

-  Temperature calibrators
-  Pressure calibrators
-  Signal calibrators
-  Software

PRODUCT SELECTION GUIDE

AMETEK Test & Calibration Instruments

AMETEK Test & 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. Our main brands are JOFRA for calibration instruments, Crystal for pressure instruments, Frode Pedersen for industrial temperature sensors, and Mansfield & Green for pumps and deadweight testers.

For over 25 years, AMETEK has solved a multitude of calibration problems making us a reputable and competent advisor to our customers. Our instruments are tested in our own accredited laboratories where precision calibration also takes place according to ISO 17025. Our Quality Assurance System is ISO 9001 certified.

AMETEK Test & Calibration Instruments is headquartered in Denmark and consists of three production facilities: AMETEK Denmark A/S, based in Allerød, Denmark, Crystal Engineering based in San Luis Obispo, California and Mansfield & Green based in Largo, Florida. All locations have R&D, production, sales and service facilities. Furthermore the company operates through a worldwide network of sales and service offices and distributors.



RTC Series – Reference Temperature Calibrator

The RTC Series features active dual- and triple-zone temperature control which provides excellent temperature homogeneity in the well by adjusting the temperature in the top of the well to the same temperature as in the bottom.

The RTC Series includes the patent-pending Dynamic Load Compensation (DLC) system that provides perfect temperature uniformity in the insert no matter the number or size of the sensors immersed. All calibrators offer unique fail safe plug & play connectivity for sensors, an easy-to-read full-color 5.7-inch VGA display and a USB connection for improved communications and software downloads.

All calibrators have a built-in reference sensor that offers high accuracy.

However, users can obtain even better accuracies and realize the calibrator's full potential by utilizing the STS (Superior Temperature Standard) reference sensor.

The RTC-159 Ultra Cooler has the widest available temperature range from -100 to +155°C and incorporates a highly efficient, free-piston Stirling cooler. It features improved heating and cooling speeds, and its patented cooling technology allows the calibrator to fast cool to -80°C in only 65 minutes.

The RTC-158 and RTC-250 offer combined dry block and liquid bath.

All of this makes the RTC Series the "Best performing dry-block with regard to the EURAMET/cg-13/v.01 guideline for testing of dry blocks".

- 12-month accuracy:
RTC-156/157 - $\pm 0.04^{\circ}\text{C}$
RTC-158/250 - $\pm 0.04^{\circ}\text{C}$
RTC-159 - $\pm 0.06^{\circ}\text{C}$
RTC-700 - $\pm 0.11^{\circ}\text{C}$
- Temperature range: -100 to 700°C
- Excellent stability
- Patent pending DLC for perfect temperature uniformity in the insert
- Input for external reference sensor and sensor-under-test
- Unique intelligent reference sensors for plug & play connection
- Auto-stepping and thermo switch test functions
- Multi-hole insert kits
- Active dual-zone or innovative triple-zone
- Functional carrying case design
- MVI stability circuitry

PTC Series – Professional Temperature Calibrator

The PTC Series is rugged, light weight and offers a wide range of innovative features like an intuitive interface and easy-to-read color VGA display. Along with a wide temperature range, PTC calibrators have increased heating and cooling speeds, making them even more versatile and cost effective.

The PTC-125 is the latest addition to the series. It offers a wide temperature range, from -90 to +125°C, and incorporates a highly efficient, free-piston Stirling cooler.

The newly designed STS-150 reference sensor that is angled at 90° and customized so the top of the sensor is only slightly higher than the top of the calibrator makes it easy for the PTC Series to calibrate threaded sensors and sensors with connection heads.



- High accuracy: $\pm 0.06^{\circ}\text{C}$ using the external reference sensor
- Temperature range: -90 to 660°C
- Excellent stability: 0.01°C
- Input for external reference sensor and sensor-under-test
- Unique intelligent sensors for plug & play connection
- Auto-stepping and thermo switch test functions
- Multi-hole insert kits
- Active dual-zone or innovative triple-zone
- Functional carrying case design
- MVI stability circuitry
- USB connector for communication

ITC Series – Industrial Temperature Calibrator

The ITC Series combine the demand for small physical dimensions with high accuracy and stability. These units contain a dual-zone heating block and offer 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.

- Temperature range: -23 to 650°C
- 12-month accuracy to $\pm 0.18^{\circ}\text{C}$
- Stability to $\pm 0.01^{\circ}\text{C}$
- MVI stability circuitry
- Stability indicator
- Auto-stepping and thermo switch test functions
- Central dual-zone



CTC Series – Compact Temperature Calibrator

The CTC Series is the economical, timesaving and reliable solution for on-site true temperature calibration. The CTC Series consists of six different models that differ in temperature ranges and two of the models have especially deep immersion depths.

- Temperature range: -17 to 1205°C
- 12-month accuracy to $\pm 0.4^{\circ}\text{C}$
- Stability to $\pm 0.05^{\circ}\text{C}$
- MVI stability circuitry
- Stability indicator
- Deep immersion depth versions
- Auto-stepping and thermo switch test functions



ETC Series – Easy Temperature Calibrator

The ETC Series is one of the fastest calibrators as it completes a dual-point test in less than 10 minutes. The ETC-400R is designed for calibration of infrared thermometers, where the 36 mm (1.4 in) target provides the optimum size for reliable calibration. The small handheld size makes the ETC easy to fit into a toolbox.

- Three models, incl. an infrared version
- Temperature range: -10 to 400°C
- 12-month accuracy to $\pm 0.5^{\circ}\text{C}$
- Stability to $\pm 0.05^{\circ}\text{C}$
- Heats up as quickly as 100°C per minute
- Stability indicator
- Auto-stepping function



HPC40 Series – Handheld Pressure Calibrator

The HPC40 Series Pressure Calibrator combines high accuracy pressure readings with the intuitive user interface and bright color display found in the ASC-400.

Single or dual pressure configurations are available with ranges from vacuum to 15 000 psi / 1000 bar. In addition, you can add an APM-CPF external pressure module to extend the range. With the barometric reference option (BARO), all pressure readings can be displayed as gauge or absolute values. Differential pressure can also be displayed between any of the three pressure ports.

Pressure accuracy is 0.035% of reading from 18 to 28°C, and 0.05% of reading through the full operating range of -20 to 50°C. One HPC40 Series can typically replace several gauges or calibrators, saving customers both initial costs and ongoing calibration costs. It's the ideal instrument for applications where intrinsic safety is not needed.

In addition to pressure, the HPC40 Series also includes a full set of electrical connections, which are fully temperature compensated. Inputs are included to measure mA, voltage, switch testing, and temperature (RTD). In addition, the HPC40 Series will also source mA with an internal 24 VDC supply.

- Store up to 5 configurations for quick recall
- Flexible power options including rechargeable
- % error calculation
- Scaling
- Dampening
- Leak Testing
- Min/Max
- CPF fittings and hose system connection (leak-free and finger-tight to 10 000 psi/700 bar)



nVision - Reference Recorder

Accurate enough to replace a deadweight tester
Rugged enough to sit in 3 feet of water
Portable enough to complete calibrations anywhere



- Gauge / Absolute Pressure Datalogger to 15 000 psi / 1000 bar / 100MPa
- Differential Pressure with up to 0.025% of reading accuracy
- Switch, Voltage, Current, and Temperature
- 500 000 data points - 10 readings per second from 2 modules
- IP67 Rated Enclosure



XP2i - Digital Test Gauge

Ultra rugged, intrinsically safe, digital test gauge with 0.1% of reading accuracy.



- Now available up to 15 000 psi
- Marine grade enclosure resists corrosion
- Accuracy not affected from -10 to 50°C
- Replaces 5 or more digital test gauges
- Fast pressure safety valve (PSV) mode
- Define custom pressure units
- Shift every day wear to replaceable CPF adapter
- Easy to use-No Menu



30 Series – Digital Pressure Calibrator

The 30 Series is a wide range pressure calibrator that fits easily into your shirt pocket. Its internal sensors give you 0.05% of reading accuracy and resist damage from overpressure

- Wide pressure range can measure vacuum and pressure up to 5000 psi (300 bar)
- Indicates milliamps to calibrate transmitters
- Ultra compact and light
- Very easy to learn and use
- Battery operated

Ready-to-use pressure systems

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

Our 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.



Our systems come in carrying cases with cutouts for fittings, hose and the complete assembled calibration unit - no time required to assemble the unit before use!

System A	System B	System C	System D	System E	System F
					
• 0 to 40 bar • 0 to 580 psi	• Vacuum to 40 bar • Vacuum to 580 psi	• 0 to 350 bar • 0 to 5,000 psi	• 0 to 350 bar • 0 to 5,000 psi	• 0 to 700 bar • 0 to 10,000 psi	• 0 to 1,000 bar • 0 to 15,000 psi

GaugeCalHP - Pressure Comparator

The GaugeCalHP is a portable, self contained, hydraulic pressure generator for calibrating pressure gauges, transmitters, sensors, and safety valves.

Use without fluid to generate up to 400 inches H₂O (995 mbar) to within 0.01 inches (0.025 mbar). Makes calibrating Differential Pressure Transmitters easy.

- Pressure to 15 000 psi / 1000 bar / 100 MPa
- Vacuum to -12.5 psi / -0.8 bar / -86 kPa
- Faster than any deadweight tester and most automated pressure controllers
- Easily test large size gauges with the unique pivoting manifold
- Quickly bleed air and capture fluid with the no mess drip tray
- Gauge-Safe integral venting system prevents damage to mechanical gauges
- Use with water, light oil or air





ASC-400 - Multi-functional Signal Calibrator

Read and source RTD, TC, Current, Voltage, Frequency, and Resistance with Puls train output. Combine it with APM CPF pressure module series or a dry block calibrator to document pressure and temperature tests.

- New large full color display with easy to use interface
- Input and output RTD, TC, Current, Voltage, Frequency, Pulse, and Resistance
- Simultaneous read-back and fast RTD simulation
- Combine with an APM CPF pressure module to calibrate pressure and a dry block to measure temperature
- Connect a RTD to use as a high accuracy thermometer



AMC910 - Advanced Multi-purpose Calibrator



The AMC910 multi-purpose calibrator is the right solution for high precision signal, temperature and pressure calibrations, as it combines sourcing and measuring in one instrument.

Use the AMC910 for temperature or pressure calibration by connecting to a dry block calibrator or an APM pressure module. Document the results with our calibration software JOFRACAL.

- Accuracy to $\pm 0.003\%$ of reading $\pm 0.001\%$ F.S.
- Output: 0-100 mA, 0-100 VDC, -10-100 mV, TCs, RTDs, 5-4000Ω
- Input: -10-75 mV, TCs, RTDs, 5-4000Ω
- Isolated input: 0-100 VDC, 0-50 mA
- Use with APM pressure modules
- RS232, IEEE-488 or optional USB interface

ASM - Advanced Signal Multi-scanner



The ASM adds flexibility and time-saving features to your calibration routine. It is delivered in three versions that enable you to calibrate different kinds of sensors and to calibrate up to eight sensors per unit. Connecting three ASMs together makes it possible to perform automatic calibrations of up to 24 sensors at the same time using JOFRACAL. Furthermore the JOFRALOG software allows the user to use the ASM as a data-logging device.

- Accuracy to 0.026°C
- Input: TCs, RTDs, 0-12 VDC, 0-24 mA, 0-4000Ω
- 24 V supply for transmitters
- 100% automatic calibration of up to 24 sensors
- RS232 interface and JOFRACAL

CSC Series - Compact Signal Calibrator



The CSC201 is designed to meet the high-accuracy demands of modern sensors and transmitters. A large number of predefined sensors types are available.

The compact CSC101 fits easily into a technician's hand and is designed to meet the high-accuracy demands of modern sensors and transmitters, offering 1μA resolution.

- CSC101 is a simple, but easy-to-use loop calibrator, with step and ramp functions
- CSC201 calibrates 16 types of RTDs and 13 types of TCs. Plus ohms, mV and customized RTD curves



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 0 to 45 volt
- Flow reading function
- Reading in mA, %, VDC or sec



DTI-1000 Reference Digital Temperature Indicator

The DTI-1000 is a fully traceable thermometer recommended as a 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 means money.

- Two different models
- Accuracy to $\pm 0.005^{\circ}\text{C}$
- Temperature range: -200 to 750°C
- Stability:
DTI-1000A: $\pm(6 \text{ ppm rdg} + 1.4 \text{ m}\Omega)$
DTI-1000B: $\pm(6 \text{ ppm rdg} + 0.7 \text{ m}\Omega)$
- Two reference sensor inputs
- True Ohm Measurement



DTI050 Digital Temperature Indicator & STS-050 Intelligent Reference Sensor

The DTI050 is a small and easy-to-use reference indicator. Combined with a STS reference sensor, it is the perfect handheld reference instrument. The DTI050 is able to automatically read calibration data and sensor type from the STS sensors with redel connector.

- Temperature range: -200 to 2500°C
- Accuracy to $\pm 0.012^{\circ}\text{C}$
- Works with both "smart" and standard temperature sensors



FP Industrial Temperature Sensors

The FP industrial temperature sensor 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 RTDs and thermocouple for OEMs

Our extensive experience developing and producing industrial temperature sensors and calibrators, provides us with a wide range of 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.

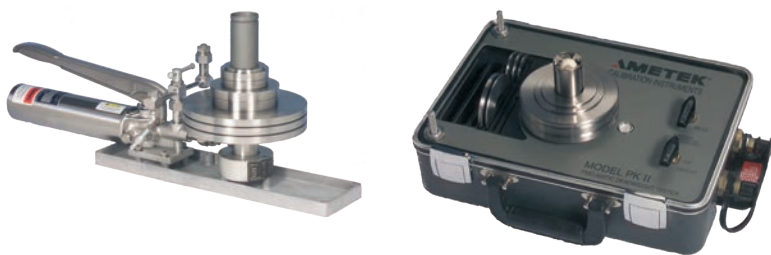


M&G deadweight testers (primary standards)

In 1966, Mansfield & Green introduced the deadweight tester based on the "floating ball" principle. This deadweight tester is an extremely easy-to-use, reliable and accurate primary standard and is now earning its reputation as the "standard of standards". A range of hydraulic deadweight testers are also available, up to 1,000 bar/15,000 psi.

Typical deadweight tester applications are for:

- Laboratory or field use
- Hazardous locations
- Critical process control loops extending the time between calibration due to better accuracy and lower uncertainty
- Calibrating instruments on custody transfer stations thereby reducing the uncertainty of the measurement
- Calibrating portable digital calibrators to achieve the highest possible accuracy and reducing maintenance costs



JOFRACAL calibration software

JOFRACAL calibration software ensures easy calibration of RTDs, thermocouples, transmitters, thermo switches, pressure gauges and pressure switches. JOFRACAL can be used with all JOFRA calibration instruments. When used with ASM-800 signal multi scanner, it can perform a simultaneous semi-automatic calibration on up to 24 pressure and/or temperature devices under test in any combination.

JOFRACAL software controls the complete calibration procedure, stores the results and provides a calibration audit trail through hard-copy certificates. Calibration data are stored for each sensor to monitor drift and optimize recalibration intervals.



JOFRACAL can be downloaded free at www.ametekcalibration.com

AMETEK Test & Calibration Instruments

A business unit of AMETEK Measurement & Calibration Technologies Division offering the following industry leading brands for test and calibration instrumentation.

JOFRA Calibration Instruments

Temperature Calibrators

Portable dry-block calibrators, precision thermometers and liquid baths. Temperature sensors for industrial and marine use.

Pressure Calibrators

Convenient electronic systems ranging from -25 mbar to 1000 bar - fully temperature-compensated for problem-free and accurate field use.

Signal Instruments

Process signal measurement and simulation for easy control loop calibration and measurement tasks.

M&G Dead Weight Testers & Pumps

Pneumatic floating-ball or hydraulic piston dead weight testers with accuracies to 0.015% of reading. Pressure generators delivering up to 1,000 bar.

Crystal Pressure

Digital pressure gauges and calibrators that are accurate, easy-to-use and reliable. Designed for use in the harshest environments; most products carry an IS, IP67 and DNV rating.

Lloyd Materials Testing

Materials testing machines and software that guarantees expert materials testing solutions. Also covering Texture Analysers to perform rapid, general food testing and detailed texture analysis on a diverse range of foods and cosmetics.

Davenport Polymer Test Equipment

Allows measurement and characterization of moisture-sensitive PET polymers and polymer density.

Chatillon Force Measurement

The hand held force gauges and motorized testers have earned their reputation for quality, reliability and accuracy and they represent the de facto standard for force measurement.

Newage Hardness Testing

Hardness testers, durometers, optical systems and software for data acquisition and analysis.

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