

# ACU-TROL® AK110™ COMMERCIAL CHEMICAL AUTOMATION CONTROLLER

AQUATIC FACILITIES • COMPETITION POOLS • RESORTS • HOTELS & MOTELS • MUNICIPAL POOLS



## ADVANCED CHEMICAL AUTOMATION

The most highly advanced single-pool controller in the industry! With its connection options the Acu-Trol AK110 controller provides unsurpassed water management to any aquatic facility operator, fulfilling all requirements of the facility's pool, spa or other water features. Programmable features

complete the Acu-Trol AK110 controller package with continuous monitoring of pH, ORP, disinfectant levels, temperature and flow rate. The bidirectional control of the Acu-Trol AK110 controller allows water chemistry changes to be made immediately from a computer anywhere in the world.

## STANDARD FEATURES

- AcuCom™ Software
- pH, ORP and temperature sensors
- Programmable pH, ORP and temperature set points
- Programmable chemical feed cycle ON and OFF (MIX) times
- Programmable proportional feed
- Programmable acid, base or CO<sub>2</sub> feed for pH control
- Flow cell with built-in flow switch, shut-off valves, inlet strainer and sampling port
- Records up to 30 days of sensor data internally in 1 or 2 hour recording intervals
- NSF Approved

# ACU-TROL® AK110™ COMMERCIAL CHEMICAL AUTOMATION CONTROLLER OPTIONS AND FEATURES

## OPTIONS

- **AcuPort™ Connectivity System**  
Ethernet, WiFi or RS422/485
- **AcuManage™ II Software**  
Notification alarms and sensor readings  
AcuManage II available via AcuPort communication only
- **AKColor™ Sensor System**  
The AKColor system measures PPM of free chlorine with the DPD (N, N-DIETHYL-P-PHENYLENEDIAMINE) test
- **Optical Level Sensor**  
Measurement and automatic control of water level
- **Digital Flow Sensor**  
Displays flow rate in gallons per minute
- **High Amp Relay (HAR1)**  
Control of high current loads
- **Real Time Clock**  
Time and day stamps for sensor data logging
- **Premounting**  
Mounted on easy to install polypropylene predrilled board

## FEATURES

- **Sensors**  
The Acu-Trol AK110 controller is capable of measuring ORP, pH, free chlorine, temperature and flow rate
- **Flow Cell**  
The AK1200™ Flow Cell offers inlet and outlet valves for sensor protection and ease of water sampling
- **Data Recording**  
Up to thirty (30) days of data storage  
In the absence of power the Acu-Trol AK110 controller will retain programming information, calibration and recorded data
- **Alarms**  
Alarms are activated by sensor measurements and will communicate every two hours until alarm is cleared
- **pH Alarms**  
pH set point  $\pm .5$   
Overfeed disables pH feed  
Flow switch disables pH feed  
High pH disables sanitizer feed

- **ORP Alarms**  
ORP set point  $\pm 75mV$   
Overfeed disables disinfectant feed  
Flow switch disables sanitizer feed
- **Communication**  
The Acu-Trol AK110 controller communicates with the AcuManage II and AcuCom™ Software Packages.
- **Security**  
Password limits access to ensure programming protection  
3 levels with 7 unique passwords

## PROGRAMMABILITY

- Proportional feed
- Feeder ON/MIX times
- Mix/Cycle times
- Overfeed lockout times
- pH, ORP and temperature set point
- ORP and pH calibration
- Colorimetric PPM measurement
- Temperature calibration
- Heater control
- Acid/Base feed
- Disinfectant feed
- Four pager numbers via dial-up modem
- Four email addresses via wireless modem
- Master & service passwords
- Event alarms



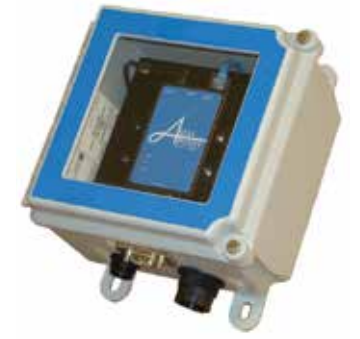
AKColor System

# ACU-PORT CONTROLLER ACUCOM SOFTWARE ACUMANAGE SOFTWARE

## OPTIONAL CONNECTIONS

### AcuPort System

The AcuPort system provides connectivity via Ethernet, WiFi or RS-422/485 communication interfaces. The port provides dedicated communication to either the Acu-Trol® AK110™ or AK600™ Controllers. New features for the AcuCom software offers direct connection via TCP/IP.



AcuPort System

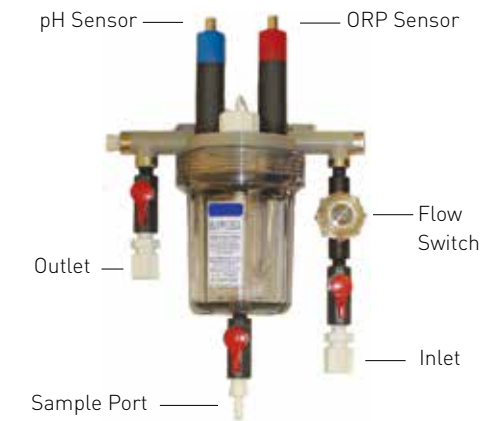
## AK1200 FLOW CELL AND SENSORS

### Flow Cell

- Convenient inlet and outlet ports
- Built-in flow switch to disable feed in no flow conditions
- Sample port for testing
- Clear acrylic viewing jar

### Sensors

- pH and ORP
- Temperature
- Flow



pH and ORP Sensors

## ACUCOM AND ACUMANAGE II SOFTWARE

Access essential water chemistry information instantly.

The AcuCom and AcuManage II software provide interactive control of multiple bodies of water with the click of a mouse from any PC. View multiple locations at once and manage water chemistry without unnecessary service calls. With the AcuPort controller, the data management system goes mobile and completes the Acu-Trol AK110 controller equipment room package.

- Remote access from AcuCom software packages (requires optional communication modules)
- System will call out alarm conditions to 4 pager numbers
- Over 30 days of data can be internally stored in two (2) hour intervals or 15 days in one (1) hour intervals



AcuCom and AcuManage Software

# ACU-TROL® AK110™ COMMERCIAL CHEMICAL AUTOMATION CONTROLLER



## SPECIFICATIONS

- A programmable chemical automation system shall be furnished for the continuous monitoring of the following pool and spa parameters: pH, disinfectant levels, temperature, and flow rate. The controller shall be capable of incorporating expansion modules that shall be capable of controlling pH, disinfectant, and colorimetric PPM, among others. Installation of the system shall be as specified by the manufacturer and no exceptions shall be taken. The water monitoring software and programmable controller systems as specified below will be provided. A factory authorized representative shall provide training to the owner.
- The system shall be a Pentair Commercial Aquatics™ Acu-Trol® AK110™ controller or a technically equal system capable of providing continuous automatic monitoring and control of water chemistry, temperature, and various other items on a single body of water.
- The controller shall be capable of controlling sensors for the measurement and control of the water system. The controller shall have the ability to calibrate all sensor inputs. The controller shall provide separate electrical isolation for the sensors. Controllers not providing separate electrical isolation for the following sensors are not considered equal. The controller shall be capable of measuring using the following sensors: ORP: (1 isolated input), the sensor range shall be 0 to 999 mV with a 1 mV resolution, pH: (1 isolated input), the sensor range shall be 4.22 to 9.70 with a 0.02 resolution, free Chlorine: (1 isolated input), the sensor range shall be 0 to 9.99 PPM with a 0.01 PPM resolution, temperature: (1 input), the sensor range shall be 32 to 212 degrees Fahrenheit with a 0.02 degree resolution, flow Switch: (1 input), the sensor shall detect an open or closed condition, flow Rate: (1 to 2 inputs), the sensor range shall be 0 to 65,535 gallons per minute with a 1 gallon per minute resolution. The controller shall provide +12 volts DC for the sensor.
- The flow cell shall include two (2) sensors, one (1) in-line filter, one (1) safety flow switch, and one (1) sampling valve for water testing. The flow cell shall be transparent allowing for visual inspection of the sensors. The flow cell shall also include a valve at the inlet and outlet that may be used to adjust the flow or to stop the flow for probe cleaning or removal. The flow cell shall have two (2) extra plumbing ports. The flow cell shall be designed in such a way that it is not possible for the sensors to be exposed to air. The flow cell shall have a removable reservoir for cleaning.
- The controller shall be capable of controlling three (3) relays. The controller shall provide at a minimum five (5) amps of current for a group of three (3) relays. Adjustable DPST and DPDT Relays: These relays shall supply either service voltage, 24 VAC, or act as a dry contact. The relay ratings are 5A at 250 VAC. The 24 VAC current rating is 0.5A total, all outputs combined. Default Relay Setups: The controller shall provide means for individually programming any relay back to factory defaults.
- The controller's enclosure shall have the rating of NEMA 4X. The controller's dimensions are approximately 10" wide by 8" tall by 4" deep with a mounting surface area of 0.55 square feet.
- The controller shall be equipped with a 4 row by 20 column LCD display and a 16 key alphanumeric keypad as the customer interface. This LCD display shall be backlit and automatically light when the keypad is touched, and shall remain lit for an adjustable amount of time. Values shall have the capability of being displayed in US and metric units. Controllers without a 16 key alphanumeric keypad shall not be considered equal.
- The controller shall be equipped with a menu and shall allow for the resetting of one or all relays back to the original factory defaults. The controller's relays shall be capable of being configured to control the following: Limiting the maximum length of time a relay shall be ON. Limiting the maximum length of time that a relay can be ON as long as the measurement is greater than five percent (5%) away from the set point. This second overfeed timer shall not be automatically cleared, but shall require the timer count to be reset or for the measurement to reach the set point in order to deactivate, Simultaneous Chemical Feed Lockout. The controller shall not adjust the pH while the disinfectant is in a feed cycle. The ability to turn OFF a relay based on the ON state of any other relay. Delaying the turn ON of a relay for a settable amount of time. Proportional feed on both the feed ON time. The controller shall have the ability to specify the range separately for both. Data recording will keep track of how many times all relays are turned. Seven (7) day timer that allows for enabling or disabling a relay based on the weekday. Time of Day based commands that allow for enabling or disabling a relay based on the Time of day. Control based on any of the flow switches installed. Manually turn ON a relay for an adjustable feed time. Control primary disinfectant and supplemental disinfectant.
- The controller shall contain factory-preset configurations or functionally equivalent programming to assist in the assignment of relay functions. ORP Control: This shall allow for detailed ORP (Oxidation Reduction Potential) based control of the disinfectant. pH Acid Feed: This shall allow for detailed control of acid feed. pH Base Feed: This shall allow for detailed control of base feed. Temperature: This shall allow the control of heater systems. Pager: This shall allow for the configuration of pagers. Alarm: This shall allow setup of all system alarms. PPM: This shall allow for colorimetric PPM disinfectant control. Water Level: This shall allow for the control of the water level in the system. Probe Clean: This shall provide for the automatic cleaning of the sensors that are installed in the flow cell.
- In the absence of power, the controller shall retain all setup information, calibration and recorded data for up to 10 years. The controller shall have the ability to record data from all sensors. The data shall be viewable on the front panel and shall be download able into the PC. The controller shall allow data recording in 1 or 2 hour intervals. The Controller shall have the ability to store 441 measurement lines for a total of 30 days of data recording at two (2) hour intervals. Controllers that do not allow at least 36 days or 441 lines of data will not be considered equal.
- The controller's alarms shall have programmable upper and lower limits. The controller's alarms shall be activated by any relay or switch input. The controller shall send the alarm information by pager or email by a user settable amount of time until the alarm condition is cleared.
- The controller shall have the ability to communicate to a PC using Windows® based software through the following methods: direct serial communications, modem remote communications, and wireless remote communications or the AcuPort™ System. When communication with the controller is established the controller's front panel shall become inactive. The PC screen shall display an exact replica of the controller's display. The graphical data shall be updated on the PC screen at a rate faster than 2 seconds or .02 minutes when connected with a modem or direct serial connection option and 3 seconds when connected with the wireless communication option. The controller shall be capable of firmware updates when connected either by a direct serial or modem connection. Controllers requiring replacement parts to upgrade the firmware shall not be considered equal. The controller's communication shall allow the user to download the following: sensor data and system configuration files. The controller shall allow the user to upload system configuration files to the controller. Modem Remote Communication: The controller shall automatically adjust to operate at the highest modem speed possible. The controller shall detect the most reliable connection speed as the line conditions change. The controller shall be capable of alerting up to four (4) pagers (phone numbers) when alarm or configurable condition occurs. Wireless Remote Communication: The controller shall be capable of sending email notifications to up to four (4) email addresses. The controller shall have the ability for sending system alarms and uploading sensor readings to a centralized internet database.
- The controller shall be capable of managing two (2) levels of security accessible via two (2) different passwords. Each password may contain up to ten (10) digits. The controller shall encrypt the password on the display at all times. The controller shall provide a means for communication lockout ensuring that no one else can access the controller remotely. When unattended, the controller shall reset to service level after the display backlight is turned off. The controller's backlight timer shall be user configurable. SERVICE: The controller shall provide limited access to the service menu. This menu shall provide calibration, manual control of relays, and lockout of programming. MASTER: The controller shall provide access to every part of every menu.
- The controller for the base bid options shall include pH, ORP, temperature sensor, and flow cell.
- The following options are available upon request in addition to the base bid. Optical Level Sensor: This sensor shall provide a measurement for the control and introduction of makeup water into a given body of water. Level Sensor: This sensor shall provide a measurement for the control and introduction of makeup water into a given body of water. Digital Flow Meter: This sensor shall provide the controller with a means to display the flow rate in gallons per minute. Colorimetric PPM Sensor: Shall provide PPM of disinfectant in the water through a colorimetric method. Below Grade Relay: Shall allow high current loads to be controlled from the controller's internal relays. Wireless Communication Module: This module shall be capable of sending email notifications of system alarms and uploading sensor readings to a centralized internet database. Modem Communication Module: The module shall allow any of the four (4) pagers to be used for communication of the alarm status. Real Time Clock Module: The module shall allow time and day stamps in the data log.
- The controller shall be covered by a standard manufacturer warranty of five (5) years. All pH and ORP sensors will be covered by a two (2) year warranty. Flow Cell will be covered by a one (1) year warranty. This warranty extends to the original retail owner only, beginning on the date of installation, and is not enforceable by any other party. Proof of purchase and/or date of installation will be required to execute a warranty claim. Warranties by Others: Some products incorporate components manufactured by other manufacturers. Some of these provide warranties in addition to the warranty provided herein. In all such cases, a copy of that warranty will be provided with the product. To the extent protection provided under any such third party warranty exceeds the Limited Warranty provided herein, the Customer will have to look to that manufacturer for the additional warranty protection.



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