APPLICATION NOTE

Sensata Technologies

THERMAL MONITORING OF HIGH CURRENT ELECTRICAL CIRCUITS

Background

In electric power distribution, a busbar is a metallic strip or bar, typically housed inside switchgear, panel boards and busway enclosures for local high current power distribution. High current busbars are prone to overheating, due to changes in the material structure from overloading. Above a certain current, the resistive losses exceed the cooling of the busbar, causing a temperature rise of the bus, hence increasing the resistivity, which in turn increases the resistive losses and so on. A so-called thermal runaway occurs that can only be stopped by reducing the current in the circuit.

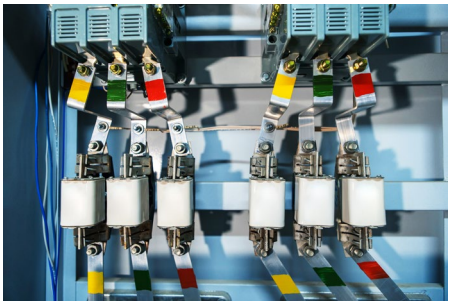
Avoid thermal runaway with continuous temperature monitoring

The same can be said for other bolted electrical connections where high currents can change the resistance at the joint and thus cause a thermal runaway and perhaps a fire. Typical applications include electrical motors, solar panels, etc.

Solution

By implementing temperature sensors on the busbar or at the electrical connection, the temperature can be monitored and any anomalies can be detected. Additionally, including an industrial wireless backend allows the status to be transmitted to a control system or cloud without the need for expensive or complex wiring runs.

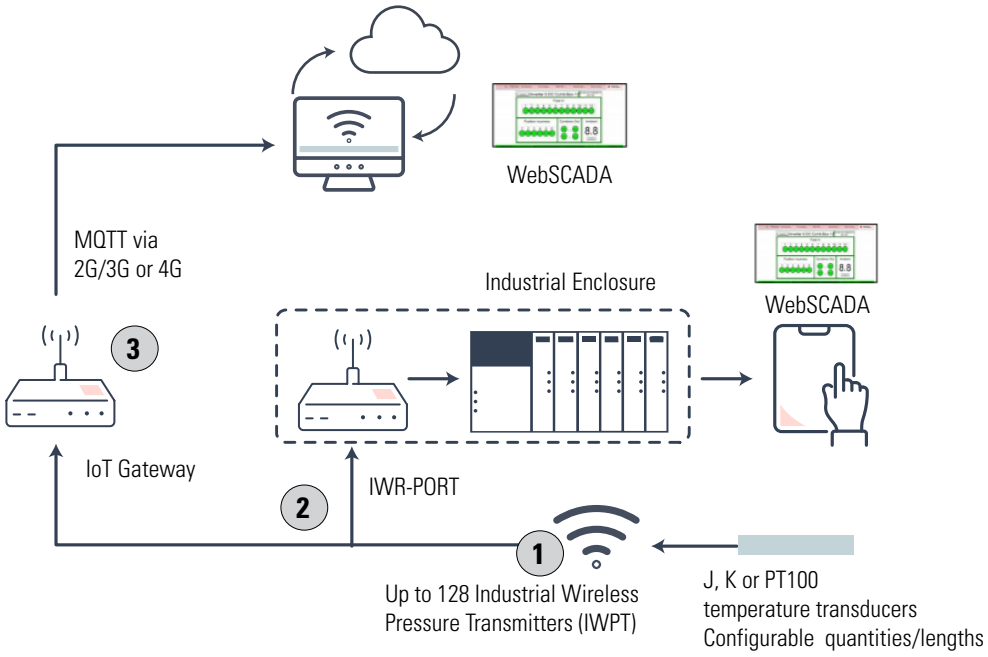
Sensata provides Industrial Wireless Temperature Transmitter (IWTT) Nodes that ingest the temperature sensor status and encrypt the data and transmit it to an Industrial Wireless Receiver via 2.4GHz. There are two receiver options; an IoT Gateway or an IWR-PORT. Both options have the potential to aggregate up to 128 transmitters and provide other I/O options. The IWR-PORT is generally used where there is a need to connect to local automation (such as a PLC). The IoT Gateway is generally used where there is a need to remotely monitor the status and an interest to either send data via cellular transmission to the cloud or via MQTT protocol to an on-premises server.



RECOMMENDED PRODUCTS

Reference on Diagram	Product	Features	Function	Brand
1	 IWTT Node	• Provides clear, reliable transmission of data in environments with obstructions in wireless 2.4 GHz ISM Band. • Utilizes either J or JK type thermocouples or 3-wire RTD sensors.	Industrial Wireless Transmitter	Sensata Technologies
2	 IWR-PORT	• Works seamlessly in any OT architecture • RS-232/485 or Ethernet Communications	Industrial Wireless Transmitter	Sensata Technologies
3	 IoT Gateway	• Sends data via MQTT to on-premises servers or the cloud using the built-in 2G/3G or 4G modem. • RS-232/485 or Ethernet Communications	Industrial Wireless Transmitter	Sensata Technologies

THERMAL MONITORING TOPOLOGY



CONTACT US

EUROPE
+44 (0)1202 897969
c3w_sales@sensata.com
Cynergy3 Components Ltd.
7 Cobham Road,
Ferndown Industrial Estate,
Wimborne, Dorset,
BH21 7PE, United Kingdom

USA
+1 310 561 8092 / +1 866 258 5057
c3w_sales@sensata.com

Rev:05/11/2021