

# JOFRA™

## 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)

## Model CSC200

# Compact Signal Calibrator

## PRODUCT DESCRIPTION

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.



## Features

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.

### Clear dual line 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.

### 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; but can be adjusted to meet specific needs.

### 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 makes it possible to select the curve matching the 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 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 a stable and reliable reading. The unit has a convenient TC plug for easy connection to the TCs and is also equipped with CJC: the CJC may be turned off if desired.

CSC200 as TC input with an ITC



CSC200 as RTD input with an ITC



### Electrical connections

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

### I/O

Selects whether the CSC200 is reading or sourcing values.

### 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.

### Left / Right arrows

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

### Adjustment Knob

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

### Type

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



## FUNCTIONAL 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±
	min	max	12 months
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±
	min	max	12 months
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)

TC Type	Temperature range				12 month accuracy	
	°C		°F		°C	°F
	From	To	From	To		
B	600.0	800.0	1112.0°	1472.0	1.40	2.52
	800.0	1000.0	1472.0	1832.0	1.50	2.70
	1000.0	1820.0	1832.0	3308.0	1.70	3.06
C	0.0	1000.0	32.0	1832.0	0.80	1.44
	1000.0	2316.0	1832.0	4200.8	2.50	4.50
E	-250.0	-100.0	-482.0	-148.0	0.80	1.44
	-100.0	1000.0	-148.0	1832.0	0.40	1.72
J	-210.0	0.0	-346.0	32.0	0.60	1.08
	0.0	800.0	32.0	1472.0	0.40	0.72
	800.0	1200.0	1472.0	2192.0	0.50	0.90
K	-200.0	0.0	-346.0	32.0	0.80	1.44
	0.0	1000.0	32.0	1832.0	0.50	0.90
	1000.0	1372.0	1832.0	2501.6	0.70	1.26
L	-200.0	0.0	-328.0	32.0	0.45	0.81
	0.0	900.0	32.0	1652.0	0.40	0.72
N	-200.0	0.0	-328.0	32.0	1.00	1.80
	0.0	1300.0	32.0	2372.0	0.60	1.08
R	0.0	1767.0	32.0	3212.6	1.40	2.52
S	0.0	1767.0	32.0	3212.6	1.40	2.52
T	-250.0	0.0	-418.0	32.0	0.80	1.44
	0.0	400.0	32.0	752.0	0.40	0.72
U	-200.0	0.0	-328.0	32.0	0.70	1.26
	0.0	600.0	32.0	1112.0	0.45	0.81
XK	-200.0	800.0	-328.0	1472.0	0.40	0.72
BP	0.0	800.0	32.0	1472.0	1.10	1.98
	800.0	2500.0	1472.0	4532.0	2.50	4.50

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.

**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

**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±
	min	max	12 months
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	400.0 Ω	0.025% rdg. ±0.02/lexc 0.025% rdg. ±0.05 Ω
	5.0 Ω	400.0 Ω	
Ohm source (high) 0.05 to 0.8 mA 0.05 to 0.4 mA	400.0 Ω	1500.0 Ω	0.025% rdg. ±0.05 Ω 0.025% rdg. ±0.05 Ω
	1500.0 Ω	4000.0 Ω	

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

RTD Type	Temperature range				12 month accuracy	
	°C		°F		°C	°F
	From	To	From	To		
Pt10 Alpha 385	-200.0	100.0	-328.0	212.0	1.40	2.52
	100.0	300.0	212.0	572.0	1.60	2.88
	300.0	600.0	572.0	1112.0	1.80	3.24
	600.0	800.0	1112.0	1472.0	2.00	3.60
Pt50 Alpha 385	-200.0	100.0	-328.0	212.0	0.40	0.72
	100.0	300.0	212.0	572.0	0.50	0.90
	300.0	600.0	572.0	1112.0	0.60	1.08
Pt100 Alpha 385	-200.0	100.0	-328.0	212.0	0.20	0.36
	100.0	300.0	212.0	572.0	0.30	0.54
	300.0	600.0	572.0	1112.0	0.40	0.72
Pt100 Alpha 3926	-200.0	100.0	-328.0	212.0	0.20	0.36
	100.0	300.0	212.0	572.0	0.30	0.54
	300.0	630.0	572.0	1166.0	0.40	0.72
Pt100 Alpha 3916	-200.0	100.0	-328.0	212.0	0.20	0.36
	100.0	300.0	212.0	572.0	0.30	0.54
	300.0	630.0	572.0	1166.0	0.40	0.72
Pt200 Alpha 385	-200.0	100.0	-328.0	212.0	0.80	1.44
	100.0	300.0	212.0	572.0	0.90	1.62
	300.0	630.0	572.0	1166.0	1.00	1.80
Pt500 Alpha 385	-200.0	100.0	-328.0	212.0	0.40	0.72
	100.0	300.0	212.0	572.0	0.50	0.90
	300.0	630.0	572.0	1166.0	0.60	1.08
Pt1000 Alpha 385	-200.0	100.0	-328.0	212.0	0.20	0.36
	100.0	300.0	212.0	572.0	0.30	0.54
	300.0	630.0	572.0	1166.0	0.40	0.72
Cu10	-100.0	260.0	-148.0	500.0	1.40	2.52
Cu50	-180.0	200.0	-292.0	392.0	0.40	0.72
Cu100	-180.0	200.0	-292.0	392.0	0.30	0.54
YSI400	15.0	50.0	59.0	122.0	0.10	0.18

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.

## ORDERING INFORMATION

Order no.	Description
CSC200	Handheld Temperature Signal Calibrator

### Certification

G	NIST traceable temperature certificate (standard)
H	Accredited calibration certificate

### CSC200G Sample order number

CSC200 calibrator with standard NIST traceable temperature certificate

## STANDARD DELIVERY

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

## ACCESSORIES

120519	Thermocouple Male Plug - Type Cu-Cu - White
120518	Thermocouple Male Plug - Type R / S - Green
120517	Thermocouple Male Plug - Type K - Yellow
120516	Thermocouple Male Plug - Type J - Black
120515	Thermocouple Male Plug - Type T - Blue
120514	Thermocouple Male Plug - Type N - Orange
121983	Extension Cable for Type K - 5 m
122523	Extension Cable for Type N - 5 m
2206011	Thermocouple plug + K wire + alligator
2206012	Thermocouple plug + T wire + alligator
65-PT100-LB-CABLE	Cable 2 m (6.6 ft.) with LEMO / Banana connectors
124717	1x 9 Volt rechargeable battery
124718	Charger for rechargeable batteries - 115/230 VAC

### 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.



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CALIBRATION INSTRUMENTS



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**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.

**JOFRA Temperature Instruments**  
Portable precision thermometers. Dry-block and liquid bath calibrators: 4 series, with more than 25 models and temperature ranges from -90° to 1205°C / -130° to 2200°F. All featuring speed, portability, accuracy and advanced documenting functions with JOFRACAL calibration software.

**JOFRA Pressure Instruments**  
Convenient electronic systems ranging from -1 to 1000 bar (25 inHg to 14,500 psi) - multiple choices of pressure ranges, pumps and accuracies, fully temperature-compensated for problem-free and accurate field use.

**JOFRA Signal Instruments**  
Process signal measurement and simulation for easy control loop calibration and measurement tasks - from handheld field instruments 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.

**M&G Pressure Testers**  
Pneumatic floating-ball or hydraulic piston dead weight testers with accuracies to 0.015% of reading.

**M&G Pumps**  
Pressure generators from small pneumatic "bicycle" style pumps to hydraulic pumps generating up to 1,000 bar (15,000 psi).

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