



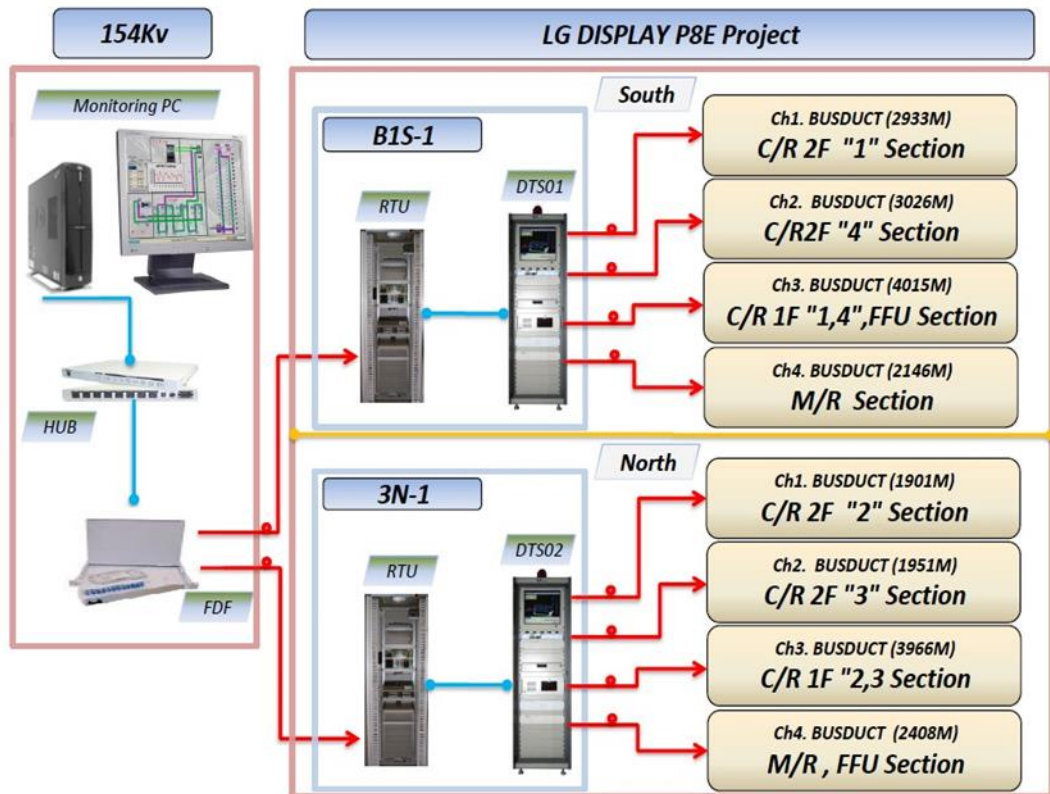
# Bus Duct Monitoring Prevents Major Accident

Paju, Korea

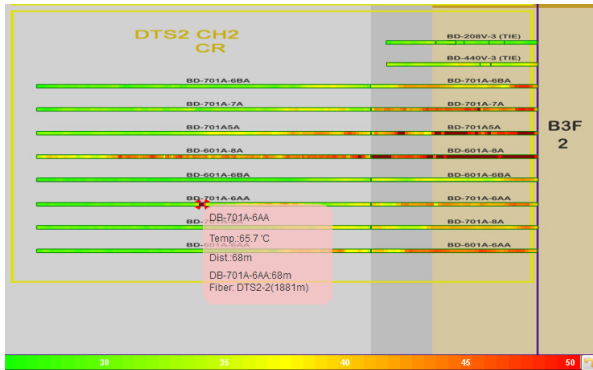
The early detection of a hot spot along a bus duct in a manufacturing cleanroom prevented a major accident that would have resulted in significant equipment loss, downtime, and potentially human injury.

The customer's manufacturing cleanroom, which is used to produce sensitive computer touchscreens, needs to operate around the clock, with typically high standards for air purity, humidity, and temperature. Cleanrooms also need large amounts of energy for their manufacturing and environmental requirements.

Over a period of 2 years, AP Sensing and their local partner installed 8 *Linear Heat Series* DTS units, to monitor over 30 km of high-current bus bars. These bars were installed in the bus duct system running throughout the plant.



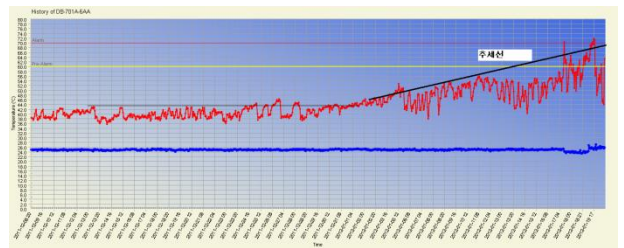
System network overview, showing 2 of the 8 DTS units



Alarm visualization software pinpoints exact hotspot location

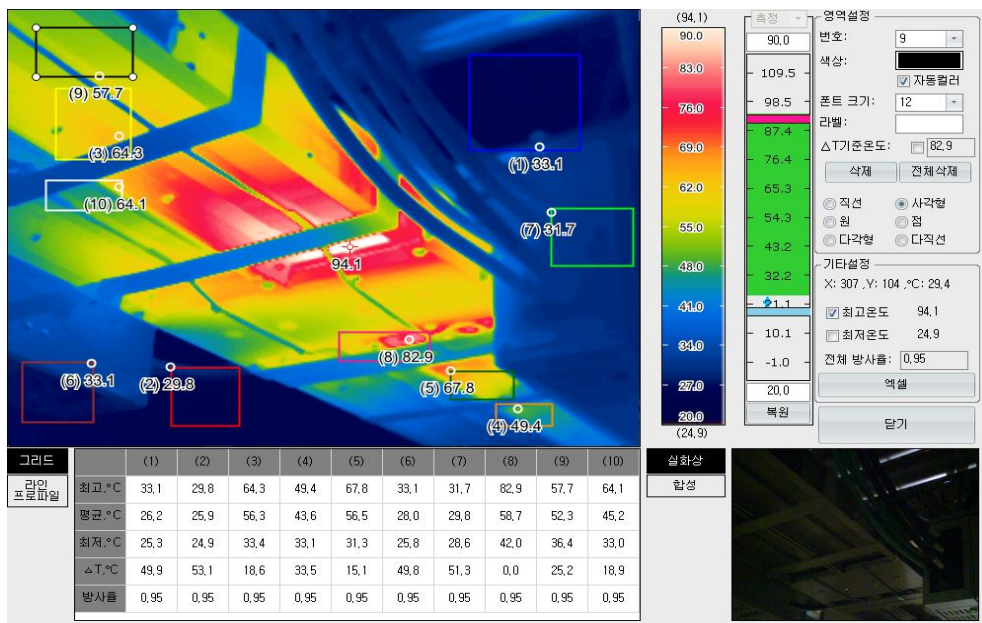
An alarm condition was reached in the cleanroom when the temperature inside the bus duct exceeded the defined maximum for that zone.

The AP Sensing asset visualization software identified the correct line, the temperature (including a history graph), and the precise location along the sensor fiber of the hot spot.



Temperature development over time at the joint

After discovering and locating the hot spot, it was necessary to take corrective action as quickly as possible. A thermal-image camera was used to take a picture of the bus duct at the hot spot location:

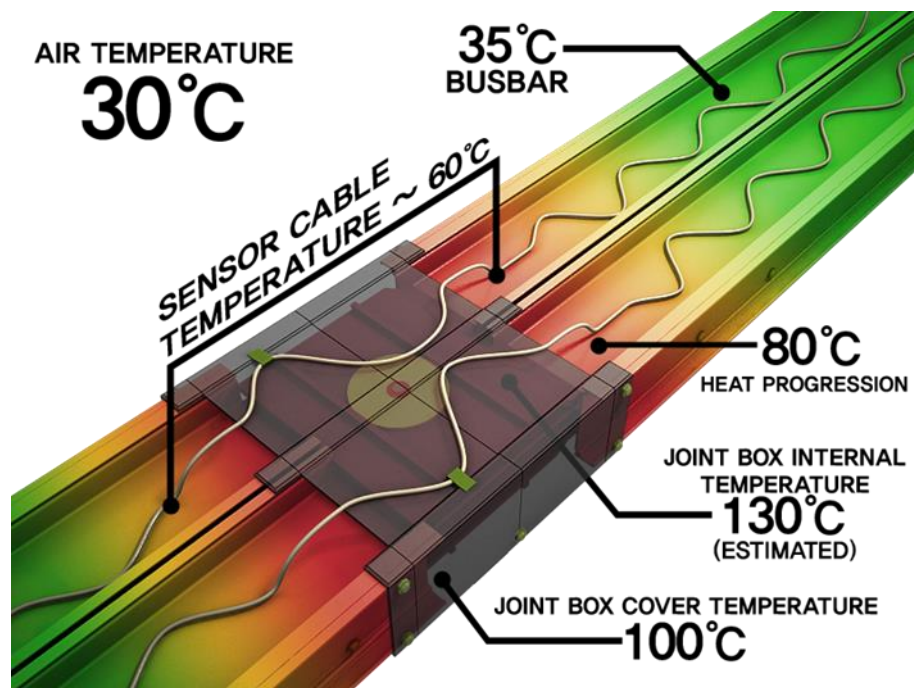


Thermal photograph of the hot spot on the bus duct

A close inspection of the hot spot revealed its cause. The joint box cover on top of the bus duct was not fastened completely. Instead there was a gap of some 5 cm with only air, which resulted in the insulation deteriorating over a span of 12 to 18 months as the temperature continued to slowly rise.

If the overheating had not been detected by the *Linear Heat Series* (or worse, if a worker had come in contact with the weakened hot spot), it is likely that a fire or an explosion would have occurred, causing major damage to the manufacturing line, significant downtime for repairs to the line and the cleanroom, and a high risk of personal injury. It is also likely that the event would have sent a large surge of current through the line, causing additional damage.

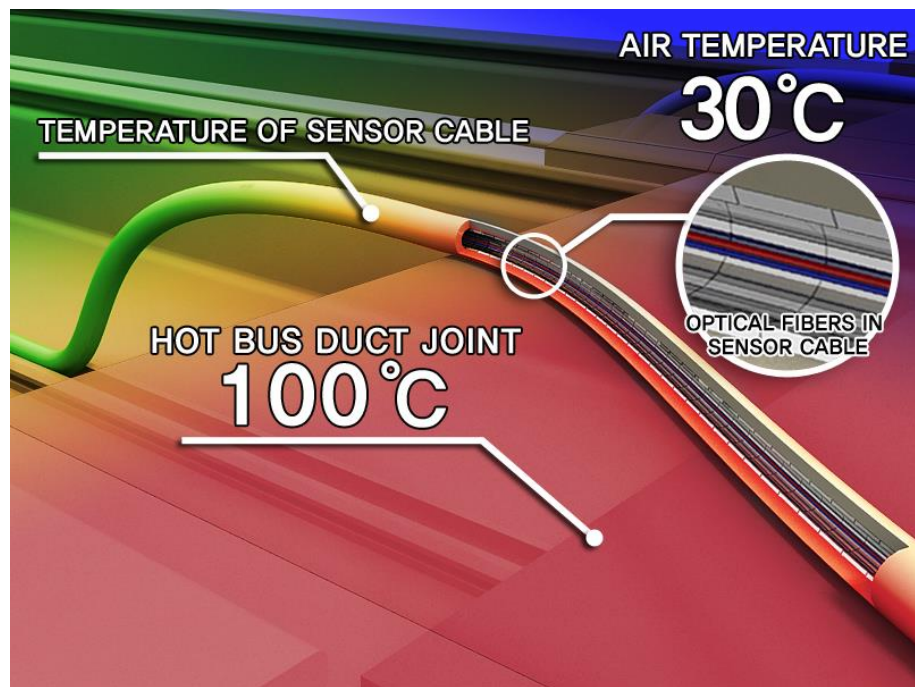
When the customer reviewed the circumstances that nearly led to a major accident, he estimated the potential loss to have been around \$20 million. In addition the significant downtime while producing the touchscreens would have damaged his reputation.



*Temperature distribution*

**Conclusion:**

AP Sensing's *Linear Heat Series* performed exactly as intended. Its DTS technology, based on our unique code-correlation OTDR, combined with the asset visualization software, revealed the developing problem as soon as the alarm condition was met. It identified the precise location of the hot spot so the problem could be identified and repaired without any interruptions to the manufacturing line. Valuable assets were protected and business continuity was maintained.



*Fiber inside the sensor cable clearly detects hot spots at joint*