DATA COLLECTION FOR AIR COMPRESSOR OPTIMIZATION

SUMMARY

Air is expensive. Yes, that's right, compressed air used in industrial machinery is quite costly. The technology that produces it has plateaued and one of the ways to increase production efficiency is to monitor the process closely and then optimize accordingly. That is what Kompresory PEMA is doing. The first step of improving any process is gathering diagnostic data. Optimization can occur only after sensors have collected the data and sent it to be analyzed. And for that, uninterrupted connectivity is a must.

CHALLENGE

Due to the technological limits of air compressors, they are not the most efficient for transforming electrical energy into work results. However, all the costs of production, transportation and consumption add up. This makes compressed air very expensive. Yet, it is still widely used in modern industry and production.

To lower the cost of compressed air, efficiency needs to be increased across the board. Metrics like pressure dew point, electricity used, solid particles and oil in the compressed air have to be closely monitored at all times.

So, the system needs multiple sensors to gather data and then send it all to the monitoring station. This solution requires a device that would gather all the data from numerous different sensors placed within the setup. Then the collected data needs to be forwarded to a monitoring center for processing. All of these parts need reliable and fast internet connectivity, as any unexpected changes within the system might be a sign of a malfunction and present inaccurate data.

PARTNER - PEMA KOMPRESORY

Kompresory PEMA focuses on reducing economic demands and achieving the most efficient operation of its customers' compressor stations. They also offer sales, services and rental of compressor equipment. Due to many years of experience in the field and a team of experts, they can provide customers with the most efficient and cost-effective solution for compression station design, operation and maintenance.
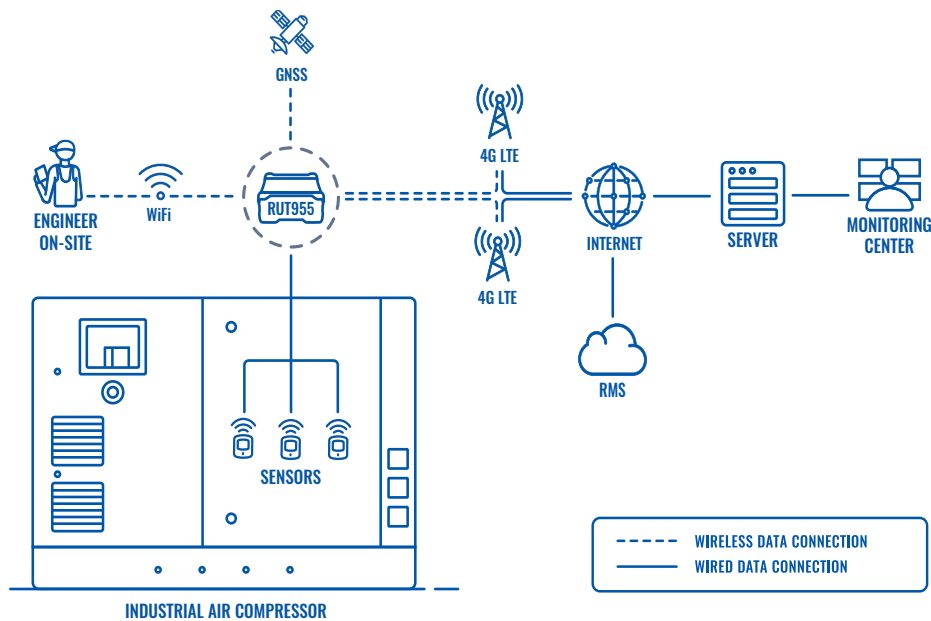
SOLUTION

In this case, Kompresory PEMA installed two 110kW compressors in a biomass power plant. The two air dryers keep a stable pressure dew point in two lines, one at -40°C and the other at +3°C. Each line has separate monitoring. The system also has drying units and the airflow for each line has individual monitoring. Several sensors track all of the minute changes in this setup. Based on the collected data, the air compression can be optimized. Machinery running at maximum efficiency prevents wasting electricity and materials.

Kompresory PEMA used Teltonika Networks RUT955 industrial cellular router to provide 4G connectivity for this monitoring solution. RUT955 connects to the sensors through an RS485 serial communication interface and LAN ports. After gathering diagnostic data via Modbus from the sensors, RUT955 relays it further to the monitoring center using the MQTT protocol. The data is analyzed and used to optimize the system and achieve the best result.

Multiple digital I/O connections allow for remote sensor control connected to the RUT955. Users can also safely connect to the router via a web interface using a VPN. Furthermore, the engineer can use Wi-Fi to access the system, perform checks, and change settings when on-site service is needed.

TOPOLOGY

GNSS

4G LTE

4G LTE

ENGINEER ON-SITE

WiFi

RUT955

INTERNET

RMS

SERVER

MONITORING CENTER

SENSORS

INDUSTRIAL AIR COMPRESSOR

- - - - - WIRELESS DATA CONNECTION
———— WIRED DATA CONNECTION

BENEFITS

- RUT955 provides stable dual SIM 4G LTE connectivity for industrial setups.
- RUT955 has a wide variety of digital and analog interfaces, perfect for industrial applications with many different components.
- Modbus (RTU and TCP/IP) and MQTT protocols allow efficient data collection and transfer to the analytical server.
- RUT955 has multiple VPN services to choose from for encrypted data transfer.

WHY TELTONIKA NETWORKS?

Kompresory PEMA explains the functionality of this IoT setup: "The solution, which relies on the Teltonika Networks device, is based on the collection of data from the entire compressed air system, their processing, sending to the server, the data is analyzed on the server and presented within several interfaces. The system operator thus has thorough information on the economics of production, transport, and consumption of compressed air, for decisions leading to better energy efficiency. "

And so, they were pleased by the connectivity provided by Teltonika Networks devices: "The most important for us is the reliability of communication and related to this is a reliable internet connection (4G). We also like the extensive options for setting up the router via the web interface from VPN to Modbus and several digital inputs."