OPERATING MANUAL

Dry Block Temperature Calibrator

Model ThermCal 130

The ThermCal 130

Introduction

The ThermCal130 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
- Insert well & ¼" diameter reference well

Even though the unit heats up and cools down rapidly, highly efficient insulation and an internal cooling fan to ensure that the case remains safe enough to handle even at maximum operating temperatures. The ThermCal130 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
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)

Voltage	*Cycles*	*Power*
230V	50/60Hz	200W
120V	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***

Aviso: ***LAS TEMPERATURAS ELEVADAS SON PELI***

HIGH TEMPERATURES ARE DANGEROUS: They can cause serious burns to operators and ignite combustible material. Accurate Thermal Systems 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 Accurate Thermal Systems 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 Accurate Thermal Systems, the protection provided by the equipment to the operator may be impaired. All Accurate Thermal Systems 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 Accurate Thermal Systems 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:

	***220V-240V***	***110V-120V***
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: 230V UK 4 AMP

The fuse in the unit protects the unit and the operator. Note that units marked 230V on the rating plate work at 220V; units marked 120V work at 110V. In both cases, however, the heating rate will degrade by approximately 8%. The rating plate is on the rear of the unit.

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.

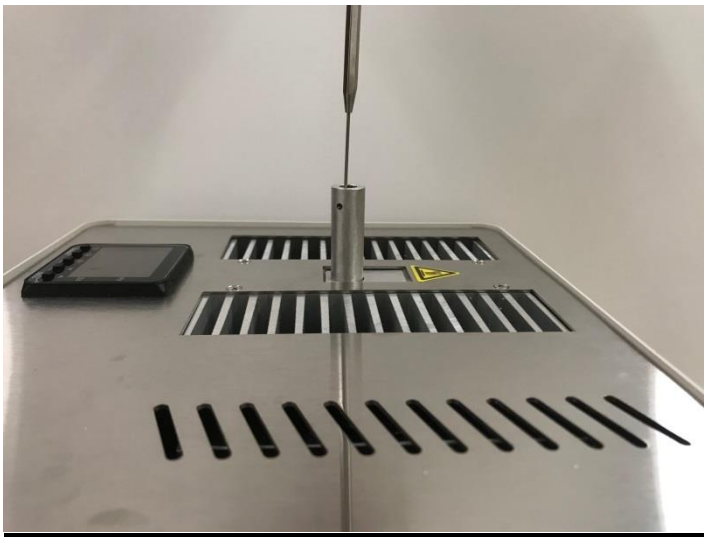
OPERATION

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 set the 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 setpoint near ambient when cooling down from a higher temperature set parameter (AL-1) 3 °C/5 °F higher than you 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). IMPORTANT: This value needs to change accordingly when switching between C to F and vice versa. Example if AL1 =20 and you switch to degrees F change this to 68.

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. **IMPORTANT**: Do not change any other parameters as the unit will not function correctly or damage may occur.

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 ThermCal130. Calibrations should be performed in a 3/16" or ¼" 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 ThermCal130 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. Accurate Thermal Systems 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 Accurate Thermal Systems if replacements or alternatives are required:

Part Number	*Description*
4163	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
4282	Instruction manual
4150	Unit carrying strap
4285	Insert extractor
ATS3074	Insert for 1/8" diameter probes
ATS3075	Insert for 3/16" diameter probes
ATS3076	Insert for ¼" diameter probes
ATS3077	Insert for 5/16" diameter probes
ATS3078	Insert for 3/8" diameter probes

Spare Parts

Part Number	*Description*
4224	Peltier
4174	Temperature controller
4147	PRT
4221	Solid state relay
4379	Power supply
4280	3 PDT power relay
4283	2 amp fuse, 5 x 20mm

Contact Information

Accurate Thermal Systems LLC
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Hainesport, NJ 08036 USA
Ph: 609-326-3190
Fax: 609-479-5124
Email: service@accuthermal.com
Website: www.accuthermal.com

GUARANTEE

The unit is guaranteed against any defects in material or workmanship for the period of 1 year. This period is from the date of purchase, and within this period, all defective parts will be replaced free of charge provided that the defect is not the result of misuse, accident or negligence. Servicing under this guarantee should be obtained from the supplier. Notwithstanding the description and specification(s) of the units contained in the Operator's Manual, Accurate Thermal Systems hereby reserves the right to make such changes as it sees fit to the units or to any component of the units. This manual has been prepared solely for the convenience of Accurate Thermal Systems customers and nothing in this Instruction Book shall be taken as a warranty, condition or representation concerning the description, merchantability, fitness for purpose or otherwise of the units or components.

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	ThermCal400 & ThermCal130
Batch/serial no.	S/N: 619-2993 & onward

2.Manufacturer

Name	Accurate Thermal Systems LLC
Address	4104 Sylon Blvd, Hainesport, NJ 08036

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

4. Object of the declaration:

Product	Dry Block Temperature Calibrator
Specification	Model ThermCal400 operating range ambient +5 to 450°C
	Model ThermCal130 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:	Accurate Thermal Systems
Place of issue:	Hainesport, NJ, USA
Date of issue:	July 8, 2019
Name:	Darren Sager
Signature:	*Darren Sager*