STI Vibration Monitoring Inc.

Vibration Monitoring and Machine Protection Systems

1010 East Main Street, League City, TX 77573 Phone:281.334.0766 Fax: 281.334.4255
www.stiweb.com / www.stiwebstore.com

Condition Monitoring Custom Products

Case History:
Power Plant Balance of Plant, BOP #1

The Problem:

A Mid-Western Power Company had a requirement to permanently monitor four (4) FD (Forced Draft), five (5) ID (Induced Draft) and six (6) PA (Primary Air) Fans. The fifteen (15) Fans were spread across two (2) generating units located next to each other. The customer wanted to make use of their existing DCS and Plant Historian System for each unit. Two (2) existing Fiber Cables from the DCS to the general area of the machines were not being currently used. The customer required that the 2 Units be entirely separate systems.

As the Fans are of heavy rotor, light case design equipped with Journal Bearings the customer determined that they would use 239 bearing mounted 100 mv/g Accelerometers and wanted displayed values and trends to be in terms of Velocity (in/sec) in the plants DCS and Historian. The 5 VFD (Variable Frequency Drive) ID Fans had an additional requirement for Speed Sensor and Transmitter as the existing speed systems were not functioning dependably.

An additional requirement was that the proposed system must be able to withstand an outdoor environment with winter temperatures down to a worst case of -27 degrees F (32.78 degrees C).

The Solution:

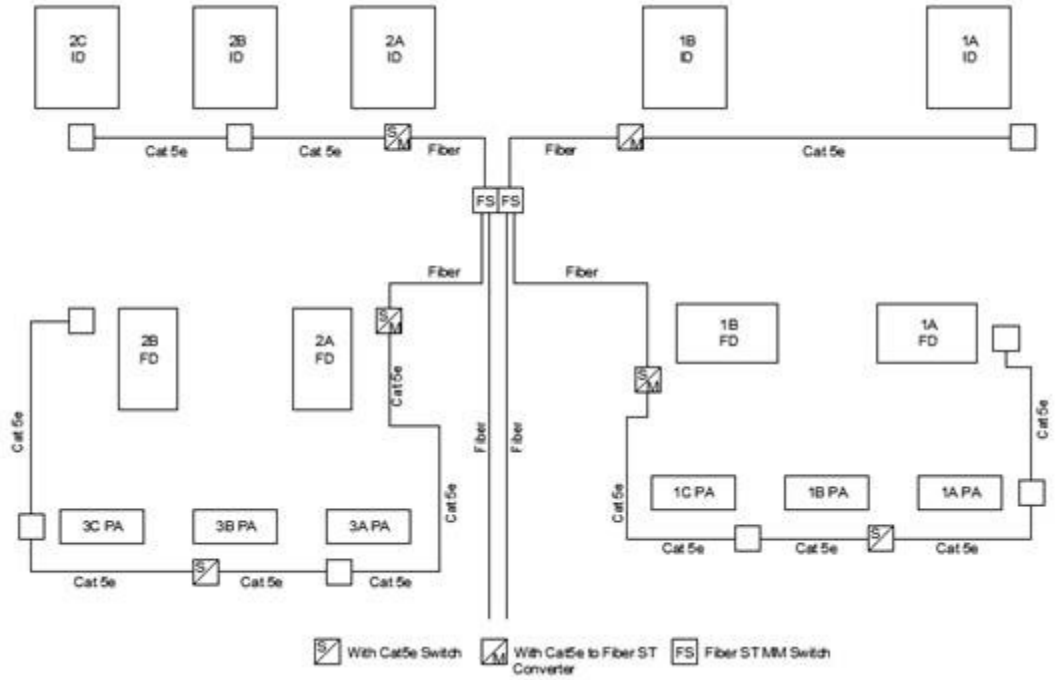
A distributed system using 15 painted steel insulated enclosures was engineered to minimize sensor cabling and reduce installation costs. A thermal load calculation was completed for each enclosure and it was determined that insulated heated enclosures would be required. A thermostat was used to only turn on heaters when or if needed. It was determined that three (3) standard size enclosures would be used, 2 each 9 channel, 8 each 12 channel and 5 each 25 channel. Each enclosure included CMCP530 Velocity Transmitters, CMCP515 Power Supply, Field IO, Industrial Ethernet Switches, Heater, Thermostat and additionally for the 5 ID Fans, CMCP240 Speed Sensor and CMCP575 Speed Transmitter.

The CMCP530 Velocity Transmitters powers and accepts the 100 mv/g Accelerometer input and integrates the signal to a 4-20 mA Velocity signal. Each transmitters internal OK (Green LED) circuitry monitors the sensor bias voltages and drives the 4-20 mA signal to 0.00 mA on loss of OK.

Modbus TCP/IP was selected as the desired protocol for both Units. Enclosures were digitally linked using Cat5e cabling with a maximum allowed cable length of 100 meters between enclosures. Industrial Ethernet Cat5e to Fiber Converters were used to convert to the Fiber runs where required by length and back to the plant computers.

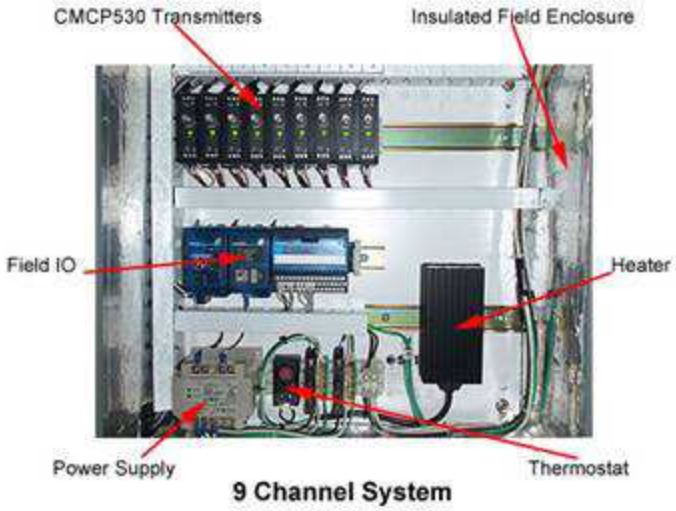
STI Vibration Monitoring Inc. completely assembled, integrated and tested each enclosure prior to shipment at its League City, Texas facility. IP addresses and Modbus buffer numbers were pre-assigned working with the customer.

Plant Layout:



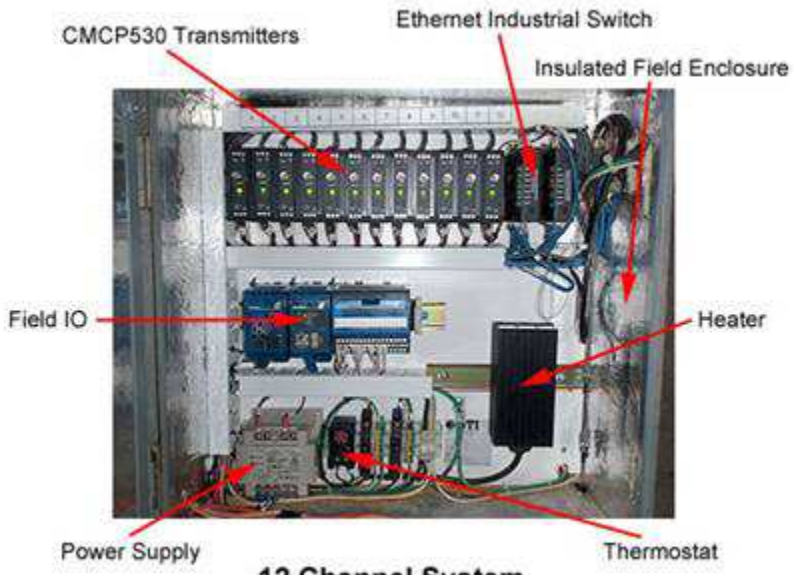
The following images were taken by customer 5 years after installation. Notice all OK lights are "Green" showing all transducers are functional. There have been no warranty replacements in 5 years. Two (2) transmitters were damaged by water and the enclosure installation was corrected to prevent damage from happening in the future.

9 Channel Enclosures:



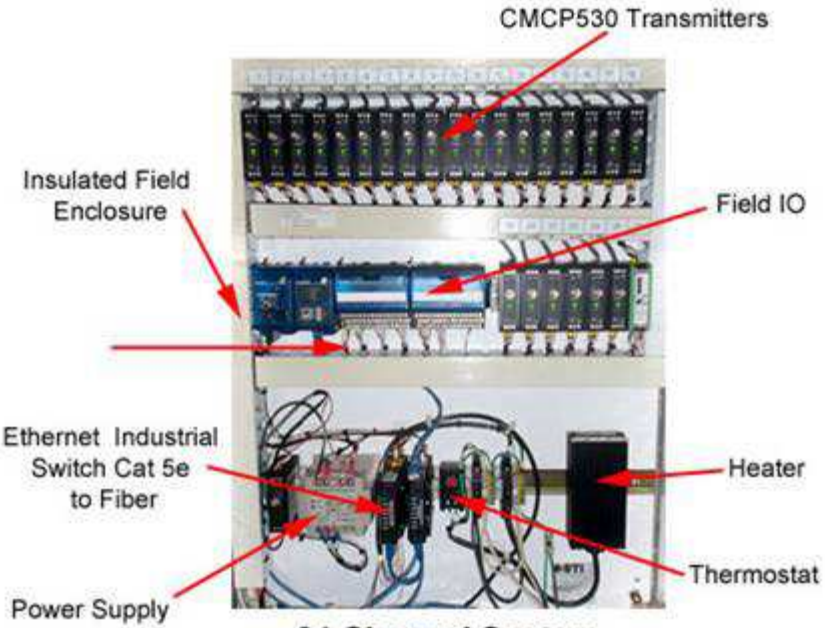
9 Channel System

12 Channel Enclosures:



12 Channel System

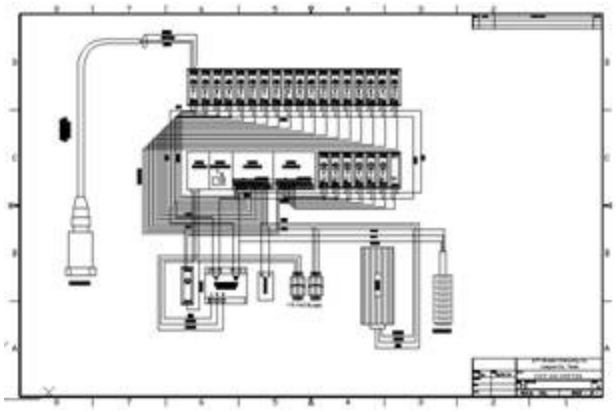
24 Channel Enclosures:



24 Channel System

Complete design and wiring drawings were supplied to the customer in DXF format. With a completely integrated and tested system supplied by STI the customer was able to complete the entire installation without assistance of STI Field Service.

Drawing Package:



If you should have any questions or comments about STI's Vibration Monitoring Systems please feel free to contact us directly.

Copyright 2011 STI Vibration Monitoring Inc.