

Monitor and Control of Manufacturing Process

A major wrench and hand tool manufacturer had a problem making wrenches of consistent quality. The manufacturer of large wrenches was a manual operation with the machine operator in control of how hot the billets are heated and the physical movement of parts from die to die in the multi-strike 600 ton press. The primary quality issue was that the operator would increase the temperature on the billet induction furnace to increase part throughput at the press. Unfortunately, pressing at a higher temperature results in metal scaling on the finished wrench which required an additional time consuming polishing operation to remove. The company's need was to better monitor and subsequently control the process even though it would still remain a manual operation.



The solution that was sought was to put in place a system to do the following:

1. Monitor the temperature of the billet prior to going into the press.
2. Warn the operator if the billet temperature was out of specification.
3. Shut down the press if the temperature remained out of specification for a predefined period of time.
4. Wirelessly report current temperatures and alarms back to a central display station in the quality department where they are logged and trended.

The solution was to use ioSelect ioPro WDL radios (IOPRO-WDL-900) in combination with the ioPro multi-IO module (IOPRO-DAIO), UniPak timer (IOS-UP-110), and ConnectPak relays (IOS-CP-822) at the remote site. The system was designed to read level and alarm values from an attached IRCON non-contact temperature sensor and provide operator notification (Lamps and delayed horn). The unit was also wirelessly connected to the Master station with a graphical operator interface terminal that logs the temperature and alarm data on up to 8 presses, displays on screen trends, and allows PC access for data archive and further analysis.



Reliable wireless communications was a key requirement, since this system was a retrofit in an existing facility and it was deemed "Near Impossible" to run the communications wire that would normally be needed. The ioPro WDL robust 1 Watt, 900 MHz Frequency Hopping Spread Spectrum (FHSS) radio communications link proved to be immune to the electrically noisy facility, and provided reliable communications between the remote units and the master.

The system has met with great success, having been instrumental in polishing rework being reduced 87% with a resulting wrench production throughput increase of 17% after installation.