Embedment RTDs

Element	TCR Ω/Ω/°C	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 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)	
		Single	Dual	Single	Dual	Single	Dual	Single	Dual
Platinum, 100 Ω ±0.36% at 0°C	.00392	S325PA, S11636PA*	S4026PA	S331PA	S7792PA	S341PA	S14320PA	S12414PA	
Platinum, 100 Ω ±0.12% at 0°C (Meets EN60751, Class B)	.00385	S304PD	S309PD	S306PD	S14405PD	S308PD	S14455PD	S13282PD	
Platinum, 100 Ω ±0.36% at 0°C	.00385	S7304PE	S305PE	S7746PE	S307PE	S7908PE	S14456PE	S13282PE	
Platinum, 1000 Ω ±0.12% at 0°C	.00385	S101907PF	S101911PF	S101908PF	S101912PF	S101909PF	S101913PF	S101910PF	
Copper, 10 Ω ±0.2% at 25°C	.00427	S324CA	S4026CA	S332CA		S342CA			
Nickel, 120 Ω ±0.5% at 0°C	.00672	S326NA, S11636NA*	S4026NA	S330NA	S7792NA	S340NA			

**MIL-T-24388C qualified models*

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. Machines can then 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.

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Case: Tin plated copper alloy. Models S12414, S13282 and S101910: Stainless steel.

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

Leads: Stranded copper with PTFE insulation; stainless steel overbraid optional (one sleeve covers all leads). Polyimide insulation available on selected models (See specification and order options).

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.

Leadwire size (AWG):

Case style	Number of leads			
	2	3	4	6
A	24	24	24	24
B	24	24	28	28
C	24	26	30	30
D	30	30	34	

***MIL-T-24388C qualified models:**
PRT-EM-E2: Order S11636PA3K36B1.
NRT-EM-E1: Order S11636NA3K36B1.

Specification and order options

S331PA	Model number from table
3	Number of leads per sensing element (2, 3, or 4): CA or PD elements not available with 2 leads. 4 leads available on single elements and S14405 only.
S	Covering over leadwires: T = PTFE insulated leads only S = Stainless steel overbraid with PTFE insulated leads F = FEP over PTFE insulated leads R = FEP over stainless steel braid and PTFE insulated leads. E = FEP over stainless steel braid, with elastomer fill and PTFE insulated leads. (max fill length 144") *S11636 Covering options only:* K = Polyimide insulated leads. S = Stainless steel overbraid with PTFE insulated leads.
36	Lead length in inches
(Stop here for case style C or D; no installation variable)	
AC1	Optional Installation/Accessory option: B0 = No babbitt metal or accessories B1 = Babbitt metal applied AC1 = Supplied with AC171 spring and AC172 series ring (case style B only) AC2 = Supplied with AC171 spring and AC1038 ring (case style B only) AC3 = Supplied with AC171 spring and AC915-1 ring (case style B only)
S331PA3S36AC1 = Sample part number	

Specify and order products at:
www.minco.com/sensors_config

Specifications subject to change

Access: Minco
Sales and Support
Americas: 763.571.3121 | Europe: (33) 5 61 03 24 01 | Asia Pacific: (65) 6511 3388

STOCKED PARTS

Case Style	Sensing Element	Single or Dual Elements	TCR (Ω/Ω/°C)	# of Leads	Lead Size (AWG)	Lead Covering	Lead Length	Optional Babbitt tip	Stock Part #
A	NA	Single	0.00672	3	24	Polyimide	36	Yes	S11636NA3K36B1
A	PA	Single	0.00392	3	24	Polyimide	36	Yes	S11636PA3K36B1
A	PA	Single	0.00392	3	24	Stainless Steel Overbraid	36	No	S325PA3S36B0
A	PA	Single	0.00392	3	24	PTFE	36	No	S325PA3T36B0
A	PA	Single	0.00392	3	24	Stainless Steel Overbraid	72	No	S325PA3S72B0
A	PA	Single	0.00392	3	24	PTFE	72	No	S325PA3T72B0
A	PA	Single	0.00392	3	24	Stainless Steel Overbraid	144	No	S325PA3S144B0
A	PA	Single	0.00392	3	24	PTFE	144	No	S325PA3T144B0
A	PD	Single	0.00385	3	24	Stainless Steel Overbraid	36	No	S304PD3S36B0
A	PD	Single	0.00385	3	24	PTFE	36	No	S304PD3T36B0
A	PD	Single	0.00385	3	24	Stainless Steel Overbraid	72	No	S304PD3S72B0
A	PD	Single	0.00385	3	24	PTFE	72	No	S304PD3T72B0
A	PD	Single	0.00385	3	24	Stainless Steel Overbraid	144	No	S304PD3S144B0
A	PD	Single	0.00385	3	24	PTFE	144	No	S304PD3T144B0
A	PD	Dual	0.00385	3	24	Stainless Steel Overbraid	36	No	S309PD3S36B0
A	PD	Dual	0.00385	3	24	Stainless Steel Overbraid	72	No	S309PD3S72B0
A	PD	Dual	0.00385	3	24	Stainless Steel Overbraid	144	No	S309PD3S144B0
B	PA	Single	0.00392	3	24	PTFE	36	No	S331PA3T36B0
B	PA	Single	0.00392	3	24	Stainless Steel Overbraid	36	No	S331PA3S36B0
B	PA	Single	0.00392	3	24	Stainless Steel Overbraid	72	No	S331PA3S72B0
B	PA	Single	0.00392	3	24	PTFE	72	No	S331PA3T72B0
B	PA	Single	0.00392	3	24	PTFE	144	No	S331PA3T144B0
B	PA	Single	0.00392	3	24	Stainless Steel Overbraid	144	No	S331PA3S144B0
B	PD	Single	0.00385	3	24	Stainless Steel Overbraid	36	No	S306PD3S36B0
B	PD	Single	0.00385	3	24	PTFE	36	No	S306PD3T36B0
B	PD	Single	0.00385	3	24	Stainless Steel Overbraid	72	No	S306PD3S72B0
B	PD	Single	0.00385	3	24	PTFE	72	No	S306PD3T72B0
B	PD	Single	0.00385	3	24	Stainless Steel Overbraid	144	No	S306PD3S144B0
B	PD	Single	0.00385	3	24	PTFE	144	No	S306PD3T144B0
B	PD	Dual	0.00385	3	28	Stainless Steel Overbraid	36	No	S14405PD3S36B0
B	PD	Dual	0.00385	3	28	Stainless Steel Overbraid	72	No	S14405PD3S72B0
B	PD	Dual	0.00385	3	28	Stainless Steel Overbraid	144	No	S14405PD3S144B0
C	PA	Single	0.00392	3	26	PTFE	36	n/a	S341PA3T36
C	PA	Single	0.00392	3	26	Stainless Steel Overbraid	36	n/a	S341PA3S36
C	PA	Single	0.00392	3	26	Stainless Steel Overbraid	72	n/a	S341PA3S72
C	PA	Single	0.00392	3	26	PTFE	72	n/a	S341PA3T72
C	PA	Single	0.00392	3	26	Stainless Steel Overbraid	144	n/a	S341PA3S144
C	PA	Single	0.00392	3	26	PTFE	144	n/a	S341PA3T144
C	PD	Single	0.00385	3	26	PTFE	36	n/a	S308PD3T36
C	PD	Single	0.00385	3	26	Stainless Steel Overbraid	36	n/a	S308PD3S36
C	PD	Single	0.00385	3	26	Stainless Steel Overbraid	72	n/a	S308PD3S72
C	PD	Single	0.00385	3	26	PTFE	72	n/a	S308PD3T72
C	PD	Single	0.00385	3	26	Stainless Steel Overbraid	144	n/a	S308PD3S144
C	PD	Single	0.00385	3	26	PTFE	144	n/a	S308PD3T144
C	PD	Dual	0.00385	3	30	Stainless Steel Overbraid	36	n/a	S14455PD3S36
C	PD	Dual	0.00385	3	30	Stainless Steel Overbraid	72	n/a	S14455PD3S72
C	PD	Dual	0.00385	3	30	Stainless Steel Overbraid	144	n/a	S14455PD3S144
D	PA	Single	0.00392	3	30	PTFE	36	n/a	S12414PA3T36
D	PA	Single	0.00392	3	30	Stainless Steel Overbraid	36	n/a	S12414PA3S36
D	PA	Single	0.00392	3	30	Stainless Steel Overbraid	72	n/a	S12414PA3S72
D	PA	Single	0.00392	3	30	PTFE	72	n/a	S12414PA3T72
D	PA	Single	0.00392	3	30	Stainless Steel Overbraid	144	n/a	S12414PA3S144
D	PA	Single	0.00392	3	30	PTFE	144	n/a	S12414PA3T144
D	PD	Single	0.00385	3	30	PTFE	36	n/a	S13282PD3T36
D	PD	Single	0.00385	3	30	Stainless Steel Overbraid	36	n/a	S13282PD3S36
D	PD	Single	0.00385	3	30	PTFE	72	n/a	S13282PD3T72
D	PD	Single	0.00385	3	30	Stainless Steel Overbraid	72	n/a	S13282PD3S72
D	PD	Single	0.00385	3	30	PTFE	144	n/a	S13282PD3T144
D	PD	Single	0.00385	3	30	Stainless Steel Overbraid	144	n/a	S13282PD3S144

Note: Available up to 10 pieces or contact Minco Customer Service

Embedment Thermocouples

Leadwire	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 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) 	
	Single	Dual	Single	Dual	Single	Dual	Single	Dual
AWG 20 stranded	TC311	TC312	TC333					
AWG 24 stranded	TC2162	TC2303	TC2084	TC2096	TC344	TC2623		
AWG 24 stranded with single SS braid over both wire pairs		TC2698		TC2520		TC2837		
AWG 30 solid							TC2741	

Overview

These thermocouples are mechanically interchangeable with the RTDs on pages 7-2 and 7-3.

Specifications

Temperature range: -184 to 260°C (-300 to 500°F).
Copper-Constantan (Type T):
AWG 24: 200°C (392°F) maximum,
AWG 30: 150°C (302°F) maximum.

Time constant: Typical value in moving water:
Grounded junction: 0.3 seconds.
Ungrounded junction: 6 seconds (case style A) to 1 second (case style C).

Insulation resistance: 10 megohms min. at 100 VDC, leads to case, ungrounded junctions only.

Case: Tin plated copper alloy.

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

Leads: See table for sizes and options. Dual element models with AWG 24 stranded leadwires are available with a single stainless steel braid over all four wires. This option is recommended for use with integral feedthroughs. See below for more information.

Specifications subject to change

Specification and order options

TC311	Model number from table
E	Junction type: E = Chromel-Constantan J = Iron-Constantan K = Chromel-Alumel T = Copper-Constantan
U	Junction grounding: G = Grounded U = Ungrounded
36	Lead length in inches
S	Covering over leadwires: T = PTFE insulated leads only S = Stainless steel overbraid with PTFE insulated leads F = FEP over PTFE insulated leads R = FEP over stainless steel braid and PTFE insulated leads E = FEP over stainless steel braid, with elastomer fill and PTFE insulated leads (max fill length 144")
(Stop here for case style C or D; no installation variable)	
B0	Optional Installation/Accessory option: B0 = No babbitt metal or accessories B1 = Babbitt metal applied AC1 = Supplied with AC171 spring and AC172 series ring (case style B only) AC2 = Supplied with AC171 spring and AC1038 ring (case style B only) AC3 = Supplied with AC171 spring and AC915-1 ring (case style B only)
TC311EU36SB0 = Sample part number	

Specify and order products at:
www.minco.com/sensors_config

STOP OIL SEEPAGE!

Feedthroughs provide an oil tight seal where a cable exits a machine housing. The stainless steel tube is epoxy filled and each wire is sealed to the individual conductor. This prevents wicking of oil inside the wires as well as leakage around the wire insulation. Pressure rating to 25 psi (1.7 bar.) See page 4-11 for details.

Leadwire and cable seal models FG1015 and FG3015 seal RTD or thermocouple leadwires where they exit oil-filled bearing housings of rotating equipment. Both versions include a grommet that provides the seal and allows adjustment of the wire or cable position. See page 4-12 for details.

Elastomer rubber-filled cable has elastomer fill between the wires, stainless steel braid, and outer jacket. This fill can extend along the entire length of the cable, or a specified portion. The outside of the cable can be sealed with an FG1015 or FG3015 fitting. See Sensor Ordering Options on page 4-13 for additional details.

Minco Application Aid #27 provides more information on the problems of oil seepage and various solutions. Download AA#27 at **www.minco.com/sensoraid/**

Non-sparking Embedment Sensors

II 3G CE Ex nA IIC IECEx DEK 11.001

Overview

- Non-sparking embedment sensors for monitoring the temperature of thrust bearings
- Four case styles offer a variety of installation options
- Certified for use in Zone 2, Group IIC hazardous areas, defined by IEC 60079-0 and IEC 60079-15

Specifications

Temperature range: -50 to 200°C (-58 to 392°F), reducing to 125°C (257°F) when elastomer filled cable is ordered.

Case: Tin plated copper alloy.

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

Leads:
RTD: stranded copper with PTFE insulation.
Stainless steel braid, FEP over PTFE and FEP over stainless steel braid with elastomer fill are optional.
Thermocouple: stranded, PTFE insulated, twisted pairs.
Stainless steel braid, FEP over PTFE and FEP over stainless steel braid with elastomer fill are optional.

Leadwire size (AWG):

RTD					
Case style	Number of leads				
	2	3	4	6	8
A	24	24	24	24	
B	24	24	28	28	28
C	24	26	30	30	
Short B	24	26	28	30	
Thermocouple					
All cases	24		24		

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

Insulation resistance: 10 megohms minimum at 100 VDC, leads to case.

Specify and order products at:
www.minco.com/sensors_config

Specifications subject to change

Specification and order options:

RTD non-sparking embedment sensors

S207596PD	Model number from next page
3	Number of leads per sensing element (2, 3 or 4): CA or PD elements not available with 2 leads 4 leads available on all single elements and dual S102618 only
E	Covering over leadwires: T = PTFE insulated leads only S = Stainless steel overbraid with PTFE insulated leads F = FEP over PTFE insulated leads E = FEP over stainless steel braid, with elastomer fill and PTFE insulated leads (max. fill length 144")
72	Lead length in inches
(Stop here for case style C; no installation variable)	
AC1	Optional Installation/Accessory option B0 = No babbitt metal or accessories B1 = Babbitt metal applied AC1 = Supplied with AC171 spring and AC172 series ring (case style B only) AC2 = Supplied with AC171 spring and AC1038 ring (case style B only) AC3 = Supplied with AC171 spring and AC915-1 ring (case style B only)
S207596PD3E72AC1 = Sample part number	

Thermocouple non-sparking embedment sensors

TC207600K	Model number from next page
U	Junction grounding: G = Grounded U = Ungrounded
72	Lead length in inches
S	Covering over leadwires: T = PTFE insulated leads only S = Stainless steel overbraid with PTFE insulated leads F = FEP over PTFE insulated leads E = FEP over stainless steel braid, with elastomer fill and PTFE insulated leads (max fill length 144")
(Stop here for case style C; no installation variable)	
B0	Optional Installation/Accessory option B0 = No babbitt metal or accessories B1 = Babbitt metal applied AC1 = Supplied with AC171 spring and AC172 series ring (case style B only) AC2 = Supplied with AC171 spring and AC1038 ring (case style B only) AC3 = Supplied with AC171 spring and AC915-1 ring (case style B only)
TC207600KU72SB0 = Sample part number	

RTD Element	TCR Ω/Ω/°C	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 C Case L: 0.300" (7.6 mm) Case Ø: 0.125" (3.2 mm) 		Short case style B Case L: .188" (4.8 mm) Case Ø: .188" (4.8 mm) Flange Ø: 0.250" (6.4 mm) 	
		Single	Dual	Single	Dual	Single	Dual	Single	Dual
Platinum, 100 Ω ±0.36% at 0°C	.00392	S207595PA	S207595PAPA	S207596PA	S207596PAPA	S207597PA	S207597PAPA	S207598PA	S207598PAPA
Platinum, 100 Ω ±0.12% at 0°C (Meets EN60751, Class B)	.00385	S207595PD	S207595PDPD	S207596PD	S207596PDPD	S207597PD	S207597PDPD	S207598PD	S207598PDPD
Platinum, 100 Ω ±0.067% at 0°C (Meets EN60751, Class A)	.00385	S207595PM	S207595PMPM	S207596PM	S207596PMPM	S207597PM	S207597PMPM	S207598PM	S207598PMPM
Platinum, 100 Ω ±0.36% at 0°C	.00385	S207595PE	S207595PEPE	S207596PE	S207596PEPE	S207597PE	S207597PEPE	S207598PE	S207598PEPE
Platinum, 1000 Ω ±0.12% at 0°C	.00385	S207595PF	S207595PFPF	S207596PF	S207596PFPF	S207597PF	S207597PFPF	S207598PF	S207598PFPF
Copper, 10 Ω ±0.2% at 25°C	.00427	S207595CA	S207595CACA	S207596CA		S207597CA		S207598CA	
Nickel, 120 Ω ±0.5% at 0°C	.00672	S207595NA	S207595NANA	S207596NA	S207596NANA	S207597NA		S207598NA	S207598NANA

Thermocouple Junction Type	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 C Case L: 0.300" (7.6 mm) Case Ø: 0.125" (3.2 mm) 		Short case style B Case L: .188" (4.8 mm) Case Ø: .188" (4.8 mm) Flange Ø: 0.250" (6.4 mm) 	
	Single	Dual	Single	Dual	Single	Dual	Single	Dual
E = Chromel-Constantan	TC207600E	TC207600EE	TC207601E	TC207601EE	TC207602E	TC207602EE	TC207603E	TC207603EE
J = Iron-Constantan	TC207600J	TC207600JJ	TC207601J	TC207601JJ	TC207602J	TC207602JJ	TC207603J	TC207603JJ
K = Chromel-Alumel	TC207600K	TC207600KK	TC207601K	TC207601KK	TC207602K	TC207602KK	TC207603K	TC207603KK
T = Copper-Constantan	TC207600T	TC207600TT	TC207601T	TC207601TT	TC207602T	TC207602TT	TC207603T	TC207603TT

STOP OIL SEEPAGE!

Feedthroughs provide an oil tight seal where a cable exits a machine housing. The stainless steel tube is epoxy filled and each wire is sealed to the individual conductor. This prevents wicking of oil inside the wires as well as leakage around the wire insulation. Pressure rating to 25 psi (1.7 bar.) See page 4-11 for details.

Leadwire and cable seal models FG1015 and FG3015 seal RTD or thermocouple leadwires where they exit oil-filled bearing housings of rotating equipment. Both versions include a grommet that provides the seal and allows adjustment of the wire or cable position. See page 4-12 for details.

Elastomer rubber-filled cable has elastomer fill between the wires, stainless steel braid, and outer jacket. This fill can extend along the entire length of the cable, or a specified portion. The outside of the cable can be sealed with an FG1015 or FG3015 fitting. See Sensor Ordering Options on page 4-13 for additional details.

Minco Application Aid #27 provides more information on the problems of oil seepage and various solutions. Download AA#27 at **www.minco.com/sensoraid/**