

### Minimum and maximum thermocouple limits

T/C type	min °C	max °C	min °F	max °F
K	-200.0	1372.0	-328.0	2501
T	-270.0	400.0	-454.0	752.0
J	-200.0	1200.0	-328.0	2192
R/S	0.0	1768.0	32.0	3214
N	-200.0	1300.0	-328.0	2372
E	-140.0	1000.0	-220.0	1832.0

### BATTERIES

'LO BAT' indicates that the batteries need replacing as soon as possible. The unit will continue to function but to maintain accuracy new batteries are required. Replace both batteries with AAA, MN2400 or equivalent 1.5 volt alkaline batteries. If 'Battery Flat' is displayed in the text line the instrument has detected that there is insufficient battery voltage left to function correctly. The instrument will shut down and will not simulate again until new batteries have been fitted.

### EMC/RFI

Readings may be affected if the unit is operated within a radio frequency electromagnetic field strength of approximately 3 volts per meter, but the performance of the instrument will not be permanently affected.

### GUARANTEE

This instrument carries a one-year warranty against defects in either components or workmanship. During this period, products that prove to be defective will, at the discretion of ThermoWorks, be either repaired or replaced without charge. The product warranty does not cover damage caused by fair wear and tear, abnormal storage conditions, incorrect use, accidental misuse, abuse, neglect, misapplication or modification. Full details of liability are available within ThermoWorks' Terms & Conditions of Sale, available by request or at [www.thermoworks.com](http://www.thermoworks.com). In line with our policy of continuous development, we reserve the right to amend our product specification without prior notice.

### Factory preset temperature values

T/C type	K,J,N & E	T	R & S
No.			
1	-20.0	-50.0	400.0
2	-10.0	-30.0	500.0
3	0.0	-20.0	600.0
4	10.0	-10.0	700.0
5	30.0	0.0	800.0
6	50.0	10.0	900.0
7	100.0	30.0	1000.0
8	195.0	50.0	1100.0
9	250.0	80.0	1200.0
10	500.0	100.0	1300.0
11	800.0	200.0	1400.0
12	1000.0	400.0	1500.0

### INSTRUMENT RECORD CARD

MODEL CODE	ORDER	RANGE	RESOLUTION
MicroCal 1Plus	THS-271-101	12 presets	0.1/1°C/°F

Serial No. \_\_\_\_\_

Calibrated by \_\_\_\_\_ Date \_\_\_\_\_

This instrument has been checked or calibrated against reference instrument(s) calibrated by a UKAS Accredited Calibration Laboratory. Traceable to NIST.

To BS EN 60584 : 1996



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ThermoWorks

## Operating Instructions for MicroCal 1 Plus

## FEATURES

**MicroCal 1 Plus** - Simulation - 12 preset adjustable temperatures, individually °C/°F selectable. Selectable thermocouple type K, T, J, R, S, N and E. Measurement - Selectable thermocouple type K, T, J, R, S, N and E.

**Cold Junction Compensation** - CJC selectable on/off, auto-off selectable on/off and selectable display contrast adjustment.

## ON/OFF

To turn the instrument on press the ON/OFF button. All display segments will be tested.

The thermocouple type and OUT or IN will be displayed in the text line above the set temperature. When turning off, the unit will remember the last settings and restart with the same configuration.

The unit is now ready to simulate or measure temperature.

To turn the instrument off press the ON/OFF button. 'Saving data' followed by 'MicroCal OFF' will be displayed in the text line.

## DISPLAY

The display has two sections. The main section is a 4½-digit temperature display located in the lower half of the viewing area, where input or output values are displayed. The other section is a 12-digit alpha/numeric dot matrix text line, located at the top of the viewing area, above the temperature display. Set-up information and command prompts will be displayed here.

## RESOLUTION

The unit resolution will be 0.1 °, within the range ± 1999.9° and will be 1 ° outside of this.

## INSTRUMENTS

This unit should only be used with appropriate thermocouple instruments made to one of the following standards.

Type K	Nickel-Chromium/Nickel-Aluminium	BS EN 60584:1996
Type J	Iron/Constantan	BS EN 60584:1996
Type T	Copper/Copper-Nickel	BS EN 60584:1996
Type R	Platinum 13% Rhodium	BS EN 60584:1996
Type S	Platinum 10% Rhodium	BS EN 60584:1996
Type N	Nicrosil/Nisil	BS EN 60584:1996
Type E	Chromel/Constantan	BS EN 60584:1996

All thermocouple tables to ITS 90.

## AUTO-OFF

In simulation/measurement mode auto-off is set at 30 minutes. This can be disabled. In ambient measurement mode the auto-off is fixed at 10 minutes.

## AMBIENT MEASUREMENT FACILITY

This facility allows the internal CJC temperature of the unit to be measured. This allows the user to determine if the unit has sufficiently acclimatized. Acclimatization is crucial for accurate simulation output/measurement. Start the unit by pressing the ON/OFF button while pressing the UP▲ and DOWN▼ buttons. Do not release the UP▲ and DOWN▼ buttons until the software revision is displayed. The software revision is shown on startup in this mode.

## SIMULATION TEMPERATURE

Start the unit by pressing the ON/OFF button.

Press the UP▲ or DOWN▼ buttons to select the output temperature. Release the button when the required temperature is displayed. Press and hold the button to scroll through the available temperatures in a continuous loop. Press both UP▲ and DOWN▼ buttons together to return to 0 °C (32°F) (R and S T/C: 400 °C). If this temperature has been reconfigured the new value will be displayed.

## MEASUREMENT

Start the unit by pressing the ON/OFF button.

Press and hold the UP▲ button to hold the reading. HOLD will illuminate in the display.

## INTERNAL/EXTERNAL CJC (Cold Junction Compensation)

The unit will automatically adjust the thermocouple millivolt output to allow for changes in the ambient temperature when the CJC is set to 'INTERNAL'. Use CJC 'EXTERNAL' if the output is being wired through an "ice point reference".

## BUTTON FUNCTION IN THE PARAMETER SET-UP MENU

Press the MODE button to enter the parameter set-up menu. The parameter and its current setting will be shown in the text line. Press the MODE button to move to the next parameter. Use either the UP▲ or DOWN▼ button to change setting (i.e. Y to N, °C to °F, Internal CJC to External CJC). When setting display contrast press and hold the UP▲ button to increase contrast (darken the display) and the DOWN▼ button to decrease contrast (lighten the display). Press both UP▲ and DOWN▼ buttons together to return to the factory default.

When all parameters have been scrolled through, 'End of list' will be displayed while the settings are saved.

## Menu

Press the MODE button to enter the prime function menu.

### Prime Function List

<Measurement> <Simulation>

The MicroCal 1 Plus has a single set-up menu in measurement mode.

### Parameter Set-up Menu List:- (Measurement)

Temp in <°C> <°F>  
T/C Type = <K> <T> <J> <R> <S> <N> <E>  
<Internal CJC> <External CJC>  
Auto Off <Y> <N>  
Contrast Set

End of List

The MicroCal 1 Plus has a split set-up menu in simulation mode. Press the MODE button to enter the set-up menu. If 'Set Temp = N' when the mode button is pressed again the PARAMETER SET-UP MENU is selected. If 'Set Temp=Y' the TEMPERATURE CONFIGURATION MENU is selected.

If :- Set Temp = N

### Parameter Set-up Menu List :- (Simulation)

T/C Type = <K> <T> <J> <R> <S> <N> <E>  
<Internal CJC> <External CJC>  
Auto Off <Y> <N>  
Contrast Set

End of List

or

If :- Set Temp = Y

### Temperature Configuration List :- (Simulation)

Temp in <°C> <°F>  
Adjust Value  
Save Value <N> <Y>

End of List

Each temperature can be individually configured, in °C or °F, to any value within the range of the unit.

When adjusting temperature values the UP▲ button increases the value and the DOWN▼ button decreases the value. Press both UP▲ and DOWN▼ buttons together to return to the factory default value for that temperature location.

To set all temperature values to °C, start the unit by pressing the ON/OFF button while pressing the MODE and UP▲ buttons. When MODE and UP▲ buttons are released the unit will start up. To set all temperature values to °F, start the unit by pressing the ON/OFF button while pressing the MODE and DOWN▼ buttons. When MODE and DOWN▼ buttons are released the unit will start up.