



## PRODUCT DESCRIPTION

The AMETEK Model 1200SE Series Dry Block Temperature Calibrators are easy-to-use, portable, precision calibration instruments. The Model 1200SE Series calibrators provide fast, reliable temperature calibration of RTDs, thermocouples, thermo switches, thermistors, plus other common temperature sensing devices. These units are ideal for high temperature applications such as kilns, boilers and incinerators.

Utilizing a compressed air cooling system, the cooling period is only 10-20 minutes. An integrated valve controllable from the processor allows complete control of the cooling period in both manual and personal computer operations.

The Model 1200SE also features an ultra-stable thermocouple to ensure that the temperature is kept to within  $\pm 1^{\circ}\text{F}$  ( $\pm 2.0^{\circ}\text{C}$ ) at temperatures  $<1100^{\circ}\text{C}$  and  $+2^{\circ}\text{F}$  ( $\pm 3.2^{\circ}\text{C}$ ) at temperatures  $>1100^{\circ}\text{C}$ . This gives you a true value with minimal fluctuation. A special high temperature insertion tube is drilled to your exact specifications to maintain optimum contact between the sensor and the dry block.

There are two models: the standard Model 1200SE and the Model 1200SE-RS with RS232C serial data communications. The Model 1200SE-RS is supplied with RS232C serial data communications and calibration software allowing for automated temperature calibration from a remote personal computer. Options also exist that allow the user to convert RTD, Thermocouple and transmitters into a temperature reading on the personal computer. Units may be specified with a separate heating/cooling tower.

## Model 1200SE Series Dry Block Temperature Calibrators

- Easy-to-Use Precision Temperature Calibrator**
  - Lightweight, Portable for Lab and General Use
  - Simple Single Step Zero Setting
- Temperature Range: 392 to 2200°F (300 to 1200°C)**
- Excellent Performance Characteristics**
  - Accuracy:  $\pm 4.0^{\circ}\text{F}$  ( $\pm 2.0^{\circ}\text{C}$ )
  - Stability:  $\pm 1.0^{\circ}\text{F}$  ( $\pm 0.5^{\circ}\text{C}$ )
- Display in °F or °C to 0.1 Resolution**
- Fast Cooling and Heating**
- User-selectable Slope Rates for Controlled Thermo Switch Testing**
- Self Diagnostics Includes Semi-Auto Switch Test and Hysteresis Test**

The calibrators include an easy-to-read, high-contrast LED display which indicates temperature in either  $^{\circ}\text{F}$  or  $^{\circ}\text{C}$ . Special indicators are provided that alert the operator to current conditions, including a stability indicator that indicates when a stable temperature has been reached. Additional indicators are supplied including SET, READ, HEAT, COOL, mA, HOLD and SLOPE.

A membrane-style keypad with tactile feedback is located on the front of the calibrator. Dedicated function keys are used to setup and operate the calibrator. Function keys include:

|                                               |                                                                                         |
|-----------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>SET</b>                                    | Let's the user select any temperature                                                   |
| <b>READ</b>                                   | Calibrator will heat/cool to a selected SET temperature and READ the actual temperature |
| <b>DISP HOLD</b>                              | Manually freeze a display as long as the key is depressed                               |
| <b>SLOPE IN</b>                               | Used to store selected slope rates into memory                                          |
| <b><math>^{\circ}\text{C}/\text{F}</math></b> | Select desired temperature readout scale                                                |
| <b>MEMO</b>                                   | Store or recall SET temperature or SLOPE rate (Up to three)                             |
| <b>SLOPE</b>                                  | Activates slope mode                                                                    |
| <b>SWITCH HOLD</b>                            | Used to determine set point of temperature switches                                     |
| <b>mA MEMO IN</b>                             | Used to display mA measurement from 0 to 24mA                                           |
| <b>TEMP SET</b>                               | Used to increase or decrease temperature in 0.1 degree increments                       |
| <b>SET ZERO</b>                               | Fixed memory for set temperature                                                        |

## FEATURES

### Fast, Efficient Heating and Cooling Times

Model 1200SE Series calibrators feature fast heating and cooling times. The instrument, including the insertion tube, reaches the maximum heating temperature (2192°F/1200°C) from 73.4°F (23°C) in just 35 minutes.

Instrument cooling time is also efficient. The instrument reaches maximum cooling temperature (572°F/300°C) from 2192°F (1200°C) in 20 minutes.

### Serial Data Interface

The Model 1200SE-RS calibrator is equipped with RS232C serial data communications. Software is supplied with this option. Simply connect the calibrator with your personal computer, place sensor in thermowell, connect sensor to calibrator, fill-in the "windows" displayed, and start your test. The software allows you to print, save and depict actual test data in a graphical format.

### Calibration Software

Using the calibrator's RS232 serial data port, the instrument may be interfaced with a personal computer running AMETEK's AMECAL-T Plus application software. This WINDOWS-based software is easy to use and provides the user with the ability to perform automated calibration with documented results and a printed certification.

AMECAL-T Plus software presents the user with a hierarchy of operations that effectively guides you through the setup, calibration and certification processes. Calibration is greatly simplified and may be completed in relatively short time periods. Calibration requirements are selected by the user through icons, pulldown menus and extensive prompts. Users may select heating sources such as liquid baths, ovens or dry-block calibrators. You may also select between an internal or external reference such as the AMETEK DTI Digital Temperature Indicator so that extremely high resolution and accuracy are achieved. Plus the AMECAL-T Plus software supplies you with a way to create and print customized certificate formats which comply with Quality Standards such as ISO 9000, GMP, HACCP and others.

Users select the calibration requirements needed including:

- Sensor
- Heating Source
- Scenario
- Reference Indicator
- External Reference Sensor
- Input Device
- Temperature Points/Procedure

Both calibration procedures and results are stored in a built-in identification/tag number database. Procedures may be queried by the user with results presented in a real certificate format. Certificate formats may be customized by the user including the ability to automatically number your certificate. The certificate may be displayed at any time.

Other features include input scaling which automatically converts mA into °F/°C. You may also present information graphically and view in real-time the calibration trends being created. Trend information may be stored for later analysis.

### Self Diagnostics

The Model 650SE Series calibrators feature extensive diagnostics that help identify and isolate faults. Using the front display, the instrument indicates using error codes, diagnostic conditions that may be impeding the instrument's operability. Typical faults and their displays are:

|         |                                         |
|---------|-----------------------------------------|
| - - - 0 | No RS232 or damaged interface           |
| - - - 1 | No RS232 contact with personal computer |
| -100.0  | RTD sensor open or short circuit        |
| E0007   | Program execution failure               |
| E0008   | Memory access failure                   |
| E0009   | Timer malfunction                       |

The instruments also perform a variety of self diagnostics at startup including a semi-automatic switch test and hysteresis test, validation tests for indicators and 4-20mA transmitter measurement.

### User-selectable Slope Rates

The Model 1200SE Series calibrators can have up to three user-selected slope rates for either heating or cooling. The following chart shows the selectable slope ranges.

| Temperature Range | 572 to 1112°F<br>300 to 600°C | 1112 to 1832°F<br>600 to 1000°C | 1832 to 2200°F<br>1000 to 1200°C |
|-------------------|-------------------------------|---------------------------------|----------------------------------|
| <b>HEATING</b>    |                               |                                 |                                  |
| Max. slope/minute | 113°F/45°C                    | 86°F/30°C                       | 68°F/20°C                        |
| Min. slope/minute | 1°F/1°C                       | 1°F/1°C                         | 1°F/1°C                          |
| <b>COOLING</b>    |                               |                                 |                                  |
| Max. slope/minute | 41°F/5°C                      | 48°F/9°C                        | 68°F/20°C                        |
| Min. slope/minute | 1°F/1°C                       | 1°F/1°C                         | 1°F/1°C                          |

## FUNCTIONAL SPECIFICATIONS

**Temperature Range**

Model 1200 SE ..... 572 to 2201°F (300 to 1205°C)  
Model 1200 SE-2 ..... 572 to 2201°F (300 to 1205°C)

**Accuracy**

$\pm 4^{\circ}\text{F}$  ( $\pm 2^{\circ}\text{C}$ )<sup>1</sup>

**Stability**

$\pm 1^{\circ}\text{F}$  ( $\pm 0.5^{\circ}\text{C}$ )<sup>1</sup>

Notes: <sup>1</sup> Measured at bottom of well with certified traceable thermocouple.

**Display Resolution**

1°F (1°C)

**Heating Time - From 572°F to 2201°F (300°C to 1205°C), including insertion tube**  
35 minutes, approximate

**Cooling Time - From 2201°F to 572°F (1205°C to 300°C), including insertion tube**

20 minutes, approximate for air cooling  
120 minutes, approximate for fan cooling

**Current Input**

0 to 24mA

**Resolution mA Input**

0.01mA

**Thermo Switch**

5Vdc

**Analog Output**

5mVdc per °C

**Serial Data Interface**

RS232C (Model 1200SE-RS Only)

## PHYSICAL SPECIFICATIONS

**Power**

115Vac 50/60Hz  
230Vac 50/60Hz

**Temperature Well**

|               |                    |
|---------------|--------------------|
| Well Depth    | 6.3-inches (160mm) |
| Well Diameter | 1.06-inches (27mm) |

**Weight**

26.4 lbs (12kg)

**Dimensions (L x W x H)**

14.6 x 5.3 x 15.9-inches  
370 x 135 x 405mm

**Operating Temperature**

41 to 104°F (5 to 40°C)

**Storage Temperature**

-4 to 140°F (-20 to 60°C)

**Humidity**

0 to 90% RH

**Protection Class**

10IP

**CE Conformance**

EN50081-1 (1992)<sup>3</sup>  
EN50081-2 (1993)<sup>3</sup>  
EN50082-1 (1992)<sup>3</sup>  
EN50082-2 (1995)<sup>3</sup>  
EN61000-3-2 (1995)<sup>3</sup>  
EN61000-3-3 (1995)<sup>3</sup>  
EN61010-1 (1993)<sup>4</sup>

Notes: <sup>3</sup> CE Regulation EMC 89/336/EEC  
<sup>4</sup> CE Low Voltage Directive 73/23/EEC

## ORDERING INFORMATION

### MODEL 1200SE SERIES DRY BLOCK TEMPERATURE CALIBRATOR

| Order Number          | Description                                                                                                                                                                                                                                                                                       |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | <b>Base Number and Range</b><br>76N-1200SE-115R Model 1200SE Calibrator, HT Insert, 392 to 2192°F (200 to 1200°C), 6.3-inch well depth<br>76-650SE-115R Model 1200SE Calibrator with Metal Carrying Case, HT Insert, 392 to 2192°F (200 to 1200°C)                                                |
|                       | <b>With RS232 Serial Data Communications</b><br>76N-650SE-115RS Model 1200SE Calibrator with RS232 Communications, HT Insert, 392 to 2192°F (200 to 1200°C)<br>76-650SE-115RS Model 1200SE Calibrator with RS232 Communications and Metal Carrying Case, HT Insert, 392 to 2192°F (200 to 1200°C) |
| Accessories           | Description                                                                                                                                                                                                                                                                                       |
| <b>60K150</b>         | Metal Carrying Case for Model 1200SE Series Calibrators                                                                                                                                                                                                                                           |
| <b>65-Modul RTD</b>   | RTD Module for Model 1200SE-RS Calibrators with RS232 Communications                                                                                                                                                                                                                              |
| <b>65-Modul VDC</b>   | VDC Module for Model 1200SE-RS Calibrators with RS232 Communications                                                                                                                                                                                                                              |
| <b>65-Modul T/C-H</b> | TC Module for Model 1200SE-RS Calibrators with RS232 Communications                                                                                                                                                                                                                               |
| <b>60F105</b>         | Kerlan Insulation (1 meter length)                                                                                                                                                                                                                                                                |
| <b>60F170</b>         | Insertion Tool (0.75- and 1-inch)                                                                                                                                                                                                                                                                 |
| <b>60F172</b>         | Insertion Tool (0.375-inch)                                                                                                                                                                                                                                                                       |
| <b>60F107</b>         | Insulation Plug                                                                                                                                                                                                                                                                                   |

Note: All Model 1200SE Series Dry Block Temperature Calibrators are supplied with NIST Certification Data.



AMETEK is a leading global manufacturer of electrical and electromechanical products for niche markets. Listed on the New York Stock Exchange (AME) since 1930, AMETEK's annual sales are approaching \$1 billion. Operations are in North America, Europe and Asia, with about one-third of sales to markets outside the United States.

**Headquarters**  
8600 Somerset Drive  
Largo, Florida 33773  
Tel (727) 536-7831  
Tel (800) 527-9999  
Fax (727) 539-6882

**AMETEK Denmark A/S**  
Gydevang 32-34  
Post Office Box 30  
DK-3450  
Allerod Denmark  
Tel 45 4816 8000  
Fax 45 4816 8080

**AMETEK Precision Instruments Europe GmbH**  
Rudolf-Diesel-Strasse 16  
D-40670, Meerbusch  
Germany  
Tel 49 2159 9136 0  
Fax 49 2159 9136 39

**AMETEK Singapore Pvt. Ltd.**  
10 Ang Mo Kio Street 65  
#05-12 TECHPOINT  
Singapore 569059  
Tel 65 484 2388  
Fax 65 481 6588  
E-Mail aspl@ametek.com.sg

Internet Addresses:  
[www.ametek.com](http://www.ametek.com)  
[www.chatillon.com](http://www.chatillon.com)

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**ISO 9001  
Manufacturer**

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