

Temperature Monitoring in Flour Milling

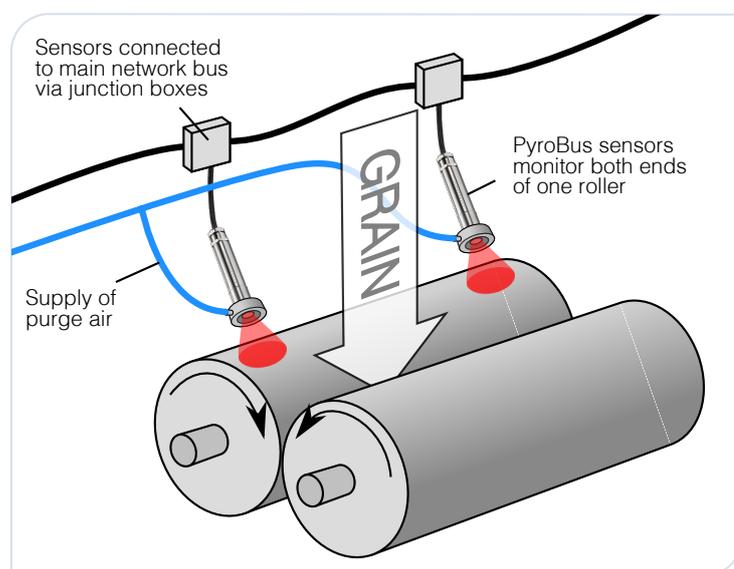
with the PyroBus Infrared Temperature Sensor

Calex has designed a temperature monitoring and alarming system for a leading flour milling company to help prevent fires and explosions.

Grain passes through a series of pairs of rollers that grind it progressively more finely into flour. The rollers are finely adjusted to an optimum separation; if they are too close together, excessive heat is generated by friction, which if left unchecked, can cause the roller temperature to become critically high. The highly combustible flour dust can then ignite, causing a fire or a devastating explosion. As well as the safety risk, this can lead to costly downtime.

Calex has worked closely with this customer to specify a system of 120 PyroBus infrared temperature sensors, with two sensors monitoring each of the 60 machines in the milling room. All 120 pyrometers are connected via an RS485 network to a PC, which provides temperature indication, alarming and data logging.

The system was selected for the customer's safety programme as part of the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR).



Two PyroBus sensors (model PB21) are aimed at the milling surface of one roller in each machine. Monitoring both ends of the roller helps ensure a hazardous temperature at only one end is properly caught.

The sensors are connected in four groups of thirty, in a daisy-chain arrangement using junction boxes. Each group of sensors has its own power supply and is connected to an isolated RS485 repeater, so a power fault or surge in one group will not affect the rest of the network. All four groups are connected to a PC via an RS485/RS232 converter.

Four alarm relay output modules are provided, one for each group of sensors. Each module provides four alarm relay outputs: audible and visible alarms for both warning and critical alarm temperature levels. One module has a single relay output that is triggered by any alarm; this may be connected to a control room beacon and/or a text-message notification system.

Bespoke CalexSCADA software is installed on the PC. This software reads from every sensor, controls the alarm outputs and displays all 120 measured temperatures simultaneously.

The user can click a temperature reading to view a pop-up window displaying detailed information on each pair of sensors and temperature history graphs.

The software also logs measured temperature, sensor temperature and alarm state at 5-minute intervals to the PC hard disk.

As the sensors may be positioned very close to the roller surface, the wide 2:1 field of view of the lowest-cost model PB21 gives good results.

Like all infrared temperature sensors, readings can be affected by contamination on the lens, so to help keep the lens clean and ensure maximum accuracy, an air purge collar is used with each sensor. This customer has designed a special mounting to fit the internal thread at the opening of the air purge.

For more information, please contact Calex.

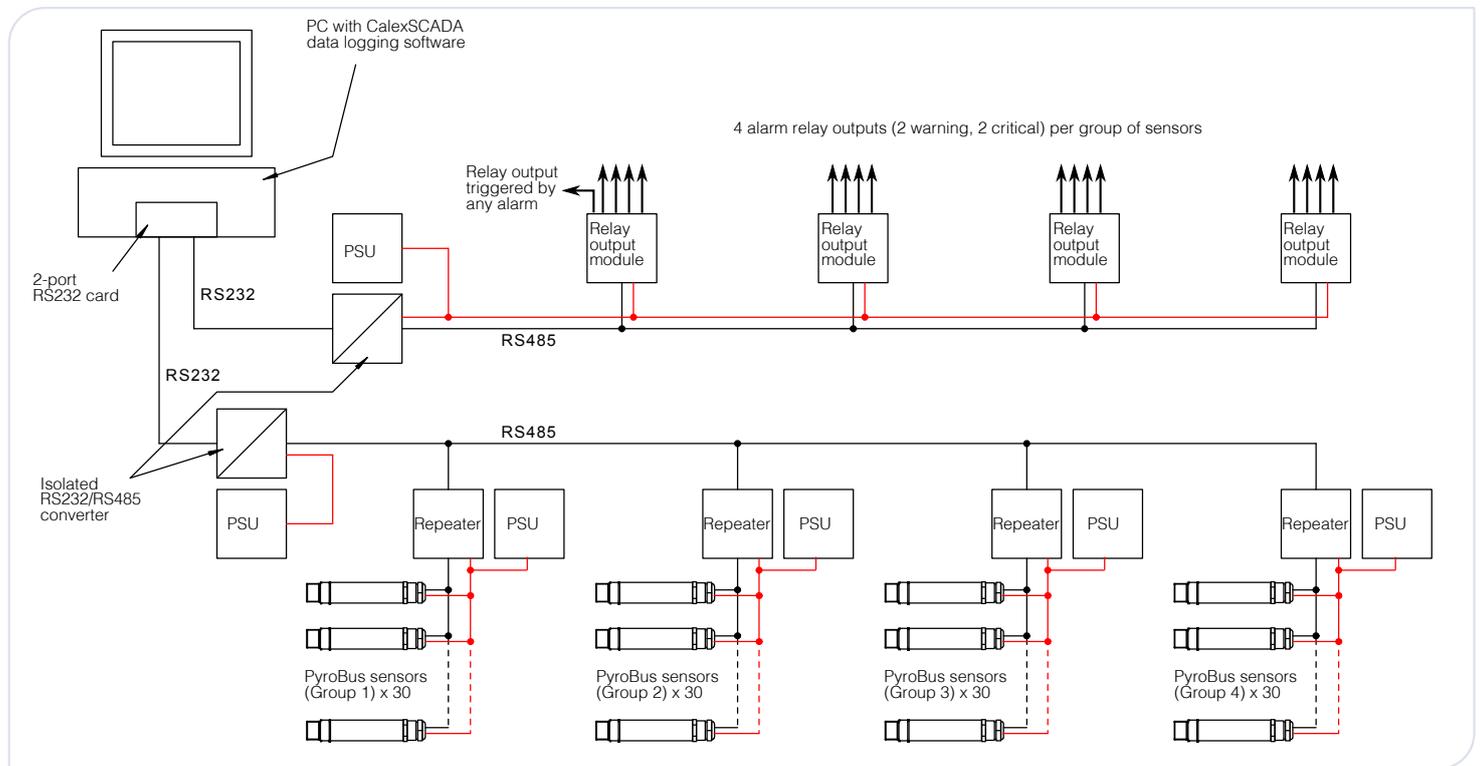


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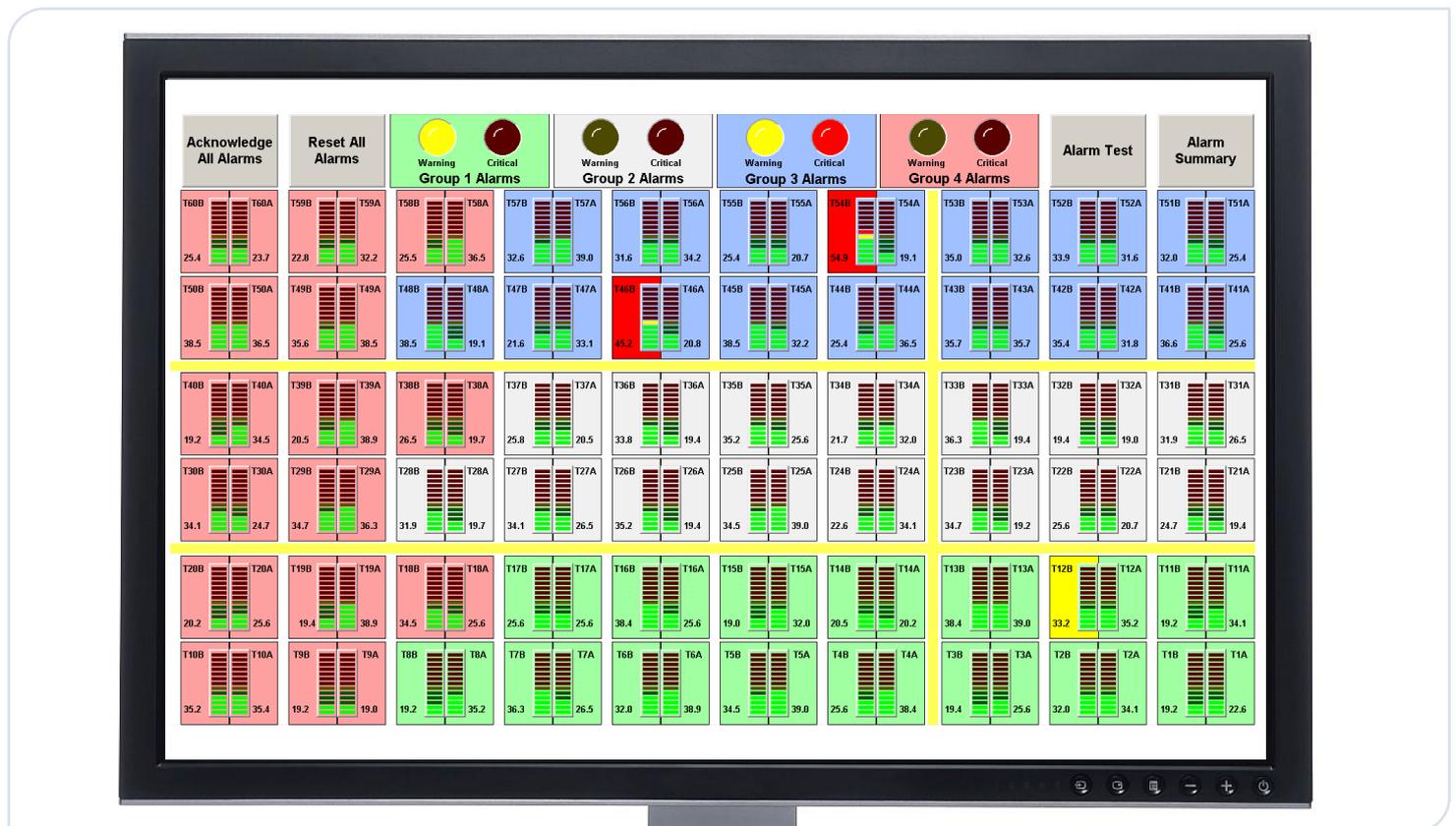
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NETWORK DIAGRAM



SOFTWARE

Screenshot showing the main screen of CalnexSCADA:



MAIN SCREEN FEATURES

- Temperature and alarm indication for all sensors simultaneously
- Sensors displayed in colour-coded groups as per the network layout
- Indication of alarm relay output state
- Acknowledge and reset all alarms
- Access the Alarm Test screen and the Alarm Summary screen
- Click any temperature gauge to access the Sensor Detail screen

ADDITIONAL FEATURES

- Sensor Detail screen (not shown) displaying temperature readings, sensor type, serial number and Modbus address
- Alarm setpoint adjustment for all sensors, per sensor or per group
- Acknowledge and reset alarms per group
- Graphs showing temperature history for the past hour, per sensor
- Data and alarm logging
- Many more features are available. Contact Calnex to discuss your requirements.

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