The SAC is a precision sensor in a lightweight package ideally suited for smaller autoclave applications or “walk-in” applications where the sensor will experience minimal handling stress. The completely waterproof design is built to withstand the harsh, repeated steam/vacuum cycling of the autoclave process while maintaining the highest levels of accuracy and repeatability. This classic Burns design has over a decade of field-proven performance.

Features and Benefits:
- Application: Chamber or load probe
- Accuracy: Standard or precision
- Sheath: 316 stainless steel in 0.25" or 0.188" diameter
- Element/Lead Wire Configuration: Single 3 or 4 wire and dual 3 wire
- Cable: Twisted Teflon® insulated wires with Teflon® jacket
- Through-Wall Installation: Designed for elastomer compression fitting
- Cleanability: 316 stainless steel sheath and Teflon® cable construction

Specifications:
- Element Configuration: Single or Dual element, 100 ohms at 0°C, 0.00385 ohm/ohm/°C nominal alpha
- Temperature Range: -50°C to 200°C
- Transition Fitting and Cable Temperature Limits: -50°C to 200°C continuous
- R0 Interchangeability: R0 ±0.10 ohms or R0 ±0.05 ohms
- Short-Term Repeatability and Hysteresis: ±0.025°C (0.01 ohms) maximum change at 0°C over any 5 consecutive thermal cycles from -38°C to 135°C
- Repeatability: ±0.025°C (0.01 ohms) maximum shift at 0°C after 10 cycles between -38°C and 200°C
- Stability: ±0.05°C (0.02 ohms) maximum shift at 0°C after 1000 hours at 135°C
- Pressure: 1 psia to 35 psia
- Insulation Resistance: 100 megohms minimum at 100 VDC at room temperature
Accuray options

-10 Standard RTD +/-0.10% of resistance at 0 degrees C
-05 Precision RTD +/-0.05% of resistance at 0 degrees C

Element / Wire Configuration and Sensor Diameter

A3 * Three wire single element, 0.188 Dia. sensor sheath
A4 * Three wire single element, 0.25 Dia. sensor sheath
B3  Four wire single element, 0.188 Dia. sensor sheath
B4  Four wire single element, 0.25 Dia. sensor sheath
C4 * Three wire dual element, 0.25 Dia. sensor sheath

*L* Sensor Sheath Length

-035 3.5 inch sensor length
-040 4.0 inch sensor length
-050 5.0 inch sensor length
-060 6.0 inch sensor length

*LY* Cable Length

-060 60.0 inch cable length
-120 120.0 inch cable length
-180 180.0 inch cable length
-240 240.0 inch cable length

Specify cable length in inches, 12 inch increments

*For all Three Wire sensors – please specify actual “installed” cable length as certain lengths cannot be shortened upon installation without impacting sensor accuracy. Visit burnsengineering.com and type in keyword: SAC, SAL, SAH or SAX for the specification drawing with cable length criteria; or contact Burns Customer Service for more information.
Originally designed for the pharmaceutical and biotechnology world; the SAL’s waterproof design extends from the sheath through the sealed transitions to the extruded lead wires preventing capillary action during pressure cycling, which can force water into the cable jacket and up into the sensor causing premature failure. Built to withstand the harsh, repeated steam/vacuum cycling of the autoclave process in a compact 0.125” sheath design makes this an ideal choice for use in load monitoring applications such as vials and sample cells.

Features and Benefits:

- Application: Load probe
- Accuracy: Standard or precision
- Sheath: 316 stainless steel in 0.125” diameter; straight or 90° bend; sharp or rounded tip
- Element/Lead Wire Configuration: Single 3 or 4 wire and dual 3 or 4 wire
- Cable: Teflon® insulated wires in highly flexible round silicone rubber jacket
- Through-Wall Installation: Designed for elastomer compression fitting, round cable design optimizes sealing of the compression fitting (vs. twisted wire cable)
- Cleanability: 316 stainless steel sheath and silicone cable construction

Specifications:

- Element Configuration: Single and dual element, 100 ohms at 0°C, 0.00385 ohm/ohm/°C nominal alpha
- Temperature Range: -40°C to 135°C
- Transition Fitting and Cable Temperature Limits: -40°C to 135°C continuous
- R0 Interchangeability: R0 ±0.10 ohms or R0 ±0.05 ohms
- Short-Term Repeatability and Hysteresis: ±0.025°C (0.01 ohms) maximum change at 0°C over any 5 consecutive thermal cycles from 0°C to 135°C
- Repeatability: ±0.05°C (0.02 ohms) maximum shift at 0°C after 20 cycles between 21°C and 135°C
- Stability: ±0.05°C (0.02 ohms) maximum shift at 0°C after 1000 hours at 135°C
- Pressure: 1 psia to 35 psia
- Insulation Resistance: 500 megohms minimum at 100 VDC at room temperature
**SAL | Sanitary Autoclave Load**

**Ordering Information**

* For all Three Wire sensors – please specify actual “installed” cable length as certain lengths cannot be shortened upon installation without impacting sensor accuracy. Visit burnsengineering.com and type in keyword: SAC, SAL, SAH or SAX for the specification drawing with cable length criteria; or contact Burns Customer Service for more information.
The SAH is designed for applications where a more rugged sensor and cable combination is required. The completely waterproof design easily handles the harsh, repeated steam/vacuum cycling of the autoclave process and incorporates an EDPM protective jacket to minimize sensor/cable separation and failure during rough handling or accidental stretching/extension. The continuous one-piece, low-profile design with “ruggedized” shock-resistant sensor is an excellent choice and provides an extra measure of protection when used in larger “walk-in” chambers where movement of carts or repeated handling and accidental “abuse” may occur.

**Features and Benefits:**

- **Application:** Chamber probe
- **Accuracy:** Standard*  
  - Sheath: 316 stainless steel in 0.25" diameter
- **Element/Lead Wire Configuration:** Single 3 or 4 wire and dual 3 wire  
  - Cable: Twisted Teflon® insulated wires with integrated flexible EDPM fiber reinforce protective jacket
- **Through-Wall Installation:** Sanitary port
- **Cleanability:** 316 stainless steel and Teflon®/EDPM cable construction

*Accuracy of 0.2°C can be achieved via matching sensor with transmitter

**Specifications:**

- **Element Configuration:** Single or dual element, 100 ohms at 0°C, 0.00385 ohm/ohm/°C nominal alpha
- **Temperature Range:** -50°C to 200°C
- **Transition Fitting and Cable Temperature Limits:** -50°C to 200°C continuous
- **R0 Interchangeability:** R0 ±0.10 ohms
- **Short-Term Repeatability and Hysteresis:** ±0.025°C (0.01 ohms) maximum change at 0°C over any 5 consecutive thermal cycles from 0°C to 135°C
- **Repeatability:** ±0.10°C (0.04 ohms) maximum shift at 0°C after 10 cycles between -50°C and 200°C
- **Stability:** ±0.26°C (0.10 ohms) maximum shift at 0°C after 1000 hours at 200°C
- **Pressure:** 1 psia to 35 psia
- **Insulation Resistance:** 100 megohms minimum at 100 VDC at room temperature
SAH | Sanitary Autoclave Heavy-Duty
Ordering Information

For all Three Wire sensors – please specify actual “installed” cable length as certain lengths cannot be shortened upon installation without impacting sensor accuracy. Visit burnsengineering.com and type in keyword: SAC, SAL, SAH or SAX for the specification drawing with cable length criteria; or contact Burns Customer Service for more information.
The SAX is designed for extreme autoclave applications where the most rugged sensor and cable combination is needed. The completely waterproof design easily handles the harsh, repeated steam/vacuum cycling of the autoclave process and incorporates an armored protective jacket to virtually eliminate sensor/cable separation and failure during rough handling or accidental stretching/extension. The SAX’s “ruggedized” shock-resistant sensor and ultra flexible steel-braid armored jacket provide the ultimate in protection for large “walk-in” chambers where movement of carts and equipment or repeated handling and accidental “abuse” often occur. The SAX utilizes a replaceable sensor to minimize downtime and cost of ownership.

**Features and Benefits:**
- Application: Chamber probe
- Accuracy: Standard*
- Sheath: 316 stainless steel in 0.25” diameter (0.375” diameter for dual 4 wire design)
- Element/Lead Wire Configuration: Single 3 or 4 wire and dual 3 or 4 wire
- Cable: Twisted Teflon® insulated wires on sensor; Armored jacket (silicone cover over a 304 stainless steel braid, over fiberglass braid welded to an inner PTFE tube). Jacket is fully vacuum and high pressure rated, meets 3A, USP Class VI and FDA 21CFR177.1550.
- Through-Wall Installation: Sanitary feedthru, order separately (reference SFX)
- Cleanability: 316 stainless steel (sheath and fittings) and Teflon®/silicone cable construction
- User Replaceable Sensor: Armored jacket can be left in place (installed) and sensor can be removed and a new one easily installed (reference SAX drawing)

*Accuracy of 0.2°C can be achieved via matching sensor with transmitter

**Specifications:**
- Element Configuration: Single or dual element, 100 ohms at 0°C, 0.00385 ohm/°C nominal alpha
- Temperature Range: -50°C to 200°C
- Transition Fitting and Cable Temperature Limits: -50°C to 200°C continuous
- R0 Interchangeability: R0 ±0.10 ohms or R0 ±0.05 ohms
- Short-Term Repeatability and Hysteresis: ±0.025°C (0.01 ohms) maximum change at 0°C over any 5 consecutive thermal cycles from 0°C to 135°C
- Repeatability: ±0.10°C (0.04 ohms) maximum shift at 0°C after 10 cycles between -50°C and 200°C
- Stability: ±0.26°C (0.10 ohms) maximum shift at 0°C after 1000 hours at 200°C
- Pressure: 1 psia to 35 psia
- Insulation Resistance: 100 megohms minimum at 100 VDC at room temperature
SAX | Sanitary Autoclave Xtreme-Duty
Ordering Information

**Accuracy**

- **Standard RTD +/-0.10% of resistance at 0 degrees C**

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<tr>
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<th>B</th>
<th>C</th>
<th>D</th>
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<td>180 inch armored jacket length</td>
<td>240 inch armored jacket length</td>
<td>Specify armored jacket length in inches, 12 inch increments</td>
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**“LY” Armored Jacket Length, 72.0 inch minimum length**

- 120 inch armored jacket length
- 180 inch armored jacket length
- 240 inch armored jacket length
- Specify armored jacket length in inches, 12 inch increments

**“LY” Cable Length Beyond Armored Jacket, 12.0 inch minimum length**

- 60.0 inch cable length
- 120.0 inch cable length
- 180.0 inch cable length
- Specify cable length in inches, 12 inch increments

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SFX | Sanitary Feedthru Xtreme-Duty

**Cap Size**

- **15** 1.5” Cap (1 Port configuration only)
- **20** 2.0” Cap (1 Port configuration only)
- **25** 2.5” Cap
- **30** 3.0” Cap
- **40** 4.0” Cap

**Number of Ports**

- **1** 1 Port
- **2** 2 Ports
- **3** 3 Ports
- **4** 4 Ports

---

*For all Three Wire sensors – please specify actual “installed” cable length as certain lengths cannot be shortened upon installation without impacting sensor accuracy. Visit burnsengineering.com and type in keyword: SAC, SAL, SAH or SAX for the specification drawing with cable length criteria; or contact Burns Customer Service for more information.*
Resistance of 100 ohm RTD Degrees C

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**Insulation Resistance (IR) ~ Influence on the Resistance Measurement:**

IR refers to the electrical resistance between the sensing circuit and the metallic sheath of a PRT. It is important for the sensing element circuit to be insulated from the sheath because electrical leakage can cause an error when measuring the resistance of the sensing element. Any error in measured resistance will translate to an error in the indicated temperature.

\[
R_{\text{Measured}} = \frac{R_{\text{RTD}} \times R_{\text{IS}}}{R_{\text{RTD}} + R_{\text{IS}}} 
\]

## Resistance of 100 ohm RTD Degrees F

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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.

Turn to Burns as your Temperature Measurement Expert.

We know the issues.
We have the answers.
Let’s talk!