



PYROVIA

TEMPERATURE MEASUREMENT FOR HYDROELECTRIC GENERATORS

HYDROPOWER SOLUTIONS



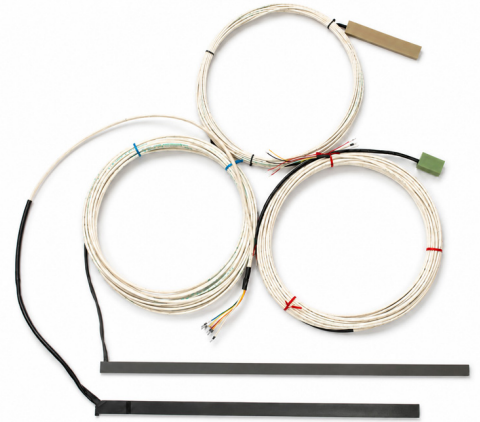
TEMPERATURE SENSORS | CUSTOM COMPONENTS | ENGINEERING SUPPORT

SOLUTIONS FOR HYDROELECTRIC GENERATOR PROJECTS

Pyrovia designs and manufactures a complete range of temperature measurement solutions for hydroelectric generators, including temperature sensors, assemblies and custom components. Our portfolio covers temperature measurement for stator windings, bearings, the stator core, cooling systems and ambient air.

Drawing on experience gained through numerous refurbishment, rewind, replacement and modernization projects, we help customers address the challenges specific to each installation: confined spaces, existing interfaces, special configurations, oil-leakage risk mitigation, and requirements for custom-designed sensors or components.

Combining engineering and CAD support with in-house machining, manufacturing and testing capabilities, Pyrovia develops solutions tailored to each project's technical requirements. From requirements definition through delivery, we work closely with customer teams to reduce risk and facilitate integration into existing installations and new projects.



Complete range of generator temperature sensors

STATOR WINDING RTD SENSORS

Pyrovia stator winding RTD sensors are manufactured to suit each project's geometry, lead-wire routing and installation constraints, ensuring accurate and stable temperature measurement.

DESIGNED FOR MECHANICAL ROBUSTNESS

The monolithic CNC-machined laminate body forms a solid structure with consistent, controlled geometry. It protects the sensing assembly from the compression and handling stresses encountered in hydroelectric generators.

As an option, an alkyd- or epoxy-based coating is applied using an HVLP process. Careful control of the coating and its application provides a uniform thickness and controlled surface resistivity.

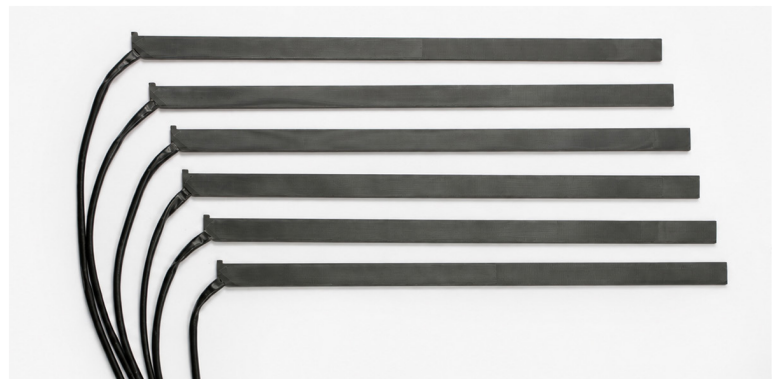
A heavy-gauge bifilar platinum wire sensing element provides reliable temperature measurement. The design of our sensors is supported by extensive mechanical, electrical and thermal reliability testing.

PRODUCT CHARACTERISTICS

- Monolithic CNC-machined laminate body
- Heavy-gauge bifilar platinum wire sensing element
- Class H insulating or semi-conductive laminate configurations
- Geometry, lead-wire lengths and routing tailored to each project
- Extensive mechanical, electrical and thermal reliability testing
- Alkyd- or epoxy-based semi-conductive coating applied using an HVLP process



Application of a semi-conductive coating



Semi-conductive laminate RTD sensors for stator windings

TEMPERATURE SENSORS FOR GENERATORS

Pyrovia offers a range of RTD sensors for temperature monitoring of bearings, the stator core, cooling systems and ambient air. Each sensor can be configured to suit each project's geometry, existing interfaces, mounting requirements, cable routing, electrical insulation and service conditions.

SENSOR FAMILIES

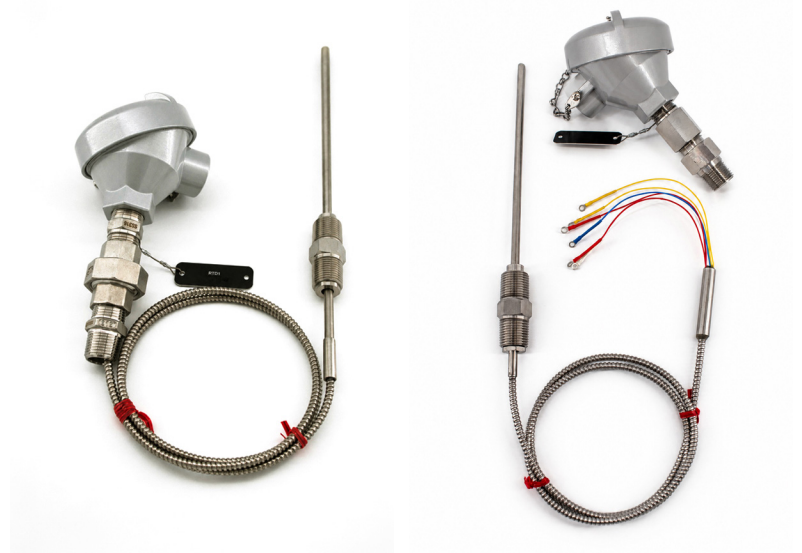
- Oil-tight RTD1, RTD3 and RTD12 models
- Electrically insulated RTD sensors
- Stator core temperature sensors
- Standard Models 350 and 360
- Ambient air temperature sensors

DISTINCTIVE ADVANTAGE

DESIGNED TO ELIMINATE THE RISK OF OIL LEAKAGE

In a hydroelectric generator, oil migration through a sensor or its cable can reach junction boxes and control equipment. The RTD1, RTD3 and RTD12 models incorporate specialized construction features designed to eliminate this risk.

These sensors undergo pressure and leak-tightness testing and are backed by experience gained through numerous installations. Their configurations can be tailored to each project's geometry, mounting requirements and cable routing.



RTD1 — Generator bearing RTD sensor with oil-tight construction

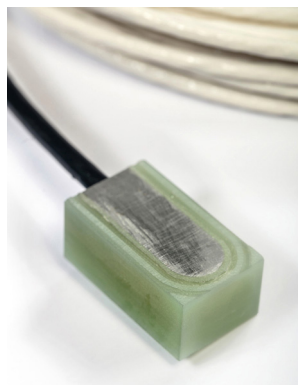
RTD3 — Generator bearing RTD sensor with oil-tight construction and two-part assembly

STATOR CORE RTD SENSORS

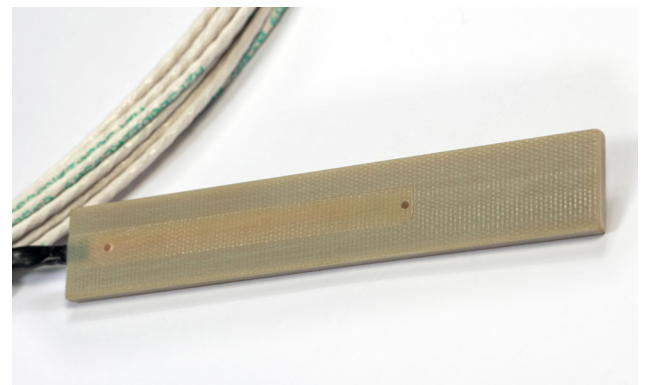
Pyrovia stator core RTD sensors are designed and machined in-house to suit the geometry and installation constraints of each generator. Our engineering, CAD and CNC machining capabilities provide extensive design flexibility, allowing us to produce custom shapes, dimensions and configurations while maintaining control over electrical insulation and lead-wire routing. This approach facilitates precise integration with both existing equipment and new installations.



Stator core RTD sensor — square profile



RTD sensor for surface temperature measurement



Stator core RTD sensor — flat profile

CUSTOM COMPONENTS FOR GENERATORS

Pyrovia develops custom parts and assemblies using customer drawings, generator geometry, existing interfaces and the specific technical constraints of each project.

CAD modeling and drawing-preparation support enable customer teams to verify component fit and integration before the components are released for manufacturing.

TYPICAL SUPPLY ITEMS

- Supports, adapters and interface components
- Feedthroughs, transitions and cable harnesses
- Devices for cable protection and routing
- Project-specific machined or welded parts
- Thermowells and custom-designed sensor assemblies



Captive stator winding RTD sensor with O-ring



Electrically insulated composite stator winding RTD sensor

ADDED VALUE FOR PROJECTS

ENGINEERING AND PROJECT SUPPORT

Existing equipment, confined spaces, incomplete or outdated drawings and non-standard interfaces often require more than an off-the-shelf product.

Pyrovia works with customer teams to define practical, manufacturable solutions that meet the project's technical requirements and constraints.



ENGINEERING AND DESIGN

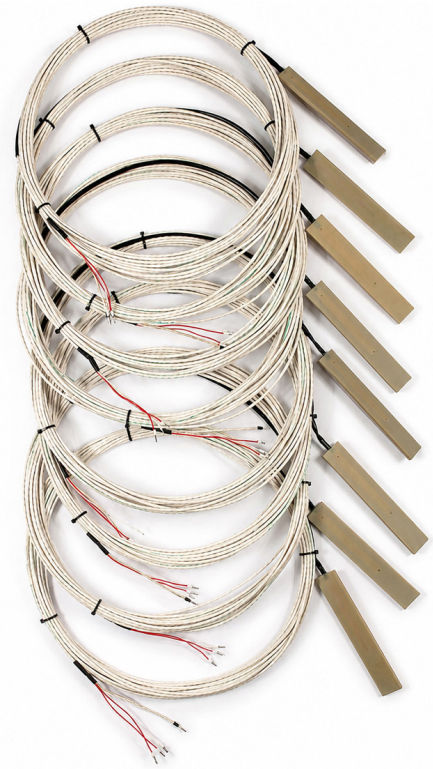
- Analysis of customer requirements and solution development
- Configuration support for replacement, retrofit and modernization projects
- CAD modeling, technical drawings and support with specification development
- Analysis of interfaces and installation constraints
- Technical support for the customer's installation team

IN-HOUSE FABRICATION & VALIDATION

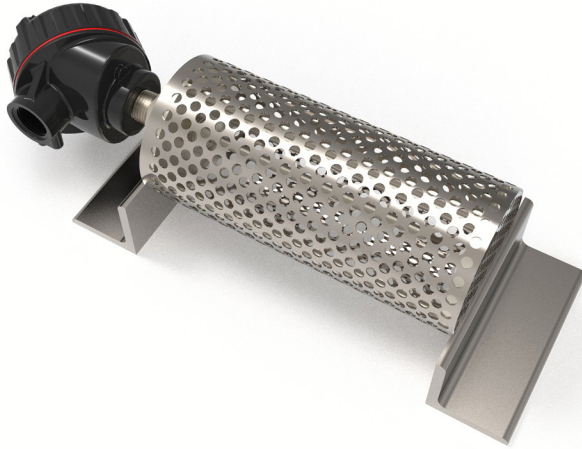
- CNC machining of metals and composite laminates
- Welding and laser microwelding
- Controlled assembly of sensors and components
- Mechanical and electrical product testing
- Technical drawings and project documentation



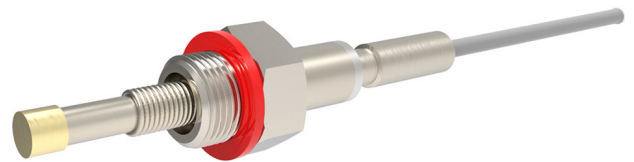
Model 360 RTD sensor assemblies with thermowells



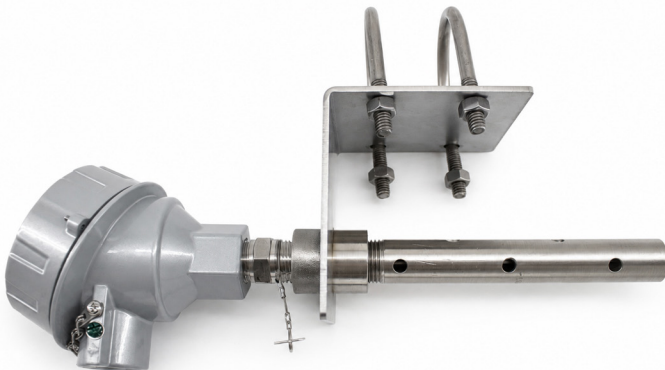
Stator core RTD sensors



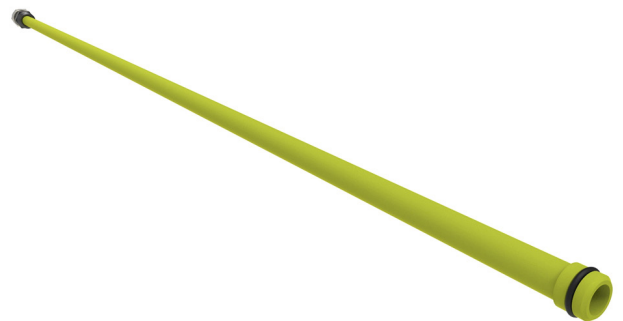
Ambient air RTD sensor assembly for pipe or surface mounting



Fast-response RTD sensor for bearings



Ambient air RTD sensor assembly with protective cage



Composite thermowell with O-ring seals

TALK TO A SPECIALIST

Discuss your hydroelectric generator projects, temperature measurement requirements or project constraints with our engineering team.