

Failure Diagnosis of Model HIR Claus Thermal Reactor Pyrometer

Measurement of temperature in the Claus Thermal Reactor is a severe and demanding application. Installed devices must tolerate the high temperatures, thermal shock, corrosion, vibration and shifting refractory. In addition, handling and installation must be done carefully to prevent damage during installation.

I. Diagnostics

- a. **Setup Parameters** – Verify units of measurement.
- b. **Calibration Parameters** – Verify control room equipment settings match Zero & Span parameters.
 - i. Zero parameter is the temperature corresponding to 4.00 mA.
 - ii. Span parameter is the temperature corresponding to 20.00 mA.
- c. **Verify Pyrometer Data**
 - i. Remove Model HIR's lens body, insert Delta Controls Model HIP hand-held pyrometer, and confirm the reading values match. Incorrect readings are generally caused by optical path obstructions in front of the lens.
 - ii. If the readings do not match, then the problem is likely from the lens back to the instrument.
 - iii. If the values match, but are different from what is expected, then consider if the reported temperature is influenced by nearby objects at a different temperature, such as a burner.
- d. **Optical Path Obstruction** – Remove lens body, and look in the aiming tube and verify there is no debris or buildup in the optical path.
- e. **Window Obstruction** – Remove lens body, and look for any debris or build-up on the window.
- f. **Guide Tube** – Remove lens body. Look through the guide tube, and verify it is aimed down the center of the opening into the reactor.
- g. **Fiber Optic Cable and Adapter**
 - i. Verify the fiber optic cable has no short radius bends. Short radius bends can cause light transmission to decrease.
 - ii. Verify the fiber cable is fully seated and tightened in the lens body.
 - iii. Verify the fiber cable is fully seated and tightened in the fiber optic adapter.
 - iv. Replace the fiber optic cable.
 - v. Replace the fiber optic cable adapter.
- h. **Electronics** – Replace the electronics module.