PULSAtrol®

MICROPROCESSOR-BASED WATER
TREATMENT CONTROLLER

MPT 200 SERIES

MODELS MPT 210, MPT 220, & MPT 250

INSTALLATION
OPERATION
MAINTENANCE
INSTRUCTION

$5.00 USA $6.25 CANADA 72-202-02

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 Electronic Control Operations. Parts purchased to correct a warranty issue may be credited after an examination of original parts by Pulsafeeder ECO. 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 and ORP 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.

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1. INTRODUCTION

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

This instruction manual covers the functions of the MPT 200 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. MPT200 CD).
- After the above steps, if feature does not display, reinitialize the unit. If that fails consult 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 PULSAtrol™ **MPT210** and **MPT220** controllers offer single and dual biocide control. They are 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 that regulates tower blowdown) to be interfaced with the biocide timer.

This design allows the MPT210 and MPT220 to accept options such as a Selectable Inhibitor Feed Timer and/or a Mounted Flow Assembly with flow switch.

The PULSAtrol™ **MPT250** is designed to automatically control the addition of inhibitor and/or blowdown.

The design also incorporates a Selectable Inhibitor Feed Timer which allows the user to choose 1 of 2 timer modes on which to base the addition of inhibitor or control other functions.

1. "PERCENT TIMER" The Inhibitor Timer runs continuously for an adjustable time cycle, with output being activated for an adjustable percent of the time cycle.
2. "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.

The design allows the MPT 250 to accept options such as a Programmable 28 Day Timer and/or Mounted Flow Assembly with flow switch.

A self charging capacitor is used to maintain time and history for up to two weeks. 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 MPT 200 Series

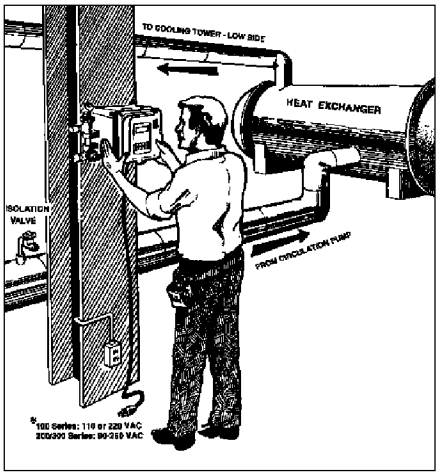
STANDARD FEATURES

MPT210	MPT220	MPT250
28 Day Biocide Timer with 24 hr. Bleed Lock Out	28 Day Dual Biocide Timer with 24 hr. Bleed Lock Out	Dual Selectable Timer, Percent or Pulse with Accumulators

OPTIONS

MPT210	MPT220	MPT230
A Conduit	**A** Conduit	**A** Conduit
B Flow Assembly	**B** Flow Assembly	**B** Flow Assembly
C Selectable Timer	**C** Selectable Timer	**D** Alarm Output Relay
D Alarm Output Relay	**D** Alarm Output Relay	**H** Single Biocide
K Dry Alarm Contact	**K** Dry Alarm Contact	**K** Dry Alarm Contact
L Serial Line Comm.	**L** Serial Line Comm.	**L** Serial Line Comm.

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, ess Warning at left. Installation should comply with national, state, and local codes.

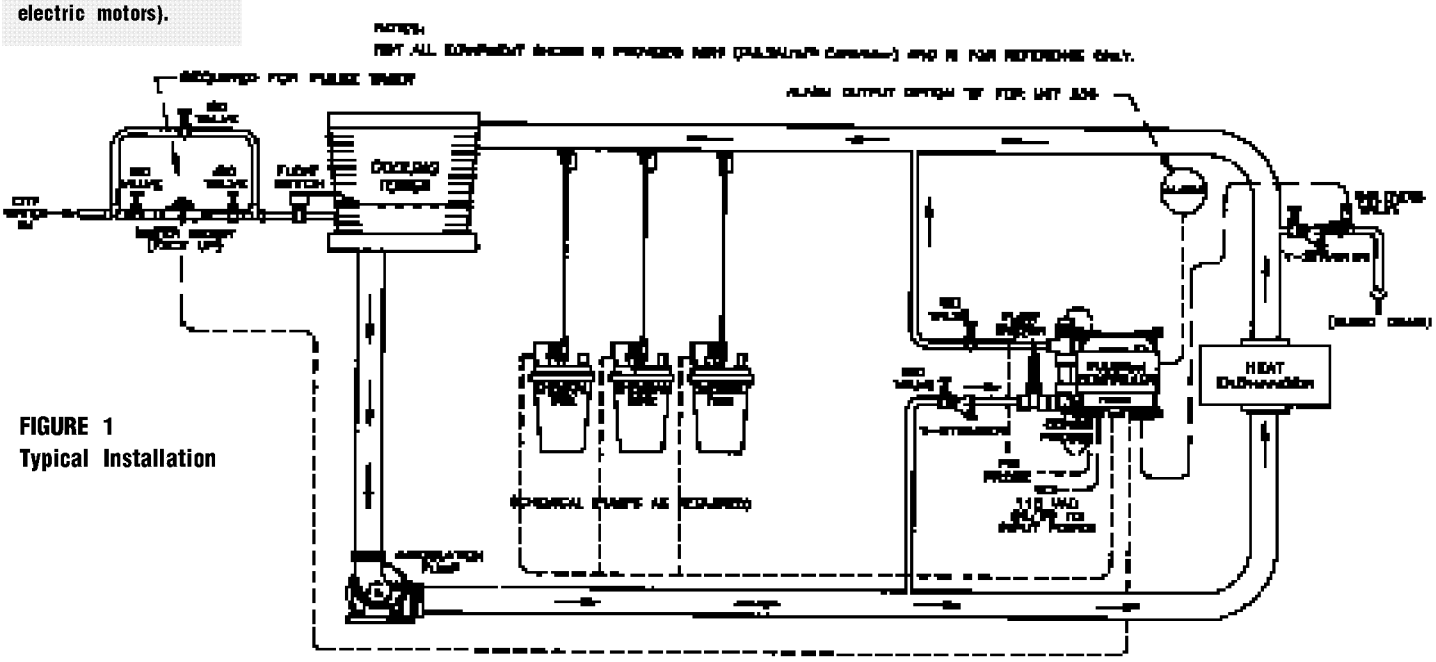


FIGURE 1
Typical Installation

NOTICE

The standard flow assembly, if provided 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. 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 past the sensors.

2. Install strainer on the upstream side of the flow assembly (if flow switch is incorporated) to collect debris that might affect controller operation.

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

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

5. Plug existing blowdown controller into receptacle provided for bleed (blowdown) lock-out.

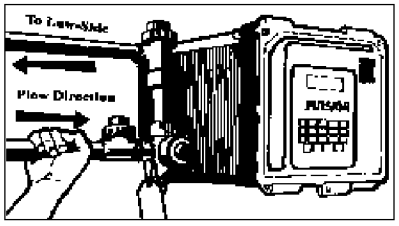


FIGURE 2
Hand tighten all NPT connections until snug plus 1/2 turn.

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

!!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 there is ANY doubt, consult a qualified electrician.

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

7. 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 sensor.

8. 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 blowdown controller readings may be affected.

ACCESSORIES

(Available through your Pulsafeeder distributor or sales representative, not included as standard)

1. Chemical metering pumps as required.

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

8. External alarm, if controller incorporates alarm relay. (See Figure 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™ MPT Series 200 electronic circuitry is protected by a 2 amp fuse (Bussman S504-2), located on the power supply board. In addition, each output relay is individually protected by replaceable plug-in 5 amp fuses (Bussman BK/PCE-5) on the relay board (refer to Diagram 2, pg. 18). Use of surge protection 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. Diagram 2, pg. 18), Relay Board, for input and output power connections. Use only 16 or 18 AWG wire for conduit power and load connections.

Low voltage signal wiring (i.e., water meter, remote sensors, etc.) should be separate from AC power lines.

When connections are required by the end user, follow the instructions below. All electrical diagrams, circuit boards, etc., are located in Section 5, pages 17-21.

NOTE:

Liquid tight fittings are provided for all signal leads.

OPEN ENCLOSURE

- Loosen thumb screw on dust cover and lift up.
- Remove the captive screw from upper control panel and lower panel.

Note: the screws are retained and will not fall out.

CAUTION!

When power is supplied to the unit, Line Voltage is present on the relay board located in the bottom of the enclosure, even with the power switch

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.

FLOW SWITCH OR INTERLOCK

It is recommended that a flow switch or auxiliary dry contact from the 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 a unit, this function will be inoperative. To use the interlock feature, connect a flow switch or auxiliary dry contact from another device. See Diagram 2, pg. 18, Relay Board, for flow switch or interlock connection located on connector J4 (connections are pin 11 and pin 12 FLOW SWITCH). To activate function, turn switch S1-"2" on. This switch is located on the mother board (refer to Diagram 3, pg. 19). Turn power switch off, wait 15 seconds, and turn power back on.

WATER METER/PULSE TIMER

For controllers with Selectable Timer utilizing Pulse Timer Mode, electrical wiring is required for water meters. Each individual timer is supplied with its own individual water meter input connection. If more than one selectable timer is to be used as a pulse timer with only one water meter, short water meter one input connection (pin 10) to any additional water meter connections (water meter 2 pin 14, water meter 3 pin 16). These connections are provided on the Relay Board. By default, these connections are factory installed. If individual water meter inputs are required, make sure connections are removed and not jumpered. Refer to Diagram 2, pg. 18, Relay Board.

BLEED LOCK-OUT

This output is provided to interface with existing blowdown controllers. The blowdown controller plugs into the receptacle provided. The output is deactivated with the start of biocide feed and is reactivated after the programmed blowdown (bleed) lockout time expires.

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, Relay Board.

RECEPTACLES

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

3. Start Up Instructions

!!WARNING!!

When power is supplied to the unit, line voltage is present on the Relay Board located in the bottom of the enclosure even with the Logic Power switch

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.

READ THE FOLLOWING BEFORE PROCEEDING ANY FURTHER!!

INITIALIZATION

This unit requires initialization upon start-up. 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. Supply power to the controller and turn the Logic Power switch on. The power LED indicator light will be illuminated. When controller is powered up, the **MAIN MENU-DISPLAY DATA** (shown right) will be displayed.:

Main Menu
Display Data

1. Press SCROLL DOWN until **MAIN MENU-CONFIGURE** is displayed and press ENTER.

Main Menu
Configure

2. Press SCROLL DOWN until **CONFIGURE-FACTORY REINIT** is displayed and press ENTER.

Configure
Factory reinit

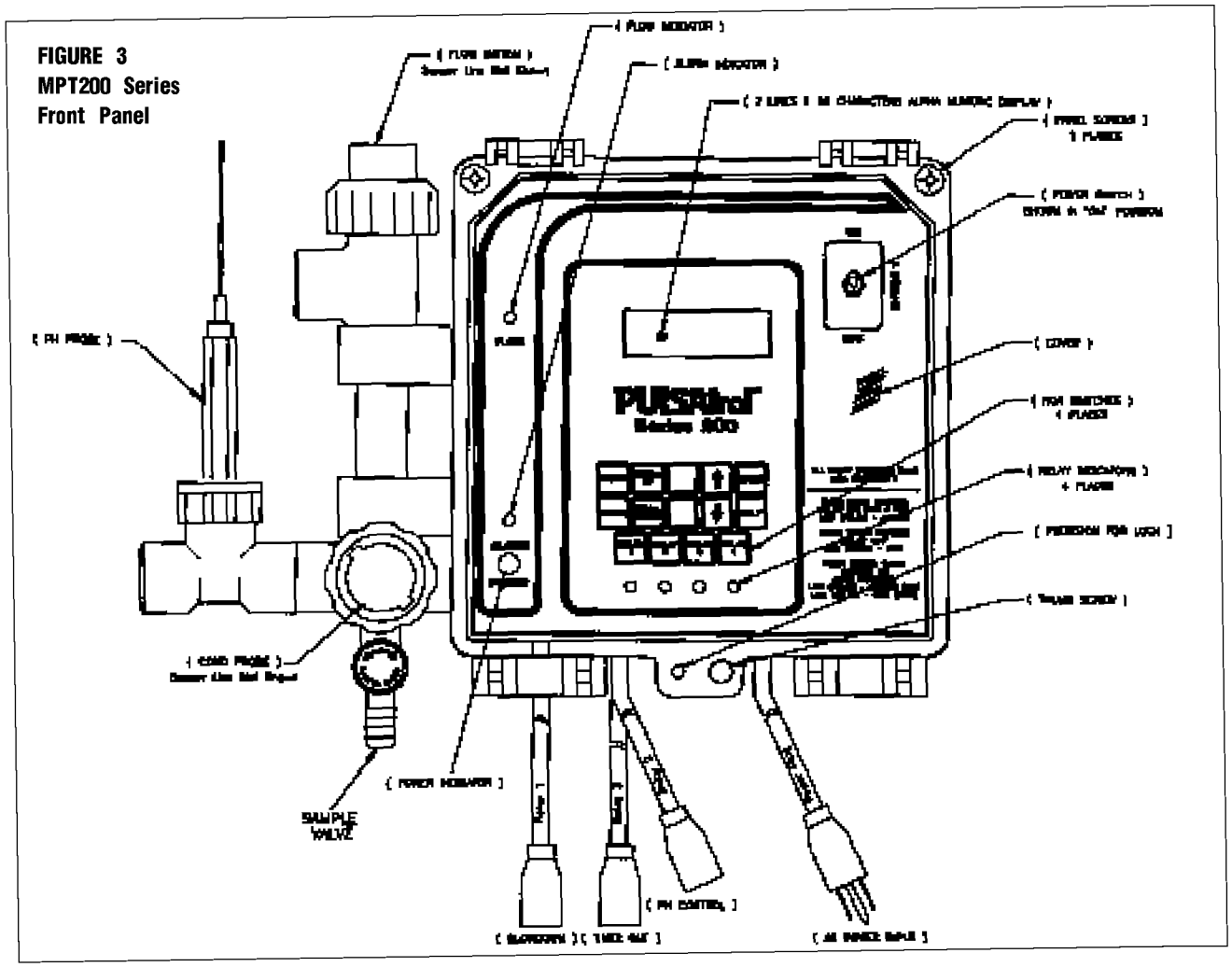
3. The Factory Re-Init Warning will be displayed. Press the ENTER key to execute Initialization. Press the HOME key repeatedly to return to the **MAIN MENU-DISPLAY DATA**.

Warning
Factory reinit

FRONT PANEL

Take a moment to review Figure 3, to become familiar with the MPT200 Series front panel.

FIGURE 3
MPT200 Series
Front Panel



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 diagram supplied with the controller was generated to reflect a PULSAtrol™ MPT200. The laminated "MENU MAP" supplied with your controller reflects your system with options ordered.

Display Data This menu displays system parameters only. No settings or adjustments are made through this menu. Present Time and Date are displayed.

Inhibitor Feed Set (Standard on MPT 250, available as Option C) In this menu, on models equipped with a Selectable Inhibitor Timer, the user is prompted to enter your choice of two inhibitor feed modes.

Biocide Programs (Standard on MPT 210 and MPT 220, available as Option H) In this menu, the user is prompted to enter all settings pertaining to the biocide program timer(s).

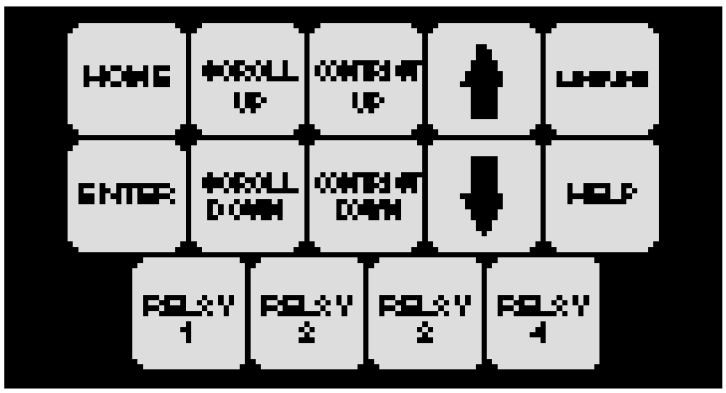
System Configure This is generally the first selection made at start up. In this menu, the user is prompted to configure system functions and options to your specific application. System Configure can include such things as time of day, date, security code, alarm relay selections, settings pertaining to the inhibitor feed mode, water meter pulse totalizer, and System Version number.

KEY PAD OPERATION

The Key Pad on the MPT200 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 scroll 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.

NOTE:

After five minutes of no keypad activity, the controller will display date and time.

Contrast Up/Contrast Down Press these keys to control contrast of viewing screen.

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.

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.

Enter This key has two functions:

FIRST, within the 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) in that particular sub-menu will be displayed.

Language This key is used for alternative foreign languages for our international customers. Spanish is installed as standard feature on the MPT 200 Series.

Help When pressed, this key will display simple instructions for the operation of the Enter, Home, Arrows, and Scroll keys.

Relays (1-4) 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, relay will be forced off until key is pressed again). 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).

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.

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—"**DISPLAY DATA**."

For this exercise, you will set "DAY, WEEK, DATE, and TIME."

1. If not already displayed, press HOME until **MAIN MENU DISPLAY DATA** is displayed.

2. Press SCROLL DOWN repeatedly until **MAIN MENU CONFIGURE** is displayed.

Press ENTER.

3. **CONFIGURE DATE/DAY/TIME** will be displayed.

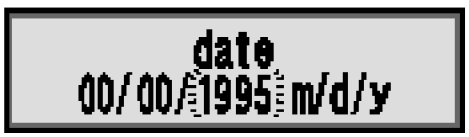
Press ENTER.

4. The **DATE** menu will be displayed with "month" flashing. Use the ARROW keys to select the current month.

Press ENTER.

5. "Day" will begin flashing. Use the ARROW keys to select the current date.

Press ENTER.



6. "Year" will begin flashing. Use the ARROW keys to select the current year.

Press ENTER to complete

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.

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.

(Continued) **DATE** programming.

7. Press SCROLL DOWN. The **TIME** menu will display with "hours" flashing. Use the ARROW keys to select current hour (24 hour clock).

Press ENTER.

8. "Minutes" will begin flashing. Use the ARROW keys to select current minutes.

Press ENTER.

If Biocide control is present on your controller (standard on MPT210 and Mpt220, available as Option H) you will also configure "Week/Day". If not, configuring "Date/Day/Time" would be complete at step 8 above.

9. Press SCROLL DOWN. The **WEEK/DAY** menu will display with "1st wk" flashing. Use the ARROW keys to select either 1st, 2nd, 3rd, or 4th wk.

Press ENTER.

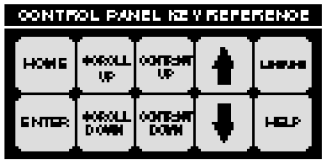
10. "Day" will begin flashing. Use the ARROW keys to select the day of the week you prefer.

Press ENTER. Nothing should be flashing and that completes the Date, Day, and Time programming.

Congratulations, you've done it! All menu programming functions operate in this manner. Feel free to repeat this exercise as often as you like until you are comfortable with the programming procedure.

Now, press the HOME key repeatedly to return to **MAIN MENU, DISPLAY DATA**.

4. MPT200 SERIES 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 initialization procedure, pg. 9). Supply power to the controller and turn power switch on. The power LED indicator light will be illuminated. When controller is powered up, it will show **MAIN MENU-DISPLAY DATA** 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!!

When power is supplied to the unit, line voltage is present on the Relay Board located in the bottom of the enclosure even with the Logic Power switch

SYSTEM CONFIGURE

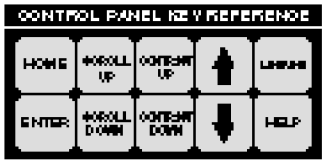
To configure the controller, press HOME key until **MAIN MENU DISPLAY DATA** appears in the display. SCROLL DOWN until **MAIN MENU-CONFIGURE** is displayed, then proceed with the following.

Main Menu
Display Data

Main Menu
Configure

A) Set CONTRAST ADJUSTMENT:

1. If display contrast requires adjustment, use the CONTRAST UP or CONTRAST DOWN keys on the control panel key pad to adjust screen for best viewing.



B) Set DATE/DAY/TIME:

1. Please refer to Sample Programming (pg. 10).

2. When completed, press HOME key once to return to **MAIN-MENU CONFIGURE.**

Main Menu
Configure

C) Set SECURITY Access Code:

The Controller can be configured to have a Security Access Code. One must know this code to access the System Configure menu.

1. Press SCROLL DOWN to display **CONFIGURE-SECURITY** and press ENTER. **SECURITY CODE-DISABLED** will appear. (If a security code has been entered, enter security code using ARROW keys. Press ENTER, **CONFIGURE-DATE/DAY/TIME** will be displayed.)

Configure
Security

security code
disabled

To set a security code, press the UP ARROW key to program the desired code and press ENTER. Once a security code has been entered, the operator must know the code to access **MAIN MENU-CONFIGURE**.

2. To disable the code after it has been entered, you must first know the code. Enter the security code with the ARROW keys then, press SCROLL DOWN to display **CONFIGURE-SECURITY** and press ENTER.

3. Press and hold DOWN ARROW key until display shows **DISABLED** and press ENTER.

5. Press HOME once to return to **CONFIGURE-SECURITY** menu.

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.

TIP:

After pressing ENTER at the end of a setting proceedure, 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.

TIP:

After pressing ENTER at the end of a setting proceedure, 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.

D) Set SELECTABLE INHIBITOR TIMER (standard on MCT250, 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.

1. SCROLL DOWN to **CONFIGURE-INH TIMER SELECT**. Press ENTER.

Configure
Inh Timer Select

2. **INH SELECT 1 - PERCENT TIMER,** or **PULSE TIMER**, will display. An asterisk (*) will be next to the presently selected mode.

inh select 1
*percent timer

3. Press either ARROW key to display your choice.

inh select
pulse timer

4. Press ENTER, an asterisk (*), indicating present feed mode, will appear next to your selection.

5. Press HOME to return to **CONFIGURE-INH TIMER SELECT**.

NOTICE:

TOTALIZER keeps track of water meter pulses. Totalizer will count even if the system is not in pulse timer feed mode and a water meter with a contact head is connected.

E) Set TOTALIZER

The Totalizer displays the accumulated number of pulses received from a contact head equipped water meter. This selection lets you reset or enter a count value.

1. SCROLL DOWN to **CONFIGURE-RESET TOTALIZER**.

Configure
Reset Totalizer

2. Press the ENTER key to display **COUNT TOTAL 1**. To **RESET TOTALIZER**, use the ARROW keys to set the reset to zero or the desired count and press ENTER.

count total 1
0

3. Press SCROLL DOWN key to display **COUNT TOTAL 1**. Follow same procedure in step 2.

count total 2
0

4. Press HOME to return to **RESET TOTALIZER** menu.

F) Set ALARM OUTPUT RELAY, ALARM DRY CONTACT (Option D & K)

Option D provides an alarm relay output of line voltage which can activate an alarm or other device.

Option K provides an alarm dry contact which can be interfaced with a computer or energy management system. Make electrical connections for Option K on terminal strip J6 as follows (refer to Diagram 2, Relay Board, pg. 18 for connections) :

Connection 1 Relay Common A1
Connection 2 N.O. A2
Connection 3 Relay Common B1
Connection 4 N.O. B2
Connection 8 is ground.

The PULSAtrol™ Series 200 allows the user to program which alarms will activate the alarm output. This can be accomplished in the SYSTEM CONFIGURE menu under **CONFIGURE-ALARM RELAY SEL**.

NOTE:

If duplicate functions are present, a number designation will be displayed with the alarm conditions. For example: @igh alarm 1@and @igh alarm 2@

Continue by configuring the controller alarm relay output functions. SCROLL UP or SCROLL DOWN to **MAIN MENU CONFIGURE**

1. SCROLL DOWN to **CONFIGURE-ALARM RELAY SEL** under the **MAIN MENU-CONFIGURE** menu. Press ENTER.

Main Menu
Configure

2. **ALARM RELAY SEL-HIGH ALARM** will display. Press ENTER and an asterisk (*) will appear or disappear. The asterisk (*) indicates that the alarm condition will activate output.

Configure
Alarm Relay Select

3. Use the ARROW keys to display other alarm conditions to be activated or deactivated. Press HOME to return to **CONFIGURE-ALARM RELAY SEL**.

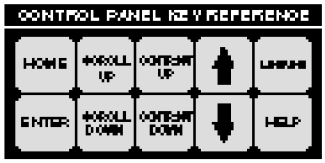
alarm relay sel
* high alarm 1

G) View VERSION NUMBER

This selection allows the user to determine the version of software installed in your controller.

1. SCROLL DOWN to **CONFIGURE-VERSION NUMBER** under the **MAIN MENU-CONFIGURE** menu. Press ENTER.

2. Present version number will display on your screen. Press HOME repeatedly to return to **MAIN MENU-DISPLAY DATA**.



Configure
Version Number

version number
1.02

NOTICE:

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

SELECTABLE INHIBITOR TIMER (Standard on MPT250, Option C)

The inhibitor feed timer is selectable. The user can choose one of two timer modes to base the addition of inhibitor. The selection of timer modes is made in **MAIN MENU-CONFIGURE**. *Only* the "Inhibitor Feed Mode" selected will be displayed in **MAIN MENU-INH FEED SET** menu.

Note: Refer to the following timer mode instructions for the mode you have selected for each timer.

!!WARNING!!

If @ACC SET@is entered as zero (0), the pulse timer will run continuously.

Pulse Timer/Accumulator Mode

Also referred to as 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 "RUN TIME" in 1 second increments up to 59 minutes and 59 seconds with an elapsed time display. The timer has a built in accumulator "ACC CT/ACC SET" that can count pulses up to 255 before activating output with an elapsed pulse counter. Also incorporated into the timer is a pulse totalizer "COUNT TOTALIZER" that keeps an ongoing count of the number of pulses received by the timer. This pulse totalizer can be reset to 0 or any other number. This is accomplished in the Main Menu-Configure menu.

1. SCROLL UP or SCROLL DOWN through the displayed main menus to **MAIN MENU-INH FEED SET**. Press ENTER.

Main Menu
Inh Feed Set

2. **INH FEED MODE 1-PULSE TIMER** will be displayed.

Inh Feed Mode 1
pulse timer

3. SCROLL DOWN to **RUN TIME 1**. The display will prompt you to enter the minutes and seconds with the ARROW keys. Press ENTER after each selection.

run time 1
00:00 m:s 00:00

4. SCROLL DOWN to **ACC CT/ACC SET 1**. The number of pulses desired will be displayed flashing. Enter the number of pulses desired to activate timer with the ARROW keys, press ENTER. The present number of pulses, **ACC CT** (accumulation count), received is displayed to the left of the **ACC SET** entry.

acc ct / acc set 1
3 10

5. SCROLL DOWN to **COUNT TOTALIZER 1** to read total pulses received from water meter. This number multiplied by gallons per contact of the water meter equals the total gallons used. This can be reset from **MAIN MENU CONFIGURE**.

count totalizer 1
3

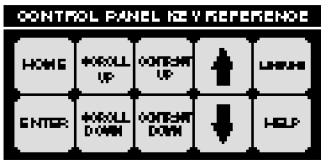
6. Press HOME key repeatedly to return to **MAIN MENU-DISPLAY DATA**.

NOTE:

If multiple timers have been installed on your controller (Option C@), SCROLL DOWN would allow you to move from Timer 1 to Timer 2. Press the ENTER key to select the timer you are prompted to set.

NOTICE:

Pulse count may also be read in the INHIBITOR FEED SET main menu if system is configured for pulse timer.



!!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!

Adjustable Percent Cycle Timer Mode

Also referred to as cycle timer. The timer runs continuously on an adjustable time (minute) cycle, with the outputs being activated for an adjustable percentage of the time cycle. The timer is adjustable in 1 percent increments up to 100 percent of the cycle time.

1. SCROLL UP or SCROLL DOWN through the displayed main menus to **MAIN MENU-INH FEED SET**. Press ENTER.

Main Menu
Inh Feed Set

2. **INH FEED MODE 2-PERCENT TIMER** will be displayed. Press ENTER.

Inh Feed Mode 2
percent timer

3. **PERCENT ON 2** will be displayed. Enter the desired percentage with the ARROW keys, press ENTER.

percent on 2
0 %

4. SCROLL DOWN to **% OF MINUTES 2**. Use the ARROW keys to enter the amount of time the timer will cycle, press ENTER. (**Example:** 10 minute percent timer set at 50% will be on for five minutes, off for five minutes.)

% of minutes 2
00 minute(s)

5. Press HOME key repeatedly to return to **MAIN MENU-DISPLAY DATA**.

TIP:

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

BIOCIDE PROGRAMMING (Standard on MPT 210, 220, Option H)

The MPT210 is a single biocide program, the MPT220 is a dual biocide program, and Option H is single biocide program. 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 blowdown (bleed) lockout for use with conductivity controllers.

1. SCROLL UP or SCROLL DOWN through the displayed main menus to **MAIN MENU-BIOCIDE PROGRAM**. Press ENTER.

Main Menu
Biocide Program

2. **BIOCIDE A** will be displayed. SCROLL DOWN again for **BIOCIDE B** or once again for **BIOCIDE C** (if available).

Biocide Program
Biocide A

3. Press ENTER and **BIO A WK/DY #1** will be displayed. The second line displays, NO WK and FRI or the last settings entered.

bio A wk / dy #1
no wk Fri

4. Use the ARROW keys to set the desired week, press ENTER. **FRI** (or last day programmed) will flash. Use the ARROW keys to set desired day and press ENTER.

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 set or if set to @no wk@after being programmed, they will not activate.

Program Start Time (BIO A START TIME)

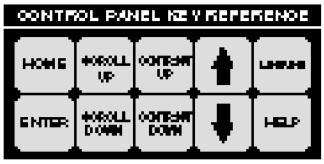
The four programs have individual program start times. Biocide feed and blowdown (bleed) lockout would activate at this time.

5. SCROLL DOWN to **BIO A START TIME**. Use the ARROW keys to set the desired start time hours, press ENTER. Use the ARROW keys to set desired start time minutes, press ENTER. This is the time program #1 is to activate.

bio A start time
#1 00:00 h:m

6. SCROLL DOWN to **BIO A WK/DY #2**. Repeat steps 3 through 5 for biocide A program #2.

7. SCROLL DOWN to **BIO A WK/DY #3**. Repeat steps 3 through 5



for biocide A program #3.

8. SCROLL DOWN to **BIO A WK/DY #4**. Repeat steps 3 through 5 for biocide A program #4.

Length Of Feed Time (BIO A RUN TIME)
The length of time biocide A feed pump is to operate. Adjustable in one minute increments up to 23 hours 59 minutes. Default 01:30.

9. SCROLL DOWN to **BIO A RUN TIME**. Use the ARROW keys to set the hours of desired feed time, press ENTER. Use the ARROW keys to set the minutes of desired feed time, press ENTER. This is the run time that the biocide A pump is to feed.

bio A run time
00:00 h:m 01:30

IMPORTANT:

BIO A RUN TIME and BIO A BLD LKOUT is common to all four biocide programs

Blowdown Lock-Out (BIO A BLD LKOUT)
The length of time blowdown (bleed) is to be locked out during and after biocide feed. The lock-out time starts when biocide feed is activated. Adjustable in one minute increments up to 23 hours 59 minutes. Default 00:00.

10. SCROLL DOWN to **BIO A BLD LKOUT** . Use the ARROW keys to set the hours of desired blowdown lock-out time, press ENTER. Use the ARROW keys to set the minutes of desired blow-down lock-out time, press ENTER. This is the amount of time that the controller will lock out the blowdown (bleed).

bio A bld lkout
00:00 h:m 00:00

NOTE:

Time settings are based on a 24 hour clock.
For example, 1:00 P.M. would be programmed as 13:00.

11. Press HOME to return to **BIOCIDE A**. If using the MPT220 controller or a second Option H , continue with step 12. If not, continue with step 13.

12. SCROLL DOWN to **BIOCIDE B**. Press ENTER and program in the same manner as **BIOCIDE A**. Press HOME to return to **BIOCIDE B**.

13. Press HOME key repeatedly to return to **MAIN MENU-SYS-TEM DATA**.

5. DIAGRAMS: INSTALLATION, COMPONENT, AND ELECTRICAL

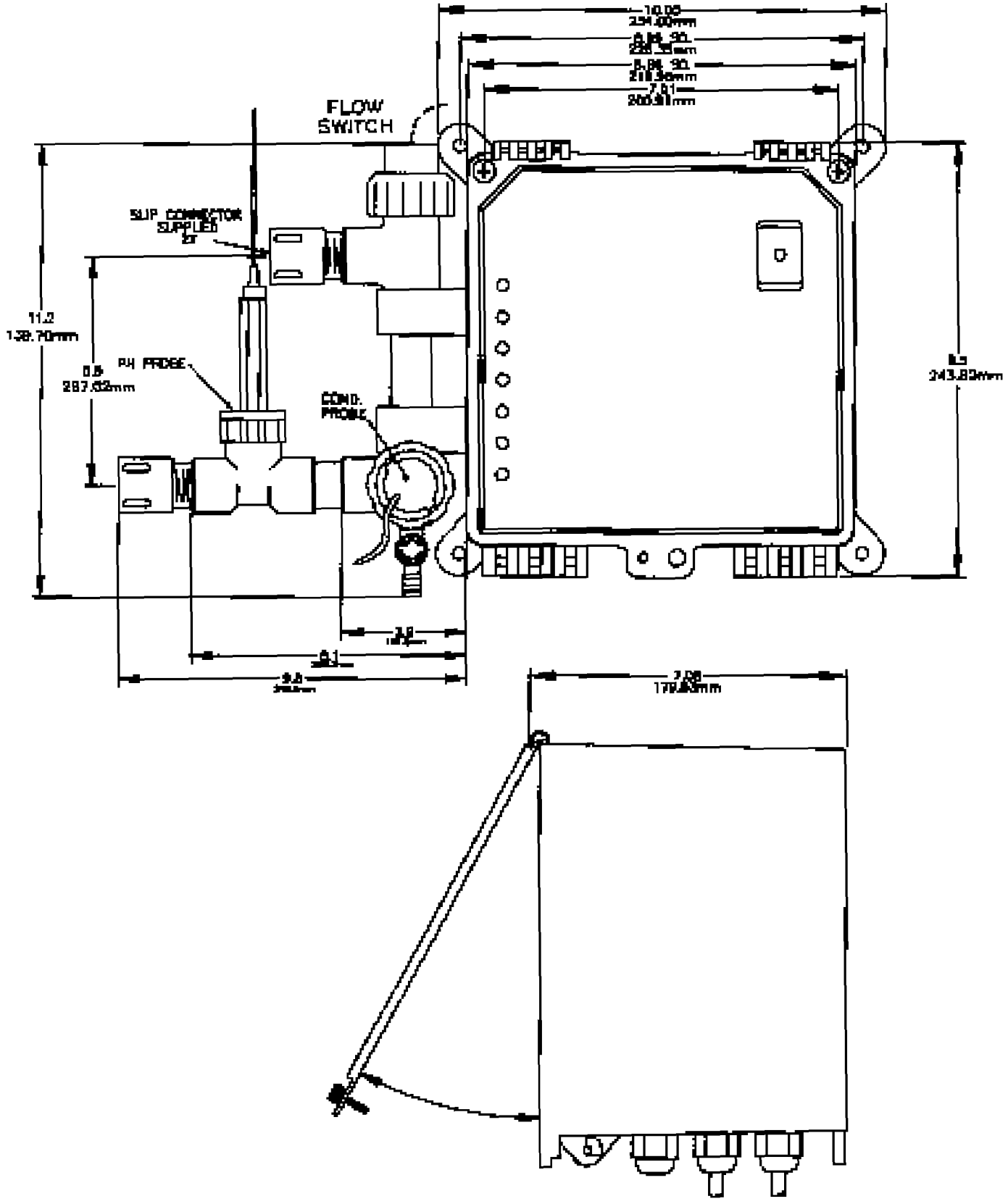


DIAGRAM 1 ENCLOSURE DIMENSIONAL DATA (shown with flow assembly, Option B)

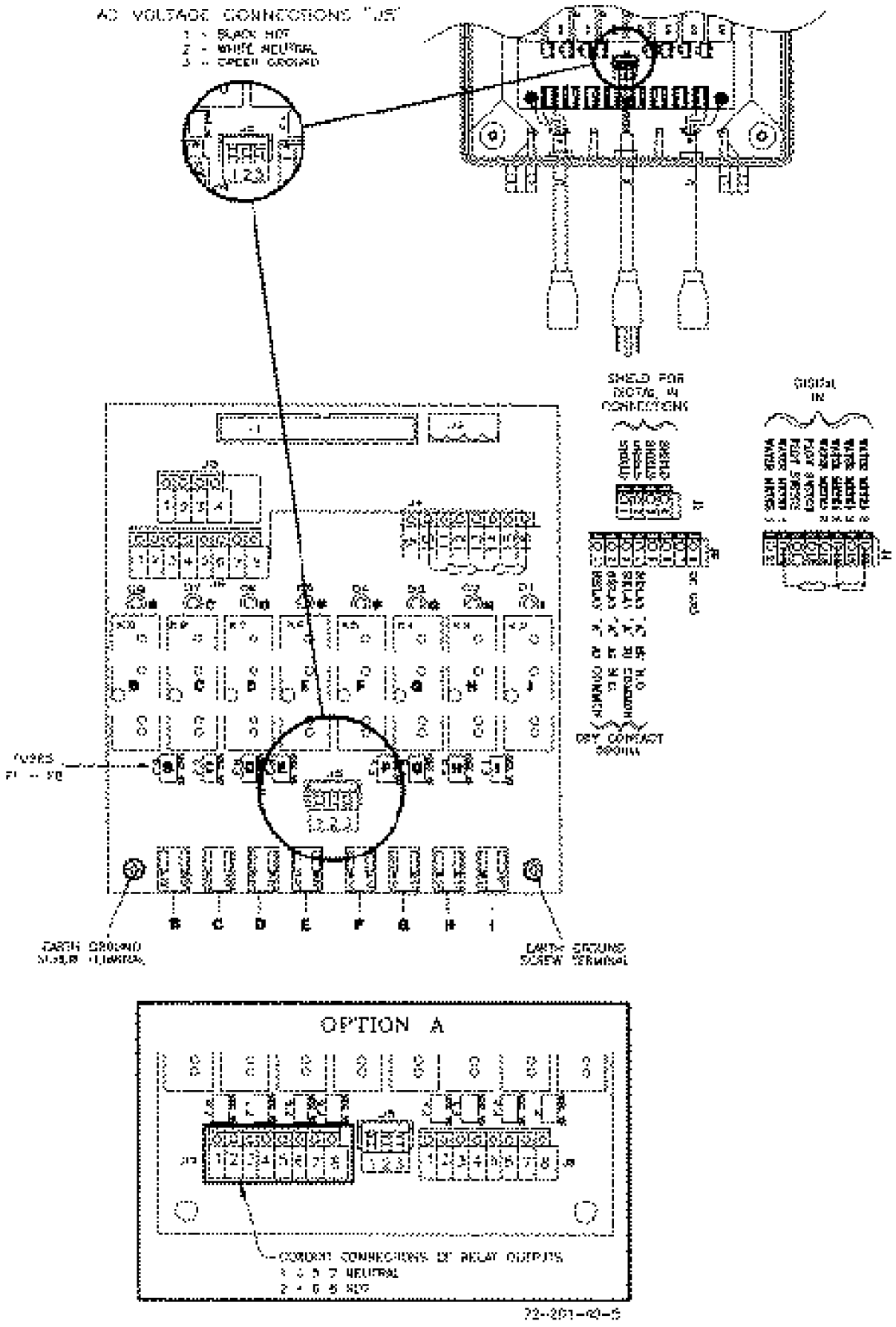
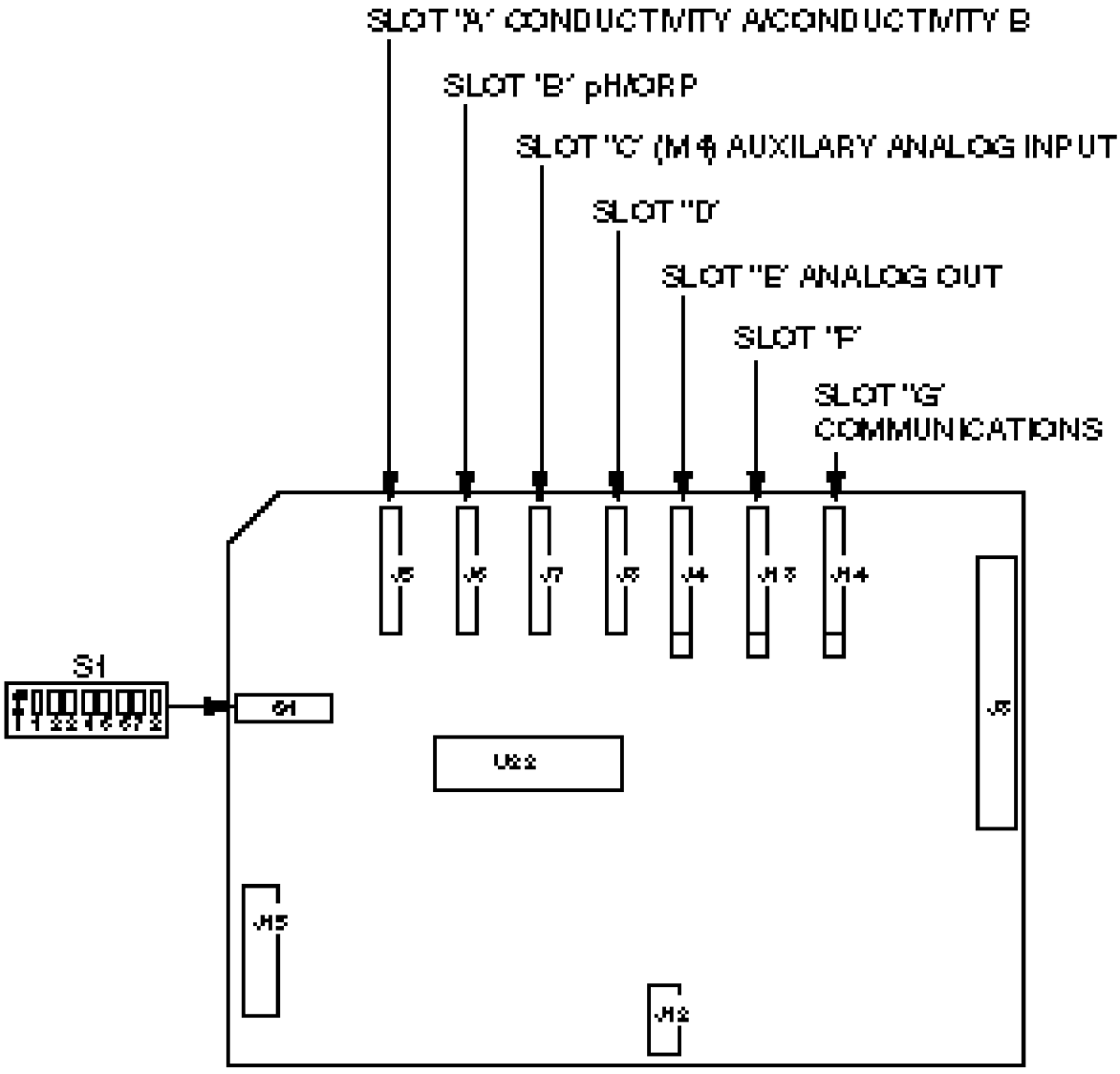


DIAGRAM 2 POWER SUPPLY/RELAY BOARD



S1 DIP SWITCH SETTINGS		
	"ON"	"OFF"
S1	"1" (FUTURE USE)	(FUTURE USE)
S1	"2" FLOW SW ENABLE	FLOW SWITCH DISABLE
S1	"3" (FUTURE USE)	(FUTURE USE)
S1	"4" (FUTURE USE)	(FUTURE USE)
S1	"5" (FUTURE USE)	(FUTURE USE)
S1	"6" (FUTURE USE)	(FUTURE USE)
S1	"7" (FUTURE USE)	(FUTURE USE)
S1	"8" (FUTURE USE)	(FUTURE USE)

This unit requires initialization upon start-up:

See Initialization procedure on pg. 9

DIAGRAM 3 MOTHER BOARD

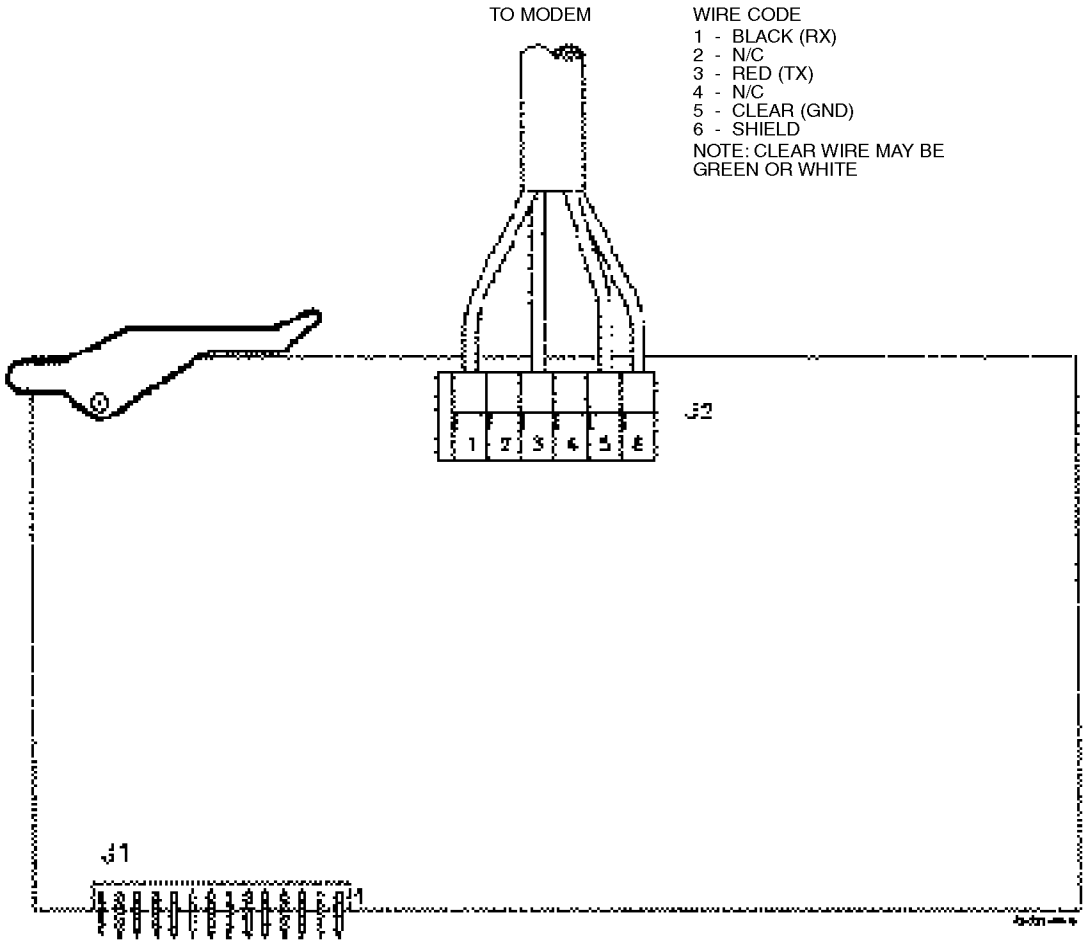


DIAGRAM 4 DAUGHTER BOARD - SERIAL COMMUNIVATIONS (Option L)

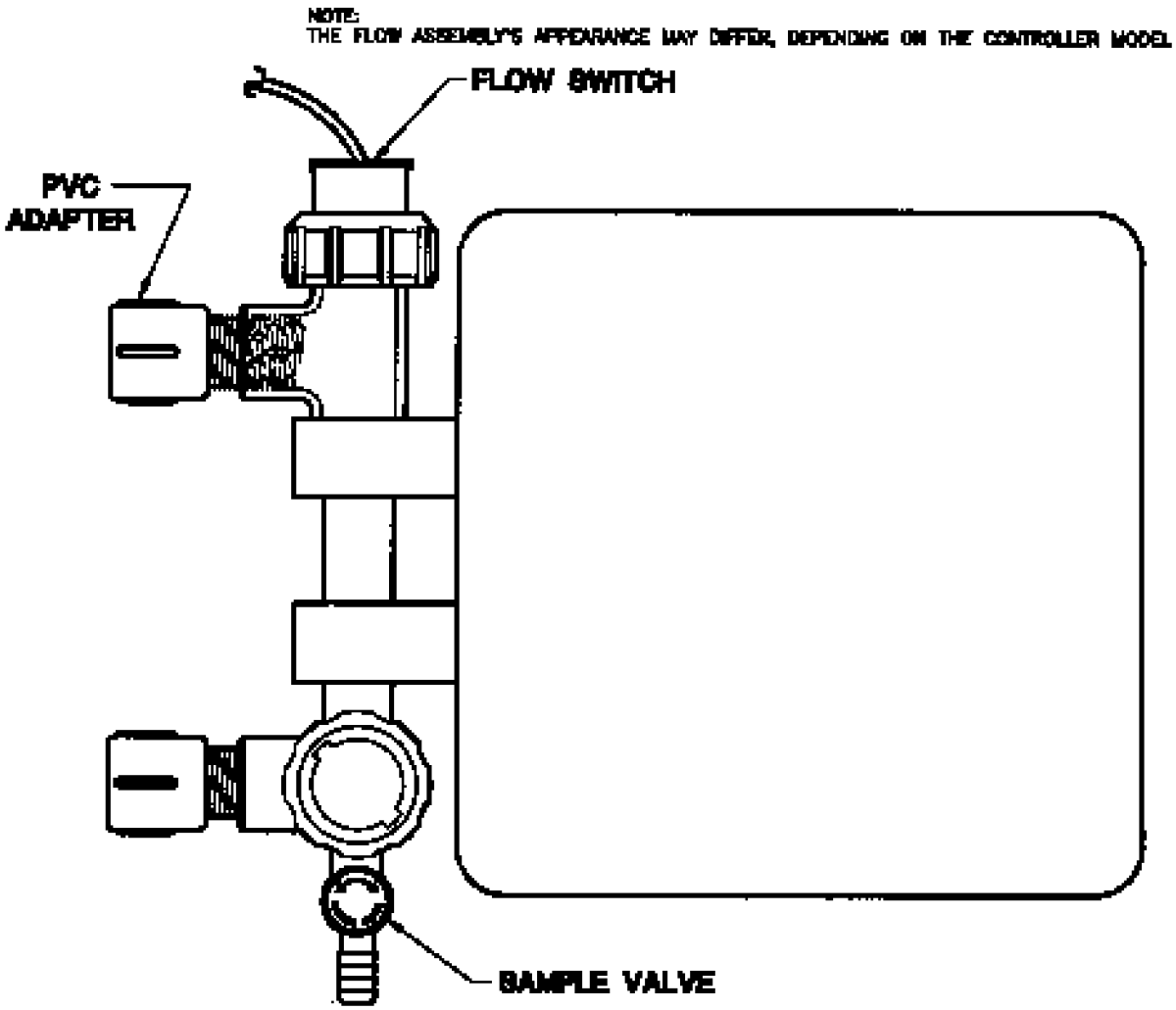


DIAGRAM 5 FLOW ASSEMBLY (Option B)

7. SPECIFICATIONS

(Factory settings are default values)

GENERAL

Power Input. . . . . 90/250VAC @ 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 2 line by 16 character lighted LCD display.

Power Switch . . . . . Recessed front panel.

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

Bilingual. . . . . English and Spanish standard.

Lockable Viewing Window . . Standard

Security Code . . . . . Standard

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

Dimensions Width 10" (25.40cm) X height 10" (17.78cm) X depth 7.08" (17.98cm)

Controller Weight . . . . . 8 lbs (3.63 kgs)

Shipping Weight . . . . . 10 lbs (4.54 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

Outputs. . . . . 4 relays

SUMMARY OF KEYPAD

Home . . . . . When pushed, returns display 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.

Contrast Keys . . . . . Used to control contrast of viewing screen.

Arrow Keys. . . . . Used to move between variables and to increase/decrease numerical settings.

Language . . . . . Used to select one of the two onboard languages.

Help . . . . . Used to display information about present displayed menu level.`

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.

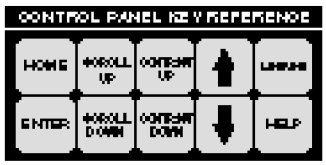
Relay Indicators . . . . . AMBER if forced on.
RED if forced off.
OFF if in auto mode and control function is not automatically activated.
GREEN if activated automatically.

8. FACTORY DEFAULT VALUES

NOTE: Your controller may not include all of these features

	SERIES 200
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
Pre-Blowdown Time	00:00 HH:MM
Conductivity Min	0 µS/cm
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	
No Flow	X
OTHER INHIBITOR FEED MODES	
PULSE TIMER	
Run Time	00:30 MM:SS
Accumulator Set	10
Count Totalizer	0
PERCENT TIMER	
Percent On	0%
% of Minutes	10

9. TROUBLESHOOTING GUIDE



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

MOTHER BOARD

Symptom	Probable Cause	Possible Solution
No Display (See Power Supply first)	Improper contrast	Adjust contrast on key pad.
	Environment exceeds122°F (50°C)	Relocate controller.
Erratic Readings	Improperly grounded power	Assure power and ground integrity.
Flow Light Never Activates (Green indicates ON, Red indicates OFF)	Function not activated	Turn switch S1-"2" on mother board ON. See Diagram 3, pg. 19.
Flow Light Stays On	Flow switch stuck	Clean flow switch.

POWER SUPPLY BOARD

Symptom	Probable Cause	Possible Solution
No Power Light	Blown fuse	Replace fuse on Power Supply board.
	Interconnecting cables loose	Check connections.
	No power supplied	Check power source.
	Power switch off	Turn power switch ON.

RELAY BOARD

Symptom	Probable Cause	Possible Solution
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: • ribbon cable.	Check ribbon cable connection or replace.
	If the Output front panel LED is lit and the Relay board LED is also lit: • blown fuse • bad relay	Replace fuse, if necessary, or replace relay
	If the Output front panel (relay) LED is not lit and the Flow LED is red	Check for flow and flow switch.

REINITIALIZATION

If the above troubleshooting steps fail to explain or solve condition, perform a factory reinitialization (see Initialization, pg.9, and Diagram 3, pg. 19, Mother Board). 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.

10. MAINTENANCE

No customer maintenance is required on the MPT200 Series controllers. All service should be performed by factory authorized personnel only. Modifications 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.

Glossary not yet updated

11. 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

Contrast difference in brightness between adjacent objects, i.e., darkness of text in screen display versus lightness of the screen background

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 MPT 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

12. INDEX

INDEX will be cross-referenced at final draft

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13. PULSAFEEDER MPT 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 w/24 hr. Blowdown (Bleed) Lock Out	0	1	0	1	0	0
120	28 Day Dual Biocide Timer w/24 hr. Blowdown (Bleed) Lock Out	0	1	0	1	0	0
150	Single Selectable Timer: Percent or Pulse w/Accumulator	0	0	0	1	1	0
210	28 Day Biocide Timer w/24 hr. Blowdown (Bleed) Lock Out	0	2	0	1	2	1
220	28 Day Dual Biocide Timer w/24 hr. Blowdown (Bleed) Lock Out	0	2	0	1	1	1
250	Dual Selectable Timer: Percent or Pulse w/Accumulator	0	0	0	1	2	1
320	28 Day Dual Biocide Timer w/24 hr. Blowdown (Bleed) Lock Out	0	3	0	1	3	1
350	Triple Selectable Timer: Percent or Pulse w/Accumulator	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 or pulse with accumulator	100/200/300		1			1	
D	Alarm output relay (Not available on MPT120)	100/200/300						
H	28 day single biocide with bleed lock-out	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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