

F250

Precision Thermometer



AUTOMATIC SYSTEMS
LABORATORIES

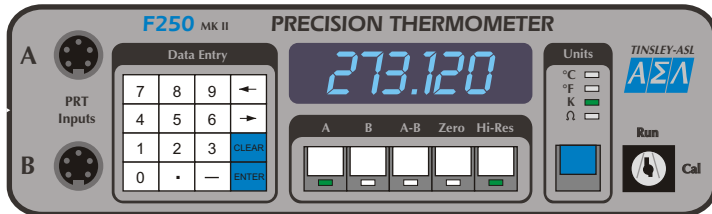


TYPICAL APPLICATIONS

- Site Thermometer Calibration
- Environmental chambers
- Research
- Viscometry
- Multi-channel logging

F250 MK II PRECISION THERMOMETER

ASL's F250 provides you with high accuracy, dual channel temperature measurement for Platinum Resistance Thermometers (PRT) and exploits the inherent advantages of AC bridge technology to maintain repeatable measurements of the highest precision. Front panel data entry allows you to enter probe calibration data, so that the thermometer resistance can accurately be converted to temperature in °C, °F or K.



A comprehensive range of features and multi-channel capabilities make the F250 ideal for a wide range of simple or specialist applications. You can use it as a single probe laboratory instrument, a portable site standard or as a permanently wired multi-channel scanning system, especially when used in conjunction with the data acquisition software.

MAIN FEATURES

- Accuracy: $\pm 0.005^{\circ}\text{C}$ at 0°C ; $\pm 0.01^{\circ}\text{C}$ over range
- Selectable resolution: 0.001°C or 0.01°C
- Direct readout in Ω , $^{\circ}\text{C}$, $^{\circ}\text{F}$ or K
- Dual channel inputs A, B or A-B
- Front panel data entry with security key
- Up to 32 channels with SB250 switchbox

TRACEABILITY

The internal reference resistor in the F250 is calibrated against internationally traceable standards. Any small differences between the measured values of the F250 and the true values, are then stored in the instruments non-volatile memory as a correction curve, thus ensuring the accuracy of all future measurements.

ASL thermometers are thermally cycled to ensure good stability and are supplied with a 4 point calibration certificate traceable to NPL. The user entered calibration data ensures the best possible conversion of resistance to temperature and is far superior to general purpose matching where only R_0 and the alpha value are entered. System accuracy is thus traceable to International Standards without a specific "System calibration". However, a

traceable system calibration, with both F250 and probes together, is offered by ASL as an option to provide you with an overall system uncertainty as low as $\pm 0.01^{\circ}\text{C}$.

PC SOFTWARE

You can use U-LOG software for control, data logging and for graphical data presentation of measurement data. Optionally you can choose U-CAL software for calibration applications with liquid baths or block calibrators and for generating calibration certificates.

Like to know more about AC and why AC measurement then see the data sheet "Why is AC better than DC ?"

MULTI-CHANNEL

8 or 16 channel SB250 switchboxes may be added to channels A and B giving a maximum of 32 input channels, without affecting system accuracy. Switching between channels can be accomplished through the keypad or via the communications interface. You can choose to connect your probes to front or back panels on both F250 and switchboxes.



A TRUE PEDIGREE

National standards laboratories around the world require the best instrumentation for their work. The majority of these organisations use ASL's top of the range Models F900 or F18 to set the temperature standard in their country, these include 22 out of the 23 members of the international C.C.T. (Consultative Committee of Thermometry). The F250 uses the same AC measurement techniques to provide you with unrivalled performance, convenience and flexibility.

FEATURES

Digital display	6 digit vacuum fluorescent display for A, B or A-B in °C, °F, K & Ω, plus data entry instructions. (F250RH indicates RH and dew point instead of K & Ω).
Data review	Enables you to check and edit the stored probe calibration data.
Stored data auto check	A unique code is stored when the probe calibration “look-up” table is generated. The F250 keeps a continuous check on data integrity and alerts you to any change.
Probe serial number entry	Data entry can include a 4 digit serial number of the probe allowing you to keep an easy check on which probe is stored to which channel, including switchboxes.
Data entry	Probe calibration data may be entered and reviewed in either °C or °F.
Coefficient D and W(660)	For better quality probes used at higher temperatures, the ITS-90 data entry method allows the additional coefficient “D” to be entered above temperatures of 660°C. A value for W (Omega) at 660°C can also be entered.
Run/Cal keyswitch	A removable key allows authorised access to probe coefficients via the keypad. In the “Run” position you can manually select channel number on optional switchboxes.

273.120

ACCESSORIES

F250-A-N	Model F250 Digital Precision Thermometer, where: N =no options V =RS232/IEEE
SB250-A-8 (or 16)	Model SB250 8 or 16 channel multi-channel switchbox, including cable to F250.
T100-250-D (or T)	Calibrated PRT, range -50°C to +250°C, stainless steel sheath 6mm OD x 350mm long, 2 metre cable with 5 pin DIN plug (D) to suit front panel connectors or 5 pin screw terminal plug (T) to suit rear panel connectors.
T100-450-D (or T)	Calibrated PRT, range -70°C to +450°C, stainless steel sheath 6mm OD x 350mm long, cable and connector as above.
T100-650-D (or T)	Calibrated PRT, range -189°C to +650°C, fused silica sheath 7mm OD x 450mm long, cable and connector as above.
F250-SYSCAL	NAMAS system calibration of F250 and probes.
PS01	Standards psychrometer for use with F250RH - call sales for further information.
FA-DT	Adaptor to convert from 5 pin DIN plug to 5 pin screw terminal plug.
FA-TD	Adaptor to convert 5 pin screw terminal plug to 5 pin DIN plug.
FA-CC250	Hard carry case for F250 + T100-250 or T100-450 probe.
FA-SC250	Soft carry case for F250, with carrying strap.
U-LOG	U-LOG Temperature measurement and data acquisition software.



F250

MK II

mV

0.01

°C

SPECIFICATION

Range	-200°C to +962°C, depending on PRT used.
Accuracy	F250 only: $\pm 0.005^{\circ}\text{C}$ ($\pm 5\text{mK}$) at 0°C , otherwise $\leq \pm 0.01^{\circ}\text{C}$ ($\pm 10\text{mK}$) F250 + T100-250: $\pm 25\text{mK}$ (-50°C to $+250^{\circ}\text{C}$) F250 + T100-450: -70°C ($\pm 45\text{mK}$), -40°C to $+250^{\circ}\text{C}$ ($\pm 25\text{mK}$), $+250^{\circ}\text{C}$ to $+450^{\circ}\text{C}$ ($\pm 100\text{mK}$) F250 + T100-650: -189°C to 420°C ($\pm 20\text{mK}$), $+420^{\circ}\text{C}$ to $+550^{\circ}\text{C}$ ($\pm 35\text{mK}$)
Resolution	Low resolution: 0.01°C , 0.01°F , 0.01K , 0.01Ω (display) or 0.001Ω (via interface). High resolution: 0.001°C , 0.001°F , 0.001K , 0.001Ω (display) or 0.0001Ω (via interface).
Repeatability	± 2 least significant digits ($\pm 0.002^{\circ}\text{C}$), included in accuracy.
Stability	Long term: typically $< 0.002\Omega$ per year ($< 0.005^{\circ}\text{C}$ for Pt100).
Temperature co-efficient	$\leq \pm 0.0005^{\circ}\text{C}/^{\circ}\text{C}$ ambient change. Operating ambient: 15°C to 25°C for best accuracy. 0°C to 50°C maximum, non-condensing.
Data entry format	ITS90 coefficients, Callendar van Dusen coefficients, Callender van Dusen data pairs or EN60751 for un-calibrated probes.
Probe current	1 mA constant current source.
Probe types	Pt100 to EN60751 with nominal $R_0=100$ and "Alpha" $=0.00385$, plus 10 and 25Ω high alpha probes up to 0.00392.
Cable length	Typically 2 metres standard, up to 30 metres permissible.
Thermometer input connectors	Front panel: 5 pin industrial DIN socket. Rear panel: 5 pin screw terminal plug.
Optional communications	RS232C: Baud rates 4800, 9600 and 19200. Parity, data and stop bits user selectable. IEEE-488: Address selectable from 1 to 7.
Operating conditions	0°C to 50°C , 10-90% RH.
Power requirements	240, 220, 120, 100 VAC ($\pm 8\%$) selectable on rear panel, 47-63 Hz, 30VA max.
Dimensions	260mm (W) x 80mm (H) x 240mm (D).
Weight	2.6kg (5.7 lbs).

Specifications are subject to change without prior notice.



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