

### **Overview**

Whether you need to monitor bearing temperature, process temperature, or virtually any temperature in a hazardous area, Minco's AS9 series temperature sensor assembly can be configured to fit your application, and is certified to satisfy your requirements. Minco's AS9 series temperature sensors offers a single product with global certifications simplifying inventory management and reducing the complexities associated with complying with multiple regional standards.

- Approval agencies: IECEx, ATEX, CSAcus (Canada and United States)
- Area classifications: Zone 0, Zone 1, Zone 2, Class I Division 1, Class I Division 2
- Protection methods: flameproof (Ex d), increased safety (Ex e), intrinsic safety (Ex i), explosionproof (XP), dustignitionproof (DIP), dust ignition protection by enclosure (Ex tb)
- **Probe options:** tip-sensitive, all stainless steel, mineral insulated
- **Output options:** resistance (RTD), voltage (thermocouple), current (4-20 mA), digital (HART<sup>®</sup>)
- Fitting options: spring-loaded, welded, union/ nipple, ½-14 NPT, G ½ (ISO 228-1)
- Connection head options: copper-free aluminum (IP66/NEMA 4), powder coated aluminum (IP66/NEMA 4X), stainless steel (IP66/NEMA 4X), various conduit threads
- Thermowell options: threaded, flanged, tapered, reduced tip

### Certifications

Minco's AS9 sensors are certified by multiple agencies. Consult the following list to learn more:



IECEx (IEC 60079): Ex ia IIC T6...T2 Ga IP66 Ex db IIC T6...T2 Gb IP66 Ex tb IIIC T85...T160°C Db



#### ATEX (EN 60079): (i) II 1 G Ex ia IIC T6...T2 Ga IP66 (i) 2 G Ex db IIC T6...T2 Gb IP66 (i) 2 D Ex tb IIIC T85...T160°C Db



CSA Canada (CSA C22.2): Class I, Zone 0, Ex ia IIC T6...T2 Class I, Zone 1, Ex db IIC T6...T2 Class II, Zone 21, Ex tb IIIC T85...T160°C IS/XP Class I, Division 1, Groups B, C, D T6...T2 Class II, Division 1, Groups E, F, G T85...T160°C Class III, Division 1

CSA USA (NEC 500 & 505): Class I, Zone 0, AEx ia IIC T6...T2 Class I, Zone 1, AEx db IIC T6...T2 Class II, Zone 21, AEx tb IIIC T85...T160°C IS/XP Class I, Division 1, Groups B, C, D T6... T2 Class II, Division 1, Groups E, F, G T85...T160°C Class III, Division 1



### Select Probes and Fittings



## Probe/Fitting Specifc ations

Probe Type	Temperature Range Probe/Process
0, 1, 2, 3, 6, 7	-50 to 260°C (-58 to 500°F)
4, 5, 8, 9	-50 to 600°C (-58 to 1112°F)

Fitting Type	Pressure Rating
0, 3, 5, 8	50 psi (3.4 bar)
1, 6	715 psi (49.3 bar)
2, 7	None

Probe Type	Material (probe)
0, 1, 6, 7	Stainless steel with copper alloy tip for faster time response
2, 3, 4, 5, 8, 9	Stainless steel

Not seeing your ideal configuration? Contact us for a custom solution!

### **Probe/Fitting Options**

AS9	Specifc ation		
0	Probe type: Tip-sensitive RTD Stem-sensitive RTD Mineral-insulated (MgO) RTD Tip-sensitive thermocouple Mineral-insulated (MgO) thermocouple	Simplex 0 2 4 <sup>1</sup> 6 8 <sup>4</sup>	Duplex 1 3 5 <sup>2</sup> 7 9 <sup>4</sup>
0	Probe diameter: 0 = 6.4 mm (.250") 1 = 6.0 mm (.236") 2 = 5.5 mm (.215") 3 = 5.5 mm (.215"); thick wall for bending by hand 4 = 4.8 mm (.188")		
0	$0 = \frac{1}{2} - 14 \text{ NPT} \text{ release knob spring-loaded} \\ 1^{23} = \frac{1}{2} - 14 \text{ NPT} \text{ release knob spring-loaded} \\ 2^{1} = \frac{1}{2} - 14 \text{ NPT} \text{ welded} \\ 2^{1} = \frac{1}{2} - 14 \text{ NPT} \text{ set screw spring-loaded} \\ 3 = \frac{1}{2} - 14 \text{ NPT} \text{ set screw spring-loaded} \\ 5 = G \frac{1}{2} \text{ velded} \\ 7^{1} = G \frac{1}{2} \text{ welded} \\ 7^{1} = G \frac{1}{2} \text{ set screw spring-loaded} \\ 8 = G \frac{1}{2} \text{ set screw spring-loaded} \\ \end{array}$		
AS900	AS9000PD100W3A0X0X1N1 = Sample part number		
1 - Only available for Probe diameter options 0, 1 2 - Only available for Probe diameter option 0			

3 – Only available for Probe type options 2, 3, 4, 5, 8, 9

4 – Not available for Probe diameter option 2

#### Insulation resistance:

- 1000 megohms min at 100 VDC, leads to case.
- 100 megohms min at 100 VDC, leads to case (ungrounded junction thermocouples).
- 10 megohms min at 100 VDC, leads to case (mineral insulated RTDs and ungrounded mineral insulated thermocouples)

#### Dielectric strength:

• 600 Vrms at 60 Hz for 2 seconds with 5 mA maximum leakage current (probe leads to connection head).



## Select Sensing Element, Insertion Depth, and Lead Configuration



### **Probe/Sensing Element Options**

AS9	Specification	
PD	Sensing element For RTD enter two letter code from table on left. For Thermocouple, enter E, J, K or T thermocouple type plus U or G for junction type as shown above.	
100	Insertion depth (mm)	
W	Leads per sensing element (colors shown are first element \\ optional second element) $Y^8 = 2 (1-red/1-white\\1-yellow/1-blue)$ $V^{89} = 2 (1-white/1-red\\1-yellow/1-black) (EN60751)$ $Z = 3 (1-red/2-white\\1-blue/2-yellow)$ $W = 3 (1-white/2-red\1-yellow/2-black) (EN60751)$ $X = 4 (2-red/2-white\2-yellow/2-blue)$ $U^9 = 4 (2-white\2-red\2-yellow/2-black) (EN60751)$ P = thermocouple (colors per ASTM E230/E230M)	
AS9000	AS9000PD100W3A0X0X1N1 = Sample part number	

8 - Not available for Sensing element options CA, CC 9 - Not available for simplex probe types.

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Nickel (0.00618  $\Omega/\Omega/^{\circ}$ C); 100  $\Omega \pm 0.22\%$  at 0°C Accuracy:  $\pm 0.4^{\circ}$ C at 0°C (DIN

Note: See interchangeability tables for accuracy over the entire temperature range.

If no thermowell or nipple/union extension, measured from thread engagement on fitting as shown in diagram above. If nipple/union extension but no thermowell, measured from thread engagement on nipple. If threaded thermowell, measured from end of thermowell threads as shown in diagram on page 5. If flanged thermowell, measured from face of flange as shown in diagram on page 5.

Minimum: 35mm (only applies when no extension

depth will vary, depending on selected options.)

Maximum: 3048mm probe length. (Maximum insertion

and/or no thermowell are specified).

NB<sup>6</sup>

5 – Simplex only 6 – Duplex only

Insertion depth:

43760 Ni 100)

7-Not available for Probe type options 4, 5

Select Connection Head and Optional Extension



Connection Head/Extension Specifications

Connection head material	Temperature range connection head/ambient
A, E, S	-50 to 121°C (-58 to 250°F)

Connection head material	Ingress protection
E, S	IP66 (Type 4X)
А	IP66 (Type 4)

Connection head material	Material (head)
А	A360.1 aluminum (0.6% copper max.)
E	A360.1 aluminum with powder coating
S	Type 316 stainless steel

Extension type, length	Material (nipple/union)
1,2,3,4,5,6,7,8	Type 316 stainless steel

### **Connection Head/Extension Options**

AS9	Specification
3	Conduit thread: 3 = 1/2" - 14 NPT 4 = 3/4" - 14 NPT 5 = M20 x 1.5
A	Connection head material: A = Aluminum E = Aluminum powder-coated S = Stainless steel D <sup>10</sup> = Aluminum with display indicator (coming soon)
0	Extension type, length: 0 = No extension; 1 = 1/2" - 14 NPT nipple/union, L = 1.8" (46mm) 2 = 1/2" - 14 NPT nipple/union, L = 2.6" (66mm) 3 = 1/2" - 14 NPT nipple/union, L = 3.6" (91mm) 4 = 1/2" - 14 NPT nipple/union, L = 4.6" (117mm) 5 = 1/2" - 14 NPT nipple/union, L = 5.6" (142mm) 6 = 1/2" - 14 NPT nipple/union, L = 5.6" (168mm) 7 = 1/2" - 14 NPT nipple/union, L = 7.6" (193mm) 8 = 1/2" - 14 NPT nipple/union, L = 8.6" (218mm) 9 = Special order - contact Minco for options
AS9000PD100W <b>3A0</b> X0X1N1 = Sample part number	
10 – Requires Temptran <sup>™</sup> code option 7. Not available for Sensing element options CA, CC.	



Select Optional Thermowell

### **Thermowell Specifc ations**

#### 1. Specify thermowell type

Code	Thermowell type
А	1" RF (Raised Face)
В	1.5" RF (Raised Face)
С	2" RF (Raised Face)
D	3" RF (Raised Face)
E	1" RTJ (Ring Type Joint)
F	1.5" RTJ (Ring Type Joint)
G	2" RTJ (Ring Type Joint)
Н	3" RTJ (Ring Type Joint)
J	Threaded, reduced tip
K	Threaded, tapered
XO	No thermowell (skip 2a and 2b)

2a. If Flange mount thermowell, specify rating and shaft design

Code	Rating and shaft design
0	150# tapered
1	300# tapered
2	600# tapered
3	900#/1500# tapered
4	2500# tapered
5	150# straight
6	300# straight
7	600# straight
8	900#/1500# straight
9	2500# straight

# **2b. If Thread mount (code J or K) thermowell, specify process thread**

Code	Process thread
0	1/2-14 NPT
1	3/4-14 NPT
2	1-11½ NPT
3	G 1/2



#### 3. Specify thermowell material

Code	Material	
Х	No thermowell	
А	Type 316/316L SST	
В	Type 304 SST	
J	Hastelloy C-276	
К	Monel 400	
N	Carbon Steel C1018	

### **Thermowell Options**

Code	Specifc ation	
х	Thermowell mounting type: select code from table 1 at left	
0	Thermowell rating/shaft or thread: select code from table 2a or 2b at left	
х	Thermowell material: select code from table 3 above	
AS9000PD100W3A0 <b>X0X</b> 1N1 = Sample part number		



Finish the part number by specifying your transmitter choice



### **Transmitter Specifc ations**

Note: TT111 series transmitter is certified only for North America use in explosionproof (XP) and flameproof (Ex d) applications

Temptran <sup>™</sup> code	Base model number	Agency approvals
1	TT518	ATEX CSA (USA and Canada) IECEx
2	TT519	ATEX IECEx
6	TT520	ATEX CSA (USA and Canada) IECEx
7	TT521	ATEX CSA (USA and Canada) IECEx

#### Calibration

Transmitters can be calibrated to nominal resistance values of the RTD (Calibration option 1). Total system error includes the tolerances of both the transmitter and the RTD sensor. Match calibration (Calibration options 2, 3, 4) uses actual resistance of the RTD to calibrate the transmitter. This effectively eliminates the sensor tolerance from system accuracy calculations. A calibration report with traceability to NIST and/or SI is provided with Calibration option 2, 3, or 4.

Calibration options 2, 3, and 4 are not available for thermocouples or duplex RTDs.

AS9	Specifc ation
1	Temptran <sup>™</sup> code: 0 = TT111 (2-lead RTD input; 4-20 mA output) 1 = TT518 (3-lead RTD input; 4-20 mA output) 2 = TT519 (thermocouple input; 4-20 mA output) 5 = TT246 (3-lead RTD input; 1-5 VDC output) 6 = TT520 (any input; 4-20 mA output) 7 = TT521 (any input; 4-20 mA output + HART®)
N	<b>Temperature range code:</b> For a list of Temperature range codes, download a Sensors Design Guide from Minco.com or contact Minco for additional range options.
1	Calibration (options 2, 3, 4 available for Simplex RTD conf gurations only): 1 = Calibrated to sensing element nominal values 2 = Match calibrated for ±0.75% of span system accuracy 3 = Match calibrated for ±0.50% of span system accuracy 4 <sup>n</sup> = Match calibrated for ±0.20% of span system accuracy
AS9000	PD100W3A0X0X <b>1N1</b> = Sample part number

11 – System accuracy =  $\pm 0.20\%$  of span or  $\pm 0.1^{\circ}C$ , whichever is greater.

