S10 RTD's & Thermocouples, Metric Connections

TYPICAL USES
- Process temperature measurements for industrial, process and power generation.
- Exhaust gas temperature measurements for diesel engines.
- Oven temperature measurements for industrial drying ovens.
- Special designs for intrinsically safe and non-incendive application.

DESCRIPTION
The Ashcroft S10 temperature sensor assemblies provide accurate temperature measurements for most applications. Each temperature sensor assembly consists of a spring loaded temperature sensor insert, a connection head and lag extension. The assembly may also include an optional terminal block for wiring and/or transmitters. Thermocouple assemblies are manufactured to either to IEC 60584-2 or ANSI MC 96.1 and RTD assemblies are manufactured to IEC 60751.

SPECIFICATIONS
Ashcroft Series: S10
Sheath Diameter: 3 mm, 4.5 mm, 6 mm, 8 mm
Stem Length: Minimum: 50 mm/2 in
Maximum: 3 m/120 in
Sensor Type & Measuring Range
RTDs Platinum 385
Pt 100 –200 to +600°C
Pt 1000 –40 to +600°C
Thermocouples
Type J –40 to +750°C
Type E –200 to +800°C
Type K –200 to +1000°C
Type N –200 to +1000°C
Wiring Configuration: RTDs single or dual
2 Wire
3 Wire
4 Wire
Thermocouples
Single or dual
Accuracy Class
(IEC 60751)
Class A: ±(0.15 + 0.0020 * |t|)
Class B: ±(0.30 + 0.0050 * |t|)
1/2 Class B: ±(0.15 + 0.0025 * |t|)
1/3 Class B: ±(0.10 + 0.0017 * |t|)

KEY BENEFITS
- Flexible designs to work in most applications
- Designs for hazardous locations

Thermocouples (ANSI MC 96.1)

<table>
<thead>
<tr>
<th>Type</th>
<th>Type J</th>
<th>Type K</th>
<th>Type E</th>
<th>Type N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>±2.2°C or ±0.0075°C</td>
<td>±1.7°C or ±0.0050°C</td>
<td>±2.2°C or ±0.0040°C</td>
<td></td>
</tr>
<tr>
<td>Special</td>
<td>±1.1°C or ±0.0040°C</td>
<td>±1.0°C or ±0.0075°C</td>
<td>±1.1°C or ±0.0040°C</td>
<td></td>
</tr>
</tbody>
</table>

Thermocouples (IEC 60584-2)

<table>
<thead>
<tr>
<th>Type</th>
<th>Type J</th>
<th>Type K</th>
<th>Type E</th>
<th>Type N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>±1.5°C or ±0.0040°C</td>
<td>±1.5°C or ±0.0040°C</td>
<td>±1.5°C or ±0.0040°C</td>
<td></td>
</tr>
<tr>
<td>Class 2</td>
<td>±2.5°C or ±0.0075°C</td>
<td>±2.5°C or ±0.0075°C</td>
<td>±2.5°C or ±0.0075°C</td>
<td></td>
</tr>
<tr>
<td>Class 3</td>
<td>N/A</td>
<td>±2.5°C or ±0.0150°C</td>
<td>±2.5°C or ±0.0150°C</td>
<td></td>
</tr>
</tbody>
</table>

(1) Absolute temperature in °C
Optional S10 Heads

BUZH-AL
Type E

BUZ-AL
Type D

DIN B
Type B

BBK-PA
Type C

OPTIONAL APPROVALS

FM Intrinsically safe:
- Class I, Division 1, Groups A, B, C, D
  - T4 for $-55^\circ C \leq T_a \leq +80^\circ C$
  - T5 for $-55^\circ C \leq T_a \leq +55^\circ C$
  - T6 for $-55^\circ C \leq T_a \leq +40^\circ C$

FM Nonincendive:
- Class I, Division 2, Groups A, B, C, D
  - T4 for $-55^\circ C \leq T_a \leq +80^\circ C$
  - T5 for $-55^\circ C \leq T_a \leq +55^\circ C$
  - T6 for $-55^\circ C \leq T_a \leq +40^\circ C$

ATEX or IECEx:
- ATEX or IECEx
  - II 1 G Ex ia IIC T6 Ga $-50^\circ C$ to $+60^\circ C$
  - II 2 G Ex ib IIC T6 Gb $-50^\circ C$ to $+60^\circ C$
  - II 2 G Ex e IIC T6 Gb $-55^\circ C$ to $+60^\circ C$
## S10 RTD ORDERING CODE

**Example:** S10 1 6 1 A A B 1 D 2 S

### Area Classification
- 1 - Standard
- 3 - Intrinsic Safety - ia
- B - Intrinsic Safety - ib
- E - Increased Safety
- N - Non-Incendive

### Sheath Diameter
- 3 - 3 mm
- 4 - 4.5 mm
- 6 - 6 mm
- 8 - 8 mm

### RTD Type
- 1 - PT 100

### Accuracy or Class (IEC 60751)
- A - Class A
- B - Class B
- C - 1/2 DIN
- D - Class AA - 1/3 DIN

### RTD Element/Range
- A - –50/+400°C
- B - –200/+600°C
- D - vibrations-proof

### Electrical Circuit
- A - Single 2 wires
- B - Single 3 wires
- C - Single 4 wires
- D - Dual 2 wires
- E - Dual 3 wires
- F - Dual 4 wires

### Sheath Material
- 1 - AISI 316L / 1.4404

### Head Type
- B - DIN B Aluminum
- D - BUZ Aluminum
- E - BUZH Aluminum
- C - BBK - Plastic

### Instrument Connection - 1/2 NPT Conduit Connection
- M - M20 x 1.5
- P - Pg 16
- 2 - 1/2" NPT

### Head Conduit Gland
- - - Without
- P - Polyamide PA, for unarmored cable
- L - Nickel plated brass, for unarmored cable
- M - Nickel plated brass, single seal for armoured cable
- N - Nickel plated brass, double seal for armoured cable
- S - Stainless steel, for unarmored cable
- T - Stainless steel, single seal for armoured cable
- U - Stainless steel, double seal for armoured cable

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All sales subject to standard terms and conditions.

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Data Sheet
S10 RTD Probes

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Continued on next page
## S10 RTD Probes

<table>
<thead>
<tr>
<th>S10 RTD ORDERING CODE</th>
<th>Example: (Cont’d)</th>
<th>X</th>
<th>C</th>
<th>52</th>
<th>R3</th>
<th>-</th>
<th>3P</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inset Nominal Length</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>52</td>
<td>R3</td>
<td></td>
<td>3P</td>
<td>T</td>
</tr>
<tr>
<td>Lag Length</td>
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<tr>
<td>F</td>
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<td>C</td>
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<td></td>
</tr>
<tr>
<td>Lag Extension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F5</td>
<td>DIN Ø11/7 AISI 316/ 1.4401 N=150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F6</td>
<td>DIN Ø14/11 AISI 316/ 1.4401 N=150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F8</td>
<td>DIN Ø11/7 AISI 316/ 1.4401 N=non std</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F9</td>
<td>DIN Ø14/11 AISI 316/ 1.4401 N=non std</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>Threaded connection cyl.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>Threaded connection conical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>Without lag extension, without plug</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Without lag extension, with plug</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Process Connection

- Q3 - Thread G½ A
- Q4 - Thread G¾ A
- S6 - Thread M14 x 1.5
- S7 - Thread M18 x 1.5
- R3 - Thread ½ NPT
- A3 - Compression fitting G ½ A, AISI 316
- C3 - Compression fitting ½" NPT, AISI 316
- - Without connection

### Electrical Connection

- - With terminal block
- 1 - With transmitter Not available with FM IS or NI approval
- 3 - Without terminal block, with flying leads

### Certifications

- - None required
- F - FM
- A - ATEX
- X - IECEx
- S - SIL 2 + ATEX
- I - INMETRO
- D - ATEX + IECEx
- 2 - SIL 2
- P - EAC (Gost R) + Metrological Russia

### Calibration Report

- - Without
- 3P - 3 points
- 5P - 5 points
- 3D - 3 points
- 5D - 5 points

### Marking

- - Without
- T - Label in stainless steel with tag

Prices subject to change without notice • All prices subject to escalation
### S10 TC ORDERING CODE

#### Example:

<table>
<thead>
<tr>
<th>Area Classification</th>
<th>S10</th>
<th>S</th>
<th>K</th>
<th>1</th>
<th>N</th>
<th>1</th>
<th>1</th>
<th>3</th>
<th>D</th>
<th>M</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>S - Standard - General Purpose</td>
<td>S10</td>
<td>S</td>
<td>K</td>
<td>1</td>
<td>N</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>D</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td>J - Intrinsic Safety - ia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B - Intrinsic Safety - ib</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E - Increased Safety</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N - Non-Incendive</td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### Sheath Diameter

- 3 - 3 mm
- 4 - 4.5 mm
- 6 - 6 mm
- 8 - 8 mm

#### Thermocouple Type

- E - temperature range: -200...+ 800°C
- J - temperature range: -40...+ 750°C
- K - temperature range: -200...+ 1000°C
- N - temperature range: -200...+ 1000°C

#### Accuracy or Class

- N - ANSI MC 96.1: cl. standard
- S - ANSI MC 96.1: cl. special
- 1 - IEC 60584-2 : class 1
- 2 - IEC 60584-2 : class 2
- 3 - IEC 60584-2 : class 3

#### Junction

- 1 - ungrounded
- 2 - grounded
- 3 - ungrounded, vibrations-proof
- 4 - grounded, vibrations-proof

#### Electrical Circuit

- 1 - Single
- 2 - Dual

#### Sheath Material

- 1 - AISI 316 / 1.4401
- 3 - Inconel 600/ 2.4816

#### Head Type

- B - DIN B Aluminum
- D - BUZ Aluminum
- E - BUZH Aluminum
- C - BBK - Plastic

#### Instrument Connection - ½ NPT Conduit Connection

- M - M20 x 1.5
- A - adapter M20x1.5
- P - Pg 16

#### Head Conduit Gland

- - - Without
- P - Polyamide PA, for unarmored cable
- L - Nickel Plated Brass, for unarmored cable
- M - Nickel Plated Brass, single seal for armoured cable
- N - Nickel Plated Brass, double seal for armoured cable
- S - Stainless steel, for unarmored cable
- T - Stainless steel, single seal for armoured cable
- U - Stainless steel, double seal for armoured cable
## S10 RTD ORDERING CODE

**Example: (Cont’d)**

<table>
<thead>
<tr>
<th>S10 RTD ORDERING CODE</th>
<th>X</th>
<th>C</th>
<th>52</th>
<th>R3</th>
<th>-</th>
<th>3P</th>
<th>T</th>
<th>N=27</th>
<th>LN=400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inset Nominal Length</td>
<td>X</td>
<td>C</td>
<td>52</td>
<td>R3</td>
<td>-</td>
<td>3P</td>
<td>T</td>
<td>N=27</td>
<td>LN=400</td>
</tr>
<tr>
<td>X - LN=... (min=50, max=100000)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(add actual length in mm LN=?? at the end of ordering code)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lag Length</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>X - N= ... (min=40, max=1000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>N - N= 150mm</td>
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<td>F - N= 16mm</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>C - N= 27mm</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- - Without</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lag Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>F5 - DIN Ø11/7 AISI 316/ 1.4401 N=150</td>
</tr>
<tr>
<td>F6 - DIN Ø14/11 AISI 316/ 1.4401 N=150</td>
</tr>
<tr>
<td>F8 - DIN Ø11/7 AISI 316/ 1.4401 N=non std</td>
</tr>
<tr>
<td>F9 - DIN Ø14/11 AISI 316/ 1.4401 N=non std</td>
</tr>
<tr>
<td>51 - Threaded connection cyl.</td>
</tr>
<tr>
<td>52 - Threaded connection conical</td>
</tr>
<tr>
<td>- - Without lag extension, without plug</td>
</tr>
<tr>
<td>4 - Without lag extension, with plug</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q3 - Thread G ½ A</td>
</tr>
<tr>
<td>Q4 - Thread G ¾ A</td>
</tr>
<tr>
<td>S6 - Thread M14 x 1.5</td>
</tr>
<tr>
<td>S7 - Thread M18 x 1.5</td>
</tr>
<tr>
<td>R3 - Thread ½ NPT</td>
</tr>
<tr>
<td>A3 - Compression fitting G ½ A, AISI 316</td>
</tr>
<tr>
<td>C3 - Compression fitting ½ NPT, AISI 316</td>
</tr>
<tr>
<td>- - Without connection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>- - With terminal block</td>
</tr>
<tr>
<td>1 - With transmitter</td>
</tr>
<tr>
<td>3 - Without terminal block, with flying leads</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Certifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>- - None required</td>
</tr>
<tr>
<td>F - FM</td>
</tr>
<tr>
<td>A - ATEX</td>
</tr>
<tr>
<td>X - IECEx</td>
</tr>
<tr>
<td>S - SIL 2 + ATEX</td>
</tr>
<tr>
<td>I - INMETRO</td>
</tr>
<tr>
<td>D - ATEX + IECEx</td>
</tr>
<tr>
<td>2 - SIL 2</td>
</tr>
<tr>
<td>P - EAC (Gost R) + Metrological Russia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Calibration Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>- - Without</td>
</tr>
<tr>
<td>3P - 3 points</td>
</tr>
<tr>
<td>5P - 5 points</td>
</tr>
<tr>
<td>3D - 3 points</td>
</tr>
<tr>
<td>5D - 5 points</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tagging</th>
</tr>
</thead>
<tbody>
<tr>
<td>- - Without</td>
</tr>
<tr>
<td>T - Label in stainless steel with tag</td>
</tr>
</tbody>
</table>

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HOW TO ORDER S10 TEMPERATURE PROBES:

- The ordering code is built by selecting the appropriate configuration for the various sections of the ordering code.
- The Insert nominal length LN is measured from base of the head to the tip of the probe.
- The lag extension length N is measured from the base of the head to the center of the threads on the lag extension.
- LN can be calculated by adding the lag extension length N to the probe insertion length L.
- The N length and the LN length are added to the end of the ordering code in millimeters.
- To convert inches to millimeters multiply by 25.4. mm = inches x 25.4

\[ \text{d = Stem diameter} \]
\[ \text{N = Lag Extension Length} \]
\[ \text{L = Insertion Length} \]
\[ \text{LN = Insert Nominal Length} \]
\[ \text{LN = N + L} \]