

Precision pneumatic pressure controller

Models CPC8000-L, CPC8000-X, CPC8000-DX and CPC8000-DL



WIKA data sheet CT 28.01

Applications

- Industry (laboratory, workshop and production)
- Transmitter and pressure gauge manufacturers
- Calibration service companies and service industry
- Research and development laboratories
- National institutes and institutions

Special features

- Pressure ranges -1 ... +400 bar, also available as a dual-range version (-DL/-DX)
- Pressure type: positive and negative gauge pressure, absolute pressure
- Control stability down to 0.001 % FS
- Precision down to 0.004 % IS (IntelliScale)
- Accuracy down to 0.008 % IS (IntelliScale)



Pneumatic precision pressure controller CPC8000

Description

Application

Due to the accuracy classes (see specifications), the two versions of the CPC8000-L, CPC8000-X or their dual-range versions, always offer a suitable calibration solution. The instruments are available as either a desktop or 19" rack-mount instrument. Their outstanding control performance is particularly impressive, thanks to special, patented valve technology and the specific pressure sensor as a measuring unit. As a result, the controller is especially suitable as a factory/working standard for testing and calibration of all types of pressure measuring instrument.

Functionality

The entry of the desired pressure value is particularly user-friendly, with the setpoint entered using the keypad, or it can be controlled stepwise via the STEP and JOG buttons. In addition, there is the possibility of storing up to five test sequences via the menu, and recalling these either automatically or manually.

The high-resolution, colour TFT display, on which up to four windows can be displayed, has a particularly clear design. A continuously adjustable control speed, three programmable relay outputs, an integrated datalogger and various functions, enable the precision pressure controller to be used in a wide variety of applications.

Software

WIKA EasyCal calibration and documentation software makes calibrating any type of pressure measuring instrument easy and enables the simple production of calibration certificates; or the customer can create his own test programs for example, with the help of LabVIEW® software.

Complete test and calibration systems

If required, complete mobile or stationary test sets can also be assembled to customer specifications. For integration into existing systems, there is an IEEE-488.2 and a RS-232 interface for communication with other instruments.

Specifications

CPC8000

Reference pressure sensors

CPC8000-L and CPC8000-DL pressure range

Accuracy	0.01 % FS	0.01 % IS-50 ¹⁾
Gauge pressure	0 ... 0.025 to 0 ... 400 bar ²⁾	0 ... 1 to 0 ... 400 bar
Bi-directional	-1 ... -0.025 to +0.025 ... +400 bar ²⁾	-
Absolute pressure	0 ... 0.35 to 0 ... 401 bar abs.	0 ... 1 to 0 ... 401 bar abs.
Precision	0.005 % FS	0.005 % IS
Control stability	0.001 % FS to 60 bar, > 60 bar 0.0012 % FS	

CPC8000-X and CPC8000-DX pressure range

Accuracy	0.008 % IS-33 ³⁾	0.008 % IS-50 ⁴⁾
Gauge pressure	0 ... 1 to 0 ... ≤ 60 bar	0 ... 60 to 0 ... 400 bar
Absolute pressure	0 ... 1 to 0 ... ≤ 61 bar abs.	0 ... 61 to 0 ... 401 bar abs.
Precision	0.004 % IS	0.005 % IS
Control stability	0.001 % FS	

Optional barometric reference

Function	The barometric reference can be used to switch pressure types ⁵⁾ . absolute <=> gauge. With gauge pressure sensors, the measuring range of the sensors must begin with -1 in order to carry out an absolute pressure emulation.	
Measuring range	800 ... 1200 mbar abs.	
Accuracy contribution with emulated absolute pressure	0.4 mbar	
Accuracy contribution with emulated gauge pressure	0.1 mbar	
Pressure units	17 and 3 freely programmable	

1) 0.01 % IS-50 accuracy: 0 ... 50 % of the measuring span 0.01 % of half the measuring span and 0.01 % between 50 ... 100 % of the measuring span.

2) Measuring range ≤ 70 mbar measuring span → 0.03 % FS.

3) < 60 bar 0.008 % IS-33 accuracy: 0 ... 33 % of the measuring span 0.008 % of the lower third of the measuring span and 0.008 % of the measured value between 33 ... 100 % of the measuring span.

4) 0.008 % IS-50 accuracy: 0 ... 50 % of the measuring span 0.008 % of half the measuring span and 0.008 % of the measured value between 50 ... 100 % of measuring span.

5) For a pressure type emulation, we recommend a native absolute pressure sensor, since the zero point drift can be eliminated through a zero point adjustment.

Note: With pressure controllers with bidirectional or absolute pressure measuring ranges greater than 20 bar, it must be ensured that vacuum pumps are not connected to the Supply Low port, since this could damage them. To control negative pressure or vacuum ranges, a vacuum pump must be connected. For this we recommend a special version with a separate exhaust port.

Base instrument

Instrument

Instrument version	Standard: 19" plug-in case optional: desktop case
Dimensions in mm	see technical drawings
Ingress protection	IP 31 (at the front IP 41)
Weight	approx. 17 kg

Display

Screen	TFT-Display (320 x 240 pixel)
Screen division	1, 2 or 4 windows
Resolution	up to 7 digits
Display update	8 values/sec
Keyboard	Membrane keypad
Warm-up time	< 30 minutes

Connections

Pressure connections	6 mm SWAGELOK® threaded pipe connection
Pressure adapters	on request
Filter elements	90 µm; the filters are seated in the Supply Low and the Test port
Permissible pressure media	dry, clean air or nitrogen
Overpressure protection	Pressure relief valve, set at 110 % of the final value

Permissible pressure

Supply High port	100 ... 110 % FS (measuring ranges ≤ 1 bar: approx. 2 bar system pressure)
Test port	120 % FS or 415 bar (whichever is the smaller value)

Voltage supply

Power supply	AC 230 V ± 10 %, 50/60 Hz; 0.75 A (optional: AC 115 V)
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Permissible ambient conditions

Operating temperature	15 ... 35 °C
Storage temperature	0 ... 70 °C
Relative Humidity	35 ... 85 % r.h. (non-condensing)

Control parameter

Control range	0 ... 100 % FS
Test volume	50 to 1,000 ccm (without throttle; leakage < 10 ⁻³)
Relay outputs	3 programmable changeover contacts (potential-free)

Communication

Interface	RS-232 and IEEE-488.2
Instruction set	WIKA SCPI

Approvals and certificates

CE conformity

EMC directive ⁶⁾	2004/108/EC, EN 61326 emission (group 1, class A) and interference immunity (industrial application)
Low voltage directive	2006/95/EC, EN 61010-1

Certificate

Calibration ⁷⁾	Incl. 3.1 calibration certificate per EN 10204
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6) **Warning!** This is class A equipment for emissions and is intended for use in industrial environments. In other environments, e.g. residential or commercial installations, it can interfere with other equipment under certain conditions. In such circumstances the operator is expected to take the appropriate measures.

7) Calibration in a horizontal position.

Special features of the CPC8000

Outstanding control performance

The precision pressure controllers of the CPC8000 series are notable for their outstanding control performance. This guarantees the fast and harmonic regulation of pressure values, free from overshoot, with the highest precision and very high control stability.

Particularly adaptable to any application

The controller has a short WARM-UP time of less than 1/2 hour. Furthermore it enables adjustment to the test volume by using the "Controller Adaption" menu item. Over the serial interface, if necessary, a head-pressure correction between the device under test and the CPC8000 is possible.

The control speed can be reduced in percent from the maximum speed to 0.1 %, so that extremely gentle and uniform control processes can also be carried out (e.g. pressure switch tests).

Simple operation

The basic, lean and unambiguous menu structure ensures a particularly high user-friendliness.

User-friendly measured-value display

The large graphical colour display enables up to four display windows, each able to display 7-digit measured values. These offer 17 standard or three programmable pressure units.

Long-term stability and low maintenance

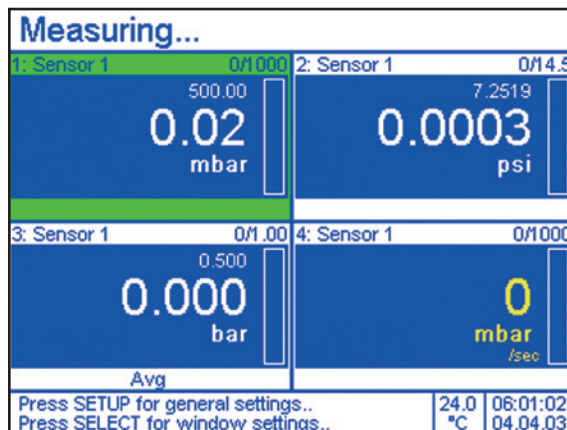
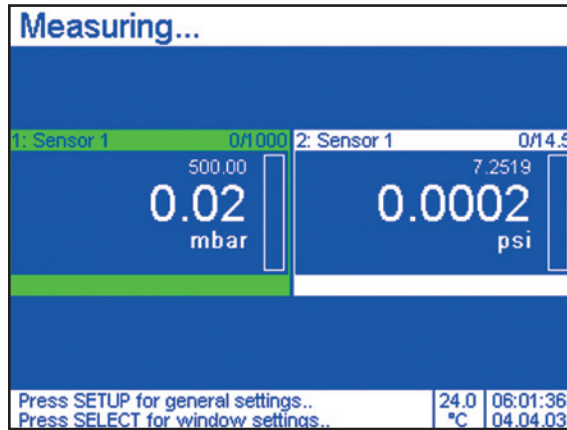
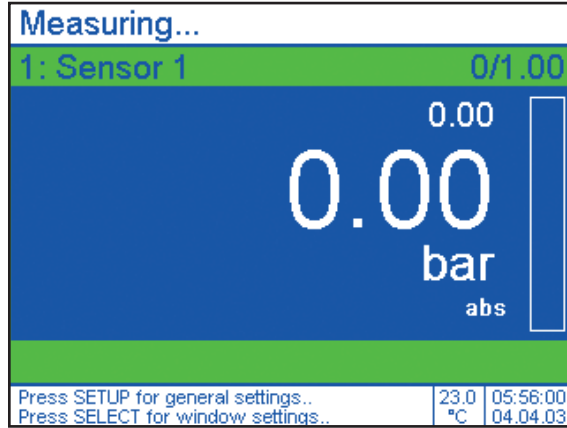
Due to its high-quality precision pressure sensor, the instrument offers excellent measuring accuracy and long-term stability. Furthermore, special patented needle valve technology ensures a low-noise and low-wear control of pressure.

Useful functions for versatile operation

- Minimum memory
- Maximum memory
- HOLD
- ZERO
- Averaging function
- Limit values with graphical alarms
- Rate of change of pressure (change in pressure/time)
- Zero point / offset correction

Further hardware and software components

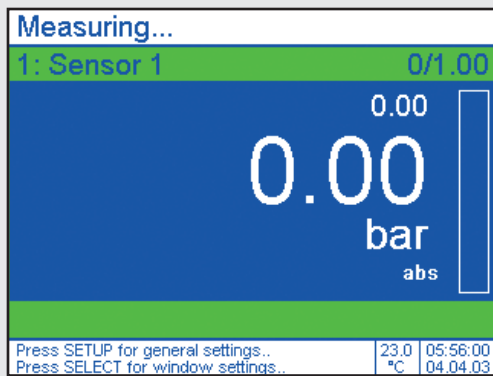
- Integrated data logger (up to 1999 measured values)
- Three programmable relay outputs
- IEEE and RS-232 serial interfaces
- Optional: with precision barometric reference



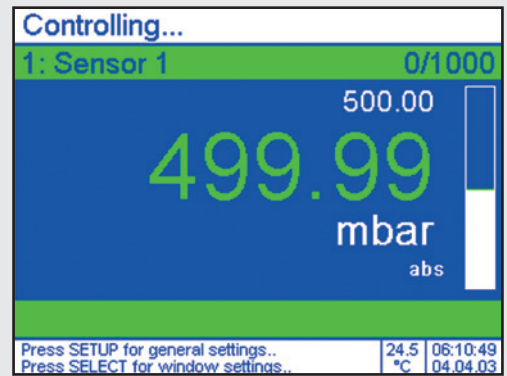
Possible screen layouts

Measure and control mode

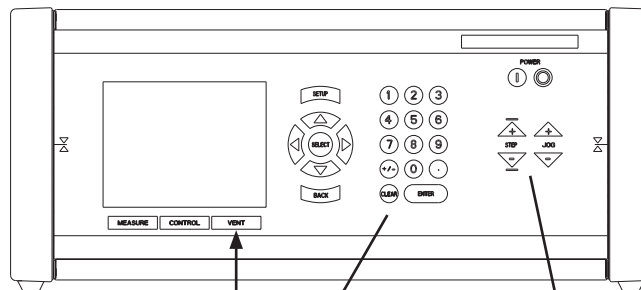
Selecting the operating mode



In Measure mode, the pressure at the Test port is measured with high accuracy.



In Control mode, a high-accuracy set pressure (0 ...100 % FS) is provided at the Test port.



Using the VENT button, the instrument and the test assembly connected to the TEST port can be vented (to atmosphere).

Controlling a pressure

via setpoint setting + ENTER	stepwise

A change in the measured value colour from white to green signals to the user that the pressure value is controlled within the tolerance.

*Decimal places can be hidden or displayed; up to seven digits in total are possible

Functional principle of a dual-range design

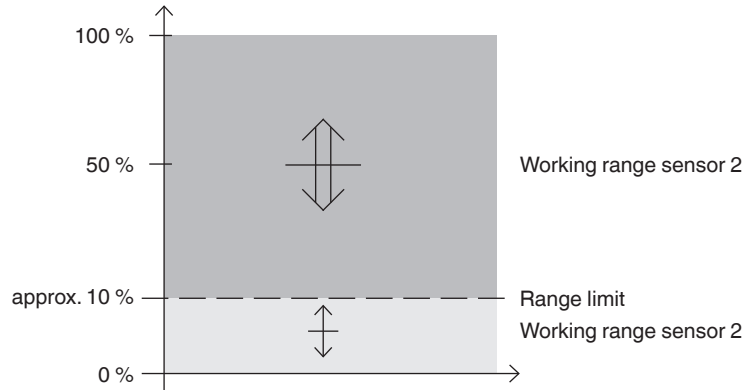
The dual-range pressure controller variant offers, in addition to the main sensor (sensor 1), a second precision sensor (sensor 2), in order to increase the accuracy in the lower part of the measuring range.

Depending on the required operating pressure, the dual-range controller automatically and intelligently selects the most appropriate measuring range.

This occurs regardless of whether the setpoint is entered via keyboard or sent via serial interface.

The combination of the precision pressure sensors can be made flexibly according to customer requirements. To cover the widest possible calibration range, sensors can be combined with a ratio of measuring ranges of up to 1:10.

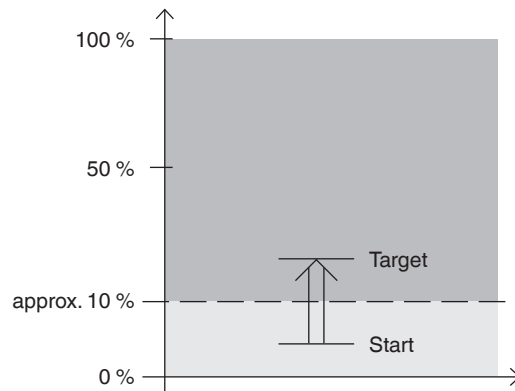
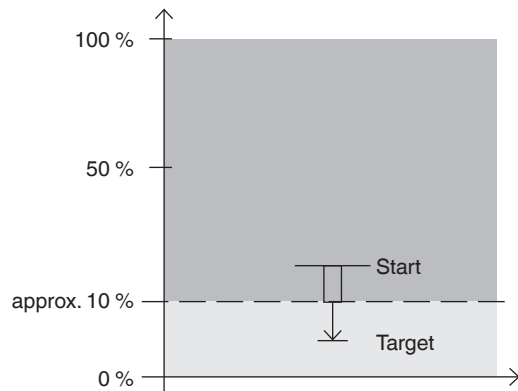
Measuring range of the pressure controller in %



Example of a changeover between sensors in a control process

a) Starting point (Start) in working range of sensor 1 (main sensor), new pressure value (Target) in working range of sensor 2

b) Starting point (Start) in working range of sensor 2, new pressure value (Target) in working range of sensor 1 (main sensor)

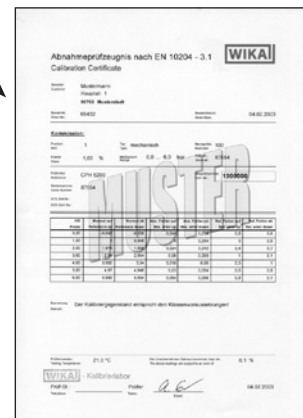
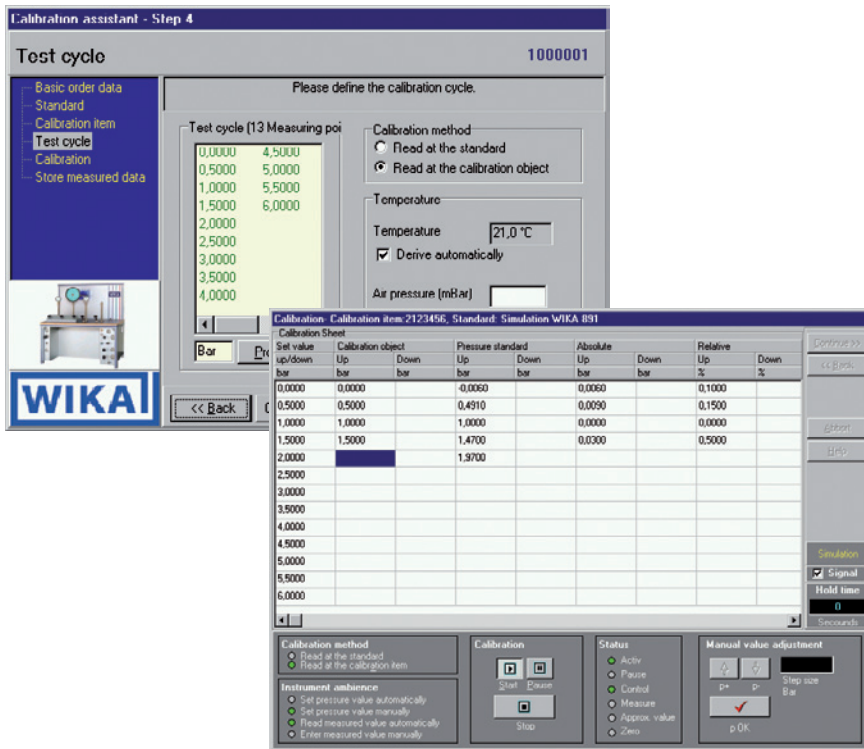


Changeover from sensor 1 to sensor 2 at the range limit

Immediately on the start of the control process, sensor 1 (main sensor) will be used as a reference, since the Target is within the range of this sensor (sensor 2 will be not used in this case).

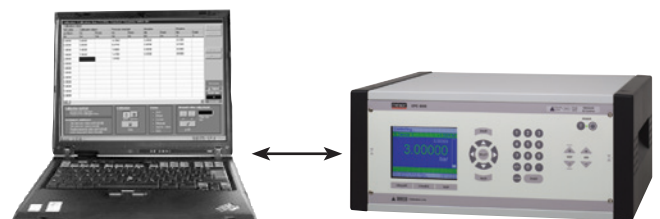
Automatic calibration using CPC8000 and EasyCal calibration software

The WIKA EasyCal calibration software is used for the calibration (inspection equipment monitoring) of mechanical and electronic pressure measuring instruments in accordance with DIN ISO 9000ff.



Performance characteristics of EasyCal professional:

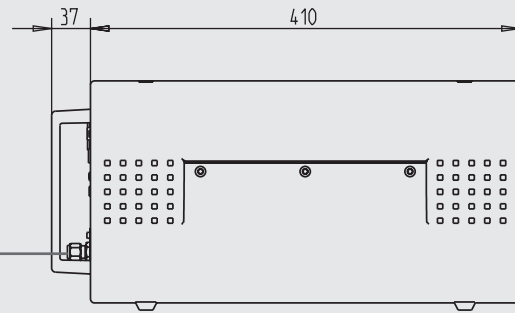
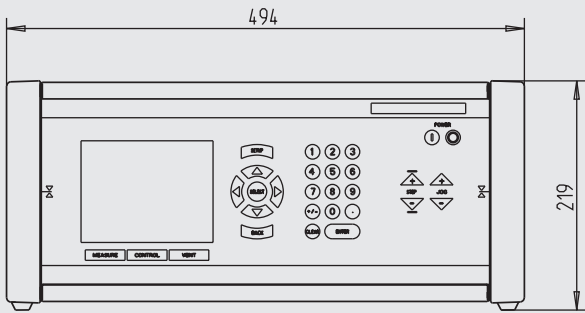
- A calibration assistant guides you through the calibration
- User-friendly interface
- Automatic generation of the calibration steps in accordance with DIN EN 837-1
- Generation of 3.1 certificates in accordance with DIN EN 10204
- Customer-specific test reports possible (Access Report designer)
- Calibration data storage and instrument management via Access database
- Languages: German/English



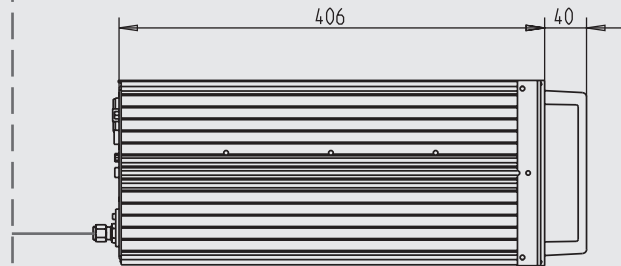
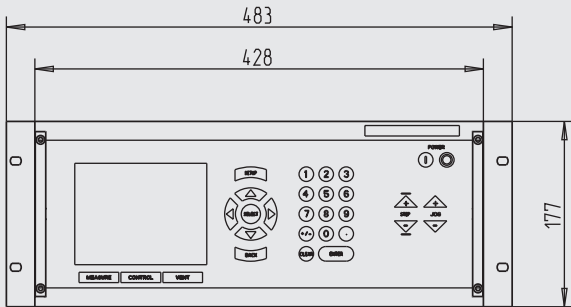
Serial communication via RS-232 or IEEE-488.2

Dimensions in mm

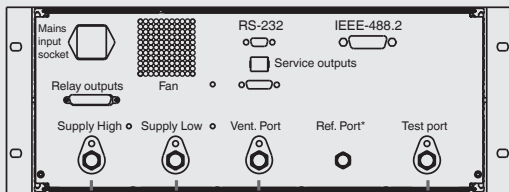
Desktop instrument



19" plug-in case

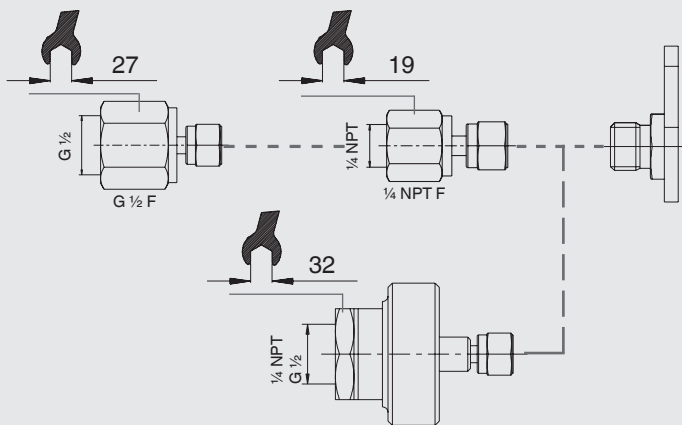


Rear view



* optional

Optional adapter



Manual quick-connect adapter with threaded insert

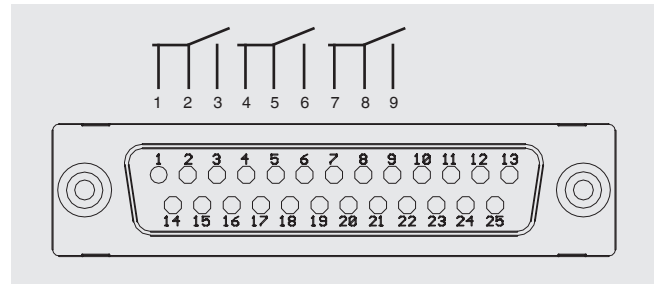
Process connection:
6 mm SWAGELOK® threaded pipe connection

Electrical connection

The mains input socket and the digital interfaces (see rear view on page 8) may only be connected with specific connection cables approved for this purpose.

Relay output (three potential-free changeover relays)

- Depicted switching state: inactive
- Relay contact rating: max. 1 A / DC 30 V
- (Contacts 10 to 25 should not be used)



Scope of delivery

- CPC8000 precision pressure controller (19" plug-in case)
- 1.5 m power cord
- Operating instructions
- 3.1 calibration certificate per DIN EN 10204

Options

- DKD/DAkkS certified accuracy
- CPC8000-DL or CPC8000-DX dual-range design
- Instrument in robust desktop case
- Barometric reference
- Complete test and calibration systems

Accessories

- Pressure connection adapter and manual quick-connect adapter
- Interface cable
- EasyCal professional calibration software



Application example

Ordering information

Model / Housing type / Instrument version / Reference pressure sensor 1 / Reference pressure sensor 2 / Barometric reference / Supply voltage / Additional order info

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We reserve the right to make modifications to the specifications and materials.

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