

# River Pines Well 6R Operator's Manual

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Prepared By:

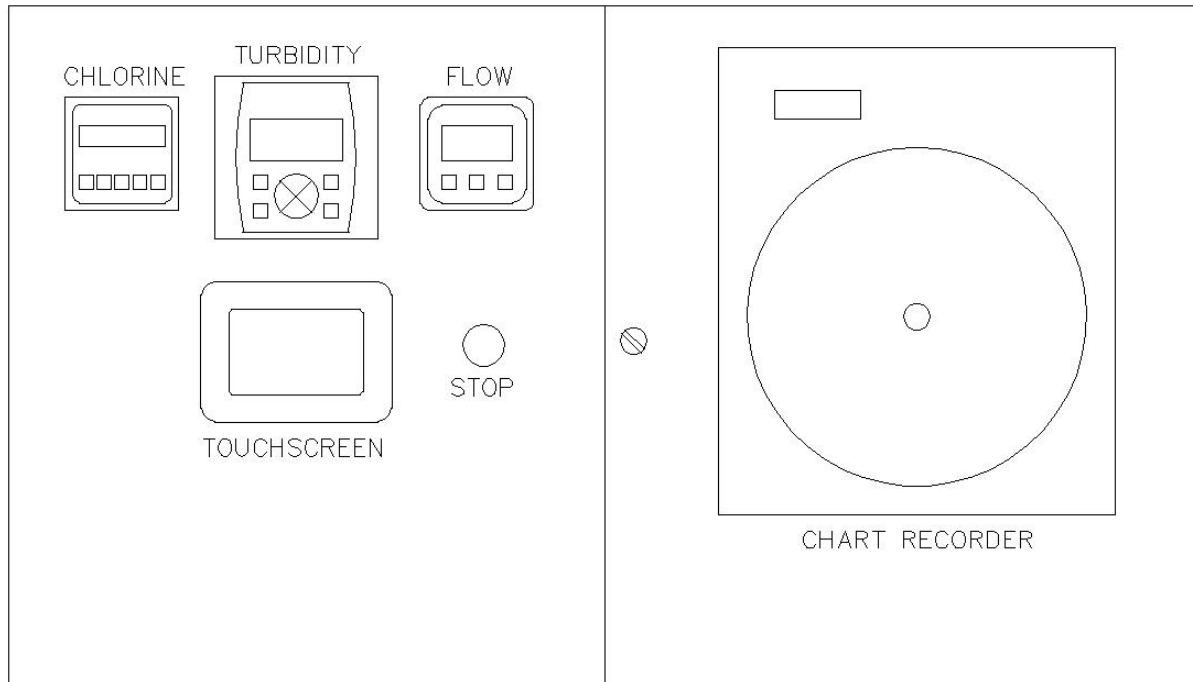


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## Revision History

Nov. 4, 2005 – Initial Release

## Section A – Introduction



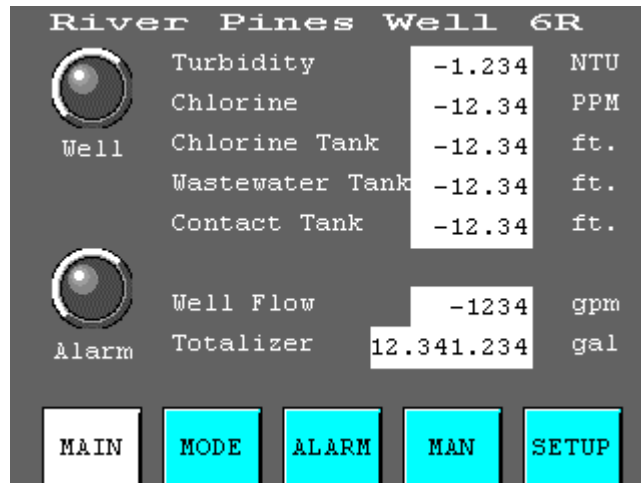
The River Pines Well 6R control panel combines all monitoring and control functions for the plant. From the touchscreen, you can turn the plant on and off, control pumps and valves, monitor water quality and tank levels, and check alarms. The circle chart recorder creates a record for verifying compliance with water quality standards.

This manual is intended to be a brief overview of operating procedures for the plant; specific procedures for maintaining legal compliance with Department of Water Quality regulations is outside the scope of this document.

## Section B – Touchscreen

The touchscreen is laid out with menu buttons along the bottom. The bottom left button will always bring you back to the main screen.

The **MAIN** screen shows the status of the well, water quality, and tank levels. If the system is in alarm, the alarm light will be red.



The **MODE** screen determines which mode the plant will run in.

**OFF**- All pumps are off, unless overridden at the drives.

**AUTO**- The plant will run when the hilltop tank calls for water, if no alarms exist.

**MANUAL**- The plant will run continuously if no alarms exist.

**WELL TO WASTE**- Valves 1 and 2 will route well water directly to the waste tank.

**FILTER TO WASTE**- Valves 3 and 4 will route filtered water to the waste tank.

**EMERGENCY SERVICE**- The plant will attempt to run regardless of the state of alarms. The well will run at high speed, and a boost pump will run continuously. Since the boost pump will outrun the well, an operator must visit the plant to cycle the boost pump on and off.

**NOTE:** Switch the unused boost pump off, since the system will attempt to start the opposite boost pump when a failure is detected. Maximum cycle time: 5 hours on, 2 hours off.

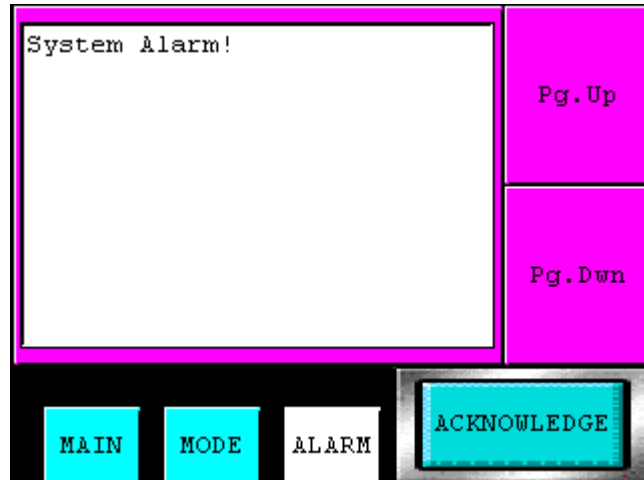


**WARNING!** Emergency mode does not guarantee sufficient contact time in the contact tank. If the contact tank level drops below 10 feet, the violation must be reported to the Department of Water Quality.

The **ALARM** screen lists alarm conditions. Potential alarm conditions include:

- High Turbidity
- High or Low Free Chlorine
- Low Chlorine Tank Level
- High Wastewater Tank Level
- High or Low Contact Tank Level
- Low Flow
- Pump Failures

The alarm screen also shows any disabled alarms.



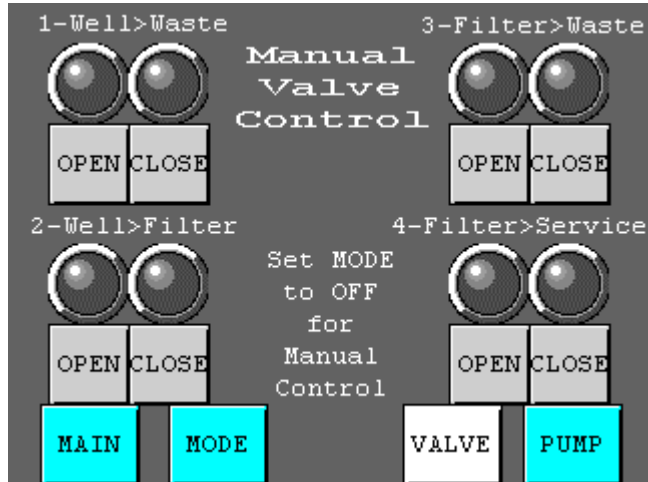
If the plant shuts down because of an alarm:  
Correct the problem.  
Record the alarm in the operator's logbook.  
Press **ACKNOWLEDGE** to clear the alarm condition and restart the plant.

**CAUTION:**  
The plant restarts **IMMEDIATELY**  
when **ACKNOWLEDGE** is pressed!

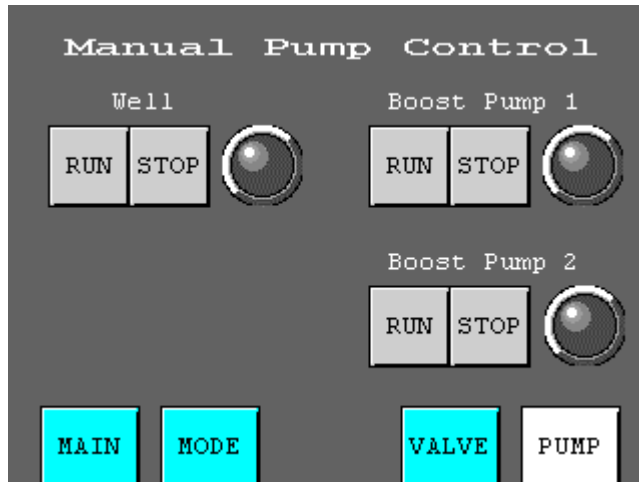
**NOTE:** During initial fill, the "Contact Tank Low" alarm must be disabled until the contact tank level reaches 10 feet. See the Alarm Enable Screen on page 6.

Don't forget to re-enable the alarm!

The **MANUAL VALVE CONTROL** screen shows valve status. If the plant is in the OFF mode, you can open and close valves for maintenance and testing purposes.



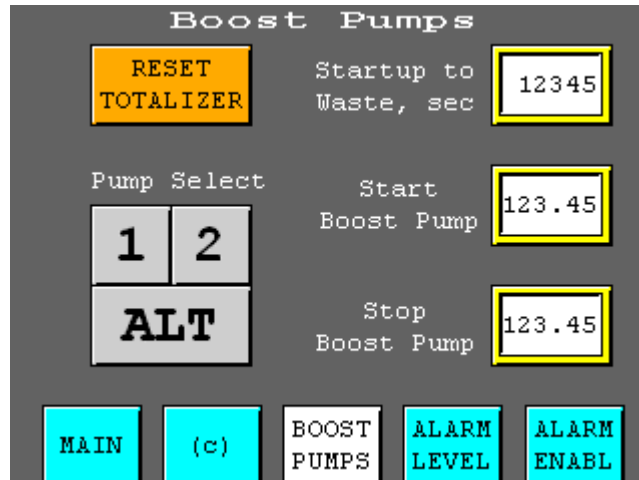
The **MANUAL PUMP CONTROL** screen shows pump status. If the plant is in the OFF mode, you can start and stop pumps for maintenance and testing purposes.



The **BOOST PUMP SETUP** screen performs several functions:

1. Totalizer Reset. Press and hold **RESET TOTALIZER** for five seconds to reset the totalizer.
2. Boost Pump Select. If you wish to use a single pump, select **1** or **2**. If you want the pumps to alternate, select **ALT**.

If a boost pump fails during operation, the system will automatically switch to the other pump.



3. Startup to Waste. During startup in **AUTO** or **MANUAL** modes, water is diverted to waste for the specified time in seconds. If the plant has been off for less than 4 hours, this feature will be bypassed.

4. Start Boost Pump. The boost pump will start when the tank reaches this level, typically 13 feet.

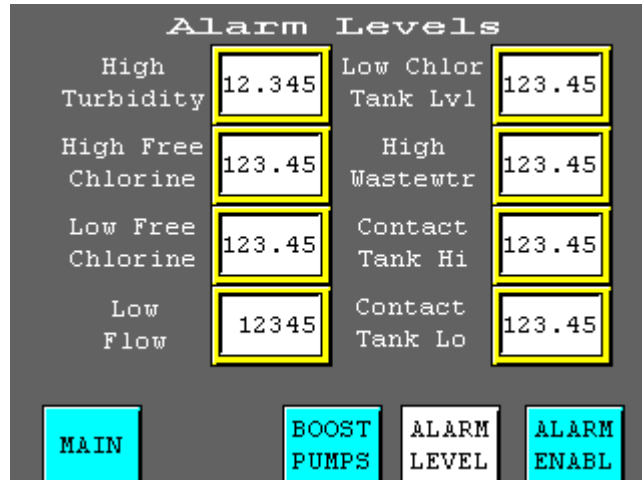
5. Stop Boost Pump. The boost pump will stop when the tank reaches this level, typically 10 feet.

Record any changes you make in the last section of this manual.

The **ALARM LEVEL** screen allows adjustment of alarm levels.

If operating parameters fall outside these levels during AUTO or MANUAL modes, the plant will shut down, unless that alarm is disabled. (see following screen)

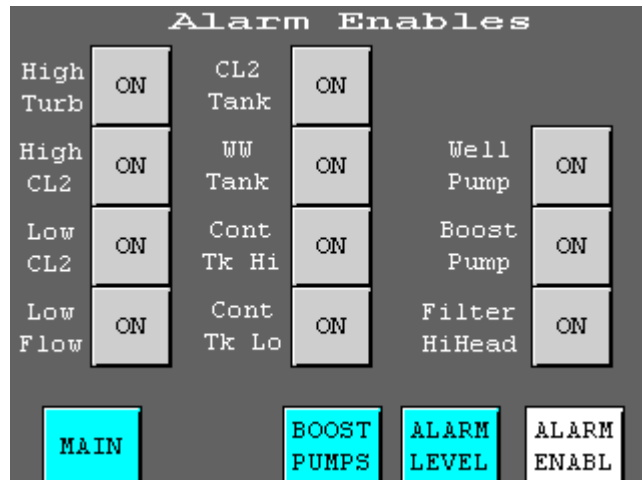
Record any changes you make in the last section of this manual.



The **ALARM ENABLE** screen allows individual alarms to be disabled in the event of a bad sensor or a wiring problem.

During initial fill, the “Contact Tank Low” alarm must be disabled until the contact tank level reaches 10 feet.

Don't forget to re-enable the alarm!



## Section C – Flow Computer

The flow computer monitors the turbine flowmeter, generates a 4-20mA signal for the circle chart recorder, passes pulses through to the PLC, and generates a scaled pulse for the chlorine injection pump.

### Resetting Flow Computer Totalizer

To reset the totalizer, press “▲”.

### Configuring K, P, etc.

Refer to the SeaMetrics FT420 Flow Computer Instructions for step-by-step procedure. Here's the abbreviated version:

**K** – Number of pulses per gallon from the turbine flowmeter. According to the chart in the SeaMetrics manual, the TX101 turbine meter in 3" Schedule 80 PVC will produce 19.49 pulses per gallon.

To change K, press “SET”. Press “◀” to select the digit you want to change. Press “▲” to change the digit. When you are finished, press “SET” until the normal display returns.

**P** – Number of gallons per pulse to the chlorine injection pump. At initial plant startup, 0.8 gallons per pulse was selected to allow the pump stroke to be set in the 70-80% range.

To change P, press “SET” twice. Press “◀” to select the digit you want to change. Press “▲” to change the digit. When you are finished, press “SET” until the normal display returns.

Record any changes you make in the last section of this manual.



## Section D – Turbidimeter

The Hach 1720E Turbidimeter requires periodic calibration. Since turbidities typically run in the 0.05 NTU range, a precise zero point must be established.

The sensor calibration and verification procedure is listed in Section 4.7 of the Hach 1720E Low Range Turbidimeter User Manual, Cat. # 6010018.

### Plant Startup Considerations

When the plant has been sitting idle for any length of time, the water in the turbidimeter body loses clarity. In order to help the instrument respond more quickly to actual conditions, drain the body before startup. If readings are still too high after flow is established, several more flushings may be necessary.



## Section E – Chlorine Analyzer

The Analytical Technology A15/62 Free Chlorine Monitor uses a small amount of electrolyte behind a membrane. The A15/62 O&M Manual, page 30, recommends changing the membrane every 3 months. Page 14 details the procedure for changing the membrane and filling the chamber with electrolyte.

If the chlorine readings appear to be dropping off, a hand sample should be taken to verify proper operation of the monitor. If the readings disagree, recalibrate the sensor using the Immediate Calibration procedure on pages 22-23. If the sensitivity falls below 40%, replace the membrane.

The Maintenance section on pages 30-31, and Troubleshooting section on pages 32-33 can be very helpful to understand this sensor better.



## Section F – Circle Chart Recorder

The circle chart recorder is set up to record Flow, Turbidity, and Free Chlorine. The chart reads from the center to the outside.

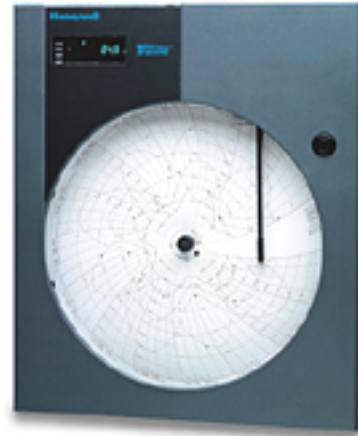
Flow is recorded on a scale from 0 to 100 gpm. Typical flow is 65-70 gpm. The flow line is usually the furthest toward the outside of the chart.

Turbidity is recorded on a scale from 0 to 1.00 NTU.

Typical turbidity is 0.05 NTU. The turbidity line is usually near the center of the circle.

Free Chlorine is recorded on a scale from 0 to 5 ppm.

Typical Free Chlorine is 2 ppm. The chlorine line is usually near the center of the chart.



### Changing Chart Paper

Open the recorder door.

Press the **CHART** key. The pen moves to and stops at the outer limit of pen travel near the edge of the chart. Also, chart rotation stops and the date and time appear in the displays.

Pull the pen lifter up to raise the pen from the chart.

Carefully remove the used chart from the hub and retaining clips (do not remove the hub adapter).

Install the new chart so that its edges are under the four retaining clips and its small alignment hole is over the alignment pin on the hub (that is, press the chart down completely around the hub adapter).

Push the pen lifter down to lower the pen.

Press the **CHART** key. The recorder goes to the "CHART RUN." The date and time in the display is replaced by the parameter prompt/value that was last selected using the **LOWR DISP** key.

### Configuring Pens, Chart Time, etc.

Refer to the Honeywell DR4500A Product Manual for configuration instructions. Record any changes you make in the last section of this manual.

## Section G – Well VFD

The well VFD contains four setpoints to allow the control panel to keep flow in the 65-70 gpm range. During normal operating conditions, the display will show the selected frequency.

### Configuring Frequency Setpoints, etc.

Refer to the Magnetek GPD 505 Manual for instructions. At startup, the following parameters were set:



Parameter	Value	Description
N002	1	Operation Mode: External control, Digital oper. freq.
N024	0	0.1 Hz display resolution
<b>N025</b>	40.0	Fast speed, Hz.
<b>N026</b>	38.0	Med-fast speed, Hz.
<b>N027</b>	36.0	Med-slow speed, Hz.
<b>N028</b>	34.0	Slow speed, Hz.
N035	0	Terminal S2: 2 wire control, Fwd.
N036	2	Terminal S3: 2 wire control, Rev.
N037	4	Terminal S4: Fault reset
N038	9	Terminal S5: Speed select 1
N039	10	Terminal S6: Speed select 2

Normally, only parameters N025 through N028 will need adjustment. To change a parameter:

With the motor stopped, press “DSPL” until the PRGM light illuminates.

Press “▲” until you reach the desired parameter.

Press “ENTER”.

Press “▲” or “▼” until you reach the desired frequency.

Press “ENTER”.

To return to normal operating mode, press “DSPL” once.

Record any changes you make in the last section of this manual.

## Section H – Boost Pump VFDs

The Boost Pump VFDs normally run at 60 Hz, because the centrifugal pumps cannot pump against a 310 foot head at lower frequencies.

The “Hand” mode frequency has been set to 58 Hz. to allow the tank to be pumped down near zero.

### Configuring Frequency Setpoints, etc.

Refer to the Yaskawa P7B Technical Manual for instructions. At startup, the following parameters were set:



Parameter	Value	Description
B1-01	0	AUTO mode frequency source = Operator
D1-01	60.0	AUTO mode frequency, Hz.
D1-02	58.0	HAND mode frequency, Hz.
E2-01	45.0	Motor Rated Current, amps

All other parameters were left at factory default values. To change a parameter:

Press “MENU” until the “Programming” message appears.

Press “Enter”.

Press “▲” until you reach the desired parameter group.

Press “▶” to shift to the parameter number.

Press “▲” until you reach the desired parameter number.

Press “ENTER”.

Press “▶” to shift to the digit you want to change.

Press “▲” or “▼” until you reach the desired number.

Press “ENTER”.

To return to normal operating mode, press “Monitor”.

Record any changes you make in the last section of this manual.

## Section I – Alarm Testing

All alarms must be tested periodically. Here's a suggested procedure.

**NOTE: Make sure all existing alarm levels are recorded in the Record of Settings!**

Alarm	Test Procedure
High Turbidity	Pull turbidimeter head out of the body. The light from the room should produce a high reading.
High Free Chlorine	1. Enter a value of 1 into the High Free Chlorine alarm level. Or 2. Shut the chlorine sample line off. Pour a solution of at least 3ppm chlorinated water into the right-hand chamber of the flowcell.
Low Free Chlorine	Shut the chlorine sample line off. Pour unchlorinated water into the right-hand chamber of the flowcell.
Low Flow	1. Enter a value of 100 into the Low Flow alarm level. Or 2. Partially close the ball valve going into the filter bank, until flow rate drops below 40gpm.
Low Chlorine Tank Level	1. Pull Fuse 25. Or 2. Pull ultrasonic sensor out of the chlorine tank lid. Point sensor at floor, holding at same height as lid.
High Wastewater Tank Level	1. Enter a value of -1 into the High Wastewater Tank alarm level. Or 2. Hold a flat object about 8" below the ultrasonic sensor in the waste tank.
High Contact Tank Level	1. Enter a value of 5 into the High Contact Tank alarm level. Or 2. Hold a flat object about 8" below the ultrasonic sensor in the contact tank.
Low Contact Tank Level	1. Pull Fuse 31. Or 2. Enter a value of 15 into the Low Contact Tank alarm level.
Well Pump Fail	Press "STOP" button on Well VFD.
Boost Pump Fail	Turn running boost pump selector switch from "AUTO" to "OFF". After 30 seconds, the opposite pump should start. Turn second boost pump selector switch from "AUTO" to "OFF".
Filter High Head	Jumper across sensor contacts for 20 seconds.

**NOTE: Make sure all alarm levels are returned to their previous settings!**

**Alarm Testing Record**

**\*\*make copies of this page- don't write on the original!\*\***

Date:				
Tested By:				
High Turbidity				
High Free Chlorine				
Low Free Chlorine				
Low Flow				
Low Chlorine Tank Level				
High Wastewater Tank Level				
High Contact Tank Level				
Low Contact Tank Level				
Well Pump Fail				
Boost Pump Fail				
Filter High Head				

**Section J – Record of Settings**

**Touchscreen Parameters Change Record**

**\*\*make copies of this page- don't write on the original!\*\***

Date:				
Changed By:				
Startup to Waste, sec.				
Start Boost Pump				
Stop Boost Pump				
High Turbidity				
High Free Cl <sub>2</sub>				
Low Free Cl <sub>2</sub>				
Low Flow				
Low Cl <sub>2</sub> Tank Level				
High WW Tank Level				
Contact Tank High				
Contact Tank Low				
Flowmeter "K"				
Flowmeter "P"				

**VFD Parameters Change Record****\*\*make copies of this page- don't write on the original!\*\***

Date:				
Changed By:				
Well Freq. N025				
Well Freq. N026				
Well Freq. N027				
Well Freq. N028				
Boost #1 Freq. D1				
Boost #1 Freq. D2				
Boost #2 Freq. D1				
Boost #2 Freq. D2				

