# Professional Thermocouple Calibration Furnace


547


Isotech has used its **40+ years of experience** and the very latest technology to develop a new deep immersion dry block calibrator, designed to give the user the most accurate calibration results.

# Why is Deep Immersion Important?

> **Of all the sources of errors and uncertainties in thermal calibration by far the largest source of error and least understood effect is that of immersion of unit under test, and the reference standard.**
>
> *from Temperature Calibration; Depths of Immersion, John P. Tavener*

> **A thermometer is sufficiently immersed when there is no change in indicated temperature with additional immersion in a constant temperature environment.**
>
> *from Supplementary Information to the International Temperature Scale of 1990*

> **The general problem occurs because there is a continuous flow of heat along the stem of a thermometer between the medium of interest and the outside world. Since heat can only flow where there is a temperature difference, the flow of heat is evidence that the tip of the thermometer is at a slightly different temperature than the medium of interest.**
>
> *from Traceable Temperatures., J.V. Nichols & D.R. White*

# Why **you** should choose the **547**

**Safely support thermocouples**

**Easy touchscreen operation with an intuitive interface available in six languages: English, French, Italian, German, Spanish & Chinese**


**Calibrate alumina laboratory standard & industrial thermocouples**

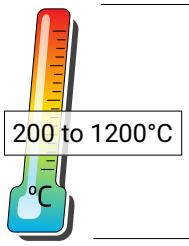
**Calibrate infrared thermometers with options for blackbody & blackbody fixed point cells**

**Rapid cooling utilizing dynamic heat flow technology**

**Can be used open ended to pass through Multi-zone thermocouples**

**Uniform profile from advanced three zone control**

**Expand for automated calibration**




# Deep Immersion Furnace
# 547


- High Accuracy Thermocouple Calibration
- Calibrates both Laboratory & Industrial Thermocouples
- Options for Blackbody Calibration

The Model 547 is the professional solution for accurate and contamination-free temperature calibration, designed to meet the needs of professionals in a wide range of industries, from industrial to laboratory.

The furnace can be equipped with a blackbody target, making it ideal for calibrating infrared thermometers. For even higher accuracy, it also offers the option to use blackbody cells, ensuring ultimate precision and lowest calibration uncertainties.

The Model 547 is also designed to accommodate open-ended multi-zone thermocouples, making it an ideal choice for calibration professionals in the semiconductor industry.

With a focus on safety and convenience, the Model 547 has been **"designed by metrologists for metrologists"**.

When used in combination with our companion products for checking thermocouple homogeneity, laboratory standard thermocouples, cold/reference junction equipment, and software to automate thermocouple calibration, it is a complete solution for all your temperature calibration needs, that no other company can rival.

Invest in the Model 547 Thermocouple Calibration Furnace and experience the ultimate in temperature calibration accuracy and convenience.

**Wide Temperature Range**
Operates efficiently from 200°C to 1200°C with exceptional stability and uniformity.

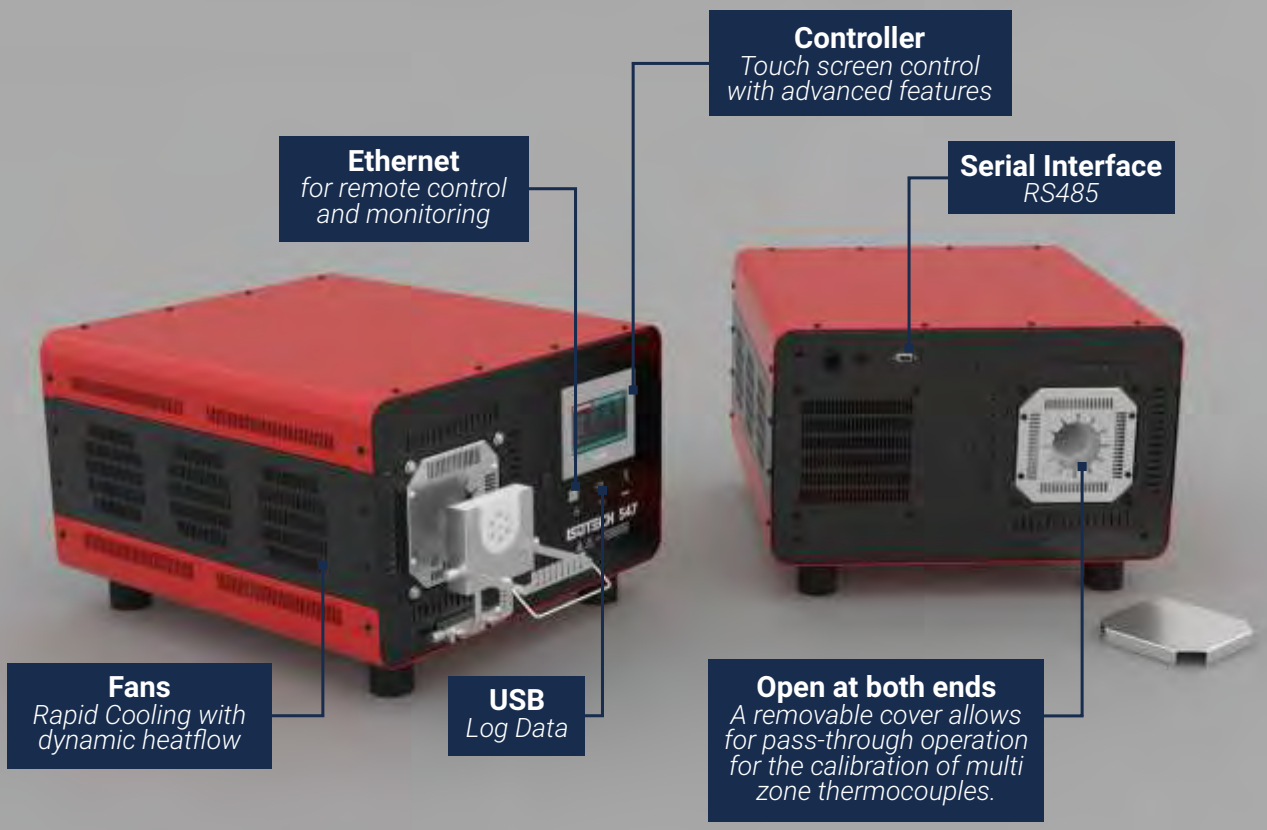
**Versatile Calibration Options**
Suitable for various thermocouple types, including laboratory standards and industrial sensors, with support for infrared thermometer calibration using blackbody targets.

**Advanced Calibration Corrections**
Switchable correction curves for deep and short immersion calibrations. Customize up to 16 correction points per immersion type, ensuring precise calibration across the full range. This feature improves accuracy and flexibility for all calibration requirements.

**Rapid Heating and Cooling**
Heats from 50°C to 1200°C in just 45 minutes and cools from 1200°C to 300°C in 90 minutes.

**Automated Calibration Capability**
Expandable for automated processes with software integration, allowing for efficient and precise calibration management.

**User-Friendly Interface**
Features a 4.5" touchscreen display for easy control and advanced three-zone temperature regulation.




| | |
|---|---|
| Model | 547 |
| Temp Range | 200°C to 1200°C |
| Stability | <0.08°C over the entire range |
| Uniformity | @200°C ±0.2°C @1200°C ±0.3°C<br>*(for more information refer to the website)* |
| Display | 4.5" Touchscreen |
| Display Resolution | 0.01° |
| Heating Time | 50°C to 1200°C in 45 minutes |
| Cooling Time | 1200°C to 300°C in 90 minutes |
| Calibration Volume | 46mm diameter x 450mm deep |
| Minimum Immersion | 180mm |
| Interface | Ethernet, Serial (RS485), USB Host |
| Power | 3kW |
| Dimensions | W510mm x H325mm x L660mm |
| Weight | 55kg |

# Accessories

## Metallic Inserts

| Metallic Insert | 547-07A | 547-07B | 547-07C | 547-07D |
|---|---|---|---|---|
| Insert Diameter | 45mm | 45mm | 45mm | Custom Insert Please Specify |
| Insert Length | 130mm | 260mm | 260mm | |
| Insert Type | Sensor Pockets | Sensor Pockets | Through Holes | |
| Holes | 6 x 8mm holes | 6 x 8mm holes | 6 x 8mm holes | |

Insert Type: Standard or custom drilled insert with blind holes for calibrating sensors
Insert Type: Open ended insert allows pass through of multi-zone thermocouples

## Ceramic Inserts

| Ceramic Insert | 547-07E | 547-07F | 547-07G | 547-07H |
|---|---|---|---|---|
| Insert Diameter | 45mm | 45mm | 45mm | Custom Insert Please Specify |
| Insert Length | 130mm | 260mm | 260mm | |
| Insert Type | Sensor Pockets | Sensor Pockets | Through Holes | |
| Holes | 6 x 8mm holes | 6 x 8mm holes | 6 x 8mm holes | |

Insert Type: Standard or custom drilled insert with blind holes for calibrating sensors
Insert Type: Open ended insert allows pass through of multi-zone thermocouples

## Blackbody Target

| Blackbody Target | 547-07I |
|---|---|
| Target Diameter | 45mm |
| Target Length | 273mm |
| Aperture | Standard |

High emissivity source to calibrate infrared thermometers

## Blackbody Cells

| Blackbody Cell | 547-07J | 547-07K | 547-07L |
|---|---|---|---|
| Cell Type | Zinc | Aluminium | Silver |
| Temperature | 419.527°C | 660.323°C | 961.78°C |
| Aperture | 10mm | 10mm | 10mm |

High emissivity source to calibrate infrared thermometers

## Choice of Alumina or Metallic Inserts

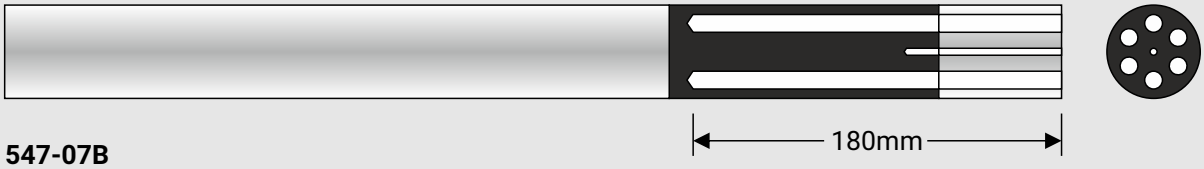
- **Alumina**: metal free inserts- avoid contaminating laboratory standard thermocouples.
- **Metal**: high temperature alloy inserts for high capacity industrial sensor calibration.

## Inserts with Sensor Pockets or Through Holes

- **Drilled with Sensor Pockets:** for calibrating Laboratory Standard and Industrial Sensors.
- **Drilled with Through Holes:** for calibrating multi-zone Thermocouples.

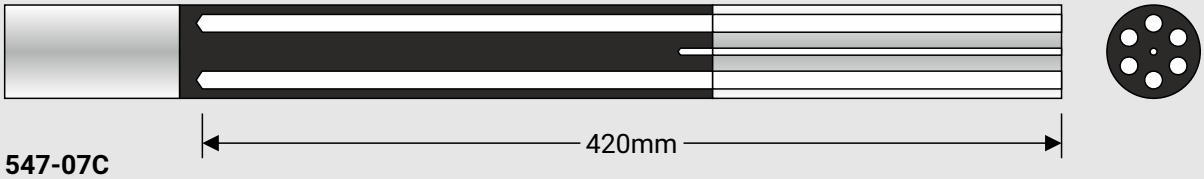
**547-07A**
Short Metallic Insert, with sensor pockets.

**547-07E**
Short Ceramic Insert, with sensor pockets.




**547-07B**
Long Metallic Insert, with sensor pockets.

**547-07F**
Long Ceramic Insert, with sensor pockets.

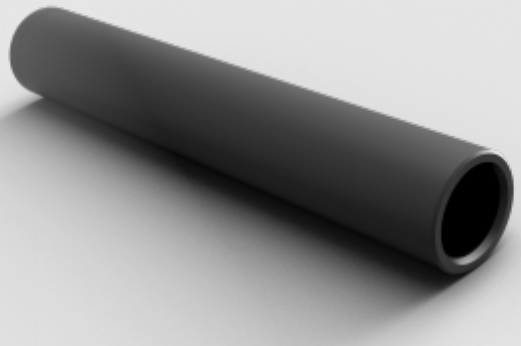



**547-07C**
Long Metallic Insert, with through holes.

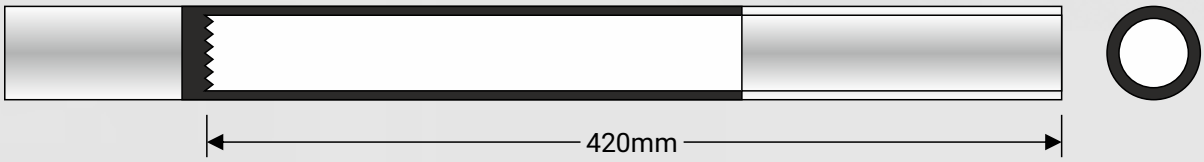
**547-07G**
Long Ceramic Insert, with through holes.

# Infrared Thermometer Calibration

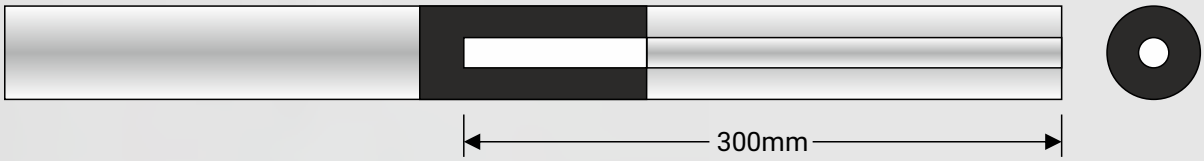
- Calibrate Infrared Thermometers using the options of Blackbody Target or Blackbody Fixed Point Cells.



**547-07I**
Blackbody Target



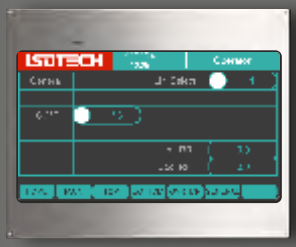

**547-07J / K / L**
Blackbody Cell (Zinc / Aluminium / Silver)




# Easy Control with Advanced Features

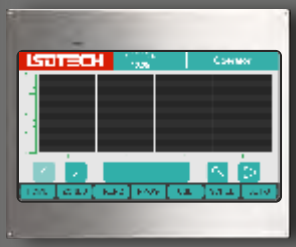
The 547 Thermocouple Calibration Furnace features a 4.5" full colour high resolution touchscreen controller, enhancing user experience and operational efficiency. This intuitive interface simplifies calibration, allowing easy temperature setting and monitoring. The advanced three-zone temperature control ensures uniformity and stability. Users can schedule and set operating times, saving time and money, and easily manage pre-set temperature routines.


- Clear user interface



- Control the heating rate

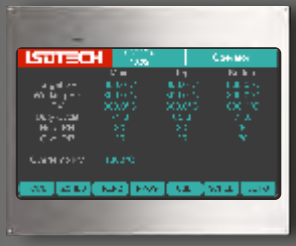
- Log data & review stability



- Set a program

- Schedule, set operating times, save time and money

- Easily manage pre-set temperature routine



- Multi-zone control

For successful temperature calibration
you need more than just a furnace...

**Trust Isotech for the complete solution.**

# 881 Thermocouple Homogeneity Scanner

- Determine uncertainty due to inhomogeneity
- Identify contaminated sections of thermocouple wire
- Assess quality of thermocouple wires

The Isotech Model 881 Dual Heatpipe Thermocouple Homogeneity Scanner provides a fully automated solution to the problem of measuring thermocouple homogeneity.

The operation of a thermocouple relies on the Seebeck Effect which causes an emf to be generated in any region of a thermo element that is exposed to a temperature gradient. Undesirably, nearly all thermocouples develop non-uniformities (inhomogeneities) in their thermoelements during normal use.

If one is to assess the accuracy of a thermocouple, then the inhomogeneity of the thermocouple is a major concern. Increasingly, users and laboratories want to be able to measure thermocouple inhomogeneity.

The scanner can be used to determine:

- If wire/cable manufacturing processes meet quality standards or tolerances.
- Whether a thermocouple is damaged or faulty and unfit for use or calibration.