

## Technote #06

# Rotor disk tests in vacuum

Large steam and gas turbine rotor disks experience high forces during full-speed operation. In order to assure mechanical reliability under these conditions, they require spin testing. This testing is usually conducted in a large vacuum chamber, to minimize the power required to drive the rotor. However, since the vacuum in the chamber is not absolute, rotor heating does occur during the test. In order to properly assess performance, rotor disk temperature must be established. Standard measurement methods (disk-mounted sensors, using slip rings or telemetry to transmit the data), can be clumsy and expensive. An IRt/c can directly measure the temperature of the rotor under full-speed conditions. With its hermetically-sealed construction,

the IRt/c operates in a vacuum without any requirement for protection. Its thermocouple leads can be connected to a standard thermocouple vacuum connector. Test installation design considerations should include IRt/c body temperature and target emissivity. To ensure that the IRt/c will remain below 100°C (212°F) even with very hot targets, you should use a solid metal mounting arrangement to heat sink the IRt/c body. This is effective since the internal construction is designed to readily conduct away radiated heat. For emissivity considerations, a shiny metal rotor disk should have black painted stripes in the areas of measurement. For best accuracy, the IRt/c read-out device can be calibrated to the precise surface conditions by using a Microscanner D-Series.

