

## signal



### Input and Output

RTD: 14 types, TC:13 types  
Resistance: 0 to 4,000  $\Omega$  (read)  
5 to 4,000  $\Omega$  (source)  
mV: -10 to 75 mV

### High level of protection

Fuse-less protection for internal circuitry  
- a common cause of failure in other units  
without this protection

### CJC

Selectable feature - use with or without  
cold junction compensation depending on  
application

### Setpoints

User-defined - make testing easier by  
storing the necessary settings for repeated  
test points and sequences

### High accuracy

Accuracy up to  $\pm 0.2^\circ\text{C}$  /  $0.36^\circ\text{F}$  - including  
programmed curves for easy use in most  
any application

### Easy connections

Jacks for 2, 3, or 4-wire RTDs and a  
dedicated TC plug - allows for connection  
of sensor-under-test

### Complete marine program

Part of a complete program of marine  
approved temperature, pressure and signal  
calibrators; including temperature sensors  
See more at [www.jofra.com](http://www.jofra.com)

ISO 9001 Manufacturer

# JOFRA™ CSC200

## Compact Signal Calibrator

Your solution to easy temperature signal  
calibration!

The JOFRA CSC200 handheld calibrator offers you an easy-to-operate interface including a knob for precise and rapid adjustment. With features including a large display and an auto stepping signal, the CSC200 makes troubleshooting and calibration of your temperature sensors a snap.



## PRODUCT DESCRIPTION

The CSC line of signal calibrators are dedicated units designed to make your calibration and maintenance tasks easier to perform. The JOFRA CSC200 is engineered for the calibration of temperature instruments offering the ability to measure and simulate several different types of RTDs and TCs. This instrument makes the job easy by utilizing a thermocouple plug for easy connection and can work with 2, 3, or 4-wire RTDs.

The CSC200 also offers features such as user-defined setpoints with a recall function, selectable cold junction compensation, and installed curves for 14 RTD and 13 TC types. These handy time savers are combined in a package offering an easy-to-read, two line display and an intuitive keypad with a knob for fine adjustments.

This calibrator is more than a simple tool but it is as straightforward as any device that you have in your toolbox. The CSC200 signal calibrator offers you the accuracy and features that you need in a convenient, compact, and easy-to-use package.

**AMETEK®**  
CALIBRATION INSTRUMENTS

## JOFRA CSC200 LAYOUT

### Clear dual line display

Large digits display the temperature or signal value. The mode of operation is displayed with dedicated icons. The type of sensor is shown on the second line and the icons show the engineering units. The engineering units are selectable at start-up and are retained after each use.

### Electrical connections

Inputs for 2, 3, and 4-wire RTD probes, TC jack, and switch test connections.

### TC/RTD

Selects between the RTD and TC functions.

### ON / OFF

Auto shut-off to extend battery life (user programmable).

### Type

This is used to scroll through the various types of sensors that are installed in the CSC200 firmware.

### Adjustment Knob

Allows for easy adjustment of values. Combined with the Arrow Keys, reaching the desired value is easy.

### Left / Right arrows

Move the cursor left or right to allow for adjustment of the desired decade.

### I/O

Selects whether the CSC200 is reading or sourcing values.

### Recall

Recalls the user-defined setpoints to allow for stepping through calibration and validation routines.

### Set

Allows for user-defined setpoints for stepping through calibrations and validations.



 **JOFRA CSC200****Overview**

The CSC200 is a temperature signal calibrator; it is designed to source and read RTDs, TCs, Resistance, and mV for temperature signal calibration. This unit is a handy calibrator that can meet applications such as simulating a temperature sensor, measuring temperature with a sensor, and checking the sensor output.

The CSC200 is not simply a calibrator but an effective troubleshooting and test device. This versatile instrument was designed for calibration and validation of temperature sensors but that does not mean that you will not find other applications for this unit. For example, you can combine the CSC200 with a JOFRA dry-block calibrator for a portable onsite calibration system.

**RTD modes**

The CSC200 offers the ability to source and read 14 types of RTDs. The formulas (curves) for the different types of RTDs are programmed into the firmware of this unit. This means that you can select the curve that matches your sensor and perform the test routine without the need for mathematical conversions. The CSC200 can be used with 2, 3, or 4-wire RTDs making it flexible enough for virtually all of your RTD calibrations.

**TC modes**

The CSC200 is also programmed with the formulas for 13 TC types. Like the RTD modes, the unit will source or read TC sensors and provide you with a stable and reliable reading. The unit has a convenient TC plug for easy connection to your TCs and is also equipped with CJC: the CJC may be turned off if desired.

**Set and Recall operation**

The CSC200 offers you a timesaving feature that is not offered amongst lesser calibrators. You can store up to 3 test points for each of the TC and RTD functions. This means that there is no need to repeatedly set each value for your test needs; just store the setpoints for your test and call them up for each sensor. The Recall button is your "hot key" to retrieve the stored values in sequential order. If you have several types of sensors in your process, the CSC200 makes it easy because you can store set values for each type.

These values are stored in a non-volatile memory location so you only need to set the values once and they are there for your use any time that you need them.

**Auto shutdown**

The CSC200 offers an automatic shutdown feature. This power saving feature turns the calibrator off after it has been idle for a specified period of time. The time delay is factory set to 30 minutes; however, you can adjust the time to meet your needs.

**Large display**

The CSC200 features a large two-line display. The upper line shows the measured or sourced temperature, resistance, or mV value. The second line indicates the type of sensor. The display also features several icons to allow for quick recognition of the status of the unit.

**CSC200 in soft case**

All JOFRA handheld calibrators are supplied in a handy soft case that allows for operation while in the case. The convenient internal storage pocket offers the space for test leads and accessories.



### Dry-block calibrators

You may use the CSC200 in conjunction with your JOFRA or other dry-block calibrators. This calibrator will allow you to make full use of your dry-block or calibration bath by offering you the ability to locally read your sensor-under-test. You can easily read the sensor-under-test and record the values, compare the reading with a remote read-out device, or be sure that remote alarms are operating as needed.

AMETEK features three families of dry-block calibrators that do not offer the ability to directly read an instrument-under-test. These portable calibrators do feature easy operation, multiple functions directly on the keypad, stable and accurate readings, and portability for on-site testing; just the type of instrument that you need for your temperature calibration and testing. When combined with the CSC200, you have no need for any other test equipment.

### JOFRA ITC Series

The ITC Series features 3 models and 3 ranges and offers high accuracy and stability.

See Spec. Sheet: SS-CP-2286 at [www.jofra.com](http://www.jofra.com)



### JOFRA CTC Series

The CTC Series features 6 models and 4 ranges to meet many in-plant and field applications.

See Spec. Sheet: SS-CP-2281 at [www.jofra.com](http://www.jofra.com)



### Reference probes

You may need to use a reference probe for validation of your dry-block or calibration bath performance. Use the CSC200 to read a JOFRA reference probe to ensure that you have the proper temperature for your test point. The system accuracy of the CSC200 with a JOFRA reference probe is the stated accuracy for the reference probe type plus the accuracy of the probe. Constants for the probe cannot be entered.

If you already have a JOFRA STS Series reference probe, you will need to verify that you have banana jacks on the termination. If not, we offer a connection cable that you can easily plug into your probe to convert to banana jacks.

AMETEK features a series of dependable, accurate, and stable reference probes: the STS Series. These probes are proven to be reliable instruments for verifying the temperature in a dry-block calibrator or calibration bath. They are available with banana jack connectors allowing for an easy use with your CSC200; just plug in the probe, select the instrument type, and read the temperature.

### JOFRA STS Series

The STS Series of reference probes features several configurations, all with high accuracy and stability.

See Spec. Sheet: SS-CP-2179 at [www.jofra.com](http://www.jofra.com)



### JOFRA ETC Series

The ETC Series features 3 models and 2 ranges; the ultimate in speed and portability.

See Spec. Sheet: SS-CP-2280 at [www.jofra.com](http://www.jofra.com)



**CSC200 SPECIFICATIONS**

**Display**

LCD ..... Dual line plus icons  
 Display resolution ..... 5 digits  
 Display update ..... 4 times per second

**Temperature range**

Operating ..... -10 to 50°C / 14 to 122°F  
 Storage ..... -20 to 60°C / -4 to 140°F

**Power supply**

Battery ..... 1 x 9 V Alkaline  
 Battery life ..... Minimum 20 hours  
 Low battery indicator ..... at 7 V

**Instrument dimensions**

L x W x H ..... 188 x 84 x 52 mm / 7.4 x 3.3 x 2.1 in  
 Weight (including battery): ..... 400 g / 14.1 oz

**Shipping dimensions**

L x W x H ..... 203 x 101 x 64 mm / 8.0 x 4.0 x 2.5 in  
 Weight (including battery): ..... 567 g / 20 oz

**Thermocouple - TC**

TC types ..... B C E J K L N R S T U BP XK  
 Cold Junction Compensation ON/OFF control: ..... Yes

Thermocouple mV	Range		Accuracy± 12 months
	min	max	
TC mV read	-10.000 mV	75.000 mV	0.02% rdg ±10 µV
TC mV source	-10.000 mV	75.000 mV	0.02% rdg ±10 µV

Maximum current output is 1 mA with an output impedance of = 1 Ω

Thermocouple Cold junction	Range		Accuracy± 12 months
	min	max	
CJC compensation	18 °C (64 °F)	28 °C (83 °F)	0.20 °C (0.36 °F)
CJC outside above			0.05 °C (0.09 °F)



Thermo- couple		Range		Accuracy± 12 months
		min	max	
B	°C	600.0 °C	800.0 °C	1.40 °C
		800.0 °C	1000.0 °C	1.50 °C
		1000.0 °C	1820.0 °C	1.70 °C
	°F	1112.0 °F	1472.0 °F	2.52 °F
		1472.0 °F	1832.0 °F	2.70 °F
C	°C	0.0 °C	1000.0 °C	0.80 °C
		1000.0 °C	2316.0 °C	2.50 °C
	°F	32.0 °F	1832.0 °F	1.44 °F
		1832.0 °F	4200.8 °F	4.50 °F
E	°C	-250.0 °C	-100.0 °C	0.80 °C
		-100.0 °C	1000.0 °C	0.40 °C
	°F	-482.0 °F	-148.0 °F	1.44 °F
J	°C	-210.0 °C	0.0 °C	0.60 °C
		0.0 °C	800.0 °C	0.40 °C
	°F	800.0 °C	1200.0 °C	0.50 °C
		-346.0 °F	32.0 °F	1.08 °F
		32.0 °F	1472.0 °F	0.72 °F
K	°C	1472.0 °F	2192.0 °F	0.90 °F
	°F	-200.0 °C	0.0 °C	0.80 °C
		0.0 °C	1000.0 °C	0.50 °C
°F	1000.0 °C	1372.0 °C	0.70 °C	
	-346.0 °F	32.0 °F	1.44 °F	
	32.0 °F	1832.0 °F	0.90 °F	
L	°C	1832.0 °F	2501.6 °F	1.26 °F
	°F	-200.0 °C	0.0 °C	0.45 °C
		0.0 °C	900.0 °C	0.40 °C
		-328.0 °F	32.0 °F	0.81 °F
	32.0 °F	1652.0 °F	0.72 °F	

Accuracy includes CJC error, does not include wire error.  
 CJC error outside of 23°C ±5°C is 0.05°C/°C / 73.4°F ±9°F is 0.05°F/°F.  
 Accuracies are stated for operation at 23°C ±5°C / 73.4°F ±9°F.  
 For operation < 18°C or > 28°C add ±0.005% of reading / °C / < 64.4°F or > 68.8°F add  
 ±0.003% of reading / °F.

Thermo-couple		Range		Accuracy± 12 months
		min	max	
<b>N</b>	°C	-200.0 °C	0 °C	1.00 °C
		0.0 °C	1300 °C	0.60 °C
	°F	-328.0 °F	32.0 °F	1.80 °F
		32.0 °F	2372.0 °F	1.08 °F
<b>R</b>	°C	0.0 °C	1767.0 °C	1.40 °C
	°F	32.0 °F	3212.6 °F	2.52 °F
<b>S</b>	°C	0.0 °C	1767.0 °C	1.40 °C
	°F	32.0 °F	3212.6 °F	2.52 °F
<b>T</b>	°C	-250.0 °C	0.0 °C	0.80 °C
		0.0 °C	400.0 °C	0.40 °C
	°F	-418.0 °F	32.0 °F	1.44 °F
		32.0 °F	752.0 °F	0.72 °F
<b>U</b>	°C	-200.0 °C	0.0 °C	0.70 °C
		0.0 °C	600.0 °C	0.45 °C
	°F	-328.0 °F	32.0 °F	1.26 °F
		32.0 °F	1112.0 °F	0.81 °F
<b>XK</b>	°C	-200.0 °C	800.0 °C	0.40 °C
	°F	-328.0 °F	1472.0 °F	0.72 °F
<b>BP</b>	°C	0.0 °C	800.0 °C	1.10 °C
		800.0 °C	2500.0 °C	2.50 °C
	°F	32.0 °F	1472.0 °F	1.98 °F
		1472.0 °F	4532.0 °F	4.50 °F

Accuracy includes CJC error, does not include wire error.  
 CJC error outside of 23°C ±5°C is 0.05°C/°C / 73.4°F ±9°F is 0.05°F/°F.  
 Accuracies are stated for operation at 23°C ±5°C / 73.4°F ±9°F.  
 For operation < 18°C or > 28°C add ±0.005% of reading / °C / < 64.4°F or > 68.8°F add ±0.003% of reading / °F.

**Resistance Temperature Detector - RTD**

RTD Types: .....Pt10, Pt25, Pt50, Pt100, Pt200, Pt500, Pt1000  
 ..... Cu10, Cu50, Cu100, Ni120, YSI400  
 Response time: ..... ≤ 5 mSec  
 Connection ..... 2, 3, and 4-wire

Ohm	Range		Accuracy± 12 months
	min	max	
Ohm read (low)	0.0 Ω	400.0 Ω	0.025% rdg. ±0.05 Ω
Ohm read (high)	400.1 Ω	4000.0 Ω	0.025% rdg. ±0.5 Ω
Ohm source (low) 0.1 to 0.5 mA 0.5 to 3 mA	5.0 Ω 5.0 Ω	400.0 Ω 400.0 Ω	0.025% rdg. ±0.02/lexc 0.025% rdg. ±0.05 Ω
Ohm source (high) 0.05 to 0.8 mA 0.05 to 0.4 mA	400.0 Ω 1500.0 Ω	1500.0 Ω 4000.0 Ω	0.025% rdg. ±0.05 Ω 0.025% rdg. ±0.05 Ω

Unit is compatible with pulsed transmitters - Frequency response is ≤ 5 m Sec.



RTD	Range		Accuracy±	
	min	max	12 months	
<b>Pt10</b> Alpha 385	°C	-200.0 °C	100.0 °C	1.40 °C
		100.0 °C	300.0 °C	1.60 °C
		300.0 °C	600.0 °C	1.80 °C
		600.0 °C	800.0 °C	2.00 °C
	°F	-328.0 °F	212.0 °F	2.52 °F
		212.0 °F	572.0 °F	2.88 °F
		572.0 °F	1112.0 °F	3.24 °F
		1112.0 °F	1472.0 °F	3.60 °F
<b>Pt50</b> Alpha 385	°C	-200.0 °C	100.0 °C	0.40 °C
		100.0 °C	300.0 °C	0.50 °C
		300.0 °C	600.0 °C	0.60 °C
		600.0 °C	800.0 °C	0.70 °C
	°F	-328.0 °F	212.0 °F	0.72 °F
		212.0 °F	572.0 °F	0.90 °F
		572.0 °F	1112.0 °F	1.08 °F
		1112.0 °F	1472.0 °F	1.26 °F
<b>Pt100</b> Alpha 385	°C	-200.0 °C	100.0 °C	0.20 °C
		100.0 °C	300.0 °C	0.30 °C
		300.0 °C	600.0 °C	0.40 °C
		600.0 °C	800.0 °C	0.50 °C
	°F	-328.0 °F	212.0 °F	0.36 °F
		212.0 °F	572.0 °F	0.54 °F
		572.0 °F	1112.0 °F	0.72 °F
		1112.0 °F	1472.0 °F	0.90 °F
<b>Pt100</b> Alpha 3926	°C	-200.0 °C	100.0 °C	0.20 °C
		100.0 °C	300.0 °C	0.30 °C
		300.0 °C	630.0 °C	0.40 °C
	°F	-328.0 °F	212.0 °F	0.36 °F
		212.0 °F	572.0 °F	0.54 °F
		572.0 °F	1166.0 °F	0.72 °F

RTD	Range		Accuracy±	
	min	max	12 months	
<b>Pt100</b> Alpha 3916	°C	-200.0 °C	100.0 °C	0.20 °C
		100.0 °C	300.0 °C	0.30 °C
		300.0 °C	630.0 °C	0.40 °C
	°F	-328.0 °F	212.0 °F	0.36 °F
		212.0 °F	572.0 °F	0.54 °F
		572.0 °F	1166.0 °F	0.72 °F
<b>Pt200</b> Alpha 385	°C	-200.0 °C	100.0 °C	0.80 °C
		100.0 °C	300.0 °C	0.90 °C
		300.0 °C	630.0 °C	1.00 °C
	°F	-328.0 °F	212.0 °F	1.44 °F
		212.0 °F	572.0 °F	1.62 °F
		572.0 °F	1166.0 °F	1.80 °F
<b>Pt500</b> Alpha 385	°C	-200.0 °C	100.0 °C	0.40 °C
		100.0 °C	300.0 °C	0.50 °C
		300.0 °C	630.0 °C	0.60 °C
	°F	-328.0 °F	212.0 °F	0.72 °F
		212.0 °F	572.0 °F	0.90 °F
		572.0 °F	1166.0 °F	1.08 °F
<b>Pt1000</b> Alpha 385	°C	-200.0 °C	100.0 °C	0.20 °C
		100.0 °C	300.0 °C	0.30 °C
		300.0 °C	630.0 °C	0.40 °C
	°F	-328.0 °F	212.0 °F	0.36 °F
		212.0 °F	572.0 °F	0.54 °F
		572.0 °F	1166.0 °F	0.72 °F
<b>Cu10</b>	°C	-100.0 °C	260.0 °C	1.40 °C
	°F	-148.0 °F	500.0 °F	2.52 °F
<b>Cu50</b>	°C	-180.0 °C	200.0 °C	0.40 °C
	°F	-292.0 °F	392.0 °F	0.72 °F
<b>Cu100</b>	°C	-180.0 °C	200.0 °C	0.30 °C
	°F	-292.0 °F	392.0 °F	0.54 °F
<b>YSI400</b>	°C	15.0 °C	50.0 °C	0.10 °C
	°F	59.0 °F	122.0 °F	0.18 °F

Read accuracy is based on a 4-wire input, for a 3-wire input add 0.005 Ω assuming all leads are matched.  
 Accuracies are stated for operation at 23°C add ±5°C / 73.4°F.  
 For operation < 18°C or > 28°C add ±0.005% of reading / °C / < 64.4°F or > 68.8°F add ±0.003% of reading / °F.

Read accuracy is based on a 4-wire input, for a 3-wire input add 0.005 Ω assuming all leads are matched.  
 Accuracies are stated for operation at 23°C add ±5°C / 73.4°F.  
 For operation < 18°C or > 28°C add ±0.005% of reading / °C / < 64.4°F or > 68.8°F add ±0.003% of reading / °F.

**Temperature coefficient**

Stability:..... ± 0.005% of reading / °C outside of 23 °C ±5°C  
 ..... ± 0.003% of reading / °F outside of 73.4 °F ±9°F

## ORDERING INFORMATION

Order no.	Description
CSC200	<b>Base model</b> Handheld loop signal calibrator
	<b>Certification</b>
G	NIST traceable (standard)
H	Accredited certificate
CSC200G	<b>Sample order number</b> CSC200 calibrator with standard NIST traceable certificate.

### Standard delivery

- JOFRA CSC200 loop calibrator
- Traceable calibration certificate
- Reference manual
- Test leads
- Soft carrying case
- Shoulder strap

## JOFRA CSC200 ACCESSORIES

Part no.	Description
120519	TC male plug - Type Cu-Cu - white
120518	TC male plug - Type R/S - green
120517	TC male plug - Type K - yellow
120516	TC male plug - Type J - black
120515	TC male plug - Type T - blue
120514	TC male plug - Type N - orange
121983	Extension cable kit for TC, Typ K - 5 m / 16.4 ft
122523	Extension cable kit for TC, Typ N - 5 m / 16.4 ft
2206011	Wire adapter - TC Type K
2206012	Wire adapter - TC Type T
124717	1 x 9 Volt rechargeable battery
124718	Charger for 124717 battery - 115/330 VAC
65-PT100-LB-CABLE	LEMO to banana - 2 m / 6.6 ft



**AMETEK Calibration Instruments** offers a complete range of calibration equipment for temperature, pressure, and signal - including calibration software.

**JOFRA Temperature standards**  
Portable precision thermometer. Dry-block and liquid bath calibrators: 4 series, with more than 20 models - featuring speed, portability, accuracy and advanced documenting functions with JOFRACAL temperature calibration software.

**JOFRA Pressure standards**  
Convenient electronic systems ranging from -1 to 700 bar (25 inHg to 10,000 psi) - multiple choices of pressure ranges, pumps and accuracies, fully temperature-compensated for problem-free and accurate field use.

**JOFRA Signal calibration**  
Process signal measurement and simulation for easy control loop calibration and measurement tasks - from handheld field instruments for multi or single signals to laboratory reference level bench top instruments.

**JOFRA / JF Marine Instruments**  
A complete range of calibration equipment for temperature, pressure and signal, approved for marine use.

**FP temperature sensors**  
A complete range of temperature sensors for industrial and marine use.

*...because calibration is  
a matter of confidence*

**AMETEK**<sup>®</sup>  
CALIBRATION INSTRUMENTS

AMETEK Calibration Instruments is one of the world's leading manufacturers and developers of calibration instruments for temperature, pressure and process signals as well as for temperature sensors both from a commercial and a technological point of view.

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Pub code SS-CP-2332-US Issue 0610

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