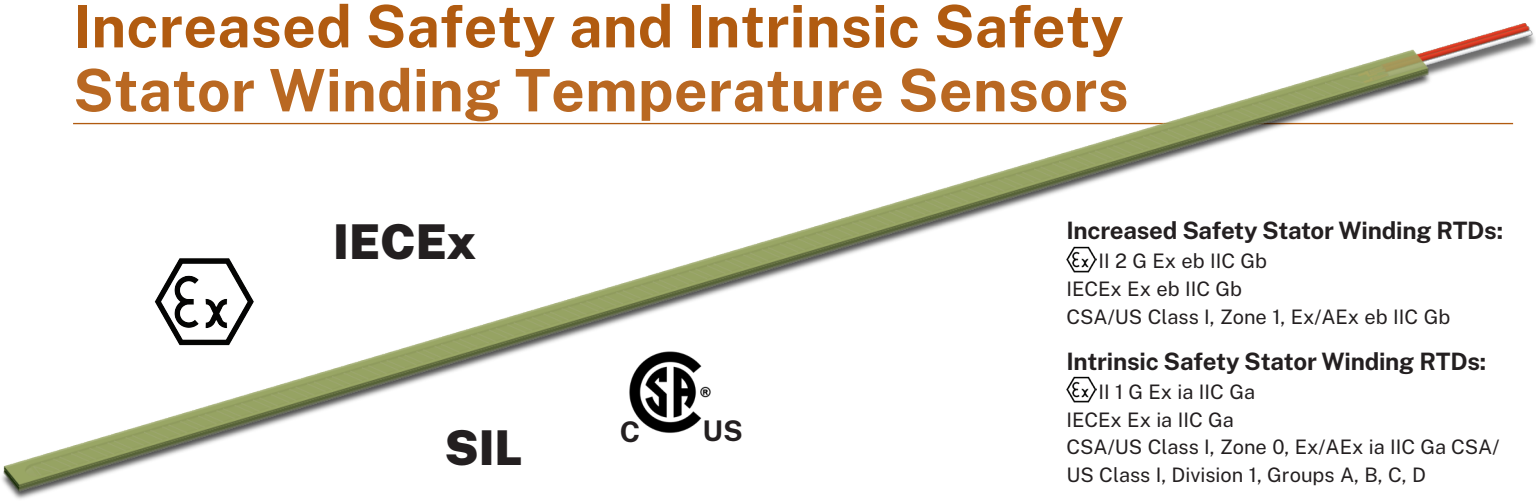
Increased Safety and Intrinsic Safety Stator Winding Temperature Sensors



Increased Safety Stator Winding RTDs:
Ex II 2 G Ex eb IIC Gb
IECEx Ex eb IIC Gb
CSA/US Class I, Zone 1, Ex/AEx eb IIC Gb

Intrinsic Safety Stator Winding RTDs:
Ex II 1 G Ex ia IIC Ga
IECEx Ex ia IIC Ga
CSA/US Class I, Zone 0, Ex/AEx ia IIC Ga CSA/US Class I, Division 1, Groups A, B, C, D

Overview

Insert these thin, laminated RTDs in stator winding slots to detect high temperatures before insulation damage occurs. RTD temperature sensors continuously monitor conditions and provide the long term trend data that is necessary for making adjustments before unexpected alarms occur. These models are designed for use in hazardous areas, where there may be a presence of flammable gas under normal operating conditions. Strict construction guidelines prevent arcing.

Agency Certifications

Tri-certified to satisfy European (EN), International (IEC), and North American (U.S. and Canada) standards for electrical apparatus in potentially explosive atmospheres (Ex):

- ATEX Directive 2014/34/EU
- EN/IEC/UL/CSA 60079-0: Equipment - General requirements
- EN/IEC/UL/CSA 60079-7: Equipment protection by increased safety “e”
- EN/IEC/UL/CSA 60079-11: Equipment protection by intrinsic safety “i”
- National and Canadian Electrical Codes as Class I, Division 1, Groups ABCD intrinsic safety “ia”
- EN 50495: Safety devices required for the safe functioning of equipment with respect to explosion risks, SIL capable up to a safety level of SIL2 or SIL3

Specifications

Temperature limit: -50 to 180°C (-58 to 356°F), class H.

Body material: High temperature epoxy glass.

Leadwires: 2, 3, or 4 leads, stranded copper, AWG #22 (0.35 mm^2, with TFE or polyimide insulation).

Dielectric strength: 3,200 VRMS at 60 Hz, 1 mA maximum leakage current, tested momentarily (1–5 seconds), between the leads and external flat body surface.

Two Sensing Options

Choose between wire-wound or thin-film sensing elements:

- Wire-wound elements are the standard for use in stator winding temperature sensors since the temperature sensitive length extends nearly the entire sensor body length. This greatly increases the probability of detecting a localized hot spot within the motor or generator. In addition, Minco’s proprietary element winding designs provide protection against electrical noise which can decrease sensor accuracy.
- Thin-film elements are effectively point sensors, with a temperature sensitive length of approximately 0.1”. A hot spot located merely inches away from the thin-film element could delay detection, or worse – remain completely undetected. Thin-film elements are generally not recommended for stator sensors longer than 4”, but are required for stator sensors under 2” long. These short sensors are also appropriate for installation within the motor/generator winding’s end turns. Minco Thermal Ribbons and Thermal Tabs are also used for end turn installation.

Specification and Order Options

Customize the sensor to best fit application needs

S1xx Example of Model Number

S1	Base Model Number
1	**Number of sensing elements:** 1 = 1 wire-wound element (single) – Not available with PF element. 2 = 2 wire-wound elements (dual) – Not available with PF element. 3 = 1 thin-film elements (single) – Not available with CA or NA element. 4 = 2 thin-film elements (dual) – Not available with CA or NA element.
0	**Thickness T:** 0 = .079” 1 = .098” 2 = .118” 3 = .138” 4 = .157” 5 = .050” Note: Thicknesses 0-4 are supplied with AWG 22 leadwires, thickness 5 is supplied with AWG 26 leadwires.
PD	**Sensing element** *(from RTD Sensing Element Table)*
100	**Body length L in .1” increments (100 = 10.0”)** MIN L = 20 (2.0”) (S11_, or S12_ models) MIN L = 7 (0.7”) (S13_ or S14_ models) MAX L = 232 (23.2”)
T	**Lead insulation:** T = PTFE K = Polyimide (only available in N leadwire configuration)
344	**Body width W in .001” increments (344 = .344”)** MIN W = 219 (.219”) (S11_or S13_; 2 or 3 leads) MIN W = 320 (.320”) (S11_or S13_; 4 leads) MIN W = 425 (.425”) (S12_ or S14_) MAX W = 956 (.956”)
Z	**Number of leads and lead color:** Single Element Y = 2 leads, RW Z = 3 leads, RWW (Minco U.S. lead colors) W = 3 leads, WRR (IEC 60751 lead colors) X = 4 leads, RRWW Dual Element Y = 2 leads per element, RW/BlY (Minco U.S. lead colors) V = 2 leads per element, WR/YBk (IEC 60751 lead colors) Z = 3 leads per element, RWW/BlYY (Minco U.S. lead colors) W = 3 leads per element, WRR/YBkBk (IEC 60751 lead colors)
360	**Lead length B in inches**
B	**Leadwire configuration/covering:** N = Straight leads, insulated with no covering T = Twisted leads, insulated with no covering F = FEP jacket over leads S = Stainless steel braid over leads R = FEP jacket over stainless steel braid B = FEP jacket over silver plated copper braid with drainwire E = FEP jacket over silver plated copper braid and drainwire with elastomer fill
10	**Cable jacket and/or braid removal length C in .1” increments (10 = 1.0”)** (Specify “0” for N and T options) otherwise, MIN C = 5 (.5”)

S110PD100T344Z360B10 = Sample part number

Calibration data (resistance measurements) may also be ordered. Contact Minco sales team for details.

RTD Sensing Element

Code	Element	TCR Ω/Ω/°C
CA	Copper, 10 Ω ±0.2% (10.02/9.98) at 25°C	0.00427
NA	Nickel, 120 Ω ±0.5% (120.60/119.40) at 0°C	0.00672
PA	Platinum, 100 Ω ±0.50% (100.50/99.50) at 0°C	0.00392
PD	Platinum, 100 Ω ±0.12% (100.12/99.98) at 0°C (Meets EN60751, Class B)	0.00385
PE	Platinum, 100 Ω ±0.50% (100.50/99.50) at 0°C	0.00385
PF	Platinum, 1000 Ω ±0.12% (1001.2/998.8) at 0°C (Meets EN60751, Class B)	0.00385
PM	Platinum, 100 Ω ±0.06% (100.06/99.94) at 0°C (Meets EN60751, Class A)	0.00385

Certifications

Minco’s S1xx series sensors are certified by multiple agencies. Consult the following list to learn more:

IECEx (IEC 60079):
Ex ia IIC Ga
Ex eb IIC Gb

ATEX (EN 60079):
II 1 G Ex ia IIC Ga
II 2 G Ex eb IIC Gb

CSA Canada (CSA C22.2):
Ex ia IIC Ga
Ex eb IIC Gb
IS Cl I, Div 1, Grp ABCD

CSA US (NFPA 70 Articles 500 & 505):
Cl I, Zone 0 AEx ia IIC Ga Cl I, Zone 1, AEx eb IIC Gb IS Cl 1, Div 1, Grp ABCD

SIL

IECEx