



ThermCal400 Dry Block Temperature Calibrator



INSTRUCTION MANUAL

Please read all the information in this booklet before using the unit.

*January 2021
Rev 16*

ThermCal400

Introduction

The ThermCal400 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 11 pounds/5 kilograms. The unit covers the temperature range from 5°C above ambient up to 430°C using a machined aluminum block as the heat transfer medium. The temperature control circuit is built into the unit and includes over-temperature limit protection.

Features include:

- Maximum temperature of 450°C/850°F
- An independent over-temperature cutout
- Ramp rate feature for accurate thermal switch testing

Even though the unit heats up rapidly, highly efficient insulation and an internal cooling fan ensures that the case remains cool enough to handle even at maximum operating temperatures. The ThermCal400 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:	5°C/9°F above ambient to 450°C/850°F
Over-temperature limit:	470°C/870°F
Display resolution:	0.1°
Accuracy:	±0.4°C (50 to 400°C) ±0.7°F (122 to 752°F) ±0.6°C (400 to 450°C) ±1.0°F (752 to 850°F)
Stability (after 15 minutes):	±0.050°C /0.100°F (50/122 to 400°C/752°F)
Well to well radial uniformity:	0.015°C at 100°C & 0.052°C at 300°C
Heat up time 25° C to 400°C:	12 minutes
Cool down 400°C to 100°C:	20 minutes
Immersion Depth:	4.5" (114.3mm)
Fan Cooling:	Automatic
Weight:	11 lbs (5 Kg)
Dimensions* (H x W x D):	8.75 x 8 x 8 inches/222.25 x 203.2 x 203.2 mm
*excluding the carrying strap	

Electrical supply

<i>Voltage</i>	<i>Cycles</i>	<i>Power</i>
230V	50/60Hz	900W
120V	50/60Hz	900W

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.

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. 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 and are fitted with a self-resetting over-temperature cutout. 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 calibrating devices, remember that the insert and your probe/thermometer 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
- 3.** Blow 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, heaters 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. The values will increment faster as you hold down the button.
- 2.** When you have the correct set temperature displayed the unit will start to heat or cool to that value.
- 3.** Once the process value/actual temperature reaches the set point, allow the block to fully stabilize for at least 15 minutes before performing a calibration.
- 4.** Upon completion of your work set the temperature to 50°C/122°F or less and allow it to cool before transporting or moving. The block fan will kick on to provide cooling. After a safe temperature has been reached power can be switched off and the unit unplugged.

C to F temperature scale conversion

To change the temperature scale press  to display the "UNIT" parameter and change as needed. Press  to display parameter "OFTL". This calibration value must be changed to maintain calibrated accuracy. The default factory value is shown below. When switching from C to F multiply the value by 1.8 and enter into "OFTL". Do the same for "OFTH" which is the offset high parameter. When switching from F to C divide these values by 1.8 and change accordingly. Calibration adjustments are discussed below.

Accessories

The following parts may be obtained directly from Accurate Thermal Systems

<i>Part Number</i>	<i>Description</i>
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
4159	Instruction manual
4168	Unit carrying strap
4153	Insert extractor
ATS3041	insert 1/8, 3/16, 1/4, 5/16 & 3/8"
ATS3047	Blank insert
ATS3043	Insert 5 x 1/4"
ATS3048	Insert 1 x 9/16" & 1 x 1/4"
ATS3044	Insert 2 x 1/4" & 2 x 3/8"
ATS3049	Insert 1 x 5/8" & 1 x 1/4"
ATS3045	Insert 2 x 1/4" & 2 x 1/2"
ATS3050	Insert 1 x 11/16" & 1 x 1/4"
ATS3046	Insert 1 x 1/4"
ATS3051	Insert 1 x 3/4" & 1 x 1/4"
ATS3129	Black body source insert for IR sensors & thermometers
ATS3052	Carrying case

Spare Parts

<i>Part Number</i>	<i>Description</i>
4146	225 watt, 120 volt heater
4317-C62	Temperature controller
4147	PRT
4145	Solid state relay
4165	4 amp fuse (240 volt units)
4157	8 amp fuse (120 volt units)
AD66	Heater block
4148	120 volt block cooling fan
4162	240 volt block cooling fan
4170	120 volt chassis cooling fan
4171	240 volt chassis cooling fan

Contact Information

Accurate Thermal Systems LLC
4104 Sylon Blvd
Hainesport, NJ 08036
Ph: 609-326-3190
Fax: 609-479-5124
Email: service@accuthermal.com
Website: www.accuthermal.com

GUARANTEE

This product is covered by a 2 year factory parts and labor warranty. It must be clear that **Accurate Thermal Systems** and our suppliers are not insuring your products/premises or guaranteeing that there will not be damage to your person or property if you purchase our Products. **Accurate Thermal Systems** or our Suppliers shall not be liable under any circumstances for damage to your person or property or some other person or that person's property by reason of the sale or use of the product we sell, or its failure to operate in the manner in which it is designed. **Accurate Thermal Systems** and our Suppliers liability, if any, shall be limited to the original cost of the Product only. Use of this Product is at your own risk. Buyer assumes full responsibility in determining the suitability of these items for buyers intended use. It must be clear that the Warrantors are not insuring your products/premises or guaranteeing that there will not be damage to your person or property if you use products purchased from **Accurate Thermal Systems**. **WARRANTORS' OBLIGATION UNDER THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF THE PRODUCT ONLY. THIS WARRANTY DOES NOT COVER PAYMENT OR PROVIDE FOR THE REIMBURSEMENT OF PAYMENT FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

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*