

# CTC Series

## Compact Temperature Calibrator



# Save Time, Save Money

## Best in class industrial calibrator



The new generation of the CTC temperature calibrator has improved the accuracy with as much as 25%. This makes it the most accurate industrial class temperature calibrator on the market.

## External reference sensor



All our C Models are designed with a signal input for an external reference sensor. The sensor makes it possible to improve accuracy even more. Our new range of external reference sensors have been developed to match each of the new CTC's.

## Wide temperature range



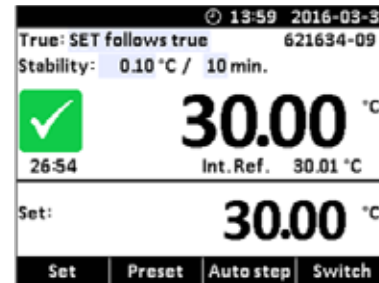
The CTC series covers a wide temperature range from -25 to 660°C (-13 to 1220°F). This makes it sufficient to cover almost all standard industrial temperature calibration applications.

CTC-155: -25 to 155°C (-13 to 311°F)

CTC-350: 28 to 350°C (82 to 662°F)

CTC-660: 28 to 660°C (82 to 1220°F)

## External sensor control



The CTC can be run in two modes when using the external reference sensor. "External ref" mode is where the external reference sensor represents the True value. The "Set follows True" mode is where the reference sensor serves two purposes; measuring the reference temperature and at the same time controlling the block temperature to the set temperature.

## Fast calibration



All our Jofra temperature calibrators feature a purpose-dedicated temperature regulator. This provides a very fast heating and cooling time as well as a short stabilization time. Performing a three point temperature calibration procedure is fast and saves time.

## Easy to carry



The CTC series is designed for both on-site and maintenance shop calibration. We have focused on great portability in regard of size and weight. The calibrator is lightweight and easy to carry and with a handle placed away from the heat-zone.

# Multi-Information Display

## Status Bar

Shows information about recalibration due status and hot/cold safety warnings and keeps track of date and time.

## Calibration Settings

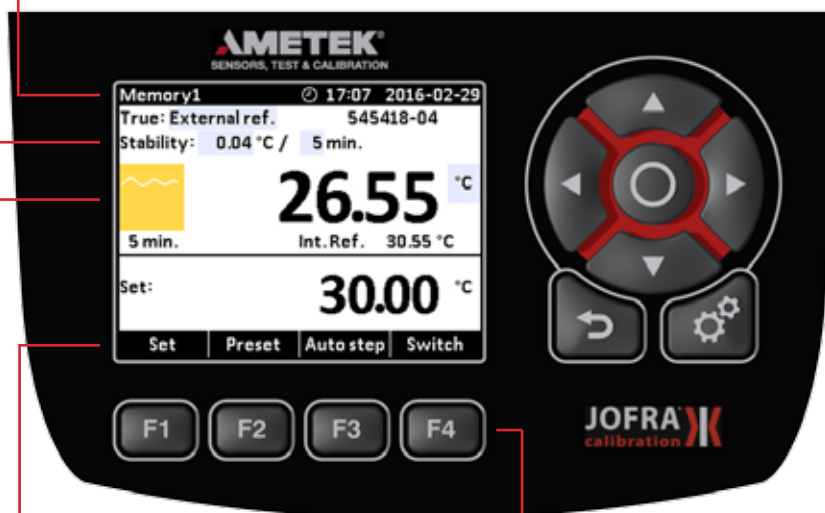
Shows the actual calibration settings for reference sensor and stability criteria. Can be accessed and changed directly in the display by use of the arrow keys.

## Calibration Status

Shows current status of the calibrator, like heating/cooling, stability achieved and expected time to stability.

## Function Bar

Shows the current possibilities of the function keys.



## Function Keys

The function keys serve as shortcuts to the main functions like Set, Preset, Auto step and Switch test. When entering one of the functions the function key shows the options within the selected function.

## Informative color display and intuitive operation

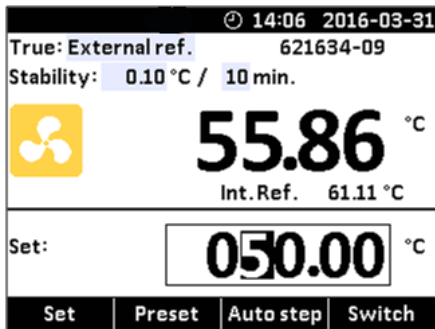
The CTC series is designed with an easy to read and very informative color display that gives you a full overview of the calibration task you currently are performing.



# Useful Features

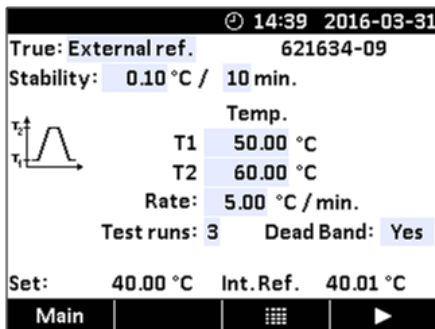
The CTC is a very versatile calibrator series with many integrated functions - you can run the calibration in four different ways.

## Set function



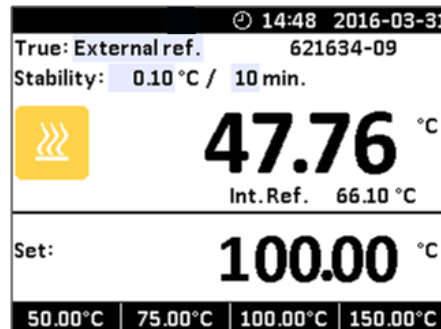
The fastest and simplest way of starting the calibrator. Simply press SET and type in the wanted temperature and off you go.

## Auto Switch Test



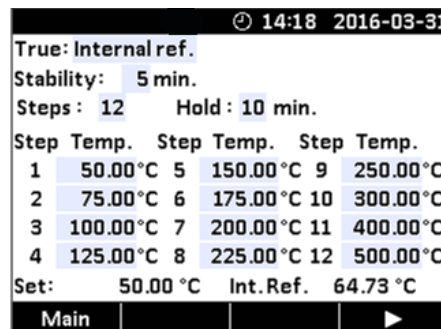
Switch test calibration is a perfect time saver. Start the switch calibration and come back to note the results after the test. You decide if you want the deadband or not - and the test can be repeated automatically in up to three subsequent runs.

## Preset mode



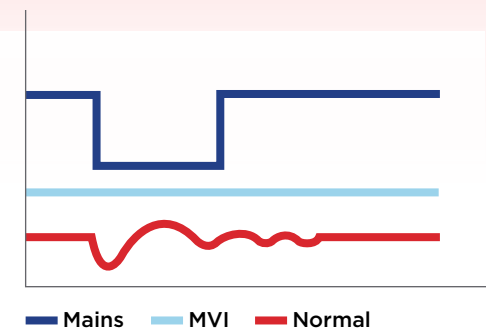
In Preset mode you just activate one of the preset temperatures. Naturally the presets are programmable for your specific needs.

## Auto Stepping



In AUTOSTEP mode you can program as much as 12 temperature steps and at the same time set the dwell time. Even the stability criteria can be programmed. Just start the sequence and the calibrator will run through the steps.

**MVI - Mains Power Variance Immunity** improves temperature stability. Unstable mains power supplies are a major contributor to calibration inaccuracies. Traditional temperature calibrators often become unstable in industrial environments where large electrical motors, heating elements, and other devices are periodically cycled on and off. The cycling of supply power can cause lower quality temperature regulators to perform inconsistently, leading to both inaccurate readings and unstable temperatures. The CTC series employ the MVI, thus avoiding such stability problems. The MVI circuitry continuously monitors the supply voltage and ensures a constant energy flow to the heating elements.



# Special features

## Multi sensor calibration



Insert heat loss due to mass loading from multiple or large sensors can be a challenge for most dry-block calibrators. The CTCs advanced feedback algorithms combined with the external reference sensor effectively addresses these challenges and makes the accuracy even better.

## Plug and Play reference sensors



All STS reference sensors are plug and play as they contain information in the connectors memory chip: Sensor coefficients • Unique serial number • Temperature range • Calibration date • Calibration interval

## Broad range of inserts



The CTC series offers a broad range of inserts to match almost any unit under test diameter. The new CTC cooler provides 35% more space for the units under test. For flexibility we also supply multihole inserts with the most common sensor diameters.

## IRI - Intelligent Recalibration Information



When switching on the calibrator or connecting the reference sensor, the calibrator immediately warns you if any of the calibration certificates are overdue. A buzzer and warning appears. The recalibration interval can be set from 1 to 99 months.

## Reference sensor protection



The CTC will be blocked if it is set to a temperature outside the reference sensors specifications. This protects the reference sensor from being damaged.

# User specified settings



## Silent mode operation

The CTC calibrator can be programmed to run in silent operation. This function is an advantage if calibrating in a laboratory or an office. If used in silent operation the calibrator is not using its full cooling potential.

## Support rod set

The support rod can be mounted on all CTC calibrators. It is used to hold the sensor under test in its position while calibrating. Includes rod, sensor grip and fixture.



## Online firmware upgrade

You can download firmware and software upgrades at [www.ametekcalibration.com](http://www.ametekcalibration.com)

Here you can register your product so we can notify you when there is a firmware upgrade or other useful information regarding your instrument.

## Protective carrying case

Our special designed protective carrying case gives excellent protection for the CTC calibrators. It has compartments for inserts, cables, manuals, plugs etc.

## Calibration software included

The CTC is supplied with our highly versatile calibration software JofraCal.

All calibrations can be documented with a certificate, given that the CTC is controlled from a PC. When the calibrator has reached the desired temperature and stability it will prompt you to type in the UUT temperature. JofraCal documents all your calibration needs within temperature, pressure and process calibration.



# Specifications CTC-155

## Temperature

### Temperature Range

Temp. @ ambient 23°C / 73° F ..... **-25 to 155°C / -13 to 311°F**  
 Temp. @ ambient of 0°C / 32° F ..... **-39 to 155°C / -38 to 311°F**  
 Temp. @ ambient of 50°C / 104° F ..... **-7 to 155°C / -19 to 311°F**

### Accuracy

CTC-155 with internal ref. sensor ..... **±0.3°C / ±0.54°F**  
 CTC-155 with STS-102 ..... **±0.2°C / ±0.36°F**  
 CTC-155 with STS-120 ..... **±0.2°C / ±0.36°F**

*Specification when using the internal reference. (Load 4 mm OD reference probe in the center of the insert).*

### Stability

CTC-155 ..... **±0.04°C / ±0.07°F**

*Measured after the stability indicator has been on for 10 minutes.  
 Measuring time is 30 minutes.*

### Radial Homogeneity (difference between holes)

CTC-155 ..... **0.03°C / 0.054°F**

### Settings

Resolution ..... **1 or 0.1 or 0.01**  
 Units ..... **°C or °F or K**

### Heating Time

CTC-155 ..... **23 to 155°C / 73 to 311°F ... 13 minutes**

### Cooling Time

CTC-155 ..... **155 to 23°C / 311 to 73°F ... 12 minutes**  
 CTC-155 ..... **23 to -25°C / 73 to -13°F ... 16 minutes**

### Time to Stability (typical)

CTC-155 ..... **10 minutes**

## Mains Power

Voltage ..... **115 V (90-127) / 230 V (180-254)**  
 Max Power Consumption ..... **100 VA**  
 Frequency, US deliveries ..... **60 Hz ±3**  
 Frequency, non US deliveries ..... **50 Hz ±3, 60 Hz ±3**

## Physical Specifications

Dimension L x W x H ..... **248x148x305 mm / 9.761x5.83x12.01 in**

### Weight

CTC-155 ..... **5.5 kg / 12.1 lb**

### Immersion Depth incl. insulation plug

CTC-155 ..... **120 mm / 4.53 in**

### Well diameter

CTC-155 ..... **26 mm / 1.02 in**

### Insert Dimensions (diameter x length)

CTC-155 ..... **25,8 mm x 100 mm / 1.01 x 3.9 in**

## Electrical

### Switch Input (dry contact)

Test Voltage ..... **Maximum 14 VDC**  
 Test Current ..... **Maximum 1 mA**

### Digital Interface

USB 2.0

## Environmental

### Operating Temperature

0 to 50°C / 32 to 122°F

### Storage Temperature

-20 to 50°C / -4 to 122°F

### Humidity

5 to 90% Rh, non-condensing

### Protection Class

IP-10



STS-120-A

STS-102-A

## External reference sensor

STS-120-A-915 ..... **-25 to 155°C / -13 to 311°F**

### Accuracy

Hysteresis (@ 0°C / 32°F) ..... **0.01°C / 0.018°F**  
 Long Term Stability (@ 0°C / 32°F) ..... **0.014°C / 0.025°F**  
 Repeatability ..... **0.004°C / 0.007°F**

### Sensing element

Type ..... **Pt100**

### Response time

STS-120-A:  $t_{0.5}$  (50%) ..... **7 sec.**  
 STS-120-A:  $t_{0.9}$  (90%) ..... **18 sec.**

### Dimensions

Diameter ..... **4 mm / 0.157 in**  
 Length ..... **140 mm / 5.51 in**  
 Max. height over calibrator top ..... **20 mm / 0.79 in**

## External reference sensor

STS-102-A ..... **-50 to 155°C / -58 to 311°F**

### Accuracy

Hysteresis (@ 0°C / 32°F) ..... **0.01°C / 0.018°F**  
 Long Term Stability (@ 0°C / 32°F) ..... **0.014°C / 0.025°F**  
 Repeatability ..... **0.002°C / 0.0036°F**

### Sensing element

Type ..... **Pt100**

### Response time

STS-120-A:  $t_{0.5}$  (50%) ..... **5 sec.**  
 STS-120-A:  $t_{0.9}$  (90%) ..... **16 sec.**

### Dimensions

Diameter ..... **4 mm / 0.157 in**  
 Length ..... **30 mm / 1.181 in**  
 Cable length ..... **1 m / 3.28 ft**

# Specifications CTC-350

## Temperature

### Temperature Range

Range ..... **28 to 350°C / 82 to 662°F**  
 Lowest calibration temperature ..... **ambient +5°C / 41°F**

### Accuracy

CTC-350 with internal ref. sensor ..... **±0.45°C / ±0.81°F**  
 CTC-350 with STS-120 ..... **±0.25°C / ±0.45°F**

### Stability

CTC-350 ..... **±0.05°C / ±0.09°F**

*Measured after the stability indicator has been on for 10 minutes.  
 Measuring time is 30 minutes.*

### Radial Homogeneity (difference between holes)

CTC-350 ..... **0.04°C / 0.072°F**

### Settings

Resolution ..... **1 or 0.1 or 0.01**  
 Units ..... **°C or °F or K**

### Heating Time

CTC-350 ..... **23 to 350°C / 73 to 662°F** ..... **6 minutes**

*All specifications are given with an ambient temperature 23° C/73.4° F  
 ± 3° C/5.9° F. Specified at 115 V/230 V.*

### Cooling Time

CTC-350 ..... **350 to 100°C / 662 to 212°F** ..... **18 minutes**  
 CTC-350 ..... **100 to 50°C / 212 to 122°F** ..... **13 minutes**

### Time to Stability (typical)

CTC-350 ..... **10 minutes**

## Mains Power

Voltage ..... **115 V (90-127) / 230 V (180-254)**  
 Max Power Consumption ..... **1150 VA**  
 Frequency, US deliveries ..... **60 Hz ±3**  
 Frequency, non US deliveries ..... **.50 Hz ±3, 60 Hz ±3**

## Physical Specifications

Dimension L x W x H... **248x148x305 mm / 9.76x5.83x12.01 in**

### Weight

CTC-350 ..... **5 kg / 11 lb**

### Immersion Depth

CTC-350 ..... **115 mm / 4.53 in**

### Well diameter

CTC-350 ..... **26 mm / 1.02 in**

### Insert Dimensions (diameter x length)

CTC-350 ..... **25,7 mm x 120 mm / 1.01 x 4.72 in**

## Electrical

### Switch Input (dry contact)

Test Voltage ..... **Maximum 14 VDC**  
 Test Current ..... **Maximum 1 mA**

### Digital Interface

USB 2.0

## Environmental

### Operating Temperature

0 to 50°C / 32 to 122°F

### Storage Temperature

-20 to 50°C / -4 to 122°F

### Humidity

5 to 90% Rh, non-condensing

### Protection Class

IP-10

## External reference sensor

STS-120-A-935 ..... **0 to 350°C / 32 to 662°F**

### Accuracy

Hysteresis (@ 0°C / 32°F) ..... **0.01°C / 0.018°F**  
 Long Term Stability (@ 0°C / 32°F) ..... **0.014°C / 0.025°F**  
 Repeatability ..... **0.004°C / 0.007°F**

### Sensing element

Type ..... **Pt100**

### Response time

STS-120-A : t<sub>0.5</sub> (50%) ..... **7 sec.**  
 STS-120-A : t<sub>0.9</sub> (90%) ..... **18 sec.**

### Dimensions

Diameter ..... **4 mm / 0.157 in**  
 Length ..... **135 mm / 5.32 in**  
 Max. height over calibrator top ..... **10 mm / 0.39 in**





# Specifications CTC-660

## Temperature

### Temperature Range

Range ..... **28 to 660°C / 82 to 1220°F**  
 Lowest calibration temperature ..... **ambient +5°C / 41°F**

### Accuracy

CTC-660 with internal ref. sensor ..... **±0.85°C / ±1.53°F**  
 CTC-660 with STS-120 ..... **±0.45°C / ±0.81°F**

### Stability

CTC-660 ..... **±0.08°C / ±0.14°F**

*Measured after the stability indicator has been on for 10 minutes.  
 Measuring time is 30 minutes.*

### Radial Homogeneity (difference between holes)

CTC-660 ..... **0.1°C / 0.18°F**

### Settings

Resolution ..... **1 or 0.1 or 0.01**  
 Units ..... **°C or °F or K**

### Heating Time

CTC-660 ..... **23 to 660°C / 73 to 1220°F ... 18 minutes**

*All specifications are given with an ambient temperature 23° C/73.4° F  
 ± 3° C/5.9° F. Specified at 115 V/230 V.*

### Cooling Time

CTC-660 ..... **660 to 100°C / 1220 to 212°F ... 39 minutes**  
 CTC-660 ..... **100 to 50°C / 212 to 122°F ... 18 minutes**

### Time to Stability (typical)

CTC-660 ..... **5 minutes**

## Mains Power

Voltage ..... **115 V (90-127) / 230 V (180-254)**  
 Max Power Consumption ..... **1150 VA**  
 Frequency, US deliveries ..... **60 Hz ±3**  
 Frequency, non US deliveries ..... **50 Hz ±3, 60 Hz ±3**

## Physical Specifications

Dimension L x W x H... **248x148x305 mm / 9.76x5.83x12.01 in**

### Weight

CTC-660 ..... **6.1 kg / 13.4 lb**

### Immersion Depth

CTC-660 ..... **115 mm / 4.53 in**

### Well diameter

CTC-660 ..... **26 mm / 1.02 in**

### Insert Dimensions (diameter x length)

CTC-660 ..... **25,7 mm x 120 mm / 1.01 x 4.72 in**

## Electrical

### Switch Input (dry contact)

Test Voltage..... **Maximum 14 VDC**  
 Test Current..... **Maximum 1 mA**

### Digital Interface

USB 2.0

## Environmental

### Operating Temperature

0 to 50°C / 32 to 122°F

### Storage Temperature

-20 to 50°C / -4 to 122°F

### Humidity

5 to 90% Rh, non-condensing

### Protection Class

IP-10

## External reference sensor

STS-120-A-966 ..... **0 to 660°C / 32 to 1220°F**

### Accuracy

Hysteresis (@ 0°C / 32°F) ..... **0.01°C / 0.018°F**  
 Long Term Stability (@ 0°C / 32°F) ..... **0.014°C / 0.025°F**  
 Repeatability..... **0.004°C / 0.007°F**

### Sensing element

Type ..... **Pt100**

### Response time

STS-120-A: t<sub>0.5</sub> (50%) ..... **8 sec.**  
 STS-120-A: t<sub>0.9</sub> (90%) ..... **26 sec.**

### Dimensions

Diameter..... **4 mm / 0.157 in**  
 Length..... **151 mm / 5.95 in**  
 Max. height over calibrator top..... **25 mm / 0.94 in**



# Inserts

Inserts for CTC-155 and CTC-350 are made of aluminum. Inserts for CTC-660 are made of brass. All specifications on hole sizes refer to the outer diameter of the sensor-under-test. The correct clearance size is applied in all predrilled inserts. All CTC-155 inserts include an insulation plug.

## Predrilled Inserts-metric (mm)

Probe Dia.	Insert Code	Part Numbers		
		CTC-155	CTC-350	CTC-660
3 mm	003	129407	129429	129459
4 mm	004	129408	129430	129460
5 mm	005	129409	129431	129461
6 mm	006	129410	129432	129462
7 mm	007	129411	129433	129463
8 mm	008	129412	129434	129464
9 mm	009	129413	129435	129465
10 mm	010	129414	129436	129466
11 mm	011	129415	129437	129467
12 mm	012	129416	129438	129468
13 mm	013	129417	129439	129469
14 mm	014	N/A	129440	129470
15 mm	015	N/A	129441	129471
16 mm	016	N/A	129442*	129472*
18 mm	018	N/A	129443*	129473*
20 mm	020	N/A	129444*	129474*
Package of the above inserts	—	129502	129504	129506
Multi-hole	M01	129489	129491	129493

## Predrilled Inserts-imperial (in)

Probe Dia.	Insert Code	Part Numbers		
		CTC-155	CTC-350	CTC-660
1/8 in	125	129420	129447	129477
3/16 in	187	129421	129448	129478
1/4 in	250	129422	129449	129479
5/16 in	312	129423	129450	129480
3/8 in	375	129424	129451	129481
7/16 in	437	129425	129452	129482
1/2 in	500	129426	129453	129483
9/16 in	562	129427	129454	129484
5/8 in	625	129428	129455	129485
11/16 in	688	N/A	129456*	129486*
13/16 in	750	N/A	129457*	129487*
3/4 in	813	N/A	129458*	129488*
Package of the above inserts	—	129503	129505	129507
Multi-hole	M02	129490	129492	129494

\* All inserts are supplied with hole for 4mm reference sensor, except if marked with \*.

## Undrilled Inserts

Inserts	Insert Code	Part Numbers		
		CTC-155	CTC-350	CTC-660
5-pack	UN1	129418	129445	129475
w/ref. hole	UN2	129419	129446	129476

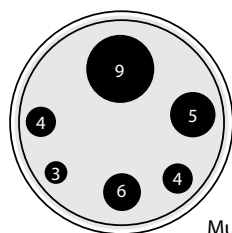
### CTC-155/350/660 Inserts

#### Typical Weight

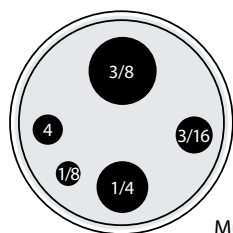
CTC-155: 2.6 oz / 75 g  
CTC-350: 5.8 oz / 170 g  
CTC-660: 17.8 oz / 510 g

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.

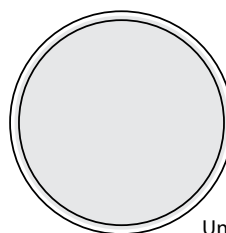
Do you need a customized insert?  
Please contact us for more information.



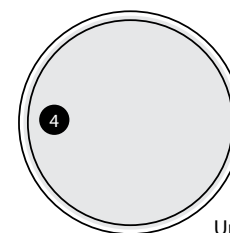
Multi-hole M01



Multi-hole M02



Undrilled



Undrilled w/ref. hole

# Ordering Information

Base Model Number	
CTC155	CTC-155, -25 to 155°C (-13 to 311°F)
CTC350	CTC-350, 28 to 350°C (82 to 662°F)
CTC660	CTC-660, 28 to 660°C (82 to 1220°F)

Model Version	
A	Basic model, without input
C	Full model, incl. Reference sensor input

Power Supply (US deliveries 60 Hz only)	
115	115 VAC
230	230 VAC

Mains Power Cable Type	
A	European 230 V
B	USA/Canada 115 V
C	UK 240 V
D	South Africa 220 V
E	Italy 220 V
F	Australia 240 V
G	Denmark 230 V
H	Switzerland 220 V
I	Israel 230 V

Insert Type and Size	
NON	Without insert (standard delivery)
UNX	1 x Undrilled insert (Please see insert section for correct code)
XXX	1 x Single hole Insert (Please see insert section for correct code)
MXX	1 x Multi hole insert (Please see insert section for correct code)
SIM	Complete set of Imperial inserts - inch
SMM	Complete set of Metric inserts - mm

STS Reference Sensor	
R1	STS-102 Ref. Sensor - temperature range up to 155°C/311°F
R21	STS-120-A-915 Ref. Sensor for CTC-155
R22	STS-120-A-935 Ref. Sensor for CTC-350
R23	STS-120-A-966 Ref. Sensor for CTC-660

Calibration Certificate	
F	Traceable Certificate to International standards (standard)
H	Accredited Certificate - ISO17025
HS	System Calibration - Accredited Certificate - ISO17025

Accessories	
CX	Protective Carrying Case
CR	Protective Carrying Case with Support Rod Set
SR	Support Rod Set

CTC350 C 230 A M01 R22 F CR

CTC-350 with standard accessories, Full model, incl. Reference sensor input, 230 VAC, European power cord, Multi-hole insert type M01, STS-120-A-935 Ref. sensor, Traceable certificate, and Carrying case with support rod.

## Standard Delivery

- CTC dry-block calibrator (user specified)
- Mains power cable (user specified)
- Traceable certificate - temperature performance
- Tool for insertion tubes
- User manual
- Test cables (1 x red, 1 x black)
- USB cable
- JofraCal calibration software
- CTC-660 includes a Heat Shield

## Accessories

- STS120A915EH**.. Reference sensor for CTC-155
- STS120A935EH**.. Reference sensor for CTC-350
- STS120A966EH**.. Reference sensor for CTC-660
- STS102A030EH**.. Reference sensor STS-102
- 129540**..... Carrying Case
- 129539**..... Support Rod set
- 125067**..... Sensor grip
- 125066**..... Fixture for sensor grip
- 129264**..... Heat Shield
- 122832**..... Cleaning Brushes - 4 mm - Package of 3 pcs
- 60F174**..... Cleaning Brushes - 6 mm - Package of 3 pcs
- 122822**..... Cleaning Brushes - 8 mm - Package of 3 pcs



## EN ISO/IEC 17025 Laboratory accreditation

AMETEK Sensors, Test & Calibration has two EN ISO/IEC 17025 accredited laboratories that issues accredited certificates in accordance with international standards. Laboratory accreditation is a reliable indicator of technical competence assuring customers the most accurate documentation. We believe in being clear about our capabilities, our accuracy, and about what you can expect from us.

**Because calibration is a matter of confidence!**

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**calibration** 

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