Continuous Emission Monitoring System in a Thermal Power Plant

Environmental Monitoring
Beijing, China

Project Introduction:

In China, a CEMS (Continuous Emissions Monitoring System) is required in power plants to monitor air pollution. The Department of Environmental Protection monitors and controls the air pollution through these units to charge corporations according to the data. With Advantech's UNO-2160, ADAM-5000/485, and ADAM-4000 modules, a new CEMS unit combines reliable operations with accurate data analysis.

System Requirements:

The Chinese Government is taking steps to control their air pollution. One of these steps has made it a requirement to setup a CEMS in every power plant to monitor air pollution emissions. This particular customer was using an outdated IPC system which was causing them problems with inaccurate data and unreliable operation.

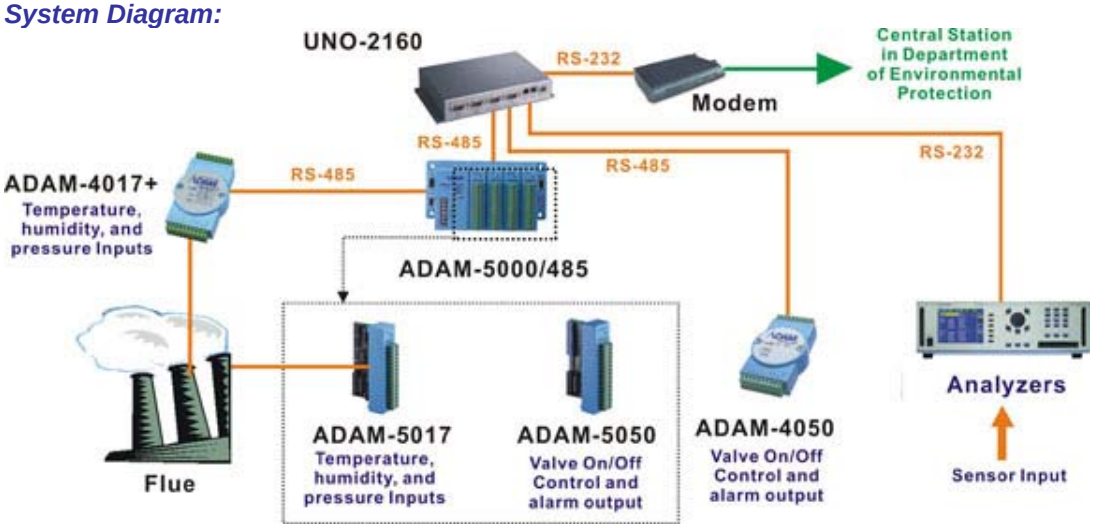
They needed to set up a new CEMS to reach the following goals:

- They wanted to have real-time monitoring of the emission levels, including the smoke, sulfur dioxide, and other chemicals from each stack. Additionally, all recorded data needed to be transferred to the Control Center at the Department of Environmental Protection.
- They wanted a reliable system to work as a data terminal to analyze, store, and distribute the data effectively.

Project Implementation:

- UNO-2160: Celeron 400 MHz Universal Network Controller with PC/104 Extension
- ADAM-5000/485: 4-slot Distributed DA&C System for RS-485 Network
- ADAM-5017: 8-channel Analog Input Module
- ADAM-5050: 16-channel Universal Digital I/O Module
- ADAM-4017+: 8-channel Analog Input Modules with Modus®
- ADAM-4050: 15-channel Digital I/O Module

System Diagram:



System Description:

This CEMS adopted the ADAM-5000/485, ADAM-4000, ADAM-5000 and UNO-2160 modules. ADAM-5017 and ADAM-4017+ modules are connected to all the flues and work as data acquisition receivers; collecting temperature, humidity, and pressure data. 3rd party analyzers will collect and analyze TOC and CDO data via special sensors. In the event of any abnormal situation, the ADAM-5050 and ADAM-4050 will send an alarm and control the valve on/off. As a data microprocessor, UNO-2160 will store the acquired data, which will be transferred to Central Station Server at the Department of Environmental Protection via modem.

Conclusion:

A thermal power plant is a very harsh working environment. Fortunately, the UNO-2160 is designed as a rugged, fanless and compact unit for such applications. Its highly reliable operation reduces future maintenance costs, and additionally it accepts popular programming languages such as VC and VB so that engineers can easily work with it. ADAM-4000 modules also integrate Modbus and ASCII commands for direct communications. By combining the UNO-2160, ADAM-4000, and ADAM-5000 modules in this way, the new CEMS provides reliable, accurate, and efficient service for our customer.