



ThermCal400 Dry Block Temperature Calibrator



INSTRUCTION MANUAL

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

*April 2016
Rev 7*

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 and includes over-temperature limit protection.

Features include:

- Maximum temperature of 410°C/770°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 410°C/770°F |
| Over-temperature limit: | 430°C/842°F |
| Display resolution: | 0.1° |
| Accuracy: | ±0.4°C/0.7°F (50/122 to 400°C/ 752°F) |
| Stability (after 15 minutes): | ±0.050°C /0.090°F (50/122 to 400°C/752°F) |
| Well to well radial uniformity: | 0.015°C at 200°C & 0.025°C at 400°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: | | <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: 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



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  key to move over to individual digits to set higher values much quicker. Press  to accept the set value.
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.

Display lockout

To prevent accidental changes to the calibration settings the display has been locked out which is indicated by the key symbol in the display. To unlock the display press the down arrow and  key at the same time. The top line will show KEYP, press the up arrow so all values are zero then press the  and the display will unlock. To relock the display press  and then set the LOC parameter to LOC2. Press  to save and exit.

Calibration

The unit has been calibrated by the factory to meet specifications. In the event that you want to adjust or correct the calibration use the following parameters with the display unlocked. Press  and PVOF will display which is the Zero or low end adjustment. Enter a negative value to correct for low readings and vice versa. If your reference thermometer is showing that the ThermCal400 is 2.0 degrees low then enter a -2.0 Press  to access PV6A which is the span or high end correction. Use a negative value for readings that are low. In most cases you will only need to adjust PVOF to correct for any errors.

The factory calibration values for unit S/N: 917-2633 are PVOF = -1.5 PV6A = -0.009

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.

Replacement Parts

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 |
| 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 (up to S/N: 116-2559) |
| 4317 | Temperature controller (S/N: 116-2560 and up) |
| 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
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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.**

EC Declaration of Conformity

In accordance with EN ISO 17050-1:2004

We Accurate Thermal Systems
of 4104 Sylon Blvd, Hainsport, NJ 08036, USA

in accordance with the following Directives:

| | |
|--------------|---|
| 2006/95/EC | The Low Voltage Directive |
| 2004/108/EEC | The Electromagnetic Compatibility Directive |
| 2011/65/EU | The Restriction of Hazardous Substances Directive |

hereby declare under our sole responsibility that:

| | |
|---------------|----------------------------------|
| Equipment | Dry Block Temperature Calibrator |
| Model numbers | ThermCal400 & ThermCal130 |

is in conformity with the applicable requirements of the following documents:

| Ref. No. | Title | Edition/date |
|-----------------|---|-------------------|
| BS EN 60519-1 | Safety in electroheating installations. General requirements | 2011 |
| BS EN 61000-6-2 | Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments | 2005 |
| BS EN 61000-6-4 | Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments | 2007 + A1:2011 |

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable Essential Requirements of the Directives.

Signed by:*Darren Sager*.....

Name: Darren Sager
Position: President
Done at Accurate Thermal Systems
On March 10, 2015



Document number.
DC18-ThermCal