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WHEN MEASUREMENTS MATTER

0871LH1
Freezing Rain Sensor

Warns of Ice Danger

Protects roads, power lines, aircraft, wind turbines

Overview

The 0871LH1 Freezing Rain Sensor detects the presence of icing conditions so that appropriate actions can be taken to prevent damage to power and communication lines, to warn of road hazards, or to keep ice off of wind turbine blades or a plane's wings.

Technical Description

Model 0871LH1 is a small, low power sensor designed specifically for light ground based freezing rain conditions. Compared to our other freezing rain sensors that are used in moderate and severe icing environments, this design has been simplified with a low-cost non-heated strut. Only the ice detection probe has deicing capability.

To detect the presence of an icing condition, the ice detection probe vibrates ultrasonically at a nominal resonant frequency of 40 kHz. As ice accretes on the probe, the added mass causes the resonant frequency to decrease. When a frequency decrease equivalent to 0.50 mm ice thickness is detected, the ice signals (RS-422 and discrete outputs) are activated for a period of 60 seconds and the ice detector initiates a self-deicing cycle that removes all accumulated ice from the probe. If another icing encounter is detected within that 50 second period, the annunciator timer is reset to zero and the ice signals remain activated for an additional 60 seconds.

The 0871LH1 should be mounted at a slight inclination angle of 20 to 30 degrees into the prevailing wind. This will allow for the proper drainage of water at the base of the sensor.

Benefits and Features

› Designed specifically for ground-based freezing rain sensing
› RS-422 and discrete output signals
› Simple design with a low-cost non-heated strut
› Small size, weighs less than 500 g
› Non-deiced strut lowers power consumption
› Commanded and continuous built-in test (BIT)
› Manufactured by Goodrich Sensor Systems

› Can be used to help prevent damage to power lines, and to warn of icy road hazards, ice on planes' wings, and ice on wind turbine blades
› Automatically defrosts itself when ice accumulation reaches a 0.5 mm layer of ice

Wind Energy Applications

The 0871LH1 can detect ice on a wind turbine's blade, which is undesirable because:

❱ The blade can throw large chunks of ice a considerable distance - an extremely dangerous, potentially lethal situation.

❱ Formation of ice can cause unbalanced loading on the turbine's blades, bearings, and gear box.

❱ Ice reduces the turbine's power output.

The 0871LH1 can be used for wind prospecting applications by helping predict the amount of time a potential wind power site may be out of commission due to icing conditions. Additionally, the sensor lets users know when ice is preventing their wind sensors from providing data.

Specifications

❱ Set Point: Ice signal activates when probe ice thickness exceeds 0.5 mm (0.02 in) ± 0.13 mm (0.006 in)

❱ Output Format: RS-422 output operates at 9600 bps

❱ Operating Voltage: 18 to 29.5 Vdc

❱ Power Draw

Sensing Mode: 5 W maximum at 24 Vdc

De-icing Mode: 27 W maximum at 24 Vdc

❱ Temperature Range

Operating:–55° to +71°C

Storage: –65° to +90°C

❱ Random Vibration: 7.9 grms (DO-160C, Category E)

❱ Shock: DO-160C

Weight: 0.3 kg (0.7 lb)

❱ Base Diameter: 7.32 cm (2.88 in)

❱ Base Height: 3.81 cm (1.5 in)

❱ Plate Size: 7.37 x 7.37 x 0.22 cm (2.9 x 2.9 x 0.085 in)

❱ Strut Diameter: 3.10 cm (1.22 in)

❱ Strut Height: 2.54 cm (1.0 in)

❱ Rod Diameter: 0.64 cm (0.25 in)

❱ Rod Height: 2.54 cm (1.0 in)

Operating Modes

❱ Sensing: Operating with no ice or with probe ice thickness below the set point

❱ De-icing: Operating with probe ice thickness exceeding the set point

Discrete Output Signals

❱ Ice Signal

No Icing: Open

Icing Detected: Ground

❱ Status Signal

Operating Correctly: Ground

Failure Detected: Open

RS-422 Output Signals

❱ Ice Signal

1 = Ice

0 = No Ice

❱ Fail State:

1 = Fail

0 = No Fail (OK)

Built-In-Test (BIT)

❱ Commanded: Performed at initial power-up. If a failure is detected and verified, the ice detector stops detecting and annunciating icing conditions; the heaters are disabled; and a failure is annunciated.

❱ Continuous: Hardware and software BIT verifies that internal electronics are functioning properly.

Electrical Connectors

❱ Mechanical: MS27474T10B199PN

❱ Mating: MS27474T10B199SN

Ordering Information

Freezing Rain Sensor

008262	0871LH1 **-** Freezing rain sensor (no cables)

Common Accessories

008263	0871LH1 Sensor Cable with user-specified cable length
010502	0871LH1 Mounting Kit
010501	0871LH1 Sensor with 24V Power Supply Kit and 3 m cable
010501-005	0871LH1 Sensor with 24V Power Supply Kit and 5 m cable