

1 YEAR
WARRANTY

Ω OMEGA™

User's Guide



Above items are included with the DBCL130 Dry Block temperature calibrator. Not shown is the calibration certificate and operator manual

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Model DBCL130
Dry Block Temperature Calibrator

DBCL130 Dry Block Temperature Calibrator

Introduction

The DBCL130 calibrator provides a safe, dry, constant temperature source for checking and calibrating a wide range of temperature sensors, systems, indicators and thermometers. It is fast and economical and can be used either on a bench top or as a portable field unit. The weight of the unit is only 15 pounds/6.8 kilograms. The unit covers the temperature range from -25°C to +130°C in an ambient of 20°C using a machined aluminum block as the heat transfer medium. The temperature control circuit is built into the unit.

Features include:

- Maximum temperature of 130°C/266°F
- Minimum temperature of -25°C/-13°F
- Up to eight setpoints can be stored & recalled
- Flexible insert well

Even though the unit heats up and cools down rapidly, highly efficient insulation and an internal cooling fan ensure that the case remains safe enough to handle even at maximum operating temperatures. The DBCL130 calibrator has been designed to comply with all relevant electromagnetic interference and electrical safety regulations.

Specification

Figures quoted are at the base of the well at the time of calibration.

Temperature range:	-25°C/-13°F to 130°C/266°F at an ambient of 20°C/68°F
NOTE:	the typical minimum achievable temperature is 45°C/80°F below the room ambient temperature
Display resolution:	0.1°
Accuracy:	±0.4°C (-20 to 130°C) ±0.7°F (-4 to 266°F)
Stability (10 minutes):	±0.050°C (±0.080°F)
Heat up time -20 to 130°C:	5 minutes
Heat up time 20 to 100°C:	2 minutes
Cool down 20 to -20°C:	3 minutes (ambient of +20°C)
Cool down 130 to 20°C:	2.5 minutes
Immersion Depth:	4" (101mm)
Insert well:	½" diameter x 4" depth
Fan Cooling:	Automatic
Weight:	15 lbs (6.8 Kg)
Dimensions* (H x W x D):	11 x 9 x 8 inches/279 x 229 x 203 mm
	*excluding the carrying strap

Electrical supply (this unit will operate on any voltage from 100 to 240 VAC)

<i>Voltage</i>	<i>Cycles</i>	<i>Power</i>
100 to 230V	50/60Hz	200W

Note: The above specifications are quoted for an ambient temperature range of 10°C/50°F to 30°C/86°F. Outside this range, the quoted figures may deteriorate but the unit will still work safely. *NOTE: The minimum achievable temperature is 45°C/80°F below the room ambient temperature.*

Working environment

The calibrator units are designed to work safely under the following conditions:

Ambient temperature range: 5°C/9°F to 40°C/104°F

Humidity: Up to 95% relative humidity, non-condensing

Warning

Warning: HIGH TEMPERATURES ARE DANGEROUS

HIGH TEMPERATURES ARE DANGEROUS: They can cause serious burns to operators and ignite combustible material. Omega Engineering has taken great care in the design of these units to protect operators from hazards, but operators should pay attention to the following points:

- USE CARE AND WEAR PROTECTIVE GLOVES TO PROTECT HANDS
- DO NOT put hot objects on or near combustible objects
- DO NOT operate the unit close to inflammable liquids or gases
- DO NOT place any liquid directly in your unit
- At all times USE COMMON SENSE


Operator Safety

All operators of Omega Engineering equipment must have available the relevant literature needed to ensure their safety. It is important that only suitably trained personnel operate this equipment in accordance with the instructions contained in this manual and with general safety standards and procedures. If the equipment is used in a manner not specified by Omega Engineering, the protection provided by the equipment to the operator may be impaired. All Omega Engineering units have been designed to conform to international safety requirements. If a safety problem is encountered, switch off at the power socket and remove the plug from the supply. Please use caution when removing probes and inserts as burns to the skin can occur if in contact.

Installation

1. All Omega Engineering units are supplied with a power cable.
2. Before connecting the power supply, check the voltage against the rating plate. Connect the power cable to a suitable plug according to the table below. Note that the unit must be earth grounded to ensure proper electrical safety.

Electrical connections:

	<i>220V-240V</i>	<i>110V-120V</i>
Live	Brown	Black
Neutral	Blue	White
Earth ground	Green/yellow	Green

The fused plug supplied with the power lead for use in the UK is fitted with the following value fuse to protect the cable: 240V UK 5 AMP

The fuse in the unit protects the unit and the operator. Note that the model DBCL130 operates on any mains voltage from 100 to 240VAC. However a properly rated mains cable should be used based on the mains operating voltage used.

3. Plug the power cable into the socket on the rear of the unit.
 4. Place the unit on a suitable bench or flat workspace, or in a fume cupboard if required, ensuring that the air inlet vents on the underside are free from obstruction.
- After use, when you have finished heating samples, remember that parts of the unit may be very hot. Take the precautions listed earlier.

OPERATION

Preparation

1. The heater design, temperature sensor and control circuit give good temperature control and uniformity, but make sure that there is a close fit of the probes in the block to allow efficient heat transfer. Contact us about an insert that more closely fits your probe or device being calibrated.
2. Plug the power cable into the socket in the back of the unit. Connect the power cable to the electrical supply and switch the power on. 1 = power on, 0 = power off.
3. Clean the heater block cavity out with shop or canned air to remove any particulate. Next place the probe insert into the heater block as shown using the supplied insert extractor to minimize the risk of damaging the heater block and/or probe insert. Never place a hot insert into a cold heater block or vice versa as the insert may become jammed which will damage both parts. Always use the insert extractor to both install and remove the probe insert.
4. To prevent damage to the heater block, insert, peltiers and PRT block sensor **DO NOT** use the following in or around the block;
Oil, Thermal grease, Water
Aluminum oxide sand,
Ceramic fiber insulation or Kaowool

Setting the operating temperature

1. To set the operating temperature required, press and hold either the up or down arrow button to increment to the value required. Alternatively you can press the («PF) key to move over to individual digits to set higher values much quicker. After 2 seconds your value will be set & retained.
2. When you have entered a set temperature the unit will start to heat or cool to that value.
3. Once the process value temperature reaches the set point, allow the block to fully stabilize for at least 10 minutes before performing a calibration.
4. When calibrating sensors and thermometers start at higher temperatures first and then work down to lower ones. This will allow devices to be removed safely.





Entering up to 8 setpoints for fast recall



1. To input up to 8 setpoints press the first button on the left and then the 2nd button from the left until the top line displays SP-0. Here you can enter up to 8 values for fast future recall. Do not change any of the settings or values after SP-7. When finished entering values press the button on the left one time. You'll need to note which value is in which location for future recall.
2. To select one of the 8 setpoints for use from the main display press the 2nd button from the left so the top line displays M-SP. Next use the up arrow key to select one of the 8 setpoint values. Press the 1st key on the left twice for the value to be accepted.

Operation near ambient

For best results, to calibrate at a set point near ambient when cooling down from a higher temperature set parameter (AL-1) 3 °C/5 °F higher than your room ambient. When heating up from a lower temperature set (AL-1) 3 °C/5 °F lower than ambient. Access the AL-1 parameter by pressing the mode button (2nd from the left).

Temperature scale conversion

To switch from C to F and vice versa press and hold  then select C or F under the **d-U** parameter. Next press  to display **SL-H** parameter. Set this value to 266 for degrees F operation and 130 for degrees C. Press  to display **SL-L** parameter, leave this value at -40 for both degrees C and F. Press  to exit.

Press  once and then  until the parameter **CN5** is displayed. For this value when switching from F to C divide the value shown by 1.8 and change it. For conversion from C to F multiply by 1.8 and change. Adjusting calibration parameters is discussed below.

Calibration Adjustment using a reference thermometer

Use the following if you have a traceable reference thermometer and would like to adjust the calibration of the DBCL130. Calibrations should be performed in a 3/16" or 1/4" diameter insert.

Press the first button on the left and then the 2nd button from the left until the top line displays **CN5**. The initial value shown is the default factory calibration and corresponds to the readings shown on the factory calibration certificate.

CN5 is a calibration offset, low end adjustment. For example if your reference thermometer reads 0.5 and the DBC130 display is indicating 0.0 then set the **CN5** value to 0.5. Then press the first button on the left. The display will correct to 0.5 and start to cool down so the block reading and your reference thermometer match. Adjust parameter **CNrt** at high end temperatures to correct non-linearity or slope. When done press the button on the left one time.

Operator maintenance

NOTE THAT THIS EQUIPMENT SHOULD ONLY BE DISMANTLED BY PROPERLY TRAINED PERSONNEL. REMOVING THE FRONT OR REAR PANELS EXPOSES POTENTIALLY LETHAL VOLTAGES. THERE ARE NO OPERATOR MAINTAINABLE PARTS WITHIN THE EQUIPMENT.

In the unlikely event that you experience any problems with your unit which cannot easily be remedied, you should contact your supplier and return the unit if necessary. Please include any details of the fault observed and remember to return the unit in its original packing. Omega Engineering will accept no responsibility for any damage to units that are improperly packed for shipment. If in doubt, contact your supplier.

1. **Cleaning:** Before cleaning your unit, ALWAYS disconnect it from the power supply and allow it to cool to 30° C. Your unit can be cleaned by wiping with a damp soapy cloth. Care should be exercised to prevent water from running inside the unit. Do not use abrasive cleaners.
2. **Fuse:** The unit is protected by a fuse. It should only be changed by suitably qualified personnel. If the fuse blows persistently, a serious fault is indicated and you may need to return the unit to your supplier for repair.

Accessories

The following parts may be obtained from Omega Engineering if replacements or alternatives are required:

<u>Part Number</u>	<u>Description</u>
DBCL-UKCABLE	UK 240 volt power cable with 13amp UK plug (5 amp fuse)
4164	Euro style 240 volt power cable with R/A Schuko plug
4150	US style 120 volt power cable
4168	Unit carrying strap
4285	Insert extractor
DBCL-3052	Soft sided carrying case
DBCL-130-3074	Insert for 1/8" diameter probes
DBCL-130-3075	Insert for 3/16" diameter probes
DBCL-130-3076	Insert for 1/4" diameter probes
DBCL-130-3077	Insert for 5/16" diameter probes
DBCL-130-3078	Insert for 3/8" diameter probes

Spare Parts

<u>Part Number</u>	<u>Description</u>
4224	Peltier
4174	Temperature controller
4147	PRT
4221	Solid state relay
4223	Power supply
4280	3 PDT power relay
4283	2 amp fuse, 5 x 20mm

EU Declaration of Conformity (No. DC18-DBCL)

In accordance with European Parliament and Council Decision No 768/2008/EC Annex III

1. *Product model / product:*

Product Dry Block Temperature Calibrator
 Model/type DBCL400 & DBCL130
 Batch/serial no. S/N: 619-2993 & onward

2. *Manufacturer*

Name Omega Engineering
 Address 800 Connecticut Ave, Norwalk, CT 06854

3. *This declaration is issued under the sole responsibility of the manufacturer.*

4. *Object of the declaration:*

Product Dry Block Temperature Calibrator
 Specification Model DBCL400 operating range ambient +5 to 450°C
 Model DBCL130 operating range -25 to 130°C (20°C ambient)

5. *The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:*

2014/35/EU The Low Voltage Directive
 2014/30/EU The Electromagnetic Compatibility Directive
 2011/65/EU The Restriction of Hazardous Substances Directive

6. *References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:*

Reference & Date	Title
EN 60519-1:2015	Safety in installations for electroheating and electromagnetic processing. General requirements
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4:2007 + A1:2011	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

7. *Additional information:*

Signed for and on behalf of: Omega Engineering
 Place of issue: Hainesport, NJ, USA
 Date of issue: July 8, 2019
 Name: Darren Sager
 Signature: *Darren Sager*



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WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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