

CTC Series

Compact Temperature Calibrator CTC-155/350/652/660







Save Time, Save Money

Best In Class Industrial Calibrator



The new generation CTC temperature calibrators feature improved accuracy by as much as 25%. They are now the most accurate industrial class temperature calibrator on the market.

Fast Calibration



All Jofra temperature calibrators feature a purpose-dedicated temperature regulator, which provides a very fast heating and cooling time, and a short stabilization time. Performing a three point temperature calibration procedure is fast and easy.

Wide Temperature Range



The CTC series covers a wide temperature range from -25 to 660°C (-13 to 1220°F).

We have a model 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-652: 28 to 650°C (82 to 1202°F)

CTC-660: 28 to 660°C (82 to 1220°F)

Easy To Carry



The CTC series is designed for both on-site and maintenance shop calibration.

The calibrator is lightweight, easy to carry, and the handle is placed away from the heat-zone.





Intelligent Accuracy

External Reference Sensor



Each CTC calibrator has a C model that includes a signal input for an external reference sensor. The sensor improves the accuracy even more. Our exter-

nal reference sensors have been developed to match

each of the CTC models.

Self Calibration



Adjust the internal reference sensor to give the same readings as the external reference sensor by performing a Self Calibration. After the Self Calibration the calibrator can be used without the external reference sensor. Regular Self Calibration is needed to ensure the accuracy. The Self Calibration is simple and fast to perform following the steps in the reference manual.

External Sensor Control



The CTC has two modes when using the external reference sensor.

In "External ref" mode, the external reference sensor represents the True value.

In The "Set follows True" mode, the reference sensor serves two purposes; measuring the reference temperatue and at the same time controlling the block temperature to the set temperature.

Liquid Filled Sensors and Switches



The tall CTC models, with an immersion depth of 190 mm / 7.5 in, are ideal for calibration of liquid filled sensors. The block mass and the specially designed non-linear heating elements in the CTC-652, provide a homogeneous temperature throughout the block. It is essential for the quality of the calibration or test that the full length of the sensing part of the sensor is exposed to the same temperature. The CTC-652 makes it possible to calibrate analog reading devices or switches with very high repeatability.





Multi-Information Display

Status Bar

Shows information about recalibration due status, hot and cold safety warnings, and date and time.

Calibration Settings

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

Calibration Status

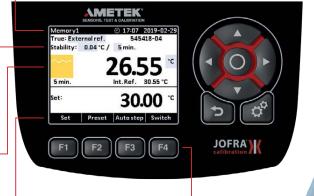
Shows current status of the calibrator, like heating or cooling, expected time to stability, or stability achieved.

Function Bar

Shows the current possibilities of the function keys.







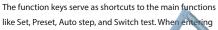
Function Keys

like Set, Preset, Auto step, and Switch test. When entering one of the functions, the function keys will then show t 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 are currently performing.





Useful Features

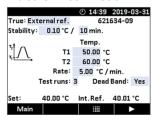
The CTC is a very versatile calibrator series with many integrated functions - you can run the calibration in four different ways.

Set Function

		@ 14:06 2	019-03-31
True: Exte	rnal ref.	62163	34-09
Stability:	0.10 °C /	10 min.	
S	5	55.8 Int. Ref.	
Set:		050.0)° c
Set	Preset	Auto step	Switch

The fastest and simplest way of starting the calibrator. Simply press SET and type in the desired 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

		@ 14:48	2019-03-31
True: Exte	rnal ref.	621	634-09
Stability:	0.10 °C /	10 min.	
<u>}}}</u>	4	17.7 Int.Ref.	4
Set:		100	.00 °c
50.00°C	75.00°C	100.00°C	150.00°C

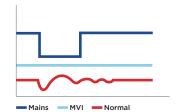
In Preset mode, you activate one of the preset temperatures. The presets are programmable for your specific needs.

Auto Stepping

				② 1	4:18 2	2019-03-31
True	: Inter	nal r	ef.			
Stabi	ility:	5 m	nin.			
Step	s: 12		Ho	ld : 10 r	min.	
Step	Temp	. S	itep	Temp.	Step	Temp.
1	50.0	0°C	5	150.00	°C 9	250.00°C
2	75.0	0°C	6	175.00	°C 10	300.00°C
3	100.0	0°C	7	200.00	°C 11	400.00°C
4	125.0	0°C	8	225.00	°C 12	500.00°C
Set:	!	50.00	o °C	Int.R	ef. 6	4.73 °C
М	ain					•

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.

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.

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 the diameter of almost any unit under test.

The CTC-155 provides 35% more space for the units under test compared to CTC-140.

For flexibility, we also supply multihole inserts with the most common sensor diameters in both metric and imperial measures.

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.







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, and it is used to hold the sensor under test in its position while calibrating. Indcludes rod, sensor grip, and fixture.





Online Firmware Upgrade

Register your products and receive notifications when we have firmware upgrades or other useful information regarding your instrument.

Protective Carrying Case

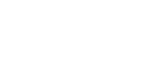
Our special designed protective carrying case gives excellent protection for the CTC calibrators. The carrying case has compartments for inserts, cables, manuals, plugs, and more.

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 stabillity it will prompt you to type in the UUT temperature. JofraCal documents all your calibration needs within temperature, pressure and process calibration.



METEK



Temperature

Temperature Range	
Temp. @ ambient 23°C / 73° F25 to 155°C / Temp. @ ambient of 0°C / 32° F39 to 155°C / Temp. @ ambient of 50°C / 122° F7 to 155°C /	-38 to 311°F
Accuracy *	
CTC-155 with internal ref. sensor	2°C/±0.36°F
Stability	
CTC-155 **±0.04	₽°C / ±0.07°F
CTC-155 @ 155°C / 311°F	
Influence From Load Ø6mm Full Range	
With Internal Reference	,
With External Reference)1°C / 0.02°F
Resolution	
Heating Time	
CTC-155	.13 minutes
Cooling Time CTC-155	
Time to Stability (typical)	

Mains Power

Voltage
Physical Specifications
Dimension L x W x H . 248x148x305 mm / 9.761x5.83x12.01 in
Weight
CTC-155
Immersion Depth incl. insulation plug
CTC-155
Well Diameter
CTC-155
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
Test Current
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

°E and cr

lease note: All specifications are given with an ambient temperature 23°C / 73.4°F ± 3°C / 5.9°F and specified at 115 V/230 V ↑ In lower 30 mm incl. Stability. Uniformity. 12-month drift (typical). Hysteresis. Resolution. Load (Max 6 mm) and calibration

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

External Reference Sensor

STS-120-A-91525 to 155°C /-13 to 311°	°F
Accuracy Hysteresis (@ 0°C / 32°F)	°F
Sensing Element	
TypePt10)0
Response Time	
STS-120-A: t _{0.5} (50%) .7 se STS-120-A: t _{0.9} (90%) .18 se	
Dimensions	
Diameter	in
External Reference Sensor	
External Reference Sensor	
STS-102-A50 to 155°C/-58 to 311°	°F
STS-102-A50 to 155°C /-58 to 311' Accuracy	
STS-102-A50 to 155°C /-58 to 311°	°F °F
STS-102-A50 to 155°C /-58 to 311° Accuracy Hysteresis (@ 0°C / 32°F)0.11°C / 0.018° Long Term Stability (@ 0°C / 32°F)0.14°C / 0.025°	°F °F
STS-102-A50 to 155°C /-58 to 311° Accuracy Hysteresis (@ 0°C / 32°F)	°F °F
STS-102-A	°F °F °F
STS-102-A. -50 to 155°C /-58 to 311° Accuracy Hysteresis (@ 0°C / 32°F) .0.01°C / 0.018° Long Term Stability (@ 0°C / 32°F) .0.014°C / 0.025° Repeatability. .0.002°C / 0.0036° Sensing Element Type .Pt10	°F °F °F
STS-102-A50 to 155°C /-58 to 311° Accuracy Hysteresis (@ 0°C / 32°F)	°F °F °C.



^{★★★)} Stability when exposed to maximum temperature for 100 hours. Stability will depend on actual use of the probe.



Temperature Temperature Range Lowest calibration temperature ambient +5°C / 41°F CTC-350 With Internal Reference Sensor @ 350°C / 662°F..... ±0.45°C /±0.81°F CTC-350 With External Reference Sensor STS-120-A-935 Radial Homogeneity (difference between holes) Influence From Load Ø6mm 350°C / 662°F With Internal Reference 0,35°C / 0.63°F With External Reference 0,01°C / 0.02°F Settings Resolution 1 or 0.1 or 0.01 Units °C or °F or K Heating Time $\text{CTC-350}\dots$ 23 to 350°C / 73 to 662°F \dots 6 minutes Cooling Time CTC-350350 to 100°C / 662 to 212°F ...20 minutes CTC-350100 to 50°C / 212 to 122°F ...14 minutes Time to Stability (typical)

Max Power Consumption .	115 V (90-127) / 230 V (180-254
	es
Physical Specific	cations
Dimension L x W x H 248	x148x305 mm / 9.76x5.83x12.01 i
Weight	
CTC-350	5 kg / 11 l
Immersion Depth	
CTC-350	115 mm / 4.53 i
Well Diameter	
CTC-350	26 mm / 1.02 i
Insert Dimensions (diame	ter x length) 25.7 mm x 120 mm / 1.01 x 4.72 i
Electrical	
Switch Input (dry contact)	
Test Voltage	
Test Voltage	
Test Voltage Test Current Digital Interface	
Test Voltage Test Current Digital Interface USB 2.0	
Test Voltage Test Current Digital Interface USB 2.0 Environmental Operating Temperature	
Test Voltage. Test Current. Digital Interface USB 2.0 Environmental Operating Temperature 0 to 50°C / 32 to 122°F Storage Temperature	Maximum 1 m

Please note: All specifications are given with an ambient temperature 23°C/73.4°F±3°C/5.9°F and specified at 115 V/230 V.

*) In lower 30 mm incl. Stability, Uniformity, 12-month drift (pylical), Hysteresis, Resolution, Load (Max 6 mm) and calibration laboratory uncertainty.

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

***) Stability when exposed to maximum temperature for 100 hours. Stability will depend on actual use of the probe.

External Reference Sensor

External Reference Sensor
STS-120-A-935
Accuracy
Hysteresis (@ 0°C / 32°F)
Long Term Stability (@ 0°C / 32°F) ★★★ 0.014°C / 0.025°F
Repeatability0.004°C/ 0.007°F
Sensing Element
TypePt100
Response Time
STS-120-A: t _{o.s} (50%)
STS-120-A: t _{0.9} (90%)
Dimensions
Diameter 4 mm / 0.157 in
Length
Max. height over calibrator top





Temperature Range

Temperature

@ Ambient 0°C/32°F 5 to 650°C / 41 to 1202°F

CTC-652 With Internal Reference Sensor @ 650°C / 1202°F..... ±0.65°C /±1.17°F @ 400°C / 752°F..... ±0.60°C /±1.08°F @ 200°C / 392°F..... ±0.50°C /±0.90°F CTC-652 With External Reference Sensor STS-200-A-970

@ 650°C / 1202°F..... ±0.45°C /±0.81°F

Stability CTC-652 **....±0.05°C/±0.09°F

Radial Homogeneity (difference between holes) CTC-652 @ 650°C / 1202°F 0.08°C / 0.14°F

Influence From Load Ø6mm 28 to 650°C / 82 to 1202°F

Units.....°C or °F or K CTC-652 23 to 650°C / 73 to 1202°F ...33 minutes

Cooling Time $\text{CTC-}652\dots\dots$ 650 to 100°C / 1202 to 212°F \dots 48 minutes CTC-652 100 to 50°C / 212 to 122°F . . . 25 minutes

Time to Stability (typical)

Mains Power

Voltage ****	115 V (103-127) / 206 V (180-254)
Max Power Consump	otion
Frequency, US delive	ries 60 Hz ±3
Frequency non US d	eliveries 50 Hz +3, 60 Hz +3

Physical Specifications

Dimension L x W x H . . 248x148x390 mm / 9.76x5.83x15.35 in

Immersion Depth

Well Diameter 26 mm / 1.02 in

Insert Dimensions (diameter x length) CTC-652 25.7 mm x 200 mm / 1.01 x 7.874 in

Electrical

Switch Input (dry contact) Test Voltage..... Maximum 14 VDC

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

Please note: All specifications are given with an ambient temperature 23°C/73.4°F ± 3°C/5.9°F and specified at 115 V/230 V.

External Reference Sensor

STS-200-A-970	700°C / 32 to 1292°F
Accuracy	
Hysteresis (@ 0°C / 32°F)	0.01°C / 0.018°F
Long Term Stability (@ 0°C / 32°F) ★★★	0.016°C / 0.029°F
Repeatability	0.002°C/ 0.0036°F
Sensing element	
Туре	Pt100
Response Time	
STS-200-A-970: t _{0.5} (50%)	8 sec.
STS-200-A-970: t _{0.9} (90%)	26 sec.
Dimensions	
Diameter	4 mm / 0.157 in
Length	241 mm / 9.29 in
Max. height over calibrator top	35 mm / 1.38 in





Temperature

Temperature Range	
Range	
Accuracy★	
CTC-660 with Internal Ref. Sensor	
@ 660°C / 1220°F	±0.85°C/±1.53°F
@ 400°C / 752°F	±0.75°C/±1.35°F
@ 200°C / 392°F	
CTC-660 with External Ref. Sensor STS-120-	
@ 660°C / 1220°F	
@ 400°C / 752°F	
@ 200°C / 392°F	±0.40°C /±0.72°F
Stability	
CTC-660 @ 660°C★★	±0.08°C / ±0.14°F
Radial Homogeneity (difference between h	noles)
CTC-660 @ 660°C / 1220°F	0.1°C / 0.18°F
CTC-660 @ 400°C / 752°F	0.03°C / 0.054°F
Influence From Load Ø6mm 28 to 660°C / 8	32 to 1220°F
With Internal Reference	0,3°C / 0.54°F
With External Reference	0,03°C / 0.054°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 122	0°F18 minutes
Cooling Time	
CTC-660	2°F39 minutes
CTC-660 100 to 50°C / 212 to 12	2°F18 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
Immersion Depth
CTC-660
Well diameter
CTC-660 26 mm / 1.02 in
Insert Dimensions (diameter x length)
CTC-660
Electrical
Switch Input (dry contact)
Test Voltage
Test Current
Digital Interface

Environmental

Operating Temperature 0 to 50°C / 32 to 122°F

Storage Temperature -20 to 50°C / -4 to 122°F

Humidity

USB 2.0

5 to 90% Rh, non-condensing

Protection Class IP-10

Please note: All specifications are given with an ambient temperature 23°C/73.4°F ± 3°C/5.9°F and specified at 115 V/230 V.

*) In lower 30 mm incl. Stability, Uniformity, 12-month drift (typical), Hysteresis, Resolution, Load (Max 6 mm) and calibration laboratory uncertainty.

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

** | Stability when exposed to maximum temperature for 100 hours. Stability will depend on actual use of the probe.

External Reference sensor

	0 to 660°C / 32 to 1220°F
y (@ 0°C / 32°F) ★★	0.01°C / 0.018°F *0.014°C / 0.025°F 0.004°C/ 0.007°F
	Pt100
i)	8 sec.
)	26 sec.
	4 mm / 0.157 in 151 mm / 5.95 in 25 mm / 0.94 in
	/ 32°F)





Inserts

Inserts for CTC-155 and CTC-350 are made of aluminum. Inserts for CTC-652 and 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)

	Part Numbers					
Probe Dia.	Insert Code	CTC-155	CTC-350	CTC-652	CTC-660	
3 mm	003	129407	129429	130156	129459	
4 mm	004	129408	129430	130157	129460	
5 mm	005	129409	129431	130158	129461	
6 mm	006	129410	129432	130159	129462	
7 mm	007	129411	129433	130160	129463	
8 mm	008	129412	129434	130161	129464	
9 mm	009	129413	129435	130162	129465	
10 mm	010	129414	129436	130163	129466	
11 mm	011	129415	129437	130164	129467	
12 mm	012	129416	129438	130165	129468	
13 mm	013	129417	129439	130166	129469	
14 mm	014	N/A	129440	130167	129470	
15 mm	015	N/A	129441	130168	129471	
16 mm	016	N/A	129442*	130169*	129472*	
18 mm	018	N/A	129443*	130170*	129473*	
20 mm	020	N/A	129444*	130171*	129474*	
Package of the above inserts	_	129502	129504	130184	129506	
Multi-hole	M01	129489	129491	130152	129493	

Predrilled Inserts-imperial (in)

	Part Numbers				
Probe Dia.	Insert Code	CTC-155	CTC-350	CTC-652	CTC-660
1/8 in	125	129420	129447	130172	129477
3/16 in	187	129421	129448	130173	129478
1/4 in	250	129422	129449	130174	129479
5/16 in	312	129423	129450	130175	129480
3/8 in	375	129424	129451	130176	129481
7/16 in	437	129425	129452	130177	129482
1/2 in	500	129426	129453	130178	129483
9/16 in	562	129427	129454	130179	129484
5/8 in	625	129428	129455	130180	129485
11/16 in	688	N/A	129456*	130181*	129486*
13/16 in	750	N/A	129457*	130183*	129487*
3/4 in	813	N/A	129458*	130182*	129488*
Package of the above inserts	_	129503	129505	130185	129507
Multi-hole	M02	129490	129492	130153	129494

^{*} All inserts are suppied with hole for 4mm reference sensor, execpt if marked with *

Undrilled Inserts

		Part Numbers			
Inserts 5-Pack	Insert Code	CTC-155	CTC-350	CTC-652	CTC-660
No ref. hole	UN1	129418	129445	130154	129475
w/ref. hole	UN2	129419	129446	130155	129476

CTC-155/350/652/660 Inserts

Typical Weight

CTC-155: 2.6 oz/75 g

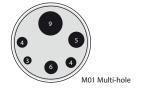
CTC-350: 5.8 oz/170 g

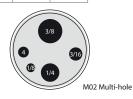
CTC-652: 28.6 oz/850 g

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.



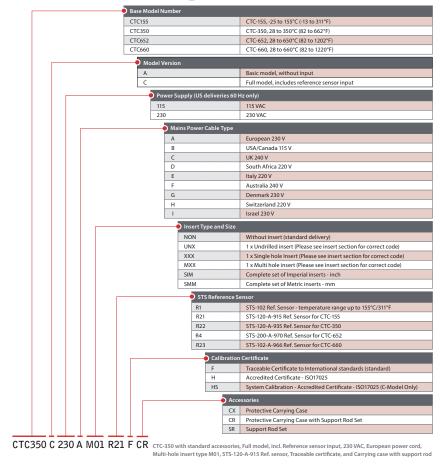






AMETEK®

Ordering Information











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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