

Flo-Fab

Standard sequence of operation

VFD-equipped (variable frequency drive) pumps and systems

With Vacon drives, our systems that have more than one pump are designed in a lead-lag principle. (For one pump the interchange and staging do not apply). One pump (the Master) is directly linked to the pressure/level feedback signal and it is used to adjust the speed needed to reach the desired pressure/water level. When a single pump is not sufficient to keep up with the output wanted, another one is staged automatically until all pumps are at maximum capacity, if needed.

All pumps are speed variable, so it uses only the power needed to maintain that pressure / water level. All running pumps slow down as the demand decreases.

After a chosen delay at minimal speed (almost no water movement, respectively 2min and 30Hz in our manufacturing standard), it goes into standby.

Pumps come back from standby (wake-up) when pressure/water level goes below the setpoint level passed a chosen margin of tolerance (5psi when working in pressure, in our standard manufacturing). *By example, if the system is configured for 70psi and it is in sleep mode (standby), pumps are going to wait until 65psi to start again.*

All pumps alternate between each other after a chosen amount of time (Interchange interval, 48 hours in our standard manufacturing) so the wear of the motors and pumps are more equal. After a change occurred, the motor that has the lowest running hours start first, and the most used start last.

In addition, 5 protections are included in the standard programming:

- Too high feedback (pressure: 300psi discharge, adjustable)
- Too low feedback (pressure: 15psi discharge, adjustable)
- Motor current limit. (determined by drive, adjustable)
- Ramping in motor starts. (at manufacturing, depends mostly on the motor size)
- Sensor signal loss

(If a change of adjustment is needed, it can be requested up until the early stages of manufacturing. Also, it is possible to carry out 2 (or 3) of those alarms via 2 integrated dry contacts)

Notes:

- *It is easy to adjust the setpoint, but without our HMI control display, user may want to change both wake-up level and setpoint together as they are independent settings.*
- *In pressure control, this sequence monitors the output at discharge (at the immediate output of the pumps or near). Suction (input) supervision needs an additional sensor and it may not be included.*
- *This process may vary with VLT drive's, however it is similar.*