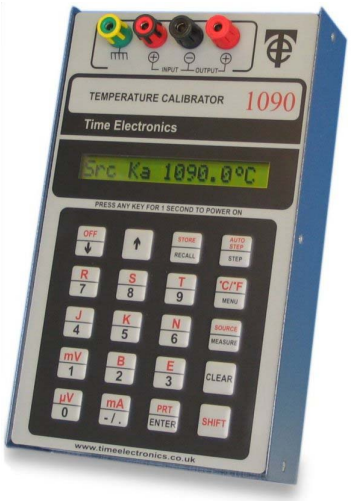
1090 Temperature and mV/mA Indicator/Calibrator

Time Electronics
Calibration, Test & Measurement

- **Measure/Simulate 8 thermocouples**
- **Measure/Simulate PT100**
- **ITS 90 standard**
- **Measure/Source (uV/mV/mA)**
- **Display in degC and degF**
- **Automatic CJC - selectable**
- **10 point memory recall**
- **Inching and Step functions**
- **Mains/Battery + auto power down**
- **Process loops 4-20mA and 0-50mA**
- **24V loop drive voltage**
- **Robust carrying case/test leads**



Introduction

The 1090 is a portable high performance instrument that combines source and measurement functions for thermocouples, PT100s, uV, mV, and mA.

Thermocouple measurement and simulation
The unit can measure and simulate the temperature and mV characteristics of J, K, T, R, S, B, N and E thermocouples.

Cold junction compensation
The unit can be operated with or without internal cold junction compensation.

PT100 measurement and simulation
Based on 0.3850 alpha probe standard.
Range is –200 degC to 700 degC.

Measurement and Source (uV, mV, and mA)
Measurement ranges are 0 to +/-30mV and 0 to +/-60mA.
Source ranges are 0 to +/-80mV and 0 to +80mA.

Temperature units selection
The display can be easily changed from degC to degF. The equivalent uV (thermocouples) and ohms (PT100) can also be shown.

24V Process Loop drive mode
A process loop can be driven at 24V and up to 60mA by selecting the 'Milliamp Source' mode and setting it at 60mA (or a lower level if required).

Inching (Incrementing/Decrementing)
The unit has a general-purpose inching function. This adjusts the output in fixed increments of temperature (thermocouples only) or voltage or current. The set-up menu gives a the user a choice of three levels of increment i.e. 0.1, 1 or 10 for degC/degF, or 1, 10, or 100 uV/uA for voltage/current. The lowest of these represents the highest setting resolution and provides the most precise control of the output. This is especially useful for calibrating thermostat controllers that have tight specification on hysteresis.

Memory recall and step/auto-step functions
Up to 10 values can be stored in the unit's non-volatile memory and they can be recalled at any time. The user can also manually step through them in sequence using the step key. Continuous stepping (auto-step) is also available at any user selectable rate between 1 and 10 seconds/step.

Power is via an internal high capacity re-chargeable metal hydride battery that can be re-charged from an external mains charger (supplied as standard).

The unit is supplied in a robust case with a carrying strap. A pocket for the instruction manual is provided.

Calibration certificates can be supplied to either NPL or UKAS traceable standards.

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V18 14/2/06

Specifications

MEASURE ACCURACY

THERMOCOUPLE TYPE	TEMPERATURE RANGE degC	ACCURACY degC
J	-200 to 580	0.7
K	-200 to –150 -150 to 750	2.5 0.5
T	-200 to 0 0 to 400	1.5 0.4
R	-50 to 400 400 to 1750	3.0 1.5
S	-50 to 100 100 to 1750	3.0 1.5
B	110 to 1000 1000 to 1800	3.5 1.5
N	-100 to 890	0.6
E	-50 to 400	0.4

Resolution: 0.1 degC or degF

SIMULATE ACCURACY

THERMOCOUPLE TYPE	TEMPERATURE RANGE degC	ACCURACY degC
J	-210 to 150 150 to 1200	0.15 0.3
K	-270 to 190 190 to 1250	0.5 0.4
T	-200 to 150 150 to 400	0.4 0.5
R	-50 to 800 800 to 1750	0.8 2.0
S	-50 to 850 850 to 1750	0.9 2.0
B	100 to 1200 1200 to 1800	2.0 3.0
N	-270 to 260 260 to 1300	0.5 1.0
E	-50 to 1000	0.3

Resolution: 0.1 degC or degF

An additional correction representing the equivalent 1µV should be allowed for stray thermal emf effects.

Cold Junction Compensation: Accuracy 0.2 degC. Resolution 0.1 degC.
Operating Temperature: -10 to 40 degC (15 to 105 degF)
Connections: Industry standard 4mm screw terminals.
Power: A metal hydride rechargeable battery pack gives approximately 60 hours continuous operation. The mains re-charger supplied allows full recharge in 20 hours, or alternatively the unit may be recharged from 12-volt car cigar lighter. To conserve battery life, a user inactivity power-down feature is included.
Dimensions: 235 x 150 x 75 mm 1.25 Kg (9.25 x 6 x 3 ins 2.8lb)

Millivolt Measure 0 to +/- 30mV
Resolution: 10µV
Accuracy: 0.05% of f.s. ±1 digit
Input resistance: 100K Ohms

Milliamp Measure 0 to +/- 60mA
Resolution: 20µA
Accuracy: 0.05% of f.s. ±1 digit
Input resistance: 0.5 ohms

PT100 Simulation
14 set temperature points
-100, -50, -20, 0, 20, 50, 100, 200,
300, 400, 500, 600, 700, 800 degC
Accuracy: 0.1% of resistance value (typically 0.5 degC)

PT100 Measure (0.2 degC or degF resolution)
Range: -200 to 700 degC, 2 wire.
Accuracy: 0.2% of resistance value (typically 0.7 degC)

Memory recall and step functions
10 memory locations for non-volatile storage of values.
Manual and Auto-Step, rate adjustable from 1 to 10 sec/step

Millivolt Source 0 to +/- 80mV
Accuracy (8 to 80mV): 0.02% of f.s.
Resolution (8 to 80mV): 5uV
Accuracy (0 to 8mV): +/-4uV
Resolution (0 to 8mV): 0.5uV
Output resistance: 10 ohm

Milliamp Source 0 to +80mA
Accuracy (8 to 80mA): 0.02% of f.s.
Resolution: 5uA
Accuracy (0 to 8mA): +/-10uA
Resolution: 0.5uA
Max load (24V drive): 300R/80mA ,480R/50mA ,1.2K/20mA

Inching
Three levels of increment, 0.1, 1 or 10 for degC/degF, and 1, 10, or 100 uV/ uA for voltage/current. The lowest of these represents the highest setting resolution and provides the most precise control of the output.

24V Process Loop drive mode
A process loop can be driven at 24V and up to 60mA by selecting the ‘Milliamp Source’ mode and setting it at 60mA (or a lower level if required).

Ordering Information

Description	Order Code
Temperature and mV/mA Indicator/Calibrator (including batteries, charger and carrying case)	**1090**
N.P.L. Traceable Calibration Certificate	**9177**
UKAS Calibration Certificate	**9139**