Bakrona AG
Rheinfelderstrasse 4
CH-4058 Basel

Tel. +41 (0)61 695 82 82
Fax +41 (0)61 691 63 26
www.bakrona.ch

BAKRONA

Modell 1502
Thermometer Readout

High Precison Temperature Indicator

for Pt100 Secondary Temperature Standards

The 1502A features accuracy up to ±0.006 °C. It reads 100-ohm, 25-ohm, and 10-ohm probes and has a resolution of 0.001 °C across its entire range.
The unit is programmable to match a probe's constants for maximum linearity and accuracy. All probe constants and coefficients are programmed through simple, front-panel keystrokes.
Temperature is displayed in °C, °F, K, or resistance in ohms.

Specifications 1502 Thermometer Readout:

Temperature Range†	–200 °C to 962 °C (–328 °F to 1764 °F)
Resistance Range	0 Ω to 400 Ω, auto-ranging
Probe	Nominal RTPW: 10 Ω to 100 Ω, RTD, PRT, or SPRT
Characterizations	ITS-90 subranges 4, 6, 7, 8, 9, 10, and 11 IPTS-68: R0, a, d, a4, and c4 Callendar-Van Dusen: R0, a, d, and b
Resistance Accuracy (ppm of reading)	0 Ω to 20 Ω: 0.0005 Ω 20 Ω to 400 Ω: 25 ppm
Temperature Accuracy†	±0.004 °C at –100 °C ±0.006 °C at 0 °C ±0.009 °C at 100 °C ±0.012 °C at 200 °C ±0.018 °C at 400 °C
Operating Temperature Range	16 °C to 30 °C
Resistance Resolution	0 Ω to 20 Ω: 0.0001 Ω 20 Ω to 400 Ω: 0.001 Ω
Temperature Resolution	0.001 °C
Excitation Current	0.5 and 1 mA, user selectable, 2 Hz
Measurement Period	1 second
Digital Filter	Exponential, 0 to 60 seconds time constant (user selectable)
Probe Connection	4-wire with shield, 5-pin DIN connector

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Specifications 1502 Thermometer Readout, cont'd

Communications	RS-232 serial standard IEEE-488 (GPIB) optional
Display	8-digit, 7-segment, yellow-green LED; 0.5-inch-high characters
Power	115 VAC (±10 %), 50/60 Hz, 1 A, nominal 230 VAC (±10 %), 50/60 Hz, 1 A, nominal, specify
Size (HxWxD)	61 x 143 x 181mm (2.4 x 5.6 x 7.1 in)
Weight	1.0 kg (2.2 lb.)
†Temperature ranges and accuracy may be limited by the sensor you use.	

Model 5615
Secondary Standard PRT"

Specifications, Model 5615 Secondary Standard PRT

Temperature range	5615-12 and 5615-9: –200 °C to 420 °C 5615-6: –200 °C to 300 °C
Nominal resistance at 0 °C	100 Ω ± 0.10 Ω
Temperature coefficient	0.0039250 Ω/Ω/°C
Accuracy[1]	± 0.024 °C at –200 °C ± 0.012 °C at 0 °C ± 0.035 °C at 420 °CC
Short-term repeatability[2]	± 0.009 °C at 0.010 °C
Drift[3]	± 0.007 °C at 0.010 °C
Sensor length	28 mm (1.1 in)
Sensor location	6.9 mm ± 3.3 mm from tip (0.27 in ± 0.13 in)

Specifications, Model 5615 Secondary Standard PRT, cont'd

Sheath dimensions	5615-6: 152 mm x 4.76 mm (6.0 in x 0.188 in) 5615-9: 229 mm x 4.76 mm (9.0 in x 0.188 in) 5615-12: 305 mm x 6.35 mm (12.0 in x 0.250 in)
Sheath diameter tolerance	± 0.127 mm (± 0.005 in)
Sheath material	Inconel™ 600
Minimum insulation resistance	1000 MΩ at 23 °C
Transition junction temperature range[4]	–50 °C to 200 °C
Transition junction dimensions	71 mm x 13 mm dia (2.8 in x 0.5 in)
Maximum immersion length	5615-6: 102 mm (4 in) 5615-9: 178 mm (7 in) 5615-12: 254 mm (10 in)
Response time[5]	9 seconds typical
Self heating (in 0 °C bath)	50 mW/°C
Lead-wire cable type	PTFE insulated with PTFE jacket, 22 AWG
Lead-wire length	183 cm (72 in)
Lead-wire temperature range	–50 °C to 200 °C
Calibration	NVLAP-accredited calibration included, lab code 200706-0. Please see calibration uncertainty table and its explanation of changeable uncertainties.

[1] Includes calibration and 100 hr drift (k=2)

[2] Three thermal cycles from min to max temp, includes hysteresis, 95 % confidence (k=2)

[3] After 100 hrs at max temp, 95 % confidence (k=2)

[4] Temperatures outside this range will cause irreparable damage. For best performance, transition junction should not be too hot to touch.

[5] Per ASTM E 644

1. NVLAP† Calibration Uncertainty

Temperature	Expanded Uncertainty (k=2)
–196 °C	0.024 °C
–38 °C	0.011 °C
0 °C	0.010 °C
200 °C	0.018 °C
420 °C‡	0.029 °C

Note: Calibration uncertainties depend on the uncertainties of the lab performing the calibration. Subsequent calibrations of this probe performed with different processes, at different facilities, or with changed uncertainty statements may state different uncertainties. †Lab code 200706-0 ‡5615-6 excluded