Stark Pool Controller

User's Guide

Rev 1
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Welcome to your Stark Controller

Welcome to the world of automated pool controls. This Stark Controller is designed to automatically manage your pool filtration system for maximum performance and minimum maintenance. In addition to filter backwash operations, this controller can automatically shut down the pool pump and heater during periods when the pool is not in use. This saves energy consumption with what we call our "Energy Saver" cycle. Although this system is automatic and if properly configured requires no operator intervention, the following discussion should be helpful in understanding the controller operation. An understanding of the pool status information present on the controller screen will also be very helpful in identifying maintenance issues before they become critical. Should it become necessary because of unusual circumstances to over-ride the automatic operations managed by this pool controller, the following discussion will provide you with the necessary instructions.

The Stark Pool Controller is an extremely flexible tool that can be configured to meet the control needs of almost any installation. For the purpose of this "User's Guide", it is assumed that the controller has been configured properly for your particular pool. For information on re-configuring the controller, please refer to the "Stark Pool Controller Operator's Manual" for a more detailed discussion of parameters and modes of operation.

Interpreting the Status Display

The Stark Controller is housed in a watertight plastic enclosure. A locking door is provided to prevent unauthorized access to the system keyboard. A window in this door allows viewing of system status.
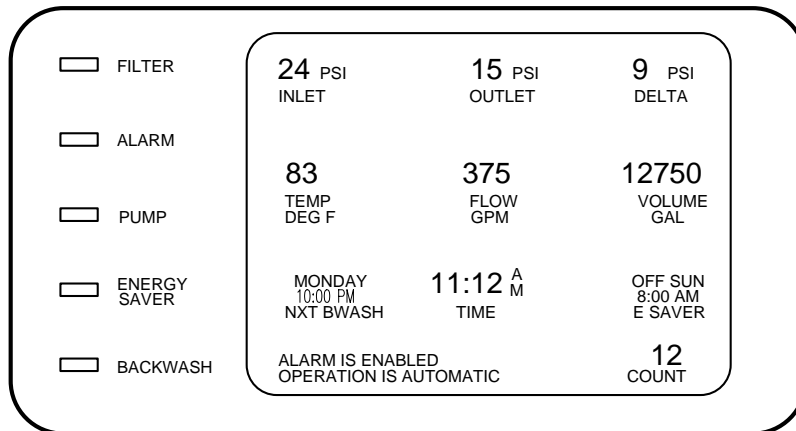

Figure 1, System Status as viewed through window

Focusing first on the blue and white LCD display, the fields displayed are as follows:

Top Left: Inlet Pressure. This field shows the current pressure at the inlet to the filter system. This reading should agree with the reading found on the mechanical gauge mounted between the pool controller and the multiport valve. This reading is used by the controller to calculate the differential pressure across the filter system (see below).

Top Center: Outlet Pressure. This field shows the current pressure at the outlet of the filter system. This reading should agree with the reading found on the mechanical gauge mounted between the pool controller and the multiport valve. This reading is used by the controller to calculate the differential pressure across the filter system (see below).

Top Right: Differential Pressure (Delta). This field shows the difference between the inlet pressure and the outlet pressure of the filter system. This back pressure indicates how much the flow is being restricted by the filter system. As the filter becomes clogged, this differential pressure will increase. The system can be instructed to initiate a backwash operation when this differential pressure reaches a trip point. A backwash operation should reduce this pressure difference back to acceptable levels.

Middle Left: Pool Temperature. If your controller has been equipped with a temperature sensor, this field will indicate the current temperature of the pool water. The controller is constantly monitoring this temperature and comparing it against acceptable limits. An out of limit condition will set the alarm output indicating that there is some difficulty with the pool heater. If no temperature sensor has been installed, this field will be blank.

Middle Center: Flow rate. If your controller has been equipped with a flow sensor, this field will indicate the current flow of pool water through the filter system. The controller can be instructed to initiate a backwash operation if this flow drops below a trip point. If no flow sensor has been installed, this field will display zero.

Middle Right: Volume filtered since last backwash. If your controller has been equipped with a flow sensor, this field will indicate how much pool water has been filtered since the last backwash operation. The controller can be instructed to initiate a backwash operation after a desired volume has been filtered. The backwash operation will reset this field to zero and it will start accumulating again every ten seconds.

Lower Left: Next Backwash. This field indicates to the best of the controller's ability when the next backwash will occur. If a time interval backwash has been called for, the number of minutes remaining until the next backwash is displayed. If a time of day backwash has been called for, the day and time of the next backwash will be displayed. Other modes of operation call for backwash triggers based on parameters other than time and may even call for a combination of circumstances to trigger a backwash. In these cases, this set of conditions will be displayed (in an abbreviated manner) but no indication of exactly when the next backwash will occur can be given.

Lower Center: Time. This is simply the system clock. It is used to initiate backwash operations based on time of day and is also used for Energy Saver cycles.

Lower Right: Energy Saver. This field indicates when the next energy saver event is scheduled to occur. This event will either be to turn the pool OFF at the beginning of the next energy saver cycle, or if the system currently is in the middle of an energy saver cycle, to turn the pool ON at the end of the cycle. If no energy saver cycles have been programmed, this field will indicate "not set".

Bottom Left: Controller Status. The first line of this field normally indicates whether the alarm capability of the system is currently enabled or disabled. The second line normally indicates whether the controller has automatic control of the pool or whether the pool operator has chosen to switch to the manual mode where all operations must be initiated from the keyboard (see following sections of this manual). When the controller is in the middle of a backwash operation, this status information is replaced information on which part of the backwash cycle the controller is presently executing. This information can be very useful when long interfilter delays or a large number of filters are present in the system.

Bottom Right: Backwash Count. This field displays the number of backwash operations that have been completed since the counter was last reset. This count can be used to schedule system maintenance.

Although this is quite a bit of information for one screen, having it all in one place prevents the necessity of opening up the door and pressing keys every time a new bit of status information is desired.
Looking to the left of the display, you will notice five rectangular lights with labels next to them:

Filter: This green light is illuminated when the filter system is filtering pool water (normal operation).

Alarm: This red light will blink on and off if the system is unable to backwash the filters successfully or if there is danger of emptying the pool with excessive backwash operations. If a temperature sensor is present, this light could also indicate that the pool temperature is outside of desired limits.

Pump: This green light is illuminated when the pool pump is running (normal operation or backwash).

Energy Saver: This green light is illuminated when the controller has the pool pump and heater shut off in an energy saver cycle (Filter and Pump lights will be off).

Backwash: This green light is illuminated when the controller is backwashing the filter system (filter light will be off).

This combination of lights and LCD display provide a complete picture of pool status "at a glance".

Navigating the System Menus

Although much can be learned about a pool's status by simply glancing through the controller window, nothing can be done about the situation without opening the controller door to gain access to the system keyboard. The keyboard consists of a ten key numeric keypad to the lower right of the display, and four "soft" keys immediately to the right of the display. These "soft" keys are used to navigate through a menu system that will take you step by step through even the most difficult of operations.   This layout should be very familiar to those of you that use a "cash machine" to do your banking (see figure 2).
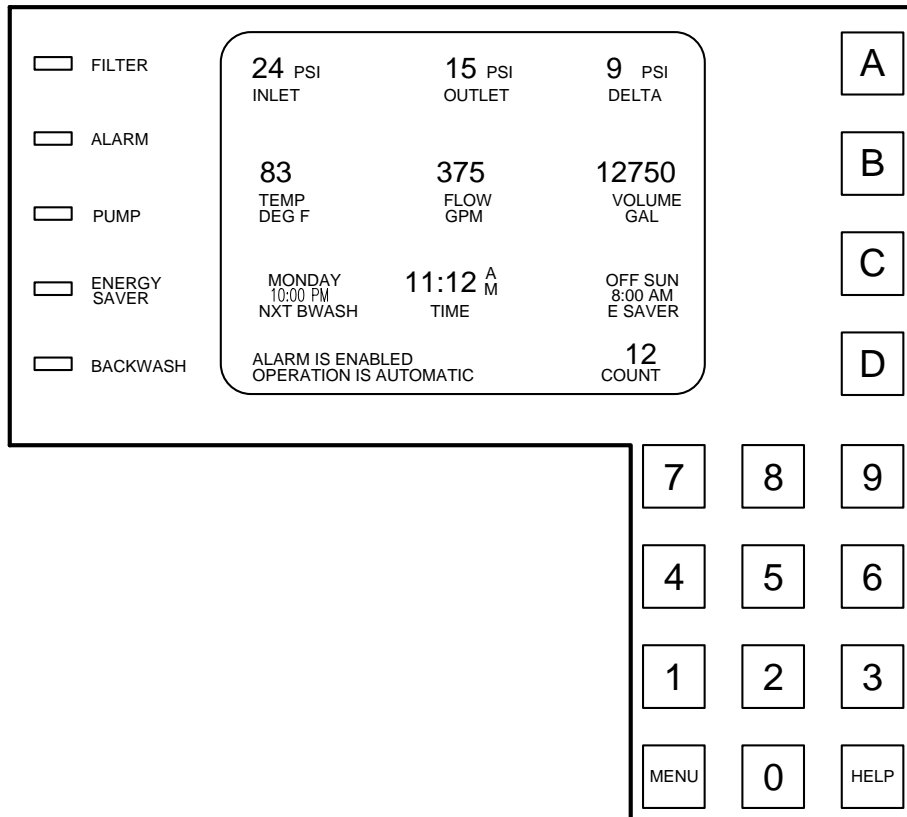
Two keys should be of special interest to you:

HELP At any time, you may press the HELP key to bring up a context sensitive set of instructions that should provide you with all of the information present in the manuals (sometimes even more information!).

MENU Also at any time, you can press the MENU key to bring up the controller main menu (if you are presently viewing the status screen), or to move up a level in the menu structure. This is helpful when you are "lost" and need to get back to familiar ground.

How to Initiate a Backwash Cycle

Although the system can perform backwash operations without operator intervention, occasionally you may wish to "force" a backwash operation from the keyboard. To do this, press the MENU key to bring up the main menu. Next press the "C" key for "system utilities". Then press the "A" key for "manual operations". Finally, press the "A" key for "force backwash". The "FORCE BACKWASH" screen will be presented (see figure 3).
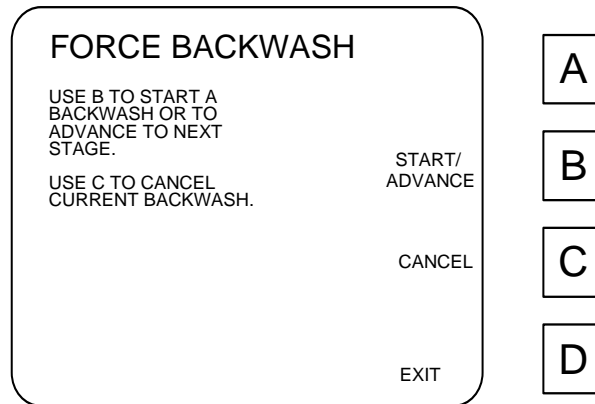

Figure 3, Force Backwash

To begin a backwash cycle, press "B" (Start/Advance). A message at the bottom of the display indicates which filter is currently selected and which phase of the backwash operation the controller is presently executing. If you wish to advance to the next phase of the backwash cycle without waiting for the programmed time delays, the "Start/Advance" key can be pressed again to advance immediately to the next phase. When advancing manually through the "Interfilter Delay" phase, the operator must use caution to allow sufficient time for accumulated effluent to drain off before cycling to the next filter. Also, some phases of the backwash cycle are not immediately obvious and do not result in a change to the message at the bottom of the screen. For instance, during a backwash cycle, there is a 60 second delay between when AUX1 and AUX3 relays come on and when AUX2 comes on. This delay can be bypassed by pressing the START/ADVANCE key once, but will not result in a new message at the bottom of the screen.

Once "B" has been pressed to start a backwash cycle, the system will proceed through a complete backwash of all of the filters in the system. Automatic backwashes that have been scheduled on a time interval basis will be rescheduled in light of the forced backwash.

If you wish to terminate a forced backwash cycle before it has proceeded to completion, press "C" (Cancel) and the controller will return the Multiport Valve to the "Home" position and resume normal operation. Backwash cycles that have been "Canceled" will not increment the backwash counter.

How to Disable Automatic Operations

At times, it may be desirable to disable all automatically triggered backwash cycles and energy saver cycles. To place the pool into "manual", bring up the main menu, then select "C" for "system utilities". Then press "A" for "manual operations". The following screen will be presented (see figure 4).
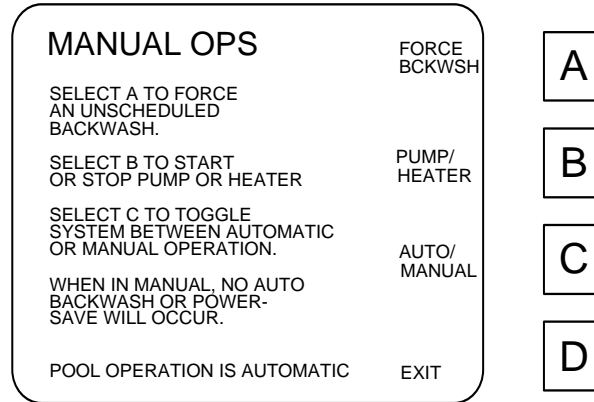
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┌─────────────────────────────────────┐
│  MANUAL OPS         FORCE      ┌───┐ │
│                     BCKWSH     │ A │ │
│  SELECT A TO FORCE             └───┘ │
│  AN UNSCHEDULED                      │
│  BACKWASH.                           │
│  SELECT B TO START  PUMP/      ┌───┐ │
│  OR STOP PUMP OR HEATER HEATER │ B │ │
│                                └───┘ │
│  SELECT C TO TOGGLE                  │
│  SYSTEM BETWEEN AUTOMATIC            │
│  OR MANUAL OPERATION.  AUTO/   ┌───┐ │
│                        MANUAL  │ C │ │
│  WHEN IN MANUAL, NO AUTO       └───┘ │
│  BACKWASH OR POWER-                  │
│  SAVE WILL OCCUR.                    │
│                                ┌───┐ │
│  POOL OPERATION IS AUTOMATIC   │ D │ │
│                     EXIT       └───┘ │
└─────────────────────────────────────┘
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Figure 4, Manual Operations

Key "C" acts directly to switch the controller between AUTOMATIC and MANUAL operations. If you wish to trigger all pool functions from the keyboard, press "C" to place the pool in MANUAL operating mode.   Now all Backwash modes or Energy Saver periods programmed will be ignored, and the pool will stay in its present state until a manual operation such as FORCE BCKWSH or PUMP/HEATER is requested.

If an alarm condition has caused the pool to switch to the MANUAL mode of operation (this status is displayed at the bottom of the main status screen), first determine the cause of the alarm and fix the problem, then reset the alarm from the ALARM CONFIGURATION screen (see below), and then enter this MANUAL OPS screen and press "C" to switch the controller back to AUTOMATIC operation.   It will also be necessary to enter the PUMP/HEATER screen to turn the pump and heater back on to resume pool filtration operations (also described below).

How to Turn Off the Alarm

The controller is continuously monitoring pool conditions and comparing them against various trips and limits. If any of these conditions fall outside of acceptable limits, and the alarm has previously been "Enabled" from the Alarm Configuration screen, the alarm output is activated. This output can be connected to a local indicator such as a light or bell to alert on site personnel of potential problems, or can alternately be used to signal an automatic dialer to call up off site telephones if necessary.

Once activated, the alarm output will remain energized even after the condition causing the alarm has returned to normal. To clear the alarm, remove the condition that caused the alarm, disable the alarm and then re-enable the alarm as discussed below. If the alarm condition has shut down the pump and heater, it may also be necessary to enter the Manual Operations screens discussed in the next section and manually turn the pump and heater back on to resume normal pool operation.

The four conditions capable of triggering the alarm are:

1)   If the controller instructs the multiport valve to advance and the cam switch does not indicate the correct valve movement, the alarm will trip and the pump and heater will be turned off until the alarm is cleared.

2)   The controller has the ability to monitor two on/off type flow sensors that can be installed either in the waste water path or in the main filter lines. These switches are ignored during the backwash cycle and for five minutes after the backwash cycle. At all other times, they are monitored to check for appropriate water flow in the system. If these switches indicate inappropriate flows (waste water flow when not in backwash for example) the alarm is tripped to indicate that a valve must be mal-functioning and the pump and heater will be turned off until the alarm is cleared.

3)   The pool water temperature is constantly monitored and compared against user selected high and low temperature limits. If the temperature falls outside of these limits, the alarm is tripped but pool pump and heater operation continue unaffected.

4)   If backwash cycles are being initiated based on flow rate or pressure differential, and either the flow or pressure limits have been set at to restrictive of a value or the filter system needs service, the system will try to backwash the filters continuously. If more than three backwash cycles are triggered with less than five minutes of normal filter operation between each backwash, the alarm is tripped. the pump and heater will be turned off until the alarm is cleared.

To turn off an activated alarm, bring up the main menu. Press "C" for "system utilities", then press "C" again for "alarm configuration" (See Figure 5).
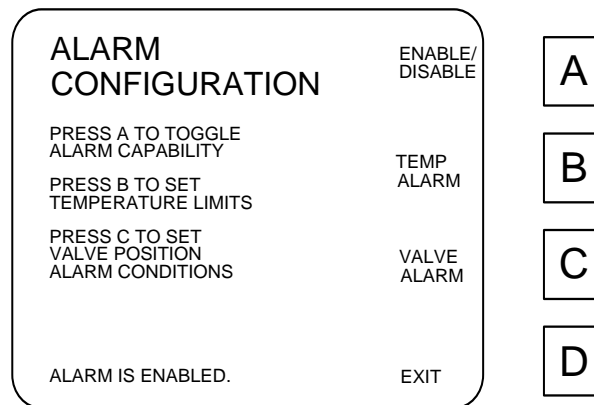

ALARM CONFIGURATION   ENABLE/ DISABLE   A

PRESS A TO TOGGLE ALARM CAPABILITY

PRESS B TO SET TEMPERATURE LIMITS   TEMP ALARM   B

PRESS C TO SET VALVE POSITION ALARM CONDITIONS   VALVE ALARM   C

ALARM IS ENABLED.   EXIT   D

Figure 5, Alarm Configuration

 From here, press "A" to disable the alarm. A message at the bottom of the screen will reflect this new alarm status. Remove the condition causing the alarm, then press "A" again to re-enable the alarm capability.

Note: Leaving the pool controller alarm in the "disabled" state will prevent the controller from turning off the pump and heater when fault conditions are detected. This could result in the pool being completely drained because of stuck valves or continuous backwash operations.

How to Control the Pump and Heater

If you wish to turn the pump and heater off for any reason, or if an alarm condition has caused the controller to turn off the pump and heater and you must now turn them back on, it will be necessary to again enter the "manual operations" screen. From the main menu, press "C" for "system utilities", then press "A" for "manual operations". Now press "B" for "pump/heater". You will be presented with the screen shown in figure 6 below.
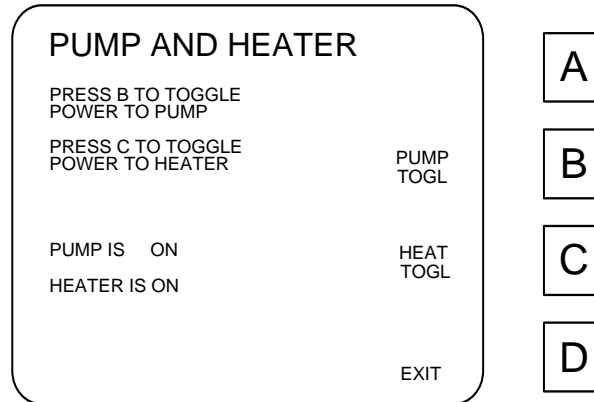
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 _____          _____
|                                |        |      |
|  PUMP AND HEATER               |        |  A   |
|                                |        |_____|
|  PRESS B TO TOGGLE             |
|  POWER TO PUMP                 |         _____
|                                |        |      |
|  PRESS C TO TOGGLE             |  PUMP  |  B   |
|  POWER TO HEATER               |  TOGL  |_____|
|                                |
|                                |         _____
|  PUMP IS   ON          HEAT    |        |      |
|                        TOGL    |        |  C   |
|  HEATER IS ON                  |        |_____|
|                                |
|                                |         _____
|                        EXIT    |        |      |
|_____|        |  D   |
                                           |_____|
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Figure 6, Pump and Heater

From this screen, key "B" can be pressed to cycle power to the pump. The system contains interlocks that prevent the pump from being turned off when the heater is on. See warning below.

Key "C" can be pressed to cycle power to the heater. The system contains interlocks that prevent the heater from being turned on if the pump is not running. See warning below.

The current status of the pump and heater are displayed for operator convenience.

WARNING

Cycling power to the heater while the pump is off is not allowed by the system. Also, after cycling power to the heater, the firemans delay is activated to prevent turning off the pump before residual heat has dissipated from the heater. If the firemans delay is in effect, a message is presented at the bottom of the screen indicating how many seconds are remaining before the pump can be turned off.

Where to Go From Here

This "User's Guide" has been created to help you use the Stark Controller to make temporary adjustments to the automated operations of your pool. As you become more familiar with its operations, you will find yourself wanting to make more permanent adjustments by changing modes of automatic operation, or by changing timing parameters used in the backwash cycle. For these details, as well as more information on controller operation, please refer to the "Stark Pool Controller Operator's Manual". Also, don't forget the HELP key. Once the basic operations presented in this guide are understood, a little direction from the on-line HELP screens should clear up any remaining confusion.