

INSTALLING VARIABLE FREQUENCY DRIVE ON SMALL INFLUENT PUMPS

BOARD MEETING PRESENTATION

JUNE 27, 2022

What is a Variable Frequency Drive (VFD)?

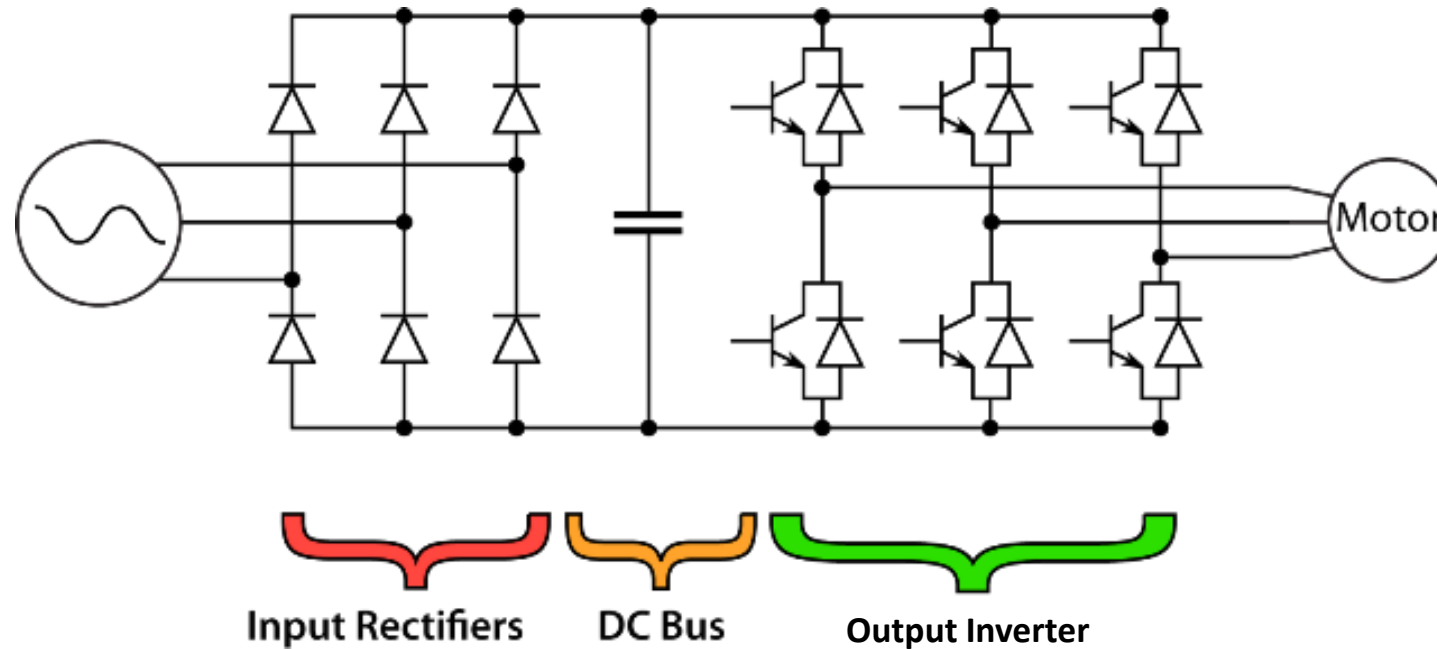
A Variable Frequency Drive (VFD) is a type of motor controller that drives an electric motor by varying the frequency and voltage supplied to the electric motor.

Frequency (or Hertz) is directly related to the motor's speed (rotations per minute). The higher the frequency, the faster the motor rotates.

For centrifugal pumps, the pump speed is in proportion with its discharge flow rate.

In wastewater treatment, pumps typically do not need to run at 100% speed at all time; VFD will allow the pumps to run at a reduced speed when needed.

How does a VFD work?



A VFD, AC inverter or electronic speed controller for AC motors converts the AC supply to DC using a rectifier, then converts it back to a variable frequency by using a inverter bridge.

Benefits of VFDs

It saves energy, prolong motor and mechanical component life

Reduces The Need For Maintenance - Having the ability to vary the velocity and torque of an electric motor can alleviate the wear and tear on the motor, as well as the machine driven by the motor, over a long period of time.

Without a VFD, the motor is either 100% on or 100% off.

It eliminates the initial power in-rush and mechanical shock of switching the motor from 0 to 100%

Typical Construction of a VFD

VFDs usually comprise of three sections:

- Rectifier – where AC is converted to DC
- DC intermediate circuit which contains capacitor and inductor for filtering
- DC-to-AC inverter where DC is turned back to three phase AC.

VFD can vary in physical sizes from small wall-mounted unit to cabinet-built



VFD Mounting

Wall-mounted VFDs



Cabinet-mounted VFDs



VFDs for the Small Influent Pumps

Proposed Configuration:

- Each small influent pump will be equipped with a new VFD
- All VFDs will have a bypass system to allow their motors to run across the line at 100% speed
- The existing cabinets will be demolished, and new VFDs will be installed in new cabinets

