

Case Study



MAJOR GAS TURBINE OEM

AMETEK Power Instruments has the privilege to work with one of the most established gas turbine manufacturers in the world. This manufacturer has over 130 years of experience and provides one-third of all electricity on earth. Touting a combined-cycle efficiency of over 60%, their H-class engines are among the best in the industry.



"These are great intermediate parts that have proven themselves to eliminate the connector LCF issue."
- Senior Engineer, Gas Turbine OEM



PROJECT OVERVIEW

Our customer approached us with the issue of thermocouple failure, high vibration and heat exposure were causing fractures to the support for the thermocouple head. This resulted in their gas turbine engine tripping offline. While developing a new design, we were asked for a secondary improvement related to tip fretting. AMETEK Power Instruments was tasked with developing and manufacturing a new generation of thermocouples for their H-Class engine that could withstand these increased levels of vibration and heat.



CHALLENGE

The gas turbine OEM had a H-class power turbine and needed new thermocouples that could withstand the increased vibration and heat over previous designs. They searched for:

- A partner with extensive knowledge of their turbine requirements to ensure the equipment would perform well within their critical application
- A supplier with design engineering experienced with working on challenging high heat and vibration applications with FEA analysis and test capability
- A proven, high quality manufacturer with the ability to quickly adapt and make changes



SOLUTION

AMETEK Power Instruments and our innovative engineers developed a brand new thermocouple, the 8TR4F series of exhaust gas thermocouple, to meet the customer's needs. With this new design, the thermocouple head was moved away from the engine insertion point to reduce the heat and stress on the connector. The seating bushing was removed and a close tolerance overshoot was used with a fixed placement length used for positioning the tip in the airstream to eliminate the fretting issue. With these two changes, head breakage and tip fretting were eliminated and the engine no longer tripped from thermocouple failures caused from these.



RESULTS

Prior to the assistance of Power Instruments, the gas turbine OEM was experiencing thermocouple failures in as little as 30 days. After the redesigned thermocouples were introduced into the H-class engine, there have been no reported failures of the 8TR4F series of thermocouples to date. These new generation II thermocouples have now been adopted as the new standard in all new and overhauled H-class engines.