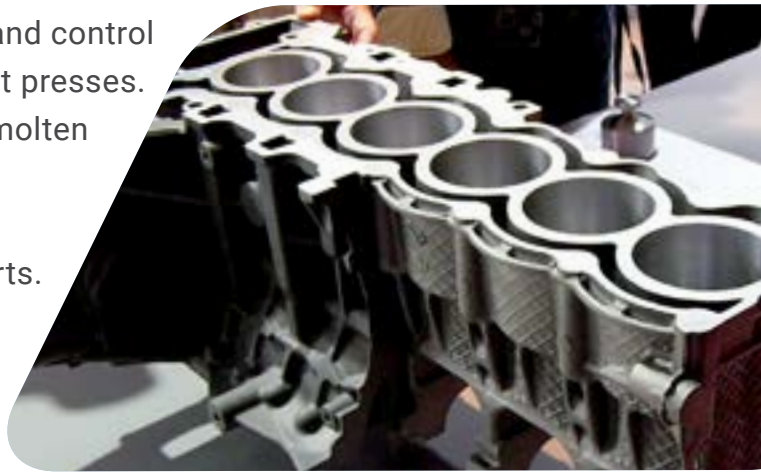
APPLICATION NOTE

CAS DATALOGGERS

Highly Accurate Die Casting Process Control Solution

ADwin-Gold Provides Manufacturers Real-Time Data Acquisition



CAS DataLoggers supplied the data acquisition and control solution for a prominent manufacturer of die cast presses. These presses used hydraulic systems to force molten metal into a die, forming intricately-shaped parts requiring little final machining for use as in automotive engines, transmissions and other parts. Control over the injection process was often managed by a PLC–however, standard industrial PLCs lacked adequate response times to maintain the tight control required during this process. It was critical to achieve fully formed parts of the proper density with minimum porosity while controlling the speed, volume and pressure during the injection process. Management saw the need for a precise die casting process control solution that could also provide data acquisition for users' quality control requirements. The solution had to accurately monitor the pressure, force, speed and displacement in real-time during the shot injection and have flexible communications capabilities for communication with a PC.

Installation

CAS DataLoggers provided the solution that incorporated an ADwin-Gold Real-time Data Acquisition and Control System enclosed in a rugged metal housing. The ADwin system monitored and controlled the various analog and digital inputs during the shot injection and was easily interfaced to a Visual Basic application providing the HMI for set-up and monitoring tasks including configuring the injection shot, viewing and storing real-time data. All of the real-time control was achieved using the on-board analog and digital I/O of the ADwin system in with sub microsecond precision.

This 16 analog input channel system measuring at 18-bit resolution was then connected to various sensors to effectively monitor the pressure, force, speed and displacement during the injection shot.

USAGE

The ADwin-Gold system's local real-time CPU supported parallel, individually-controlled real-time processes while running independently of a PC's operating system, providing deterministic operation with less than 1 microsecond or less response times. The ADwin's CPU also controlled signal acquisition and all measurements were recorded in real-time onto 1 MB of external DRAM for data storage. Communication with a PC was via the system's integrated Ethernet interface.

The ADwin application runs on the processor internal to the ADwin hardware. It is accessible by applications on computers running Windows, Linux, Mac iOS and other platforms. Multiple PCs communicated with the ADwin-Gold concurrently during program implementation and commissioning, and when necessary, one PC could also access multiple ADwin systems, as part of a network to provide centralized monitoring. The system also enabled calibration of the system's analog inputs and outputs and had drivers for many popular programming environments including VB, VC/C++, LabVIEW, Kakkiste and others.

The ADbasic application was created using the ADbasic development environment With ADbasic, users defined the processing sequences executed on the ADwin hardware, optimizing and compiling the program code with just a click of the mouse. The system's real-time processes executed independently after being loaded on the ADwin-Gold via ADbasic or a graphical PC user interface. ADbasic also contained the functions to access all inputs and outputs as well as those for floating-point operations, process control and PC communication. Users also had a library containing standard functions such as for filtering, various examples for counter use, function generators etc., which helped them to quickly implement the program. ADTools offered a simple way for users to view their real-time data graphically or numerically to visualize process sequencings or to set input values via potentiometers, sliders, or push buttons. Additionally, ADtools constantly provided the current status of the ADwin system's resources.

Benefits

The manufacturer's shot injection process was effectively monitored and controlled following installation of the ADwin-Gold data acquisition system. The ADwin provided highly accurate, die casting process control in real-time and was easily customized to provide special functionality, resulting in faster, and more accurate performance than was possible using conventional PLCs. Operators used a Windows-based PC for the HMI to greatly simplify connection to the factory network for monitoring, recipe management and process feedback—this oversight gave users the split-second response times needed to ensure the correct part density and porosity. Additionally, data transmission and accessibility were greatly simplified via the system's flexible communications capabilities. The project is one of the many applications of control systems possible with ADwin.

For further information on the ADwin-Gold Real-Time Data Acquisition and Control System, die casting process control, or to find the ideal solution for your application-specific needs, contact a CAS Data Logger Application Specialist at **(800) 956-4437** or www.DataLoggerInc.com.