PULSAFEEDER®

PULSAblue

**PULSAblue
Model 3205**

CONDUCTIVITY COOLING TOWER CONTROLLER

INSTALLATION & OPERATION MANUAL

SERIAL #: _____

Table of Contents

Pulsafeeder™ Model 3205 Controller

1 Quick Installation Sheet

1. Install the controller on a flat, non-vibrating surface. Use the four (4) supplied mounting feet. Do not mount the controller to a steel object that has a large temperature change (side of cooling tower, etc). This can cause water to condense inside the enclosure.

2. Install water meter, chemical pumps, plumbing assemblies and the conductivity sensor (see drawing on back for suggested installation).

3. Open the front cover from the Model 3205 Controller.

4. Wire the flow switch (use jumper wire for no flow switch), conductivity sensor, water meter and 4-20 mA output, if applicable (see drawing on back). Ensure wiring connections are correct or damage may occur.

5. If doing a conduit installation, remove receptacles and wire pumps and bleed valve. Refer to the instruction manual for more details.

6. Use a standard screwdriver to set the power selector switch to either 115 VAC or 230 VAC operation.

7. Reinstall the front cover keypad making sure the ribbon cable is properly attached.

8. Plug in chemical pumps and bleed valve to controller (unless hardwired as per step #5).

9. Apply power to the 3205 controller, press **BACK** twice, press **7** System setup, press **1** INITIALIZE, press **2** WHOLE CTRLR, press **1** Yes. After initialization, press the **BACK** key several times until you get to the main menu.

10. Press 1 Process, Press **ENT**. This screen allows manual control of the relay outputs to test the chemical pumps and bleed valve. Press the number for the relay you want to operate; 1 for bleed, 2 for relay 2, and 3 for relay 3. The box will flash to show that that relay is in manual control. To restore automatic control press that number again. Press **BACK** to return to the Process screen.

11. To calibrate conductivity take a sample with a handheld conductivity meter, press the **CAL** button, type in conductivity value, press **ENT** (skip if not using conductivity sensor).

   Program the 3205 relays for bleed and chemical feed schemes. See instruction manual for more details.

2 Cautions and Warnings

IMPORTANT NOTICE

WARNING: CHEMICAL FEED

All electromechanical devices are subject to failure from a variety of causes. These include mechanical stress, component degradation, electromagnetic fields, mishandling, improper setup, physical abuse, chemical abuse, improper installation, improper power feeds, and exposure.

While every precaution is taken to insure proper functioning, extra precautions should be taken to limit the ability of over-feeding by limiting chemical quantities available, secondary shut-downs, alarms, and redundancy or other available methods.

CAUTION: POWER SOURCE AND WIRING

Low voltage wiring and high voltage (110 plus) should not be run in the same conduit. Always run separately. Even shielded low voltage is not a guarantee of isolation.

Every precaution should be taken to insure proper grounding and elimination of shorting or Electromagnetic field (EMF) interference.

WARNING: ELECTRICAL SHOCK

To reduce the risk of electrical shock, this equipment has a grounding-type plug that has a third (grounding) pin. This plug will only fit into a grounding -type outlet. If the plug does not fit into the outlet, contact a qualified electrician to install the proper outlet. ***DO NOT*** change the plug in any way.

3 Contact Information

We thank you for your selection and purchase of a Pulsafeeder product.

With proper care and maintenance, this device should give you many years of trouble-free service. Please take the time to read and understand this Installation and Operation Manual, paying special attention to the sections on **OPERATION** and **MAINTENANCE**.

If, in the future, any parts or repairs are required, we strongly recommend that only original replacement parts be used. Our Customer Service Department is happy to assist you with your parts or service requests.

☎ **Pulsafeeder Customer Service and Technical Support Departments can be reached by calling (800) 333-6677 or faxing (941) 575-4085, Monday through Friday, 8:00 a.m. - 5:00 p.m. EST.**

4 Introduction

The Model 3205 is a microprocessor based, menu driven, controller designed for use in cooling towers. The Model 3205 provides for conductivity tracking and control, flow monitoring and chemical injection. The Model 3205 is NTL/CSA, and CE approved.

The Model 3205 uses the latest in microprocessor capability, giving the user a high level of application flexibility. A digital display screen, multiple inputs, and an intuitive menu characterize this new technology.

The Model 3205 is user-friendly with a graphical screen, numeric keypad, LEDs for power, alarm, flow, and relay status. It accepts multiple inputs and is easily configured. It's a combination of reliability, accuracy, security and simplicity.

5 Features, Benefits, Specifications

5.1 Features

- Controller is designed for use with Cooling tower systems.
- Removable power cord and receptacles for conduit installations. Enclosure is rated NEMA 4X
- Three user configurable relays for conductivity control and chemical addition. These relays can be configured in multiple ways including scheduled feed for biocide addition.
- One (1) water meter inputs, conductivity input, flow switch input, 4-20 mA output, and scheduled feed capability are all standard features.
- Designed with a single circuit board for high reliability and lower cost.
- Large open shallow enclosure for easy wiring.
- 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 Model 3205 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 3205 includes a capacitive backup device to retain information such as water meter total, 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.

5.2 Benefits

- Easy to program, the Model 3205 Controller uses an intuitive menu and programs identical to the PULSAblue 3200 controllers.
- No add-on options. Flow switch input, 4-20mA output, and scheduled feed features are standard.

5.3 Specifications

Conductivity range
0-10,000 μS

Conductivity sensor
Two-electrode with 500 ohm NTC

Conductivity Resolution

10 μS

Temperature comp.
Automatic

Accuracy & repeatability
± 1.0% of scale

Deadband/Setpoint
User programmable

Auto/Manual outputs
Menu selectable

Keypad
16 tactile steel-dome push buttons

Display
16 X 2 Character

Maximum pressure
140 psi (9.65 bar) @ 100°F

Maximum system temp
140°F

Required flow rates
Minimum 1 gpm
Maximum 5 gpm

Enclosure
NEMA 4x

Water meter input (1)
Contact head, paddle wheel or Autotrol turbine

Timer
Relay run time exceeded.

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

Output relays
3 selectable use

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 (-20 - 65°C)

6 Unpacking, Mounting and Installation

6.1 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 Model 3205 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.**

6.2 Mounting

The Model 3205 can be mounted to a panel or to a flat non-vibrating wall. The Model 3205 includes four removable mounting feet that can be attached in the horizontal or vertical position. The mounting feet are attached to the enclosure using four screws. The Model 3205 has a shipping weight of less than 5 lbs.

To change the position of the mounting feet: remove the screws from the feet and reposition either vertically or horizontally as desired and reattach the screws.

The dimensions of the enclosure in inches are:
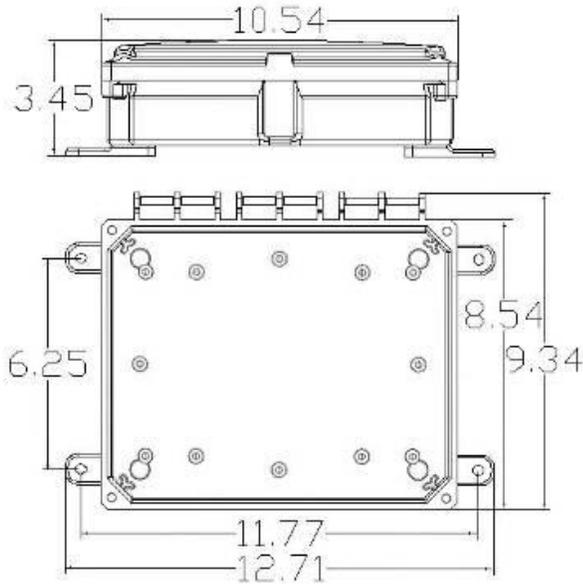
7 Plumbing Installation

7.1 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.

<table>
<tr><td>

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

</td></tr>
</table>
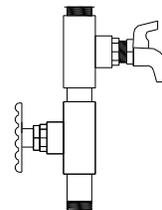
Figure 1:

Model 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.

☎ **If you have questions or need assistance, call Pulsafeeder Technical Service Department at (800) 333-6677, Monday-Friday, 8:00 a.m. - 5:00 p.m. EST.**

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

7.2 Blowdown Valve Sizing

If you have a way to measure your blowdown flow rate and pressure range, you can use the chart below to determine the correct valve size. If not, consult your water treatment engineer.

Adjustable flow rate diaphragm valves require at least 10-psi (0.7 bar) differential pressure to close. If your water pressure is marginal, use a supply water pressure actuated diaphragm valve or a valve designed to work with zero differential pressure.

Extremely dirty cooling water will plug diaphragm valves. In such cases, use a motorized ball valve and a globe valve for flow control. A strainer ahead of the valve may be okay, but you must flush it regularly. If your flow lines are above 3 inch (for large systems), use a pneumatically operated butterfly valve.

- Be sure to provide isolation and bypass valves. Refer to drawings in the back of the manual for examples of typical installations. If your blowdown valve ever fails, you need to be able to bypass it in order to service it.

BLOWDOWN VALVE SIZING CHART					
Pressure range		**Flow range**		**Suggested Valve Size**	
(psi)	**(bar)**	**(gpm)**	**(Lpm)**	**(inch)**	**(cm)**

10-50	0.7-3.4	1-5	3.8-18.9	¾ inch	1.9 cm
50-150	3.4-10.3	5-10	18.9-37.9	¾ inch	1.9 cm
10-50	0.7-3.4	5-10	18.9-37.9	1 inch	2.5 cm
50-150	3.4-10.3	10-15	37.9-56.8	1 inch	2.5 cm
10-50	0.7-3.4	10-15	37.9-56.8	1½ inch	3.8 cm
50-150	3.4-10.3	15-20	56.8-75.7	1½ inch	3.8 cm
10-50	0.7-3.4	15-20	56.8-75.7	2 inch	5.1 cm
50-150	3.4-10.3	20-30	75.7-113.6	2 inch	5.1 cm
10-50	0.7-3.4	30-100	113.6-378.5	3 inch	7.6 cm
10-50	0.7-3.4	100-300	378.5-1135.5	4 inch	10.2 cm

7.3 Sensor Mounting

The conductivity sensor should be mounted in the horizontal position. 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 tip will cause erroneous readings. The sensor should be in direct contact with the process flow.

8 Electrical Installation

TRANSFORMER

POWER SELECTOR SWITCH

FUSES 100mA 10A

INCOMMING POWER

Terminal blocks For:
RELAY #1

RELAY #2

RELAY #3

RIBBON CABLE

DISPLAY

TERMINAL P-8

TERMINAL P-2

RELAYS

TERMINAL P-7
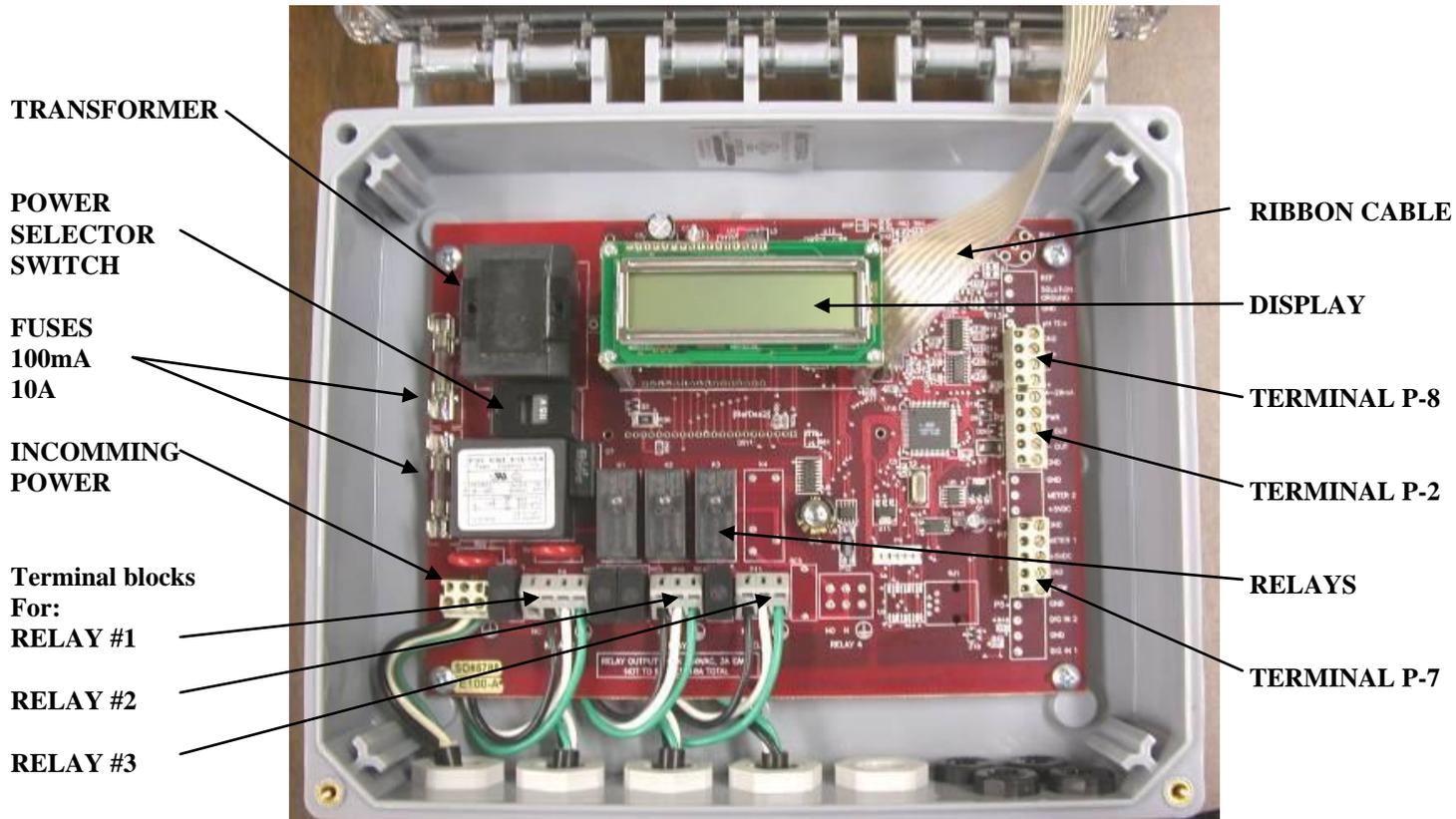
8.1 Incoming Power 115/230 VAC

The Model 3205 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 standard screwdriver.

The Model 3205 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.

8.2 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 #3. 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 any device that requires either or both types of contacts for operation, such as a motorized blowdown valve. The normally open (NO) contact energizes when the relay turns on and the normally closed (NC) contact is energized when the relay turns off. 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.

8.3 Flow Switch Wiring

The Model 3205 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 Model 3205. The flow switch is wired to terminal block P7 terminals 1 and 2.

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.

8.4 Sensor Wiring

The Model 3205 uses the Pulsafeeder two-electrode conductivity cooling tower sensor. The maximum recommended wiring distance for sensor is 20 feet.

The conductivity sensor is wired directly to the P8 terminal block on the upper right corner of the control board. The black wire is wired to terminal # 1. The red wire is wired to terminal # 2. The white wire is wired to terminal # 3. The green wire is wired to terminal # 4. The red and black wires are the two electrodes of the sensor and the green and white wires are the temperature compensation wires.

CONTACTING HEAD TYPE
WATER METER

RED — A
BLK — B
WHT — C
SHLD

WATER METER   AUTOTROL TURBINE

BLK (+24VDC) — A
RED (SIGNAL) — B
SHD (GND) — C
SIGNET

10K RESISTOR

P6   GND
      IO+
      I−
      I−
      4−20mA
P2   IN
      PWR
      + OUT
      − OUT
      GND

4−20mA SEE
DWG 1217849

P7   GND
      METER I
      +5VDC
      GND
      FLOW
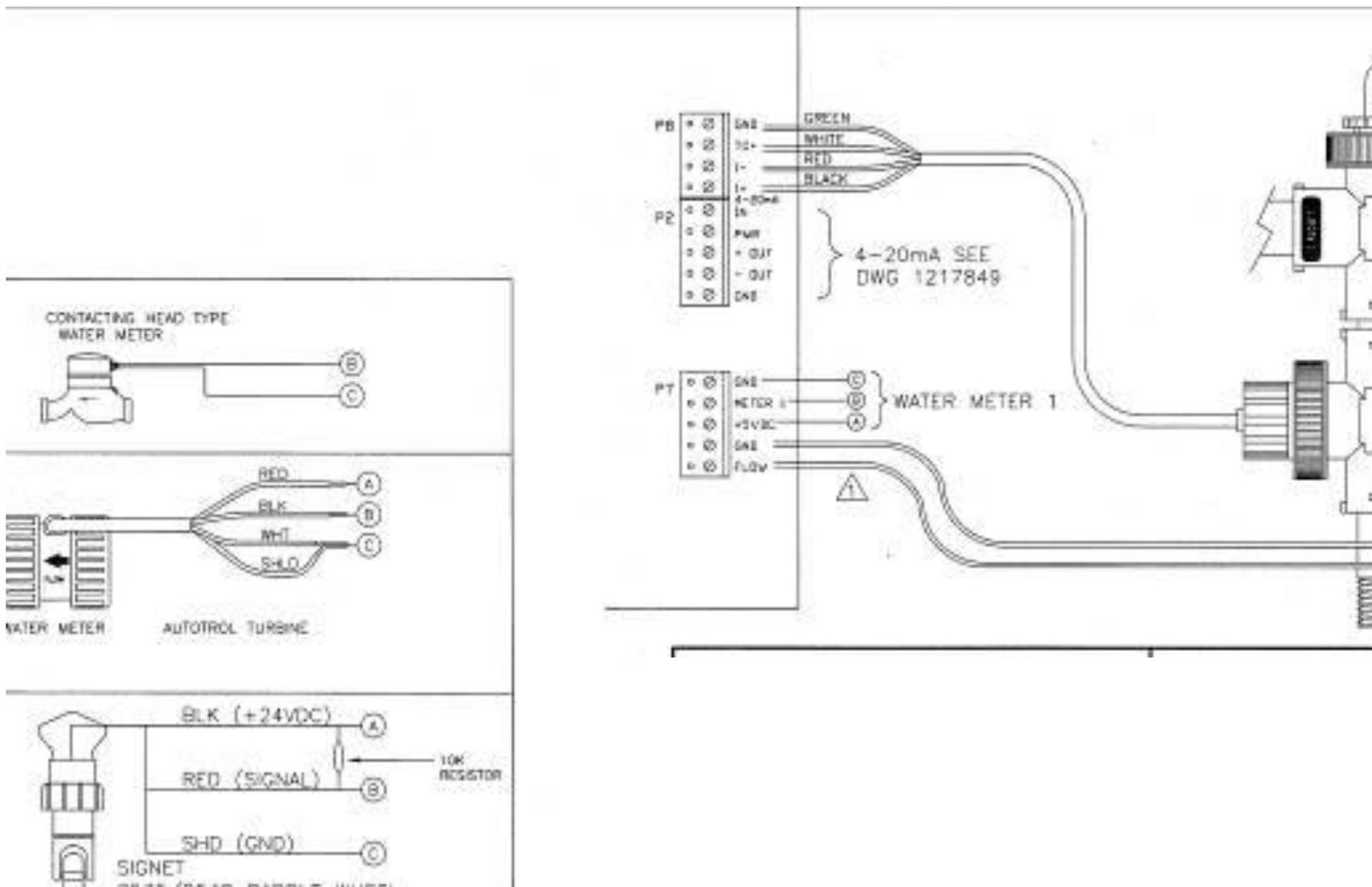
WATER METER 1

8.5 Water Meter

The Model 3205 will accept one water meter input. Refer to the water meter manufacturer's manual for plumbing information.

The Model 3205 controller 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.

8.6 4-20 mA Output Wiring

The Model 3205 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.

9 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 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 18.1 of this manual to initialize the controller.

Set the clock by following section 19

Set the high and low conductivity alarms by following section 15

Configure the relays for operation by following section 13.1

Calibrate the conductivity by following section 12.3

Configure the 4-20 mA output by following section 17

Verify operation of the controller before leaving the area.

10 Functional Overview

10.1 Front Panel

Figure 2: *Model 3205 Front Panel with Display*

LCD A large, 16 x 2 character display makes it easy to read the menu-driven program

ENCLOSURE	16-BUTTON KEYPAD	INDICATOR LIGHTS
A sturdy NEMA 4X enclosure protects your controller. Make sure it is properly mounted on a flat, non-vibrating wall.	**ENT** = for Menu selection and/or acceptance of selected values. **BACK** = to exit a Menu selection and/or skip input options. **CAL** = to program a Menu selection. **LANG** = Not used.	LEDs for Power, Alarm, Relay status, and Flow

10.2 Display

The Model 3205 uses a 16 x 2 LCD digital display for ease of viewing. It has two lines to display information such as the conductivity reading, alarms, relay status, relay configuration, clock, total flow, and menu selections.

10.3 Keypad

The Model 3205 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	Same as BACK.
UP arrow	To move about in the menu.
DOWN arrow	To move about in the menu.
Number keys	To input a value or to select a menu item.

10.4 Menu

The Model 3205 is programmed and calibrated by the use of a menu. The complete **Main Menu** has 8 available options that can be accessed. However, only one option can be viewed on the display at a time. Use the ↑ and ↓ keys to scroll through the options. Press **ENT** to enter the displayed programming option. 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. The entire menu is shown on the next page.

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

1	2	3	4	5	6	7	8
1500 μS **RLY: B☐ 2☐ 3☐**	WHICH RELAY? 1 BLOW 2 RLY2 3 RLY3	CALENDAR TIMER 1*BY WEEKDAY 2 CYCLE CALENDR 3 LIST SCHEDULE	HIGH ALM=**2000**μS LOW ALM=**1000** μS	MTR1: GALS/LTRS? 1*GALLONS 2 LITERS	4-20 MA OUTPUT 1 SET RANGE 2 MANUAL CTRL 3 CALIBRATE	SYSTEM SETUP 1 INITIALIZE 2 FIRMWARE VER	THU 18 FEB '04 **05:42:40**

MAIN MENU

1> PROCESS
- DISPLAY DATE
- DISPLAY TIME
- DISPLAY WATER METER TOTAL
- DISPLAY RELAY 2 CONFIGURATION
- DISPLAY RELAY 3 CONFIGURATION
- DISPLAY RELAY STATUS
- DISPLAY ALARMS

ENT> MANUAL CONTROL OF RELAYS

PRO> CALIBRATION OF CONDUCTIVITY

2> RELAY

1> **BLOW RELAY**
- 1> SETPOINT VALUES
  - SETPOINT
  - DEADBAND
  - BLOW ALARM TIME
- 2> WHEN TO BLOW
  - ABOVE SETPOINT
  - BELOW SETPOINT

2> **RELAY #2**
- 1> DISABLE
- 2> SETPOINT
  - 1> SETPOINT VALUES
    - SETPOINT
    - DEADBAND
    - TIME OUT
  - 2> WHEN TO FEED
    - ABOVE SETPOINT
    - BELOW SETPOINT
- 3> WATER METER
  - 1> GALLONS
    - SET FEED TIME
  - 2> LITERS
    - SET FEED TIME
- 4> FEED BY % BLOWDOWN
  - SET % BLOWDOWN
- 5> FEED BY % ON-TIME
  - SET % ON-TIME
- 6> FEED BY SCHEDULE
- 7> ACTIVATE BY ALARM

3> **RELAY #3**
- 1> DISABLE
- 2> SETPOINT
  - 1> SETPOINT VALUES
    - SETPOINT
    - DEADBAND
    - TIME OUT
  - 2> WHEN TO FEED
    - ABOVE SETPOINT
    - BELOW SETPOINT
- 3> WATER METER
  - 1> GALLONS
    - SET FEED TIME
  - 2> LITERS
    - SET FEED TIME
- 4> FEED BY % BLOWDOWN
  - SET % BLOWDOWN
- 5> FEED BY % ON-TIME
  - SET % ON-TIME
- 6> FEED BY SCHEDULE
- 7> ACTIVATE BY ALARM

11
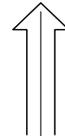
3> FEED SCHEDULE
- 1> **BY WEEKDAY**
- 2> **BY CYCLE CALENDAR**
  - SET CYCLE DAY
- 3> **LIST SCHEDULE**
  - PROGRAM FEED SCHEDULE

4> ALARMS
- **HIGH ALARM**
- **LOW ALARM**

5> WATER METER
- 1> **GALLONS**
  - 1> CONTACT HEAD
    - ENTER GALLONS/CONTACT
    - RESET METER COUNTS
  - 2> PADDLE WHEEL
    - ENTER K-FACTOR
    - RESET METER COUNTS
  - 3> AUTOTROL 1 IN.
    - RESET METER COUNTS
  - 4> AUTOROL 2 IN.
    - RESET METER COUNTS
- 2> **LITERS**
  - 1> CONTACT HEAD
    - ENTER GALLONS/CONTACT
    - RESET METER COUNTS
  - 2> PADDLE WHEEL
    - ENTER K-FACTOR
    - RESET METER COUNTS
  - 3> AUTOTROL 1 IN.
    - RESET METER COUNTS
  - 4> AUTOROL 2 IN.
    - RESET METER COUNTS

6> 4-20 MA OUT
- 1> **SET RANGE**
  - 4 MA VALUE
  - 20 MA VALUE
- 2> **MANUAL CONTROL**
- 3> **CALIBRATE**
  - 4 MA VALUE
  - 20 MA VALUE

7> SYSTEM SETUP
- 1> **INITIALIZE**
  - 1> CALIBRATION
    - ARE YOU SURE
  - 2> WHOLE CONTROLLER
    - ARE YOU SURE
- 2> **FIRMWARE VERSION**

8> CLOCK
- **SET THE TIME AND DATE**
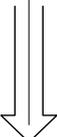
12 Operation of the Controller

12.1 Process Screen

The screens that are used the most in the Model 3205 controller are the Process Screens. Below are the process screen views. The process screen has two sections. The top section shows the conductivity reading. The bottom section has user selectable readings as shown below.

1 - DATE SCREEN 1000 μS 25 Jun '04	• There are many different screens available in the **PROCESS** screen. These screens allow you to view the controller settings (incl. Date, time setting, relay set-ups, total flow, relay status, 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 control a relay for testing or troubleshooting purposes. • Press "**CAL**" to calibrate the conductivity.

2 TIME SCREEN	**2 ALL RELAY SCREEN**	**3 WATER METER SCREEN**
1000 μS 15:58:11	1000 μS RLY: B□ 2□ 3□ Note: A flashing box next to the relay number indicates that the relay is in manual control.	1000μS MTR: 1002730 G
5 BLOWDOWN RELAY SCREEN	**6 RELAY #2 SCREEN**	**7 RELAY #3 SCREEN**
1000 μS □B: SET=99999 μS	1000 μS □2: DISABLED	1000 μS □3: BY WATER MTR
8 ALARM SCREEN 100 μS **LOW CONDUCTIVITY**	NOTE: THE DISPLAYED ALARMS WILL ROTATE THROUGH ALL ACTIVE ALARMS.	

12.2 Manual Operation of the Relays

All three 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:

```
 MANUAL-RLY 5 MIN
RLY:   B□  2□  3□
```

Note: A flashing box next to the relay number indicates that the relay is in manual control.

Press **"1-3"** to manually change the state of a particular relay. If the relay is already on, pressing that number will turn it off. A five-minute countdown timer will start and the box next to the relay number will start to flash. After five minutes has expired the relay will return to automatic control. The relay will remain in manual control even if this screen is exited. A relay that is in manual control will stay in manual control until the five minutes expires or until that relay number is pressed again. The five-minute timer helps to prevent damage to the system if a relay is left in manual.

> **WARNING: Manual control overrides all automatic control functions including the flow switch lockout. Use care when operating relays manually with no flow in the system.**

12.3 Calibration of Conductivity

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

A 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 system water to properly calibrate the controller. A hand-held conductivity meter that tests the sample works well for this purpose.

To calibrate the Model 3205 controller:

- 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.

```
 CALIBRATION:
 00000   μS
```

 Use the keypad to input the conductivity reading from the hand-held. Press "**ENT**".

- The controller will respond with **"CALIBRATION COMPLETE".**
- Take another hand-held sample to verify calibration.

Note:

The controller will **not** be able to complete a calibration if either the **Opened T.C.** or **Shorted T.C.** alarms are present.

13 Main Menu

The **MAIN MENU** of the Model 3205 consists of 8 menu selections:

1. Process – Displays process conditions.
2. Relays – Relay configuration screens.
3. Calendar Timer – Program the feed schedules.
4. Alarms – Set the high and low conductivity alarms.
5. Water meter – Configure water meter type and reset total flow.
6. 4-20 MA Out – Set up and calibrate the 4-20 ma output.
7. System Setup – Initialize the controller and view firmware version.
8. Clock – Set the date and time.

Only one menu selection will appear on the screen at a time. The Menu always appears in the top half of the screen. The bottom half of the display shows the selectable item in the menu. The screen will look like this:

```
┌──────────────────────┐     1.  PROCESS
│                      │     2.  RELAYS
│  MAIN MENU           │     3.  CALENDAR TIMER
│  1 PROCESS           │     4.  ALARMS
│                      │     5.  WATER METER
└──────────────────────┘     6.  4-20 MA OUT
                             7.  SYSTEM SETUP
                             8.  CLOCK
```

The **MAIN MENU** can be accessed from the **PROCESS** screen by pressing "**BACK**"**.**

To move about in the menu screens use the ↑ and ↓ keys to display the desired selection and press "**ENT**" or press the number key for the desired selection to access that selection.

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 is discussed in detail later in this manual.

13.1 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.

```
┌──────────────────────┐     1 Blow
│  WHICH RELAY?        │     2 RLY2
│  1 BLOW              │     3 RLY3
└──────────────────────┘
```

13.2 Configuring the Blowdown Relay

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

```
BLOWDOWN
SETPT:
    1 SETPT VALUES
```

1 SETPNT VALUES
2 WHEN TO BLOW

13.2.1   Setpoint

In the **SETPT VALUES** screen you will set the **SETPOINT**, the **DEADBAND** and the **BLOW ALARM 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 **SETPT 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.

13.2.2   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 relay turning on at 1,050 μS and turning off 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 **TIMEOUT** alarm screen.

13.2.3   Blow Alarm Time

The **BLOW ALARM 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 Model 3205 controller−**it will not close the blowdown valve**. If a relay is configured as an alarm relay, the **BLOW ALARM 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**".

13.2.4   When to Blowdown

Most applications for cooling towers 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 **BLOWDOWN SETPT** screen, press "**2**" or highlight **WHEN TO BLOW** and press "**ENT**".

  In the **WHEN TO BLOW** screen, select either "**1**" **ABOVE SETPT** or "**2**" **BELOW SETPT**. Then press any key.

13.3   Configuring Relays 2 and 3

Both relays can be configured to operate based on: Disabled, Setpoint, Water Meter, Percent of blowdown, Percent of Time, Feed Schedule, or by Alarm. From the **WHICH RELAY?** screen select either relay #2 or relay #3. When relay 2(3) is selected for programming the **RELAY OPTIONS** screen will appear. The asterisk (*) next to one of the options tells you how that relay is configured to feed. Use the ↑ and ↓ keys to view all of the relay options.

<div style="text-align:center; border:1px solid; display:inline-block;">

RELAY 2 (3) OPTIONS
1 SETPOINT

</div>

1 DISABLED
2 SETPOINT
3 WATER METER
4 % BLOWDOWN
5 % OF TIME
6 CALENDAR TIMER
7 ALARM RELAY

13.3.1   Disabled

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

- From the RELAY OPTIONS screen press "1" Disabled to disable the relay.

13.3.2   By Setpoint

To set up a relay to operate based on a setpoint:
- Press or select **"2" SETPOINT**. The following screen will appear.

<div style="text-align:center; border:1px solid; display:inline-block;">

BASED ON SETPT
1 SETPT VALUES

</div>

1 SETPNT VALUES
2 WHEN TO FEED

13.3.3   Setpoint

In the **SETPT VALUES** screen you will set the **SETPOINT**, the **DEADBAND** and the amount of time for the **TIMEOUT** alarm.

The **SETPOINT** is the conductivity value at which you want the relay to operate. Check with your water treatment engineer to determine the conductivity setpoint for your system needs.

> **WARNING: THE SETPOINT AND DEADBAND VALUES FOR THIS RELAY SHOULD BE SET AT THE SAME VALUES AS THE BLOW RELAY TO PREVENT OVER OR UNDER FEEDING OF CHEMICAL.**

From the **BASED ON SETPT** screen follow these instructions to establish the relay's setpoint:

- Press "**1**" or highlight **SETPT VALUES** and press "**ENT**".

- Use the keypad numbers to enter the proper conductivity setpoint and press "**ENT**". When finished, you will automatically be prompted to set the deadband.

13.3.4   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 relay turning on at 1,050 μS and turning off 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 TIMEOUT alarm screen

13.3.5   Timeout

The TIMEOUT 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 relay timeout function is an alarm feature that is displayed on the 3205 series display process screen and it will turn off the pump. If a relay is configured as an alarm relay, the TIMEOUT alarm will energize the alarm relay. To disable the timeout 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".

13.3.6   When to Feed

The relay can be configured to operate either above the setpoint or below the setpoint. When the relay is configured to operate above the setpoint, the relay will turn on when the conductivity rises above the setpoint plus one-half of the deadband. When configured to operate below the setpoint, the relay will turn on when the conductivity falls below the setpoint minus one-half of the deadband.

- In the WHEN TO FEED screen, select either "1" ABOVE SETPT or "2" BELOW SETPT. Then press any key.

13.3.7   By Water Meter

Relays 2 and 3 can be configured to operate for a specified amount of time based on a specified amount of flow through the water meter input. The water meter total is used to activate the relay.

- From the **RELAY OPTIONS** screen press "**3**" **WATER METER**.
- 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. This time is in minutes and seconds. Press "**ENT**".

13.3.8   By Percent Blowdown Time

Relays 2, and 3 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**" **% BLOWDOWN.**

Use the keypad to enter a percent of blowdown time to activate this relay. Press "**ENT**".

13.3.9   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 how Percent of Time works over a 400 second **example**.

x = 20 seconds on
- = 20 seconds off

```
                    ←=================400 seconds====================→
0%      -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
5%      x  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
10%     x  -  -  -  -  -  -  -  -  -  x  -  -  -  -  -  -  -  -  -
20%     x  -  -  -  -  x  -  -  -  -  x  -  -  -  -  x  -  -  -  -
30%     x  -  -  x  -  -  x  -  -  -  x  -  -  x  -  -  x  -  -  -
40%     x  -  x  -  -  x  -  x  -  -  x  -  x  -  -  x  -  x  -  -
50%     x  -  x  -  x  -  x  -  x  -  x  -  x  -  x  -  x  -  x  -
60%     x  -  x  x  -  x  -  x  x  -  x  -  x  x  -  x  -  x  x  -
70%     x  x  -  x  x  -  x  x  x  -  x  x  -  x  x  -  x  x  x  -
80%     x  x  x  x  -  x  x  x  x  -  x  x  x  x  -  x  x  x  x  -
90%     x  x  x  x  x  x  x  x  x  -  x  x  x  x  x  x  x  x  x  -
95%     x  x  x  x  x  x  x  x  x  x  x  x  x  x  x  x  x  x  x  -
100%    x  x  x  x  x  x  x  x  x  x  x  x  x  x  x  x  x  x  x  x
```

A 400-second example is shown because it will cover the patterns of the major percentages. The patterns for odd values such as 37% or 52% cannot be shown in a 400-second time interval but they would look very much like those patterns shown for 40% and 50% respectively. In an extreme case such as 99%, the relay would be on for 99 20-second blocks (1980 seconds) and then off for 1 20-second block (20 seconds) and then on for 1980 seconds and off for 20 seconds etc.

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.

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

- From the **RELAY OPTIONS** screen press "**4**" **PERCENT OF TIME**.

   Use the keypad to enter the percentage of time desired. Press "**ENT**".

13.3.10   By Calendar Time

The calendar timer 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 14

- From the **RELAY OPTIONS** screen press "**6**" **Calendar Timer**.

The controller will respond with the following screen.

```
┌─────────────────────────────┐
│      CALENDAR TIMER         │
│      press any key          │
└─────────────────────────────┘
```

   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. Program the feed schedule by following section 14

13.3.11   As an Alarm Relay

Relays #2 and 3 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, BLOW ALARM TIMEOUT, RELAY #2 TIMEOUT, RELAY #3 TIMEOUT, and the NO FLOW alarm.

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

```
┌─────────────────────────────┐
│      ACTVE ON ANY ALM       │
│      press any key          │
└─────────────────────────────┘
```

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

14 Setting Up the Calendar Timer

Refer to section 13.1 to configure a relay to feed based on the Calendar Timer <u>before</u> continuing with this section.

To get to Calendar Timer menu:

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

```
┌─────────────────────────────┐
│      CALENDAR TIMER         │        1 BY WEEKDAY
│      3 LIST SCHEDULE        │        2 CYCLE CALENDR
└─────────────────────────────┘        3 LIST SCHEDULE
```

The feed schedule can be programmed to feed chemicals by either **WEEKDAY** or by a **CYCLE CALENDAR** basis. NOTE: All scheduled feeds will be by the method selected.

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 **CALENDAR 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 an alternating weekly basis. To configure the feed schedule to feed by cycle calendar:

- From the **CALENDAR TIMER** screen, press "**2**" **CYCLE CALENDAR.**
- 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**".
- Use the keypad to enter the number of days in your cycle; e.g. there are 14 days in my cycle. Then press "**ENT**". Remember, the maximum number of days allowed is 28.

After selecting whether the feed schedule will be fed by **WEEKDAY** or by **CYCLE CALENDAR** it is time to actually program the feed 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: A maximum of 6 scheduled feeds may be programmed into the controller.

```
NO  DAY  TIME   RLY
1    SUN  00:00       -
```

```
1 SUN  00:00  -
2 SUN  00:00  -
3 SUN  00:00  -
4 SUN  00:00  -
5 SUN  00:00  -
6 SUN  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 the relay to be a feed schedule relay as per section 13.1

```
RELAY=RLY3
DAY=SUN
```

```
RELAY=RLY3
DAY=SUN
TIME=00:00
SETPOINT=1000
BLOW DUR=00:00
FEED DUR=00:00
LOCKOUT=00:00
```

- To program the schedule use the arrow keys or 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. Then press "**ENT**".

CYCLE DAY or **DAY** is the day you wish to actuate the feed schedule relay. Use the arrow keys to select the day. Then press "**ENT**".

TIME is the time of day you want to start the feed schedule sequence. This time is based on a 24-hour clock; i.e. 10p.m is 22:00. Use the keypad to enter a time. Then press "**ENT**".

SETPOINT is a pre-feed setpoint. This would typically be lower than the normal conductivity setpoint. Because the bleed valve will be disabled during a scheduled feed, a pre-feed will help prevent a build up of tower conductivity. 0 μS will disable this feature. Use the keypad to enter a setpoint then press "**ENT**".

BLOW DUR if the SETPOINT is not met within this time, the blowdown will stop and the feed schedule relay will be actuated. Inputting 0:00 will disable this feature. Use the keypad to enter a time then press "**ENT**".

FEED DUR is the amount of time the feed schedule relay will be on. Use the keypad to enter a time then press "**ENT**".

LOCKOUT after the feed schedule relay is done; an additional lockout time for relays **1, 2, and 3** 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. Use the keypad to enter a time then press "**ENT**".
N**OTE: All Times are in Hours and Minutes**

15 Alarms

The Model 3205 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 alarm screen and any configured alarm relays will be activated. If a high conductivity alarm is received, the blow relay 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 ALM= 5000μS
LOW ALM=   100μS
```

16 Water Meter

The Model 3205 controller 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.

To get to the water meter configuration screen:

- From the **main menu**, press "**5**" **WATER METERS**.

- The water meter 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.

<pre>┌─────────────────────┐
│   WATER MTR   │
│   TYPES   │
│ 1 CONTACT HEAD   │
└─────────────────────┘</pre>
	1 CONTACT HEAD
	2 PADDLE WHEEL
	3 AUTOTROL 1 IN
	4 AUTOTROL 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 meter count 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 meter count to zero. Press "**1**" for **YES** or press "**2**" for **NO**.

If **AUTOTROL TURB 1 IN.** is selected**:**
- You will be asked if you want to reset the meter count to zero. Press "**1**" for **YES** or press "**2**" for **NO**.

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

You will be asked if you want to reset the meter count to zero. Press "**1**" for **YES** or press "**2**" for **NO**.

17 Set-up the 4-20mA Output

The Model 3205 has one 4-20 mA output that is configured for conductivity.

To set up the 4-20 mA output:

- From the **Main Menu**, press "**6**" **4-20 mA 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.

<pre>┌─────────────────────┐
│ 4-20 MA OUTPUT   │
│ 1 SET RANGE   │
└─────────────────────┘</pre>
	1 SET RANGE
	2 MANUAL CTRL
	3 CALIBRATE

17.1 Set the 4-20mA Range

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

- From the **4-20 mA OUTPUT** 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**".

17.2   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 and restore automatic control of the 4-20 mA output press "**BACK**".

17.3   Calibrate the 4-20mA Output

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 OUTPUT** 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**".

18   System Set-up Menu

The system setup menu is used to initialize the controller or calibration, and check the firmware version. To reach the **SYSTEM SETUP MENU:**

- From the **MAIN MENU** press **"7" SYSTEM SETUP.** The following screen will appear.

<table>
<tr><td>SYSTEM SETUP
1 INITIALIZE</td><td>1 INITIALIZE
2 FIRMWARE VER</td></tr>
</table>

18.1   Initialize

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 "**1**" **INITIALIZE**.
- Press "**2**" **WHOLE CTRLR.**   You will then be asked "**ARE YOU SURE?**". Press "**1**" for **YES** or press "**2**" for **NO**.

To initialize just the calibration:

- Press "**1**" **CALIBRATION** instead of "**2**" **WHOLE CONTROLLER** in the procedure above. The same message will appear.

18.2 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 "**2**" **FIRMWARE VER**.

  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.

19 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:

```
TUE 24 AUG '04
   15:02:41
```

- Press "**CAL**" to change the clock settings.
- 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.

20 Maintenance

Periodic maintenance is required to ensure trouble free operation of the Model 3205 controller. The following sections cover the required maintenance.
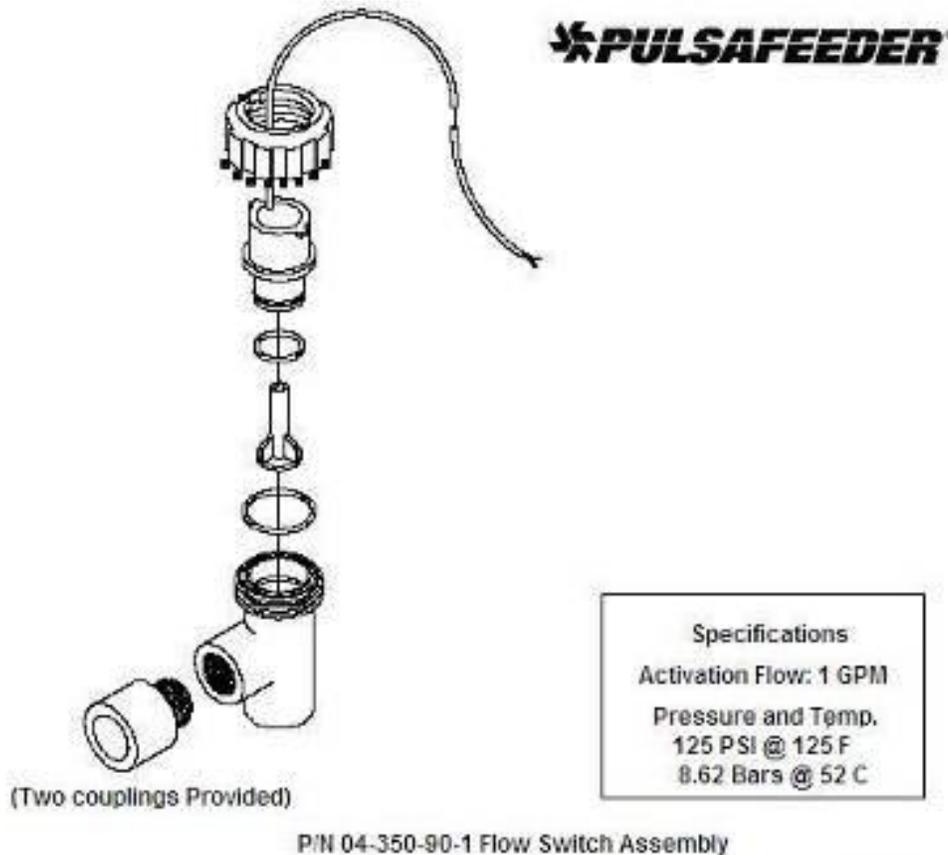

20.1 Sensor Maintenance

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.
- Verify operation before leaving area.

20.2 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, flow sight 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.

Specifications

Activation Flow: 1 GPM

Pressure and Temp.
125 PSI @ 125 F
8.62 Bars @ 52 C

(Two couplings Provided)

P/N 04-350-90-1 Flow Switch Assembly

21 Replacing the Fuses

The Model 3205 contains a two 5 x 20 mm, European-style fuses. 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.

115/230V power selector switch

100mA, 250V slow blow fuse

10A, 250V fast blow fuse
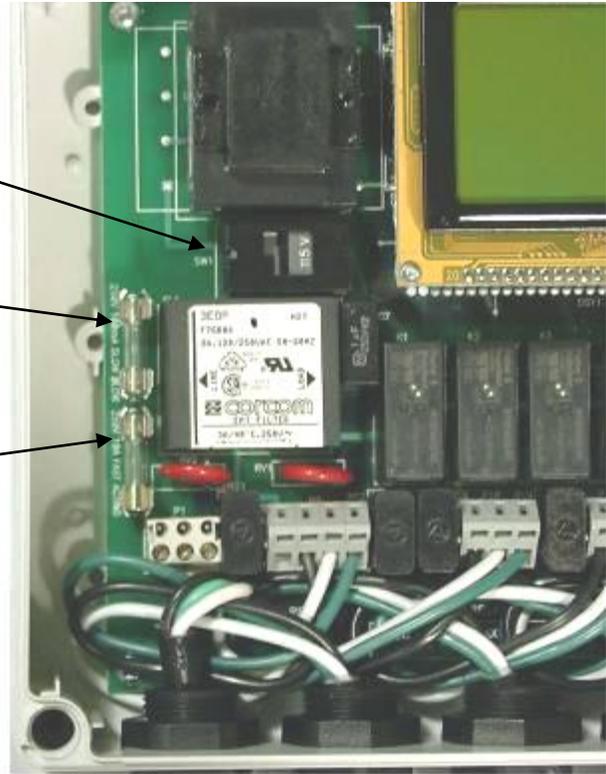
22 Troubleshooting

22.1 Error Messages

This section discusses some of the more common questions with the Model 3205. 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" OR "CONDUCTIVITY LOW"	Conductivity is too high or low with respect to the high or low alarm setpoint.	1. See problem "RELAY TIMEOUT". 2. Check the chemical pump operation. 3. The chemical drum is empty. 4. Check the High or Low Alarm Value. 5. Check relay setpoints and deadbands. 6. Insure the system is not overflowing.
Water meter not accumulating.	There may be a problem with the wiring or the reed switch in the meter may be bad. For water meters other than the contacting head type, check the manufacturer's user manual for that particular water meter.	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.	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.	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. If no flow switch is used, a jumper wire should be installed across the flow switch input. Removing the jumper disables all relay outputs.

PROBLEM	WHAT THIS MEANS	CORRECTIVE ACTION
{Alarm Flashing} **"RELAY TIMEOUT".**	This indicates that the controller has been trying to operate a relay for longer than the user-programmed time and is unable to reach the setpoint.	1. Check for proper operation of the pump or valve. Use the manual relay control to help. 2. Check the relay configuration and verify settings. 3. Check chemical levels in the drums or totes. 4. Verify operation of water meters. 5. Momentarily shut off system flow to reset alarms.
{Alarm Flashing} **"OPENED TC".**	Temperature compensator not being properly read.	1. Check sensor wiring. 2. Verify Temperature Compensation setting in the Process Parameters screen. 2. Replace conductivity sensor.
{Alarm Flashing} **"SHORTED TC".**	Temperature compensator not being properly read.	1. Check sensor wiring. 2. Verify Temperature Compensation setting in the Process Parameters screen. 3. Replace conductivity sensor.
Motorized ball valve functions, but will not remain "open" or "closed" as expected.	The motorized ball valve is not indicating to the 3205 that it has actually reached the open or closed position.	Adjust the limit switch for the motorized ball valve.

22.2 Factory Service
Factory Service Policy

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.

Service Guide

When calling Pulsafeeder, please have your controller's complete model 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.
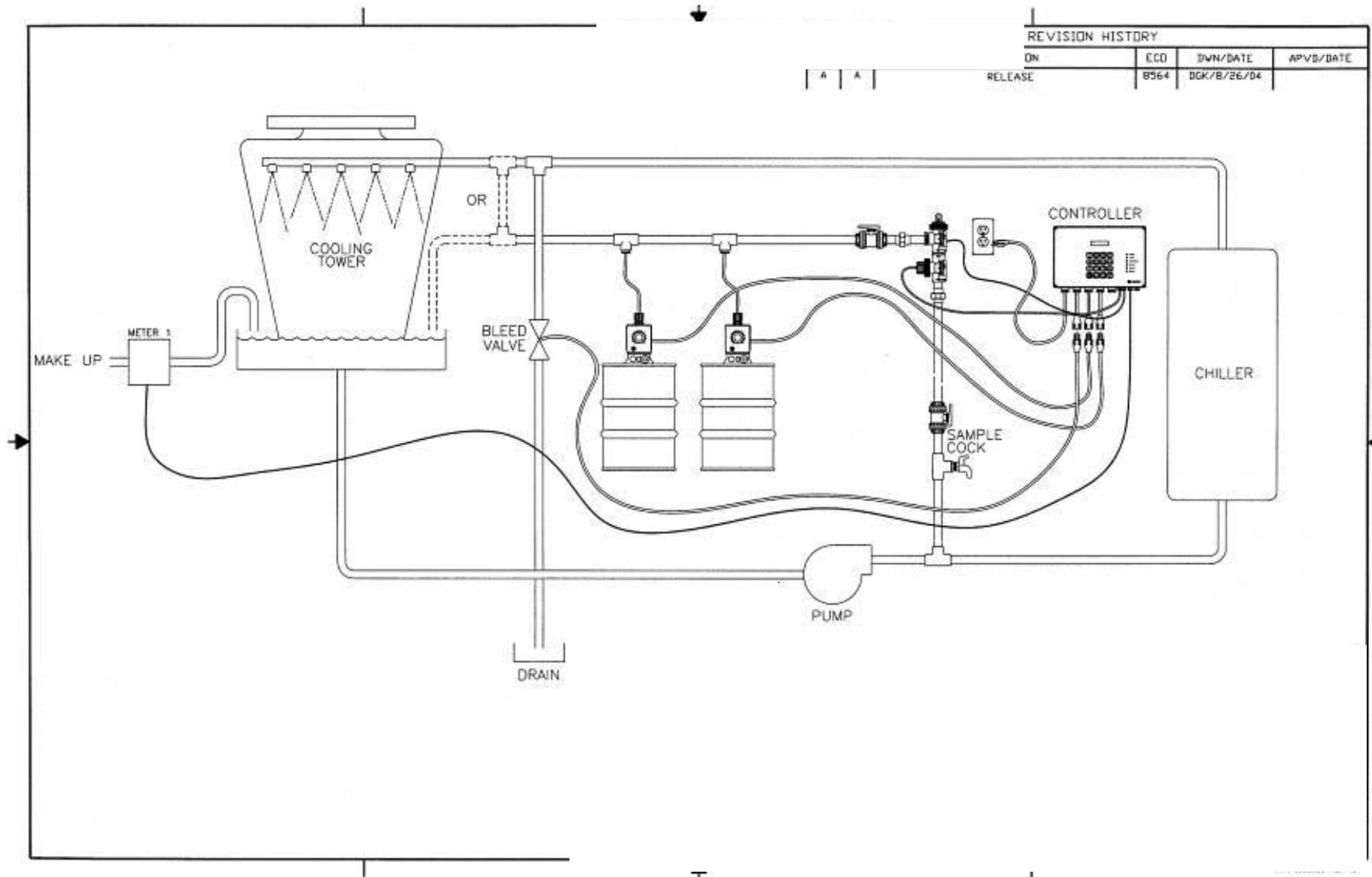
Write your controller's complete model number, serial number, and firmware version here so that you will have them available if you wish to contact a Pulsafeeder technician.
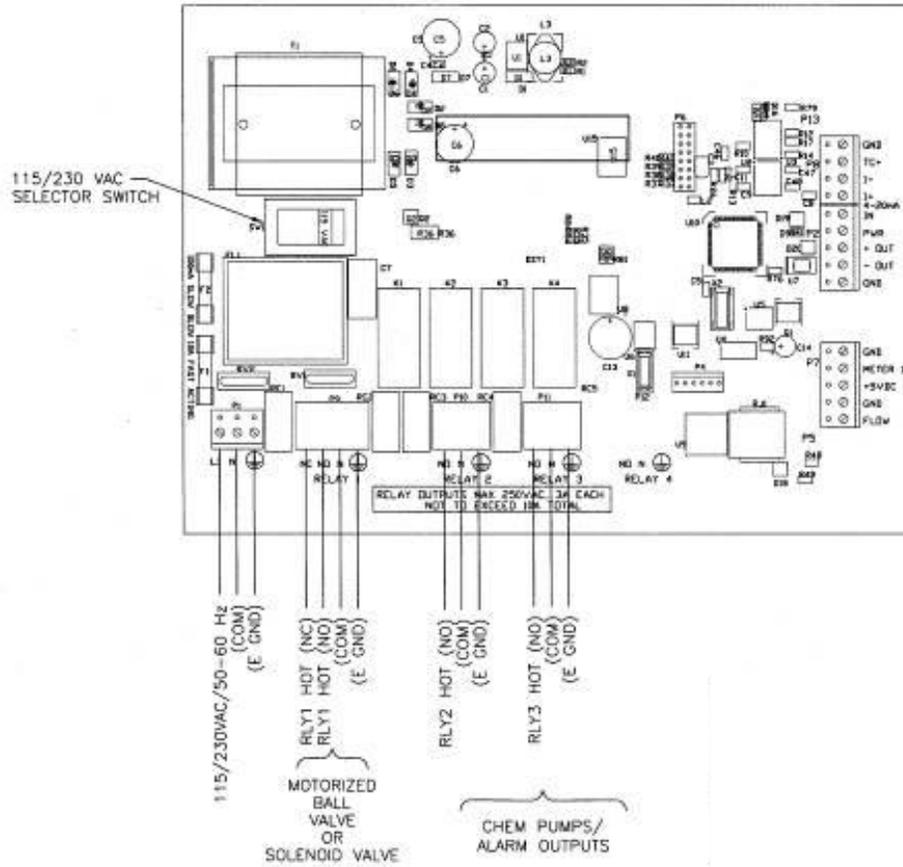
Model Number:

Serial Number:

Firmware Version:

23 Drawings

115/230 VAC SELECTOR SWITCH

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

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

RLY1 HOT (NC)
RLY1 HOT (NO)
(COM)
(E GND)

MOTORIZED BALL VALVE OR SOLENOID VALVE

RLY2 HOT (NO)
(COM)
(E GND)
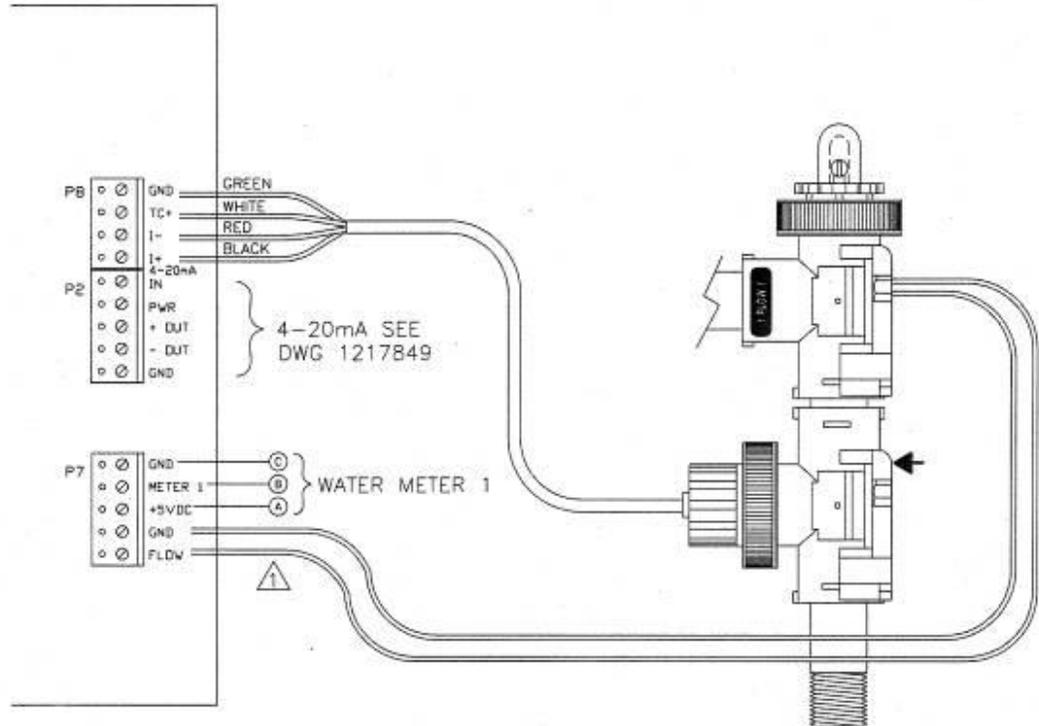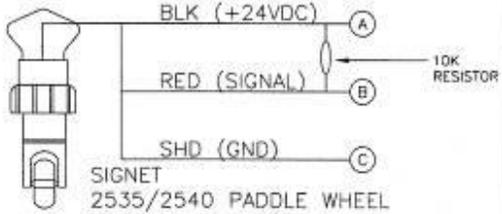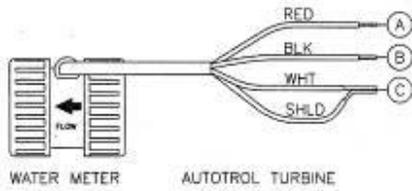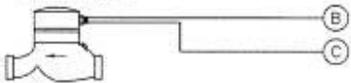
RLY3 HOT (NO)
(COM)
(E GND)

CHEM PUMPS/ ALARM OUTPUTS

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

ION		ECO	DWN/DATE	APVD/DATE
SE		8564	DGK/8/26/04	

P8
GND — GREEN
TC+ — WHITE
I- — RED
I+ — BLACK

P2
4-20mA IN
PWR
+ OUT
- OUT
GND

} 4-20mA SEE
DWG 1217849

P7
GND — C
METER 1 — B
+5VDC — A
GND
FLOW

} WATER METER 1

⚠

CONTACTING HEAD TYPE
WATER METER
B
C

RED — A
BLK — B
WHT — C
SHLD
FLOW

WATER METER   AUTOTROL TURBINE

BLK (+24VDC) — A
10K RESISTOR
RED (SIGNAL) — B
SHD (GND) — C
SIGNET
2535/2540 PADDLE WHEEL

P/N 1038130 REV B

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	ECD	DWN/DATE	APVD/DATE
	8564	DGK/8/26/04	

NOTES: UNLESS OTHERWISE SPECIFIED;

⚠ FOR INTERNAL 24VDC JUMPER WIRE IS REQUIRED.

NON-ISOLATED
4-20mA OUTPUT
WITH INTERNAL
24VDC POWER
SUPPLY

GND
TC+
I-
I+
4-20mA
IN
PWR ⚠
+ OUT
- OUT
GND

GND
METER 1
+5VDC
GND
FLOW

+
4-20mA DEVICE
-

GND

ISOLATED 4-20mA
OUTPUT WITH
EXTERNAL 24VDC
POWER SUPPLY

GND
TC+
I-
I+
4-20mA
IN
PWR
+ OUT
- OUT
GND

GND
METER 1
+5VDC
GND
FLOW

+24 VDC

+
4-20mA DEVICE
-

EXTERNAL
24 VDC
SOURCE

GND

P/N 1030130 REV B

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