

ThermCal400

Dry Block Temperature Calibrator

INSTRUCTION MANUAL

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

August 2013

The 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/five kilograms. The unit covers the temperature range from 5°C above ambient up to 400°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 400°C/752°F
- An independent over-temperature cutout
- Up to eight setpoints can be stored & recalled

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 400°C/752°F
Over-temperature limit:	450°C/842°F
Display resolution:	0.1°
Accuracy:	±0.25°C (30 to 200°C) ±0.4°C (200 to 400°C)
Stability (after 20 minutes):	±0.020°C (50 to 200°C) ±0.040°C (200 to 400°C)
Well to well radial uniformity:	0.015°C at 200°C & 0.025°C at 400°C
Heat up time 20° C to 300°C:	9 minutes
Cool down 300°C to 100°C:	18 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
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 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.

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.

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 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.

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.

Factory default control parameters

The parameters used in the controller have been developed by Accurate Thermal Systems to give the best unit performance for most applications. If the need arises the "AT" autotune command can be run to further optimize results based on the thermal block load and ambient conditions. Contact us for further support and details.

Switching the display from Degrees C to Degrees F and vice versa

To switch the display press and hold down the left key until the display indicates "CN-t", next press the 2nd key from the left one time and the top line will show "d-U" which is display units. Switch to either C or F. Based on which setting you use the parameters below must be changed to those shown. They will display by pressing the 2nd key from the left after setting C or F. After all values have been changed hold down the left most key so the controller resets and accepts the new values.

<i>Parameter</i>	<i>Degrees C</i>	<i>Degrees F</i>
<i>SL-H</i>	<i>410.0</i>	<i>770.0</i>
<i>SL-L</i>	<i>0.0</i>	<i>0.0</i>
<i>To correct the calibration offset – press button on left, then button 2nd from the left until the parameter CN5 is displayed</i>		
<i>CN5</i>	<i>If in C multiply value by 1.8 to switch to F</i>	<i>If in F divide value by 1.8 to switch to C</i>

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 below 50° 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. Fuses: Your unit is protected by fuse. They should only be changed by suitably qualified personnel. If the fuse blow persistently, a serious fault is indicated and you may need to return the unit to your supplier for repair.

ADDITIONAL INFORMATION

The controller is factory preset with all parameters and calibration data and therefore cannot be calibrated or serviced in the field. Please contact Accurate Thermal Systems for arrangements to have your unit calibrated or serviced.

Replacement Parts

The following parts may be obtained from Anville Instruments Ltd. if replacements or alternatives are required:

<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		
4150	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"
ATS3052	Carrying case		

Spare Parts

<i>Part Number</i>	<i>Description</i>
4146	225 watt, 120 volt heater
4160	Temperature controller
4147	PRT
4145	Solid state relay
4165	4 amp fuse (240 volt units)
4157	8 amp fuse (120 volt units)

Contact Information

Accurate Thermal Systems LLC
61 Mohr Road
Burlington, NJ 08016
Ph: 609-326-3190
Email: service@accuthermal.com
Website: www.accuthermal.com

GUARANTEE

The unit is guaranteed against any defects in material or workmanship for the period of 3 years. 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.