

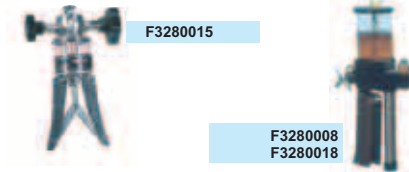
MicroCal PM200 System

Ordering Instructions

MicroCal PM200 System



Pressure module with internal pump



F3280015

F3280008
F3280018



F3280013



F3280011
F3280012



External pressure sensor

MicroCal PM200 X - A - B - C - D - E - F - G

The multifunction Pressure calibrator requires a MicroCal 200 to operate. The base MicroCal PM200 System is equipped with pressure sensor(s) and supplied with a set of fast coupling of pneumatic connectors, a TTLRS232 adapter (BB530001), a leather carrying case, a Report of Calibration and an Instruction Manual.

Table X Internal sensors accuracy
 3222 0.05% of rdg
 3226 0.025% of rdg (absolute sensors excluded)

Table A Signal Calibrator
 0 None (customer has one MicroCal 200 available)
 2 MicroCal 200 MAV (only V, mA, Hz measurements)
 4 MicroCal 200 MAV+ (only V, mA, Hz Input and Output)
 6 MicroCal 200 cat:3916
 8 MicroCal 200+ cat:3918
 9 MicroCal 2000+ cat:3928

Table B Signal Calibrator mains power supply
 0 None (only for A=0. The pressure module is powered by Microcal 200)
 1 120 V USA plug
 2 230 V Schuko plug
 3 240 V UK plug
 4 230 V European plug
 5 100 V USA/Japan plug

Table C Pressure Module/Internal Sensors
 (only for non-reducing, non-corrosive, non-condensing and non-explosive gases)
 0 No internal sensors. Only external sensors capabilities.
 1L Dual from vacuum -0.8 to 500 mbar and from -0.8 to 20 bar automatic selection (Gauge and differential)
 1 Dual from vacuum -0.8 to 2 bar and from -0.8 to 20 bar automatic selection (Gauge and differential)
 2 Single from vacuum -0.8 to 2 bar (Gauge)
 3 Single from vacuum -0.8 to 20 bar (Gauge)
 4 Dual from vacuum -0.8 to 2 bar (Gauge and differential)
 5 Dual from vacuum -0.8 to 20 bar (Gauge and differential)
 6 Dual from 0 to 2 bar and from 0 to 20 bar automatic selection (Absolute and differential)
 7 Single from 0 to 2 bar (Absolute)
 8 Single from 0 to 20 bar (Absolute)
 9 Dual from 0 to 2 bar (Absolute and differential)
 A Dual from 0 to 20 bar (Absolute and differential)
 Z Special

Table D Pumps
 0 None
 1 Built in 20 bar only pressure
 5 Built in from -0.8 to 20 bar pressure and vacuum
 6V External hand-hold from -0.8 to 2 bar (F3280013)
 7V External hand-hold from -0.8 to 20 bar (F3280014)
 8 External hand-hold 200 bar hydraulic (F3280008)
 8H External hand-hold 350 bar hydraulic (F3280018)
 9 External hand-hold 700 bar hydraulic (F3280015)
 B External 400 bar hydraulic (F3280012)
 C External 800 bar hydraulic (F3280011)

Table E Accessories
 0 None
 2 BSP kit** each kit include: n.1 1/8" BSPM (EE170067) n.1 1/4" BSPM (EE170069)
 4 NPT kit ** each kit include: n.1 1/8" NPTM (EE170068) n.1 1/4" NPTM (EE170070)
 6 Electrical signal test lead kit (EE300040)
 8 Rilsan tube holder (EE170066) + 2 m Rilsan tube F6/4 mm (EE370048)
 A CalpMan software for PC (BB260097)
 C LinMan software for PC (BB260096)
 E LogMan software for PC (BB260095)
 G TTL/RS232 isolated adapter (BB530004)
 L External impact printer (BB490000)

Table F External pressure sensors

	bar	PSI
0	No External pressure sensors	
1	35 bar (Gauge) 316SS (EE830050)	2 30
3	70 bar (Gauge) 316SS (EE830051)	10 525
5	150 bar (Gauge) 316SS (EE830052)	20 1050
7	350 bar (Gauge) 316SS (EE830053)	50 2250
9	700 bar (Gauge) 316SS (EE830054)	100 4500
Z	Special (differential, brometric and absolute)	700 10500

Table G Report of Calibration
 1 Eurotron Report

Example: To order a MicroCal PM200 System composed of a MicroCal 200+ signal calibrator with European plug, a dual internal gauge sensors from -0.8 to 20 bar, a built-in vacuum/pressure pump, n.3 tube holder, n.2 BSP kits, a CalpMan software, 70 bar and 350 bar external sensors and Eurotron Report of Calibration, use the code
MicroCal PM200 3222-8-4-1-5-22A-37-1

Note: ** Two kits are required if dual internal sensor are ordered

NON-CONTRACT DOCUMENT - SUBJECT TO CHANGE PDS/JU/105/0203

High Accuracy Signal and Pressure Calibrator

- ▶ **Pressure accuracy :**
±0.05% of rdg. or ± 0.025%.of rdg.
- ▶ **Pressure range from -0.8 bar to 20 bar with internal sensors and up to 700 bar with external sensor.**
- ▶ **Gauge, differential and absolute pressure measurement**
- ▶ **Built-in pressure/vacuum pump**
- ▶ **Two channel high accuracy multifunction calibrator**
- ▶ **CalpMan Software for test and calibration documenting.**



All descriptions are related to a fully optioned instrument. See last page for the different configurations.

Eurotron - A world leader in high technology equipment: portable flue gas analysers - high accuracy calibrators - non-contact IR thermometers.



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General

Pressure, by definition, is a parameter derived by the combination of a mass measurement imposed upon an area. It is commonly expressed in terms of weight per unit area.

Pressure can also be expressed in terms of height of a liquid column (eg. mmH₂O) that produces the same pressure at its base.

Pressure measurements are always expressed as the difference between the measured pressure and some basic pressure.

The **Gauge Pressure** is the pressure measured with reference to the atmospheric pressure.

The **Absolute Pressure** is the pressure measured with reference to the zero gauge pressure, or to a perfect vacuum.

The **Differential Pressure** is the difference between two pressures measured by a pressure gauge.

Primary Pressure Standards

Primary Pressure Standards, such as dead-weight testers, are directly traceable to the physical standards of length and mass and any errors must either be eliminated or evaluated.

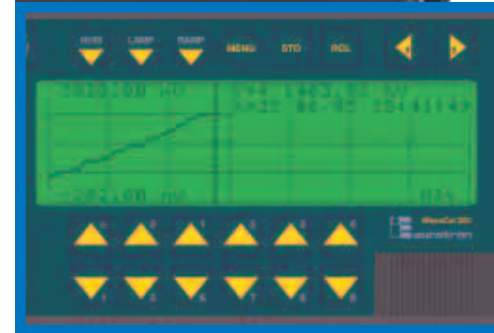
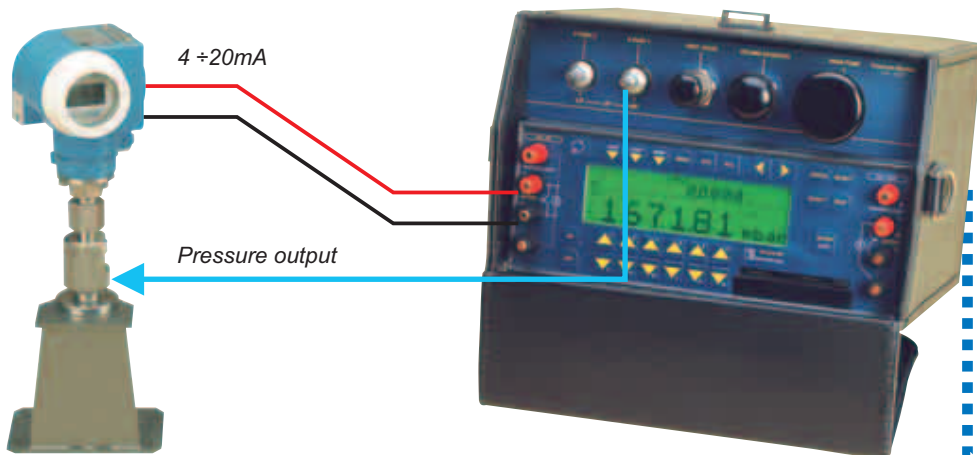
Within the deadweight tester the area of the piston and cylinder (or the ball and nozzle) can be measured and directly traceable to the physical standard of length. The weights can be measured directly, traceable to the physical standard of mass.

The only other pressure measurement device that fulfils this definition of primary is the "U" tube manometer. All other devices for measuring pressure are considered as secondary.

Secondary Pressure Standards

A Secondary Pressure Standard, is calibrated and certified by comparison with a Primary Standard and can be used in routine field and laboratory tests and calibration activities to ISO 9000 requirements.

The **MicroCal PM200 System** is an Electronic Pressure Secondary Standard system that uses a technique of a full temperature and linearity characterization to grant overall highly stable long term performances (accuracy, repeatability, hysteresis, temperature effect and resolution). Compact, rugged, and with a user friendly operative mode, the **MicroCal PM200** is the most versatile and powerful calibrator on the market today. A Report of Calibration is supplied with each instrument to state the traceability in accordance with International standards.



- **Overpressures:**
125% of f.s. without calibration derating of the active sensor
- **Pressure media:**
Internal sensors: compatible with non-reducing, non-oxidant, non-condensing and non explosive gases
External sensors: Gauge sensors compatible with all 316SS gases. Differential wet/wet sensors with a maximum line pressure of 35 bar.
- **Pressure connections :** Quick release coupling
- **Accuracy (built-in sensors) :**
mod.3222: $\pm(0.05\% \text{ rdg} + 0.006\% \text{ f.s.})$ for each sensor
mod.3226: $\pm(0.025\% \text{ rdg} + 0.006\% \text{ f.s.})$ for each sensor
The above relative accuracy is stated for 90 days and includes nonlinearity, hysteresis and repeatability. The average temperature coefficient, inside the temperature compensated range, is $\pm 0.002\%$ of reading for °C (w.l.r. + 23 °C/ +73°F)
- **Accuracy (external sensors) :**
 $\pm 0.1\% \text{ f.s. Standard}$
 $\pm 0.05\% \text{ f.s. on request}$
- **Keyboard selectable technical units:**
mbar, bar, Pa, hPa, MPa, kg/cm², kg/m², psi, mmH₂O, cmH₂O, mH₂O, torr, atm, lb/ft², inH₂O, inH₂O₄, ftH₂O, inH₂O², mmHg, cmHg, mHg, inHg, custom.
- **Scale factor and square root:**
for direct flow measurement
- **Response time:**
2 readings for second (nominal)
- **Display:**
High contrast graphic LCD display with backlight device
- **Battery life:**
4 hours without printing and backlight
- **Data memory:**
Up to 1500 data records. It can be extended up to 300.000 data records using the PCMCIA memory card installed in the MicroCal 200+
- **Operating temperature:** from -5°C to +50°C (+23°F to +122°F)
- **Temperature compensated range:** from +0°C to +45°C (+23°F+113°F)
- **Reference temperature:** +23°C $\pm 1^\circ\text{C}$ (+73°F $\pm 1^\circ\text{F}$)
- **Storage temperature:** from -20°C to +60°C (-4°F +140°F)
- **Case:**
Pressure module : Aluminium
Signal Calibrator : ABS with internal metal coating
System : Leather case to contains all the system
- **Dimensions:**
250 x 60 x 172 mm (module only)
250 x 156 x 172 mm (PM system)
270 x 170 x 267 mm (PM system + leather case)
- **Weight:**
net 3 kg / 6.6 lbs (module only)
7 kg / 15.4 lbs (PM system)

MicroCal PM200 System

More Than One Calibrator

Instrument Highlight

Unique handy field operation

The leather case contains both the Pressure Module and the Signal calibrator and is extremely useful for a practical use since it allows to leave one hand free for instrument under test.

Pressure Units

Most common pressure units can be selected for readout (see list under specifications). Additional units can be included on request.

Auto Zero

The display offset can be reset by activating a soft key.

Multifunction system

Two channel calibrator measure millivolt, Volt, milliampere, ohm, temperature with thermocouples and resistance temperature detectors. Frequency, counts, pressure are all the available standard.

Safe operation with toxic gases

All In/Out pneumatic connectors are fast coupling type and equipped with a self shut-off feature. A plastic/rubber tube can be connected to the exhaust port to keep the operator in safe environment.

Built-in pressure pump

The instrument can be specified with an internal hand pump capable of generating -0.8 to +20 bar gauge pressure, a volume adjuster for fine control, a ventilation valve for pressure release and a group of solenoid valves for pressure/vacuum switchover and pump limit for safety.

Peak

To measure the low and high peak values. It may also be used to measure pressure pulses.

Switch test

A pressure switch test facility is included and the display will automatically hold trigger points (open or closed).

Leak Test

Provides pressure decay data on a programmable Time period.

Filter/Damp

Introduces a digital filter for unstable readings.

Powerful data logging capability

Data logging can be performed automatically. The instrument is able to visualize the real-time graph of the measured parameter. Flash memory + 1 Mbytes PCMCIA memory card allow repetitive storage of complete displayed values of above 300,000 data records.

Temperature Compensated

To eliminate temperature effects the instrument and the sensors are temperature compensated in the range from 0°C to +45°C (+32°F to +113°F)

Pressure Media

Internal sensors

The instrument is supplied as a standard for all non-reducing, non-oxidant, non-condensing and non-explosive gases.

External sensors

Gauge sensors are compatible with all 316SS gases.

Differential wet/wet sensors have a maximum line pressure of 35 bar.

Pressure ports

Pressure ports are available for each installed internal sensor. All pressure ports use special, quick coupling, and auto-closing connectors.

Traceable Certification

Report of Calibration stating the nominal and actual values and the deviation errors with a traceable declaration and references.

Quality System

Research, development, product inspection, and certification activities are defined by method and procedures of the Eurotron Quality System inspected for compliance and certified ISO 9001 by GASTEC

EMC Conformity

The equipment is fully tested in conformity with the directive n. 89/336/CEE Electromagnetic Compatibility.



MicroCal PM200 System

Typical Applications

MicroCal PM200 System

Is a true multifunction and multipurpose calibrator with two insulated, simultaneous and independent channels.

MicroCal PM200 System, is primarily used for calibrating transmitters, transducers and systems over the range -0.8 bar to 20 bar gauge, absolute and differential.

Used in conjunction with external transducers, the range of the instrument can be extended to 700 bar.

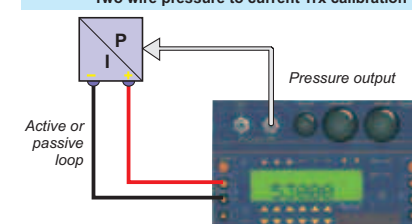
Typical calibration application are as it follows:

- **Gauge, absolute and differential pressure Trx**
Pressure to voltage ;
Pressure to current ;
- **Pressure converter/controller**
Voltage to pressure ;
Current to pressure ;
Pressure to pressure ;
- **Pressure switch test**
- **Analogue and digital pressure gauge**
- **Flow meter calibration**

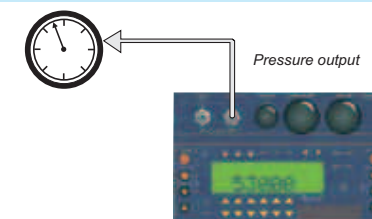


Serial communication

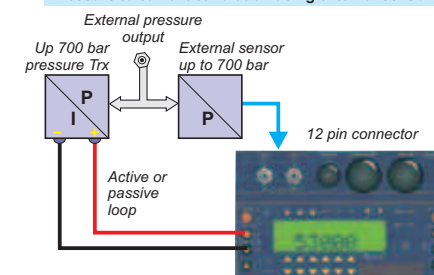
Two wire pressure to current Trx calibration



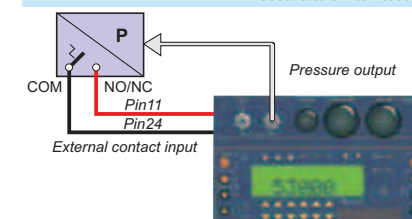
Analog pressure gauge calibration



Pressure to current calibration using external sensor



Pressure to switch test



MicroCal PM200 System

MicroCal PM 200 System

MicroCal PM200 system is a universal, multifunction, accurate, rugged, and portable instrument to perform both in laboratory and in field work, all process instrumentation test and calibration. The system consists of a MicroCal 200 series multifunction calibrator and one high accuracy pressure module.

The high accuracy Pressure Module is designed to operate together with a standard MicroCal 200 series calibrator extending the overall performances to absolute, relative (gauge) and differential pressure measurements and calibrations.

Microcal PM200 System represents the most advanced, powerful and versatile indicator-simulator available on the market today for measurements and simulations of:

- millivolt
- volt
- milliampere (active and passive loop)
- ohm
- temperature with thermocouples
- temperature with resistance thermometers
- frequency and pulse
- pressure

Most common pressure technical units are selectable through a simple keyboard procedure.

A standard 19" rack format is available on request for installation in laboratory calibration work stations.

The pressure Module and MicroCal 200 communicate through a dedicated digital port simplifying base calibration and service. MicroCal PM200 System is powered by Ni-Cd rechargeable batteries.

High Accuracy Multifunction Calibrator

MicroCal PM200 Pressure Module

The high accuracy Pressure Module is designed to operate together with MicroCal 200 series calibrator extending the overall performances to absolute, relative (gauge) and differential pressure measurements and calibrations.

The Pressure Module has been developed using a microcontroller technique to combine high flexibility of performances with a special procedure of calibration using computerized methods and storing into memory the relevant calibration data.

The gauge, absolute and differential pressure measurement uses a temperature compensated silicon piezoresistive transducer individually characterized for linearity and temperature coefficient.

The individual sensor temperature/linearization matrix data are stored in a non-volatile EEPROM resident in the module.

In order to make the calibration activity easy, the MicroCal PM200 System can be specified with an internal single or twin pressure transducers up to 20 bar and, as an option, with a built-in hand vacuum/pressure pump, a volume adjuster for fine control, a ventilation valve for pressure release and a pressure port.

As it is important that the maximum pressure for the device under test is not exceeded, a safety LIMITS function may be selected to automatically block the pumping action at the desired set pressure. Two overpressure valve are used to protect the internal sensors (active also with instrument switched off).

An external pressure transducer can be connected for pressure up to 700 bar.

MicroCal 200 calibrators

MicroCal 200 is a high accuracy multifunction instrument with two insulated and independent channels, designed to meet the requirements of instrumentation engineers, both in laboratory and in field work.

Both pressure and electrical parameter readings are indicated on the high contrast backlite LCD graphic display together with engineering unit, type of sensor or signal, temperature scale, cold junction selection, etc.

The selection of the operative mode is made on the keyboard of the MicroCal 200 through dedicated menu-driven procedures.

Different models are available to satisfy all accuracy needs.

Model	Basic Accuracy
MicroCal200 MAV	± 0.02% rdg.
MicroCal200	± 0.02% rdg.
MicroCal200+MAV	± 0.01% rdg.
MicroCal200+	± 0.01% rdg.
MicroCal2000+	± 0.005% rdg.

Note: for specifications refer to MicroCal 200 series technical bulletin.

Hand free operations



MicroCal PM200 System

Automated procedure

Measurements plays a key role: from measuring your products, process and equipment, to measuring your standards against national legal standards. All of these measurements need to be collected and documented to keep the compliance with ISO9000. Automated and periodical calibration offers a number of important benefits. You can do the job faster. You can assure that all operators complete all tests and collect the appropriate test results the same way every time a calibration is performed. Documenting the status of instruments before and after calibration, you can optimize the predictive and preventive maintenance period. Eurotron has developed two different software: CalpMan, for in field work and CalpMan 2000 for laboratory automated calibrations.

Calibration Procedure Manager

CalpMan

CalpMan is a powerful, Microsoft Windows™ based, calibration procedure manager. It is able to transfer a selection of calibration procedures from a PC to the internal memory of MicroCal PM200 in order to simplify field calibration selecting the required TAG code. Operator can work without using calculator, pen and notebook; all data are stored directly into the MicroCal PM200 system. Both "before" and "after" data and results of each TAG can be recalled from the instrument, transferred into the PC and printed.

CalpMan 2000

CalpMan 2000 is a powerful, flexible full-featured automated calibration environment for PCs running Microsoft Windows 95/98™. With it, you can create and edit calibration procedures using Eurotron calibrators, run those procedures, collect test data, generate calibration reports and certificate.

CalpMan 2000 supports three basic types of calibrations. The first is manual calibration, where CalpMan 2000 prompts the operator to enter values indicated on the instruments, calculates the error and records the result. The second is semi-automatic calibration, where CalpMan 2000 manage automatically one Eurotron calibrator and the operator enter values indicated on the second one. Finally, is the completely automatic calibration, where CalpMan 2000 manage automatically two Eurotron calibrators, programs the test points, collect data, calculates the error and store the results.

Test results can be organized as certificates. Operator can customize it and print the report.

19" pannel mounting

