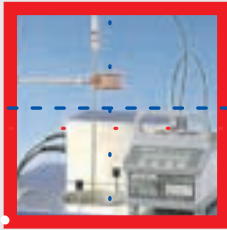


JOFRA™ STS series

Secondary Temperature Standard



JOFRA industrial temperature reference probes are based on more than 50 years of industrial temperature sensor manufacturing experience. The main requirement of a reference probe is stability. The less the probe drifts, the lower the measurement uncertainty.

Wide temperature range

-150 to 650°C (-238 to 1202°F)
A single probe may cover complete temperature spans.

Fast response time

Ensures correct monitoring of temperature stability in liquid baths or dry-block calibrators.

Specified low drift

Maintains a minimal uncertainty budget over the entire period between re-calibration intervals.
Allows for easier re-calibration scheduling.

90° angled probe

Allows the user to have both the sensor-under-test and the reference probe in the dry-block at the same time.

Calibration certificate

Wide choice of accredited or traceable certificates.



PRODUCT DESCRIPTION

The JOFRA STS-100 A industrial temperature reference probes are built to last. More than 50 years of experience has taught us how to manufacture temperature sensors for industrial use. It is important that the probe and the calibration equipment meet the application requirements to calibrate industrial process sensors. All JOFRA Secondary Temperature Standard probes are economical and offer fast response times, low immersion depths, compact physical sizes, and specified low drift rates: even at high temperatures. These are all important considerations when selecting a reference probe.

In addition to straight probes, AMETEK® offers a 90° angled version specifically developed for use with dry-block temperature calibrators. This probe allows the user to have both the sensor-under-test and the reference probe in the thermowell at the same time: even if the sensors have a connection or a transmitter head.

Quality defined

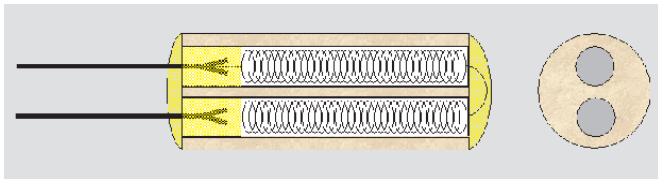
It is not easy to make a good quality reference probe. The main requirement of a reference probe is stability. This means minimal drift as a function of operating time at the actual temperature. The less the probe drifts, the lower the measurement uncertainty.

Small diameter - fast response

The STS-100 A series has a relatively small diameter. This leaves optimum space for sensors-under-test in the dry-block and ensures a fast response time. A fast reacting sensor will optimize the measurement information.

Reduced hysteresis and drift

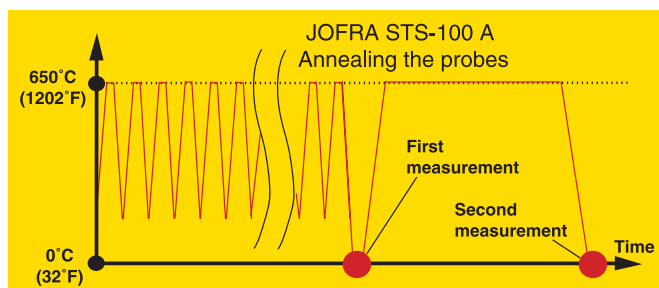
The sensing element is comprised of a pure platinum coil. This coil is suspended in a way that minimizes stress and ensures a near zero hysteresis value.



The main reason for drift within a sensor assembly is impurities within the element, especially at temperatures above 350°C (660°F). All internal parts must be cleaned thoroughly. AMETEK has developed a unique cleaning method for the internal bore of the Inconel® sheath. The platinum sensor is embedded within an ultra-clean, temperature resistant ceramic, and assembly of the components is performed in a sterile environment. These precautions ensure minimum contamination of the element during use and provide the user with the best possible performance.

Ageing/annealing

Once the probes are assembled, they are subjected to a long approval process. This includes mechanical stress reduction of the entire assembly as well as ageing the sensor element itself. The purpose of ageing the sensor is to remove the initial drift. The procedure involves heating the sensor to 650°C (1202°F) and holding it for 1 hour before cooling down. This process is repeated over a period of several days. The resistance is then measured at 0°C (32°F) and recorded. The sensor is heated again to 650°C (1202°F), however this time the temperature is held constant for only 16 hours. Finally, the output from the sensor is again measured at 0°C (32°F) and recorded. The difference between the first and second measurement is our verification of the stability qualities of the sensor. To be accepted for final calibration and certification, the probe must meet our minimum tolerance.



Reduced isolation-resistance-error

Electrical isolation resistance (parasite-resistance-error), when measured at the highest operating temperature, should be as high as possible. A low isolation resistance would cause the output signal to be incorrect in relation to the temperature.

JOFRA STS-100 A series probes meet the IEC-751 requirements of isolation resistance by several hundred per cent.

The final quality-certificate-check

Upon completion of every certificate, after final calibration of the probe, an examination and approval cycle is performed according to our established procedures. A critical verification is that the difference between the initial and the final 0°C (32°F) measurement on the certificate meets our minimum tolerance. These requirements are based on a vast amount of data, which has been evaluated statistically. This value indicates if the probe has sufficient long-term stability. AMETEK also checks that the IEC-751 linearization coefficients R_0 , A, B and C have values that correlate to an acceptable curve sequence in accordance with our requirements.

Certification

The final documentation on the probe is the calibration certificate. The JOFRA STS-100 A probes have the following calibration options:

Accredited certificate (as standard):

(Traceable to the European Accreditation Organisation)

Temperature range from -40 to 650°C (-40 to 1202°F).

The certificate contains 8 temperature points starting and ending at 0°C (32°F). The certificate also contains calculated IEC-751 linearization coefficients (R_0 , A, B, and C).

The entire temperature calibration uncertainty:

-150 to -1°C (-238 to 30°F) 0.04°C (0.072°F)

0 to 399°C (32 to 750°F) 0.02°C (0.036°F)

400 to 650°C (752 to 1202°F) 0.05°C (0.09°F)

NIST traceable certificate (optional):

Temperature range from -30 to 650°C (-22 to 1202°F).

The certificate contains 8 temperature points starting and ending at 0°C (32°F). The certificate also contains calculated IEC-751 linearization coefficients (R_0 , A, B, and C).

Calibration uncertainty:

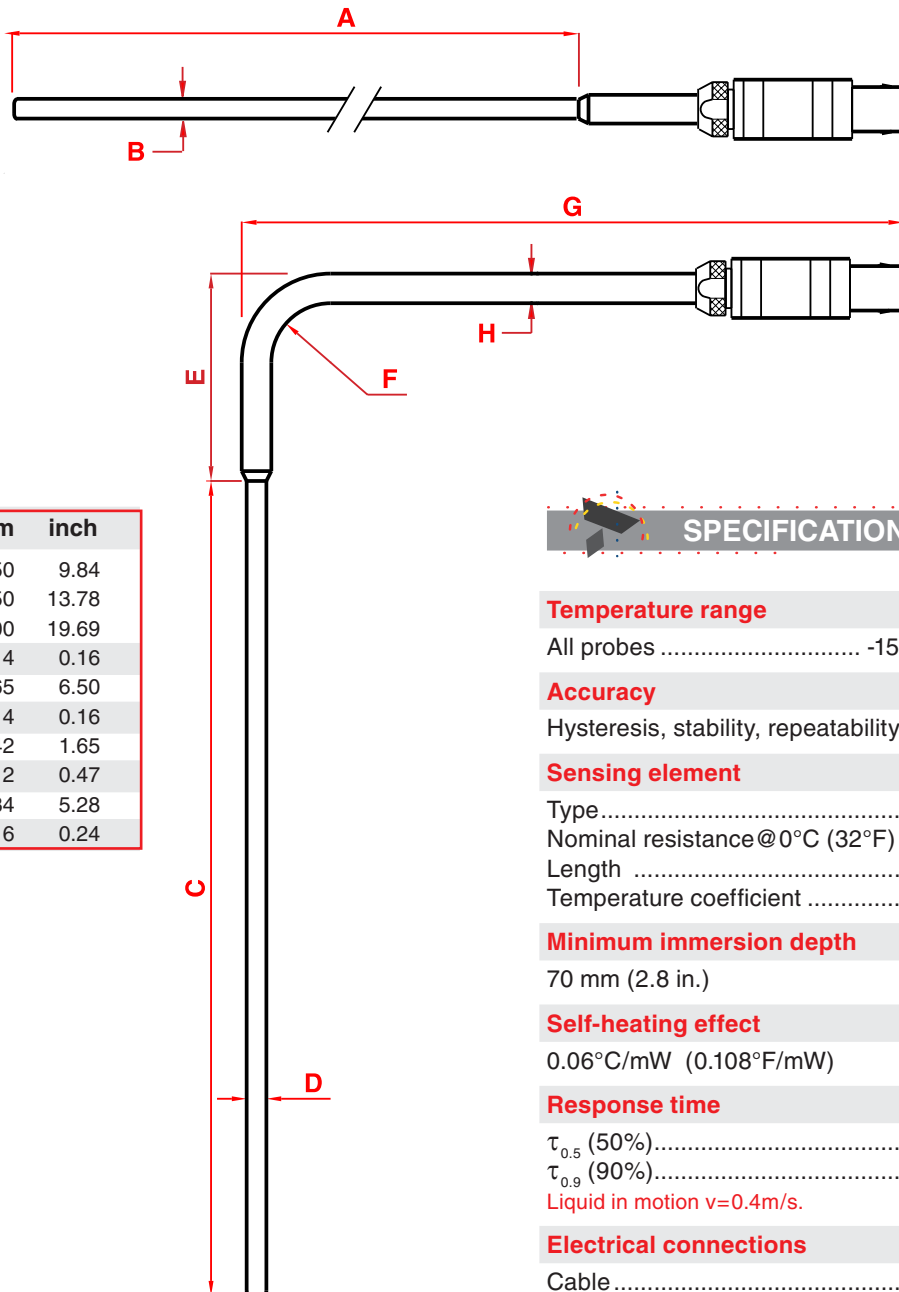
-30 to 650°C (-22 to 1202°F) 0.035°C (0.063°F)

Delivery without certificate (annealed only) - (optional):

In some cases, the customer may prefer to calibrate the probe himself or herself. It is possible to purchase the probe without any certification. AMETEK does not recommend this option because we are not able to complete the final "quality-certificate-check".

Custom-made certificate (optional):

The NIST traceable certificate and the accredited certificates both may be customized to meet a customer requirement; extra calibration points, different temperature points, limited or extended temperature ranges are available.



Dimensions

Ref.	mm	inch
A	250	9.84
	350	13.78
	500	19.69
B	4	0.16
C	165	6.50
D	4	0.16
E	42	1.65
F	12	0.47
G	134	5.28
H	6	0.24

SPECIFICATIONS

Temperature range

All probes -150 to 650°C (-238 to 1202°F)

Accuracy

Hysteresis, stability, repeatability..... 0.002°C (0.0036°F)

Sensing element

Type.....Pt100
 Nominal resistance@0°C (32°F) 100 ohm
 Length 40 mm (1.6 in.)
 Temperature coefficient $\alpha_{100}=0.00385$ 1/°C

Minimum immersion depth

70 mm (2.8 in.)

Self-heating effect

0.06°C/mW (0.108°F/mW)

Response time

$\tau_{0.5}$ (50%)..... 8 seconds
 $\tau_{0.9}$ (90%)..... 26 seconds

Liquid in motion $v=0.4$ m/s.

Electrical connections

Cable 4 wire + shield
 Connection LEMO goldplated

Insulation resistance

@ 23°C (73°F)..... 100 Gohm
 @ 650°C (1202°F)..... 400 Mohm

Outer tube

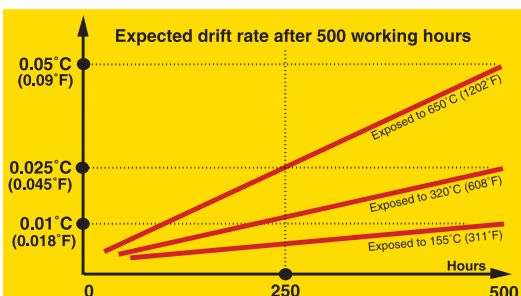
Inconel 600

Operating conditions

(Probe, connection, and cable) Max. 70°C (158°F)
 Storage temperature -20 to 60°C (-4 to 140°F)
 Humidity 0 to 90% RH
 Protection class (connectors) DIN 40050 IP-50

Shipping dimensions

Straight probes (including cardboard box):
 L x W x H 660 x 110 x 95 mm (26 x 4.3 x 3.7 in.)
 90° angled probe (including carrying case):
 L x W x H 220 x 250 x 60 mm (8.7 x 9.8 x 2.4 in.)
 Shipping weight including packing
 Straight probes 650 g (1.4 lb)



ORDERING INFORMATION

Model STS series temperature reference probes

Order no.	Description
STS100	<p>Base model number- 1st thru 7th characters Pt100 reference probe</p> <p>Diameter of the probe 8th character Overall diameter 4 mm (0.16 in.)</p> <p>Shape and length - 9th thru 11th characters Straight probe, L 250 mm (9.8 in.), cable 2 m (6.6 ft.) Straight probe, L 350 mm (13.8 in.), cable 2 m (6.6 ft.) Straight probe, L 500 mm (19.7 in.), cable 2 m (6.6 ft.) 90° angled probe, L 207 mm (8.1 in.)</p> <p>Calibration certificate 12th character Accredited certificate 8 temperature points NIST traceable certificate 8 temperature points Annealed probe. No certificate Custom-made certificate</p> <p>Termination 13th character Short cable 0.5 m (1.6 ft.) and LEMO connector for JOFRA ATC dry-blocks Cable 2 m (6.6 ft.) and LEMO connector Cable 2 m (6.6 ft.) and Banana plugs</p>
STS100 A 901 A A	<p>Sample order number Reference Pt100 probe angled 90°, cable length dedicated to the JOFRA ATC series dry-block calibrators.</p>

Standard delivery

- JOFRA STS-100 A probe
- Cable - according to order number
- Accredited certificate
- 90° angled probe: Plastic carrying case with foam insert
- Straight probes: Cardboard box with foam insert
- User guide

ACCESSORIES

Part no.	Description
65-PT100-LL-CABLE	Cable LEMO to LEMO length: 2 m (6.6 ft.)
65-PT100-LB-CABLE	Cable LEMO to banana length: 2 m (6.6 ft.)
122801	Cable LEMO to LEMO length: 0.5 m (1.6 ft.)
123084	Re-certification, accredited 8 temperature points
123518	Re-certification, NIST traceable 8 temperature points
105049	User guide
123517	Plastic carrying case for 90° angled probe

AMETEK[®] CALIBRATION INSTRUMENTS

AMETEK Test & Calibration Instruments
8600 Somerset Drive
Largo, Florida 33773, USA
Tel +1 (727) 536-7831
Tel (800) 527-9999
Fax +1 (727) 539-6882

AMETEK Denmark A/S
Gydevang 32-34
Post Office Box 30
DK-3450 Allerød
Denmark
Tel +45 4816 8000
Fax +45 4816 8080
E-mail ametek@ametek.dk

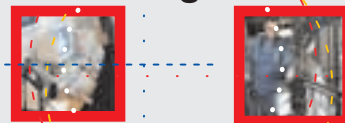
**ISO 9001
Manufacturer**

AMETEK is a leading global manufacturer of electrical and electromechanical products for niche markets. Listed on the New York Stock Exchange (AME) since 1930, AMETEK's annual sales are approaching \$1 billion. Operations are in North America, Europe and Asia, with about one third of sales to markets outside the United States.

AMETEK Precision Instruments Europe GmbH
Postfach 2165
D-40644, Meerbusch
Germany
Tel +49 2159 9136 0
Fax +49 2159 9136 39
E-mail info@ametek.de

AMETEK Singapore Pte. Ltd.
10 Ang Mo Kio Street 65
#05-12 TECHPOINT
Singapore 569059
Tel +65 484 2388
Fax +65 481 6588
E-mail aspl@ametek.com.sg

temperature
software
pressure
signal



AMETEK

Calibration Instruments

offers a complete range of calibration equipment for pressure, temperature, and signal - including software.

Temperature standards

Portable precision thermometer. Dry-block calibrators: 3 series, more than 13 models - featuring speed, portability, accuracy, and advanced documenting functions.

Primary pressure standards

Pneumatic floating-ball or hydraulic piston deadweight testers - easy-to-use with accuracies up to 0.015% of reading.

Electronic pressure standards

Convenient electronic systems ranging from -1 to 700 bar (25 inHg to 10,000 psi) - multiple choices of pressure ranges, pumps, and accuracies, fully temperature-compensated for problem-free and accurate field use.

Signal calibration

Process signal measurement and simulation for easy control loop calibration and measurement tasks - from the small mA loop calibrator to the complete, software supported, modular-based "calibration shop".

**...because calibration is
a matter of confidence**