PULSAtrol®

MICROPROCESSOR-BASED WATER
TREATMENT CONTROLLER

# MPT 100 SERIES

## MODELS MPT 110, MPT 120, MPT 150

INSTALLATION
OPERATION
MAINTENANCE
INSTRUCTION

$5.00 USA $6.25 CANADA 72-101-00

## PULSATROL@ FACTORY SERVICE POLICY

Your PULSAtrol™ controller is a state of the art microprocessor based unit with on-board diagnostics. If you are experiencing a problem with your PULSAtrol™ controller, first consult the troubleshooting guide in your operation and maintenance manual. If the problem is not covered or cannot be solved, please contact our Technical Services Department for further assistance.

Trained technicians are available to diagnose your problem and arrange a solution. Solutions may include purchase of replacement parts or returning unit 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.

## PULSATROL@ WARRANTY

Pulsafeeder, Inc. warrants PULSAtrol™ 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. 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 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.

Note: pH probes are not covered under the PULSAtrol™ warranty. These items carry their own manufacturer's warranty.

## FCC WARNING

This equipment generates and uses radio frequency energy. If not installed and used properly, in strict accordance with the manufacturer's instructions, it may cause interference to radio communications. It has been type tested and found to comply with the limits for a class A computing device pursuant to subpart J of part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial or industrial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures necessary to correct the interference.

# Contents

# 1. INTRODUCTION

The PULSAtrol™ Series of microprocessor based controllers have been designed to control and monitor a wide range of parameters, both analog and digital.

This instruction manual covers the MPT 100 Series of PULSAtrol™ controllers. Refer to Table 1 for the specific standard features and options for the model number of your controller. All standard features are covered in this manual and most options have instructions where applicable.

**IMPORTANT!** While using this manual, if you see instructions for a feature that does not display on your controller, check the following:

- Consult Table 1 to see if that feature is available for your controller either as standard or option.
- Refer to the model number of your controller found on the enclosure of the unit. The letters after the model number are the options installed (i.e. MPT110 APB).
- After the above steps, if feature does not display, reinitialize the unit. If that fails, consult the factory.

For your convenience, there is an abbreviated instruction and software "MENU MAP" laminated card supplied with all manuals to be kept with the controller. This card is not a substitute for this instruction manual. It is supplied as a quick reference only and should be used in conjunction with the instruction manual.

## DESCRIPTION

The MPT110 is a single biocide controller, while the MPT120 offers dual biocides. They are both designed to automatically control the feed of biocide into a cooling water system. PULSAtrol™ biocide programs are 28 day cycles. Each biocide has four individual programs with a wide range of day and week setting combinations. The biocide program timer incorporates bleed lock-out which allows another controller (such as a conductivity controller, which regulates system blowdown) to be interfaced with the biocide timer.

The MPT110 and MPT120 are designed to accept options such as the mounted flow assembly with flow switch.

The PULSAtrol™ MPT150 automatically controls the addition of inhibitor with a design that incorporates a Selectable Inhibitor Feed Timer. The selectable timer allows the user to choose 1 of 3 timer modes on which to base the addition of inhibitor.

1. "LIMIT TIMER" Interfaced and used in conjunction with an existing bleed and feed controller, the Inhibitor Timer is actuated simultaneously with blowdown. The timer limits feed time during any single blowdown cycle, preventing overfeed.
2. "PERCENT TIMER" The Inhibitor Timer runs continuously for an adjustable time cycle, with output being activated for an adjustable percent of the time cycle.
3. "PULSE TIMER" The controller accepts pulses from a contact head water meter located in the make-up line and/or blowdown line of the cooling system, to activate the Inhibitor Timer for an adjustable amount of time based on the amount of pulses received.

A mounted flow assembly (Option B) with quick release electrode, flow switch and sample cock is available for the ease and convenience of installation and to facilitate periodic maintenance and sampling. The flow switch disables the outputs of the controller when flow is discontinued in the flow assembly.

A Lithium battery maintains the clock while the EEPROM protects operating parameters during power outages. Hand/Off/Auto keys are provided on the keypad for immediate control of pumps, solenoid valves, etc., without scrolling through menus.

**TABLE 1 The MPT100 Series**

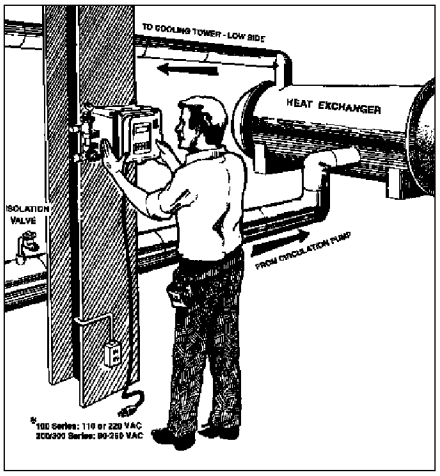
**STANDARD FEATURES**

| MPT110 | MPT120 | MPT150 |
|---|---|---|
| Single Biocide | Dual Biocide | Single Selectable Timer |

**OPTIONS**

| MPT110 | MPT120 | MPT150 |
|---|---|---|
| **A** Conduit | **A** Conduit | **A** Conduit |
| **B** Flow Assembly | **B** Flow Assembly | **B** Flow Assembly |
| **D** Alarm Output Relay | **E** Biocide | **D** Alarm Output Relay |
| **K** Dry Alarm Contact | **K** Dry Alarm Contact | **H** 28 Day Single Biocide |
| **P** 220 VAC @ 50/60 Hz, requires Option A | **P** 220 VAC @ 50/60 Hz, requires Option A | **K** Dry Alarm Contact |
| | | **P** 220 VAC @ 50/60 Hz, requires Option A |

# 2. INSTALLATION




**!!WARNING!!**
**CONTROLLER COULD BE DAMAGED AND VOID WARRANTY!**

**Avoid locations where the controller would be subjected to extreme cold or heat [less than 0@F (-17.8@C) or greater than 122@F (50@C)], direct sunlight, vibration, vapors, liquid spills or EMI (electromagnetic interference; i.e., strong radio transmission and electric motors).**

## LOCATION

Select a mounting location convenient to grounded electrical and plumbing connections. Mount the controller on a wall or other verticle surface with adequate lighting. Position so operator has access to the unit and a clear view of front panel display. Refer to Diagram 1, pg. 17, Standard Enclosure Dimensional Data and Mounting Hole Template for mounting details of our standard enclosures. An actual size Mounting Template (Attachment A) is provided for your convenience. Avoid locations where the controller would be subjected to extreme cold or heat [less than 0°F (-17.8°C) or greater than 122°F (50°C)], direct sunlight, vibration, vapors, liquid spills or EMI (electromagnetic interference; i.e., strong radio transmission). Installation should comply with national, state, and local codes.

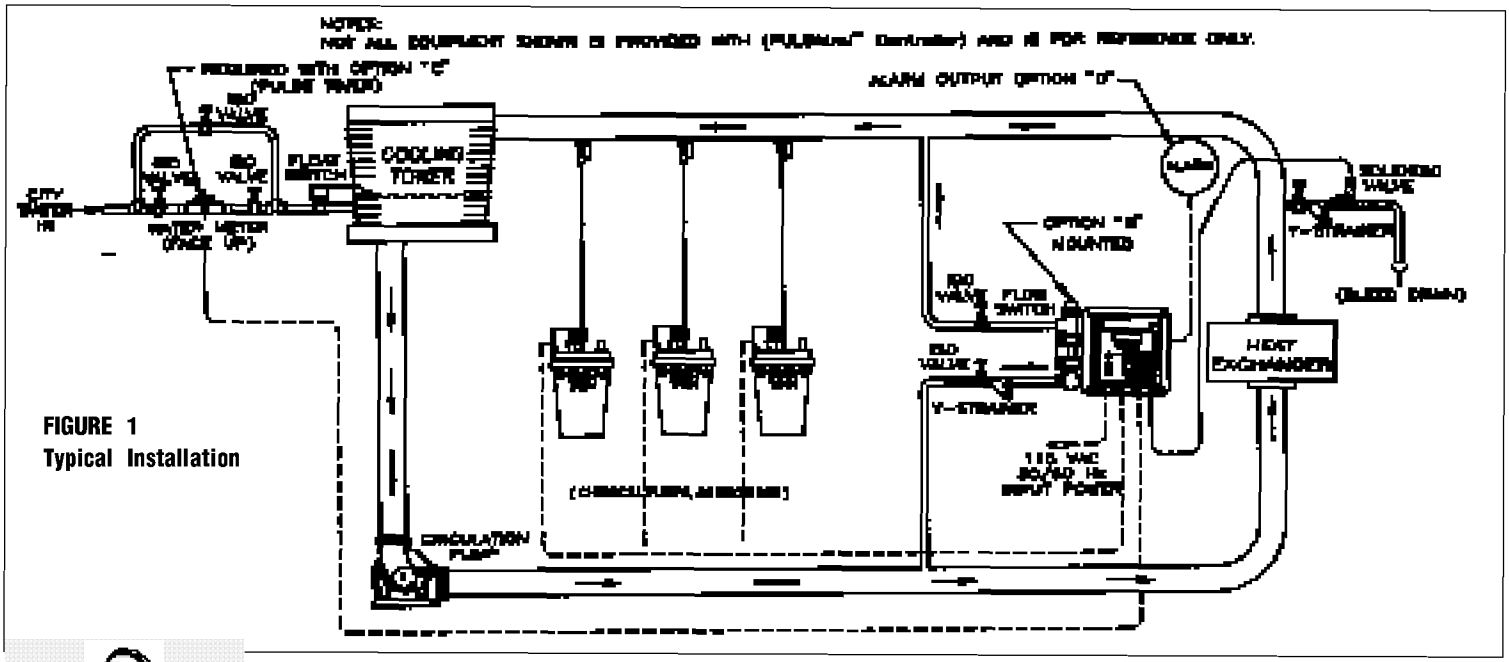



**FIGURE 1**
**Typical Installation**

**NOTICE**

**The flow assembly option, if ordered with this controller, is constructed of durable glass filled polypropylene (GFPPL). Standard connection to flow line is 3/4@ NPT. A PVC thread to slip adapter is provided so that a PVC weld joint, if preferred, can be**

## INSTALLATION NOTES

1. Install sample stream flow assembly at some point before chemical injection points, where chemical and water are thoroughly mixed. Refer to Fig. 1.

2. Inlet pressure of the sample flow assembly must have a flow rate of at least 1 GPM (gallons per minute) so system water will flow through the assembly.

3. Install strainer on the upstream side of the flow assembly to collect debris that might affect controller operation.

4. Install hand valves on each side of the flow assembly for easy isolation and removal of sensors and strainer screens (see Fig.1).

5. Direction of flow should be from the bottom to the top of the flow assembly (see Fig. 2).

6. A manual needle valve should be installed in the blowdown line

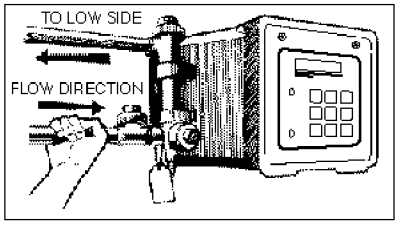



**FIGURE 2**
*Hand tighten all NPT connections until snug plus 1/2 turn.*

*Note that a pressure differential must exist between the High and Low side for proper flow.*

on the system side of the solenoid valve. This will be used for isolating and throttling (controlling the flow rate of blowdown) blowdown assembly if blowdown is incorporated.

7. Most solenoid valves require a pressure differential of 7 to 15 psi to close if blowdown is incorporated. If this is not available, install zero pressure solenoid valve.

8. Always install a strainer upstream of the solenoid valve to collect debris that may clog solenoid valve if blowdown is incorporated.

9. For proper operation and accuracy, install water meters horizontally with meter face up if Pulse Timer mode is used.

10. If chemicals are to be injected into a sample line (not recommended) always use a back check valve to prevent chemicals from backing up around the flow assembly. if incorporated.

11. Plug existing blowdown controller into receptacle provided for bleed (blowdown) lock-out. See Fig. 1, pg. 5.

12. If a flow assembly or sample stream assembly is present, never install blowdown valve off these lines. System will not achieve proper blowdown and accuracy of controller readings may be affected.

## ACCESSORIES

(Available through your Pulsafeeder distributor or sales representative, not included as standard. Chemical Metering Pumps may be the only accessories required for Model MPT 110 and MPT 120).

1. Two manual gate valves, one on each side of the electrode or flow assembly if controller incorporates a flow switch, to isolate the electrode or flow assembly for installation and routine maintenance.

2. One needle valve, for isolating and throttling blowdown assembly if controller incorporates a blowdown valve.

3. Three manual gate valves, for isolating, by-passing and maintenance of water meter, if controller incorporates a water meter (optional).

4. Solenoid valve, if system incorporates blowdown.

5. Two Y-strainers, one before solenoid valve and the other before flow assembly.

6. Chemical metering pumps as required.

7. Contact head water meter, if controller incorporates a pulse timer (optional).

8. External alarm, if controller incorporates alarm relay. Refer to Fig. 1, pg. 5.

**!!CAUTION!!**

**Line voltage is present on the power supply located behind the Safety/EMI cover behind the front panel. Line voltage is also present on the relay board located in the bottom of enclosure, even when power is off.**

**POWER MUST BE DISCONNECTED WHILE CONNECTIONS ARE BEING MADE!**

## ELECTRICAL WIRING

The PULSAtrol™ MPT100 Series electronic circuitry is protected by a (Bussman BK/PCE-1) 1 amp fuse (F4). While each output relay is individually protected by replaceable (Bussman BK/PCE-5) plug-in 5 amp fuses (F1, F2, F3) located on the power supply/relay board. Refer to Diagram 2, Power Supply/Relay Board, pg. 18. Use of a surge protector is strongly recommended!

The controller should be connected to its own 15 amp power branch

(i.e., its own wiring, circuit breaker, etc.)

Prewired units are supplied with 10 foot, 18 AWG 3 wire grounded power cords and clearly marked 18 AWG 3 wire grounded receptacle cords for all controlled line voltage outputs.

Conduit units are factory predrilled with easily accessible terminals for hard wiring. See Diagram 5, pg. 30, for input and output power connections. Use only 16 or 18 AWG wire for conduit power and load connections. Never run power and signal wiring (sensor, proportional or recorder outputs) together in same conduit. Low voltage signal wiring (i.e., water meter, remote sensors, etc.) should be separate from AC power lines.

NOTE: Liquid tight fittings are provided for all low voltage signal leads.

When connections are required by the end user, follow the instructions below. All electrical diagrams, circuit boards, etc., are located in Section 5, pages 17-22.

**NOTICE**

**For proper rejection of AC line voltage spikes, sensor EMI, noise rejection and personal safety, the case ground (SAFETY GROUND) must be properly installed. If ANY doubt, consult a qualified electrician.**

### OPEN ENCLOSURE

Remove the screws from upper control panel and open panel.

### FLOW SWITCH OR INTERLOCK (Option K)

It is recommended that a flow switch or auxiliary dry contact from control panel be used to make outputs inoperative when cooling tower is shut down. This connection is provided for on all units with or without mounted flow assembly. If a flow switch is not ordered with unit, this function will be inoperative. To use the interlock feature, connect a flow switch or auxiliary dry contact from another device (see Fig. 3). Refer to Diagram 4, Daughter Board, pg. 20, for flow switch or interlock connection marked JP1 pin 7 and 8, Flow Switch. To activate function, turn switch S1-"2", Fig. 4 (located on the Mother Board, Diagram 5, pg. 21) on and turn power off, wait 15 seconds and turn back on.

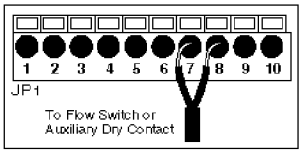



**FIGURE 3**
*Flow switch or interlock connection.*

**!!WARNING!!**
**CONTROLLER COULD BE DAMAGED AND VOID WARRANTY!**

**Analog outputs are self powered. Do not try to externally loop power. Externally powered outputs will damage your controller!**

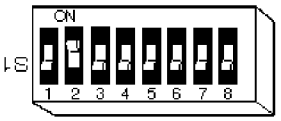



**FIGURE 4**
*Dip switch S1-"2" shown in "on" position to activate interlock function.*

### WATER METER (FOR PULSE TIMER)

If a Selectable Inhibitor Feed Mode is present and the Pulse Timer Mode is chosen, connect the water meter on daughter board to connector JP1 pin 9 and 10, Water Meter (see Fig. 5). Refer to Diagram 4, Daughter Board, pg. 20, for location of these connections.

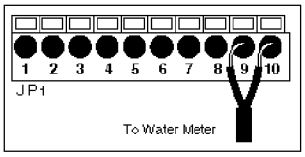



**FIGURE 5**
*Water meter connection*

**NOTE:**

**The solid state relays used in the PULSAtrol™ result in a small leakage current at all receptacles. While this can possibly be detected by a voltmeter, it is insufficient to power any typical electrical device.**

### ALARM DRY CONTACT

Alarm dry contacts (Rated @ 500 mA) are provided when Option K has been ordered for user connection. Refer to Diagram 2, pg. 18, Power Supply/Relay Board.

### RECEPTACLES

The PULSAtrol™ offers a unique prewired package that allows for easy installation. Each cord is clearly marked and readily accessible for connecting external electrical devices to be controlled.

# 3. Start Up Instructions

**NOTE:**

**The controller must be initialized at start-up to function properly.**
**Also, any extended period of power failure combined with loss of battery power will necessitate reinitializing your controller.**

**!!WARNING!!**
**CONTROLLER COULD BE DAMAGED AND VOID WARRANTY!**

**UNIT WILL FAIL if Initialization procedure is not followed properly.**

**READ THE FOLLOWING BEFORE PROCEEDING ANY FURTHER!!**

## INITIALIZATION

This unit requires initialization upon start-up (see Figs. 6-9 at right). There is a lithium battery backup that protects the time and history files during power outages that must be enabled as follows:

1. Before power is supplied, open front panel by loosening the two screws holding the front cover closed with a phillips screwdriver .

2. Locate switch S1 on the mother board, Fig. 7 (also refer to Diagram 5, pg. 21). Assure switch S1-"8" is in the "on" position.

3. With the unit open, locate the battery in the corner of the mother board, behind the front panel. Remove the paper from under the battery clip, Fig. 8.

4. With the front panel closed, turn unit on for 15 seconds. After 15 seconds turn unit off, disconnect power, open front panel. Change switch S1-"8" to the "off" position. (Refer to Diagram 5, pg. 21)

5. Close front panel. Connect power, turn unit on. The unit is now ready to be configured and programmed, Fig. 9.

## FRONT PANEL

Take a moment to review Fig. 10, to become familiar with the MPT100 Series controler front panel.

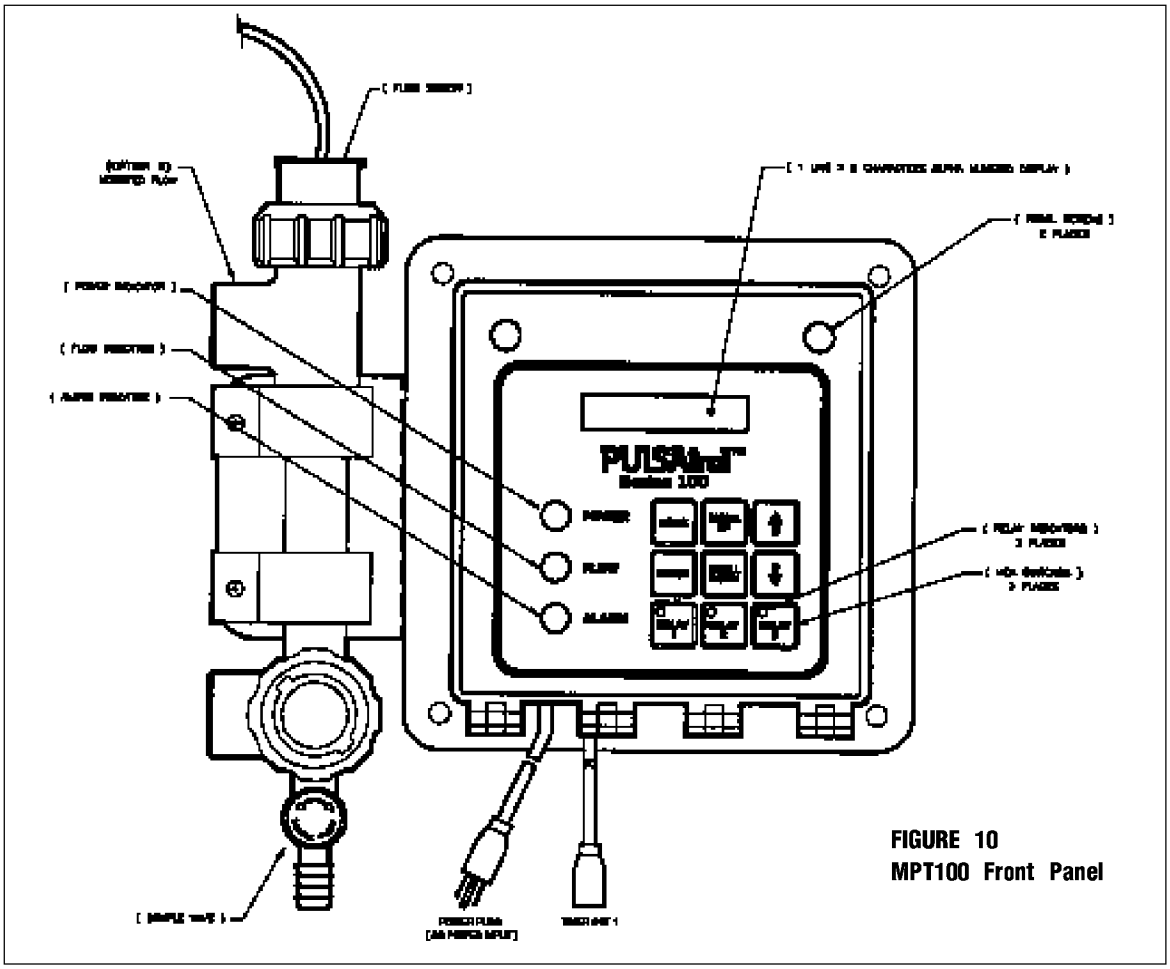



**FIGURE 10**
**MPT100 Front Panel**

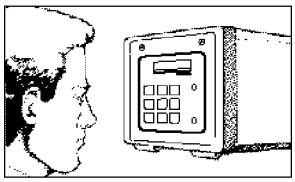


**FIGURE 6**
*Read instructions on cards taped to inside of the plastic cover.*

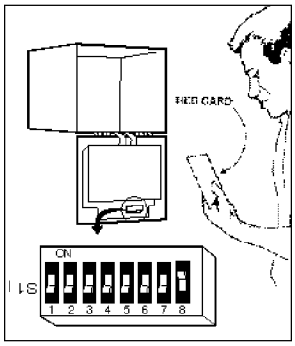



**FIGURE 7**
*Open front cover. Remove packing material. Locate switch S1.*

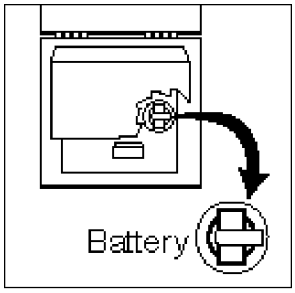



**FIGURE 8**
*Remove paper from between battery and clip.*

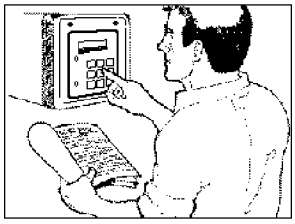


**FIGURE 9**
*Close unit's cover then configure the controller per the user's manual*

**TIP:**

**For help with menu locations, please refer to the @Menu Map@ supplied with your controller.**

## MENU STRUCTURE

The PULSAtrol™ menu structure as well as the hardware were designed with the user in mind. The menu structure or map diagram supplied with the controller was generated to reflect a PULSAtrol™ MPT100 Series controller. The laminated "MENU MAP" supplied with your controller reflects your system with options.

**SYS DATA or DISPLAY (System Data)** This menu displays system parameters only. No settings or adjustments are made through this menu. Date and Time is displayed on the MPT150 model. Date, Time, and any programmed Biocide is displayed on the MPT110 and MPT120 models.

**TIMER (Selectable Inhibitor Feed Timer, standard on MPT150, Option C for MPT110 and MPT120)** In this menu, the user enters the settings pertaining to the inhibitor feed mode chosen in the Configure menu.

**BIO A & B (Biocide Programs, standard on MPT110 and MPT120 models, Option H on MPT150)** In this menu, the user is prompted to enter all settings pertaining to the biocide program timer.

**CONFIGUR (System Configure)** This is generally the first selection made at start up. In this menu, the user is prompted to configure system functions and options to your specific application. Depending on your model of controller, System Configure can include such things as time, date, day, week, selection of inhibitor feed mode, analog output, and system version number.

**NOTE:**

**After five minutes of no keypad activity, the controller will display Date and Time.**

## KEY PAD OPERATION

The Key Pad on the MPT100 series is easy to use and will guide you through all the sub menus and functions of the controller.

Feel free to try out these keys as you read about them. You will not hurt the controller and the values will need to be reprogrammed later anyway.

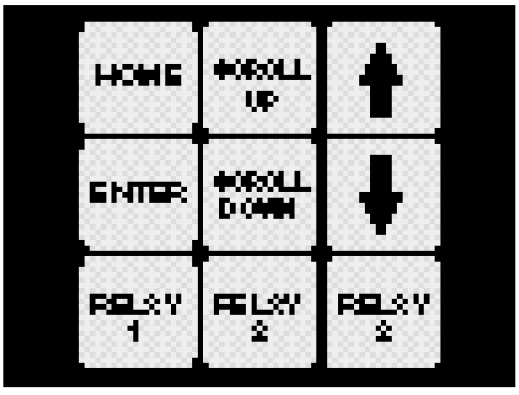
**Home** Press this key to return to previously displayed menu.

**Scroll Up/Scroll Down** Some menus contain more choices than can be displayed at once. Press either key to reveal other items on menu displayed. If no other choices are present, nothing will happen when pressing Scroll Keys. The Menu Map supplied with your controller will show you which menus need to be scrolled to show additional choices.

**TIP:**

**When using the Arrow Keys, press once to change numbers by one unit. Continuously holding down either Arrow Key will change numbers more rapidly.**

**Arrows** The Arrow Keys are used to change the numerical values associated with the various settings you will be entering. Use "down" arrow to select lower numbers and the "up" arrow to select higher numbers.




**Enter** This key has two functions:

FIRST, within a sub menu, pressing the Enter Key will activate the selection.

SECOND, after selecting the value needed with the Arrow Keys, press the Enter Key to "lock-in" the value. The next value to be set (if one exists) that particular sub-menu will be displayed .

**Relays (1-3)** These Hand/Off/Auto (HOA) keys allow immediate control of pumps, solenoid valves, etc. affected by the controller without scrolling through the menus. Press a Relay Key once to force relay on for 5 minutes (an amber light will appear below that key). Press Relay Key again to force relay off (a red light will appear below that key). Press a Relay Key a third time to return relay to auto control (green light will indicate that relay is on, no light indicates that relay is not activated).

## SAMPLE PROGRAMMING

The following is a detailed example of how to program your controller. Once you have mastered this exercise, you will be ready to set up the controller to your specifications.

IMPORTANT! Please note that in all programming instructions, keypad instructions are presented as all capitals—"ENTER", items as they appear in the display are presented as all capitals and bold face—"**SYS DATA**."

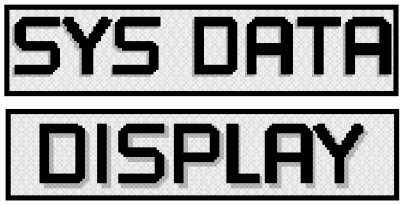
For this exercise, you will set the Date and Times configuration.

**IMPORTANT:**

**NEVER leave a screen with choices still @lashing@ Controller accuracy may be affected, and/or controller may not operate properly. If you forget, simply return to that menu and complete your programming.**

**TIP:**

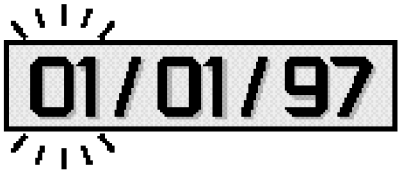
**Be sure to press keys firmly until you feel or hear a faint click, then pause before you try again. There is a very slight delay for the controller to react to your command. This is normal.**



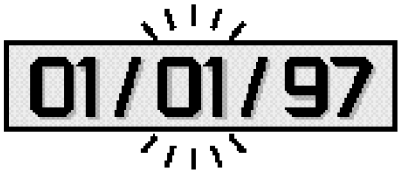

1. If not already displayed, press HOME key until display shows **SYS DATA** (or **DISPLAY** on the MPT150).


2. Press SCROLL DOWN key until **CONFIGUR** appears in display.

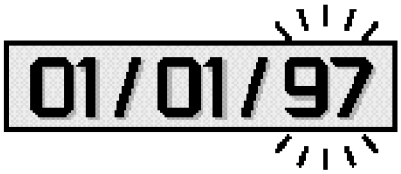

3. Press ENTER. **DATE** will appear in the display. Press ENTER.




4. The Date will display with month flashing. Use the ARROW keys to set the month. Press ENTER.




5. The Date will display with day flashing. Use the ARROW keys to set the day. Press ENTER.




6. The Date will display with year flashing. Use the ARROW keys to set the year. Press ENTER. Note: the date will not be set unless month, day,and year have all been entered.


7. The next item in the **CONFIGUR** menu, **TIME**, will appear in the display. Press ENTER.


8. The Time will display with the hour flashing. Use the ARROW keys to set the hour (24 hour clock). Press ENTER.


9. The Time will display with minutes flashing. Use the ARROW keys to set the minutes. Press ENTER.

**TIP:**

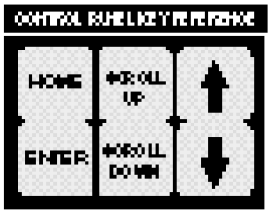
**If at any time, while programming your controller, you get lost or confused, press the HOME key repeatedly until you get back to the Main Menu and start again.**

10. The next item in the **CONFIGUR** menu, such as **DAY** for the MPT110 and MPT120, or **VERSION** for the MPT150 will display. These are configured in the same manner as Date and Time, or in the case of Version, it simply displays the version number of the software currently installed in your controller. Press HOME repeatedly until SYS DATA or DISPLAY is displayed.

This concludes the sample programming exercise. The instructions for the functions in this exercise, as well as all **CONFIGUR** menu items are explained in the System Configure section in this manual, pg. 12.

Repeat this exercise until you feel comfortable with the programming procedure. All functions of the MPT100 Series controllers will programmed using this same technique.

# 4. MCT110 CONTROLLER SET UP




## GENERAL INFORMATION

Before applying power, insure that devices being controlled are not in a position to cause harm or damage if activated upon initial start-up. With the controller now installed in a convenient location, INITIALIZE Controller (see warning at left!). Supply power to the controller. The power LED indicator light will be illuminated. When controller is powered up, it will show **SYS DATA** (**DISPLAY** for MPT150) in the display.

The PULSAtrol™ is a flexible yet powerful controller. The default values for all Control features have been factory set, but you will want to fine tune the controller to meet your specific application.

**!!WARNING!!**
**CONTROLLER COULD BE DAMAGED AND VOID WARRANTY!**

**Controller must be initialized at start up! Refer to Section 3 General Instructions, Initialization, before proceeding any**

## SYSTEM CONFIGURE

Configure the controller functions using the key pad and supplied Menu Map. To begin, if **SYS DATA** does not show in the display, press HOME repeatedly until **SYS DATA** is displayed. Proceed with the following:

SYS DATA

**NOTE:**

**When Initializing or Re-Initializing your controller, all of the system settings will overwritten by original factory default settings. The controller must be reconfigured to your specifications.**

**A) Set DATE:**

1. Press SCROLL DOWN until **CONFIGUR** is displayed.

CONFIGUR

2. Press ENTER, **DATE** will be displayed, press ENTER.

DATE

3. Month/ Date/Year (shown as **01/01/97**) will be displayed with Month flashing. Use ARROW keys to enter the current month. Press ENTER. Do the same procedure to set Date and Year. Press ENTER when finished with Year. **TIME** should display next.

01/01/97

**B) Set TIME:**

1. With **TIME** displayed in the window, press ENTER.

TIME

2. Hours:Minutes (24 hour clock shown as **00:00**) will be displayed with Minutes flashing. Use the ARROW keys to enter the current minutes. Press ENTER, Hours will begin to flash. Use ARROW keys to enter current hour. Press ENTER, **DAY** should display next.

00:00

**TIP:**

**After pressing ENTER at the end of a setting procedure, if the next item to be set within a submenu does not display, press the HOME key to return to the submenu title then press SCROLL UP or SCROLL DOWN until you see the item to be set next.**

**C) Set DAY (MPT110 and MPT120 only):**

1. With **DAY** displayed in the window, press ENTER.

DAY

2. **SUNDAY** or another day of the week will be displayed. Use the SCROLL keys to show the current day. Press ENTER, **WEEK** should display next.

SUNDAY

**D) Set WEEK (MPT110 and MPT120 only):**

1. With **WEEK** displayed in the window, press ENTER.

WEEK

2. **1ST WEEK** or 2nd through 4th week will be displayed. Use the SCROLL keys to show the current Week. Press ENTER, **VERSION** should display next.

1ST WEEK

**NOTICE:**

**When configuring Inhibitor Feed Timer in System Configure menu, you may select only one of the modes present.**

**E) View VERSION**

This selection lets you view the system software version which is installed on your controller. No settings or adjustments can be made in this menu. This is for information purposes only.

1. With **VERSION** displayed in the window, press ENTER.

2. **2.00** or whatever version software that is installed in your controller will be displayed. Press ENTER, **TIMERSEL** (on MPT150 only, or equipped with Option C) should display next. If your controller is a MPT 110 or MPT 120 without Option C, press HOME key repeatedly to return to **SYS DATA**.

VERSION

2.00

**F) Set SELECTABLE TIMER (Standard on MPT 150 or Option C)**

This selection lets you choose the method desired to control the operating duration of the inhibitor feed pump when activated by system blowdown. This will be the inhibitor feed mode displayed in the **TIMER** menu.

1. With **TIMERSEL** displayed in the window, press ENTER.

2. **PULSE** will be displayed, flashing. Press SCROLL DOWN to display, **PERCENT** flashing. Press SCROLL DOWN to display **LIMIT**, flashing. By pressing either of the SCROLL keys, the display will "toggle" between the three options. Press ENTER when your choice is displayed. press HOME key repeatedly to return to **SYS DATA (DISPLAY)**.

TIMERSEL

2.00

**TIP:**

**For help with menu locations, please refer to the @Menu Map@ supplied with your controller.**

**SELECTABLE INHIBITOR FEED TIMER (Standard MPT150, Option C)**

MPT150 and MPT110/120 with Option C, will have this menu. The inhibitor feed timer is selectable; the user can choose one of three modes on which to base the addition of inhibitor. The selection of timer modes is made in the **CONFIGUR** menu. Only the mode selected in the **CONFIGUR** menu will be displayed in the **TIMER** menu. Refer to the following timer mode instructions for the mode selected in the **CONFIGUR** menu.

**10 Minute Percent Timer (PERCENT).**

Also referred to as cycle timer. The timer runs continuously on a ten minute cycle with the outputs being activated for a adjustable percentage of the ten minute cycle. The timer is adjustable in one percent increments up to 100 percent of ten minutes on time.

1. Press HOME key until **DISPLAY (SYS DATA for MPT110/120)** is displayed. Press SCROLL DOWN through the displayed main menus to **TIMER**. Press ENTER, **PERCENT** will be displayed.

2. Press ENTER and the factory setting or the last percent setting entered will be displayed flashing. Use the ARROW keys to display the desired percent of "pump on" time. Press ENTER to enter percentage. **PERCENT** will be displayed.

3. Press HOME repeatedly to return to **DISPLAY**.

DISPLAY

TIMER

PERCENT

5

PERCENT

**NOTE:**

**Electrical wiring is only required for water meter (if used) in the @ulse Timer@ mode. Refer to Electrical Wiring, pg. 6 in the instruction manual.**

**!!WARNING!!**

**If PULSE SET is entered to zero (0), pulse timer will run continuously.**

**NOTICE:**

**The Pulse Counter will store one (1) overlapping pulse, if received while pumping.**

**Pulse Timer/Accumulator (PULSE T)**

Also referred to as a water meter timer or reset timer. The timer accepts pulses from a water meter to actuate a chemical feed pump. The timer has an adjustable feed time, **DURATION** in 1 second increments up to 250 minutes and 59 seconds. The timer has a built in accumulator, **ACC SET** that can count pulses up to 255 before activating output. Also incorporated into the timer is a pulse totalizer, **TOTAL CT** that keeps an ongoing count of the number of pulses received by the timer. This pulse totalizer can be reset to zero by turning power off and back on.

1. Press HOME key until **DISPLAY** is displayed. Press SCROLL DOWN through the displayed main menus to **TIMER**. Press ENTER, **PULSE T** will be displayed.

2. Press ENTER, **DURATION** will be displayed.

3. Press ENTER, **00MN00S** (00minutes/00seconds), the factory setting or the last minute setting entered will be displayed with seconds flashing. Use the ARROW keys to display the desired seconds, press ENTER. Minutes will begin flashing. Use the ARROW keys to display the desired minutes. Press ENTER to enter minutes, **ACC SET** will be displayed.

4. Press ENTER and the factory setting or the last accumulator setting entered will be displayed flashing. Use the ARROW keys to display the desired number of pulses before pump is to activate. Press ENTER to enter accumulator setting. **TOTAL CT** will be displayed.

5. Press ENTER and the total number of pulses received from the water meter will be displayed. This number multiplied by gallons per contact of the water meter equal the total gallons used. To reset, remove power and reapply power. Press HOME to return to **TOTAL CT**.

6. Press HOME repeatedly to return to **DISPLAY**.

DISPLAY

TIMER

PULSE T

DURATION

00MN00S

ACC SET

3

TOTAL CT

0

**TIP:**

**TO RESET TIMER:**
**1) Interrupt flow through flow assembly, if installed.**
**2) Satisfy the condition by manually feeding, etc.**

**LIMIT (Feed Limit Timer ).**

Also referred to as lock-out timer. The chemical feed pump is actuated based on conductivity, simultaneously with blowdown1. The timer limits the length of time the pump can be activated during any single blowdown cycle preventing over feeding that could occur if the blowdown line were restricted. The timer is adjustable in one minute increments up to 23 hours and 59 minutes.

1. Press HOME key until **DISPLAY** is displayed. Press SCROLL DOWN through the displayed main menus to **TIMER**. Press ENTER, **LIMIT** will be displayed.

2. Press ENTER, **00HR30MN** (00 hours/30 minutes), the factory setting or the last setting entered will be displayed with minutes flashing. Use ARROW the keys to display the desired minutes. Press ENTER to enter minutes. Hours will begin flashing. Use ARROW the keys to display the desired hours. Press ENTER to enter hours. **LIMIT** will be displayed.

3. Press HOME repeatedly to return to **SYS DATA**.

SYS DATA

INH FEED

LIMIT

00HR00MN

**IMPORTANT:**

**Before the biocide can be programmed, the @DATE@ @TIME@ @DAY@and @WEEK@ must be programmed into the controller. This is accomplished in the CONFIGUR menu, see pg. 12.**

## BIOCIDE PROGRAMMING (Standard on MPT110/120, Option H on MPT150)

PULSAtrol™ biocide programs are on a 28 day cycle. Each biocide has four individual programs with a wide range of day and week setting combinations. The biocide program timers incorporate bleed lock-out. For your convenience, there is a Biocide work sheet in the back of this manual that you may copy to document your Biocide Program records.

1. Press HOME key until **SYS DATA (DISPLAY on MPT150)** is displayed. Press SCROLL DOWN through the displayed main menus to **BIO A**. Press ENTER, **PROGRAM1** will be displayed.

SYS DATA

BIO A

PROGRAM1

**Note:** Only BIO A is available on the MPT110. Model MPT120 features dual biocide programs; BIO A and BIO B. BIO B is programmed in the same manner as BIO A.

2. Press ENTER, **WEEK P1** will be displayed. Press ENTER and **NO WEEK** (the factory setting) or the last week setting entered will be displayed flashing. Use the ARROW keys to set the desired week that biocide A, program 1 is to operate (see Biocide Week settings below), press ENTER. **DAY P1** will be displayed. If not, press HOME to return to **WEEK P1** and SCROLL DOWN to **DAY P1**.

WEEK P1

NO WEEK

DAY P1

| BIOCIDE "WEEK" SETTINGS | | BIOCIDE "DAY" SETTINGS | |
|---|---|---|---|
| NO WEEK | 4TH WEEK | SUN | THU |
| 1ST WEEK | EVEN WEEK | MON | FRI |
| 2ND WEEK | ODD WEEK | TUE | SAT |
| 3RD WEEK | EVERY WEEK | WED | EVERY |

**NOTE:**

**If programs are not programmed or if set to @NO WK@after being previously set, they will not activate. Refer to the Biocide programming work sheet, pg. 31.**

3. Press ENTER and **FRIDAY** (the factory setting) or the last day setting entered will be displayed flashing. Use the ARROW keys to set the desired day (see Biocide Day settings above) that biocide A, program 1 is to operate, press ENTER. **START P1** will be displayed. If not, press HOME to return to **DAY P1** and SCROLL DOWN to **START P1**.

FRIDAY

START P1

**Program Start Time (START P1)**

The four programs have individual program start times. Biocide feed and bleed lock-out would activate at this time.

4. Press ENTER and **00:00** (the factory setting) or the last start time setting entered will be displayed with minutes flashing. Set minutes with the ARROW keys and press ENTER. Hours will begin to flash. Use ARROW keys to set hours and press ENTER. This sets the desired time that biocide A, program 1 is to start. **WEEK P1** will be displayed. If not, press HOME to return to **START P1**. Press HOME again, to return to **PROGRAM1**.

00:00

PROGRAM1

**TIP:**

**For help with menu locations, please refer to the @Menu Map@supplied with your controller.**

5. SCROLL DOWN to **PROGRAM2**, repeat steps 2 through 4 for biocide A program 2.

PROGRAM2

6. SCROLL DOWN to **PROGRAM3**, repeat steps 2 through 4 for biocide A program 3.

PROGRAM3

7. SCROLL DOWN to **PROGRAM4**, repeat steps 2 through 4 for biocide A program 4.

PROGRAM4

**NOTE:**

**RUN TIME and BLD LKOT settings are common to all four biocide programs.**

**RUN TIME (Length of Feed Time)**

The length of time that Biocide A feed pump is to operate.

8. SCROLL DOWN to **RUN TIME**. Press ENTER.

RUN TIME

9. Press ENTER and **00HR:00MN** (the factory setting) or the last start time setting entered will be displayed with minutes flashing. Set minutes with the ARROW keys and press ENTER. Hours will begin to flash. Use ARROW keys to set hours and press ENTER. This sets the desired time that biocide A pump is to feed. **BLD LKOT** will be displayed. If not, press HOME to return to **RUN TIME** and SCROLL DOWN to **BLD LKOT**.

00HR:00MN

BLD LKOT

**TIP:**

**After pressing ENTER at the end of a setting procedure, if the next item to be set within a submenu does not display, press the HOME key to return to the submenu title then press SCROLL UP or SCROLL DOWN until you see the item to be set next.**

**Bleed Lock-Out (BLD LKOT)**

This is the length of time blowdown is to be locked out during and after biocide feed. The lock-out time starts when the feed is activated.

10. SCROLL DOWN to **BLD LKOT**. Press ENTER.

BLD LKOT

11. **00HR00MN** (the factory setting) or the last bleed lock-out time setting entered will be displayed flashing. Set minutes with the ARROW keys and press ENTER. Hours will begin to flash. Use ARROW keys to set hours and press ENTER. This sets the desired length of time bleed is to be locked out. **PREBLEED** will be displayed. If not, press HOME to return to **BLD LKOT** and SCROLL DOWN to **PREBLEED**.

00HR:00MN

# 5. DIAGRAMS: INSTALLATION, COMPONENT, AND ELECTRICAL

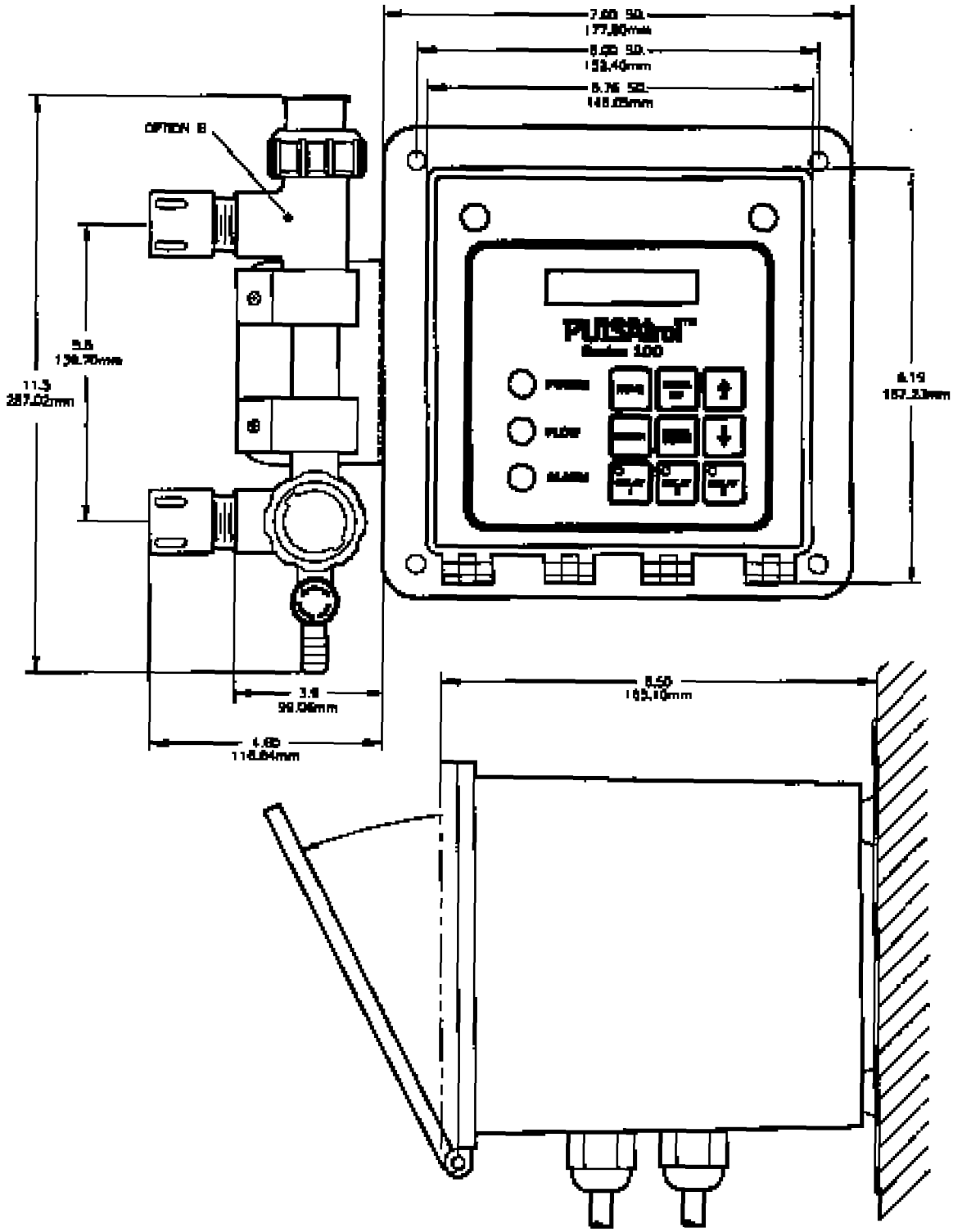
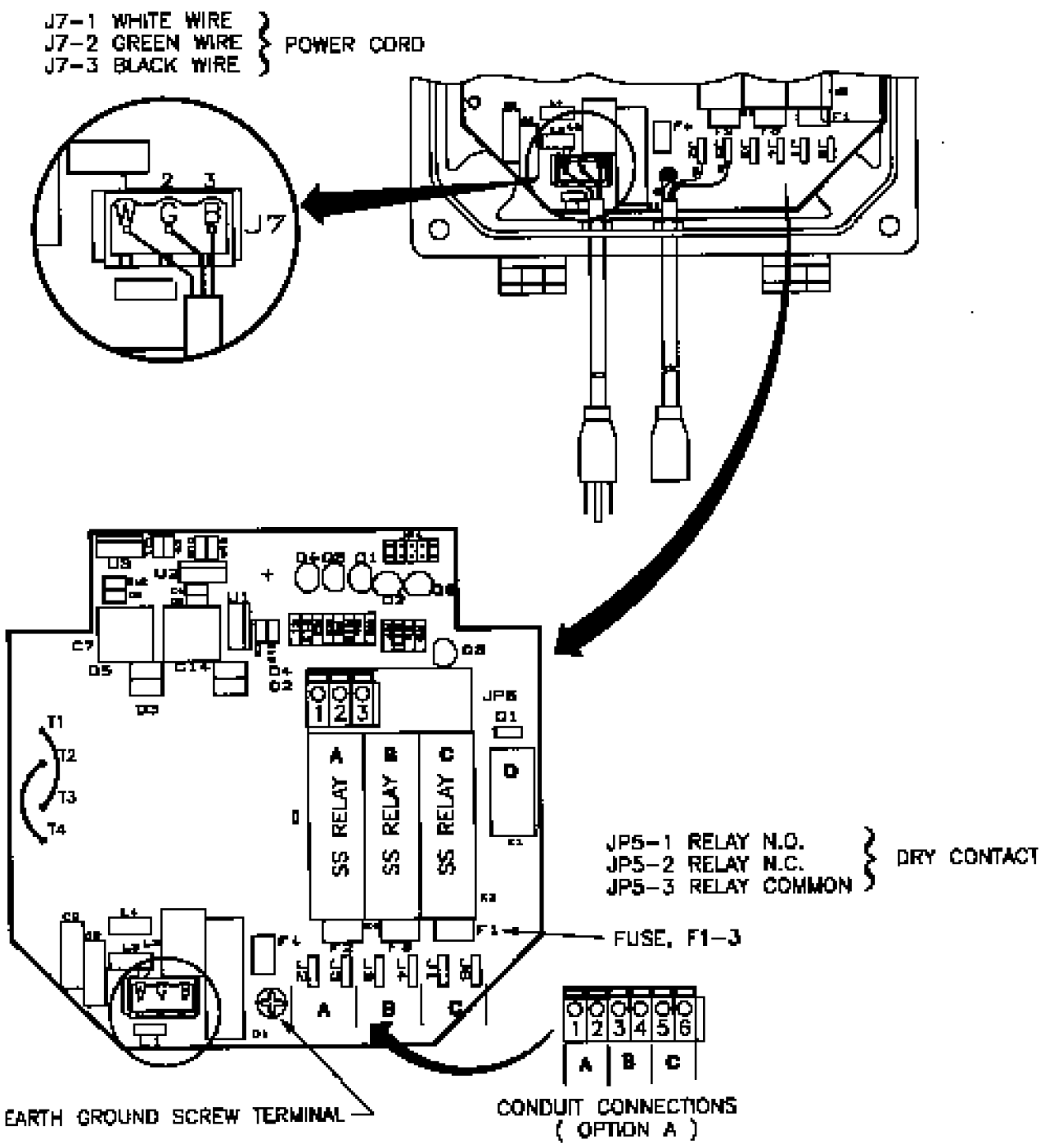



**DIAGRAM 1 ENCLOSURE DIMENSIONAL DATA**




| | | |
|---|---|---|
| A | J2 HOT<br>J5 NEUTRAL | RELAY 1 |
| B | J3 HOT<br>J4 NEUTRAL | RELAY 2 |
| C | J1 HOT<br>J6 NEUTRAL | RELAY 3 |

**DIAGRAM 2 POWER SUPPLY/RELAY BOARD**

Conduit units are factory predrilled with easily accessible terminals for hard wiring. See Relay Board, Diagram 4, pg. 29, and Electrical Wiring section in this manual, pg. 7.

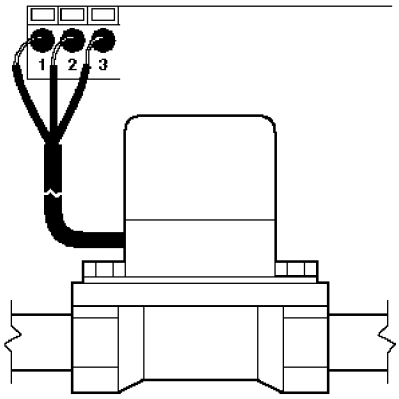
**NOTE:** Use only 16 or 18 AWG wire for conduit power and load connections. Never run power and signal wiring together in same conduits. (Example: Sensor Outputs with Power wiring)

I know this chart is not completely correct. I left it in with the possibility of something similar for the MPT100 series???

| HOA Key | Relay 1 | Relay 2 | Relay 3 | |
|---|---|---|---|---|
| Relay/Fuse Connection | A | B | C | D |
| MCT110 | Blowdown | Inhibitor | | |
| MCT110C | Blowdown | Timer Out 1 | | |
| MCT110CD | Blowdown | Timer Out 1 | Alarm Relay | |
| MCT110CE | Blowdown | Timer Out 1 | Bio A | |
| MCT110D | Blowdown | Inhibitor | Alarm Relay | |
| MCT110E | Blowdown | Inhibitor | Bio A | |
| MCT120 | pH Control | | | |
| MCT120C | pH Control | Timer Out 1 | | |
| MCT120CD | pH Control | Timer Out 1 | Alarm Relay | |
| MCT120D | pH Control | | Alarm Relay | |
| MCT120E | pH Control | | Bio A | |
| MCT130 | ORP Control | | | |
| MCT130C | ORP Control | Timer Out 1 | | |
| MCT130CD | ORP Control | Timer Out 1 | Alarm Relay | |
| MCT130D | ORP Control | | Alarm Relay | |
| MCT130E | ORP Control | | Bio A | |
| Option K | | | | Alarm Dry Contact |

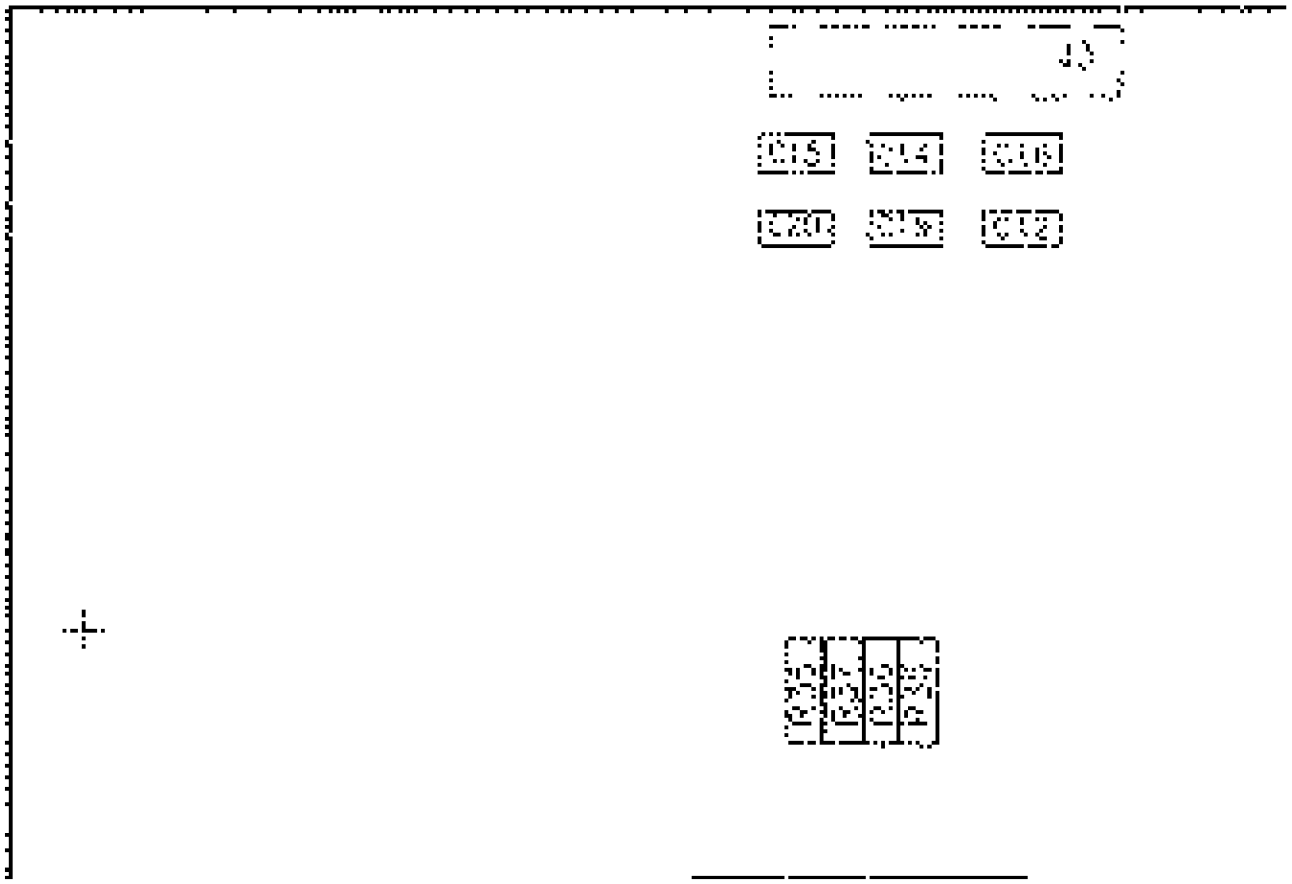
**INSTRUCTIONS:** Find the model number of your controller in the far left column. Options that do not require wiring will not appear in the model number. Find the output in the columns to the right. The connection for that output will be the letter in the row labeled "Relay/Fuse Connection."

Use a small screwdriver to depress orange tab and push wire in corresponding hole. Remove pressure from tab and pull on wire to insure a good connection.



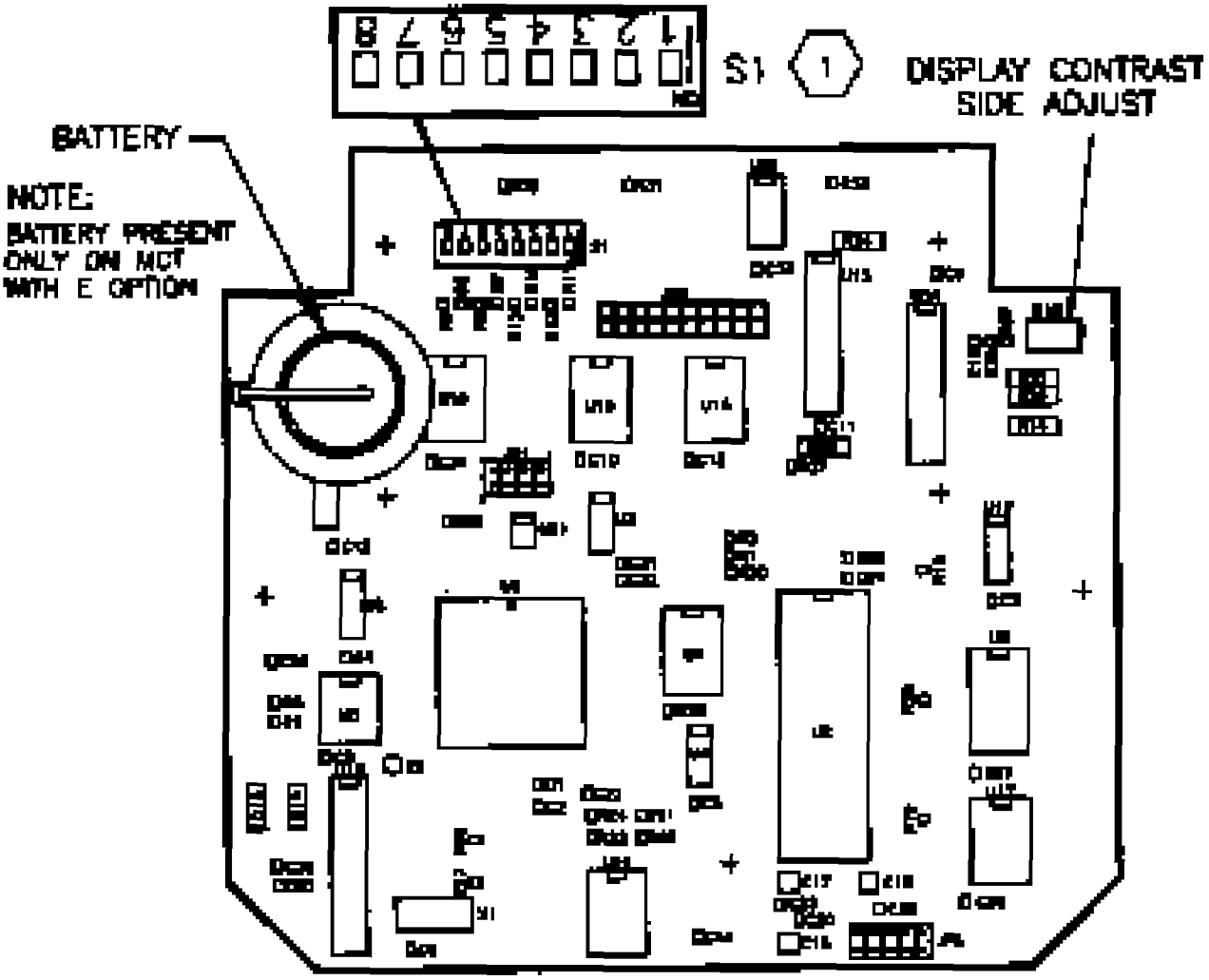

The above Figure illustrates how an actuated (motorized) ball valve, which is used for "blowdown", is connected to the relay board. It employs a normally open (NO), a normally closed (NC), and Common (or Neutral) connection. In this example the connections are made at Relay A, JP5, pins 1, 2, and 3. Refer to Diagram 4, pg. 29, for JP5 location.

**DIAGRAM 3 CONDUIT WIRING TABLE (OPTION A)**



| | | |
|---|---|---|
| JP1-7 | DIN0 | Flow Switch |
| JP1-8 | DIN0 | Flow Switch |
| | | |
| JP1-9 | DIN1 | Water Meter |
| JP1-10 | DIN1 | Water Meter |

**DIAGRAM 4 DAUGHTER BOARD**




**READ THE FOLLOWING BEFORE PROCEEDING ANY FURTHER!!**

## INITIALIZATION

This unit requires initialization upon start-up (see Figures 6-9 on pg. 8). There is a lithium battery backup that protects the time and history files during power outages that must be enabled as follows:

1. Before power is supplied, open front panel by loosening the two screws holding the front cover closed with a phillips screwdriver .

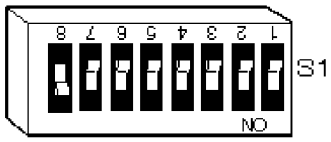
2. Locate switch S1 on the mother board, refer to Diagram 5, above). Assure switch S1-"8" is in the "on" position.

3. With the unit open, locate the battery in the corner of the mother board, behind the front panel. Remove the paper from under the battery clip.

4. With the front panel closed, turn unit on for 15 seconds. After 15 seconds turn unit off, disconnect power, open front panel. Change switch S1-"8" to the "off" position.

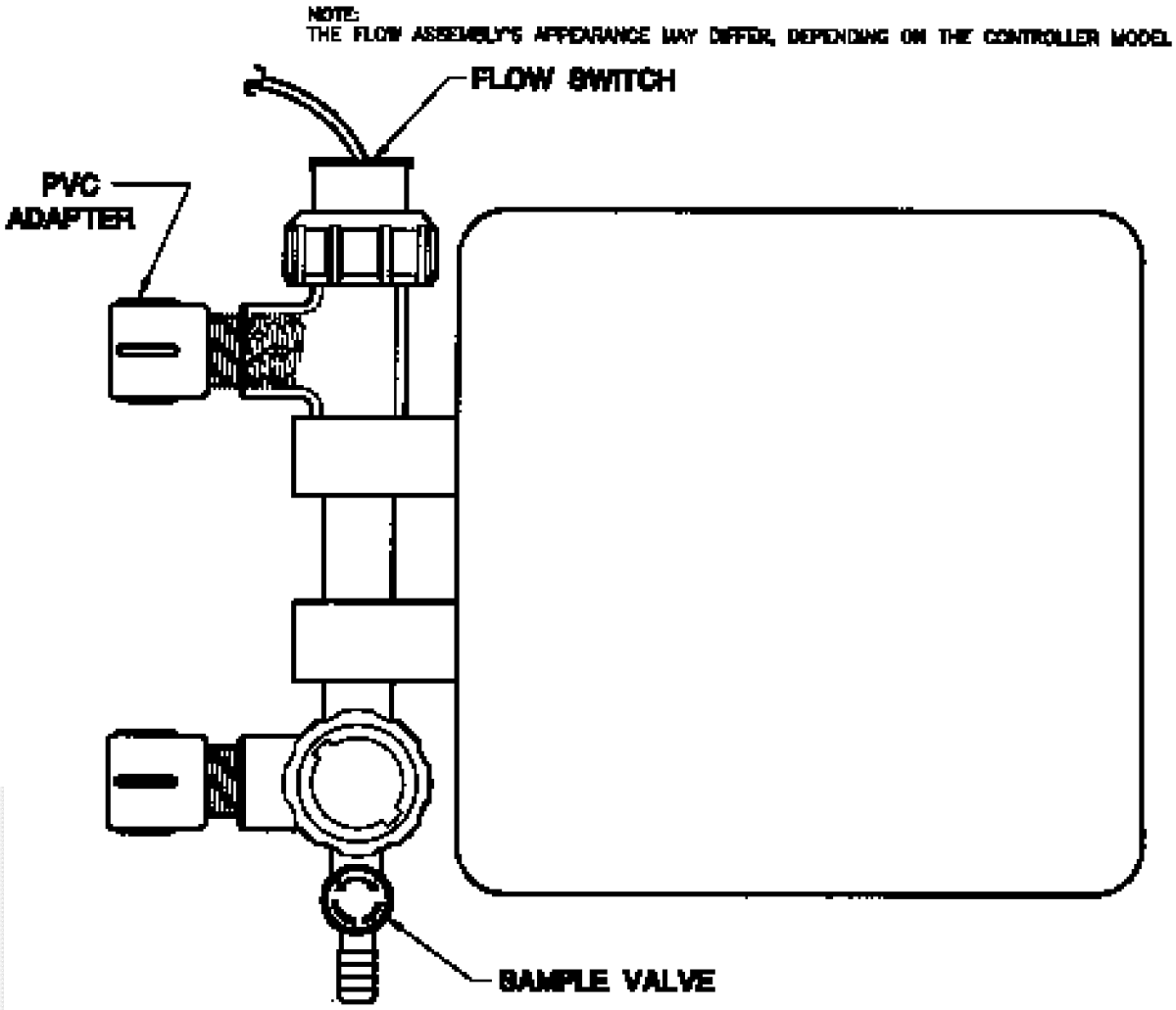
5. Close front panel. Connect power, turn unit on. The unit is now ready to be configured and programmed.

| | |
|---|---|
| JP4 | Header for option board |
| S1-1 | OFF |
| S1-2 | OFF - Flow disabled |
| | ON - Flow enabled |
| S1-3 | OFF |
| S1-4 | OFF |
| S1-5 | OFF |
| S1-6 | OFF |
| S1-7 | OFF |
| S1-8 | OFF - Operate |
| | ON - Factory reinit. |




*Switch S1-"8" shown in the on position.*

**DIAGRAM 5 MOTHER BOARD**




**NOTE:**

**The standard flow assembly provided with this controller is constructed of durable glass-filled polypropylene. Standard connection to the flow line is 3/4" NPT, but we have provided a PVC thread to slip adapter so that a PVC weld joint, if preferred, can be made. If NPT connections are used, hand-tighten until snug, then tighten an additional half turn.**

Material of Construction.....Black glass fille polypropylene, PVC and transparent PVC
Plumbing .....3/4" slip and threaded, rated for 125 psi (8.62 bar) @ 125ÞF (52ÞC), black glass filled polypropylene
Flow Switch .....1 GPM activation, transparent PVC
Sample Valve .....Black glass filled polypropylene

**DIAGRAM 6 FLOW ASSEMBLY (OPTION B)**

# 6. SPECIFICATIONS (Factory settings are default values)

## GENERAL

Power Input. . . . . 110/220 VAC @ 50/60 Hz 100 VA.

Control Output . . . . . Line voltage @ 600 VA (5 amps @ 115 VAC) per relay.

Enclosure Prewired . . . . . High impact resistant polystyrene designed to NEMA 4X, with convenient molded receptacle cords and power cord with molded plug for electrical connections.

Enclosure Conduit . . . . . High impact resistant polystyrene designed to NEMA 4X, factory predrilled with easily accessible terminals for hard wiring.

Display . . . . . Alphanumeric 1 line by 8 character lighted LCD display.

H/O/A Switches . . . . . Front panel keypad.

Environment . . . . . Ambient temp. 0°F (-17.8°C) to 122°F (50°C); relative humidity 0 to 100%.

Dimensions. . . . . Width 7" (17.78cm) X height 7" (17.78cm) X depth 6.5" (16.51cm)

Controller Weight . . . . . 6 lbs (2.5 kgs)

Shipping Weight . . . . . 8 lbs (3.7 kgs)

Flow Switch or Interlock . . . Connection provided. Function activated by dip switch if mounted flow switch or remote flow switch not ordered with controller.

Inputs . . . . . 2 digital (MPT110/120/150)

Outputs. . . . . 2 relays (MPT150), 3 relays (MPT110/120)

## SUMMARY OF KEYPAD

Home . . . . . When pushed, returns displayed menu back one level in menu structure.

Enter. . . . . When pushed, enters displayed variable or value.

Scroll Up . . . . . Used to scroll-up through (view) menu structure and to display variables.

Scroll Down . . . . . Used to scroll-down through (view) menu structure and to display variables.

Arrow Keys. . . . . Used to increase/decrease numerical settings.

Relay Keys . . . . . Hand/Off/Auto (HOA) switches, depressing key:
ONCE - Forces corresponding output relay on for five minutes; LED color amber.
TWICE - Forces corresponding output relay off indefinitely; LED color red.
THREE times - Returns control to automatic; LED off if within set point, green if out of set point.

## SUMMARY OF LED INDICATOR LIGHTS

Power Indicator. . . . . Illuminates when power is supplied to unit.

Flow Indicator. . . . . Illuminates when flow is present through flow switch. This indicator will not be functional or labeled if mounted flow assembly was not ordered. User can activate function on site.
GREEN - Indicates flow
RED - Indicates no flow
OFF - Indicates disabled

Alarm Indicator. . . . . Flashes red when an alarm condition is present.

Relay Indicators . . . . . AMBER if forced on.
RED if forced off.
OFF if in auto mode and control function is not automatically activated.
GREEN if activated automatically.

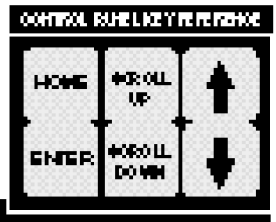
# 7. FACTORY DEFAULT VALUES

NOTE: Your controller may not include all of these features

| | SERIES 100 |
|---|---|
| **INHIBITOR TIMER** | Limit |
| Feed Timer | 1:00 HH:MM |
| **BIOCIDE TIMERS** | |
| Week | No Week |
| Day | Friday |
| Start Time | 00:00 HH:MM |
| Run Time | 01:30 HH:MM |
| Bleed Lock Out Time | 00:00 HH:MM |
| **BOILERS** | |
| Interval Time | 01:00 HH:MM |
| Duration Timer | 00:30 MM:SS |
| Sample Mode | Timed Sample |
| **MISCELLANEOUS** | |
| Hi/Low Alarms | Tracking Set Point |
| Display Dampener | 1 Second |
| **POSSIBLE ALARMS** | |
| All High Alarms | X |
| All Low Alarms | X |
| Limit Time pH | X |
| Limit Time ORP | X |
| No Flow | N/A |
| Inhibitor Limit Timers | X |
| OTHER INHIBITOR FEED MODES | |
| **PULSE TIMER** | |
| Run Time | 00:30 MM:SS |
| Accumulator Set | 10 |
| Count Totalizer | 1 |
| **PERCENT TIMER** | |
| Percent On | 5% |
| % of Minutes | 10 |
| **% OF POST BLOWDOWN** | |
| % of Blowdown Feed | 5% |

# 8. TROUBLESHOOTING GUIDE

If controller is not operating properly, proceed through the troubleshooting instructions below.




### MOTHER BOARD

| Symptom | Probable Cause | Possible Solution |
|---|---|---|
| **Inability To Keep Time/Date** | Battery shipping paper not removed | Remove fish paper from behind battery. |
| | Battery bad | Replace battery. Use Eveready 3V E-CR2032. |
| **No Display (See Power Supply first)** | Improper contrast | Adjust contrast on Mother Board. See Diagram 5, pg. 21 |
| | Environment exceeds122°F (50°C) | Relocate controller. |
| | Battery loose | Check fit of battery. |
| | Battery missing or bad | Replace battery with Eveready 3V E-CR2032. |
| **Erratic Readings** | Improperly grounded power | Assure power and ground integrity. Shields of all sensors should be connected at controller end only. |
| **Flow Light Never Activates** | Function not activated | Turn switch S1-"2" on mother board ON. See Diagram 5, pg. 21. |
| **Flow Light Stays On** | Flow switch stuck | Clean flow switch. |

### POWER SUPPLY/RELAY BOARD

(Series 100 Power Supply located on Relay Board)

| Symptom | Probable Cause | Possible Solution |
|---|---|---|
| **No Power Light** | Blown fuse | Replace fuse on Power Supply/Relay board. |
| | Interconnecting cables loose | Check connections. |
| | No power supplied | Check power source. |
| **No Outputs Each relay, on the Relay Board, has a fuse and a red LED** | If the Output front panel LED is lit and the Relay board LED is not lit:<br>• ribbon cable. | Check ribbon cable connection or replace. |
| | If the Output front panel LED is lit and the Relay board LED is also lit:<br>• blown fuse<br>• bad relay | Replace fuse<br>Replace Power Supply/Relay Board |

**REINITIALIZATION** If the above troubleshooting steps fail to explain or solve condition, perform a factory reinitialization (see Initialization at pg. 8, and Diagram 5, Mother Board, pg. 21). If condition still exists, contact factory for customer service assistance at (1/800-333-6677). A Return Authorization (RA) number is required for any return.

# 9. MAINTENANCE

Maintenance on the PULSAtrol™ MPT100 Series controller requires only that the operator replace the battery once a year or after an accumulation or 1000 hours of battery dependency, whichever comes first.

The controller is designed for factory maintenance only. There are no field serviceable parts. Service should be performed only by factory authorized service personnel. Modification to or tampering with the circuit level components, makes all warranties, written or implied, and/or manufacturer's responsibility for this controller null and void.

# 10. GLOSSARY

**Alarm Relay** an electric circuit when triggered by a predetermined signal will activate an externally connected alarm

**Analog** a device that represents in terms of physical variables, i.e. conductivity, pH, ORP

**Analog Recorder** a device such as a plotter that physically stores or presents quantities of data in a physical manner

**Auto Scroll** a function of the Controller which allows unit to automatically display system status, active alarms, time, date, etc.

**Biocide** an agent used to control the growth of algae and other organic substances

**Bleed** (or blowdown) to release cooling tower water from the system, used to control conductivity

**Blowdown** see Bleed

**Blowdown Valve** the valve that opens or closes to release water from the system activated by a signal from the Controller

**Buffer Solution** a solution with a specific pH value used as a control in calibrating probes and sensors

**Calibration** a procedure to match values "read" by probes and sensors to actual real world values

**CalKit** a kit available from PULSAfeeder with a specific cavity volume used to calibrate conductivity sensor

**Caustic** burning, corrosive, a characteristic of some chemicals especially strong alkalis

**Chattering** a situation that occurs when relay controlled device repeatedly turns off and on

**Chemical Feed Pump** a relay or proportionally controlled pump that disperses chemical into the system

**Chemical Metering Pump** see Chemical Feed Pump

**Conductivity** the ability of a substance to conduct electrical current, concentrations of dissolved and suspended matter in cooling tower water directly determine the conductivity of the water

**Configure** procedure to set up basic functions of the controller, i.e. date, time, set point control, etc.

**Contacting head water meter** a water meter that outputs a dry contact signal every time it pulses

**Cooling Tower** a structure of various sizes that allows heat to radiate away from the system water.

**Cycle Timer** a timing device that can be preset to turn off and on at specific intervals

**Daughter Board** an auxiliary circuit board within the controller dedicated to a specific function(s) of the controller

**Differential** also referred to as dead band or hysteresis, this is a range or offset applied to a set point value (see chattering)

**Dip Switch** very small switches located on the circuit boards usually used in combination with other dip switch settings

**Display Dampener** a setting in the System Configure menu that determines the number of samples that are averaged and the number of seconds before a new reading is displayed on the screen

**Double Junction** type of construction on a pH probe

**Dry Contact** relay contacts without power

**EEPROM** Electrically Erasable Programmable Only Memory

**Electrodes** or sensors, the metal protrusions that measure conductivity in the conductivity sensor assembly

**Conduit** hard wired

**Fish Paper** thin paper that is inserted between battery and battery clip to prevent battery drain during shipping or storage of controller

**Float Switch** a mechanical switch that shuts off fresh water supply to the cooling tower system when water level rises to a predetermined height

**Flow** refers to the movement of water through the system

**Flow Assembly** a PULSAfeeder option which attaches to the controller and incorporates a flow switch, sensor/probe ports, and sample valve

**Gate Valve** a type of on/off valve for controlling the flow of liquid

**GFPPL** Glass Filled Polypropylene

**Ground Loops** unwanted stray electrical signals that adversely affect controller

**Heat Exchanger** a mechanical device which produces energy and is cooled by the flow of water in the cooling tower system

**HCl** Hydrochloric Acid

**Hi Lo Alarm** a function of the controller that signals the user when conditions exceed a predetermined high or low value

**History Files** information that is stored in the controller, (history files are lost if battery fails or is removed)

**HOA** abbreviation for Hands Off Auto

**HOA Switches** manual relay switches or keys (relay 1 - 6) located on the control panel of the controller

**Home** this key when pressed returns user to the previous menu displayed on the viewing screen, press repeatedly to return to the main menu

**Independent Set Point** this feature, when selected under HI LO ALARM in the System Configure menu, allows user to independently set the high and low alarm values

**Inhibitor** a chemical or compound used to aid the control of corrosion or scaling in the cooling tower system

**Inhibitor Feed** term referring to the dispersement of inhibitor in to the system

**Inhibitor Timer** a function of the controller which regulates the amount of time inhibitor is introduced to the system

**Initialization** a procedure to set up the starting condition of the controller

**Inorganic Scale Deposits** undesirable precipitate formations within the cooling tower system

**Inputs** receptacles or hookups for signals delivered to the controller

**(ISO) Isolation Valves** general term which refers to valves in the system used to isolate various components of the system from the main flow

**Jumper** a wire connector (shunt) that connects two points

**KCl** Potassium Chloride

**LED** abbreviation for Light Emitting Diode

**Limit Timer** also referred to as lockout timer or feed limit timer, it limits the amount of time output is activated

**Line Voltage** voltage equivalent to outside source voltage to the controller

**Lockout** intentionally preventing blowdown or other functions of the system

**Menu Map** printed document supplied with controller illustrating all menu item locations

**Metering Pump** see chemical feed pump

**Micro Siemens** unit of measure of conductivity expressed as uS/cm

**Mother Board** main circuit board located in controller

**NaOH** Sodium Hydroxide

**ORP** Oxidation Reduction Potential, measured in milliVolts (mV) to detect and control level of chlorine or other oxidizing agents in system water

**Outputs** receptacles or hookups for signals originated at the controller

**Overfeed** a condition in which the quantity of an ingredient dispersed into the system exceeds the amount desired

**Percent Post Blowdown** refers to the amount of time as a percentage of blowdown time that chemical feed pumps are activated when blowdown is deactivated

**Percent Timer** also referred to as a cycle timer that runs continuously that activates an output to run as a percent of total cycle time

**pH** the measurement of acidity or alkalinity (acid or base) of an aqueous solution

**Pre-Bleed** refers to the time bleed (or blowdown ) is executed before biocide feed

**Pre-Blowdown** see Pre-Bleed

**Probe** also referred to as a sensor or electrode; a device connected to the controller which monitors or measures a value in the cooling tower flow stream

**Probeless Calibration** a calibration procedure used to test and verify operation of the controller

**Program Parameters** the user programmed settings that determine how the controller responds to the conditions of the cooling tower water

**Pulse** the action of a water meter that when equipped with a contact head, can generate a signal sent to the controller

**Pulse Timer** a feature of the controller in which a timer accepts pulses from a water meter to actuate a chemical feed pump

**Relay Board** a circuit board in the controller for relay outputs, water meter hookups, flow switch, etc.

**Relay Indicators** lights (LEDs) located beneath the relay keys on the face of the control panel that indicates the status of individual relays

**Sample Cock** see Sample Valve

**Sample Line** a line within the cooling tower flow where probes and other monitoring devices are located controlled with isolation valves

**Sample Stream Flow Assembly** a PULSAfeeder option (standard on many models) which is a modular assembly that mounts to the controller with quick-release probe(s), flow switch and sample cock or (valve)

**Sample Valve** small valve on the flow assembly that provides user a means to drain small quantities of water from the system for testing

**Scale/Range** the adjustable monitoring range of the controller in reference to conductivity levels in the system

**Security Code** a code that can be entered by the user when configuring the system to secure access to the controller settings

**Sensors** see Probe

**Set Point** the user determined value within a monitored range at which the controller initiates action

**Set Point Differential** also referred to as dead band or hysteresis; the offset applied to a set point to prevent chattering of an output relay around a set point

**Solenoid** an electromagnetically controlled switch

**Storage Boot** small protective rubber boot filled with a junction wetting agent found on the tip of a new pH or ORP probe to keep tip wet during shipment and storage

**System Overfeed** usually a malfunction condition where a feed pump fails shut off

**System Parameters** see program parameters

**System pH** level of pH in the system water

**TDS** abbreviation for Total Dissolved Solids, measured in terms of electrical conductivity(u/Scm)

**Temperature Compensation** displays conductivity as if measured at 25°C

**Temp Sensor** used to measure temperature, not currently available on MCT series

**Throttling** the act of adjusting a valve or other flow control device to vary flow volume

**Totalizer** a resetable function of the controller which keeps count of the number of water meter pulses

**Track Set Point** a function of the controller in which set point offset range is determined by set point value

**uS/cm** micro Siemens

**Water Hammer** a potentially damaging situation that occurs if a valve in the system is opened to quickly, where the action results in a "hammering" effect throughout the system water lines

**Y-Strainer** inline filter or screen to remove debris from system flow assembly

# 11. INDEX

# 12. PULSAFEEDER MPT COOLING TOWER SERIES PRODUCT LINE UP

## SELECTIONS

| | STANDARD FEATURES | AVAILABLE FOR OPTIONS | | | | | |
|---|---|---|---|---|---|---|---|
| SERIES | | ANALOG IN | DIGITAL IN | ANALOG OUT | DRY CONTACT | RELAY OUT | SERIAL COMM. |
| 110 | 28 Day Biocide Timer with 24 hour Bleed Lock Out | 0 | 1 | 0 | 1 | 0 | 0 |
| 120 | 28 Day Dual Biocide Timer with 24 hour Bleed Lock Out | 0 | 1 | 0 | 1 | 0 | 0 |
| 150 | Single Selectable Timer: Percent, Pulse, or Limit with Accumulator | 0 | 0 | 0 | 1 | 1 | 0 |
| 210 | 28 Day Biocide Timer with 24 hour Bleed Lock Out | 0 | 2 | 0 | 1 | 2 | 1 |
| 220 | 28 Day Dual Biocide Timer with 24 hour Bleed Lock Out | 0 | 2 | 0 | 1 | 1 | 1 |
| 250 | Dual Selectable Timer: Percent, Pulse, or Limit with Accumulators | 0 | 0 | 0 | 1 | 2 | 1 |
| 320 | 28 Day Dual Biocide Timer with 24 hour Bleed Lock Out | 0 | 3 | 0 | 1 | 3 | 1 |
| 350 | Triple Selectable Timer: Percent, Pulse, or Limit with Accumulators | 0 | 0 | 0 | 1 | 3 | 1 |

## OPTIONS

| | | SERIES | REQUIRED FOR OPTIONS | | | | | |
|---|---|---|---|---|---|---|---|---|
| OPTION | DESCRIPTION | | ANALOG IN | DIGITAL IN | ANALOG OUT | DRY CONTACT | RELAY OUT | SERIAL COMM. |
| A | Conduit | 100/200/300 | | | | | | |
| B | Mounted flow assembly | 100/200/300 | | | | | | |
| C | Selectable timer: percent, limit, or pulse with accumulator | 100/200/300 | | 1 | | | 1 | |
| D | Alarm output relay (Series 100 requires relay out) | 100/200 | | | | | | |
| H | 28 day single biocide with bleed lock-out and pre-bleed | 100/200/300 | | | | | 1 | |
| K | Alarm dry contact (Series 100 requires relay out) | 100/200/300 | | | | 1 | | |
| L-1 | Serial line communications with software | 200/300 | | | | | | 1 |
| L-2 | Serial line communications with software and modem | 200/300 | | | | | | 1 |
| P | 220 VAC @ 50/60 Hz service (requires option A) | 100 (only) | | | | | | |

# 13. BIOCIDE PROGRAMMING WORK SHEET

(Please make copies of this sheet for future use)

**CHEMICAL NAME** _____ **BIOCIDE** _____

**PROGRAM #1**

Week _____ Day _____

Start Time: _____:_____H:M

**PROGRAM #2**

Week _____ Day _____

Start Time: _____:_____H:M

**PROGRAM #3**

Week _____ Day _____

Start Time: _____:_____H:M

**PROGRAM #4**

Week _____ Day _____

Start Time: _____:_____H:M

Biocide ___ Run Time _____:_____H:M

Biocide ___ Pre-Bleed Time _____:_____H:M

Biocide ___ Pre-Bleed Min Conductivity _____:_____H:M

Biocide ___ Bleed Lock-Out _____:_____H:M

Make Copies and Repeat For Each Biocide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Muskogee, Oklahoma 74401-8233
918-683-0238 Fax: 918-683-4858
1-800-333-6677
Fax Orders 1-800-274-6677