



909

Secondary Standard Platinum
Resistance Thermometers, -200°C to
 670°C

The 909 economically-priced secondary standard PRT -Platinum Resistance Thermometers- are the workhorse of calibration laboratories all over the world. The wide temperature ranges from -200°C to 670°C and economic pricing make these thermometers ideal for the secondary laboratory.

Description

The 909 economically-priced Standard Platinum Resistance Thermometers are the workhorse of calibration laboratories all over the world. The wide temperature ranges from -200°C to 670°C and economic pricing make these thermometers ideal for the secondary laboratory. For smaller uncertainties to suit the Primary Laboratory refer to the 670 SPRTs.

The resistance element is of pure platinum, coiled and mounted in a strain free construction. The former is of pure alumina material and all parts have been pre-aged to eliminate contamination and strain. All joints are welded to minimize resistance changes. The leads are brought to a handle assembly where they are connected to a low loss cable, 2 m long and screened.

The 909Q model has a Quartz sheath while the 909L and 909H have metal sheaths. Quartz glass thermometers have the advantage that the internal components are visible and can be inspected and continue to be our recommended models. The low temperature models have excellent immersion characteristics and a significant cost saving when compared to the higher temperature models.

Three thermometer lengths are available, standard length 480 mm, extra length 550 mm or maximum length 600 mm.

The Model 909 is supplied in standard with a traceability certificate at Water Triple Point and Fixed Point of Gallium. Alternatively we can provide a complete UKAS calibration certificate.

Key features:

- Three stem lengths
- Wide operating range

Specifications

General specifications

| | | |
|-------------------------|---|-----------|
| Rtpw | 25.5 Ω | 100 Ω |
| Nominal resistance | 25.5 Ω at 0°C | 100 Ω |
| Recommended max current | 1 mA | 0.5 mA |
| Nominal sensitivity | 0.1 Ω /°C | 0.4 Ω /°C |
| Resistance ratio | Wga > 1.11807 as required by ITS-90 | |
| Self-heating | 1 mK / 26 μW | |
| Stability | Depends on the temperature range of use. See table below for typical annual stability. | |
| Internal leads | Four wire | |
| External leads | Silver-plated multi-strand wires in a low-loss insulation cable terminating in gold-plated terminals. | |

Models 25.5 Ω

| Reference | Temperature range | Sheath | Diameter | Length | Sensing length | Construction | Standard | Notes |
|-------------|-------------------|--------|----------|--------|----------------|------------------------------------|----------|--|
| 909Q/25/480 | -200 to 670°C | Quartz | 7.5 mm | 480 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | Recommended secondary standard SPRT |
| 909Q/25/550 | -200 to 670°C | Quartz | 7.5 mm | 550 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |
| 909Q/25/600 | -200 to 670°C | Quartz | 7.5 mm | 600 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |
| 909H/25/480 | -80 to 670°C | Metal | 6 mm | 480 mm | 65 mm | Sealed | ITS-90 | Internal alumina tube protects sensor from contamination |
| 909H/25/550 | -80 to 670°C | Metal | 6 mm | 550 mm | 65 mm | Sealed | ITS-90 | |
| 909H/25/600 | -80 to 670°C | Metal | 6 mm | 600 mm | 65 mm | Sealed | ITS-90 | |
| 909L/25/ | -200 to | Metal | 6 mm | 480 mm | 65 mm | Sealed | ITS-90 | Optimize |

| | | | | | | | | |
|-------------|---------------|-------|------|--------|-------|------------------------------------|--------|---|
| 480 | 165°C | | | | | with dry oxygen / argon mix | | d for low temperatures, less stem conduction due to internal construction |
| 909L/25/550 | -200 to 165°C | Metal | 6 mm | 550 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |
| 909L/25/600 | -200 to 165°C | Metal | 6 mm | 600 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |

Models 100 Ω:

| Reference | Temperature range | Sheath | Diameter | Length | Sensing length | Construction | Standard | Notes |
|--------------|-------------------|--------|----------|--------|----------------|------------------------------------|----------|--|
| 909Q/100/480 | -200 to 550°C | Quartz | 7.5 mm | 480 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | Recommended secondary standard SPRT |
| 909Q/100/550 | -200 to 550°C | Quartz | 7.5 mm | 550 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |
| 909Q/100/600 | -200 to 550°C | Quartz | 7.5 mm | 600 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |
| 909H/100/480 | -80 to 550°C | Metal | 6 mm | 480 mm | 65 mm | Sealed | ITS-90 | Internal alumina tube protects sensor from contamination |
| 909H/100/550 | -80 to 550°C | Metal | 6 mm | 550 mm | 65 mm | Sealed | ITS-90 | |
| 909H/100/600 | -80 to 550°C | Metal | 6 mm | 600 mm | 65 mm | Sealed | ITS-90 | |
| 909L/100/480 | -200 to 165°C | Metal | 6 mm | 480 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | Optimized for low temperatures, less stem conduction due to internal c |

| | | | | | | | | |
|--------------|---------------|-------|------|--------|-------|------------------------------------|--------|--------------|
| 909L/100/550 | -200 to 165°C | Metal | 6 mm | 550 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | Construction |
| 909L/100/600 | -200 to 165°C | Metal | 6 mm | 600 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |

Typical uncertainties of 909 SPRTs with UKAS calibration

| Fixed point | °C | Range 1 | Range 2 | Range 3 | Range 4 | Range 5 | Range 6 |
|--------------|----------|---------|---------|---------|---------|---------|---------|
| BP Nitrogen | -195.798 | 10 mK | | 10 mK | 10 mK | 10 mK | 10 mK |
| TP Mercury | -38.8344 | 2 mK | 2 mK | 2 mK | 2 mK | 2 mK | 2 mK |
| TP Water | 0.01 | 1 mK | 1 mK | 1 mK | 1 mK | 1 mK | 1 mK |
| MP Gallium | 29.7646 | | 1 mK | | | | |
| FP Indium | 156.5985 | | | 3 mK | 3 mK | | |
| FP Tin | 231.928 | | | | 3 mK | 3 mK | 3 mK |
| FP Zinc | 419.527 | | | | | 3.5 mK | 3.5 mK |
| FP Aluminium | 660.323 | | | | | | 10 mK |

Models and accessories

909 Secondary Standard Platinum Resistance Thermometers, -200°C to 670°C
Delivered in standard with:

- Traceable certificate at Water Triple Point and Fixed Point of Gallium
- Carrying case

Models 25.5 Ω

| Reference | Temperature range | Sheath | Diameter | Length | Sensing length | Construction | Standard | Notes |
|-------------|-------------------|--------|----------|--------|----------------|------------------------------------|----------|---|
| 909Q/25/480 | -200 to 670°C | Quartz | 7.5 mm | 480 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | Recommended secondary standard SPRT |
| 909Q/25/550 | -200 to 670°C | Quartz | 7.5 mm | 550 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |
| 909Q/25/600 | -200 to 670°C | Quartz | 7.5 mm | 600 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |
| 909H/25/480 | -80 to 670°C | Metal | 6 mm | 480 mm | 65 mm | Sealed | ITS-90 | Internal alumina tube protects sensor from contamination |
| 909H/25/550 | -80 to 670°C | Metal | 6 mm | 550 mm | 65 mm | Sealed | ITS-90 | |
| 909H/25/600 | -80 to 670°C | Metal | 6 mm | 600 mm | 65 mm | Sealed | ITS-90 | |
| 909L/25/480 | -200 to 165°C | Metal | 6 mm | 480 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | Optimized for low temperatures, less stem conduction due to internal construction |
| 909L/25/550 | -200 to 165°C | Metal | 6 mm | 550 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |
| 909L/25/600 | -200 to 165°C | Metal | 6 mm | 600 mm | 65 mm | Sealed with dry oxygen / | ITS-90 | |

| | | | | | | | | |
|--|--|--|--|--|--|-----------|--|--|
| | | | | | | argon mix | | |
|--|--|--|--|--|--|-----------|--|--|

Models 100 Ω

| Reference | Temperature range | Sheath | Diameter | Length | Sensing length | Construction | Standard | Notes |
|--------------|-------------------|--------|----------|--------|----------------|------------------------------------|----------|---|
| 909Q/100/480 | -200 to 550°C | Quartz | 7.5 mm | 480 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | Recommended secondary standard SPRT |
| 909Q/100/550 | -200 to 550°C | Quartz | 7.5 mm | 550 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |
| 909Q/100/600 | -200 to 550°C | Quartz | 7.5 mm | 600 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |
| 909H/100/480 | -80 to 550°C | Metal | 6 mm | 480 mm | 65 mm | Sealed | ITS-90 | Internal alumina tube protects sensor from contamination |
| 909H/100/550 | -80 to 550°C | Metal | 6 mm | 550 mm | 65 mm | Sealed | ITS-90 | |
| 909H/100/600 | -80 to 550°C | Metal | 6 mm | 600 mm | 65 mm | Sealed | ITS-90 | |
| 909L/100/480 | -200 to 165°C | Metal | 6 mm | 480 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | Optimized for low temperatures, less stem conduction due to internal construction |
| 909L/100/550 | -200 to 165°C | Metal | 6 mm | 550 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |
| 909L/100/600 | -200 to 165°C | Metal | 6 mm | 600 mm | 65 mm | Sealed with dry oxygen / argon mix | ITS-90 | |