

Temperature Measurement Experts





A01 | 1/8" Miniature RTD

The A01 design delivers an extremely small profile sensor with class leading tolerances. When space is limited and accuracy and repeatability are a must, the A01 is the answer. The small diameter highly flexible sheath enables the sensor to maneuver into even the tightest spaces to secure your critical temperature measurements. With unlimited installation possibilities, the A01 gives you maximum flexibility in a compact design.

Features and Benefits:

- **Application:** Direct or indirect immersion in subzero and elevated temperature applications. Easily "snaked" into difficult to reach areas. Ideal for vial or sample cell measurements.
- Accuracy: Precision, 0.05% and Standard, 0.10%
- Tip: 316 stainless steel, 0.125" diameter, 1.250" length
- Sensitive Length: 0.40"
- Element/Lead Wire Configuration: Single 3 or 4 wire
- · Wire: 32 AWG PTFE insulated wires with PFA sheath
- Cleanability: 316 stainless steel tip and PFA cable jacket

- Element Configuration: Single, 100 ohms at 0°C, 0.00385 ohm/ohm/°C nominal alpha
- Temperature Range: Sensor and Cable
 - » Precision Accuracy: -196°C to 200°C
 - » Standard Accuracy: -50°C to 200°C
- R0 interchangeability:
 - » Precision Accuracy: R0 ± 0.05 ohms
 - » Standard Accuracy: R0 ± 0.10 ohms
- Repeatability and Hysteresis: Maximum change at 0°C after 10 thermal cycles over the operating temperature range.
 - » Precision Accuracy: ±0.05°C (0.02Ω)
 - » Standard Accuracy: ±0.10°C (0.04Ω)
- Long Term Stability: Maximum change at 0°C after 1000 hour soak at 200°C
 - » Precision Accuracy: ±0.03°C (0.01Ω)
 - » Standard Accuracy: ±0.26°C (0.10Ω)
- Insulation Resistance: 10 mega-ohms minimum at 100 VDC at room temperature





A01 | 1/8" Miniature RTD

Ordering Information



All dimensions in inches



Element/Lead W	ire Configuration
WHITE 0	WHITE O
WHITE O	}
5	RED 0
REDO	REDO
REDO	
FOUR WIRE SINGLE	THREE WIRE SINGLE

Example Part Number: A01-05A120

NOTE: For longer cable lengths please refer to A05.



Customized miniature sensors, designed for your application.

Surface Mount

Adapts to a variety of surface temperature measurement applications. The stainless steel cup allows the sensor to be glued or clamped in place on nearly any surface.

A02 | 3/16" Miniature RTD

Specifications

Originally designed for the pharmaceutical and biotechnology world as a freezer sensor, the A02 meets the accuracy and repeatability demands of a highly regulated industry while maintaining a very small profile. Equally precise at elevated temperatures, the A02 combines the accuracy of a full-size sensor in a reduced size to easily reach your most critical temperature measurement points.

Features and Benefits:

- **Application:** Direct or indirect immersion in subzero and elevated temperature applications. Easily "snaked" into guide tubes and difficult to reach measurement points.
- Accuracy: Precision, 0.05% and Standard, 0.10%
- Sheath: 316 stainless steel, 0.188" diameter, 1.250" length
- Sensitive Length: 0.40"
- Element/Lead Wire Configuration: Single 3 or 4 wire
- Cable: 22 AWG stranded PTFE insulated wires with PFA jacket
- Cleanability: 316 stainless steel sheath and PFA cable jacket

Specifications:

- Element Configuration: Single, 100 ohms at 0°C, 0.00385 ohm/ohm/°C nominal alpha
- Temperature Range: Sensor and Cable
 - » Precision Accuracy: -196°C to 200°C
 - » Standard Accuracy: -50°C to 200°C
- R0 interchangeability:
 - » Precision Accuracy: R0 ± 0.05 ohms
 - » Standard Accuracy: R0 ± 0.10 ohms
- Repeatability and Hysteresis: Maximum change at 0°C after 10 thermal cycles over the operating temperature range.
 - » Precision Accuracy: ±0.05°C (0.02Ω)
 - » Standard Accuracy: ±0.10°C (0.04Ω)
- Long Term Stability: Maximum change at 0°C after 1000 hour soak at 200°C
 - » Precision Accuracy: ±0.03°C (0.01Ω)
 - » Standard Accuracy: ±0.26°C (0.10Ω)
- Insulation Resistance: 10 mega-ohms minimum at 100 VDC at room temperature



A02 | 3/16" Miniature RTD

Ordering Information



All dimensions in inches



Element/Lead	d Wire Configuration
WHITE O	WHITE O
RED 0	RED 0
FOUR WIRE SINGLE	THREE WIRE SINGLE

Example Part Number: A02-05A120



Customized miniature sensors, designed for your application.

Surface Mount

Installs easily on any pipe or tube with a standard hose clamp. Radius groove in housing matches tube or pipe diameter to insure good contact and heat transfer.

A03 | 1/4" Miniature RTD

Specifications

The A03 is a full-service RTD in a compact package. Ideally suited for applications demanding high accuracy and repeatability, but with limited space, the A03 delivers the confidence and dependability you've come to expect from a Burns RTD. Built with an industry standard 0.25" diameter stainless steel sheath, the A03 easily installs in existing guide tubes and thermowells. Designed to perform in subzero as well as elevated temperatures, this sensor is available in multiple configurations to meet your unique application needs.

Features and Benefits:

- **Application:** Direct or indirect immersion for freezers, incubators or anywhere in between where an accurate measurement and a small profile sensor is required.
- Accuracy: Precision, 0.05% and Standard, 0.10%
- Sheath: 316 stainless steel, 0.25" diameter, 1.25" length
- Sensitive Length: 0.40"
- Element/Lead Wire Configuration: Single 3 or 4 wire and dual 3 wire
- Cable: 22/26* AWG stranded PTFE insulated wires with PFA jacket
- Cleanability: 316 stainless steel sheath and PFA cable jacket

*22 AWG for single element designs, 26 AWG for dual element design

- Element Configuration: Single, 100 ohms at 0°C, 0.00385 ohm/ohm/°C nominal alpha
- Temperature Range: Sensor and Cable
 - » Precision Accuracy: -196°C to 200°C
 - » Standard Accuracy: -50°C to 200°C
- R0 interchangeability:
 - » Precision Accuracy: R0 ± 0.05 ohms
 - » Standard Accuracy: R0 ± 0.10 ohms
- Repeatability and Hysteresis: Maximum change at 0°C after 10 thermal cycles over the operating temperature range.
 - » Precision Accuracy: ±0.05°C (0.02Ω)
 - » Standard Accuracy: ±0.10°C (0.04Ω)
- Long Term Stability: Maximum change at 0°C after 1000 hour soak at 200°C
 - » Precision Accuracy: ±0.03°C (0.01Ω)
 - » Standard Accuracy: ±0.26°C (0.10Ω)
- Insulation Resistance: 10 mega-ohms minimum at 100 VDC at room temperature



A03 | 1/4" Miniature RTD

Ordering Information



All dimensions in inches



Element/Lead Wire Configuration						
WHITE O	WHITE 0					
RED 0	RED 0					
FOUR WIRE SINGLE	THREE WIRE SINGLE					
WHITE O	S BLACK					
RED 0	GREEN G					
THREE WIRE DUAL						

Example Part Number: A03-05B180



Customized miniature sensors, designed for your application.

Shallow Immersion

This thermocouple configuration allows for accurate temperature measurement of shallow fluid level in a vial. The coiled mineral insulated cable allows for flexibility, is completely waterproof, and easily seals through environmental chamber walls.

A04 | PFA Sheath Miniature RTD

Specifications

The A04 is a uniquely designed RTD incorporating an extremely small profile with a completely non-metallic PFA sheath. Originally designed for temperature measurements inside small vials, the A04 handles both cryogenic and elevated temperatures, making it an ideal sensor for lab or small sample applications. The one-piece flexible sheath offers a diameter of just 0.080" and easy cleanability with no place for contaminates to "hide". The sheath design maximizes response time by eliminating the thermal mass of a traditional stainless steel sheath.

Features and Benefits:

- **Application:** Direct or indirect immersion in cryogenic and elevated temperature applications. Easily "snaked" into difficult to reach areas. Ideal for vial or sample cell measurements.
- Accuracy: Precision, 0.05%
- Sheath: 0.080" diameter, PFA
- Sensitive Length: 0.30"
- Element/Lead wire Configuration: Single 3 or 4 wire
- Wire: 32 AWG PTFE insulated wires with integrated PFA sheath
- Cleanability: PFA sheath with no crevices to trap contaminants

- Element Configuration: Single, 100 ohms at 0°C, 0.00385 ohm/ohm/°C nominal alpha
- Temperature Range: Sensor and Cable
 - » Precision Accuracy: -196°C to 200°C
- R0 interchangeability:
 - » Precision Accuracy: R0 ± 0.05 ohms
- **Repeatability and Hysteresis:** Maximum change at 0°C after 10 thermal cycles over the operating temperature range.
 - » Precision Accuracy: ±0.05°C (0.02Ω)
- Long Term Stability: Maximum change at 0°C after 1000 hour soak at 200°C
 » Precision Accuracy: ±0.03°C (0.01Ω)
- Insulation Resistance: 10 mega-ohms minimum at 100 VDC at room temperature





A04 | PFA Sheath Miniature RTD

Ordering Information



A04- PFA Sheath Miniature RTD **RTD** Accuracy 05 Precision, +/- 0.05% of resistance at 0 degrees C **Element Configuration** Three wire single А В Four wire single "L" Sheath Length 12.0 inches 120 240 24.0 inches 360 36.0 inches A04-

Element/Lead \	Vire Configuration
WHITE O	WHITE O
RED 0	RED 0
FOUR WIRE SINGLE	THREE WIRE SINGLE

Example Part Number: A04-05B240

NOTE: For longer cable lengths please refer to A06.



Customized miniature sensors, designed for your application.

Bioreactor

Stable and repeatable temperature measurement for disposable bioreactor bags. Small, .083"diameter, fits into exsisting wells and secures via a Luer lock style connector.

A05 | 1/8" Miniature RTD w/Cable Extension

The A05 design delivers an extremely small profile sensor with class leading tolerances. When space is limited accuracy and repeatability are a must and extended cable length is necessary, the A05 is the answer. The small diameter, highly flexible sheath enables the sensor to maneuver into even the tightest spaces to secure your critical temperature measurements. With unlimited installation possibilities, the A05 gives you maximum flexibility and reach in a compact design.

Features and Benefits:

- **Application:** Direct or indirect immersion in subzero and elevated temperature applications. Easily "snaked" into difficult to reach areas. Ideal for vial or sample cell measurements.
- Accuracy: Precision, 0.05% and Standard, 0.10%
- Tip: 316 stainless steel, 0.125" diameter, 1.250" length
- Sensitive Length: 0.40"
- Element/Lead Wire Configuration: Single 3 or 4 wire
- Cable: 32 AWG PTFE insulated wires with PFA sheath and white PFA cable extension
- Cleanability: 316 stainless steel tip and PFA cable jacket

Specifications:

- Element Configuration: Single, 100 ohms at 0°C, 0.00385 ohm/ohm/°C nominal alpha
- Temperature Range: Sensor and Cable
 - » Precision Accuracy: -196°C to 200°C
 - » Standard Accuracy: -50°C to 200°C
- R0 interchangeability:
 - » Precision Accuracy: R0 ± 0.05 ohms
 - » Standard Accuracy: R0 ± 0.10 ohms
- Repeatability and Hysteresis: Maximum change at 0°C after 10 thermal cycles over the operating temperature range.
 - » Precision Accuracy: ±0.05°C (0.02Ω)
 - » Standard Accuracy: ±0.10°C (0.04Ω)
- Long Term Stability: Maximum change at 0°C after 1000 hour soak at 200°C
 - » Precision Accuracy: ±0.03°C (0.01Ω)
 - » Standard Accuracy: ±0.26°C (0.10Ω)
- Insulation Resistance: 10 mega-ohms minimum at 100 VDC at room temperature





A05 | 1/8" Miniature RTD w/Cable Extension

Ordering Information



All dimensions in inches



Element/Lead Wire Configuration					
WHITE O	WHITE O				
WHITEO					
REDO	REDO				
RED 0					
FOUR WIRE SINGLE	THREE WIRE SINGLE				

Example Part Number: A05-05A120-024



Customized miniature sensors, designed for your application.

The T16 Mini Transmitter

Maximum performance in minimal space. Easily programmed and an excellent addition to the Burns S01 Mini Sanitary RTD or adaptable to nearly any RTD application.

A06 | PFA Sheath Miniature RTD w/Cable Extension

The A06 is a uniquely designed RTD incorporating an extremely small profile with a completely non-metallic PFA sheath. Originally designed for temperature measurements inside small vials, the A06 handles both cryogenic and elevated temperatures where an extended cable length is necessary, making it an ideal sensor for lab or small sample applications. The one-piece flexible sheath offers a diameter of just 0.080" and easy cleanability with no place for contaminates to "hide". The sheath design maximizes response time by eliminating the thermal mass of a traditional stainless steel sheath.

Features and Benefits:

12

- **Application**: Direct or indirect immersion in cryogenic and elevated temperature applications. Easily "snaked" into difficult to reach areas extension cable for access to nearly anywhere.
- Accuracy: Precision, 0.05%
- Sheath: 0.080" diameter, PFA
- Sensitive Length: 0.30"
- Element/Lead wire Configuration: Single 3 or 4 wire
- Cable: 32 AWG PTFE insulated wires with integrated PFA sheath and white PFA cable extension
- · Cleanability: PFA sheath with no crevices to trap contaminants

- Element Configuration: Single, 100 ohms at 0°C, 0.00385 ohm/ohm/°C nominal alpha
- Temperature Range: Sensor and Cable » Precision Accuracy: -196°C to 200°C
- R0 interchangeability:
 - » Precision Accuracy: R0 ± 0.05 ohms
- Repeatability and Hysteresis: Maximum change at 0°C after 10 thermal cycles over the operating temperature range.
 » Precision Accuracy: ±0.05°C (0.02Ω)
- Long Term Stability: Maximum change at 0°C after 1000 hour soak at 200°C
 - » Precision Accuracy: ±0.03°C (0.01Ω)
- Insulation Resistance: 10 mega-ohms minimum at 100 VDC at room temperature





A06 | PFA Sheath Miniature RTD w/Cable Extension

Ordering Information





Element/Lead W	/ire Configuration
WHITE O	WHITE O
WHITE O	Ş
Ş	RED 0
RED 0	REDO
REDO	
FOUR WIRE SINGLE	THREE WIRE SINGLE

Example Part Number: A06-05B240-120



Customized miniature sensors, designed for your application.

The model 18378 Mini Flush Mount RTD

Offers minimal immersion and enhanced surface sensitivity in a compact package. The 18378 is designed for process tanks and surface measurement applications.

RESistance vs Temperature RTD Reference Table

Resistance in Ohms for Series A RTDs in Degrees C

(-196	° to +	+200°
-------	--------	-------

		(10)	0 10 200)		
	0	2	4	6	8
200	175.86				
190	172.17	172.91	173.65	174.38	175.12
180	168.48	169.22	169.96	170.70	171.43
170	164.77	165.51	166.26	167.00	167.74
160	161.05	161.80	162.54	163.29	164.03
150	157.33	158.07	158.82	159.56	160.31
140	153.58	154.33	155.08	155.83	156.58
130	149.83	150.58	151.33	152.08	152.83
120	146.07	146.82	147.57	148.33	149.08
110	142.29	143.05	143.80	144.56	145.31
100	138.51	139.26	140.02	140.78	141.54
90	134.71	135.47	136.23	136.99	137.75
80	130.90	131.66	132.42	133.18	133.95
70	127.08	127.84	128.61	129.37	130.13
60	123.24	124.01	124.78	125.54	126.31
50	119.40	120.17	120.94	121.71	122.47
40	115.54	116.31	117.08	117.86	118.63
30	111.67	112.45	113.22	114.00	114.77
20	107.79	108.57	109.35	110.12	110.90
10	103.90	104.68	105.46	106.24	107.02
0	100.00	100.78	101.56	102.34	103.12
	•	0		<u> </u>	0
	U	-2	-4	-6	-8
0	100.00	99.22	98.44	97.65	96.87
-10	96.09	95.30	94.52	93.73	92.95
-20	92.16	91.37	90.59	89.80	89.01
-30	88.22	87.43	86.64	85.85	85.06
-40	84.27	83.48	82.69	81.89	81.10
-50	80.31	79.51	78.72	77.92	77.12
-60	76.33	75.53	74.73	73.93	73.13
-70	72.33	71.53	70.73	69.93	69.13
-80	68.33	67.52	66.72	65.91	65.11
-90	64.30	63.49	62.68	61.88	61.07
-100	60.26	59.44	58.63	57.82	57.01
-110	56.19	55.38	54.56	53.75	52.93
-120	52.11	51.29	50.47	49.65	48.83
-130	48.00	47.18	40.30	45.53	44.70
-140	43.88	43.05	42.22	41.39	40.56
-150	39.12	30.09 24 70	30.UD	31.22	30.38 22.40
-100	30.04 21.24	34.7U 20.40	33.80 20 64	ວວ.U∠ ວ໑ ໑໐	32.10 27.05
120	31.34 27.10	30.49 26.24	29.04 25.20	∠0.ŏU 24 54	21.90
-100		10 1/1	273 SM	14 74	1 1 1 1 1
100	27.10	20.24	20.00	27.07	23.00



Resistance vs Temperature

RTD Reference Table

Resistance in Ohms for Series A RTDs in Degrees F

(-320° to +392°)

	0	2	4	6	8		0	-2	-4	-6	-8
390	175.45	175.86				0	93.03	92.60	92.16	91.72	91.29
380	173.40	173.81	174.22	174.63	175.04	-10	90.85	90.41	89.97	89.54	89.10
370	171.35	171.76	172.17	172.58	172.99	-20	88.66	88.22	87.78	87.34	86.91
360	169.30	169.71	170.12	170.53	170.94	-30	86.47	86.03	85.59	85.15	84.71
350	167.24	167.66	168.07	168.48	168.89	-40	84.27	83.83	83.39	82.95	82.51
340	165.18	165.60	166.01	166.42	166.83	-50	82.07	81.63	81.19	80.75	80.31
330	163.12	163.53	163.95	164.36	164.77	-60	79.86	79.42	78.98	78.54	78.10
320	161.05	161.47	161.88	162.29	162.71	-70	77.66	77.21	76.77	76.33	75.88
310	158.98	159.40	159.81	160.23	160.64	-80	75.44	75.00	74.55	74.11	73.67
300	156.91	157.33	157.74	158.15	158.57	-90	73.22	72.78	72.33	71.89	71.45
290	154.83	155.25	155.66	156.08	156.49	-100	71.00	70.55	70.11	69.66	69.22
280	152.75	153.17	153.58	154.00	154.42	-110	68.77	68.33	67.88	67.43	66.99
270	150.67	151.08	151.50	151.92	152.33	-120	66.54	66.09	65.64	65.20	64.75
260	148.58	149.00	149.41	149.83	150.25	-130	64.30	63.85	63.40	62.95	62.50
250	146.49	146.91	147.32	147.74	148.16	-140	62.06	61.61	61.16	60.71	60.26
240	144.39	144.81	145.23	145.65	146.07	-150	59.81	59.35	58.90	58.45	58.00
230	142.29	142.71	143.13	143.55	143.97	-160	57.55	57.10	56.65	56.19	55.74
220	140.19	140.61	141.03	141.45	141.87	-170	55.29	54.83	54.38	53.93	53.47
210	138.08	138.51	138.93	139.35	139.77	-180	53.02	52.56	52.11	51.65	51.20
200	135.97	136.40	136.82	137.24	137.66	-190	50.74	50.29	49.83	49.38	48.92
190	133.86	134.28	134.71	135.13	135.55	-200	48.46	48.00	47.55	47.09	46.63
180	131.74	132.17	132.59	133.01	133.44	-210	46.17	45.71	45.26	44.80	44.34
170	129.62	130.05	130.47	130.90	131.32	-220	43.88	43.42	42.96	42.49	42.03
160	127.50	127.93	128.35	128.78	129.20	-230	41.57	41.11	40.65	40.19	39.72
150	125.37	125.80	126.22	126.65	127.08	-240	39.26	38.80	38.33	37.87	37.40
140	123.24	123.67	124.09	124.52	124.95	-250	36.94	36.47	36.01	35.54	35.08
130	121.11	121.53	121.96	122.39	122.82	-260	34.61	34.14	33.68	33.21	32.74
120	118.97	119.40	119.82	120.25	120.68	-270	32.27	31.80	31.34	30.87	30.40
110	116.83	117.26	117.68	118.11	118.54	-280	29.93	29.46	28.98	28.51	28.04
100	114.68	115.11	115.54	115.97	116.40	-290	27.57	27.10	26.62	26.15	25.68
90	112.53	112.96	113.39	113.82	114.25	-300	25.20	24.73	24.25	23.78	23.30
80	110.38	110.81	111.24	111.67	112.10	-310	22.83	22.35	21.87	21.39	20.92
70	108.23	108.66	109.09	109.52	109.95	-320	20.44				
60	106.07	106.50	106.93	107.36	107.79						
50	103.90	104.34	104.77	105.20	105.63						
40	101.74	102.17	102.60	103.04	103.47						
30	99.57	100.00	100.43	100.87	101.30						
20	97.39	97.83	98.26	98.70	99.13						
10	95.21	95.65	96.09	96.52	96.96						

93.91

94.34

94.78

0

93.03

93.47

Custom solutions designed for your specific needs.

Burns Engineering has a long history of designing and building temperature sensors to meet the measurement needs of unique and varied applications. The products in this catalog were specifically developed to meet field requirements and allow for configured-to-order flexibility. Not sure what product is right for your application? Our application engineering group is here to help you select, configure, and/or custom design the right product for your specific needs.

Burns Engineering is a leading supplier of temperature measurement solutions for all your process and metrology applications.

Your processes require advanced temperature measurement solutions that you can depend on. We understand that measurement accuracy, reliability and consistency are important to your success.

Temperature measurement is our business.

MINIATURE RTDs



What will your solution BE?

Turn to Burns as your Temperature Measurement Expert.[®]



Burns Engineering | 10201 Bren Rd. E., Minnetonka, MN 55343 | email: info@burnsengineering.com Phone (Toll Free): 800-328-3871 | Phone (Local): 952-935-4400 | Fax: 952-935-8782