

# Application Note: Optimizing Pump Performance with a Panel PC, HMI and Ethernet I/O

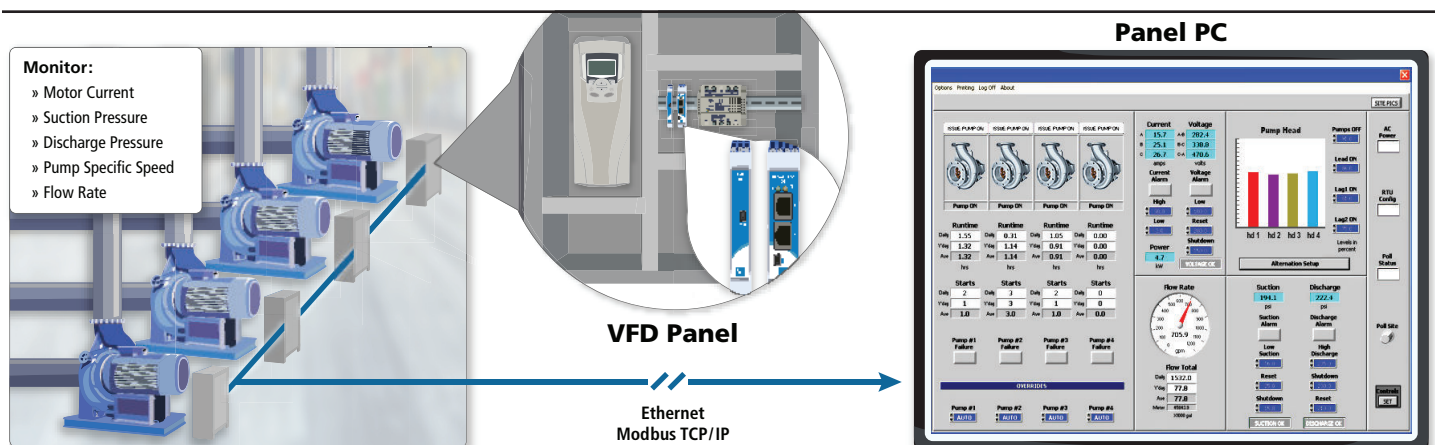
## Defining the Problem:

Pumps are integral to a wide variety of industries and processes. Monitoring pump performance can lower operating costs, reduce downtime, schedule maintenance and improve process throughput. An automation system is needed with local displaying of real-time parameters, analytical calculations, data storage, trending, set warning and shutdown alarms, issue event driven messages and network communications. Additionally, with vibration monitoring and proactive maintenance, machine condition monitoring can be implemented.

## System Requirements:

- An industrial panel PC with Windows® or Linux® OS and a suitable HMI for distributed control and process automation.
- Ethernet I/O to interface the pump sensors with the HMI.

Converting pump analog signals to Ethernet facilitates an easy connection to the PC, simplifies wiring and minimizes electrical noise in harsh environments.



## Implementing the Solution:

1. To optimize the pump performance, add the following sensors to monitor:

- Electrical power: current transformer (CT) with 4-20mA output
- Flowrate: flowmeter with 4-20mA output
- Suction pressure at the inlet side: pressure transmitter with 4-20mA output
- Discharge pressure at the output side: pressure transmitter with 4-20mA output
- Pump specific speed: (calculated from the shaft RPM, flowrate and the head)  
Hall Effect speed sensor with frequency output to signal conditioner TT239-0600, converting to 4-20mA

2. An Ethernet connection from the XT1211-000 to the Panel PC for Modbus TCP/IP communications. The HMI will Poll the XT and read back the pump parameters to display and perform calculations.

3. Add a device driver to the PC OS:

- For a PC running Windows®: add a Modbus TCP/IP ActiveX Control or .NET Control
- For a PC running Linux®: add an Ethernet Modbus C Library utility to build Modbus TCP/IP commands

## Featured Products:

[XT1211-000](#): 8-Channel Differential Analog Current Input

[TT239-0600](#): Transmitter, Frequency/Pulse/PWM Input, 12-32V DC Loop/Local Power

## Notes:

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## Why Acromag:

The Acromag Ethernet I/O interfaces directly with many HMI programs making set up and communications simple and reliable. With 4G vibration and 25G shock ratings, Class 1 Div 2 and ATEX Zone 2 Approvals, these products can be mounted near motors and Hazardous Locations for added flexibility.