

JOFRA  
temperature,  
pressure  
and signal  
calibration  
instruments

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



# ...because calibration is a matter of confidence

## About AMETEK 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. Our main brands are JOFRA for calibration instruments and FP for industrial temperature sensors.

The company is situated in Allerød, Denmark (near Copenhagen), where we have our R&D, production, sales, and service facilities. Furthermore the company operates through a worldwide network of sales and service offices and distributors.

Calibration means that the performance of the measuring instrument is compared to known temperature references. In this way, all sources of errors are analyzed and provided with numerical values. Increasing quality demands have continuously resulted in a growing number of industry customers requesting calibration of their measuring equipment.

Over the years, AMETEK has solved a multitude of calibration problems. The experience therefore makes us a well-reputed and competent advisor to the benefit of our customers. As a manufacturing enterprise, AMETEK knows the need for first-class quality products delivered on time and sometimes - in case of emergency - at very short notice. Our Quality Assurance System is ISO 9001 certified.

Instruments from AMETEK Calibration Instruments are tested in our own laboratory where precision calibration also takes place. All calibrations are documented by means of a certificate being our customers documentation to third parties.



# temperature

## JOFRA ATC Advanced Temperature Calibrator

*This is a complete, stand-alone, on-site, documenting test laboratory with timesaving automatic functions. The ATC employs a unique active dual-zone heating/cooling block ensuring optimum temperature homogeneity in the calibration zone of the block. With the latest ATC models, it is now possible to calibrate even more sensors at the same time and to calibrate large and odd sized sensors in either a large diameter dry-block or in a liquid bath.*

- 12 different models including liquid baths and large diameter dry-block calibrators
- Temperature range -45° to 650°C / -49° to 1202°F
- 12-month accuracy to  $\pm 0.04^\circ\text{C}$  /  $0.07^\circ\text{F}$
- Stability to  $\pm 0.01^\circ\text{C}$  /  $0.018^\circ\text{F}$
- MVI stability circuitry
- 100% automatic calibration
- RS232 interface and JOFRACAL calibration software
- Input for external reference probe
- Input for sensor-under-test
- Several time-saving features
- Active dual-zone



**Publication No. SS-CP-2285, which is to be found at [www.jofra.com](http://www.jofra.com) (standard dry-blocks)**

**Publication No. SS-CP-2284, which is to be found at [www.jofra.com](http://www.jofra.com) (liquid baths and large diameter dry-blocks)**



## JOFRA ITC Industrial Temperature Calibrator

This calibrator combines the demand for small physical dimensions with high accuracy and stability. The ITC contains a dual-zone heating block and offers one-key-one-function operation. The ITC-320 and ITC-650 also offer a deep immersion depth and a wide enough diameter to allow for simultaneous insertion of a reference sensor and the sensor-under-test or for multiple sensor tests.

- 3 different models
- Temperature range -23° to 650°C / -9°F to 1202°F
- 12-month accuracy to  $\pm 0.25^\circ\text{C}$  /  $0.45^\circ\text{F}$
- Stability to  $\pm 0.03^\circ\text{C}$  /  $0.05^\circ\text{F}$
- MVI stability circuitry
- Stability indicator
- RS232 interface and JOFRACAL calibration software
- Timesaving auto-stepping and thermo-switch test functions
- Central dual-zone



Publication No. SS-CP-2286, which is to be found at [www.jofra.com](http://www.jofra.com)

## JOFRA CTC Compact Temperature Calibrator

This is the economical, timesaving, and reliable solution for on-site true temperature calibration. The applications are generally critical process control but can vary based on calibration and testing requirements. The JOFRA CTC series consists of six different models that differ in temperature ranges and immersion depths. Two of the models have especially deep immersion depths.



- 6 different models
- Temperature range -17° to 1205°C / -1 to 2200°F
- 12-month accuracy to  $\pm 0.4^\circ\text{C}$  /  $0.7^\circ\text{F}$
- Stability to  $\pm 0.05^\circ\text{C}$  /  $0.09^\circ\text{F}$
- MVI stability circuitry
- Stability indicator
- RS232 interface and JOFRACAL calibration software
- Deep immersion depth versions
- Timesaving auto-stepping and switch test functions
- DNV Marine Approval

Publication No. SS-CP-2281, which is to be found at [www.jofra.com](http://www.jofra.com)

## JOFRA ETC Easy Temperature Calibrator

The ETC series may be the fastest dry-block temperature calibrator on the market as it completes a dual-point test in less than 10 minutes. One model, the ETC-400 R is designed for calibration of infrared thermometers, where the 36 mm (1.4 in) target provides the optimum size for reliable calibration of infrared thermometers in the process industry. The small handheld physical size makes the ETC easy to fit into a toolbox and you can bring it almost anywhere.

- 3 different models, including an infrared version
- Temperature range -10° to 400°C / 14° to 752°F
- 12-month accuracy to  $\pm 0.5^\circ\text{C}$  /  $0.9^\circ\text{F}$
- Stability to  $\pm 0.05^\circ\text{C}$  /  $+0.09^\circ\text{F}$
- Heats up as quickly as 100°C / 210°F per minute
- Stability indicator
- RS232 interface and JOFRACAL calibration software
- Timesaving auto-stepping function
- DNV Marine Approval



Publication No. SS-CP-2280, which is to be found at [www.jofra.com](http://www.jofra.com)

## JOFRACAL temperature calibration software

The JOFRACAL calibration software saves the operator time on lengthy documentation work. The software is delivered as standard with all JOFRA dry-block calibrators, the JOFRA DTI-1000 reference thermometer, the JOFRA DTI050 reference indicator, the JOFRA ASM multi scanner and the JOFRA ASC300 multi-signal calibrator. Besides this, JOFRACAL also supports the use of liquid baths, ice points, or other manual dry-block heat sources. JOFRACAL calibration software can be used for post-processing and printing of certificates. The calibration data collected may be stored in the PC for later recall or analysis.

Publication No. SS-CP-2510, which is to be found at [www.jofra.com](http://www.jofra.com)

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## JOFRA DTI-1000 Reference Digital Temperature Indicator

The JOFRA DTI-1000 is a fully traceable thermometer recommended as the high accuracy reference instrument to verify true temperature in any type of process or temperature calibrator, liquid bath, or dry-block calibrator. Use the DTI-1000 and the JOFRA STS sensors as the working temperature reference in any calibration application or use the set-up directly in custody transfer applications where high accuracy (low uncertainty) means money. The superior specifications combined with a long history of reliability and low drift have made the DTI-1000 and the STS sensors standard in many National Laboratories worldwide.

- Temperature range -200° to 750°C / -328°F to 1382°F
- DTI-1000 Pt100 accuracy to  $\pm 0.004^{\circ}\text{C}$  /  $0.009^{\circ}\text{F}$
- DTI-1000 + STS probe to  $\pm 0.03^{\circ}\text{C}$  /  $0.054^{\circ}\text{F}$
- Resolution to  $1/1000^{\circ}\text{C}$ , °F, or K
- RS232 interface and JOFRACAL calibration software
- Dual channel inputs
- Documented response times and self-heating effect



Publication No. SS-CP-2290, which is to be found at [www.jofra.com](http://www.jofra.com)

## JOFRA DTI050 Digital Temperature Indicator and JOFRA STS-050 Intelligent Reference Sensor

The JOFRA DTI050 is a small sized and easy-to-use reference indicator. Combined with an JOFRA STS reference sensor, it is the perfect handheld reference instrument. The DTI050 uses intelligent detection technology for sensors, meaning that it is able to automatically read calibration data and sensor type from a memory chip placed in the JOFRA STS-050, especially developed for the DTI050 indicator.



- Temperature range -200 to 2500°C / -328 to 4532°F
- DTI050 Pt100 accuracy to  $\pm 0.01^{\circ}\text{C}$  /  $\pm 0.018^{\circ}\text{F}$
- DTI050 + STS sensor accuracy to  $\pm 0.04^{\circ}\text{C}$  /  $\pm 0.072^{\circ}\text{F}$
- RS232 interface and JOFRACAL calibration software
- Intelligent sensor technology
- Handles signals from 4-wire RTD's, TC's and thermistors

Publication No. SS-CP-2295, which is to be found at [www.jofra.com](http://www.jofra.com)

## JOFRA ASM Advanced Signal Multi-scanner

The ASM signal multi-scanner adds further flexibility and time-saving features to your calibration routines, as the ASM multi-scanner is delivered in 3 versions, enabling you to calibrate different kinds of sensors and to calibrate up to 8 temperature sensors with one multi-scanner. Connecting three ASM multi-scanners even makes it possible to perform automatic calibrations of up to 24 sensors at the same time using JOFRACAL calibration software.

- Six different models
- Accuracy to  $0.026^{\circ}\text{C}$  /  $0.047^{\circ}\text{F}$
- Input: TCs (12 types), RTDs (13 types), 0-12 VDC, 0-24 mA, 0-4000 $\Omega$
- 24 V supply for transmitters
- 100% automatic calibration of up to 24 sensors
- RS232 interface and JOFRACAL calibration software
- STS temperature reference sensor capability



Publication No. SS-CP-2360, which is to be found at [www.jofra.com](http://www.jofra.com)



## JOFRA Signal Calibrators in conjunction with JOFRA Temperature dry-blocks

In conjunction with a JOFRA temperature dry-block, it is possible to use one of the JOFRA Signal Calibrators. JOFRA ASM multi-scanner, JOFRA ASC300 as well as CSC100 and CSC200 signal calibrators allow full use of the non-input ATC model A, ITC, CTC or ETC dry-block calibrator offering the ability to locally read the sensor-under-test.



## JOFRA AMC900 Advanced Multi-purpose Calibrator

This is one of the finest benchtop precision temperature, signal, and pressure calibrators available. Save money on maintaining all of your signal, temperature, and pressure calibrators and devices yourself.

- Accuracy to  $\pm 0.016^{\circ}\text{C}$  /  $0.029^{\circ}\text{F}$
- STS temperature reference capability
- Input: 0-100 mV, TCs (13 types), RTDs (14 types), 5-4000V
- Output: 0-100 mA, 0-100 VDC, -10-100 mV, TCs (13 types), RTDs (14 types), 5-4000V
- External APM pressure module capability
- IEEE-488 and RS232 interface



Publication No. SS-CP-2380, which is to be found at [www.jofra.com](http://www.jofra.com)



## JOFRA ASC300 Advanced Signal Calibrator

Substantial enough to cover all your needs for a process signal calibrator with superior accuracy and compact enough to fit into your toolbox. Operate the instrument with one hand for easy field service, test, and calibration.

- Accuracy to  $\pm 0.2^{\circ}\text{C}$  /  $0.36^{\circ}\text{F}$
- Simultaneous input and output
- Input and output: TCs (13 types), RTDs (14 types), 0-20 VDC, 0-24 mA, 5-4000V, 0-10 kHz, and pulse trains
- Isolated read-back circuit with 24 VDC loop power
- Fuseless protection on all inputs
- APM pressure module input for pressure applications

Publication No. SS-CP-2350, which is to be found at [www.jofra.com](http://www.jofra.com)

## JOFRA CSC200 Compact Signal Calibrator

The CSC200 is a dedicated calibrator designed to make calibration and maintenance tasks easier to perform. The CSC200 is engineered for the calibration of temperature instruments offering the ability to measure and simulate several different types of RTDs and TCs.

- Accuracy to  $\pm 0.2^{\circ}\text{C}$  /  $0.36^{\circ}\text{F}$
- TC and RTD input/output
- Reads and simulates temperature
- Fuseless protection on all inputs
- Use the CSC200 in conjunction with your JOFRA dry-block calibrators

Publication No. SS-CP-2332, which is to be found at [www.jofra.com](http://www.jofra.com)



## JOFRA CSC100 Compact Signal Calibrator

The CSC100 signal calibrator offers the features needed for specific calibration, testing, and troubleshooting tasks. The CSC100 is engineered for instrument loop calibrations and is specifically manufactured for 4 to 20 mA loops. It can also be used as a signal simulator to test transmitters without the need for actual operation.

- Accuracy to  $\pm 0.015\%$  of reading
- mA and voltage input/output
- Sources and reads loop voltage and current
- Fuseless protection on all inputs

Publication No. SS-CP-2330, which is to be found at [www.jofra.com](http://www.jofra.com)

## JOFRA mAcal Calibrator

This is the economical answer to easy and accurate loop calibration. Test all 4-20 mA loops in the process with this handy calibrator that sources, reads, steps through test points, converts readings to percentages etc.

- Accuracy to  $\pm 0.05\%$  F.S.
- Auto-stepping and ramping
- 24 VDC loop power
- Measure to  $\pm 45$  VDC and 24 mA
- Flow reading function
- Reading in mA, %, VDC, or sec

Publication No. SS-CP-2320, which is to be found at [www.jofra.com](http://www.jofra.com)



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## JOFRA DPC-500 Documenting Pressure Calibrator

The electronic pressure calibrator DPC-500 is used for high precision calibration of pressure instruments, e.g. pressure gauges, pressure transmitters, digital manometers, pressure switches, overpressure protection valves, etc. Calibration procedures can be predefined and used for calibrations on site. The DPC-500 is featured with USB and RS232 interfaces and is powered by a Lithium-Ion battery (rechargeable without memory-effect).



- Accuracy to  $\pm 0.025\%$  F. S.
- Available in 6 complete calibration systems with pump, carrying case, and fittings
- Pressure range 0 to 1,000 bar / 14,500 psi and also vacuum, combination and absolute ranges
- External DPC-J pressure module capability
- Measures pressure, voltage and current, and supplies 24VDC as source for transmitters
- USB and RS232 interface and calibration software
- Documenting, handles 16 work orders with up to 22 calibration points

Publication No. SS-CP-2182, which is to be found at [www.jofra.com](http://www.jofra.com)

## JOFRA APC Advanced Pressure Calibrator

This high accuracy pressure calibrator is user-friendly, extremely accurate, and expandable to meet multiple applications. Features such as RS232 capability, loop sourcing, scalability, 17 engineering units, switch test, min/max readings, and mA% calculations make this an invaluable calibration instrument.



- Accuracy to  $\pm 0.04\%$  of reading  $+0.01\%$  F. S.
- Available as an indicator or in a complete calibration system with pump, carrying case, and fittings
- Pressure range vacuum to 700 bar / 10,000 psi
- External APM pressure module capability
- Reads, sources, and scales transmitters
- Supplied with fittings for NPT and BSP threads
- DNV Marine Approval

Publication No. SS-CP-2181, which is to be found at [www.jofra.com](http://www.jofra.com)

## JOFRA CPC Compact Pressure Calibrator

This series of digital pressure calibrators is designed for accuracy and ease of use. The CPC has the features you need in a pressure test and calibration tool: 17 engineering units, switch test, min/max readings, mA reading.

- Accuracy to  $\pm 0.05\%$  F. S.
- Available as an indicator or in a complete calibration system with pump, carrying case, and fittings
- Pressure range vacuum to 15 bar / 200 psi
- Measures loop current to 24 mA
- Min/max readings and switch test function
- Supplied with fittings for NPT or BSP threads
- DNV Marine Approval

Publication No. SS-CP-2180, which is to be found at [www.jofra.com](http://www.jofra.com)



## JOFRA Signal Calibrators in conjunction with JOFRA Pressure Calibrators

JOFRA Signal Calibrators may offer the flexibility to perform pressure calibrations with accuracies up to 0.01% F.S.. Both the JOFRA AMC900 and JOFRA ASC300 are designed to be compatible with the JOFRA APM pressure modules, as the modules may easily be plugged into the front panel and communicate directly with the AMC900 and the handheld multifunction calibrator JOFRA ASC300.

## JOFRA IPI Industrial Pressure Indicator



This handy instrument combines the ease of an analog gauge with the accuracy and easy-to-read display of a digital calibrator. The IPI offers a long battery life, high accuracy, and even serial communication. The accuracy of the IPI rivals that of a pressure calibrator and is temperature compensated for shop or machine room applications.

- Accuracy to  $\pm 0.05\%$  of F.S.
- Available as an indicator or in a complete calibration system with pump, carrying case, and fittings
- Pressure range vacuum to 700 bar / 10,000 psi
- 17 different and 1 user-definable pressure units
- Min/max readings
- Ex Certification by CSA as conforming to relevant Canadian and USA standards
- DNV Marine Approval

Publication No. SS-CP-2179, which is to be found at [www.jofra.com](http://www.jofra.com)

# pressure

## JOFRA APM Advanced Pressure Module

These pressure modules extend the usage of the JOFRA APC, ASC300, and AMC900. All APM modules contain the calibration data. Just connect the modules to the instrument and perform your measurement.

- Accuracy to  $\pm 0.01\%$  F. S.
- Pressure range vacuum to 700 bar / 10,000 psi
- 62 different models
- Rugged and dependable for field or lab use
- Gauge, absolute, vacuum, differential, and combination modules
- Supplied with fittings for NPT and BSP threads



Publication No. SS-CP-2190, which is to be found at [www.jofra.com](http://www.jofra.com)

## Ready-to-use pressure systems for the DPC-500, APC, CPC, and IPI calibrators

AMETEK offers the user several solutions for pressure generation. This line spans from a small pneumatic "bicycle" type pump to a hydraulic pump that generates up to 15,000 psi / 1,000 bar. These are durable pumps with features such as vernier valves, vent valves, manifold connections, swivel fittings, and optional O-ring materials and fittings making the pumps flexible to meet your calibration and testing applications.

For all pressure systems, the pump and the indicator are separate systems. Therefore, a replacement of the pump does not mean that you have to send the complete system for repair. Maintenance of the instrument is also made easy. Recalibration of the unit can be performed locally with an accurate pressure reference: No need to send the unit back to the manufacturer for recalibration. If you do require a factory calibration, the pump and indicator are independent and only the indicator needs to be returned.

JOFRA pressure calibrators are as standard delivered as individual indicators or as complete calibration systems ready to use in a carrying case, including pump, hose, set of fittings, batteries, test leads, user manual, and a traceable calibration certificate.

### Pump system A

DPC-500, APC, CPC, and IPI  
Vacuum to 15 bar



### Pump system B

DPC-500, APC, CPC, and IPI  
Vacuum to 35 bar



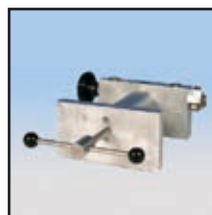
### Pump system C

DPC-500, APC and IPI  
0 to 350 bar



### Pump system D

DPC-500, APC and IPI  
0 to 350 bar



### Pump system E

DPC-500, APC and IPI  
0 to 700 bar



### Pump system F

DPC-500, APC and IPI  
0 to 1000 bar



## FP Industrial Temperature Sensors

Besides manufacturing and selling calibrators under the brand name JOFRA, AMETEK Calibration Instruments are also producing and selling industrial temperature sensors under the brand name FP (Frode Pedersen). The FP product line includes a complete range of thermocouple assemblies and resistance thermometers, measuring inserts, thermocouples of precious as well as base material, thermocouple wire, extension wire, temperature transmitters and portable digital thermometers.

### Customized RTD's and thermocouple for OEM's

As it is our objective to be a company specialized in temperature measurement, with a high know-how and service level, AMETEK Calibration Instruments can provide much more than just standard sensors and assemblies.

Our long experience, developing and producing industrial temperature sensors and calibrators, provides us with a wide knowledge about applications and customer needs, which enables us to build and deliver quick and custom-designed quality temperature sensors for all kinds of solutions and applications no matter what industry.

**Biopharmaceutical industry • Energy sector • Process industry • Chemical and petrochemical industries • Food, beverage and tobacco industries • Paper industry • Iron and metal industries • Engineering industry • Plastics industry • Foundries and heat treatment plants • Research and laboratories • Stone-working, pottery and glass industries • Brickworks, glass works, ceramic industry • Petrochemical industry • Marine sector**

All specification sheets on standard FP temperature sensors and our Sensor guide are available at [www.jofra.com](http://www.jofra.com)



**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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**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.

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