Hazardous Area Embedment Sensors

Overview

Install miniature sensors in or beneath the babbitt layer of bearing shoes. They monitor metal temperature—the most reliable indicator of bearing condition—to give early warning of oil film breakdown. With predictive maintenance, machines can be shut down and the problem corrected before catastrophic failure occurs.

While no larger than many bare ceramic elements, these RTDs have metal cases and insulated leads to withstand rough handling and harsh environments. They are easy to install in drilled holes for general purpose sensing.

Agency Certifications

Certified for use in hazardous areas to IECEx, ATEX, North America (CSAc-us), KCs (Korea), PESO (India), and CCC (China) requirements. These wide-ranging certifications allow users to cover many potential certification requirements with one sensor product, thus increasing flexibility and reducing inventory. For more information see the Certifications box to the right.

Specifications

Temperature range: -60°C to 200°C (-76°F to 392°F),

Reducing to 180°C (356°F) for FEP jacket on cable options;
Reducing to 125°C (257°F) for elastomer filled cable options;
Reducing to -20°C to 149°C (-4°F to 300°F) for feedthrough options.

Babbitt tip: Factory applied babbitt tip, available on case style A, reduces the danger of overheating the sensor when installed in babbitt layer.

Time constant: 3.0 seconds (case style A) to 1.5 seconds (case style D), typical value in moving water.

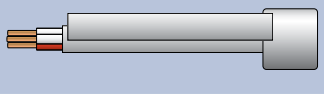
Insulation resistance: 10 megohms min. at 100 VDC, leads to case and to stainless steel braid and feedthrough cases when specified.

Dielectric strength: 600 Volts RMS at 60 Hz for 2 seconds with a maximum leakage of 5mA, leads to case and to stainless steel braid and feedthrough cases when specified.

Lead wire colors can be specified in part number make up per IEC 60751 or Minco standard lead wire conventions.

Special options: Calibration data and tagging options are also available; contact Minco for details.

Case Styles

Case	Specifications
	**Case Style A** Case L: 0.250" (6.4 mm) Case Ø: 0.275" (7.0 mm)
	**Case Style B** Case L: 0.250" (6.4 mm) Case Ø: 0.188" (4.8 mm) Flange Ø: 0.250" (6.4 mm)
	**Case Style B Short** Case L: 0.188" (4.8 mm) Case Ø: 0.188" (4.8 mm) Flange Ø: 0.250" (6.4 mm)
	**Case Style C** Case L: 0.300" (7.6 mm) Case Ø: 0.125" (3.2 mm)
	**Case Style D** Case L: 0.300" (7.6 mm) Case Ø: 0.080" (2.0 mm)

Certifications

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

SIL2 IEC 61508-2:2010

ATEX (EN 60079):
II 1 G Ex ia IIC Ga
II 2 G Ex eb IIC Gb
II 3 G Ex ic ec IIC Gc

CSA Canada (CSA C22.2): Ex ia IIC T6...T2 Ga
Ex eb IIC T6...T2 Gb
Ex ic ec IIC T6...T2 Gc
IS Cl I, Div 1, Grp ABCD T6... T2
Cl I, Div 2, Grp ABCD T6... T2

CSA US (NFPA 70 Art 500 & 505):
Cl I, Zone 0 AEx ia IIC T6... T2 Ga
Cl I, Zone 1, AEx eb IIC T6...T2 Gb
Cl I, Zone 2, AEx ic ec IIC T6...T2 Gc
IS Cl 1, Div 1, Grp ABCD T6...T2
Cl 1, Div 2, Grp ABCD T6...T2

Korea (KOSHA Art. 84/Art. 110):
Ex ia IIC Ga
Ex eb IIC Gb
Ex IC ec IIC Gc

China (GB/T 3836):
Ex ia IIC Ga
Ex eb IIC Gb
Ex ic ec IIC Gc

India (Petroleum Rules 2002):
Ex ia IIC Ga
Ex eb IIC Gb
Ex ic ec IIC Gc

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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
NB	Nickel, 100 Ω ±0.22% (100.22/99.78) at 0°C (Meets Din 43760)	0.00618
PA	Platinum, 100 Ω ±0.36% (100.36/99.64) 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 ±0.36% (100.36/99.64) 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

	Feedthrough Options
C	Feedthrough designator
36	Feedthrough distance from sensor case in inches
J	Feedthrough diameter code: H = .188" DIA (same as AC958) J = .215" DIA (same as AC717) M = .250" DIA (same as AC718) N = .375" DIA (same as AC961)
40	Feedthrough length in .1" increments (40 = 4.0") (Standard lengths: 20, 25, 30, 35, 40, 45)
Sample part number: S711PDZS72A1C36J40	

Specifications and Options — RTD

S7	Model number
1	Number of RTD sensing elements: 1 = 1 sensing element (single) 2 = 2 sensing elements (dual) — no duals available in Case Style D, NA and NB duals also not available in Case Style C, CA dual only available in Case Style A
1	Case: 0 = Case Style A, copper alloy, tin plated 1 = Case Style B, copper alloy, tin plated 2 = Case Style C, copper alloy, nickel plated 3 = Case Style Short B, copper alloy, tin plated 4 = Case Style D, type 303 stainless steel
PD	RTD sensing element: CA, NA, NB, PA, PD, PE, PM or PF (from table on this page)
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) X = 4 leads per element, RRWW/BlBlYY) (Minco U.S. lead colors) - only Case Style B U = 4 leads per element, WWRR/YYBkBk (IEC 60751 lead colors) - only Case Style B
S	Leadwire configuration/covering: T = PTFE insulated leads only (no covering) F = FEP jacket over PTFE insulated leads S = Stainless steel braid over PTFE insulated leads R = FEP jacket over stainless steel braid and PTFE insulated leads E = FEP jacket over stainless steel braid and PTFE insulated leads, with elastomer fill (max fill length 144")
72	Lead length in inches
A1	Optiontional Installation/Accessories - skip for Case Styles C and D A1 = AC171 spring/AC172 series ring - Case Style B only A2 = AC171 spring/AC1038 rings (Qty of 2) - Case Style B only A3 = AC171 spring/AC915-1 ring - Case Style B only A4 = AC672 spring/AC172 series ring - Case style Short B only A5 = AC672 spring/AC1038 ring (Qty of 2) - Case style Short B only A6 = AC672 spring/AC915-1 ring - Case Style Short B only B0 = No babbitt or no accessory - Case Style A B0 = No accessory or feedthrough - Case Styles B and Short B B1 = Babbitt layer applied to case tip, .100" MIN - Case Style A only
TO ORDER WITHOUT FEEDTHROUGH STOP HERE TO ORDER WITH FEEDTHROUGH CONTINUE IN NEXT COLUMN	

**Lead wire color code: R = red, W - white, Bl = blue, Y = yellow, Bk = black*

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	Feedthrough Options
C	Feedthrough designator
36	Feedthrough distance from sensor case in inches
H	Feedthrough diameter code: H = .188" DIA (same as AC958) J = .215" DIA (same as AC717) M = .250" DIA (same as AC718) N = .375" DIA (same as AC961)
40	Feedthrough length in .1" increments (40 = 4.0") (Standard lengths: 20, 25, 30, 35, 40, 45)
Sample part number: TC711KUS120A1C36H40	

Leadwire size (AWG)

Case style	Number of leadwires				
	2	3	4	6	8
RTD					
A	24	24	24	24	x
B	24	24	28	28	28
Short B	24	26	28	30	x
C	24	26	30	30	x
D	30	30	34	x	x
Thermocouple					
A, B, C	24	x	24	x	x
Short B	24	x	24	x	x
D	30	x	x	x	x

Specifications and Options — Thermocouple

TC7	Specification	
1	Number of sensing elements: 1 = 1 sensing element (single) 2 = 2 sensing elements (dual) in one cable 3 = 2 sensing elements (dual) in two cables	
1	Case: 0 = Case Style A, copper alloy, tin plated 1 = Case Style B, copper alloy, tin plated 2 = Case Style C, copper alloy, nickel plated 3 = Case Style Short B, copper alloy, tin plated 4 = Case Style D, copper alloy, tin plated	
K	Junction type: E = Chromel-Constantan J = Iron-Constantan	K = Chromel-Alumel T = Copper-Constantan
U	Thermocouple junctions: U = Ungrounded (insulated from case) G = Grounded (fused internally to case)	
S	Leadwire covering: T = TFE insulated leads (wrapped and fused) F = FEP jacket over TFE insulated leads S = Stainless steel braid over TFE insulated leads R = FEP jacket over stainless steel braid and TFE insulated leads E = FEP jacket over stainless steel braid and TFE insulated leads, with elastomer fill (max fill length 144")	
120	Leadwire length	
A1	Optional Installation/Accessories — leave blank for Case Styes C and D: A1 = AC171 spring/AC172 series ring - Case Style B only A2 = AC171 spring/AC1038 rings (Qty of 2) - Case Style B only A3 = AC171 spring/AC915-1 ring - Case Style B only A4 = AC672 spring/AC172 series ring - Case Style Short B only A5 = AC672 spring/AC1038 ring (Qty of 2) - Case Style Short B only A6 = AC672 spring/AC915-1 ring - Case Style Short B only B0 = No babbitt, no accessory - Case Style A only B0 = No accessory or feedthrough - Case Styles B or Short B only B1 = Babbitt layer applied to case tip, .100" MIN - Case Style A only	
TO ORDER WITHOUT FEEDTHROUGH STROP HERE TO ORDER WITH FEEDTHROUGH CONTINUE IN NEXT COLUMN		