

MegaTron Controller Manual Installation Maintenance

HE-30
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MegaTron Combination Controller Instruction & Maintenance Manual Table of Contents

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Instructions herein apply to various MegaTron models. Some parts may not apply to your specific model number. We have tried to include instructions when it is necessary for any options which have been included in your unit.

I. Introduction

The MegaTron microprocessor based controllers are designed to provide a wide range of control functions for recirculating water treatment systems. The controller is programmed through a front panel keypad and can be configured to provide a customized control system for your application. Your particular unit's functions can be determined by comparing the unit's model number to the Model Numbering Table (see page 3).

 **Notice:** Depending upon the options supplied on your unit you may or may not have all features and functions described in this manual.

Model Numbering

MegaTron units have several base system control functions and unit optional features. Your unit may be supplied with one or more of the features described in this manual. To determine what features apply to your unit check the model number label located on the controller enclosure.

Base System Control Functions


- C** - Tower Conductivity Control
- B** - Boiler Conductivity Control
- M** - Make-up Conductivity
- P** - pH Control
- R** - ORP Control
- T** - Temperature Control
- F1** to **F5**- Chemical Feed Timers
- E** - Flow Switch Assembly
- L1** to **L5** - Drum Level Alarm Inputs

Optional Features

- A** - Conduit connections
- D** - Dry Contact relays
- H** - Remote Communications bus only
- H1**- Direct Connect Communications
- H2**- Internet Connect Communications
- J** - Additional System Card bus only
- K** - Additional Control Relays
- Y** - ETL Agency Listing / Approvals

A model number will start with **MG** and will be followed with the Base System Control functions. If the unit is a dual system, all of the control functions of system one are followed by a **dash** then the functions for system two. If system two is the same as the first a (-X2) is used. Another **dash** separates the optional features listed after all base system control functions.

Example Model Number: **MGCPF3E-X2-DHY**

 **Note:** This list represents our most popular options additional options codes are available and may appear consult factory if any questions arise.

Description of Unit

MegaTron controllers may be configured to control one or two separate systems including cooling tower and boiler applications and may have various features depending on the model number. Whether the unit is controlling 1 or 2 systems each individual system can be configured with a variety of the functions / features listed below and there

may be feature differences between the two systems on a unit with two systems. (See model numbering table on page 3.)

Control Functions

Each of these control functions are based on an analog input from a probe and will include user settable relay control settings along with a High and Low Alarm setting and Limit Timer. Each control function will include a control relay output. When the reading reaches the Set Point the control relay is activated until the reading changes by the Differential amount.

1. **Conductivity** – The conductivity function of the controller is designed to monitor and control Total Dissolved Solids (TDS) in a recirculating system like a cooling tower or boiler in terms of electrical conductivity measured in MicroSiemens/cm. This control function is also referred to a Bleed. Units with conductivity and the make-up conductivity function can control the TDS of the tower system by calculating the difference between the incoming make-up water's conductivity and the system's conductivity.
2. **pH** – The pH function monitors and controls pH on a scale of 0-14 pH units.
3. **ORP** – The ORP function monitors and controls ORP on a scale of +/- 1000 mV.

Chemical Feed Timers

Chemical feed timers are designed to automate the addition of various chemicals by activating a relay output. Multiple timers can be supplied depending upon the model number and each timer will include a relay output. All timers can be programmed to be one of the following types.

1. **Pulse Time** – This timer accepts pulses from a make-up water meter (supplied separately). It can accumulate 1-99 pulses to the activate the timer to run from 0-99 minutes in minutes and seconds.
2. **Feed with Bleed** – This timer activates the relay output simultaneously with the bleed. This timer limits the amount of time the relay output will be on during the bleed cycle, thereby preventing chemical overfeed.
3. **Feed after Bleed**- This timer activates the relay output based on a user defined percentage of time the bleed off. The relay is activated after a bleed cycle and runs for the set percentage of that bleed cycle.
4. **Percentage** – The relay is on for a percentage of a continuously repeating cycle time. Both the percentage and cycle time are programmable.
5. **28 Day** – The timer is based on a 28 day cycle with two independent programmable feed cycles with prebleed and bleed lockout settings.


II. Installation

Electrical Wiring

The MegaTron controller has an internal regulated fused power supply that will operate off of 90 to 250 VAC at 47 to 63 Hz on the incoming wiring. Each output relay is individually protected with a replaceable fuse. Relay outputs will equal incoming line voltage.

WARNINGS:

1. **The controller should be connected to its own isolated circuit breaker and for best results the ground should be a true earth ground not shared. Wiring must be done according to all applicable local codes.**
2. **Power (line voltage) must be disconnected while making any connections. If power is supplied to the unit, line voltage will be present on the relay cards located in the lower section of the enclosure, even with the power (ON/OFF) switch off.**
3. **Low voltage signal wires (probes, flow switch, water meter etc...) should never be run in conduit with high voltage wires.**

 **NOTE: Liquid tight fittings and some labeled signal leads are provided for all signal (low voltage) connections for both pre-wired and conduit units.**

Pre-Wired

Pre-wired units are supplied with a 16 AWG cable with 3-wire grounded USA 115 volt plug for incoming power and 3-wire grounded receptacle cords for all control relay outputs also 16 AWG.

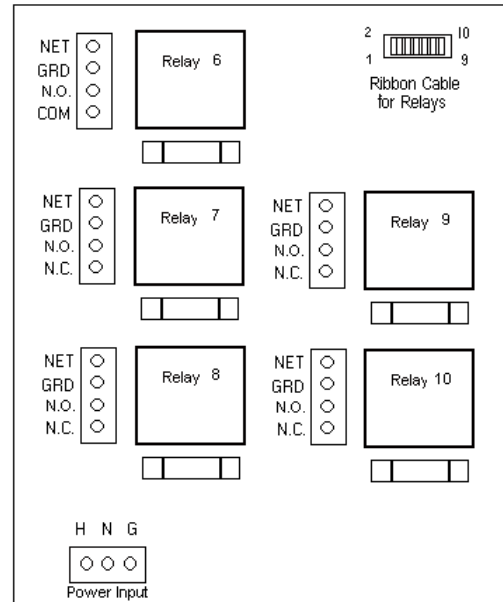
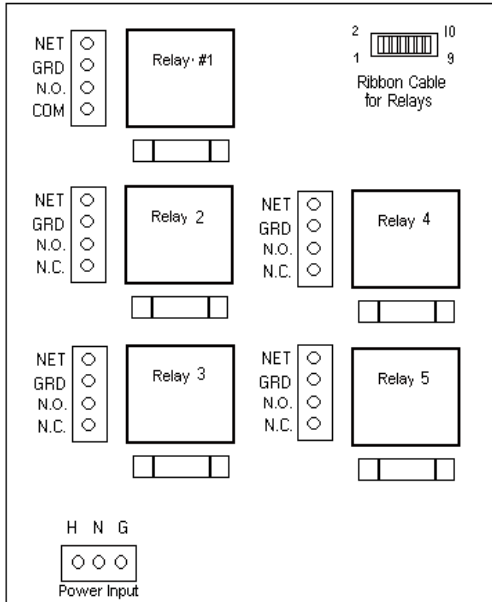
Conduit

Conduit units are predrilled at the factory and supplied with conduit knockouts for easy hard wiring to supplied detachable connectors on the relay card(s) located in the lower section of the controller. Remove the six screws of the lower panel for access.

NOTES:

1. **Relay 1 and 6 (if supplied) only provide a normally open (N.O.) relay output. If a N.O. and normally closed (N.C.) are required for a specific control function use one of the other relays and program the selected relay to be controlled by the desired control function. See relay configure set up on page 18.**
2. **What control function that activates each relay output is pre-configured at the factory based on the options selected on your controller. To change what activates a given relay see relay configure set up on page 18.**

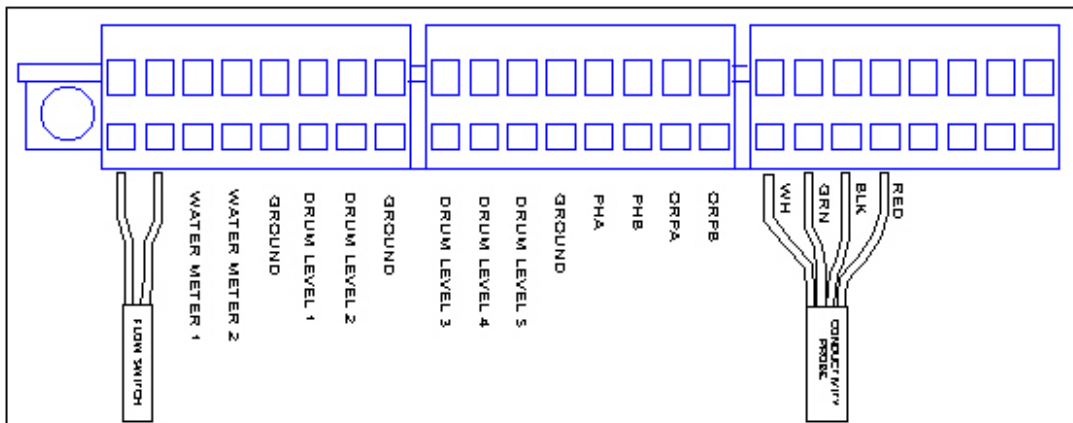
Relay Card Diagram



System Card Wiring


Units are provided with all low signal wires (probe, water meter, flow ...) pre-wired with labeled cables coming out of the controller. If it is desirable to wire directly to the system cards the following diagram indicates all connection for each system card.

⚠️ WARNING: This procedure is not recommended since it requires removal of the front panel.



Mounting Instructions

Select a mounting location that provides the operator easy access to the unit and a clear view of the controls through the cover of the controller. The location should be convenient to grounded electrical connections, the needed sample line plumbing and is on a stable vertical surface.

 **WARNING: Avoid locations that expose the controller to direct sunlight, vapors, vibration, liquid spills or extreme temperatures; less than 0°F (-17.8°C) or greater than 120°F (50°C). EMI (electromagnetic interference) from radio transmissions and electric motors can also cause damage or interference and should be avoided.**

Electrode Installation

MegaTron controllers may come configured for various circulating water systems. Listed below are instructions for cooling tower and boiler typical installations. Your specific installation requirements may differ but should conform to these instructions as much as possible for proper operation.

A. Cooling Tower

The standard probe(s) and/or flow assembly for cooling tower installations is constructed of schedule 80 PVC and supplied with 3/4" slip fittings for installing into a sample line. To insure proper operation the sample line must have a flow rate of 3-10 gpm. Inlet pressure must be higher than outlet pressure in order for water to flow past the electrode(s) to achieve the required rate. The probes are temperature compensated for increased accuracy.

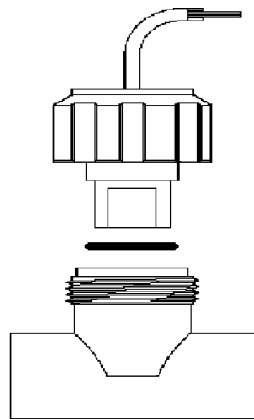
NOTES:

1. Install an isolation valve on either side of the flow assembly so electrodes can be easily isolated for removal and cleaning.
2. A line strainer is recommended upstream from the probes to protect against fouling and damage.
3. Mount pH electrodes vertically.
4. Units with a flow switch require the needed flow rate to operate the relay outputs.

WARNINGS:

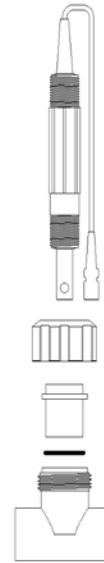
1. Electrodes are O-ring sealed, which if damaged will cause a leak.
2. Do not allow pH sensor tips to dry out, damage will occur.
3. Do not exceed a water temperature range of 32°F to 140°F.
4. Do not exceed a maximum pressure of 150 psi.

Conductivity Probe



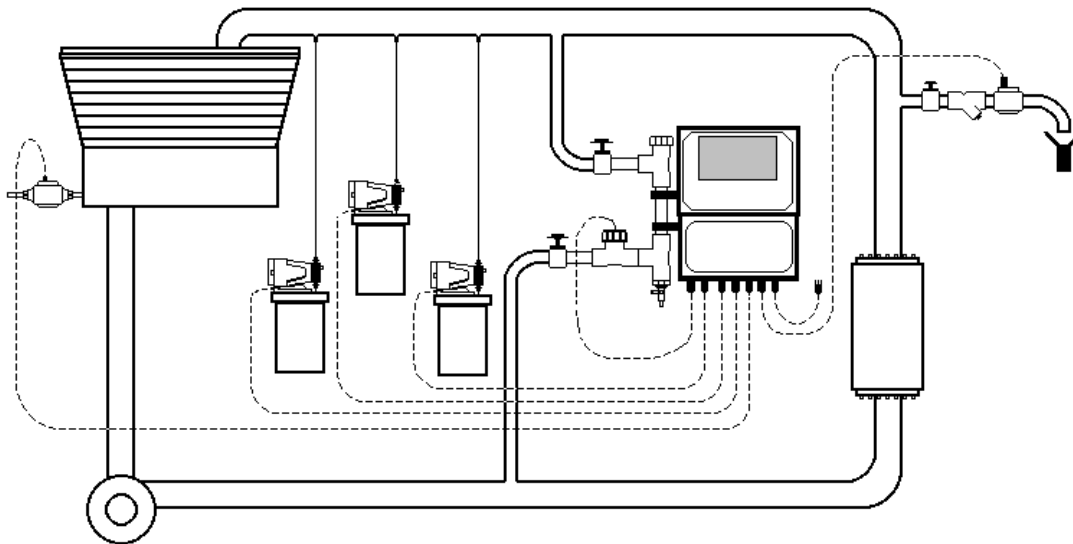
TE-4A

**pH and/or
ORP Probe**



PE-2 or OE-2

Typical Cooling Tower Installation Diagram



B. Boiler

Standard boiler electrodes (part # BE-4BC) have a 1" MNPT stainless steel bushing and are supplied with a 1" FNPT cross designed for mounting in the skimmer (surface) blowdown line. Sampling of the boiler's water can be achieved using one of two typical plumbing configurations (continuous sampling or timed and/or hold sampling). For a

successful installation, it is critical to observe the recommended distances and pipe sizes provided in the installation drawings. The probes are temperature compensated for increased accuracy.

For best results, the electrode cross should be mounted on a 1"skimmer blowdown line within 4' of the boiler. Smaller line sizes and greater distances may affect the response time and accuracy of the electrode. A flow-throttling device down stream from the probe (within 12-24 inches) is required to ensure that the electrode is exposed to water and not steam. Properly installed and adjusted, this device will prevent flashing in the electrode chamber.

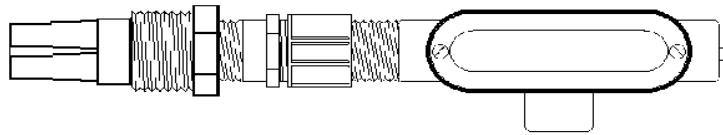
☀NOTES:

1. **Install a fully ported type valve between the electrode and the boiler. This allows the electrode to be isolated for removal and cleaning.**
2. **A flushing line and 1/4 turn type ball valve should be installed in the bottom of the cross to periodically "flush" sediment from the electrode chamber.**
3. **Make sure the alignment arrows on the probe end up parallel to the flow for best performance.**

☀WARNINGS:

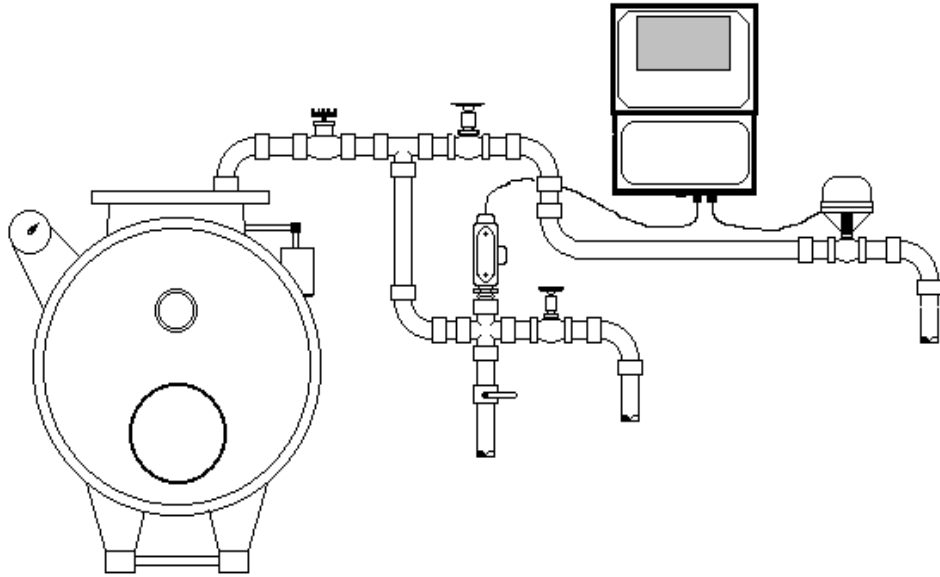
1. **The probe must be fully immersed in the system water to read correctly. Steam flashing will result in incorrect readings.**
2. **Do not exceed a maximum water temperature of 400°F.**
3. **Do not exceed a maximum pressure of 300 psi.**
4. **A throttling device must be installed down stream from the probe.**

**Boiler
Conductivity
Probe**

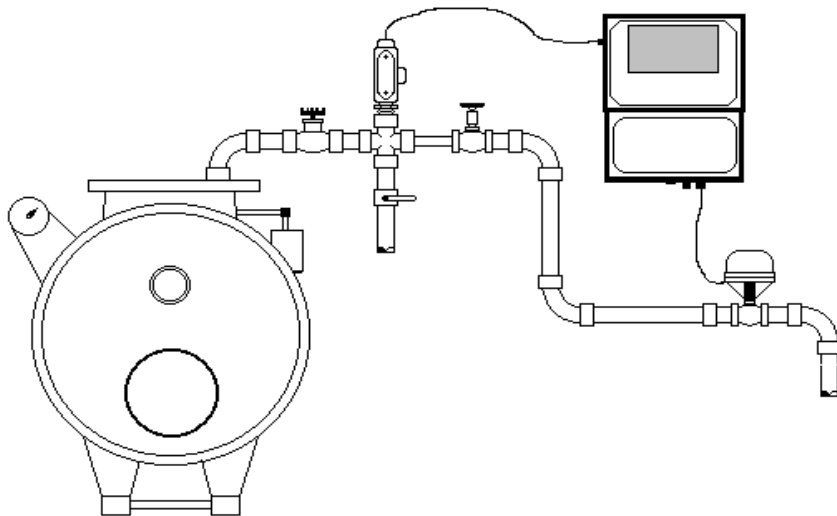


BE-4B

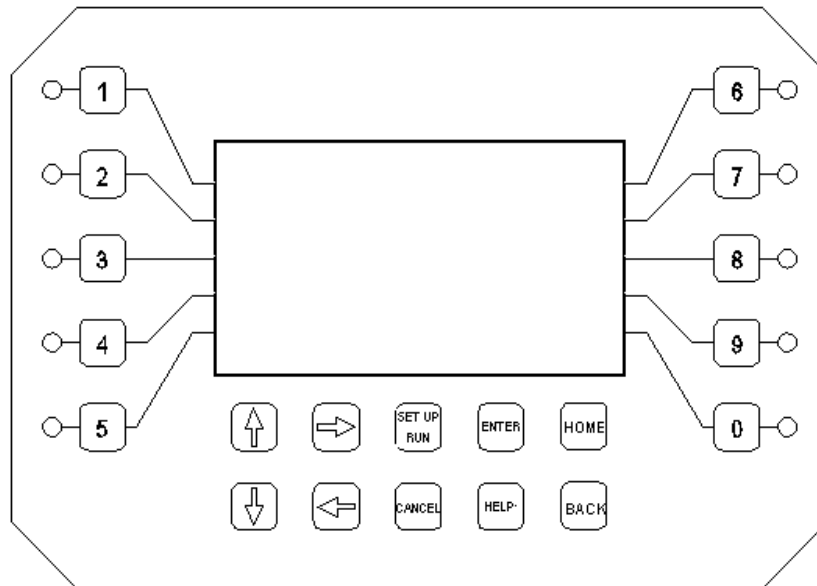
Typical Continuous Sampling Boiler Installation Diagram



Typical Timed Sampling and Sample and Hold Boiler Installation



Front Panel Description



- NUMBER** Keys- Used to enter new values in the SET UP mode and to access desired sub menus.
- UP/DOWN** - Used to cycle through text options to find desired setting.
- LEFT/RIGHT** - Used to cycle through text or setting options to find desired setting.
- SET UP/RUN** - System initializes into RUN mode. Press this switch to put the controller in SET UP Mode and see HOME menu page.
- ENTER** Key - Used to log a changed value into program.
- HOME** Key - Used to go back to the HOME menu page.
- CANCEL** Key - Used to clear values keyed in that are not wanted.
- HELP** Key- Used to access help screens.
- BACK** Key - Used to go back to last menu screen viewed.

IV. System Operation Overview

Operation

MegaTron controllers have two modes of operation, **RUN** and **SET-UP**.

RUN - This mode is for normal operation. In the RUN mode the display will show each system's parameters. If an alarm is present the ALARM box will flash how many alarms are present. No settings may be entered or changed in the RUN mode.

☀️ **NOTE:** Readings are updated every 6 seconds on the screen while in the RUN mode.

SET-UP - This mode is used to make adjustments to settings and readings on the controller. To access the SET UP mode from the RUN screen, press the SETUP/RUN key.

Typical Start Up Instruction

Complete all installation steps before beginning this procedure. Ensure that all controlled devices (pumps, solenoid valves, etc.) are operational and connected to the controller. Open the isolation valves to allow water to pass through the sample stream assembly.

Before beginning the start up procedure, familiarize yourself with the programming and operation of the system by reviewing the menus available. Use the keys of the controller to skim through all your options.

A. Calibration

All MegaTron controllers are factory calibrated for temperature, conductivity, pH and ORP. All units are shipped with the date preset, and the clock set to your current time. These readings and settings should be verified for accuracy, and adjusted as per the instructions listed below.

An accurate temperature reading is critical to a good conductivity reading as the temperature compensation factor is approximately 1% per degree F.

1. Conductivity - To calibrate the conductivity reading, remove the electrode from the line and wipe the flat surface with a clean cloth. Re-install the electrode and open the isolation valves to allow a sample across the probe. Be sure to allow the reading to stabilize for one minute. Select "SYSTEM COND" from the "CALIBRATION" menu. Then key in the corrected conductivity value. Press ENTER to log in that reading.

2. pH - Under normal operating conditions, pH calibration is achieved using the following steps. From the "CALIBRATION" menu, select "SYSTEM PH." Enter the correct pH value. Press ENTER to log in the new reading.

3. ORP - To calibrate ORP, from the CALIBRATION menu select "SYSTEM ORP". Compare the displayed reading to the actual system ORP. If these readings do not

match, key in the correct ORP value, and push ENTER. Press the SETUP/RUN key to resume normal operation.

There are limits to how much the calibration can be adjusted. The instrument will only accept new conductivity values which are from 1/2 to 2x the present reading. Any entry outside this range will cause a default to the original reading. If this happens, call 1-800-743-7431 for technical assistance.

V. Menu Navigation

To access the menus press the **Set Up / Run** key on the front panel. This takes you to the **Home** menu. MegaTron controller's menus are easily navigated by selecting your desired menu move by pressing the associated number key next to a menu box on the screen. Once you have stepped through the sub menus to reach a point at which a value or selection is made a Pop-up window will appear prompting you to enter a desired value or selection.

 **NOTE:** When entering new numeric values, enter all available digits (characters).

1. Home Menu

>HOME SETUP<	
SETPOINTS	DATE/TIME
CALIBRATION	CONFIGURE
TIMERS	HISTORY
CUSTOMIZE	WATER METER
ALARMS	RELAYS

From the **HOME** menu select the desired menu. The menu name explains what parameters can be programmed in the menu.

- SET POINTS** - Setting control set points for conductivity, temperature, pH and ORP.
- CALIBRATION** - Calibrating conductivity, temperature, pH and ORP if present.
- TIMERS** - Menu for selecting type and settings for all present feed timers.
- CUSTOMIZE** - Giving the controller, each system and all relays a user defined name.
- ALARMS** - View current alarms.
- DAY/TIME** - Menu for setting date and time.
- CONFIGURE** - Menus for configuring passwords, relay activations, digital inputs, setting history interval, flow switch, contrast, temperature scale.
- HISTORY** - Allows for view history on board in a graph form.
- WATER METER** - Menu for configuring water meter totalizing.
- RELAYS** - Menu for resetting accumulated "ON" times and manual activation.

2. Set Points

The same basic format is used for defining each available analog probe input's control parameters. Boiler conductivity systems will also have an additional menu step for programming the sampling method desired from continuous, timed or sample and hold.

```
>SYSTEM 1 SET POINTS<
SYSTEM COND
SYSTEM TEMP
SYSTEM Ph
SYSTEM ORP
```

SET POINTS – For setting the relay set points for the available analog probe readings such as conductivity, pH, ORP or temperature.

If there is more than one System present you first select which system's values are to be adjusted.

2.1 Set Point Options

```
>SYSTEM 1 COND SETPOINT <
SET POINT
DIFFERENTIAL
HIGH ALARM
LOW ALARM
LIMIT TIME
```

SET POINT – What reading turns the relay on
DIFFERENTIAL –Amount reading changes by before the relay is turned off

HIGH ALARM – What reading generates a High alarm notification.

LOW ALARM – What reading generates a Low alarm notification.

LIMIT TIMER- What amount of continuous bleeding will generate a time alarm notice.

3. Calibration

Calibration is for adjusting the unit's displayed value of a probes reading to match your tester or known solution.

```
>SYSTEM 1 CALIBRATION<
SYSTEM COND
SYSTEM TEMP
SYSTEM Ph
SYSTEM ORP
```

CALIBRATION – For adjusting the actual reading values of the available analog probe inputs, such as conductivity, pH, ORP or temperature.

3.1 Conductivity Calibration

```
>SYSTEM 1 COND CALIBRATION<
CALIBRATE
RESET ZERO
```

CALIBRATE – With a clean probe on-line seeing the system's water enter the known (tested from a calibrated hand held tester) value.

RESET ZERO – With the probe out of solution and dry enter a new zero point.

Note: Probe must be dry!

3.2 pH and ORP Calibration

```
>SYSTEM 1 pH CALIBRATION<
1 POINT CAL
2 POINT CAL
```

1 POINT – With a clean probe on-line seeing the system’s water enter the known (tested from a calibrated hand held tester) value.

2 POINT – Enter a known Low value with a clean probe in a buffer solution. Then enter a known High value with the clean probe in a buffer.



- Notes:**
1. Probes must be rinsed between buffers when doing a 2 Point calibration and given at least 30 seconds in solution to adjust to the buffer.
 2. There must be at least 2 full pH points between buffer solutions. Using a buffer of 4 and 10 is the best procedure. ORP buffers should be at least 200 points apart.

4. Timers

A unit may have up to 5 selectable timers for each system on a controller. All timers are associated with their system, so for a % of post bleed timer looks at the bleed of that system.

```
>SYSTEM 1 TIMERS<
TIMER 1
TIMER 2
TIMER 3
TIMER 4
TIMER 5
```

TIMERS – Select the type (28-day, pulse, limit, percent or percent of post blowdown) as well as the run times of each timer available per system.

4.1 Timer Type Selection

A pop-up screen lets you scroll through the various timer types available.

```
>SYSTEM 1 TIMER 1 SET UP<
  >SET TIMER TYPE (PULSE)<
    ->PULSE
  USE UP/DOWN KEYS TO CHANGE
  PRESS ENTER TO ACCEPT
SET UP                                TIMER TYPE
```

- Pulse-** A water meter activated timer
- Limit** – Feed with bleed with a maximum run time or limit for one bleed cycle.
- Percent** – A continuous cycle timer that sets a percentage On time of a cycle.
- Percent Post Bleed** – For feed after bleed for a settable percentage of the bleed time with a maximum run time.
- 28-Day** – A biocide or event timer.

4.2 Timer Set Up

Each timer type selected will have its own unique Set Up sub menu with additional selections specific to the type of timer selected. The page displayed before entering the Set Up menu of a timer provides an overall review of the timers current settings.

```
>SYSTEM 1 TIMER 1 SET UP<
TIMER TYPE: PULSE
           PULSES: 10
RUN TIME  (MM:SS): 01:00
           INPUT: WATER METER 1
[ SETUP ]           [ TIMER TYPE ]
```

4.3 Pulse Timer

```
>SYSTEM 1 TIMER 1 CHANGE<

PULSES
RUN TIME
METER INPUT
```

PULSES- The number of contacts from water meter to count be activating timer.

RUN TIME-The amount of timer for the timer to run

METER INPUT-Since each system with timers has two water meter inputs you must select which meter to get contacts from.

4.4 Percent Timer

```
>SYSTEM 1 TIMER 1 CHANGE<

% OF CYCLE
CYCLE TIME
```

% of CYCLE- The percent of the defined cycle timer that the timer is to be on.

CYCLE TIME-The amount of time in MM:SS that the cycle is going to be.

4.5 Post Bleed Timer

```
>SYSTEM 1 TIMER 1 CHANGE<

% OF BLEED
LIMIT TIME
```

% of BLEED- The percent of the post conductivity bleed time that you want the timer to run.

LIMIT TIMER- The limit timer is a safety feature that limits a single feed cycle to the amount of timer set regardless of the calculated post feed %.

4.6 With Bleed Timer

```
>SYSTEM 1 TIMER 1 CHANGE<

LIMIT TIME
```

LIMIT TIMER- This timer starts when the conductivity bleed starts and turns off when the bleed stops or until the limit time has been reached. The time can be set in MM:SS.

4.7 28-Day Timer

Each 28-day timer has a Program 1 and a Program 2 for programming the various feed times. The programming for Program 1 and 2 are the same but allow for more variation in the timer's relay activation.

```
>SYSTEM 1 TIMER 1 CHANGE<
WEEKS                MIN COND
DAYS                 FEED LOCK
START TIME           BLEED LOCK
RUN TIME              FLOW LOCK
PREBLEED
```

WEEKS- The week(s) that the timer is to feed.

DAYS- The day(s) that the timer is to feed.

START-The time of day for the timer to start.

RUN- How long the timer is to run.

PREBLEED-How long the controller is to bleed down before feeding in chemical.

NOTE: The prebleed starts at the START time programmed above.

MIN COND-The minimum conductivity that the unit will prebleed down to.

FEED LOCK-Which other system timer to lockout during this timers run time.

BLEED LOCK-How long to lock out the bleed function after the timer's run time.

FLOW LOCK-If the system has a flow switch you can ignore it for this timer.

5. Customize

```
>CUSTOMIZE<
UNIT NAME
SYS 1 NAME
SYS 2 NAME
RELAY NAMES
```

CUSTOMIZE – Allows for the user to define the on-screen name for the Unit, System 1 and System 2 (if applicable) as well as the names for each relay.

6. Alarms

```
>ALARMS<
SYS 1 ALARMS
SYS 2 ALARMS
```

ALARMS – Shows any current alarms.

7. Date and Time Set Up

```
>SET DATE AND TIMES<
SET DATE
SET TIME
SET DAY
SET WEEK
Friday May 18, 2002 03:04:56
```

DATE AND TIME - For setting the date, time, day and week on the controller.

8. Configure

Provides access to menus to set-up passwords, relay activation, temp scale, display contrast, flow switch, inputs, history time stamps, factory set-up and system information.

```
>CONFIGURE<
PASSWORD          CONTRAST
RELAYS            TEMP SCALE
INPUTS           NETWORK
HISTORY          SYS INFO
FLOW SW         FACTORY
```

INPUTS- This screen shows what digital inputs are available on the unit such as water meters, flow and drum level alarms.

CONTRAST- This screen allows for adjusting the display contrast.

FLOW SW- Defines a flow switch to be open or closed with flow.

FACTORY- A factory only menu

TEMP SCALE- Set between Celsius or Fahrenheit

HISTORY – Sets the history time stamp interval.

SYS INFO- Tells unit software specifics.

8.1 Password

```
>CONFIGURE PASSWORDS<
ADMIN PASSWORD
USER PASSWORD
USER SET UP
```

ADMIN PASSWORD – The administrator password gives access to all menus except factory set up.

USER PASSWORD – The user password allows the user to access HOME menus that are made available in **USER SET UP**.

8.2 Relays

```
>CONFIGURE RELAYS<
RELAY 1
RELAY 2
RELAY 3
RELAY 4
RELAY 5          MORE RELAYS
```

CONFIGURE RELAYS – This menu lets you choose what available function (timer 1, conductivity, alarms etc...) activates a particular relay. When you select a relay a pop-up screen appears with a list of all available activation functions to arrow through.

8.3 Network

```
>CONFIGURE NETWORK<
IP ADDRESS          HTTP REMOTE
IP MASK              FTP
GATEWAY             RESET
SERVER
HTTP LOCAL
```

NETWORK – This menu is used for setting up the remote WebAdvantage communications and is covered in a separate manual.

9. History

The onboard history allows for viewing the history of the probe readings, relay activations, key pad activity, calibrations and alarm logs for each system present. An initial overview page is displayed showing your current sample interval, the calculated number of days the unit can keep probe history for before losing the oldest. The number of sensor samples and relay/alarm events currently stored is also displayed.

```
>HISTORY REVIEW<
SYSTEM 1      Sample Time:   5 MIN
              (Length  164.62 days)
              Sensor Samples
              882
              Relay/Alarm Events
              323
```

Note: The history can be reset by going to the configure menu and entering a different sample interval. After the new sample interval has been entered you can then re-enter your desired sample interval.

9.1 Viewing History

```
>HISTORY<
RELAY LOGS
ALARM LOGS
SENSOR HISTORY
EVENT LOG
```

RELAY LOGS- Relay activations displayed in a log form. Arrow up to advance through the log.

ALARM LOG- Alarm activations displayed in log form.

SENSOR HISTORY- For selecting the parameters and viewing of a given probe reading's history in log or graph form.

EVENT LOG- Displays various keypad activities.

10. Water Meters

```
>WATER METERS<
SYS 1 WATER METER 1
SYS 1 WATER METER 2
SYS 2 WATER METER 1
SYS 2 WATER METER 2
```

WATER METERS – Shows the water meter input records (totalizer) and defines the contact value (100) and units of measure (gallons).

11. Relays

```
>RELAYS<
RELAYS 1-10 STATUS
RELAYS 1-10 RESET
```

STATUS– Allows for viewing accumulated relay ON times, forcing relays ON or OFF or seeing which relay is on.

RESET- Allows for the resetting to zero the accumulated run time of a particular relay.

VI. Maintenance

The only required maintenance for normal uninterrupted operation of your MegaTron controller is cleaning of the electrode(s).

After initial start up, it is a good idea to clean the electrode frequently until a schedule based on need has been developed. Since each application is unique, it is difficult to estimate the required frequency of cleaning. The first cleaning should take place after about one week of the system being on line.

To determine the required cleaning frequency, record the reading on the controller before the electrode is removed for cleaning. After cleaning, record the new reading. If a change is observed in the two readings, the electrode was dirty. The more significant the change, the dirtier the electrode. If no change occurs, cleaning needs to be done less often.

Conductivity Electrode Cleaning Procedure

1. Record the current conductivity reading.
2. Turn off water flow through the electrode loop, bleed pressure from the line and remove electrode.
3. Use a clean cloth and a mild cleaning solution to remove loose dirt etc., from the flat surface of the electrode.
4. If the electrode has deposits such as scale attached to the electrode surface a more aggressive cleaning approach will be needed. There are several ways to do this, the preferred method being the one that is easiest for the user.
 - a. Use a mild acid solution to dissolve deposits.
 - b. Lay a piece of sandpaper (200 grit or finer) on a flat surface such as a bench top. "Sand" electrode to remove stubborn deposits. (Do not wipe surface with your finger. Oil from your skin will foul carbon tips.
5. Reinstall the electrode in the system. After the reading stabilizes, calibrate the unit to a reliable test reading.

Many times an electrode can appear to be clean, but the unit still cannot be calibrated. If this is the case, use one of the more aggressive electrode cleaning procedures listed in step 4 above. Recheck the calibration after completion of this procedure. If no change was observed in the reading, replace the electrode. If a change occurred but the unit still will not calibrate, repeat procedure as many times as necessary.

pH and ORP Electrode Cleaning Procedure

1. Remove the pH electrode from the system by turning counter-clockwise until fully released.

2. Spray with water and/or detergent, using a soft brush to dislodge any particulate matter.
3. Visually inspect the electrode for signs of damage.
4. Calibrate the electrode.
5. Replace the PTFE tape and re-mount into the system, taking care to avoid torsion on the cable.

Slow response or non-reproducible measurements are signs that the electrode has become coated or clogged.

The pH glass is susceptible to mounting by many substances. The speed of response, normally 95% of the reading in less than 10 seconds, is dramatically degraded when the pH glass is coated.

For pH electrode, to restore the speed of response, clean the bulb with a high quality detergent, methyl alcohol or other suitable solvent using a "Q-tip". Rinse well with distilled water and retest. If the electrode now responds, but erratically, soak the sensor in 0.1 Molar HCl for 5 minutes. Remove and rinse with water and place in 0.1 Molar NaOH for 5 minutes. Remove, rinse again and then place the sensor in pH 4. buffer for 10 minutes before use.

ORP/REDOX electrode may be gently abraded by use of 600 grade wet silicone carbide paper, jewelers rouge or very fine steel wool. Try one of the previous cleaning methods first before using this method.

VII. Troubleshooting

The Advantage MegaTron controller is designed for many years of trouble free operation. Should a problem occur, refer to the following chart to help identify the problem. If replacement is required, follow the procedures listed in the Warranty and Factory Service portion of this manual.

SYMPTOM	POSSIBLE CAUSE	SOLUTION
False reading	Bad or dirty electrode Out of calibration	Clean, as needed Calibrate unit
Will not calibrate.....	Dirty electrode Faulty electrode Faulty wiring to electrode	Clean electrode Replace electrode if needed Replace electrode if needed
No system power.....	Check power source Check fuse Check connections	Plug into different receptacle Replace as needed Make sure ribbon cables are secure
Pulse timer not activating...	Check wiring Check external device	Repair as needed Repair/replace as needed
Outputs not energized.....	No flow Check fuse	Check sample line for clogged pipes or strainers Replace as needed

VIII. Advantage Controls' Product Warranty

Advantage Controls, Inc. warrants control systems of its manufacture to be free of defects in material or workmanship. Liability under this policy extends for 24 months from date of installation. Liability is limited to repair or replacement of any failed equipment or part proven defective in material or workmanship upon manufacturer's examination. Removal and installation costs are not included under this warranty. Manufacturer's liability shall never exceed the selling price of equipment or part in question.

Advantage disclaims all liability for damage its products caused by improper installation, maintenance, use or attempts to operate products beyond their intended functionality, intentionally or otherwise, or any unauthorized repair. Advantage is not responsible for damages, injuries or expense incurred through the use of its products.

The above warranty is in lieu of other warranties, either expressed or implied. No agent of ours is authorized to provide any warranty other than the above.

30 Day Billing Memo Policy

Advantage Controls, Inc. maintains a unique factory exchange program to ensure uninterrupted service with minimum downtime. If your controller malfunctions, call 1-800-743-7431, provide our technician with Model and Serial Number information. If he is unable to diagnose and solve your problem over the phone, a fully warranted replacement panel will be shipped, usually within 48 hours, on a 30 Day Billing Memo.

This service requires a purchase order and the replacement panel is billed to your regular account for payment.

The replacement panel will be billed at current list price for that model less any applicable resale discount. Upon return of your old panel, credit will be issued to your account at either 100% if your unit is in warranty or at 50% if your unit was out of warranty. The exchange covers only the panel. Electrode and enclosure are not included.

FCC Warning

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instruction, 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.