# Automation Functionality Overview

PROZESS TECHNOLOGIE

The Reveal platform has multiple connectivity features to facilitate integration into existing process control systems. All Reveal platforms offer "out of the box" connectivity using industry standard protocols. These standard connectivity features allow for closed loop control to easily integrate Reveal process data into existing processes.

Once connected to the process control system, the unit can be remotely monitored for health and status. Sampling data can also be collected.

Example Architecture

PLANT NETWORK

REVEAL UNIT | PLC | SCADA NODE | HISTORIAN SERVER | RELATIONAL DATABASE
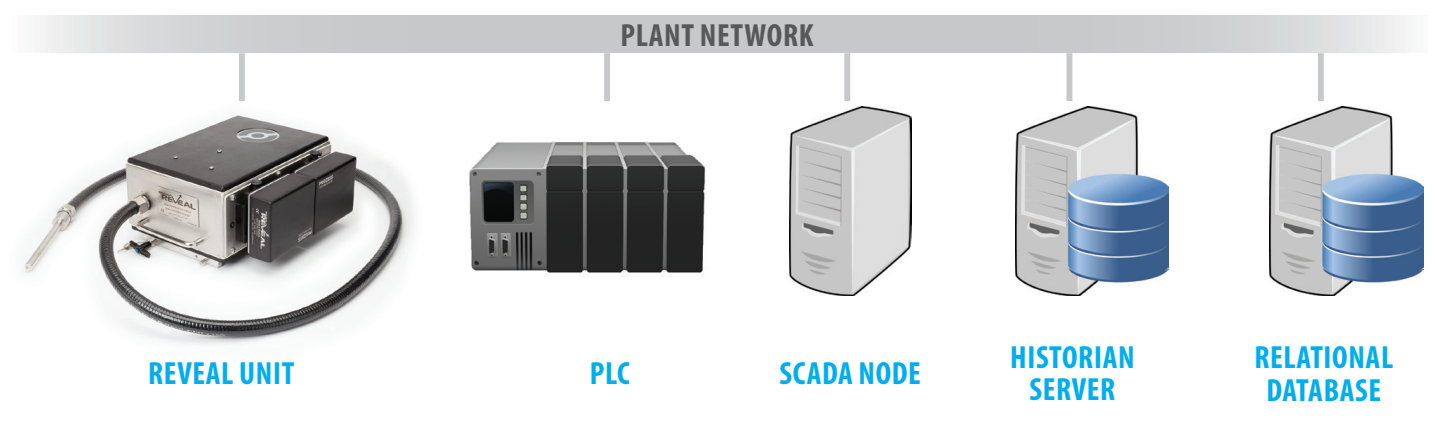
PLC & HMI Integration

Sample and status data from the Reveal platform can be easily connected to the plant process PLC using industry standard communication methods. Modbus TCP, OPC-UA and Ethernet I/P protocols are included in each Reveal unit, which means there is no need to order a separate model.

Once a connection to the PLC is established with the Reveal platform, sample and status information can be displayed on the plant HMI as well as portable HMIs via the web interface.

Sample Logging

The Reveal platform can be integrated into the existing process control system to perform periodic sample testing. Samples can be time stamped and correlated to the sensor data at the time of the sample.

Historical Data Collection

The Reveal platform also has internal memory that can store up to 30 days of data. Sampling data from the Reveal platform can be collected and stored in the plant historian server. This data can be used for trending and data analysis. Compressed data can be stored efficiently for months or years.

Closed-Loop Control

Using real-time data from the Reveal sensor and a closed-loop control system, the error (difference between the input signal (e.g. desired moisture) and feedback signal (e.g. actual moisture) is fed to the controller to reduce output error.

More advance methods of control, such as feed forward bias, also can be implemented for slow-reacting systems or load-based disturbances.

REVEAL™

Supported Communications

Connectivity

- 10/100 Ethernet with sealed connector (both static and dynamic IP addressing supported)
- Wireless 802.11 A/G/N
- An expansion port is available for additional communication outputs

Supported Protocols

- Modbus TCP (typically used when communicating with a Modicon PLC)
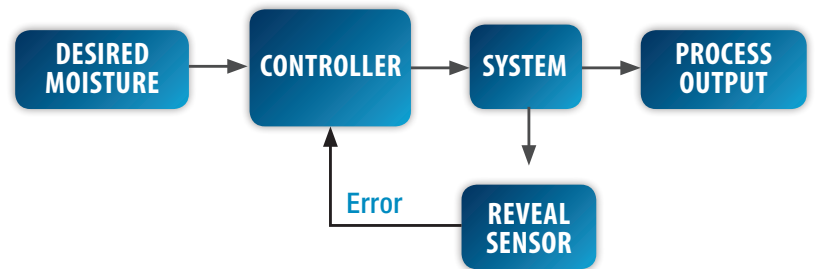- Ethernet I/P (typically used when communicating with a Rockwell PLC)
- OPC-UA

Data available via communications

Readable
- Watchdog heartbeat
- Status
- Lamp state
- Sampling state
- Sensor data (e.g. moisture, protein)

Writeable
- Lamp off/on
- Sampling start/stop
- Trigger signal

Health and Tolerance Monitoring

The combination of Reveal platform diagnostic data and PLC integration can be used to determine the health of the sensor and certainty of the data. Should the PLC receive information from the sensor that indicates it is not healthy, the PLC can warn the operator through an Alarm and/or transition to a safe manual control mode.

Preventive Maintenance logic also can be implemented for items, such as lamp life and sensor instability. These types of alarms can be displayed locally to the operator and also sent as e-mail alerts to engineering or maintenance groups.

Logic also can be added to determine if the sensor output is in a band of expected output for known conditions. Alarms and messages can be generating based on this known criteria.

Remote monitoring

Future units will provide a remote tunneling protocol that can be turned on or off at the unit. This can facilitate remote model configuration, and firmware and model updates. Provisions for managing fleets of units over multiple plants and multiple sensors per plant with remote support are likely to be in units soon.

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