

IRIS POWER CAPACITIVE AIR GAP SENSORS

Continuous On-Line Air Gap Monitoring for Hydro Generators

Capacitive Air Gap Sensors measure the distance between the rotor and stator in hydroelectric generators to avoid reduced efficiency or damage caused by off-center or out-of-round conditions.

WHY MONITOR AIR GAP?

In a typical scenario, stator deformation in an aging hydrogenerator can reduce the air gap between the rotor and the stator to critical proportions. The generator would have to be put into an unscheduled shut down, costing thousands of dollars.

Online monitoring of the air gap with Iris Power Capacitive Gap Sensors (CGS) can provide important information about the generator condition as it changes, allowing air gap issues to be identified and corrected before an in-service failure.

AIR GAP MEASUREMENTS

Air gap is the distance between the outside diameter of the rotor and the inside diameter of the stator. Monitoring of air gap in hydro generators is important as both the stator and the rotor can be quite flexible with the shape and location influenced by operating centrifugal forces, thermal effects, magnetic forces and mechanical system failure. Off-center or out-of-round conditions can reduce operating efficiency and lead to damage caused by magnetically induced heating or a rotor-to-stator rub.

CAPACITIVE AIR GAP PROBE

Air Gap Capacitive Probes are specifically designed for the application. The sensor is made from a printed circuit board and affixed to the stator core bore using an application specific epoxy resin. Linear measurement range of the sensors is 2–50 mm.

LINEARIZATION MODULE

The Capacitive Gap Linearization Module converts the sensor output to a common industrial format for collection by a Continuous Monitoring Instrument. The user can select an output that is either 4-20mA or 2-10V proportional to the measured air gap distance.

AIR GAP SENSOR KIT FEATURES

- Output directly proportional to the air gap distance (pole profile)
- Easy to install
- No calibration needed
- High Temperature Stability
- Immune to magnetic fields, dust, oil, EMI, RFI
- The sensor kits include the probes, linearization modules, junction box and installation materials.



Iris Power Capacitive Gap Probe and Linearization Module

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CAPACITIVE AIR GAP SENSOR SPECIFICATIONS

| TYPE | CGS020210 | CGS020310 | CGS020410 |
|---------------------------------------|-------------------------------|------------------|------------------|
| Capacitive Air Gap Probe | CGP-02 | CGP-03 | CGP-04 |
| Measuring Range | 3mm to 15mm | 5mm to 25mm | 10mm to 50mm |
| Recommend Range for Air Gap | 5mm to 12mm | 12mm to 22mm | 22mm to 47mm |
| Maximum Sensor Distance From Core Top | 0.5m | 1m | 1m |
| Sensor Dimension | 135 x 32 x 1.7mm | 230 x 32 x 2.4mm | 250 x 40 x 3.2mm |
| Interface to Module Length | 10m | | |
| Operating Temperature | - 15 °C to 125 °C | | |
| Full Range Accuracy | ±3% | ±3% | ±5% |
| Temperature Drift | <300ppm/ °C | | |
| Linearization Module | CGL Module | | |
| Frequency Response | 0 TO 1000 Hz (-3dB) | | |
| Power Input | +24Vdc, ±10%, 220mA max | | |
| Operating Temperature | -15 °C to 70 °C | | |
| Relevative Humidity | 95% non condensing | | |
| Mechanical Dimensions | 175 x 80 x 60mm with endplate | | |
| Case Protection Class | IP66 | | |