

# Block Calibrators



CL122-1.

## CL120/CL134 Series



- ✓ Capable of Simultaneous Heat and Cool Sourcing in 1 Unit
- ✓ Universal Jaw is Ideal for Accepting Irregularly Shaped Probes and Sensors
- ✓ Portable for Field or Laboratory Use
- ✓ CE Approved
- ✓ NIST-Traceable Certificate of Calibration
- ✓ 115V Power, 230V Optional

## CL120 Series Calibration COOL/HEAT Source

The CL120 Series is capable of simultaneous heat and cool sourcing in 1 unit and is available with either 1 or 2 modules. You select the combination of modules: COOL source only, HEAT source only, COOL source and HEAT source, or 2 HEAT sources. Both the COOL and HEAT sources are available with the universal jaw or a "five hole block."

A dual module system with simultaneous cooling and heating is a significant advantage, because temperature sensors are rarely tested at only 1 temperature. The most common procedure is to test at 0°C (32°F) and at the maximum temperature, thereby characterizing the offset and gain errors. Two HEAT source systems may also be ordered.



OMEGACARE<sup>SM</sup> extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARE<sup>SM</sup> covers parts, labor and equivalent loaners.

## NIST Calibration Traceability Satisfies ISO and FDA Thermal Validation requirements

OMEGA certifies the accuracy of its products by using working standard test equipment that is compared to equipment calibrated yearly at NIST (National Institute of Standards and Technology) and redundant equipment calibrated at an independent lab that maintains standards traceable to NIST. This NIST-traceable documentation is provided for each calibration including the actual calibration data.



CL134-5 shown smaller than actual size.

## CL134 Series Temperature Source/Measure

The CL134 Series has the same features as the CL120 but includes measurement capabilities. This additional feature simplifies the testing of temperature sensors by conveniently housing both the source and measure in one package. The CL134 Series has 3 distinct capabilities:

1. A COOL source (either universal jaw or "5 hole block") with range down to  $-30^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$ )
2. A HEAT source with range to  $500^{\circ}\text{C}$  ( $932^{\circ}\text{F}$ ) with universal jaw or range to  $700^{\circ}\text{C}$  ( $1292^{\circ}\text{F}$ ) with a "5 hole block," the CL134 Series may be ordered with 2 HEAT sources and no COOL source
3. Measures thermocouples, RTDs, current and voltage

Input Type		Range	Accuracy*
Process Voltage		0 to 100 mV, 0 to 1V, 0 to 10 Vdc	0.03% rdg
Process Current		0 to 20 mA, 4 to 20 mA	0.03% rdg
J	Iron-Constantan	-346 to $1400^{\circ}\text{F}$	$0.7^{\circ}\text{F}$
K	CHROMEGA®-ALOMEGA®	-454 to $-256^{\circ}\text{F}$ -256 to $2502^{\circ}\text{F}$	$1.8^{\circ}\text{F}$ $0.7^{\circ}\text{F}$
T	Copper-Constantan	-454 to $-310^{\circ}\text{F}$ -310 to $752^{\circ}\text{F}$	$1.8^{\circ}\text{F}$ $0.7^{\circ}\text{F}$
E	CHROMEGA®-Constantan	-454 to $-364^{\circ}\text{F}$ -364 to $1832^{\circ}\text{F}$	$1.8^{\circ}\text{F}$ $0.7^{\circ}\text{F}$
R	Pt/13%Rh-Pt	-58 to $104^{\circ}\text{F}$ 104 to $3250^{\circ}\text{F}$	$1.8^{\circ}\text{F}$ $0.9^{\circ}\text{F}$
S	Pt/10%Rh-Pt	-58 to $212^{\circ}\text{F}$ 212 to $3214^{\circ}\text{F}$	$1.8^{\circ}\text{F}$ $0.9^{\circ}\text{F}$
B	30%Rh-Pt/ 6%Rh-Pt	212 to $1184^{\circ}\text{F}$ 1184 to $3308^{\circ}\text{F}$	$1.8^{\circ}\text{F}$ $0.9^{\circ}\text{F}$
C	5%Re-W/ 26%Re-W	32 to $4253^{\circ}\text{F}$	$0.7^{\circ}\text{F}$
N	Nicrosil-Nisil	-418 to $-148^{\circ}\text{F}$ -148 to $2372^{\circ}\text{F}$	$1.8^{\circ}\text{F}$ $0.7^{\circ}\text{F}$
L	J DIN	-328 to $1652^{\circ}\text{F}$	$0.7^{\circ}\text{F}$
RTD	Pt, 385, 100 $\Omega$	-328 to $1652^{\circ}\text{F}$	$0.3^{\circ}\text{F}$
	Pt, 392, 100 $\Omega$	-328 to $1562^{\circ}\text{F}$	$0.3^{\circ}\text{F}$

\* Accuracy (all  $\pm$ ) includes maximum linearization error.

## Specifications

**Internal Reference Sensor:** Pt RTD with repeatability better than 0.05°C after repeated cycling to 700°C

**Ramp Mode:** Can be set in 0.1°/min increments

**Ambient Temperature:** 4 to 40°C (39 to 104°F)

## Case Dimensions:

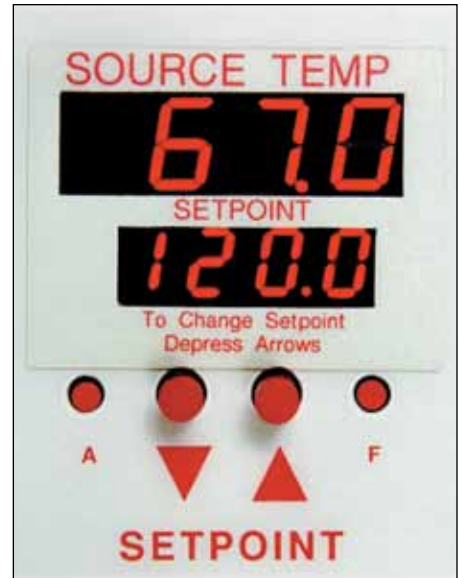
**CL120:** Aluminum, 213 H x 292 W x 178 mm D (8.4 x 11.5 x 7"); removable top 64 mm high (2.5")

**CL134:** Aluminum, 254 H x 406 W x 229 mm D (10 x 16.0 x 9"); removable top 64 mm (2.5" D)

**Power:** 90 to 130 Vac, 210 to 250 Vac (specify option 230) 800 VA max, 50/60Hz



The operator controls are the up/down pushbuttons for the setpoint, and ON/OFF for the COOL/HEAT sources. The calibration controls (A, F) are recessed and digitally locked out. The readout units may be set to °C or °F with 0.1° resolution up to 537.0°C (999.9°F). A ramp mode may be accessed to test temperature transmitter trip points.



## Universal Jaw

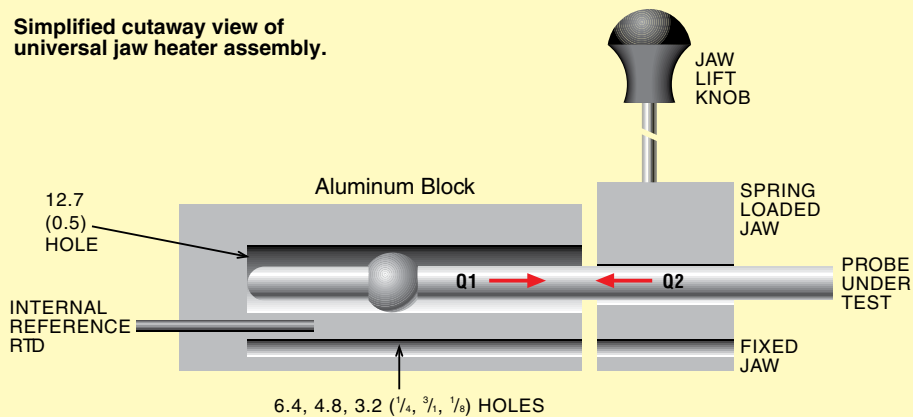
Illustrated is an industrial temperature probe with a ferrule. This probe cannot be tested in a conventional drilled hole because the ferrule prevents good contact between the probe and the metal block. Heat  $Q_1$  flows down the stem of the probe, causing the probe output to read less than the calibration temperature as sensed by the internal reference RTD. This effect is referred to as stem loss.

The universal jaw clamps around the probe with actively heated jaws and injects the amount of heat  $Q_2$  needed to neutralize the stem loss. For the COOL source, the universal jaw works similarly, except the directions of  $Q_1$  and  $Q_2$  are reversed.

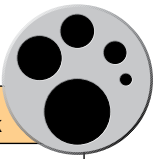


Universal jaw is ideal for irregularly shaped probes.

Simplified cutaway view of universal jaw heater assembly.



5-hole block diameters: 1.6, 3.2, 4.8, 6.4, and 9.5 mm ( $\frac{1}{16}$ ,  $\frac{1}{8}$ ,  $\frac{3}{16}$ ,  $\frac{1}{4}$ , and  $\frac{3}{8}$ ").



General Specifications	COOL Source Universal Jaw	COOL Source 5 Hole Block	Heat Source Universal Jaw	Heat Source 5 Hole Block
Range °C Range °F	Ambient to -30° Ambient to -22° range is 50°C (90°F) below ambient		30° to 500° 86° to 932°	30° to 700° 86° to 1292°
Accuracy <sup>1</sup>	±0.1°C (±0.2°F) for probes 6.4 mm (0.25") and smaller		±(0.05% of setpoint + 0.1°C [0.2°F]) for probes 6.4 mm (0.25") and smaller	
	±0.2°C (0.4°F) for probes >6.4 to 12.7 mm (0.25 to 0.5")		±(0.1% of setpoint + 0.1°C [0.2°F]) for probes >6.4 to 12.7 mm (0.25 to 0.5")	
Resolution	0.1°C or °F		0.1°C or °F	0.1° to 537°C (999°F) 1° above 537°C (999°F)
Stability <sup>2</sup>	±0.05°C (0.1°F)		±0.05°C (0.1°F)	
Repeatability <sup>3</sup>	±0.05°C (0.1°F)		±0.05°C (0.1°F)	
Uniformity X-Y Axis (Across Flats)	<±0.03°C (0.05°F)		<±0.03°C (0.05°F)	<0.1°C (0.2°F)
Z Axis (Depth)	<0.1°C (0.2°F) from 102 mm (4") deep to 51 mm (2") deep		<0.1°C (0.2°F) from 4" (102 mm) deep to jaws	<0.1% of setpoint from 102 mm (4") deep to 51 mm (2") deep
Cool/Heat Time	5 minutes to COOL and stabilize from ambient to 0°C (32°F)		10 minutes to HEAT and stabilize @ 300°C	12 minutes to HEAT and stabilize @ 600°C
Metal Block	Aluminum	Aluminum	Aluminum	Bronze Alloy
	Jaw accepts up to 12.7 mm (0.5") drilled holes 3.2, 4.8, 6.4 mm ( $\frac{1}{8}$ , $\frac{3}{16}$ , $\frac{1}{4}$ ") 102 mm (4") deep	Drilled holes 1.6, 3.2, 4.8, 6.4, 9.5 mm ( $\frac{1}{16}$ , $\frac{1}{8}$ , $\frac{3}{16}$ , $\frac{1}{4}$ , $\frac{3}{8}$ ") 102 mm (4") deep; other holes available	Jaw accepts up to 12.7 mm (0.5") drilled holes 3.2, 4.8, 6.4 mm ( $\frac{1}{8}$ , $\frac{3}{16}$ , $\frac{1}{4}$ ") 102 mm (4") deep	Drilled holes 1.6, 3.2, 4.8, 6.4, 9.5 mm ( $\frac{1}{16}$ , $\frac{1}{8}$ , $\frac{3}{16}$ , $\frac{1}{4}$ , $\frac{3}{8}$ ") 102 mm (4") deep; other holes available

Cooling method: Peltier elements.

<sup>1</sup> Accuracy for 1 year with ambient between 20° to 26°C.

<sup>2</sup> Measured for 24 hours with ambient between 20° to 26°C.

<sup>3</sup> Measured with rosemount 162CE as follows: 1. Measure temperature at 100°C. 2. Heat to maximum (500°C for universal jaw, 700°C for 5 hole block). 3. Remeasure at 100°C. The difference between 1. and 3. is <0.05°C.

## To Order Visit [omega.com/cl120](http://omega.com/cl120) for Pricing and Details

Model No.	Description
CL121-1	Block calibrator with single module COOL universal jaw -30°C (-22°F)
CL121-2	Block calibrator with single module HEAT universal jaw 500°C (932°F)
CL121-3	Block calibrator with single module COOL 5-hole block -30°C (-22°F)
CL121-4	Block calibrator with single module HEAT 5-hole block 700°C (1292°F)
CL122-1	Block calibrator with dual module COOL universal jaw -30°C (-22°F), HEAT universal jaw 500°C (932°F)
CL122-2	Block calibrator with dual module HEAT universal jaw 500°C (932°F)
CL122-4	Block calibrator with dual module COOL 5-hole block -30°C (-22°F), HEAT 5-hole block 700°C (1292°F)
CL122-5	Block calibrator with dual module HEAT 5-hole block 700°C (1292°F)

Note: 2 COOL sources not available in 1 instrument. Add "-230" suffix for 230 Vac power option, for an additional cost.

Ordering Example: CL121-1, block calibrator with a cooling source using the universal jaw. OCW-3, OMEGACARE<sup>SM</sup> extends standard 2-year warranty to a total of 5 years.

Model No.	Description
CL134-1	Block calibrator with COOL universal jaw -30°C (-22°F), HEAT universal jaw 500°C (932°F), and measurement readout
CL134-2	Block calibrator with dual mode HEAT universal jaw 500°C (932°F), and measurement readout
CL134-4	Block calibrator with COOL 5 hole block -30°C (-22°F) HEAT 5-hole block 700°C (1292°F), and measurement readout
CL134-5	Block calibrator with HEAT 5 hole block 700°C (1292°F), and measurement readout (dual heat sources)

Add "-230" suffix for 230 Vac power option, for an additional cost.

K, J, T, E, C, S, R, B, and N thermocouple types may be read with 0.1°C or °F resolution. RTDs (resistance temperature detectors) may be tested in 2-, 3-, or 4-wire modes with alpha values of 0.385 or 0.392. The outputs of temperature transmitters may be read directly by the MEASURE unit in either mA or Vdc.

Ordering Example: CL134-4, block calibrator with cooling and heating source using standard 5-hole block. OCW-3, OMEGACARE<sup>SM</sup> extends standard 2-year warranty to a total of 5 years.