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 metre, but the performance of the instrument will not be permanently affected.

GUARANTEE - This instrument carries a two-year guarantee against defects in either components or workmanship. During this period, products that prove to be defective will, at the discretion of ETI, be either repaired or replaced without charge. The product guarantee 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 ETI's Terms & Conditions of Sale, available by request or at www.etiltd.com/terms. In line with our policy of continuous development, we reserve the right to amend our product specification without prior notice.

Factory preset temperature values (MicroCal 1 and 1 Plus)

T/C type No.	K,J,N & E	T	R & S
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	order code	range	resolution
MicroCal 1	271-100	12 presets	0.1/1°C/°F
MicroCal 1 Plus	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.
BS EN 60584-1:2013

THE QUEEN'S AWARDS
FOR ENTERPRISE:
2014

CE

MicroCal 1 & 1 Plus Calibrators

Operating Instructions

FEATURES

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

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.

All models - 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 (1 Plus only) 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 (1 Plus only). 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 60584-1:2013
Type J	Iron/Constantan	BS EN 60584-1:2013
Type T	Copper/Copper-Nickel	BS EN 60584-1:2013
Type R	Platinum 13% Rhodium	BS EN 60584-1:2013
Type S	Platinum 10% Rhodium	BS EN 60584-1:2013
Type N	Nicrosil/Nisil	BS EN 60584-1:2013
Type E	Chromel/Constantan	BS EN 60584-1:2013

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 acclimatised. Acclimatisation 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 (MicroCal 1 & 1 Plus) - 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 (MicroCal 1 Plus ONLY) - 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 (MicroCal 1 & 1 Plus) - 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.

MicroCal 1 Plus ONLY - 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 and 1 Plus have 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.