

OPERATIONAL FEATURES

PID control

The controller incorporates a complete digital PID control system which is used to regulate the speed reference signal based on the setpoint and feedback pressure signal. In addition to adjustment of the setpoint, both the Proportional, Integral and Derivative components on the algorithm can be varied.

PID reverse

The standard PID configuration is valid only for installations where pressure pumping is required, so that a decrease in pressure results in an increase in speed (and vice versa). There are however applications such as fluid level control where the system must pump water out of a well to maintain a consistent level. In this case the PID is required to perform the opposite action: increase the pump speed as the level increases.

Stage and destaging

When a pump is staged the speed reference will already be at a relatively high speed as this is what triggers the pump stage process. In some circumstances depending on the PID settings bringing on the second pump with this high speed reference could cause an undesirable overshoot in the system pressure. With the use of the sophisticated PID algorithm the operational pumps vary their speed as one of the pumps is coming in or out of service.

Bumpless transfer

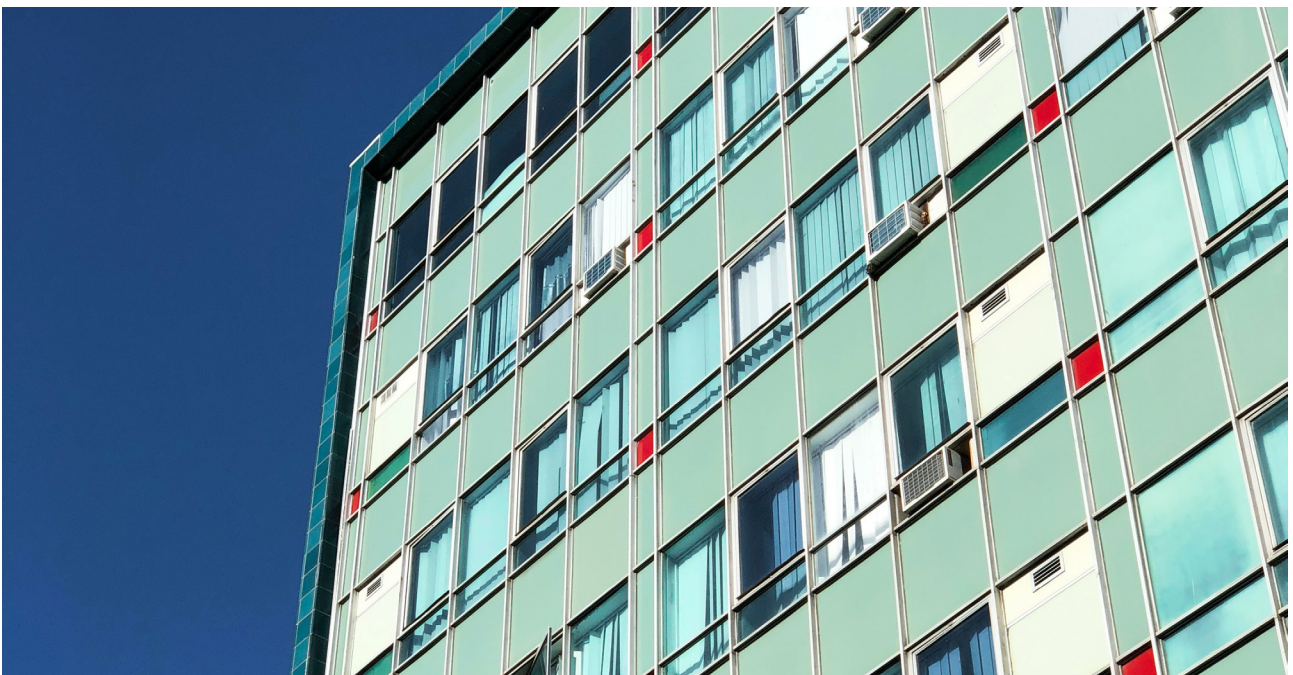
When duty changes in time based mode it's likely that the duty pump will be running when the change occurs. Bumpless transfer ensures that the transition of duty from one pump to another causes no pressure dips or spikes.

Sleep and sleep boost

As the flow rate reduces the operational pumps destage out of duty until only one duty pump remains. Then if the system is still maintaining pressure and the speed is at or below the 'no demand speed' the system will enter a sleep state, awaiting another pressure drop. To reduce unnecessary cycling of the pump a sleep boost pressure can be set to slightly over pressurize the system to a specific pressure level. This will reduce the pump start frequency for leaky taps or very low flows.

Pipe fill

Upon entering a running state (either on initial power up or wake-up from sleep) it's possible that there is minimal or no fluid present in the downstream piping. In order to avoid the pumps running at full speed sending water hurtling to the other end of the pipe, the pipe fill parameter will slowly fill and pressurize the pipe before entering normal operation.



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Setpoint ramp

Whenever the system enters a running state (either on initial power up or wake-up from sleep) it's likely that the system pressure will be below the setpoint pressure. In order to avoid the effects of a large feedback error on the PID algorithm, the setpoint ramp function can be enabled via the [setpoint_ramp_en] parameter. This will smoothly increase pressure to the setpoint whilst limiting any over shoot.

VSD or DOL jacking

Some applications have only low average flow but high peak flows. In these cases the installation will pair a smaller lead pump with larger pumps that only come into play during these peak periods. The HydroTOUCH is able to support such configurations using a smaller VSD controlled pump or DOL pump. After the larger pumps start the jacking pump will smoothly ease out of use to limit unnecessary run time.

Easy set-up wizard

An in-depth application knowledge of VSD pumping systems has enabled development of an easy step-by-step set-up wizard to configure the system, without having to scroll through and give consideration to a host of 'advanced' parameters, not generally applicable to standard application set-ups. This ensures correct first time commissioning, if at a later date applications/site conditions change and impact on system hydraulic characteristics, the set-up wizard can be run again to re-establish the essential parameters.

Advanced parameter adjustment

Even though the HydroTOUCH Controller has the easy set-up wizard, some applications may require further tweaking. The list of parameters that can be adjusted is very extensive. This enables the operator to fine-tune settings, achieving optimum system performance in a variety of complex pumping applications.

Water and energy management

With the HydroTOUCH Multi-pump VSD Controller the systems power and energy consumption can be monitored to provide information required for the system efficiency analysis. In addition to comprehensive Energy Monitor and Management capabilities, data associated with two independent analogue inputs is also able to be monitored, logged and downloaded for reporting purposes. For example if a meter is connected to the system, total flow/water usage is displayed instantly, logged and stored in real time. All the recent data can be viewed as trend graphs on the on-board high-resolution touch screen.

Massive 1-12 pump configuration

A unique feature of the highly flexible and adaptive HydroTOUCH controller is its capacity to control and monitor up to 12 pumps in a single system. For applications where a jacking pump is required, the controller as standard can be configured to provide for this as a dedicated duty pump. Duty will be shared evenly between all the main pumps increasing the service life of the system.



OPERATIONAL FEATURES cont.

On-board BMS and SCADA connections

Connections to BMS and SCADA systems are available via multiple options. Firstly, there are 10 configurable digital relay outputs, which can be assigned to any of the fault alarms. Secondly, there are two configurable analogue outputs, which can either be set to mirror the analogue inputs, or other system monitored parameters. Thirdly, industry standard Modbus RS485 protocol is available on-board and can be configured for full remote monitoring and control by any SCADA system of the system.

Additional analogue level display and monitoring

The Touch VSD Controller has the ability to display and monitor (for example) Supply Tank/Storage level, by way of the second analogue input connected to a 4-20 mA level sensor. The tank level has adjustable low level and high level set points for enabling/disabling the system and/or activating an alarm. Recent tank level trending can be displayed graphically on the HMI and the level will be logged for further monitoring.

System redundancy

In some applications redundancies are required to ensure the pump set continues to operate even if a component was to fail. The HydroTOUCH has redundancy on every pump as well as on the pressure transducer, if a second one is installed. If either failed, the system would seamlessly transfer operation and bring up an alarm to indicate the fault.

Graphical user interface

The 7" wide touchscreen display has been designed with touch screen mobile devices in mind. Most people know these devices and this has enabled us to achieve a very user friendly intuitive interface which can be easily navigated. Some areas of the interface have password protection such as the parameter list, to provide access only to the required personal. Most common information is displayed on the main screen but if you want more information just touch on what you are after and it will appear.

Optional – rains/mains

With the addition of a rains/mains module a water supply system can be backed up by a secondary water supply in the event of the loss of primary water supply, a critical system fault or the loss of power supply. This module comes with a low power pulse latching valve to ensure that the solenoid doesn't have to be powered for days at a time.

Optional – remote access

With the addition of Netbiter GSM unit the controller panel evolves to a whole new level of flexibility and usability. This enables the use to monitor and control the system from anywhere in the world. The user will receive a login and secure password to access the Touch VSD Controller through internet accessible device. The system can also be configured for users with different levels of access. It also send e-mails of any fault status to a number of users to ensure that down time never goes unnoticed.



FAULT PROTECTION

Pump protection

In addition to standard protection features such as motor overload, phase failure, short circuit and under/over voltage fault, the system also can be programmed to detect individual (per pump) loss of prime and 'off curve' conditions such as cavitation. These additional protection features are particularly useful when certain centrifugal pumps are being used for low flow applications.

High pressure protection

Most installations are required to be limited to a maximum pressure. The High Pressure Parameters enable the customer to adjust these settings to suit their requirements. These consist of time delays, set level, auto or manual reset, alarms and the option to shut down the system.

Low pressure protection

The HydroTOUCH controller also incorporates low pressure protection with the same flexibility as the high pressure protection. This will help reduce damages in a burst pipe situation by instantly picking up the drop in pressure and then shutting down the pumps. Also, if there was a failure in the incoming supply the pumps could shut down and automatically start again when the supply was restored.

Low level lockout

The flexibility of the assignable inputs allows for a low level input. If assigned the input can shut down the pumps before they lose prime. This can be configured for and lockout alarm. There is also an adjustable time delay to ensure the contact is permanently open and not oscillating due to a wave in the tank.

Pump cycle protection

If the system has a faulty non-return valve or similar fault where the system can fail to maintain pressure, energy can be wasted due to continual pump cycling. If cycling protection is enabled then each time the system exits sleep within a set time frame (seconds) of entering sleep, a cycle counter is implemented. If this counter exceeds the set threshold within a continuous 1 hour period then a Pump Cycle fault is flagged. If the cycle shutdown is enabled the system will be locked out requiring a manual reset.

Sensor failure

If the system is in auto mode and the 4-20 mA pressure feedback signal drops below 4 mA for a set time delay then a fault will be triggered. If there is a secondary pressure transducer then this will continue system operation. Once the primary pressure transducer is above 4 mA it will return to operation as the operational transducer.

Pipe fill fail

When the system begins a pipe fill sequence there may be instances where pressure cannot be increased such as an burst pipe. If the pipe fill is unable to build pressure within a set time frame then the system would be shut down and an alarm activated.

Open pipe protection

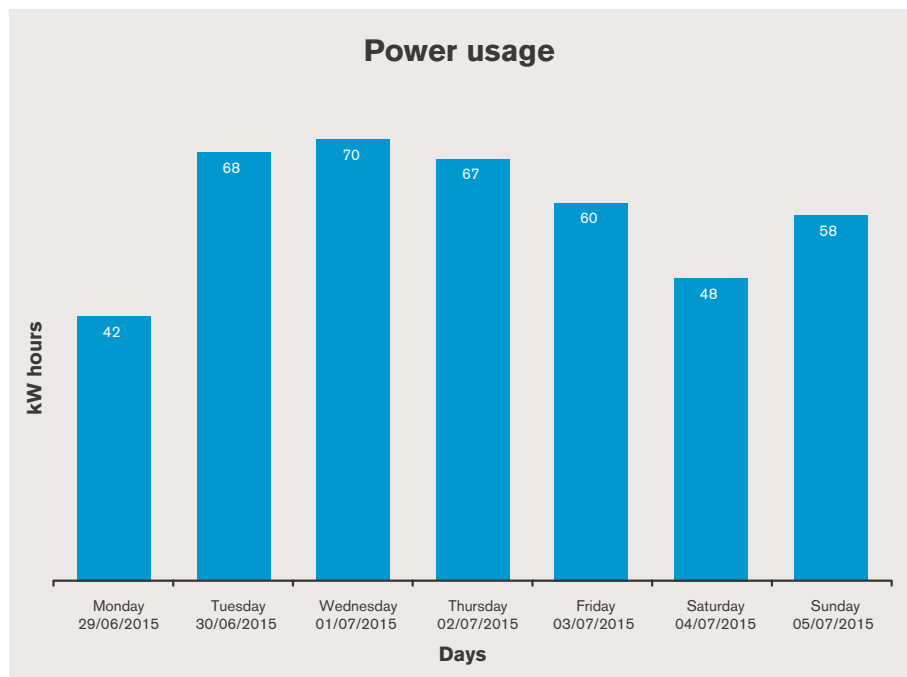
If a pipe was to burst or the system was to run at maximum capacity for a set time delay then there would be an open pipe fault and the system would be shut down.



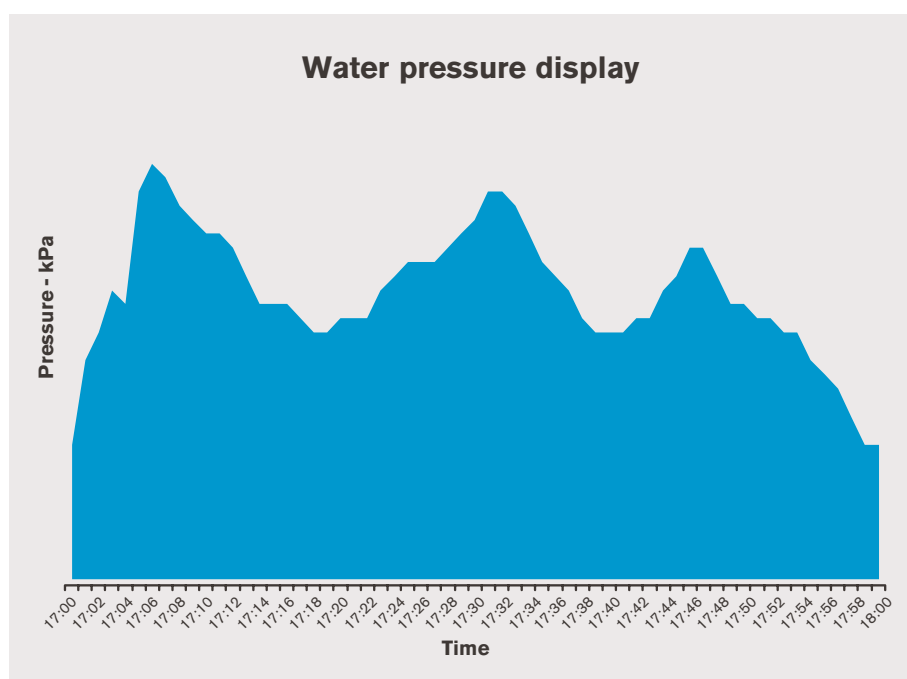
DATA LOGGER

Advanced logged data

Logged data is time and date stamped. This includes all fault and alarm events. In addition to this regular pressure, low tank level and speed values are stored to help monitor the operation of the system. All logged data can be downloaded via a RS485 to USB converter connected to the SCADA modbus port. Data will be downloaded as a CSV file.



Log graphs available for power and water usage



Log graphs available for pressure, flow, tank level and pump speed

PHYSICAL FEATURES

- IP44 powder coated metal enclosure
- clear, informative 7" touchscreen interface
- main isolator
- thermostatically controlled cabinet temperature
- ventilation fan and integral vents
- individual pump circuit breaker
- circuit breaker protected control circuit
- low voltage control and input circuitry
- advanced microprocessor control module
- Auto/Off/Manual operation of all pumps
- IP21 VSD's in panel for 4 pump systems up to 22 kW
- IP54 Loose supplied VSD's for systems greater than 22 kW or greater than 4 pumps, drives configured ready for installation
- installer friendly, clearly labelled, DIN rail mounted, input and output terminal connection
- individually serial numbered and logged for traceability and product support
- owner/operator, installation and operation manual supplied with each controller

For IP54 VSD

