The EQ 2431-A is used for monitoring air gap in large turbogenerators, hydrogenerators and electrical motors for detecting changes in the rotor profile and stator core relative movement. The flat, small size of the sensor makes it easy to install on the stator wall, often without the need to remove rotor poles. The temperature compensated components give excellent accuracy in strong magnetic fields. The sensor is immune to deposits and stator vibrations.

Description

The EQ 2431-A Air Gap Sensor is a high accuracy, high linearity and high stability non-contacting measuring transducer system. Thanks to its very low profile design, the sensor can be mounted on the stator wall of generator and electrical motor having an air gap in the range of 5 to 25 mm. The stator-mounted sensor measures the distance between its surface and a target using the capacitive measuring principle. This novel transducer design entirely eliminates the influences of signal cable.

The transducer system consists of a sensor with integral flexible triaxial cable of 2 meters terminated by a small size coaxial connector. The 2-meter triaxial cable is protected on its entire length by a flexible polyamide conduit plugged to an adapter module terminated by integral three-core shielded cable (8 meters length) with a 4-pole connector. A flexible metallic conduit protects the signal cable for its entire length.

Physical Dimensions

The conditioner provides two types of output as follows: Pole profile and Minimum gap. Current and voltage outputs are provided for signal transmission.
Specifications

**Electrical**

Linear measuring range ........................................ 5 to 25mm (0.2 to 1 in.)

**Outputs**

- **Output voltage – Pole profile:** 2 to 10V
- Sensitivity to distance ........................................... 0.4V/mm
- Tolerance of sensitivity ........................................... ±1% at 15mm
- Output resistance .................................................. <1000Ω
- **Output voltage – Minimum gap:** 2 to 10V
- Sensitivity ................................................................. 0.4V/mm
- Residual ripple .......................................................... Depends on rotor speed
- **Output current – Pole profile or Min. gap:** 4 to 20mA, selectable by jumper
  - Current sensitivity .................................................. 0.8mA/mm
  - Tolerance of sensitivity ............................................. ±1% at 15mm
  - Linearity of outputs
    - 8 to 20mm ............................................................ <2% of reading
    - 5mm and 25mm ...................................................... <5% of reading
- Temp. coefficient of sensitivity .................................. <300 ppm/°C at 15mm
- Temp. coefficient at zero .......................................... <300 ppm/°C at 15mm
- Output noise (peak) .................................................. <1% of reading
- Typical frequency response ....................................... (-3dB) 1kHz
- Interchangeability tolerance ..................................... Max. ±5% of full scale

**Environmental**

- **Temperature range**
  - **Operation**
    - Sensor .......... -15°C to +125°C (+5 to +259°F)
    - Conditioner .... -15°C to +55°C (+5 to +131°F)
  - **Non destructive**
    - Sensor .......... -40°C to +150°C (-40 to +302°F)
    - Conditioner .... -20°C to +70°C (-5 to +212°F)
- Humidity .......................................................... Resistant to 95% RH
- Vibration .......................................................... IEC 68.2.27 standard, 5g peak, 10Hz to 150Hz
- Shock .............................................................. IEC 68 2.27 standard, 15g peak, 11ms
- EMC ............................................................... Probe withstands 1.5Tesla in a 50 or 60Hz magnetic field
- Fluid compatibility ................................................ Withstand contact with water, oil, solvents, acids without degradation

**Mechanical**

- **Sensor dimensions** ................................................ 32 W x 220.5 L x 2.1 D mm – 3.5mm at cable entry
- **Sensor** .............................................................. Cable permanently connected to 2m triaxial cable terminated with a 5mm diameter coaxial connector to plug to adapter module. Delivered with polyamid flexible conduit.
- **Adapter module** .................................................. Sensor input via coaxial connector and output via shielded three-core cable of 8m terminated with a 4-pole connector diameter 11.5mm. Delivered with 8 meters metallic flexible conduit.
- **Conditioner module** ............................................. Silver painted, color RAL 7001, aluminum case AlSi12
  - 65 W x 172 L x 43 H mm including 3mm anodized mounting plate, stuffing gland and 4-pole input connector
- **Case protection class** ........................................... IP66, EN60529

**Power**

- **Voltage** .......................................................... +24VDC nominal, ±10%
- **Current consumption** .......................................... Approx. 125mA

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