How Data Logging Can Optimize Your Heat Processing

By: Watlow - April 12, 2021

The Fourth Industrial Revolution (https://www.weforum.org/focus/fourth-industrial-revolution), also known as Industry 4.0, has produced countless changes related to automation and data exchange. Machines have become increasingly connected, with information created and tabulated in real-time and then shared across various communication points. One of the most important technologies impacting process heating is data logging.

Data logging refers to the recording of critical system data through an electronic device either on-site or remotely through extended networks. Various process steps are monitored through sensing equipment that sends signals to controllers and loggers. The process information is archived and offers operators and technicians deeper insights into where their systems can be optimized for greater effectiveness or output.

Essentially, the data is collected into digital "logs" recording specific details such as run times, process temperatures, variations in system performance and host of other system events that are significant. Design engineers can analyze this information to design better systems and understand which steps in their process are most critical to the desired outcome. Data logs also make it possible for information to be distributed and shared, which improves communication among team members working within a system.

Multi-channel data loggers support multiple inputs and can be compatible with different types of temperature sensors such as thermocouples, RTDs and thermistors. Some data loggers may include fitted components, such as probes, to safeguard sensitive parts from harsh environments or over-temperature conditions that can damage equipment.

Advanced data logging systems provide users with data integration tools that can capture and model various data formats enabling easy readability and accessibility across several types of platforms and devices.

Data logging: a technological transition

Traditional technicians relied on electronic instruments to log system values such as temperature and pressure measurements. These prototype data loggers usually came in the form of strip chart recorders connected to an industry sensor where tiny pens mapped out printed, graphical measurements. Some of these early assemblies continue to function in museums where facility administrators use them to monitor the temperature and humidity of encased exhibits.

Early electronic data loggers were single zone and, therefore, costly as multiple units were required to adequately monitor a process. Additionally, the electronic versions proved inflexible, utilizing preset monitoring durations that prevented flexible logging routines.

Today's data logging equipment is dynamic and robust offering solutions that enable multiple zones and varying signal types at affordable costs. Additionally, users can conveniently download and share recorded information via built-in communication channels, such as USB and Ethernet enabling cloud-based storage and access to big-data analysis. Digital solutions provide engineers and technicians with simplified, automated and customizable data-logging solutions that reduces human error and improves data quality.

Advancing through the times with digital data logging

Digital data logging enables manufacturers to upgrade existing equipment with modern, data-logging solutions. Real-time digital data logging provides manufacturers with advanced system support that can reduce or prevent the scrap, costly recalls and customer ill will by helping operators recognize conditions leading to compromised processes and production errors.

For example, a foam sheet manufacturing company was able to quickly recover from a quality issue by reacting to information made available through excellent data logging practices. Using Watlow's ASPYRE® DT power controllers, with built-in data logging, engineers where directed to specific temperature variations in their curing process. By quickly seeing and resolving the root cause of their problem, the company saved thousands of dollars in scrap and customer returns, to say nothing about the potential impact to the reputation of their brand.

Another value provided to manufacturers through an effective data logging system is the ease in which tight, industrial standards must be maintained and documented. For example, diligent data logging allows aerospace and airframe manufacturers to automate the tracking standards required to maintain Nadcap conformity (https://p-r-i.org/nadcap/)for demanding quality and auditing standards.

Data logging options

Watlow® delivers the most advanced heating products, including the most dynamic and multifunctional data logging equipment on the market today. Clients have two options in implementing digital data logging solutions. Manufacturers can choose an integrated system such as the ASPYRE DT power controller with built in data logging and add additional units down the road as power and data logging needs evolve.

Watlow's F4T® temperature controller also features data logging capabilities, and our D4T™ is a dedicated data logging device. Customers can work with their Watlow team to create logging parameters that are preconfigured right out of the box saving setup time and complexity. Watlow's solutions also come with a comprehensive list of popular setup configurations to help manufacturers optimize data logging tailored to their specific needs.

For a quick option, the EZ-ZONE® RM access and RMA PLUS™ modules dynamically connect with other devices providing measurement capability and can record data with onboard SD cards. Watlow's SpecView™ HMI software provides basic data logging capabilities, while users operating more complex systems may opt for historical replay functions at an additional cost.

The future of data logging

The rapid rate of digital transformation might lead to mainstream integration of AI data logging capabilities. Manufacturers may enjoy the advantages of advanced algorithms that calculate and rectify value discrepancies, without the need for routine manual support.

Freeing engineers' schedules from periodic logging enables teams to focus on more value-added tasks, such as product development and system improvements, promoting growth and scalability across industries. Gone will be the days of engineers with clipboards in hand, slogging away with hourly inspections on an autoclave.

Watlow (/en/about-watlow) continues to supply quality thermal systems and products, including heaters, temperature controllers and sensing equipment for the most demanding industrial needs. Visit our inventory to learn how we can help you create a future powered by possibility.