µS

ENT: ACCEPT BACK: QUIT

NOTE: The high conductivity alarm will override the normal conductivity setpoint and force a **blowdown**.

9.21 Water Meters

The 3200 Series controllers will work directly with the following types of meters: dry contacting head meters, Seametrics open collector output meters, Signet 2535 and 2540 paddle wheel meters, and the Autotrol 1 inch and 2 inch meters. Contact Pulsafeeder for other types of water meters.

Both water meter inputs are programmed in the same manner.

To get to the water meter configuration screen:

- From the **main menu**, press "5" **WATER METERS**. This will take you to the **WHICH WATER METER SCREEN**.
- Press "1" for **MTR1** or press "2" for **MTR2**.
- The water meters can be configured for gallons or liters. Press "1" for **GALLONS** or press "2" for **LITERS**.
- This will take you to the **WATER METER TYPES** screen as shown below.

WATER METER TYPES	
=====	
1	CONTACTING HEAD
2	PADDLE WHEEL
3	AUTOTROL TURB 1 IN.
4	AUTOTROL TURB 2 IN.

- Use the keypad to select the type of water meter that you are using.

If **CONTACTING HEAD** is selected:

- You will be taken to the **GALLONS OR LITERS PER CONTACT** screen. Use the keypad to enter the number of gallons or liters per contact for your specific meter then press "**ENT**". You will then be asked if you want to reset the total count for that meter to zero. Press "**1**" for **YES** or press "**2**" for **NO**.

If **PADDLE WHEEL** is selected:

- You will be taken to the **K-FACTOR** screen. Use the keypad to enter the K-factor for your particular water meter then press "**ENT**". You will then be asked if you want to reset the total count for that meter to zero. Press "**1**" for **YES** or press "**2**" for **NO**.

If **AUTOTROL TURB 1 IN.** is selected:

- The controller will confirm that the **AUTOTROL TURB 1 IN.** has been selected and you will be asked if you want to reset the total count for that meter to zero. Press "**1**" for **YES** or press "**2**" for **NO**.

If the **AUTOTROL TURB 2 IN.** is selected:

- The controller will confirm that the **AUTOTROL TURB 2 IN.** has been selected and you will be asked if you want to reset the total count for that meter to zero. Press "**1**" for **YES** or press "**2**" for **NO**.

9.22 4-20 mA IN/OUT

The PULSAblue 3200 Series has one 4-20 mA output that is configured for the conductivity.

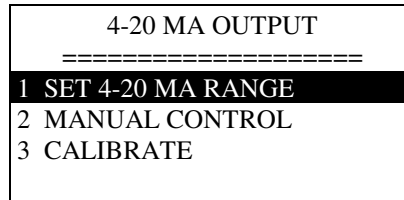
The PULSAblue 3200 Series has a 4-20 mA input that is used for a remote conductivity input to the controller.

9.23 Set Up of the 4-20 mA Output

To set up the 4-20 mA output:

- From the **Main Menu**, press "6" **4-20 mA IN/OUT**.
- Press "1" **4-20 mA OUT SETUP**.

There are three things that can be done from the **4-20 mA Out Setup** screen; set the 4-20 mA range, take manual control of the 4-20 mA output and calibrate the 4-20 mA output. Below is the **4-20 mA Setup** screen.



9.24 Set the 4-20 mA Range

The 4-20 mA output range must be set for the output to be useful.

- From the **4-20 mA Setup** screen, press "1" **Set the 4-20 mA RANGE**.
- Use the keypad to enter a conductivity value for the 4-mA point. Press "ENT".
- Use the keypad to enter a conductivity value for the 20-mA point. Press "ENT".

9.25 Manual Control

Manual control is used to temporarily change the 4-20 mA output.

- From the **4-20 mA Setup** screen, press "2" **MANUAL CONTROL**.
- Use the up and down arrow keys to raise or lower the 4-20 mA output. To exit this screen press "BACK".

9.26 Calibrate

The 4-20 mA needs to be calibrated to the actual output to be accurate. A milliamp meter is necessary to calibrate the 4-20 mA output. Connect the milliamp meter in-line with one leg of the 4-20 mA output. Refer to the drawing in the back of this manual for wiring instructions.

- From the **4-20 mA Setup** screen, press "3" **CALIBRATE**.
- Use the keypad to enter the milliamp reading from the milliamp meter for the **4-mA** point. Press "ENT".
- Use the keypad to enter the milliamp reading from the milliamp meter for the **20-mA** point. Press "ENT".

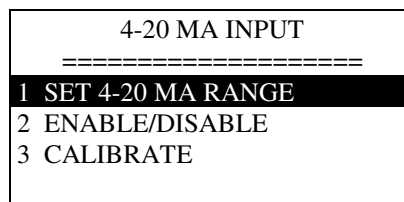
9.27 Set Up of the 4-20 mA Input

The 4-20 mA input is used for a remote conductivity application where the conductivity sensor will be mounted greater than 20 feet from the controller. An external 4-20 mA device is required, and an isolated analog signal conditioner works well for this application. Contact the factory for recommended analog signal conditioners.

To set up the 4-20 mA input:

- From the Main Menu press "6" **4-20 mA IN/OUT**.
- Press "2" **4-20 mA IN SETUP**.

There are three things that can be done from the **4-20 mA IN Setup** screen; set the 4-20 mA range, enable or disable the 4-20 mA input and calibrate the 4-20 mA input. Below is the **4-20 mA INPUT** setup screen.



9.28 Set the 4-20 mA Range

The 4-20 mA input range must be set to the 4-20 mA output range of the 4-20 mA device to be useful.

- From the **4-20 mA IN** setup screen, press "1" **Set 4-20 mA RANGE**.
- Use the keypad to enter a conductivity value for the 4-mA point. Press "ENT".
- Use the keypad to enter a conductivity value for the 20-mA point. Press "ENT".

9.29 Enable/disable

To use the 4-20 mA input, it must be enabled.

- From the **4-20 mA IN** setup screen, press "2" **ENABLE/DISABLE**.
- Press "1" to enable the 4-20 mA input or press "2" to disable the 4-20 mA input.

9.30 Calibrate

The 4-20 mA input needs to be calibrated to the actual input to be accurate. A milliamp meter is necessary to calibrate the 4-20 mA input. Connect the milliamp meter in-line with one leg of the 4-20 mA input. Refer to the drawing in the back of this manual for wiring instructions.

- From the **4-20 mA Setup** screen, press "3" **CALIBRATE**.
- Use the keypad to enter the milliamp reading from the milliamp meter. Press "ENT".

10 The System Setup Menu

The system setup menu is used to set up the cell constant, temperature compensation, anti-flashing, enable or disable the conductivity input, initialize the controller, change the security password, check the firmware version and check the diagnostics.

10.1 Process Parameters

The process parameters screen is used to set up the cell constant, temperature compensation, anti-flashing, and enable or disable the conductivity input.

10.2 Cell Constant

The conductivity sensor has a cell constant associated with it. The cell constant must be set up for the default conductivity value to be close to the actual conductivity.

To set up the cell constant:

- From the Main Menu press "7" **SYSTEM SETUP.**
- Press "1" **PROCESS PARAMETERS.**
- Press "1" **CELL CONSTANT.**
- Use the keypad to enter the cell constant for your conductivity sensor.

Below is a table of the Pulsafeeder conductivity sensor cell constants that can be used with the PULSABlue 3200 Series:

Table #1: Sensor Identification per Application

Application	Sensor P/N's	Description	Cell Constant	Temp Comp.
Cooling Tower	1167157	Sensor with 2 ft of cable	1.000	500 NTC
Cooling Tower	1167158	Sensor with 20 ft of cable	1.000	
Boiler (SR)	1168374	Sensor with 20 ft of cable	0.100	NONE
Condensate	1104591	540K.1-4-10I-10-TC500	0.100	500 NTC
Condensate	1168617	540K.1-4-10R-18-TC500	0.100	
Condensate	1104592	540K.01-4-10I-10-TC500	0.010	
Condensate	1169642	540K.01-4-10R-18-TC500	0.010	

10.3 Temperature Compensation

All Pulsafeeder conductivity sensors are temperature compensated with the exception of the SR type boiler sensor. The temperature compensation for your sensor must be set in the PULSAblue 3200 Series controller. Refer to the table above for the temperature compensation values for the Pulsafeeder conductivity sensors.

To set up the temperature compensation:

- From the Main Menu press **"7" SYSTEM SETUP.**
- Press **"1" PROCESS PARAMETERS.**
- Press **"2" TEMP COMPENSATION**
- Press **"1" for 500 NTC.** Press **"2" for NONE.**

10.4 Anti-flashing

The anti-flashing menu selection inserts a damping circuit value into the conductivity circuit to slow down the rate of change of the conductivity when steam flashing is occurring. The anti-flashing should only be used when the PULSAblue 3200 Series is used with the boiler sensor in a hot sample application.

To set up the anti-flashing:

- From the **Main Menu** press **"7" SYSTEM SETUP.**
- Press **"1" PROCESS PARAMETERS.**
- Press **"3" ANTI-FLASHING.**
- Press **"1" YES** to enable anti-flashing, press **"2" NO** to disable anti-flashing.

10.5 Enable or Disable the Conductivity Input

The PULSAblue 3200 Series can be used with or without the conductivity input. If conductivity is not being used, disable the conductivity input.

- From the **Main Menu** press **"7" SYSTEM SETUP.**
- Press **"1" PROCESS PARAMETERS.**
- Press **"4" ENABLE/DISABLE.**
- Press **"1" YES** to enable the conductivity input or press **"2" NO** to disable the conductivity input.

10.6 Initialization

Initialization restores the factory default settings to the controller. The whole controller can be initialized or just the calibration. It is suggested that you initialize the whole controller before you program the controller. This will clear any random settings that may be in the controller. To do so, follow these instructions:

- From the **Main Menu**, press **"7"** **SYSTEM SETUP**.
- Press **"2"** **INITIALIZATION**.
- Press **"2"** **WHOLE CONTROLLER** and press **"ENT"**. A warning will appear on the screen (see below). Press **"1"** to proceed, **"2"** to cancel.

WARNING: THIS OPTION MAY REQUIRE YOU TO RE-CALIBRATE THE CONTROLLER. ARE YOU SURE? 1 YES 2 NO

To initialize just the calibration:

- Press **"1"** **CALIBRATIONS** instead of **"2"** **WHOLE CONTROLLER** in the procedure above. The same warning screen will appear.

10.7 Change the Security Password

The security password can be changed from the factory default setting of 2222 to any four-digit value that you desire.

To change the security password:

- From the **Main Menu**, press **"7"** **SYSTEM SETUP**.
- Press **"3"** **SECURITY**.
- Use the keypad to enter the old password. If the password has not been changed before, the old password is **2222**.
- Use the keypad to enter the new password.
- Use the keypad to enter the new password a second time for verification

If you lose your password, contact Pulsafeeder for assistance.

10.8 Firmware Version

Sometimes it is necessary to verify the firmware version of the controller for troubleshooting purposes. To get to the firmware version:

- From the **Main Menu**, press **"7"** **SYSTEM SETUP**.
- Press **"4"** **FIRMWARE VERSION**.
- The firmware version will be displayed along with a checksum value. The checksum value is used to verify that the program has not been corrupted. To exit this screen, press any key.

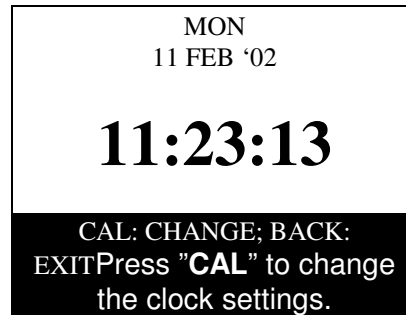
10.9 Diagnostics

The diagnostics screen is used for troubleshooting purposes. Contact Pulsafeeder for assistance.

10.10 Setting the Clock

The clock uses the 24 hour or military time. 06:00:00 is 6 a.m. 18:00:00 is 6 p.m. To set the clock:

- From the **Main Menu** press "8" **CLOCK**. The following screen will appear:



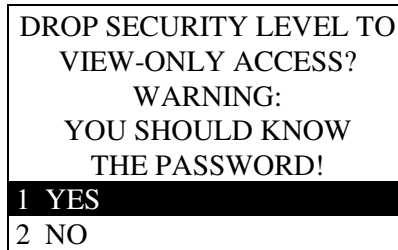
- Use the up and down arrow keys to change the day of the week. Press "**ENT**".
- Use the number keys to change the date. Press "**ENT**".
- Use the arrow keys to change the month. Press "**ENT**".
- Use the number keys to change the year. Press "**ENT**".
- Use the number keys to change the hour. Press "**ENT**".
- Use the number keys to change the minutes. Press "**ENT**".
- Use the number keys to change the seconds. Press "**ENT**".
- Press "**BACK**" to exit this screen.

You must press "**ENT**" all the way through this menu for the settings to take affect.

10.11 Changing the Security Levels

The security level can be change to prevent any unwanted tampering of the controller. To change the security level from **Technician** to **View-Only**:

- From the **Main Menu**, press “0”. (*Note that “0” does not appear on the menu screen.*)



- Select **YES** to change the security level.



The controller menu now functions at the VIEW-ONLY security level.

To return to the **Technician** security level:

- Press the numeric password from the **Process** screen:



Remember that following the first power-up the Technician password is 2222. You may change the passwords in the SYSTEM SETUP menu.

11 Maintenance

Periodic maintenance is required to ensure trouble free operation of the PULSAblue 3200 Series controller. The following sections cover the required maintenance.

11.1 Sensor Maintenance

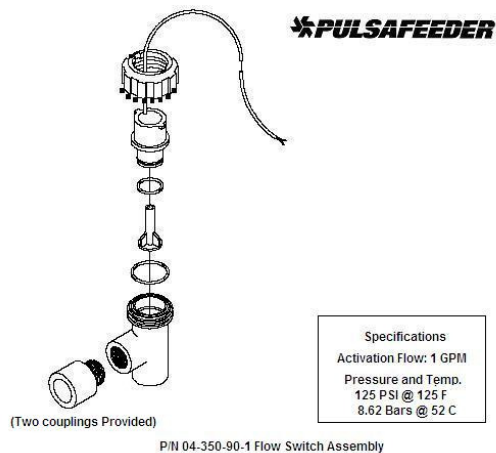
Routine maintenance is necessary in order to maximize the efficiency and accuracy of your sensor. Clean the electrode end of the conductivity sensor at least once per month. Cleaning of the conductivity sensor may need to be performed more frequently if it is in a high fouling environment.

- Remove power from the controller and shut off the sample flow.
- Remove the sensor from its plumbing.
- Use a wire brush to lightly brush the sensor tips. Do not use cloth to clean the sensor tips. Cloth has oils that will foul the sensor.
- If there is oil on the sensor tips, use isopropyl alcohol to clean the tips.
- If there is scale on the sensor tips use a 10% Muriatic or HCL acid to clean the sensor.
- Wash the sensor off with tap water.
- Install the sensor in its plumbing.
- Restore sample flow and check for leaks.
- Restore power to the controller.
- Perform a calibration of the conductivity.

11.2 Flow Switch Maintenance

If you have the flow switch plumbing assembly, you may need to periodically clean the wetted parts in this assembly.

- Shut off the inlet flow and the power to the controller.
- Turn the coupling nut for the flow switch counterclockwise.
- Pull out the red shuttle with your fingers.
- Use a bottlebrush on the shuttle, flowsight and the flow switch assembly to remove any residue.
- Clean and lubricate the “O” ring with a silicone-based lubricant (petroleum-based lubricants will cause the O-ring to swell).
- Tighten down the coupling nut after you replace the components.
- Turn the inlet flow back on and check for leaks.



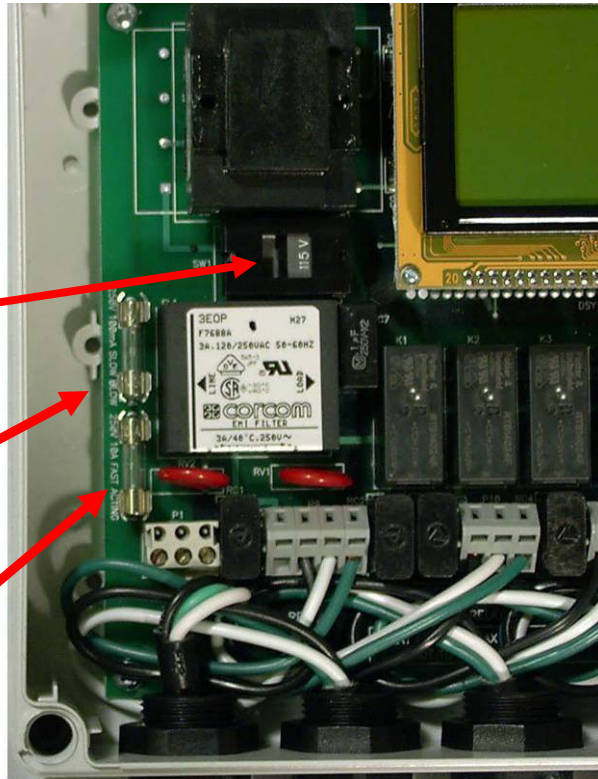
11.3 Replacing the Fuses

The PULSAblue 3200 Series contains a two 5 x 20 mm, European-style fuse. Replacement fuses must be a Schurter 0034.1526, Littlefuse 217.010, or equivalent 10A, 250V, fast blow type for Fuse F1 and a Littlefuse 218.100, Schurter 0034.3107, or equivalent 100mA, slow blow for Fuse F2. If a fuse is blown, the display will be blank when the unit is connected to power. Refer to the troubleshooting section of this manual for more information about blank displays.

115/230VAC power selector switch

100mA, 250V, slow blow fuse

10A, 250V, fast blow fuse



12 Troubleshooting

12.1 Error Messages

This section discusses some of the more common questions with the PULSABlue 3200 Series. These notes are not intended to be all-inclusive—only to cover the most common situations. If you have other questions or are need support, contact the Pulsafeeder Technical Service Department toll free at (800) 333-6677.

PROBLEM	WHAT THIS MEANS	CORRECTIVE ACTION
{Alarm Flashing} “CONDUCTIVITY HIGH”.	Conductivity is too high with respect to the high alarm setpoint. Also opens up Bleed Valve (useful during FEED SCHEDULE lockout).	<ol style="list-style-type: none"> 1. See {BLOWDOWN TIMEOUT}. 2. Change the High Alarm Value.
{Alarm Flashing} “CONDUCTIVITY LOW”.	Conductivity is too low with respect to the low alarm setpoint.	<ol style="list-style-type: none"> 1. Check blowdown setpoint and deadband. 2. Verify blowdown valve is not stuck open. 3. Change the Low Alarm Value. 4. Insure the system is not overflowing.
Water meters not accumulating.	<p>There may be a problem with the wiring or the reed switch in the meter may be bad.</p> <p>For water meters other than the contacting head type, check the manufacturer’s user manual for that particular water meter.</p>	<ol style="list-style-type: none"> 1. Approximately 5 volts DC should be present at the input terminal when the water meter contact is closed. That should change to zero VDC when the contact opens. Check these voltages and for correct wiring. 2. Is the controller configured for your type of water meter?
{Alarm Flashing} “FEED SEQUENCE ACTIVE”.	This simply indicates that a feed schedule relay is active.	No action necessary.
Display is blank.	There may be a problem with the incoming power, the fuses or the circuit board. Open the front panel to troubleshoot.	<ol style="list-style-type: none"> 1. Check the fuse F1. Replace with 5 x 20 mm, 10A, 250V, fast blow fuse. 2. Check the fuse F2. Replace with 5 x 20 mm, 100mA, 250V, slow blow fuse. 3. Does the unit have power? 4. If there is power to terminals AC and ACC on P1, call Pulsafeeder Technical Service for more information.
“NO FLOW” alarm.	Flow input switch is not closed.	<ol style="list-style-type: none"> 1. The flow switch float may be stuck or no flow is present. 2. Flow switch may be bad. Replace reed switch in plumbing assembly. <p>If no flow switch is used, a jumper wire should be installed across the flow switch input. Removing the jumper disables all relay outputs.</p>

PROBLEM	WHAT THIS MEANS	CORRECTIVE ACTION
<p>{Alarm Flashing} “BLOWDOWN TIMEOUT”.</p>	<p>This indicates that the controller has been trying to reduce the conductivity for longer than the user-programmed time and is unable to reach the setpoint.</p>	<ol style="list-style-type: none"> 1. Check for proper operation of the blowdown valve. Use the manual relay control to help. 2. Check that the blowdown valve is not stuck closed or restricted. 3. Check for proper makeup flow. 4. Verify blowdown timeout time is properly set for your application (see item #2 or RELAYS in MAIN menu).
<p>{Alarm Flashing} “OPENED TC”.</p>	<p>Temperature compensator not being properly read.</p>	<ol style="list-style-type: none"> 1. Check wiring. 2. Replace conductivity sensor.
<p>{Alarm Flashing} “SHORTED TC”.</p>	<p>Temperature compensator not being properly read.</p>	<ol style="list-style-type: none"> 1. Check wiring. 2. Replace conductivity sensor.
<p>Motorized ball valve functions, but will not remain “open” or “closed” as expected.</p>	<p>The motorized ball valve is not indicating to the 3200 Series that it has actually reached the open or closed position.</p>	<p>Adjust the limit switch for the motorized ball valve.</p>

13 Factory Service

Your PULSAblue is a state of the art microprocessor based controller. If you are experiencing a problem with your process control instrument, first consult the troubleshooting guide in this manual. If the problem is not covered or cannot be solved, contact Technical Services for assistance:

PULSAFEEDER INC. (SPO)
27101 AIRPORT ROAD
PUNTA GORDA, FL 33982
941-575-3800

Trained technicians are available to diagnose your problem and arrange a solution. Solutions may include purchase of replacement parts or returning the controller to the factory for inspection and repair. All returns require a Return Authorization number to be issued by Pulsafeeder. Parts purchased to correct a warranty issue may be credited after an examination of original parts by Pulsafeeder. Warranty parts returned as defective which test good will be sent back freight collect. No credit will be issued on any replacement electronic parts.

Any modifications or out-of-warranty repairs will be subject to bench fees and costs associated with replacement parts.

Warranty

Pulsafeeder, Inc. warrants control systems of its manufacture to be free of defects in material or workmanship. Liability under this policy extends for 24 months from date of shipment. Electrodes/probes are considered maintenance items and as such are warranted for six (6) months from the date of shipment of the controller. Electrodes/probes purchased as spare parts are warranted for 90 days from date of shipment. The manufacturer's liability is limited to repair or replacement of any failed equipment or part, which is proven defective in material or workmanship upon completion of the manufacturer's examination. This warranty does not include removal or installation costs and in no event shall the manufacturer's liability exceed the selling price of such equipment or part.

The manufacturer disclaims all liability for damage to its products through improper installation, maintenance, use, or attempts to operate such products beyond their functional capacity, intentionally or otherwise, or any unauthorized repair. The manufacturer is not responsible for consequential or other damages, injuries, or expense incurred through the use of its products.

The above warranty is in lieu of any other warranty, whether expressed or implied. The manufacturer makes no warranty of fitness or merchantability. No agent of ours is authorized to provide any warranty other than the above.

13.1 Parts List and Service Guide

When calling Pulsafeeder, please have your controller's complete PULSAblue number and serial number available, together with the firmware version so that the Technician can better assist you.

Refer to the Ordering Information section of this manual for part numbered replacement parts.

Write your controller's complete PULSAblue number, serial number, and firmware version here so that you will have them available if you wish to contact a Pulsafeeder technician.

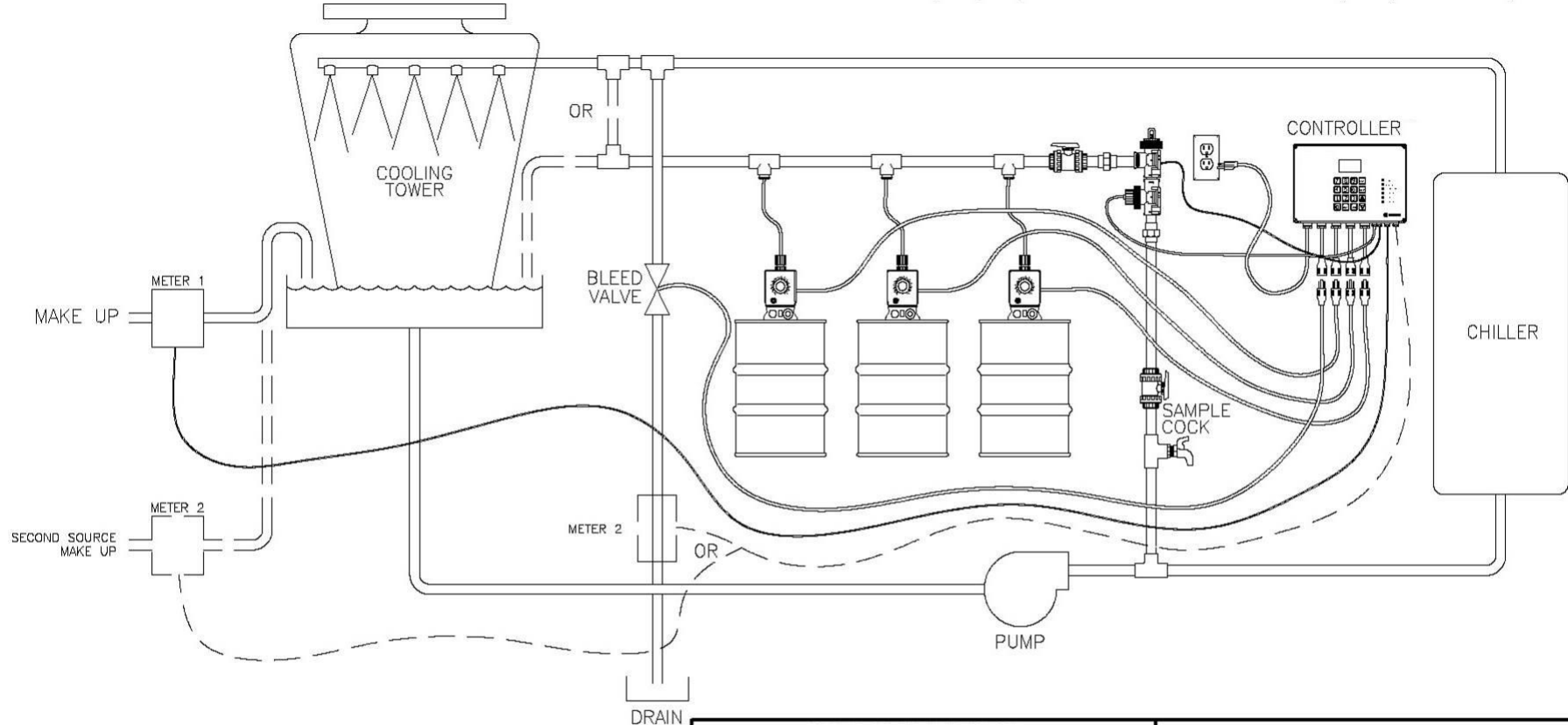
PULSAblue Number:

Serial Number:

Firmware Version:

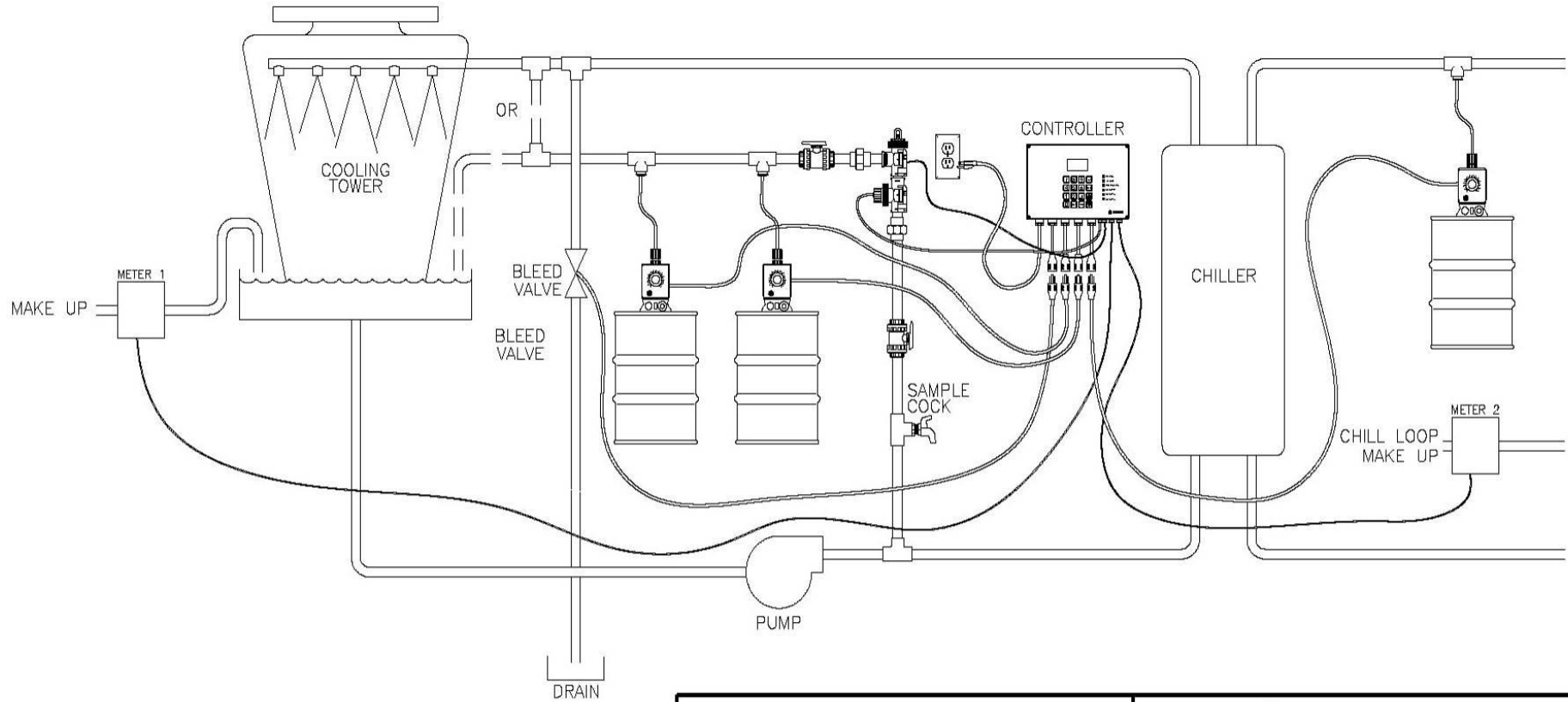
14 Drawings

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECD	DWN/DATE	APVD/DATE
A	A	RELEASE	6975	DGK/8/15/02	



DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994		TITLE	
MATERIAL	N/A	INSTALLATION DRAWING COOLING TOWER	
FINISH		TOLERANCES UNLESS NOTED	
N/A		DECIMALS ANGLES NOTED	
		.X ± ± SURFACE	
		.XX ±	
		.XXX ±	
		✓	
DWN	DGK	DATE	8/15/02
CHKD		DATE	
PROJECT:	N/A	APVD	DATE
LIBRARY:	N/A	PART VERSION	N/A
SIZE	B	PN	1229239
SCALE	NTS	SHEET	1 OF 1
		DWG NO	1205429
		REV	A
		REV	A

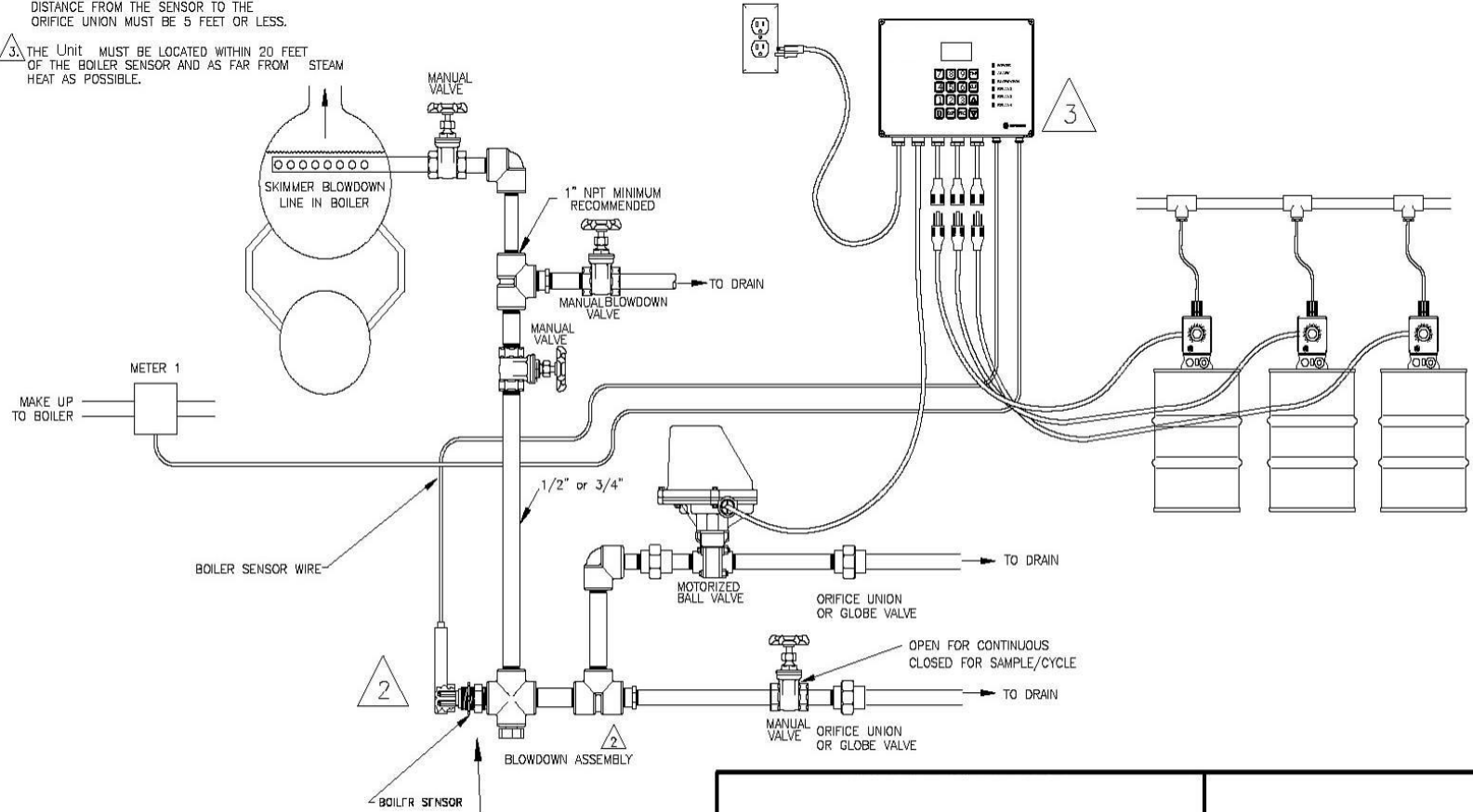
REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECD	DWN/DATE	APVD/DATE
A	A	RELEASE	6975	DGK/8/15/02	



DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994				TITLE			
MATERIAL	N/A	TOLERANCES UNLESS NOTED		INSTALLATION DRAWING			
		DECIMALS	ANGLES	CHILL LOOP/COOLING TOWER,			
		.X ±	±				
		.XX ±	±				
		.XXX ±	SURFACE				
FINISH	N/A	DWN	DGK	DATE	8/15/02	SIZE	REV
		CHKD		DATE		B	A
PROJECT:	N/A	APVD		DATE		THIRD ANGLE	
LIBRARY:	N/A	PART VERSION	N/A			PN	
						1229239	
						DWG NO	REV
						1205430	A
						SCALE	
						NTS	
						SHEET	
						1 OF 1	

- NOTES: UNLESS OTHERWISE SPECIFIED;
- ORIFICE UNIONS MUST BE INSTALLED TO PREVENT STEAMFLASH. REFER TO USER MANUAL 1106840 FOR PROPER ORIFICE SIZING.
 - SENSOR MUST BE MOUNTED HORIZONTALLY AND MUST BE AT LEAST 2 FEET BELOW THE WATER LEVEL OF THE BOILER. THE DISTANCE FROM THE SENSOR TO THE ORIFICE UNION MUST BE 5 FEET OR LESS.
 - THE Unit MUST BE LOCATED WITHIN 20 FEET OF THE BOILER SENSOR AND AS FAR FROM STEAM HEAT AS POSSIBLE.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECD	DWN/DATE	APVD/DATE
A	A	RELEASE	6975	DGK/9/16/02	

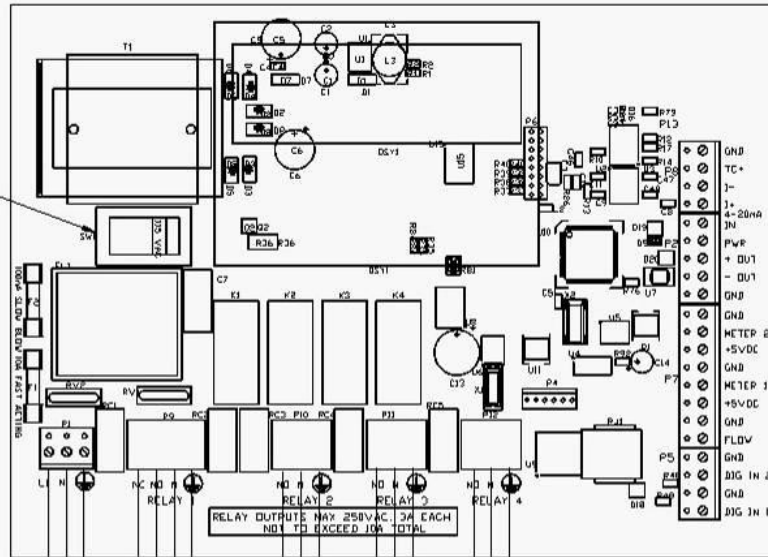


SENSOR MUST BE MOUNTED HORIZONTALLY AND MUST BE AT LEAST 2 FEET BELOW THE WATER LEVEL OF THE BOILER. THE DISTANCE FROM THE SENSOR TO THE ORIFICE UNION MUST BE 5 FEET OR LESS.

DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994		TITLE			
MATERIAL	N/A	TOLERANCES UNLESS NOTED	INSTALLATION LAYOUT CONTINUOUS OR SAMPLE/CYCLE		
		DECIMALS	ANGLES		
		.XX ±	±		
		.XXX ±	SURFACE		
FINISH	N/A	DWN	DGK	DATE	9/16/02
		CHKD		DATE	
PROJECT:	N/A	APVD		DATE	
LIBRARY:	N/A	PART VERSION	N/A	SCALE	NTS
				SHEET	1 OF 1
				DWG NO	1205431
				PN	1229239
				REV	A
				REV	A

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6377	DGK/23JAN02	

115/230 VAC
SELECTOR SWITCH



115/230VAC/50-60 Hz
(COM)
(E GND)

RLY1 HOT (NC)
RLY1 HOT (NO)
RLY1 HOT (COM)
(E GND)
MOTORIZED
BALL
VALVE
OR
SOLENOID VALVE

RLY2 HOT (NO)
(COM)
(E GND)

CHEM PUMPS/
ALARM OUTPUTS

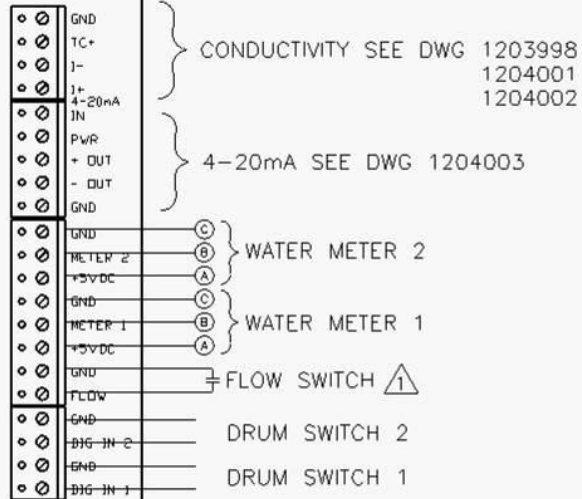
RLY3 HOT (NO)
(COM)
(E GND)

RLY4 HOT (NO)
(COM)
(E GND)

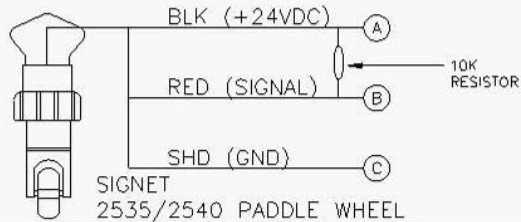
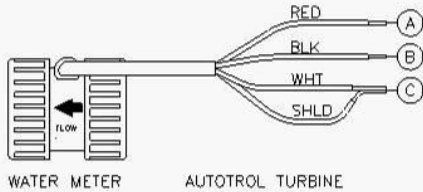
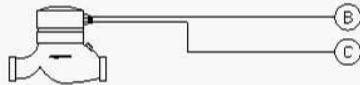
DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994		TITLE		REV	
MATERIAL	N/A	TOLLERANCES UNLESS NOTED DECIMALS ± .X ± .XX ± SURFACE .XXX ±		WIRING DIAGRAM FOR THE POWER CONNECTIONS	
FINISH	N/A			SIZE B	PN 1229239
PROJECT:	APVD	DATE	DATE	SCALE NTS	SHEET 1 OF 1
LIBRARY:	PART VERSION	DATE	DATE	DWG NO. 1203999	REV A

NOTES: UNLESS OTHERWISE SPECIFIED;
 ⚠ IF NO FLOW SWITCH IS USED, SHORT OUT PINS 1 & 2 WITH WIRE.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6377	DGK/23JAN02	



CONTACTING HEAD TYPE WATER METER

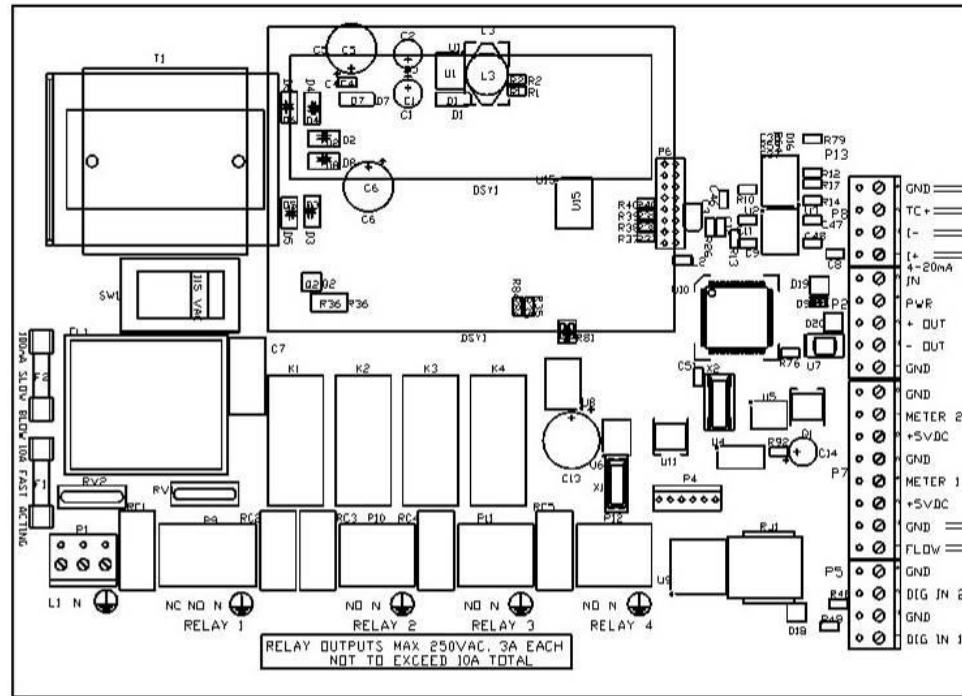


DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994		TITLE	
MATERIAL	N/A	WIRING DIAGRAM FOR WATER METER INPUTS	
FINISH	N/A	SIZE	PN 1229239
		B	REV A
PROJECT:	APVD	SCALE	SHEET
LIBRARY:	PART VERSION	NTS	1 OF 1
			DWG NO. 1204000
			REV A

NOTES: UNLESS OTHERWISE SPECIFIED:

⚠ MAXIMUM DISTANCE FROM SENSOR TO CONTROLLER IS 20 FEET.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6377	DGK/23JAN02	LRS/23JAN02



GREEN
WHITE
RED
BLACK

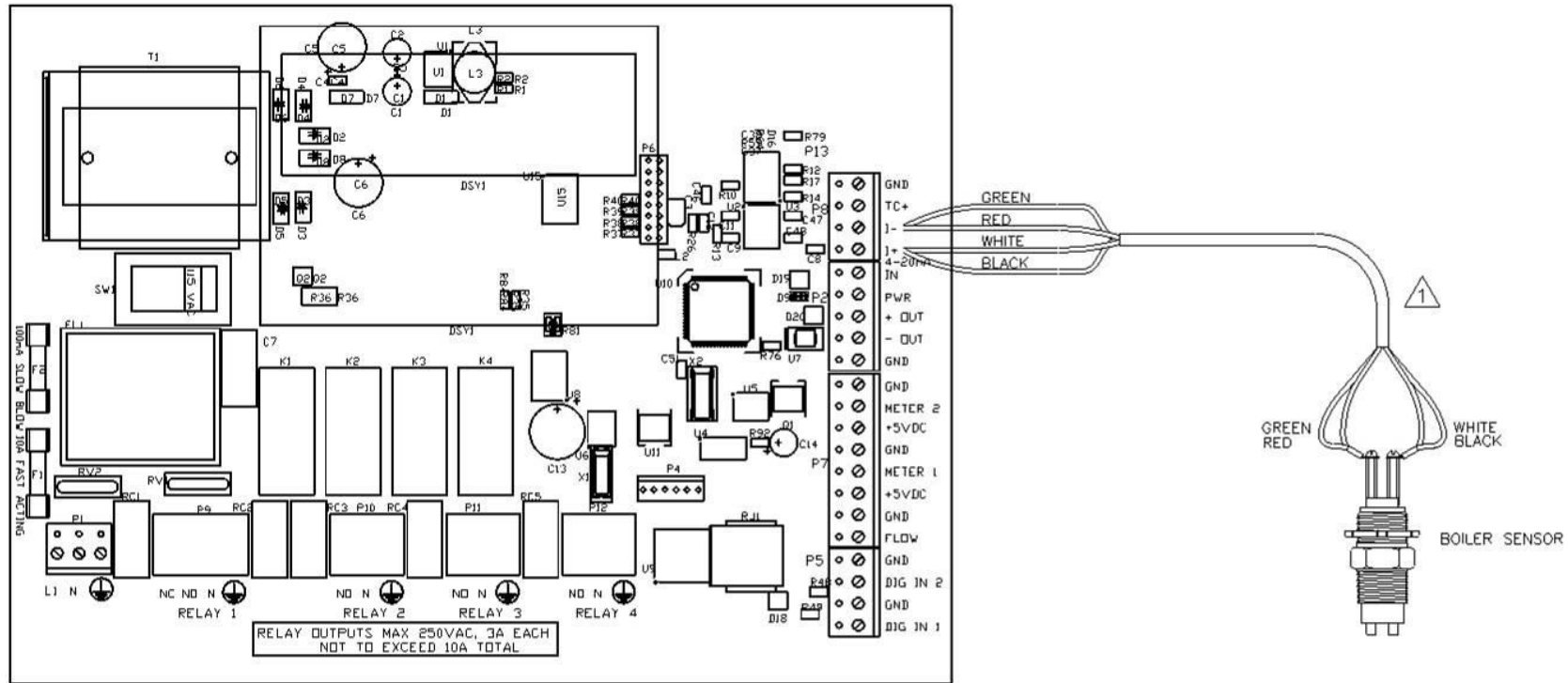
GND
TC+
TC-
P
4-20mA
IN
PWR
+ OUT
- OUT
GND
METER 2
+SVDC
GND
METER 1
+SVDC
GND
FLOW
GND
DIG IN 2
GND
DIG IN 1

RELAY OUTPUTS MAX 250VAC, 3A EACH
NOT TO EXCEED 10A TOTAL

DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994		TITLE	
MATERIAL	TOLERANCES UNLESS NOTED DECIMALS .X ± .XX ± .XXX ± ANGLES ± SURFACE	COOLING TOWER SENSOR WIRING	
FINISH	DWN DGK DATE 23JAN02 CHKD PEP DATE 23JAN02	SIZE B	PN 1229239
PROJECT:	APVD LRS DATE 23JAN02	SCALE NTS	SHEET 1 OF 1
LIBRARY:	PART VERSION	DWG NO. 1203998	REV A

NOTES: UNLESS OTHERWISE SPECIFIED:
 ⚠ MAXIMUM DISTANCE FROM SENSOR TO CONTROLLER IS 20 FEET.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6377	DGK/23JAN02	

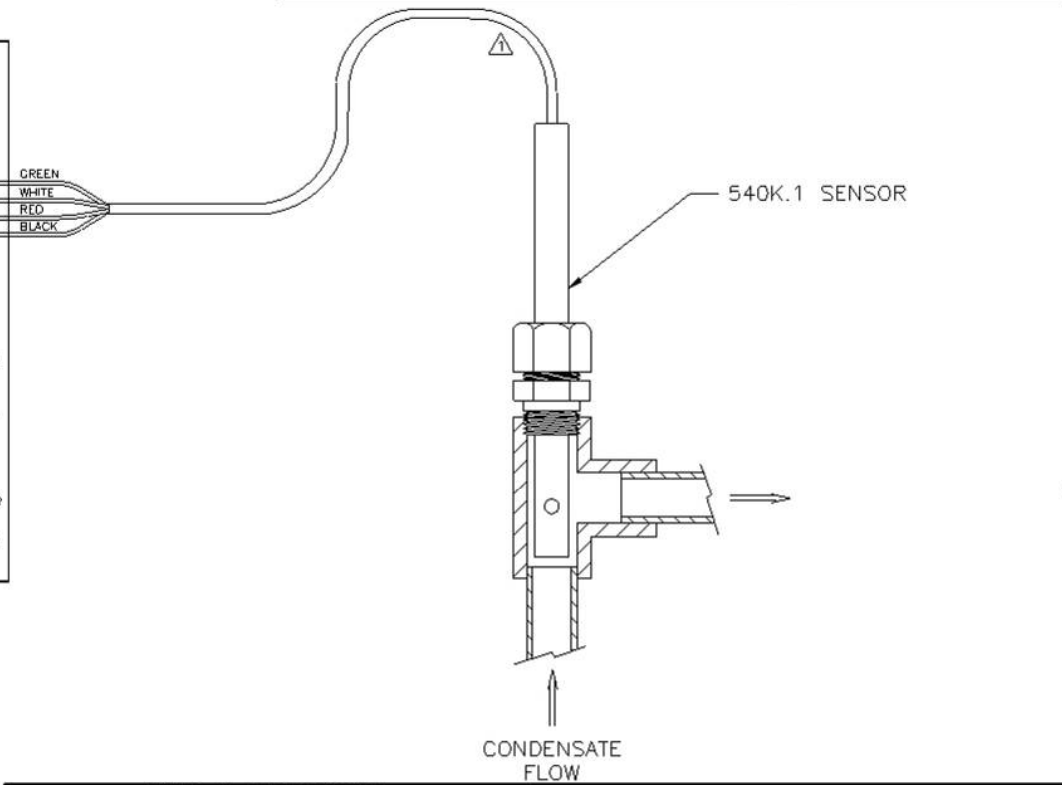
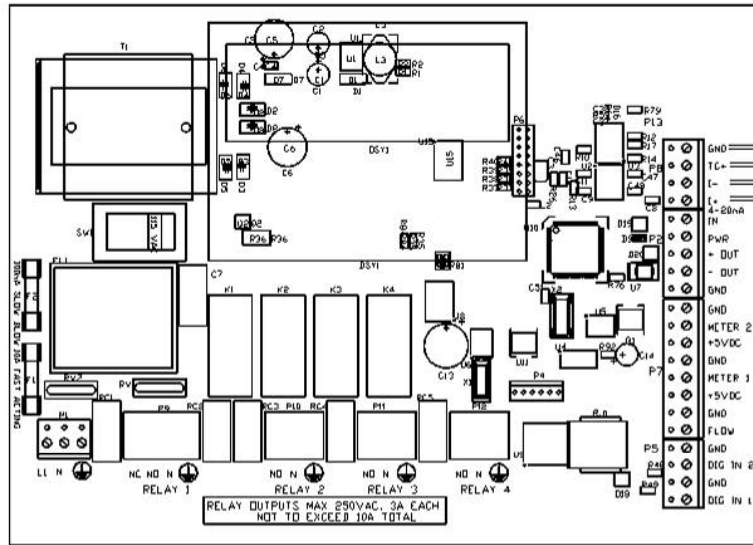


DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 1994		TITLE		BOILER SENSOR WIRING FOR THE	
MATERIAL	N/A	TOLERANCES UNLESS NOTED DECIMALS .X ± .XX ± .XXX ±	ANGLES ± SURFACE ✓	PN	1229239
FINISH	N/A	DWN DGK	DATE 23JAN02	SIZE	B
PROJECT:	APVD	CHKD	DATE	SCALE	1:1
LIBRARY:	PART VERSION			SHEET	1 OF 1
				DWG NO.	1204002
				REV	A

NOTES: UNLESS OTHERWISE SPECIFIED:

⚠ MAXIMUM DISTANCE FROM SENSOR TO CONTROLLER IS 20 FEET.

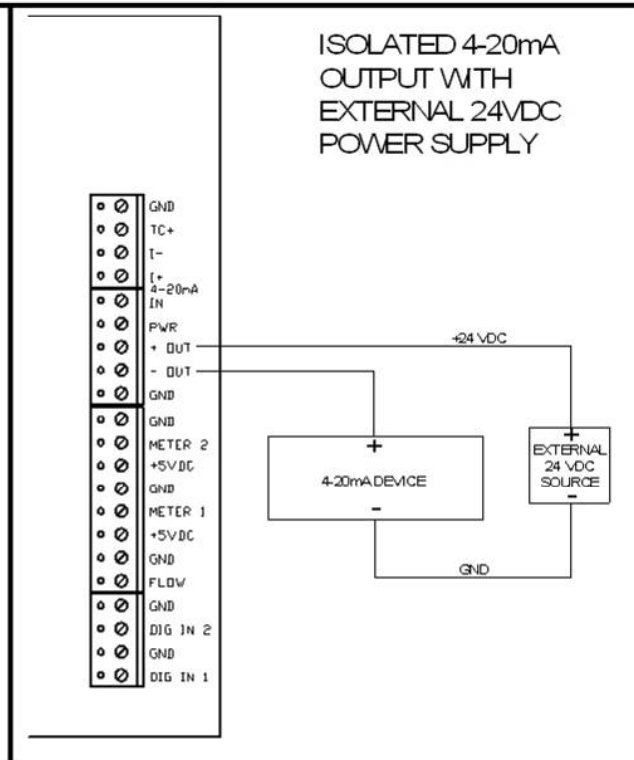
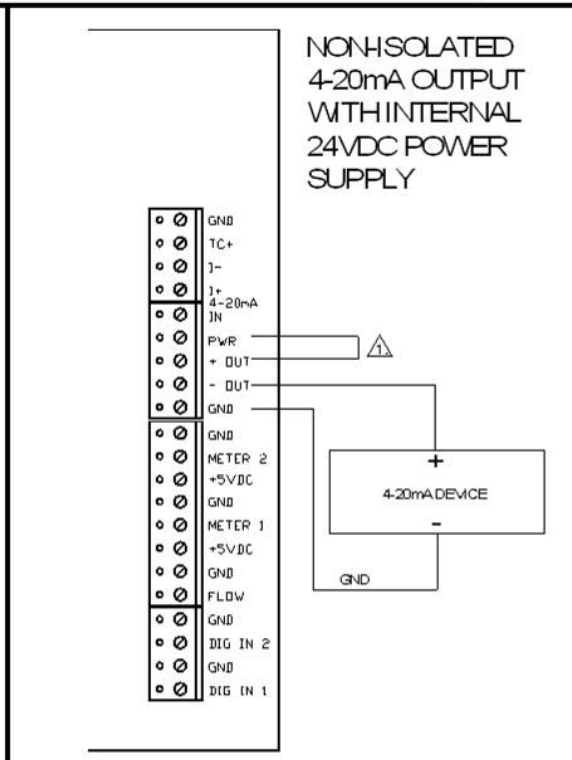
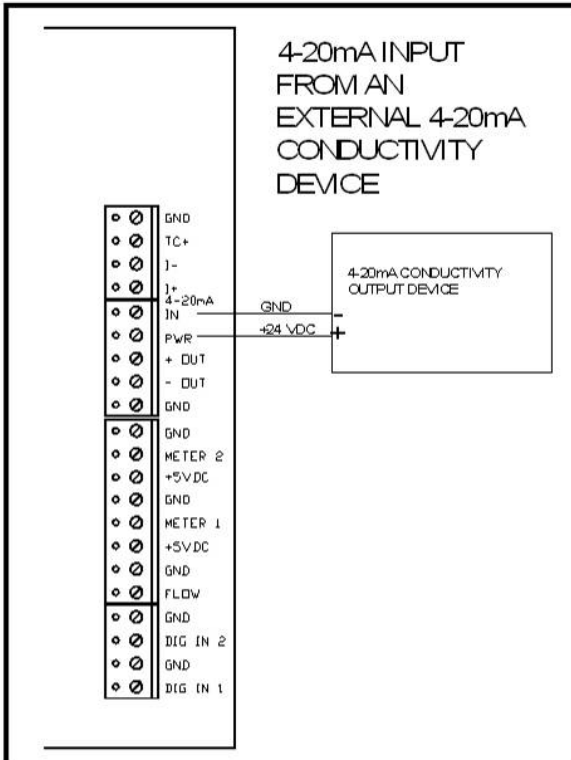
REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6377	DGK/23JAN02	



DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994		TITLE			
MATERIAL	N/A	TOLERANCES UNLESS NOTED DECIMALS .X ± .XX ± .XXX ±	ANGLES ± SURFACE	540K.1 SENSOR WIRING FOR THE	
FINISH	N/A	DWN DGK	DATE 23JAN02	SIZE B	PN 1229239
PROJECT:		CHKD	DATE	SCALE 1 OF 1	SHEET 1 OF 1
LIBRARY:		APVD	DATE	DWG NO. 1204001	REV A
		PART VERSION			REV A

NOTES: UNLESS OTHERWISE SPECIFIED:
 ⚠ FOR INTERNAL 24VDC JUMPER WIRE IS REQUIRED.

REVISION		REVISION HISTORY			
DWG	PART	DESCRIPTION	ECO	DWN/DATE	APVD/DATE
A	A	RELEASE	6377	DGK/23JAN02	



DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994		TOLERANCES UNLESS NOTED		TITLE	
MATERIAL	N/A	DECIMALS	ANGLES	4-20mA WIRING	
FINISH	N/A	.X ±	±	SIZE	B
PROJECT:	APVD	DATE	DATE	PN	1229239
LIBRARY:	PART VERSION	DATE	DATE	SCALE	1 OF 1
		DATE	DATE	DWG NO.	1204003
				REV	A
				REV	A

