

# Benefits of Variable Frequency Drives in Pumping Applications



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# VFD Benefits

- Water hammer improvement / elimination
- Energy efficiency
- Extended motor pump life
- Maintenance alarms
- Energy consumption information



# Improve / Eliminate **Water Hammer**

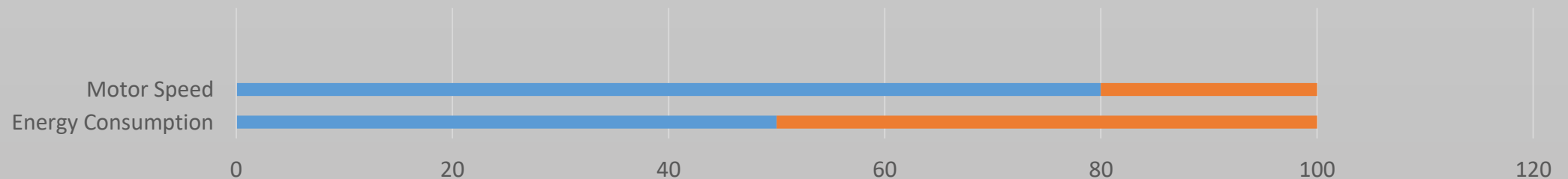


- **Gradually starting / stopping motors can dramatically reduce water hammer – and potentially eliminate**
- **Consider pump and motor cooling**



# Improve Energy Efficiency

- Starting large HP motors with rotating mass reduces current inrush and energy demand on utility systems
- Reducing pumping speed to 80% can reduce energy consumption to 50%
- Not possible / practical in situations requiring pressure or flow minimums





# Controlled Ramp Start / Stop

- Extends life of mechanical motor and pump assembly
- Results in cost savings for your organization







# Fault History Log

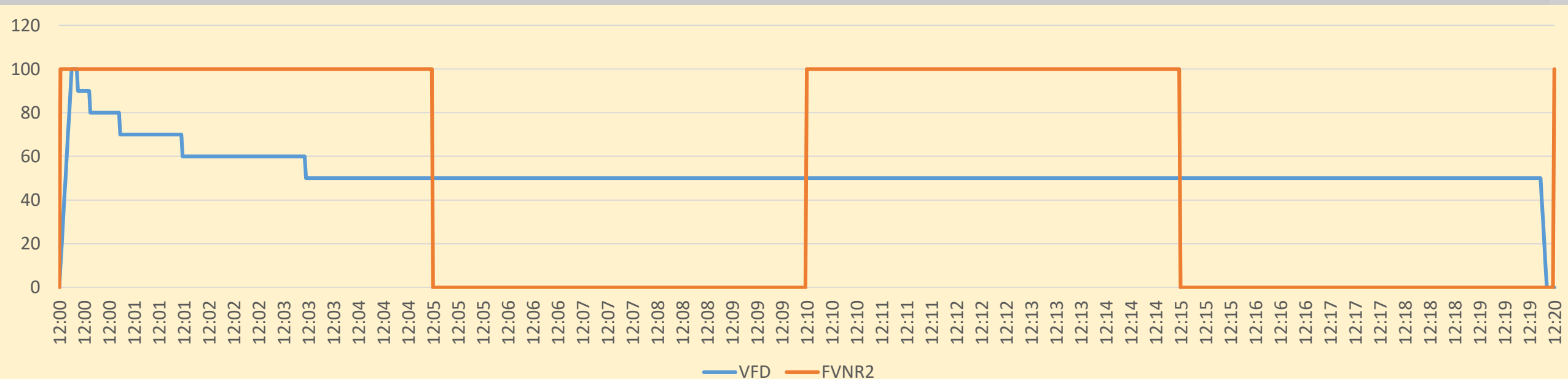
- Nearly all VFDs include fault history log
- Some integrate real-time clock to pinpoint issues
- Tracking results in less downtime





# Extend Pump Cycles

- Start pump at normal set-point
- Slow as it approaches stop set-point
- Limits start/stop cycles + additional benefits





# Why Not **Soft Start**?

- **Soft starter does provide benefits to mechanical assembly**
- **However, systems operate differently electrically**
- **Not the same same energy efficiencies**
- **Doesn't allow for changes to motor speed while running**







# Existing Single Phase **Utility Services**

- Often possible to upgrade existing sites with single phase utility electrical services
- Can utilize up-to-date three phase motors/pumps using VFD to create three-phase circuit



# Initial Considerations

**Heat Generation in controller environment**

- **VFDs generate much more heat than across-the-line starters**





# Initial Considerations

## Installation space and air movement

- Space is required around an installed drive
- Air must be able to flow across heat sink





# Initial Considerations

## Application benefits and paybacks

- Are you able to produce at lower speeds?
- Does it make sense to extend pump cycles?



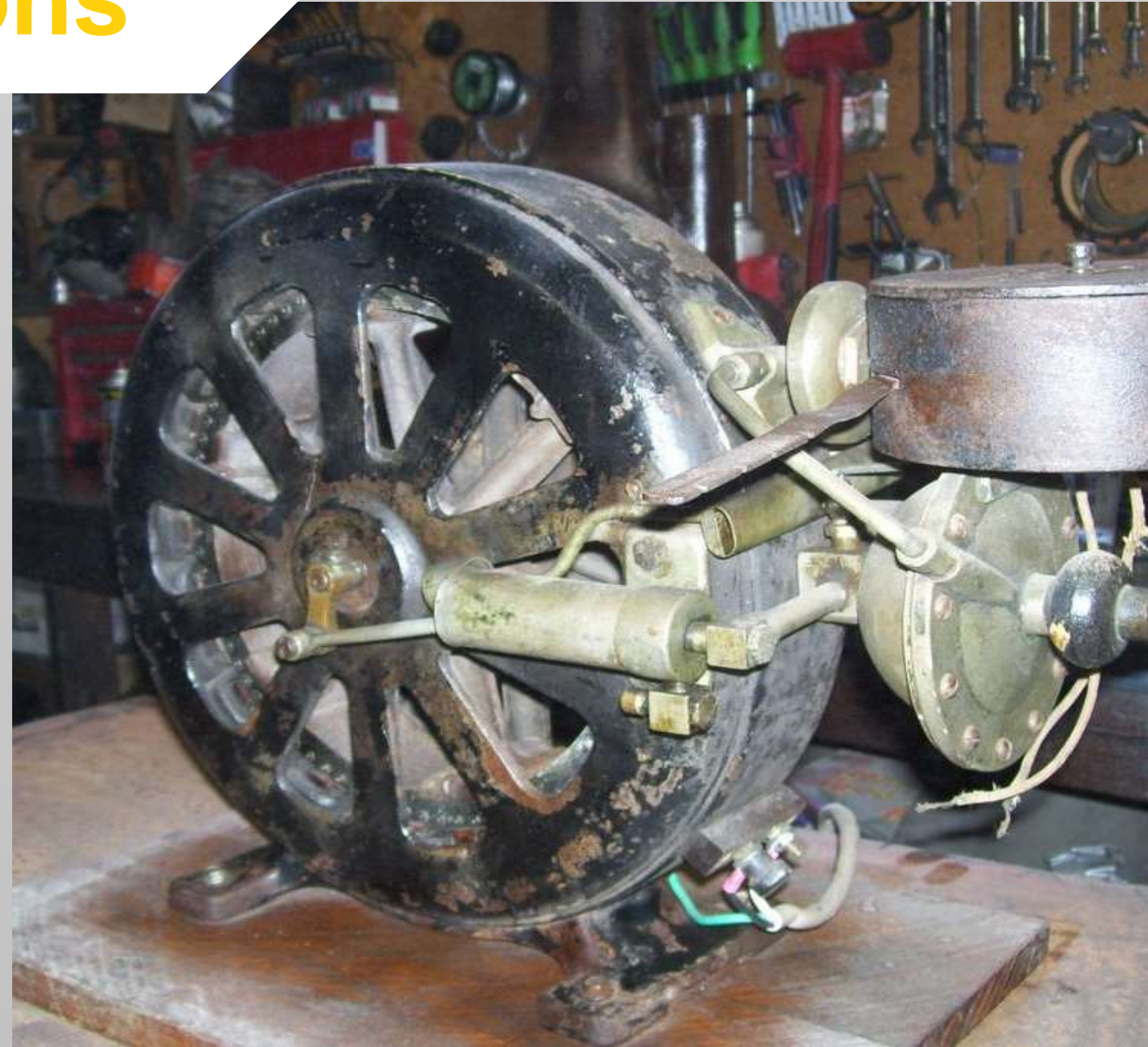




# Initial Considerations

**Pump motors must be  
“Inverter Duty Rated”**

- **Older motors built for  
across-the-line starting  
may not be rated for VFD**

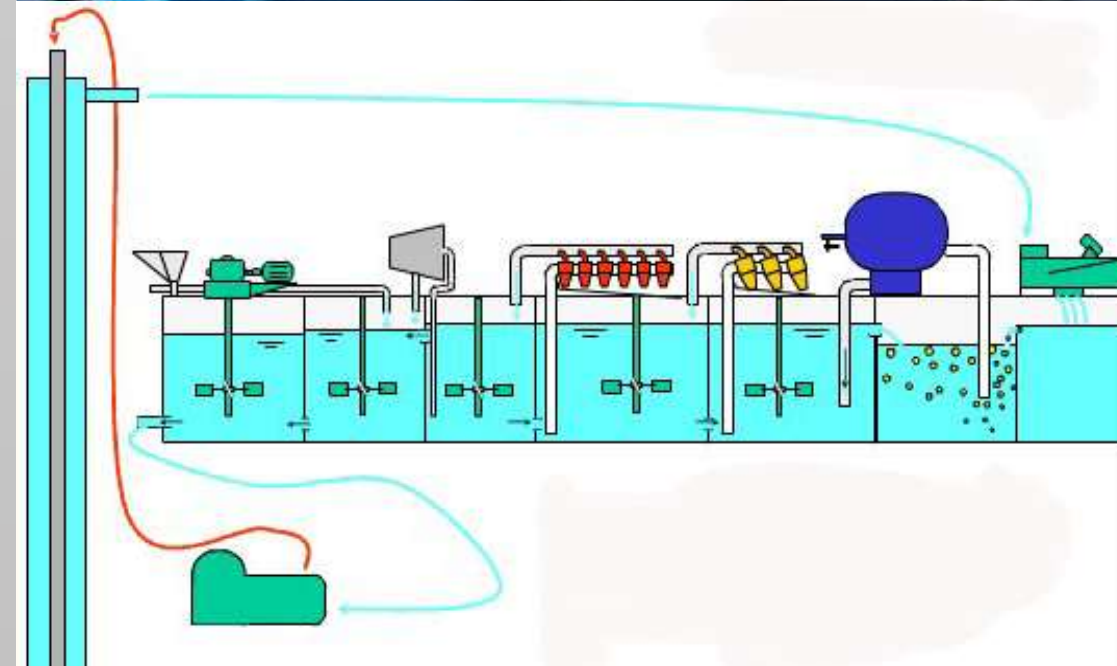




# Initial Considerations

## Sizing VFDs based on application

- Not all applications are the same
- Some might require “heavy duty” sizing or have special voltage situations





# Thank you!

## Follow up? Questions?

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