IOT – WHAT IS IT AND WHAT DOES IT MEAN FOR AIR COMPRESSORS?

By Luiselle Rivera

What is IoT?

IoT, or the Internet of Things refers to the network of devices and/or machinery containing sensors, software and technologies enabling data to be shared over the internet. In this digital age, some examples of how we are connected by many familiar things are fitness trackers, phones, doorbells, security systems, home heating/AC, and even cars. In the business world, IoT is a strategy that connects machinery, systems, and networks to leverage technology and data to improve products and services and/or streamline business processes. In manufacturing, IoT can provide feedback to mobile robots and forklifts that move products around factory floors and warehouses, help monitor temperature fluctuations or scan for gas leaks in buildings and/or machinery and much more.

How does IoT work?

First, an internet-connected device (or set of devices) collects data from other internet-connected gadgets and/or sensors embedded in machinery that communicate via a network. The data-collecting device is able to differentiate which machine or part of a machine is sending data since each sensor has a unique IP address. Second, the gathered data is sent over the internet to a cloud-based data center wirelessly or via wired networks. Data processing and analytics can take place in data centers or over the cloud. Edge devices, or hardware that controls the data flow between two networks, are sometimes used to speed data transfer. The real value of collecting data is that users and operators are also able to view and use historical information to uncover certain trends and patterns that may have otherwise gone unnoticed. This allows them to perform predictive maintenance - identifying potential pain points and problems before there is a malfunction.

Leveraging IoT in Compressed Air Systems

The production and distribution of compressed air is a complex process. Air input and air demand depend on various factors including ambient air temperature and humidity, dust and pollen, voltage, pressure, flow, and dew points. To obtain optimal efficiency, many of these parameters must be constantly measured and/or monitored which is where IoT technology can help improve and support the compressed air production process. IoT devices and sensors are constantly collecting and monitoring the status of units and processes while perpetually communicating data. With this large pool of data collected by IoT devices and analyzed in the cloud, operators can track nearly every aspect of their air compressors, which they can monitor with a sensor, in real-time and remotely, including motor performance, amount of generated pressure, air flow, dryer speed and more.

The data collected by IoT devices enables operators to use historical information to uncover trends and patterns that may have otherwise gone unnoticed. When changes are detected in the machinery and processes, trends are reviewed to determine when adjustments, replacements or overhauls are needed. They can use this historical information to compare the performance of one air compressor to another; create comprehensive histories on various aspects of system operation, from pressure drops across filters to motor temperatures; and optimize energy consumption by utilizing a “smart” controller to control fluctuating air demand.

Operators can use this historical data for predictive maintenance instead of scheduled maintenance – meaning they no longer have to spend time doing maintenance more often than needed or waiting for something to break before they can fix it. With the help of IoT technology, suspected problems can be addressed early before they have a chance to become much bigger and more expensive. Rather than scheduling shutdowns and still reacting to breakdowns, work is planned to minimize costs and production impacts.

Ultimately, implementing an IoT program helps engineers, operators, and organizational leaders make more informed decisions regarding maintenance and other applications, better allocate critical resources, and help lower energy costs.

Remote Monitoring

Remote monitoring is a growing and exciting area of compressor management. IoT technology allows operators to remotely monitor their compressors, receiving alerts by email. Operators are then able to log into their monitoring system on a tablet, laptop, or any web-enabled device to view and analyze the data. In some systems, operators are able to send adjustments from their own home or just about anywhere there is internet access available.

AirLinx® remote monitoring system from Hitachi Global Air Power is a system that sends data points such as ambient temperature and line pressure to the user's dashboard and then sends an alert of any issues to the user directly to their phone or email. The future of AirLinx® remote monitoring lies in expanding what is monitored on an air compressor in a way that meets customer's evolving needs. This can be anything from added service alerts to integrated responses and parts ordering once alerts are activated.

The Future of IoT

Other IoT future (and not-so-future) opportunities are in automatic service call generation and expansion of predictive maintenance and service alerts that increase efficiency. Apps that allow the scheduling of and the ability to track service, as well as the overall health of the compressor, are already here and likely to be commonplace in the near future.

Additionally, IoT technology can be leveraged in the area of building management systems. From the customer's perspective, these systems coordinate multiple air compressors and other machinery such as air conditioners from multiple manufacturers on a manufacturer's shop floor; integrating alerts from all machines to allow for consolidated and simplified monitoring.

The future of IoT holds even more exciting possibilities. The biggest trend for remote monitoring will include expanding on what can be monitored remotely and to what extent. Ultimately, there will be a deeper analysis of gathered data, and information will be aggregated to devise action plans for even more/deeper predictive maintenance.