» High accuracy
Down to ±0.06°C (±0.11°F) using the external reference sensor. 4-wire True-Ohm Measurement technology applied

» Excellent stability 0.01°C

» Wide temperature range
PTC-155 from -25 to 155°C (-22 to 311°F)
PTC-350 from 33 to 350°C (91 to 662°F)
PTC-660 from 33 to 660°C (91 to 1220°F)

» Improved temperature homogeneity
Unique active dual-zone block ensures good temperature homogeneity in the calibration zone

» Intelligent reference sensors
JOFRA reference sensors are supplied with intelligent plugs, containing calibration data (coefficients) of the reference sensor. A truly plug’n’play calibration system

» USB communication
All PTC calibrators communicate via an easy-to-use USB port

» Time-saving
High speed heating and cooling times. 350°C in only 7 minutes

» Work order functionality
Upload advanced calibration routines to your PTC for troublefree and automatic on-site calibrations

AMETEK continues to develop new techniques to improve performance, accuracy, convenience and functionality of the well-known JOFRA calibration products. By doing so, we maintain our position as the leading worldwide manufacturers of temperature dry-block calibrators.

The new PTC calibrator comes in three different models: A, B and C
• PTC-A professional temperature calibrator
• PTC-B professional temperature calibrator with input for reference sensor and sensors-under-test
• PTC-C professional temperature calibrator with input for reference sensor

The PTC offers many of the well-known JOFRA features, such as:
• Easy-to-read color VGA display with perfect overview of the actual calibration status
• Intelligent recalibration information, IRI
• Intuitive, fast and user-friendly navigation
• Lightweight and easy to carry around
• Functional carrying case
• Multi-hole insert kits covering all the most used sensor sizes
• High profile design and the well-known long lasting JOFRA quality
Unique temperature performance
The PTC series of calibrators provides precision temperature calibration of sensors, whatever the type or format. This is accomplished through an innovative active dual-zone heating technology.

The JOFRA PTC-series features our well-known active dual-zone heating technology. Each heating zone is independently controlled for precision temperature calibration. The homogeneity in the lower part is close to that of a laboratory liquid bath. The lower zone ensures optimum heat dissipation throughout the entire calibration zone. The upper zone compensates for heat loss from the sensor-under-test and from the open top. This design also eliminates the need for extra insulation of sensors-under-test and makes it possible to calibrate liquid-filled and other mechanical sensors.

Unique reference sensors
The new STS-150 reference sensors are angled at 90° and are only slightly higher than the top of the PTC calibrator.

The unique design makes it possible to calibrate threaded sensors and sensors with connection heads without any problems.

Easy to carry
Particularly users that frequently perform on-site calibrations will appreciate the focus on minimizing the weight of the PTC calibrator.

We have thoroughly included the weight issue in our design and have developed new design techniques that have made the PTC calibrator lightweight and easy to carry around without compromising its quality, durability and functionality.

Fast temperature calibration
Time is money! The new PTC calibrators have an increased heating and cooling speed. The PTC-350 goes from 33°C up to 350°C in just 7 minutes. The implication is savings in both production downtime and general calibration costs.

New multi-hole insert kits
Two special multi-hole insert kits have been developed to comply with calibration of almost any sensor diameter without having to buy numerous inserts.

The first kit is a metric insert kit consisting of only four inserts covering all diameters from 3 to 12 mm. The other is an imperial insert kit consisting of only three inserts covering six different sizes from 1/8” to 1/2”. All inserts have, beside the holes for the Sensor under test, a 4 mm STS reference sensor hole. With this new insert kit in the carrying case, the user is now able to calibrate all commonly known sensor sizes.

Wide temperature range
The PTC-series can perform calibration over a very wide temperature range starting from -25°C and up to 660°C (-13 to 1220°F). This makes it possible to perform calibration jobs over a range of 685°C (1233°F) with only two calibrators.

USB connector for communication
The new USB connection provides fast and easy access to all laptops without the need of RS-232 to USB converters. Future-proof through e.g. a flash capability for easy firmware upgrades as well as already integrated LAN communication and USB host connectors for future use.

Intelligent recalibration information, IRI
In order to comply with ISO, SOP’s and FDA it is imperative that the calibration equipment never exceeds the expiry date of the calibration certificate. The PTC calibrators are constantly checking calibration dates on the calibrator as well as for the connected STS sensors. If the calibration period has expired, a warning will appear in the display. This feature prevents costly consequence evaluation.

Intelligent reference sensors
The JOFRA STS-150 intelligent reference sensors contain individual calibration data regarding the sensor. This means that the time-consuming coefficient downloading sequence with risk of errors is no longer necessary and that the user can change the reference sensor and be up and running immediately.

With the intelligent sensors, AMETEK has eliminated a source of error and the system is now giving a fail-safe plug’n’play calibration system.
Integrated support rod
The integrated support rod is part of the reduced weight philosophy. It is lightweight and very easy to mount on the PTC. Two fixing holes are integrated in the calibrator where the support rods can be mounted.

MVI - Secure temperature stability
MVI stands for “Mains power Variance Immunity”. Unstable mains power is a major contributor to on-site calibration inaccuracies. Traditional temperature calibrators often become unstable in production environments where large electrical motors, heating elements, and other devices are periodically cycled on or off. The cycling of supply power can cause the temperature regulator to perform inconsistently, leading to both inaccurate readings and unstable temperatures.

The JOFRA PTC calibrators all employ the MVI functionality, thus avoiding such stability problems. For the PTC-155 the MVI functionality is obtained by running the calibrator on stabilized DC voltage.

Highest accuracy
The PTC series B and C models are supplied with a built-in reference measuring circuit to be used with an external reference sensor. This feature allows the instrument to perform calibrations on-site, while maintaining a high accuracy.

A special 90° angled external reference sensor is designed to accommodate calibration of sensors with a transmitter head, top connector or similar arrangement. The user can decide whether to read the built-in reference sensor or the more accurate angled reference sensor from the large, easy-to-read display. The external and the internal sensor readings are independent of one another.

SET-Follows-TRUE
Available on B and C models only, the “SET-Follows-TRUE” makes the instrument tune in until the temperature reading of the external reference “TRUE” meets the desired “SET” temperature. This feature is important when it is critical that the temperature of the calibration zone matches the desired temperature when measured with accurate external reference sensors.

Easy-to-read color display and user-friendly navigation
The 5.7” full color VGA display is very easy to read. The main temperatures, like SET, READ, TRUE and Sut (Sensor under test), are always displayed at all stages of the programming or calibration procedure.

The navigation is menu-driven and very logical to use and the display shows any important information needed for the current function in use. The communication windows pop up and are followed by discrete sound messages.

The back-lit display can easily be read in all light conditions.

The large display contains more detailed information, such as:
- Stability status
- Real time clock
- Serial number of reference sensor
- Sensor-under-test status

All-in-one carrying case
The specially designed carrying case makes it possible to store the STS reference sensors in an optimum physical protection. There is room for inserts and insulation plugs to cover all dimensions and a compartment for wires, manuals, certificates, plugs, insert tools etc.
Reading of sensor-under-test
The PTC model B is equipped with a built-in accurate measuring circuit for sensor-under-test (input), which enables measurement of virtually any type of temperature sensors including: resistance thermometers (RTD), thermocouples (TC), transmitters, milliamps (mA) and thermostats.

The PTC calibrators can be user-programmed from the keyboard for fully automatic sensor calibrations. Once the unit is programmed, the instrument is self-operating and performs the configured calibration routine. All calibration data are stored and can be read in the display.

Switch test
On the B model you can perform a thermoswitch test and find “Open”, “Closed” and the hysteresis (deadband) automatically. The instrument retains the last twenty test results.

Auto-stepping
Up to 20 different temperature steps may be programmed including the hold time for each step. Upon completion of an auto step routine, the user can easily read the results for the sensor-under-test on the PTC display. Results from twenty auto-step calibrations are stored.

The “Set temperature” feature allows the user to set the exact desired temperature with a resolution of 0.01°.

Enhanced stability
A stability indicator shows when the PTC calibrator has reached the desired temperature and is stable. The user may change the stability criteria for the external reference and the sensor-under-test quickly and simply. The stability criterion is the user’s security of a correct calibration. A count-down timer is displayed next to the temperature read-out.

Instrument setups
The PTC series allows the user to store up to ten (10) complete instrument setups. You can store all sorts of information including temperature units, stability criteria, use of external reference sensors, resolutions, sensors-under-test (Sut), conversions to temperature, display contrasts, etc. The setup may be recalled at any time.

Maximum and minimum temperature
From the setup menu, the user can select the maximum and minimum temperature limit for the calibrator. This function prevents damage to the sensor-under-test caused by excessive temperatures and it helps reduce sensor drift from exposure to high temperatures. This feature can be locked with an access code.

JOFRACAL calibration software
JOFRACAL is a highly versatile calibration software that is supplied together with the PTC calibrator. The software ensures easy calibration of all kind of temperature sensors, such as RTD’s, thermocouples, transmitters and thermostwitches. Furthermore, it can be used for pressure calibration i.e. pressure gauges and pressure switches.

This allows the PTC calibrator to:
• Operate as a stand-alone instrument, using advanced calibration routines without the assistance of a personal computer on site. The work order functionality
• Prevent unauthorized changes to a calibration routine. Personnel who are not authorized to alter a calibration routine cannot do so

Once all calibrations are completed, the data may be uploaded to the JOFRACAL for printing of certificates. The data collected may be stored on the personal computer for later recall or analysis.

JOFRACAL offers extended output formats of the captured calibration data such as PDF file format and ASCII/semicolon separated text format for further processing and calculation of data in spreadsheets and word processors.

JOFRACAL is compatible with all JOFRA temperature, pressure and signal calibrator instruments.

JOFRACAL may also be used for manual calibrations, as it can be set up to accept manual entry of calibration data together with other brand dry-block heat sources, liquid baths or ice points.
Calibration of up to 24 sensors with JOFRA ASM

Using the JOFRA PTC series together with the ASM, Advanced Signal Multi-scanner, offers a great time-saving automatic solution to calibrate multiple temperature sensors at the same time. The ASM series is an eight channel scanner controlled by the JOFRACAL software on a PC. Up to 3 ASM units can be stacked to calibrate up to 24 sensors at a time. It can handle signals from 2-, 3- and 4 wire RTD’s, thermocouples, transmitters, temperature switches and voltage.

Optional PTC firmware package

Optional feature for B model only. See Option U1 in ordering code.

The PTC calibrator can be supplied with additional functionality.

1. Engineering units in display
2. Work order functionality
3. Additional sensor under test input types*

*Pt10(90)385, Pt50(90)385, Pt200(90)385, Pt500(90)385, Pt50(90)391, M50(90)428, M100(90)428, Pt100 Mill and YSI-400

Upon buying the User Interface functionality, U1, the following three capabilities are enabled.

Documenting temperature calibrator

The PTC calibrator can store calibration procedures and may be taken out to the process site without bringing a personal computer.

This allows the PTC calibrator to:

• Operate as a stand-alone instrument, using advanced calibration routines without the assistance of a personal computer on site. The work order functionality

• Prevent unauthorized changes to a calibration routine. Personnel who are not authorized to alter a calibration routine cannot do so

Once all calibrations are completed, the data may be uploaded to the JOFRACAL for printing of certificates. The data collected may be stored on the personal computer for later recall or analysis.

As found/As left

On the B model you can, when running a calibration initiated from a work order, select the calibration as an As Found or an As Left calibration.

Calibration of indication devices

When calibrating the B model an indicating device in the work order mode, users may key in the results during or after the test. Using the “Calibration info” function, the user may view the complete calibration task, including the “Scenario” before the calibration takes place.

Hardware requirements

• INTEL™ 486 processor
• (PENTIUM™ 800 MHz recommended)
• 32 MB RAM (64 MB recommended)
• 80 MB free disk space on hard disk prior to installation
• Standard VGA (800 x 600, 16 colors) compatible screen
• (1024 x 786, 256 colors recommended)
FUNCTIONAL SPECIFICATIONS

Temperature range @ 23°C / 73°F
PTC-155 ........................................... -25 to 155°C / -13 to 311°F
PTC-350 ........................................... 33 to 350°C / 91 to 662°F
PTC-660 ........................................... 33 to 660°C / 91 to 1220°F

Accuracy (model B & C) with external STS ref. sensor
PTC-155 B & C ........................................ ±0.06°C/±0.11°F
PTC-350 B & C ........................................ ±0.08°C/±0.15°F
PTC-660 B & C ........................................ ±0.15°C/±0.27°F
12-month period. Relative to reference standard. Specifications by use of the external JOFRA STS-150 reference sensor

Accuracy with internal reference sensor
PTC-155 A, B & C .................................... ±0.18°C/±0.32°F
PTC-350 A, B & C .................................... ±0.20°C/±0.36°F
PTC-660 A, B & C @ 33 to 420°C .......... ±0.30°C/±0.54°F
PTC-660 A, B & C @ 420 to 660°C .......... ±0.50°C/±0.54°F

Stability
PTC-155 .................................................. ±0.01°C/±0.018°F
PTC-350 .................................................. ±0.02°C/±0.036°F
PTC-660 .................................................. ±0.04°C/±0.072°F
Measured after the stability indicator has been on for 15 minutes. Measuring time is 30 minutes.

Radial homogeneity (difference between holes)
PTC-155 .................................................. ±0.01°C/±0.018°F
PTC-350 .................................................. ±0.02°C/±0.036°F
PTC-660 .................................................. ±0.10°C/±0.180°F

Resolution (user-selectable)
All temperatures ...................................... 1° or 0.1° or 0.01°

Heating time
PTC-155 -25 to 23°C/-13 to 73°F .......... 4 minutes
23 to 155°C/73 to 311°F .......... 12 minutes
PTC-350 33 to 350°C/91 to 662°F .......... 7 minutes
PTC-660 33 to 660°C/91 to 1220°F .......... 20 minutes

Cooling time
PTC-155 155 to 23°C/311 to 73°F .......... 10 minutes
23 to -25°C/73 to -13°F .......... 15 minutes
PTC-350 350 to 100°C/662 to 212°F .......... 12 minutes
100 to 50°C/212 to 122°F .......... 12 minutes
PTC-660 660 to 100°C/1220 to 212°F .......... 36 minutes
100 to 50°C/212 to 122°F .......... 15 minutes

Time to stability (approx.)
PTC-155 ............................................. 10 minutes
PTC-350 ............................................. 10 minutes
PTC-660 ............................................. 10 minutes

Immersion depth
PTC-155 ........................................... 160 mm/6.3 in
PTC-350 ........................................... 140 mm/5.5 in
PTC-660 ........................................... 150 mm/5.9 in

INPUT SPECIFICATIONS

All input specifications apply to the dry-block of the calibrator running at the respective temperature (stable plus an additional 20 minute period).

Input specifications are not applicable to the PTC-A models
All input specifications are valid for PTC-155, PTC-350, PTC-660.

RTD reference input (B & C models only)
Type.................. 4-wire RTD with true ohm measurements1) F.S. (Full Scale) .............................................. 400 ohm Accuracy (12 months) ....... ±(0.003% rdg. + 0.0007% F.S.)

<table>
<thead>
<tr>
<th>RTD Type</th>
<th>Temperature</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt100 reference</td>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>-25</td>
<td>-13</td>
<td>±0.014</td>
</tr>
<tr>
<td>0</td>
<td>32</td>
<td>±0.015</td>
</tr>
<tr>
<td>55</td>
<td>131</td>
<td>±0.017</td>
</tr>
<tr>
<td>100</td>
<td>212</td>
<td>±0.018</td>
</tr>
<tr>
<td>155</td>
<td>311</td>
<td>±0.020</td>
</tr>
<tr>
<td>350</td>
<td>662</td>
<td>±0.028</td>
</tr>
<tr>
<td>660</td>
<td>1220</td>
<td>±0.041</td>
</tr>
</tbody>
</table>

Note 1: True ohm measurement is an effective method to eliminate errors from induced thermoelectrical voltage

RTD sensor under test input (B model only)
F.S. (range) ..................................................................... 400 ohm Accuracy (12 months) ....... ±(0.006% Rdg. + 0.015% F.S.) F.S. (range) ..................................................................... 4000 ohm Accuracy (12 months) ....... ±(0.005% Rdg. + 0.005% F.S.) 2-wire ........................................................... add 50 mOhm

<table>
<thead>
<tr>
<th>RTD Type</th>
<th>Temperature</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt1000 (90) 385</td>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>-25</td>
<td>-13</td>
<td>±0.07</td>
</tr>
<tr>
<td>0</td>
<td>32</td>
<td>±0.07</td>
</tr>
<tr>
<td>155</td>
<td>311</td>
<td>±0.08</td>
</tr>
<tr>
<td>350</td>
<td>662</td>
<td>±0.10</td>
</tr>
<tr>
<td>660</td>
<td>1220</td>
<td>±0.13</td>
</tr>
<tr>
<td>Pt500 (90) 385</td>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>-25</td>
<td>-13</td>
<td>±0.12</td>
</tr>
<tr>
<td>0</td>
<td>32</td>
<td>±0.12</td>
</tr>
<tr>
<td>155</td>
<td>311</td>
<td>±0.14</td>
</tr>
<tr>
<td>350</td>
<td>662</td>
<td>±0.16</td>
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<tr>
<td>660</td>
<td>1220</td>
<td>±0.20</td>
</tr>
<tr>
<td>Pt100 (90) 385</td>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>-25</td>
<td>-13</td>
<td>±0.04</td>
</tr>
<tr>
<td>0</td>
<td>32</td>
<td>±0.04</td>
</tr>
<tr>
<td>155</td>
<td>311</td>
<td>±0.05</td>
</tr>
<tr>
<td>350</td>
<td>662</td>
<td>±0.06</td>
</tr>
<tr>
<td>660</td>
<td>1220</td>
<td>±0.08</td>
</tr>
</tbody>
</table>

The PTC calibrator has as standard input for resistance sensors and curves such as:
P100(90)391, P100(90)392, H120(90)672
The PTC can optionally be supplied with input for resistance sensors and curves such as:
Pt10(90)385, Pt50(90)385, Pt200(90)385, Pt500(90)385, Pt50(90)391, M50(90)428, M100(90)428, Pt100, Mill and YSI-400
**TC Type** | **Temperature** | **Accuracy**
---|---|---
**E** | 0 | ±0.14  ±0.25
 | 155 | ±0.14  ±0.25
 | 350 | ±0.17  ±0.31
 | 660 | ±0.31  ±0.40
**J** | 0 | ±0.17  ±0.31
 | 155 | ±0.17  ±0.31
 | 350 | ±0.23  ±0.41
 | 660 | ±0.41  ±0.57
**K** | 0 | ±0.22  ±0.40
 | 155 | ±0.22  ±0.40
 | 350 | ±0.26  ±0.48
 | 660 | ±0.32  ±0.57
**T** | 0 | ±0.20  ±0.36
 | 155 | ±0.20  ±0.36
 | 350 | ±0.19  ±0.35
 | 400 | ±0.19  ±0.35
**R** | 0 | ±1.56  ±2.81
 | 155 | ±0.83  ±1.50
 | 350 | ±0.75  ±1.36
**S** | 0 | ±0.92  ±1.66
 | 660 | ±0.85  ±1.53
**B** | 0 | ±2.42  ±4.70
 | 660 | ±1.22  ±2.37
**N** | 0 | ±0.30  ±0.54
 | 155 | ±0.30  ±0.54
 | 350 | ±0.29  ±0.52
 | 660 | ±0.32  ±0.57
**U** | 0 | ±0.20  ±0.36
 | 155 | ±0.18  ±0.33
 | 350 | ±0.19  ±0.35
 | 600 | ±0.21  ±0.37

*Excl. CJC accuracy ±0.35°C / ±0.63°F

**TRANSMITTER SUPPLY (B MODEL ONLY)**

Output voltage.............................................. 24VDC ±10%
Output current.................................................. Maximum 28 mA

**TRANSMITTER INPUT mA (B MODEL ONLY)**

Range .................................................. 0 to 24 mA
Accuracy (12 months) ......................±(0.02% Rdg. + 0.01% F.S.)

**Mains Specifications**

- Voltage ..............................................115V (90-127) / 230V (180-254)
- Frequency, non US deliveries ..............50 Hz ±5, 60 Hz ±5
- Frequency, US deliveries .....................60 Hz ±5
- Power consumption (max.) PTC-155 ..........400 W
- Power consumption (max.) PTC-350/PTC-660 1150 W

**Switch Input (B Model Only)**

Switch dry contacts
Test voltage .................................................. Maximum 5 VDC
Test current .................................................. Maximum 2.5 mA

**Communication Interface**

- Serial data interface .........................USB 2.0 device port
- Serial data interface .........................USB 2.0 host double port
- LAN............................................................ Ethernet MAC 10/100 Base-T
- * for future expansion

**PHYSICAL SPECIFICATIONS**

- Weight and instrument size (L x W x H)
  - PTC-155 ........................................... 10.3 kg/22.7 lb
  - PTC-350 ........................................... 8.2 kg/18.1 lb
  - PTC-660 ........................................... 8.9 kg/19.6 lb
  - PTC-ALL ........................................... 1262 x 171 x 363 mm/14.3 x 6.7 x 14.3 in

- Shipping (without carrying case)
  - PTC-155 ........................................... 14.0 kg/30.9 lb
  - PTC-350 ........................................... 11.9 kg/26.2 lb
  - PTC-660 ........................................... 12.6 kg/27.8 lb
  - PTC-ALL ........................................... 580 x 250 x 500 mm/22.8 x 9.8 x 19.7 in

- Shipping (including solid protective carrying case) - CX
  - PTC-155 ........................................... 19.0 kg/41.9 lb
  - PTC-350 ........................................... 16.9 kg/37.2 lb
  - PTC-660 ........................................... 17.6 kg/38.8 lb
  - PTC-ALL ........................................... 610 x 340 x 486 mm/24.0 x 13.4 x 19.5 in

- Shipping (including solid protective trolley carrying case) - CT
  - PTC-155 ........................................... 23.9 kg/52.7 lb
  - PTC-350 ........................................... 21.8 kg/48.1 lb
  - PTC-660 ........................................... 22.5 kg/49.6 lb
  - PTC-ALL ........................................... 550 x 440 x 610 mm/21.7 x 17.3 x 24.0 in

- Shipping (carrying case only) - CX
  - Weight .................................................. 7.2 kg/15.9 lb
  - Size .................................................... 610 x 340 x 495 mm/25.5 x 13.4 x 19.5 in

- Shipping (carrying case only) - CT
  - Weight .................................................. 12.1 kg/26.7 lb
  - Size .................................................... 550 x 440 x 610 mm/21.7 x 17.3 x 24.0 in

- PTC-155 and PTC-350 .................................. aluminium
- PTC-660 .................................................. brass

**INSERTS**

- Insert dimensions, diameter & length
  - PTC-155 and PTC-350 ..................... 25.8 x 150 mm/1.02 x 5.91 in
  - PTC-660 ........................................... 24.8 x 160 mm/0.98 x 6.30 in

- Weight of non-drilled insert (approx.)
  - PTC-155 and PTC-350 ..................... 205 g / 7.2 oz
  - PTC-660 ........................................... 225 g / 8.0 oz

- Use of other inserts may reduce performance of the calibrator. To get the best results out of the calibrator, the insert dimensions, tolerance and material is critical. We highly advise using JOFRA inserts, as they guarantee trouble free operation.

**MISC.**

- Operating temperature ..................... 0 to 40°C/32 to 104°F
- Storage temperature ..................... -20 to 50°C/-4 to 122°F
- Humidity .................................................. 0 to 90% RH
- Protection class ........................................ IP-10

**IP-10**
### PREDRILLED INSERTS FOR PTC series

All predrilled inserts have holes for 4 mm reference sensor.
All inserts for PTC-155 are supplied with an insulation plug drilled with the necessary holes.

<table>
<thead>
<tr>
<th>Sensor diameter</th>
<th>Insert code</th>
<th>PTC-155 A/B/C</th>
<th>PTC-350 A/B/C</th>
<th>PTC-660 A/B/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 mm</td>
<td>003</td>
<td>127937</td>
<td>127990</td>
<td>128031</td>
</tr>
<tr>
<td>4 mm</td>
<td>004</td>
<td>127938</td>
<td>127991</td>
<td>128032</td>
</tr>
<tr>
<td>5 mm</td>
<td>005</td>
<td>127939</td>
<td>127992</td>
<td>128033</td>
</tr>
<tr>
<td>6 mm</td>
<td>006</td>
<td>127940</td>
<td>127993</td>
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<td>7 mm</td>
<td>007</td>
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<td>13 mm</td>
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<td>127947</td>
<td>128007</td>
<td>128041</td>
</tr>
<tr>
<td>14 mm</td>
<td>014</td>
<td>127948</td>
<td>128001</td>
<td>128042</td>
</tr>
<tr>
<td>15 mm</td>
<td>015</td>
<td>127949</td>
<td>128002</td>
<td>128043</td>
</tr>
<tr>
<td>Package of the above inserts</td>
<td>SMM</td>
<td>127951</td>
<td>128004</td>
<td>128045</td>
</tr>
</tbody>
</table>

Note 1: Use the insert code, when ordering a JOFRA standard insert together with the PTC calibrator.

### UNDRILLED INSERTS FOR PTC SERIES

<table>
<thead>
<tr>
<th>Inserts, undrilled incl. insulation plugs</th>
<th>Insert code</th>
<th>PTC-155 A/B/C</th>
<th>PTC-350 A/B/C</th>
<th>PTC-660 A/B/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-pack, undrilled inserts with no holes</td>
<td>UN1</td>
<td>127935</td>
<td>127988</td>
<td>128029</td>
</tr>
<tr>
<td>5-pack, undrilled inserts with hole for 4 mm reference sensor</td>
<td>UN2</td>
<td>127936</td>
<td>128989</td>
<td>128030</td>
</tr>
<tr>
<td>Undrilled insulation plug</td>
<td>UN2</td>
<td>127969</td>
<td>Not possible</td>
<td>Not possible</td>
</tr>
</tbody>
</table>

Note 1: Use the insert code, when ordering a JOFRA standard undrilled insert together with the PTC calibrator.
### MULTI-HOLE INSERTS FOR PTC SERIES - METRIC (MM)

All inserts for PTC-15S are supplied with an insulation plug drilled with the necessary holes.

<table>
<thead>
<tr>
<th>Insert type</th>
<th>Insert code</th>
<th>PTC-155 A/B/C</th>
<th>PTC-350 A/B/C</th>
<th>PTC-660 A/B/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-hole type 1</td>
<td>M01</td>
<td>127962</td>
<td>128015</td>
<td>128056</td>
</tr>
<tr>
<td>Multi-hole type 2</td>
<td>M02</td>
<td>127963</td>
<td>128016</td>
<td>128057</td>
</tr>
<tr>
<td>Multi-hole type 3</td>
<td>M03</td>
<td>127964</td>
<td>128017</td>
<td>128058</td>
</tr>
<tr>
<td>Multi-hole type 4</td>
<td>M04</td>
<td>127965</td>
<td>128018</td>
<td>128059</td>
</tr>
<tr>
<td>Multi-hole type 7</td>
<td>M07</td>
<td>127966</td>
<td>128019</td>
<td>128060</td>
</tr>
<tr>
<td>Multi-hole type 8</td>
<td>M08</td>
<td>127967</td>
<td>128020</td>
<td>128061</td>
</tr>
<tr>
<td>Set of 4 Metric Multi Inserts, 3mm to 12mm</td>
<td>SMX</td>
<td>127976</td>
<td>128022</td>
<td>128067</td>
</tr>
</tbody>
</table>

Note 1: Use the insert code, when ordering a JOFRA standard multi-hole insert together with the PTC calibrator.

![Multi-hole Inserts M01, M02, M03, M04, M07, M08, SMX](multi-hole Inserts M01, M02, M03, M04, M07, M08, SMX.png)

### MULTI-HOLE INSERTS FOR PTC SERIES - IMPERIAL (INCH)

All inserts for PTC-15S are supplied with an insulation plug drilled with the necessary holes.

<table>
<thead>
<tr>
<th>Insert code</th>
<th>Insert code</th>
<th>PTC-155 A/B/C</th>
<th>PTC-350 A/B/C</th>
<th>PTC-660 A/B/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-hole type 5</td>
<td>M05</td>
<td>127970</td>
<td>128023</td>
<td>128063</td>
</tr>
<tr>
<td>Multi-hole type 6</td>
<td>M06</td>
<td>127972</td>
<td>128025</td>
<td>128065</td>
</tr>
<tr>
<td>Multi-hole type 10</td>
<td>M10</td>
<td>127973</td>
<td>128026</td>
<td>128066</td>
</tr>
<tr>
<td>Multi-hole type 11</td>
<td>M11</td>
<td>127971</td>
<td>128024</td>
<td>128064</td>
</tr>
<tr>
<td>Set of 3 Imperial Multi Inserts, 1/8 to 1/2 inch</td>
<td>SIX</td>
<td>127977</td>
<td>128027</td>
<td>128068</td>
</tr>
</tbody>
</table>

Note 1: Use the insert code, when ordering a JOFRA standard multi-hole insert together with the PTC calibrator.

![Multi-hole Inserts M05, M06, M10, M11](multi-hole Inserts M05, M06, M10, M11.png)
STANDARD DELIVERY

Model A, B and C:
- PTC dry-block calibrator (user specified)
- Mains power cable (user specified)
- Traceable certificate
- Tool for insertion tubes
- Heat shield - PTC-350 and PTC-660
- JOFRACAL
- USB cable
- Set of rubber cones for insulation plugs - PTC-155
- Manual

Model B instruments contain the following extra items:
- Test cables (2 x red, 2 x black)
- Traceable certificate - for reference sensor input
- Traceable certificate - for sensor-under-test input

Model C instruments contain the following extra items:
- Traceable certificate - for reference sensor input

OPTIONS

Carrying Case
- Option CX
Our new developed protective carrying case gives excellent protection to the PTC calibrator and holds room for inserts, cables etc.

Trolley Carrying Case
- Option CT
With our special designed carrying case it is now possible to store reference sensors in the case with an optimum physical protection. With improved integrated trolley system for easy and safe transportation.

ACCESSORIES

125066 Extra fixture for sensor grip
125067 Extra sensor grip
120516 Thermocouple Male Plug - Type J - Black
120517 Thermocouple Male Plug - Type K - Yellow
120514 Thermocouple Male Plug - Type N - Orange
120515 Thermocouple Male Plug - Type T - Blue
120518 Thermocouple Male Plug - Type R / S - Green
120519 Thermocouple Male Plug - Type Cu-Cu - White

FUNCTIONAL COMPARISON

<table>
<thead>
<tr>
<th>Feature</th>
<th>Model A</th>
<th>Model B</th>
<th>Model C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual-zone heating/cooling block</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>MVI - Mains Variance Immunity (or similar)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Stability indicator</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Automatic step function</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>USB communication</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Display resolution 0.01°C</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Programmable max. temperature</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>External precision reference sensor input</td>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>“SET” follows “TRUE”</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Input for RTD, TC, V, mA</td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-20 mA transmitter input incl. 24 VDC supply</td>
<td></td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>All sensor-under test inputs scalable to temperature</td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic switch test (open, close and hysteresis)</td>
<td>•</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OPTIONAL functionality by choosing Optional PTC Firmware Package - U1

Download of calibration work orders from PC
- •
Upload of calibration results (as found & as left)
- •
Engineering units visible in display
- •
Additional sensor-under-test input types
- •
<table>
<thead>
<tr>
<th>Order number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTC155</td>
<td>PTC-155 Series, -25 to 155˚C (-22 to 311˚F)</td>
</tr>
<tr>
<td>PTC350</td>
<td>PTC-350 Series, 33 to 350˚C (91 to 662˚F)</td>
</tr>
<tr>
<td>PTC660</td>
<td>PTC-660 Series, 33 to 660˚C (91 to 1220˚F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model version</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Basic model, without input</td>
</tr>
<tr>
<td>B</td>
<td>Full model, incl. Reference sensor input, Sensor-under-test input</td>
</tr>
<tr>
<td>C</td>
<td>Middle model, incl. Reference sensor input</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply (US deliveries 60 Hz only)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
<td>115VAC</td>
</tr>
<tr>
<td>230</td>
<td>230VAC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mains power cable</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>European, 230V</td>
</tr>
<tr>
<td>B</td>
<td>USA/Canada, 115V</td>
</tr>
<tr>
<td>C</td>
<td>UK, 240V</td>
</tr>
<tr>
<td>D</td>
<td>South Africa, 220V</td>
</tr>
<tr>
<td>E</td>
<td>Italy, 220V</td>
</tr>
<tr>
<td>F</td>
<td>Australia, 240V</td>
</tr>
<tr>
<td>G</td>
<td>Denmark, 230V</td>
</tr>
<tr>
<td>H</td>
<td>Switzerland, 220V</td>
</tr>
<tr>
<td>I</td>
<td>Israel, 230V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insert type and size</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NON</td>
<td>No insert selected (standard)</td>
</tr>
<tr>
<td>UNX</td>
<td>1 x Undrilled Insert (Please see Insert selection for code)</td>
</tr>
<tr>
<td>XXX</td>
<td>1 x Single hole insert (Please see Insert selection for code)</td>
</tr>
<tr>
<td>MXO</td>
<td>1 x Multi hole insert (Please see Insert selection for code)</td>
</tr>
<tr>
<td>SIX</td>
<td>Set of 3 Imperial multi hole inserts. Covering holes from 1/8” to 1/2”</td>
</tr>
<tr>
<td>SMX</td>
<td>Set of 4 Metric multi hole inserts. Covering holes from 3mm to 12mm</td>
</tr>
<tr>
<td>SIM</td>
<td>Set of 9 Imperial inserts. Covering holes from 1/8” to 5/8” / for PTC-660 set of 8 inserts only up to 9/16”</td>
</tr>
<tr>
<td>SMM</td>
<td>Set of 13 Metric inserts. Covering holes from 3mm to 15mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User Interface Functionality (optional)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U1</td>
<td>Workorders, Complete Sensor-under-Test types, etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STS Reference sensor (B &amp; C models only, optional)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>STS-102 Ref. sensor. Dia. 4mm. Length 30mm (STS102A030EH)</td>
</tr>
<tr>
<td>R11</td>
<td>STS-150 Ref. sensor. Dia. 4mm. Length 180mm. For PTC-155 only (STS150A915EH)</td>
</tr>
<tr>
<td>R12</td>
<td>STS-150 Ref. sensor. Dia. 4mm. Length 165mm. For PTC-350 only (STS150A935EH)</td>
</tr>
<tr>
<td>R13</td>
<td>STS-150 Ref. sensor. Dia. 4mm. Length 203mm. For PTC-660 only (STS150A966EH)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Calibration Certificate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Traceable Calibration Certificate (standard)</td>
</tr>
<tr>
<td>H</td>
<td>Accredited Calibration Certificate</td>
</tr>
<tr>
<td>EA</td>
<td>Full EURAMET Accredited Calibration Certificate</td>
</tr>
<tr>
<td>FS</td>
<td>Traceable System Calibration Certificate (B &amp; C model only)</td>
</tr>
<tr>
<td>HS</td>
<td>Accredited System Calibration Certificate (B &amp; C model only)</td>
</tr>
<tr>
<td>EAS</td>
<td>Full EURAMET Accredited System Calibration Certificate (B &amp; C model only)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CX</td>
<td>Protective Carrying case</td>
</tr>
<tr>
<td>CT</td>
<td>Solid Protective Carrying case with trolley</td>
</tr>
<tr>
<td>SR</td>
<td>Support rod set</td>
</tr>
<tr>
<td>CR</td>
<td>Protective Carrying case with Support rod set</td>
</tr>
<tr>
<td>TR</td>
<td>Solid Protective Carrying case with trolley &amp; Support rod set</td>
</tr>
</tbody>
</table>

**Sample order number** PTC-155 B with 230VAC, EU power cord, set of metric inserts, workorders, STS-150 ref. sensor, full EA temp. calibration certificate, and carrying case with trolley.
### Reference sensors to the PTC series of calibrators

#### Temperature ranges
- For PTC-155: STS-102A030EH .............................................-45 to 155 °C
- For PTC-155: STS-150A915EH .............................................-25 to 155 °C
- For PTC-350: STS-150A935EH .............................................0 to 350 °C
- For PTC-660: STS-150A966EH .............................................0 to 660 °C

#### Diameter and length
- STS-102A030EH .............................................4 x 30 mm
- STS-150A915EH .............................................4 x 180 mm
- STS-150A935EH .............................................4 x 165 mm
- STS-150A966EH .............................................4 x 203 mm

#### Calibration points
- STS-102A030EH .............................................-45, -20, 0, 50, 100, 155 °C
- STS-150A915EH .............................................-25, -18, -12, 0, 50, 100, 155 °C
- STS-150A935EH .............................................0, 100, 200, 275, 350 °C
- STS-150A966EH .............................................0, 100, 250, 400, 660 °C

#### Certificate
- Standard: Accredited

#### Plug with memory
- Holding information as:
  1. Measuring range
  2. Ro value
  3. Sensor coefficients
  4. Calibration date
  5. Serial no.

---

**AMETEK Test & Calibration Instruments**
A business unit of AMETEK Measurement & Calibration Technologies Division offering the following industry leading brands for test and calibration instrumentation.

**JOFRA Calibration Instruments**
Temperature Calibrators
Portable dry-block calibrators, precision thermometers and liquid baths. Temperature ranges from -90°C(-130°F) to 1205°C(2200°F). Temperature sensors for industrial and marine use.

**Pressure Calibrators**
Convenient electronic systems ranging from -25 mbar to 1000 bar - fully temperature-compensated for problem-free and accurate field use.

**Signal Instruments**
Process signal measurement and simulation for easy control loop calibration and measurement tasks.

**M&G Pressure Testers & Pumps**
Pneumatic floating-ball or hydraulic piston dead weight testers with accuracies to 0.015% of reading. Pressure generators delivering up to 1,000 bar.

**Lloyd Instruments**
Materials testing machines and software from Lloyd Instruments guarantees expert materials testing solutions. The comprehensive program also covers Texture Analysers to perform rapid, general food testing and detailed texture analysis on a diverse range of foods and cosmetics.

**Davenport Polymer Test Equipment**
Allows measurement and characterization of moisture-sensitive PET polymers and polymer density.

**Chatillon Force Measurement**
The hand held force gauges and motorized testers have earned their reputation for quality, reliability and accuracy and they represent the de facto standard for force measurement.

**Newage Testing Instruments**
Hardness testers, durometers, optical systems and software for data acquisition and analysis.

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