

Pressure controller High-end version Model CPC8000

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 [-15 ... 6,000 psi]
- Control stability 0.002 % of the span
- Accuracy down to 0.008 % IS (IntelliScale)
- Precision 0.004 % FS



Pressure controller, high-end version, model CPC8000

Description

Application

The model CPC8000 high-end pressure controller is a premium accuracy instrument capable of being a calibration solution for various applications.

Its outstanding control performance is particularly impressive, thanks to special, patented valve technology and the specific pressure transducer as a measuring unit. With this the controller is suitable as a factory or working standard for the testing or calibration of any type of pressure measuring instrument.

Functionality

The CPC8000 high-end pressure controller provides an extraordinarily stable and accurate pressure output. Maximum ease-of-use is achieved through the large touchscreen and the simple and intuitive menu navigation. In addition, its operability is further supported by the availability of a large number of menu languages. On the large touchscreen, all necessary information such as current measured value and set point can be found on a single screen.

Optionally, the measured values can be displayed in other pressure units. The pressure controller can be remotely controlled via serial interfaces available. Through these, a wide range of emulation command sets for other pressure controllers are available.

Design

The CPC8000 is available as a desktop instrument or as 19" rack-mounted unit. The transducers can be changed via the front, without taking out the complete controller (e.g. out of a calibration rig).

Interface

There is an IEEE-488.2, RS-232 or USB and an Ethernet interface for communication with other instruments, and thus the instrument can be integrated into existing systems.

Software

The WIKA-Cal calibration software enables the convenient calibration of pressure measuring instruments and the generation of test certificates.

Complete test and calibration systems

On request, complete mobile or stationary test systems can be manufactured.

Specifications

Reference pressure transducer model CPR8000			
Pressure range			
Accuracy ¹⁾	0.008 % FS ²⁾	0.008 % IS-50 ³⁾	0.008 % IS-33 ⁴⁾
Gauge pressure ⁵⁾	0 ... 0.35 up to 0 ... 400 bar [0 ... 5 up to 0 ... 6,000 psi]	0 ... 1 up to 0 ... 400 bar [0 ... 15 up to 0 ... 6,000 psi]	0 ... 1 up to 0 ... 100 bar [0 ... 15 up to 0 ... 1,500 psi]
Bidirectional	-1 ... +1 up to -1 ... 400 bar [-15 ... +15 up to -15 ... 6,000 psi]	-1 ... 10 up to -1 ... 400 bar [-15 ... 145 up to -15 ... 6,000 psi]	-1 ... 10 up to -1 ... 100 bar [-15 ... 145 up to -15 ... 1,500 psi]
Absolute pressure ⁶⁾	0 ... 0.5 up to 0 ... 401 bar abs. [0 ... 7.5 up to 0 ... 6,015 psi abs.]	0 ... 1 up to 0 ... 401 bar abs. [0 ... 15 up to 0 ... 6,015 psi abs.]	0 ... 1 up to 0 ... 101 bar abs. [0 ... 15 up to 0 ... 1,515 psi abs.]
Precision ⁷⁾	0.004 % FS		
Calibration interval	365 days ⁸⁾	365 days	365 days

- 1) It is defined by the total measurement uncertainty, which is expressed with the coverage factor ($k = 2$) and includes the following factors: the intrinsic performance of the instrument, the measurement uncertainty of the reference instrument, long-term stability, influence of ambient conditions, drift and temperature effects over the compensated range during a periodic zero point correction every 30 days.
- 2) FS = Full span = end of measuring range - start of measuring range
- 3) 0.008 % IS-50 accuracy: Between 0 ... 50 % of the full scale, the accuracy is 0.008 % of the half full scale and between 50 ... 100 % of the full scale, the accuracy is 0.008 % of reading.
- 4) 0.008 % IS-33 accuracy: Between 0 ... 33 % of the full scale, the accuracy is 0.008 % of the lower third of the full scale and between 33 ... 100 % of the full scale, the accuracy is 0.008 % of reading.
- 5) For pressure ranges from $\geq 100 \dots \leq 138$ barg [$\geq 1,500 \dots \leq 2,000$ psig] will be sealed gauge sensors.
- 6) The minimum calibrated range of absolute sensor(s) is 600 mTorr.
- 7) It is defined as the combined effects of linearity, repeatability and hysteresis throughout the stated compensated temperature range.
- 8) 180 days for pressure ranges below 1 bar [15 psi] gauge or absolute and -1 ... +1 bar [-15 ... +14.5 psi] bidirectional. 365 days for the remainder of specified ranges.

Barometric reference	
Measuring range	<ul style="list-style-type: none">■ 552 ... 1.172 mbar abs.■ 8 ... 17 psi abs.■ 552 ... 1.172 hPa abs.
Accuracy ²⁾	0.01 % of reading
Function	The barometric reference can be used to switch pressure types ²⁾ , absolute \Leftrightarrow gauge. With gauge pressure transducers, the measuring range of the transducers must begin with -1 bar [-15 psi] in order to carry out an absolute pressure emulation.

- 1) It is defined by the total measurement uncertainty, which is expressed with the coverage factor ($k = 2$) and includes the following factors: the intrinsic performance of the instrument, the measurement uncertainty of the reference instrument, long-term stability, influence of ambient conditions, drift and temperature effects over the compensated range during a periodic zero point correction every 30 days.
- 2) 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.

Base instrument	
Instrument	
Instrument version	<ul style="list-style-type: none"> ■ Desktop case ■ 19" rack-mounting kit with side panels incl. rack-mounting kit
Dimensions	→ See technical drawings
Weight	Approx. 22.2 kg [49 lb], with all internal options selected
Warm-up time	Approx. 30 minutes
Digital display	
Type of display	10.1" colour TFT with capacitive touchscreen
Display resolution	4 ... 7 digits depending on range and units
Measuring range	<ul style="list-style-type: none"> ■ 0 ... 0.35 bar to 0 ... 400 bar [0 ... 5 psi to 0... 6,000 psi] ■ -1 ... +1 bar to -1 ... 400 bar [-15 ... +15 psi to -15 ... 6,000 abs.] ■ 0 ... 0.5 bar abs. to 0 ... 401 bar abs. [0 ... 7.5 psi abs. to 0... 6,015 psi abs.] Depending on the reference pressure transducer and accuracy of model CPR8000
Pressure type	<ul style="list-style-type: none"> ■ Gauge ■ Bidirectional ■ Absolute pressure
Unit	38 and two freely programmable pressure units

Control parameter	
Control stability	0.002 % FS
Control speed	< 60 s ¹⁾
Control range	0.05 ... 100 % FS
Rate control	0.1 ... 10 % FS/s
Minimum control pressure	0.0017 bar [0.025 psi] over exhaust pressure or 0.05 % FS → Whichever is greater
Test volume	<ul style="list-style-type: none"> ■ 50 ... 300 ccm ■ Test volume greater than 300 ccm available on request

1) Regarding a 10 % FS pressure increase in a 150 ml test volume

Pressure connections													
Connections	<ul style="list-style-type: none"> ■ 5 ports with 7/16"-20 F SAE ■ 1 port with 10-32 UNF female 												
Filter elements	All pressure ports have a 40-micron filters												
Pressure port adapters	<ul style="list-style-type: none"> ■ 6 mm SWAGELOK® threaded pipe connection ■ Others on request 												
Barometer port adapters	<ul style="list-style-type: none"> ■ Barb fitting ■ 6 mm tube fitting ■ 1/4" tube fitting 												
Wetted parts	<table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">■ KEL-F</td> <td style="width: 33%;">■ Ceramic</td> <td style="width: 33%;">■ Aluminium (7000 series)</td> </tr> <tr> <td>■ PTFE</td> <td>■ Tungsten carbide</td> <td>■ Brass (300 series)</td> </tr> <tr> <td>■ FKM/FPM</td> <td>■ Silicon</td> <td>■ Stainless steel (300 series)</td> </tr> <tr> <td>■ Buna N</td> <td>■ Nickel-plated SS</td> <td></td> </tr> </table>	■ KEL-F	■ Ceramic	■ Aluminium (7000 series)	■ PTFE	■ Tungsten carbide	■ Brass (300 series)	■ FKM/FPM	■ Silicon	■ Stainless steel (300 series)	■ Buna N	■ Nickel-plated SS	
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Permissible pressure media	<ul style="list-style-type: none"> ■ Dry, clean air ■ Nitrogen (ISO 8573-1:2010 class 5.5.4 or better) 												
Overpressure protection	Safety relief valve fixed to reference pressure transducer and adjusted to specific customised measuring range												
Permissible pressure													
Supply port	Max. 110 % FS												
Measure/Control port	Max. 105 % FS												

Communication	
Interface	<ul style="list-style-type: none"> ■ Ethernet ■ IEEE-488 ■ USB ■ RS-232
Baud rate	<ul style="list-style-type: none"> ■ 9600 ■ 19200 ■ 38400 ■ 57600 ■ 115200
Command sets	<ul style="list-style-type: none"> ■ Mensor ■ WIKA SCPI ■ Others on request
Response time	< 100 ms
Digital I/O	
Digital input	DC 3.3 V or DC 5 V; current limited by 330 Ω resistor
Digital output	0.5 A at AC 125 V
	1 A at DC 24 V

Voltage supply	
Operating voltage	<ul style="list-style-type: none"> ■ AC 100 ... 120 V, 50/60 Hz ■ AC 220 ... 240 V, 50/60 Hz
Power consumption	Max. 130 VA
Supply voltage fluctuation	±10 %
Fuse	1.6 A, 250 V; SLO-BLO 5 x 20 mm

Operating conditions	
Place of use	Indoor Not for wet locations
Altitude	Up to 3,048 m [10,000 ft] above sea level
Operating temperature	15 ... 40 °C [59 ... 104 °F]
Compensated temperature range	15 ... 45 °C [59 ... 113 °F]
Storage temperature	0 ... 70 °C [32 ... 158 °F]
Relative humidity, condensation	0 ... 95 % r. h. (non-condensing)
Mounting position of transducers	Horizontal or slightly tilted
Permissible pollution degree	Degree 2
EMC (HF field)	EN 61326-1 emission (group 1, class A) and immunity (industrial application)

Approvals

Logo	Description	Region
CE	EU declaration of conformity	European Union
	EMC directive ¹⁾ EN 61326 emission (group 1, class A) and immunity (industrial application)	
	Low Voltage Directive	
	RoHS directive	
UK CA	UKCA	United Kingdom
	Electromagnetic compatibility regulations	
	Electrical equipment designed for use within certain voltage limits in support of the electrical equipment (safety) regulations	
	Restriction of hazardous substances (RoHS) regulations	

1) **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.

Optional approvals

Logo	Description	Region
-	MChS Permission for commissioning	Kazakhstan
-	PAC China Metrology, measurement technology	China

Manufacturer's information and certificates

Logo	Description
-	China RoHS directive

Certificates

Certificates	
Calibration ¹⁾	
Barometric reference	<ul style="list-style-type: none"> ■ Without ■ A2LA calibration certificate (traceable and accredited in accordance with ISO/IEC 17025) ■ DAkkS calibration certificate for barometric reference (traceable and accredited in accordance with ISO/IEC 17025)
Reference pressure transducer model CPR8000	<ul style="list-style-type: none"> ■ A2LA calibration certificate (traceable and accredited in accordance with ISO/IEC 17025) ■ DAkkS calibration certificate - gauge pressure (traceable and accredited in accordance with ISO/IEC 17025) ■ DAkkS calibration certificate - absolute pressure (traceable and accredited in accordance with ISO/IEC 17025)
Recommended calibration interval	1 year (dependent on conditions of use)

1) Calibration in a horizontal position / operating position.

Approvals and certificates, see website

Working range of the basic controller

Bidirectional or gauge pressure (bar [psi]) ¹⁾

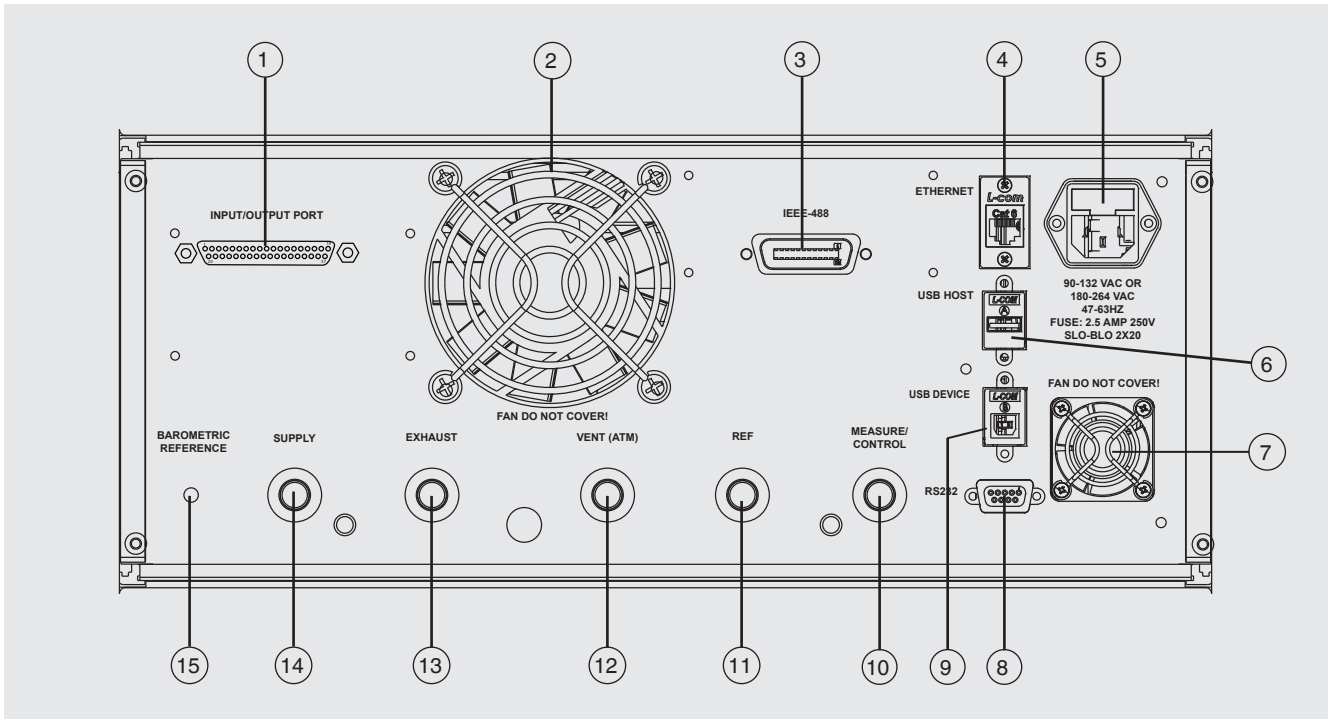
-1 [-15]	0	6 [90]	70 [1,000]	135 [2,000]	210 [3,000]	400 [6,000]
LP-NVR 0.35 bar [5 psi] / ±1 bar [±15 psi] ²⁾						
MP-NVR -1 ... 3.5 bar [-15 ... 50 psi] ²⁾						
SP-NVR -1 ... 7 bar [-15 ... 100 psi] ²⁾						
HP-NVR -1 ... 10 bar [-15 ... 145 psi] ²⁾						
EP-NVR -1 ... 20 bar [-15 ... 290 psi] ²⁾						

Absolute pressure (bar abs. [psi abs.]) ¹⁾

0	7 [105]	71 [1,015]	136 [2,015]	211 [3,015]	401 [6,015]
LP-NVR 0 ... 0.5 bar abs. [0 ... 7.5 psi abs.] ²⁾					
MP-NVR 0 ... 4.5 bar abs. [0 ... 65 psi abs.] ²⁾					
SP-NVR 0 ... 8 bar abs. [0 ... 115 psi abs.] ²⁾					
HP-NVR 0 ... 11 bar abs. [0 ... 160 psi abs.] ²⁾					
EP-NVR 0 ... 21 bar abs. [0 ... 305 psi abs.] ²⁾					

- 1) Mixing of absolute pressure and gauge pressure sensors in a module is not possible
 2) Smallest recommendable sensor range

Electrical and pressure connections - rear view



- | | |
|---|---|
| ① Input/Output port | ⑨ USB interface (instrument) for remote communication |
| ② Fan | ⑩ Measure/Control port (7/16-20 UNF) |
| ③ IEEE-488 interface for remote communication | ⑪ Reference port (7/16-20 UNF) |
| ④ Ethernet interface for remote communication | ⑫ Vent port (7/16-20 UNF) |
| ⑤ Power supply with microfuse | ⑬ Exhaust port (7/16-20 UNF) |
| ⑥ USB interface (host) for service | ⑭ Supply port (7/16-20 UNF) |
| ⑦ Fan | ⑮ Barometric reference |
| ⑧ RS-232 interface | |

Modular design of the CPC8000

Due to the modular transducer design, the large pressure range of up to 400 bar [6,000 psi] and the ability to exchange the transducers through the front, the CPC8000 high-end pressure controller brings a maximum degree of flexibility in terms of hardware design or a subsequent transducer expansion.

Up to three reference pressure transducers possible

The controller offers at least one reference pressure transducer (optional are two or three), whose calibration data is stored in the transducer (for available ranges, see specifications).

The five basic instruments, which are matched to the respective maximum ranges, provide an optimal control performance. In one controller, either absolute or gauge pressure transducers are possible. With two or three available reference pressure transducers, the measuring ranges of one controller can either be selected automatically via the auto-range function or via the menu. The maximum ratio of the reference pressure transducers in a controller is 1:10. Each larger transducer must include the measuring range of the next smaller transducer. Optionally, a barometric reference allows switching between gauge pressure and absolute pressure.

Extremely easy to maintain

The instrument offers the maximum serviceability and the highest possible adaptability in the shortest time, since transducers of different pressure ranges can be exchanged in just five minutes (plug-and-play).

Special features of the CPC8000

Outstanding control performance

The high-end pressure controllers model CPC8000 is notable for its outstanding control performance. The control unit guarantees fast, harmonic and overshoot-free control of pressure values with the highest precision and a very high control stability.

Particularly adaptable to any application

The controller has an short warm-up time of approx. 30 minutes. Furthermore, it enables an automatic adjustment to the test volume. The CPC8000 high-end pressure controller also offers the possibility of rate control, so that extremely gentle and smooth control processes can also be achieved (e.g. pressure switch tests).



Modular parts of the hardware

Up to three reference pressure transducers per instrument

Simple operation

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

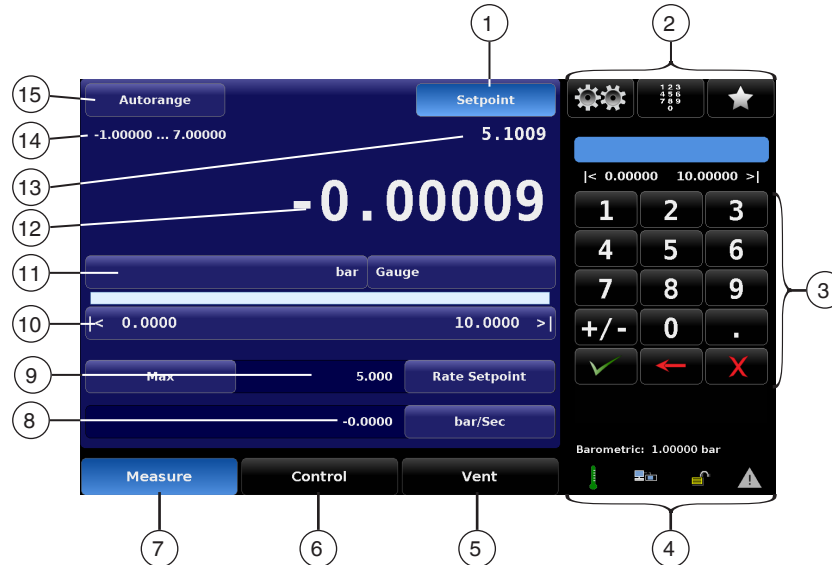
Long-term stability and low maintenance

As a result of the high-quality precision pressure transducer technology, the instrument offers an excellent measuring accuracy and long-term stability. Furthermore, special patented needle valve technology ensures a low-noise and low-wear control of pressure.

Touchscreen and intuitive operator interface

The CPC8000 high-end pressure controller has a high-resolution colour touchscreen with an intuitive menu structure. The instrument offers a precision pressure controller, whose set-up (incl. optional functions) can be easily configured via the touchscreen.

Standard desktop / Main screen



- ① Set-point selection
- ② General settings
Selection: numeric keypad, settings and favourites
- ③ Input menu field
(Numeric / Step function / Jog function)
- ④ Display: integrated barometer, serial interface communication status, touchscreen lockout and warnings
- ⑤ **Vent**
Immediately vents the system, including the test assembly connected to the test port or Measure/Control port, to atmosphere.
- ⑥ **Control**
In control mode the instrument provides a very precise pressure at the test port or Measure/Control port of the respective channel in accordance with the desired value setting.
- ⑦ **Measure**
In measure mode, the pressure present at the test port or Measure/Control port is measured with high accuracy (if you switch directly from **Control** to **Measure** mode, the last controlled pressure in the connected test assembly will be maintained/locked).
Temperature changes or external leakage may impact the pressure reading in this state.
- ⑧ Optionally adjustable: currently measured slew rate
- ⑨ Optionally adjustable: slew rate
- ⑩ Adjustable control limits
- ⑪ Current pressure unit and mode
- ⑫ Current measured value
- ⑬ Entered set point
- ⑭ Pressure range of the sensor
- ⑮ Selection of the active sensor or auto-range

WIKA-Cal calibration software

Easy and fast creation of a high-quality calibration certificate

The WIKA-Cal calibration software is used for generating calibration certificates or logger protocols for pressure measuring instruments and is available as a demo version for a cost-free download.

To switch from the demo version to a licenced version, a USB dongle with a valid licence must be purchased.

The preinstalled demo version changes automatically to the selected version when plugging in the USB dongle and remains available as long as the USB dongle is connected to the PC.



- The user is guided through the calibration or logger process
- Management of calibration data and instrument data
- Intelligent preselection via SQL database
- Menu languages: German, English, Italian, French, Dutch, Polish, Portuguese, Romanian, Spanish, Swedish, Russian, Greek, Japanese, Chinese
More languages are due with software updates
- Customer-specific complete solutions possible
- Maximum degree of automation in connection with our CPC series

The supported instruments are continuously expanded and even customer-specific adaptations are possible.

→ For further information, see data sheet CT 95.10

Three WIKA-Cal licences are available together with one CPC series pressure controller

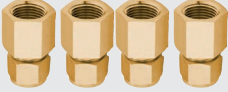
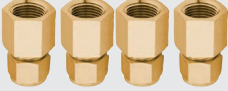

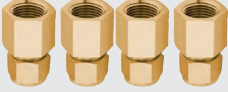

The WIKA-Cal calibration software is available for online calibrations together with a PC. The scope of software functions depends on the selected licence.

Several licences can be combined on one USB dongle.

Cal-Template (demo version)	Cal-Template (light version)	Cal-Template (full version)	Log-Template (full version)
Fully automatic calibration	Semi-automatic calibration	Fully automatic calibration	<ul style="list-style-type: none"> ■ Live measured value recording for a certain period of time with selectable interval, duration and start time ■ Creation of logger protocols with graphic and/or tabular representation of the measuring results in PDF format ■ Possibility of exporting measuring results as CSV file
Limitation to two measuring points	No limitation of the measuring points approached		
<ul style="list-style-type: none"> ■ Creation of 3.1 inspection certificates per DIN EN 10204 ■ Calibration data can be exported to Excel® template or XML file ■ Calibration of pressure measuring instruments 			
Ordering information for a single licence			
Is available for a cost-free download	WIKA-CAL-LZ-Z-Z	WIKA-CAL-CZ-Z-Z	WIKA-CAL-ZZ-L-Z
Ordering information for a pair licence			
Cal-Template (light version) together with Log-Template (full version)			WIKA-CAL-LZ-L-Z
Cal-Template (full version) together with Log-Template (full version)			WIKA-CAL-CZ-L-Z

Accessories and spare parts

Description ¹⁾		Order code
		CPX-A-C8
-	Desktop case	-D-
-	19" rack mount case With side pieces, EU	-R-
	With side pieces, NAM	-U-
	Barometric reference Measuring range: 8 ... 17 psi abs. Accuracy to 0.01 % of reading	-3-
	Measuring range: 552 ... 1,172 mbar abs. Accuracy to 0.01 % of reading	-K-
	Measuring range: 552 ... 1,172 hPa abs. Accuracy to 0.01 % of reading	-L-
	Calibration adapter For reference pressure transducers, voltage supply and software	-4-
	Calibration adapter For barometric reference, voltage supply and software	-5-
	Transport case	-6-
	Silencer	-7-
	RS-232 interface cable	-9-
-	Vacuum pump	-2-
	Adapter set 6 mm Swagelok® male thread (4 adapters) Max. 137 bar [2,000 psi] Material: brass	-M-
	Adapter set 6 mm Swagelok® male thread (4 adapters) Max. 400 bar [6,000 psi] Material: stainless steel	-C-
	Adapter set ¼" tube fitting (4 adapters) Max. 137 bar [2,000 psi] Material: brass	-I-
	Adapter set ¼" tube fitting (4 adapters) Max. 400 bar [6,000 psi] Material: stainless steel	-E-

Description ¹⁾		Order code
		CPX-A-C8
	Adapter set 1/8 BSPG, female thread (4 adapters) Max. 137 bar [2,000 psi] Material: brass	-B-
	Adapter set 1/4 NPT, female thread (4 adapters) Max. 137 bar [2,000 psi] Material: brass	-N-
	Adapter set 1/4 NPT, female thread (4 adapters) Max. 400 bar [6,000 psi] Material: stainless steel	-A-
	Adapter set 1/8 NPT, female thread (4 adapters) Max. 137 bar [2,000 psi] Material: brass	-S-
	Adapter set 1/8 NPT, female thread (4 adapters) Max. 400 bar [6,000 psi] Material: stainless steel	-F-
Ordering information for your enquiry:		
		↓ []
		1. Order code: CPX-A-C8 2. Option:

1) The figures are an example and may change depending on the state-of-the-art in design, material composition and representation.

Scope of delivery

- Pressure controller, high-end version, model CPC8000
- 2 m [6.5 ft] power cord
- Operating instructions
- A2LA calibration certificate (standard on factory)

Options

- Customer-specific system

Ordering information

CPC8000 / Case type / Pressure range base instrument / Reference pressure transducer 1 / Reference pressure transducer 2 / Reference pressure transducer 3 / Barometric reference / Type of certificate for the barometric reference / Pressure connection adapter / Power cord / Transport case / Further approvals / Additional order information

CPR8000 / Mounted in CPC8000/CPC8000-H/CPC7000 / Pressure unit / Pressure type / Start of measuring range / End of measuring range / Accuracy / Type of certificate / Further approvals / Additional ordering information

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