



Vivid Smart Controller

The chemical and operational demands on refinery and petrochemical plant water treatment systems are dynamic and versatile. Automation, by itself, will rarely resolve complex issues associated with refinery water systems. BHGE views automation as a valuable tool, to ensure sustained operational excellence.

The VIVID Smart Controller was designed by BHGE to provide robust, reliable monitoring and control of refinery cooling, boiler, and waste water streams. We have improved the industry standard by enhancing the user interface, system hardware, and reporting capabilities. The inclusion of a fully functional touch screen allows operations teams to easily compare lab results with the controller readout. The tablet, computer based controller is capable of providing feedback and feedforward control. The controller also provides both remote data access and DCS tie in, allow operations teams to determine KPI compliance in real time and truly take ownership of their water systems.

The Vivid Smart Controller's continuous monitoring capabilities provide automated water treatment program optimizations, ensuring system KPI's are met while minimizing costs. The treatment program can utilize a chemical tracer, which can be monitored in real time using the VIVID™ Smart Controller system for accurate control. The chemical tracer, combined with Optidose polymer demand testing provides powerful tools for accurately measuring not only the amount of product actually to the system but also system demand and program performance. The controllers were designed to seamlessly replace existing controllers and easily tie into plant DCS systems, ensuring operations teams are always aware of threats and deviations.

VIVID Smart Controllers have provided some partners with substantial savings and KPI performance improvements.

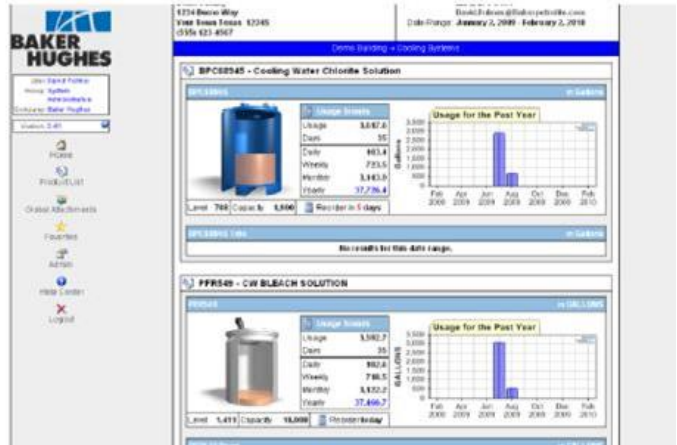


The placement of the controller is nearly unlimited. The electronics and wiring connections are housed in a NEMA 4X enclosure. The electronics and other monitoring equipment may be housed in a larger NEMA 4X enclosure with an air purge system to meet a Class 1 Div 2 rating and to provide an easy turnkey installation.

Communication with the controller is possible by five means: keypad, direct Ethernet connection, modem connection, wireless Ethernet, and wireless cellular communication. Regardless of the communication method, there are three levels of security to view or modify the controller parameters.

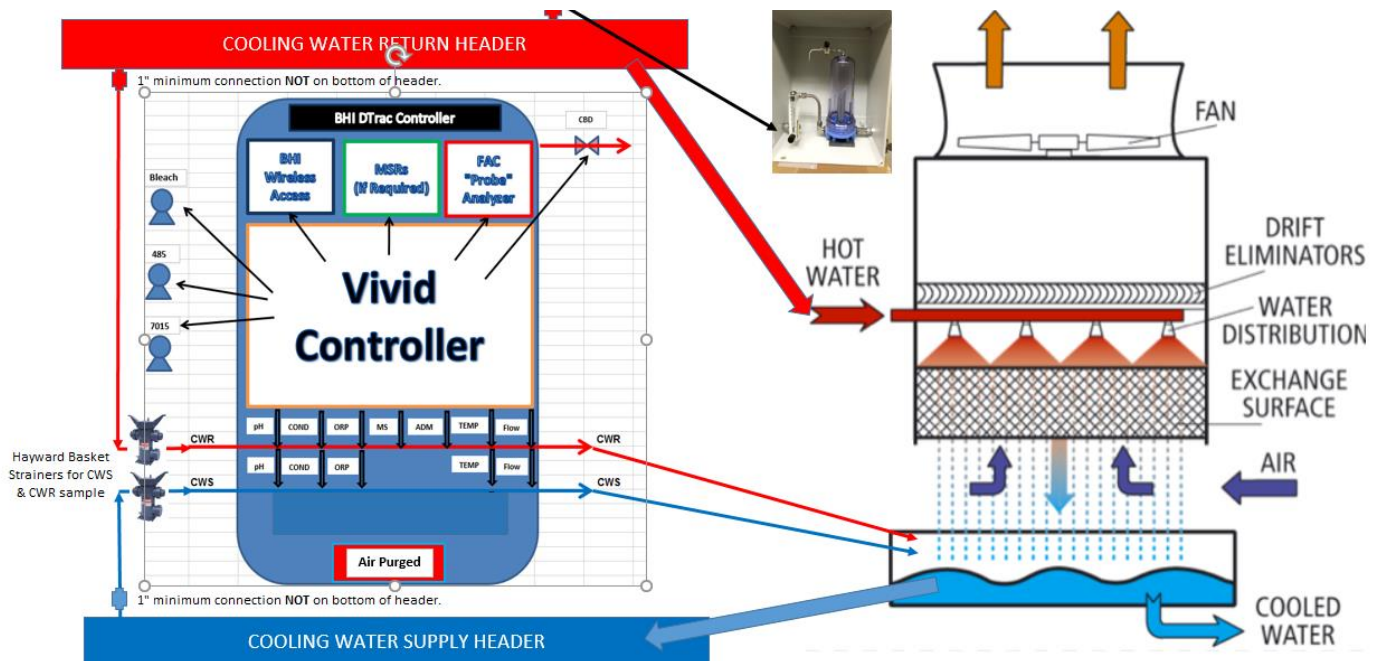
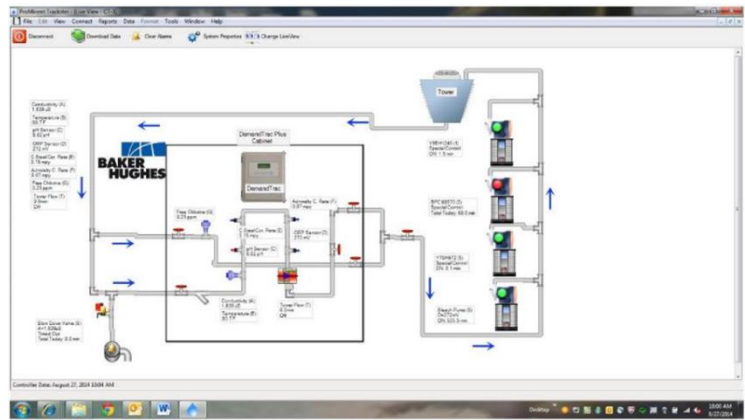
The keypad is used to access the controller at its physical location. A four-line display on the controller door provides the user with information on both input and output conditions. Information is updated on the screen every 5 seconds. All of the parameters will be displayed sequentially.

The four remaining means to communicate with the controller involves the use of a web browser (Internet Explorer, etc.) or via the included windows-based software. This makes it very convenient to view all parameters at once. The wireless feature eliminates the need to run costly communication wiring between the controller and remote computer. With any of these four communications, alerts can be sent to the BHGE field representative (or your personnel) if the system goes into alarm.



The Web Browser option is a good tool in locations where there are concerns about installing software on the plant computers. The Web browser option allows you to connect to the controller to view live data, acknowledge alarms and change settings.

The windows-based software is included as part of the entire package. The advantage of this software is the ability to create custom drawings, download historical data and create trend charts. There is also a feature to automatically download the data at user-defined times, such as midnight of each day or Saturday of each week.





VIVID Plus Controller Specifications

Monitors

- pH (supply and return water)
- Conductivity (make up, supply and return water) –
- Temperature (make up, supply and return water) –
- ORP or FRC (supply and return water)
- Automatic Control of dispersants and other products using dye tracer.
- Carbon Steel Corrosion Rate (return water)
- Admiralty Brass Corrosion Rate (return water)
- Polymer levels from polymer analyzer (return water) –
- Flow Switch for Piping (supply and return water)
- Relay output control
- Acid feed via on /off relay
- Blow down via on / off relay
- Bleach / sodium bromide via on / off relay
- Corrosion Inhibitor / Dispersant / scale inhibitor pumps via on /off relay
- Data retention
- 28 days data logging capability

Water Connections

- Make up, supply and return water in – 3/4” schedule 80 PVC
- Make up, supply and return water out to cooling tower basin– 3/4” schedule 80 PVC
- Drain Line – Gravity Drain line out for polymer analyzer to drain – 3/4 “ schedule 80 PVC

Electrical Connections

- Main power in – 110 -120 volt – 20 amp dedicated circuit
- Relay out for blow down valve – 110 - 120 volt
- Relay out for acid pump – 110 -120 volt
- Relay out for Bleach pump – 110 – 120 volt
- Relay out for Sodium Bromide pump – 110 – 120 volt
- Relay out for dispersant polymer pump – 110 – 120 volt
- Relay out for scale inhibitor pump – 110 – 120 volt
- Relay out for Corrosion inhibitor pump – 110 – 120 volt

Communication

- Ethernet – Ethernet (direct computer connect or to plant Ethernet if available)
- Wireless – Cellular Wireless
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Enclosure Type

- NEMA 4X Free Standing Enclosure
- Air purged to create Class 1 Div 2 rating