



Calibration

Pressure controller High-end version Model CPC8000



WIKA data sheet CT 28.01


 for further approvals
 see page 4

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] in the pressure types positive and negative gauge pressure as well as absolute pressure
- Up to three integrated, interchangeable reference pressure sensors
- 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 suitable as a calibration solution for various applications.

Its outstanding control performance is particularly impressive, thanks to special, patented valve technology and the specific pressure sensor 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.

Design

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

Functionality

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.

Complete test and calibration systems

On request, complete mobile or stationary test systems can be manufactured. There is an IEEE-488.2, RS-232, 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.

Specifications Model CPC8000

Reference pressure sensors model CPR8000			
Pressure range	Standard	Optional	Optional
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 ⁵⁾	-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
Optional barometric reference			
Function	The barometric reference can be used to switch pressure types ⁹⁾ , absolute <=> gauge. With gauge pressure sensors, the measuring range of the sensors must begin with -1 bar [-15 psi] in order to carry out an absolute pressure emulation.		
Measuring range	552 ... 1,172 mbar abs. [8 ... 17 psi abs.]		
Accuracy ²⁾	0.01 % of reading		
Pressure units	38 and two freely programmable		

- 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.
- 9) 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	<div> <div></div> Desktop case <div></div> 19" rack-mounting kit with side panels incl. rack-mounting kit </div>
Warm-up time	Approx. 25 minutes
Dimensions	See technical drawings
Weight	Approx. 22.2 kg [49 lbs.], with all internal options selected
Display	
Screen	9.0" colour TFT with capacitive touchscreen
Resolution	4 ... 7 digits

Base instrument		
Connections		
Pressure connections	5 ports with 7/16"-20 F SAE and 1 port with 10-32 UNF female	
Pressure port adapters	<div><div><div>■</div><div>7/16"-20 SAE male to 6 mm threaded pipe connection</div></div><div><div>■</div><div>7/16"-20 SAE male to ¼" threaded pipe connection</div></div><div><div>■</div><div>7/16"-20 SAE male to ⅛" NPT female</div></div><div><div>■</div><div>7/16"-20 SAE male to ¼" NPT female</div></div><div><div>■</div><div>7/16"-20 SAE male to ⅛" BSPG female</div></div></div>	
Barometer port adapters	<div><div><div>■</div><div>Barb fitting</div></div><div><div>■</div><div>6 mm tube fitting</div></div><div><div>■</div><div>1/4" tube fitting</div></div></div>	
Filter elements	All pressure ports have a 40-micron filters	
Permissible pressure media	<div><div><div>■</div><div>Dry, clean air</div></div><div><div>■</div><div>Nitrogen (ISO 8573-1:2010 class 5.5.4 or better)</div></div></div>	
Wetted parts	<div><div><div>■</div><div>KEL-F</div></div><div><div>■</div><div>PTFE</div></div><div><div>■</div><div>FKM/FPM</div></div><div><div>■</div><div>Buna N</div></div></div>	<div><div><div>■</div><div>Ceramic</div></div><div><div>■</div><div>Tungsten carbide</div></div><div><div>■</div><div>Silicon</div></div><div><div>■</div><div>Nickel-plated SS</div></div></div> <div><div><div>■</div><div>Aluminium (7000 series)</div></div><div><div>■</div><div>Brass (300 series)</div></div><div><div>■</div><div>Stainless steel (300 series)</div></div></div>
Overpressure protection	Safety relief valve fixed to reference pressure sensor and adjusted to specific customised measuring range	
Permissible pressure		
Supply port	Max. 110 % FS or max. 420 bar [6,100 psi] → Whichever is the smaller value	
Measure/Control port	Max. 105 % FS	
Voltage supply		
Operating voltage	<div><div><div>■</div><div>AC 100 ... 120 V, 50/60 Hz</div></div><div><div>■</div><div>AC 220 ... 240 V, 50/60 Hz</div></div></div>	
Power consumption	Max. 130 VA	
Permissible ambient conditions		
Storage temperature	0 ... 70 °C [32 ... 158 °F]	
Humidity	0 ... 95 % r. h. (non-condensing)	
Compensated temperature range	15 ... 45 °C [59 ... 113 °F]	
Mounting position	Horizontal or slightly tilted	
Control parameter		
Control stability	0.002 % FS	
Control speed	< 60 s ¹⁾	
Control range	0.5 ... 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	<div><div><div>■</div><div>50 ... 300 ccm</div></div><div><div>■</div><div>Test volume greater than 300 ccm available on request</div></div></div>	
Communication		
Interface	<div><div><div>■</div><div>Ethernet</div></div><div><div>■</div><div>IEEE-488</div></div><div><div>■</div><div>USB</div></div><div><div>■</div><div>RS-232</div></div></div>	
Command sets	<div><div><div>■</div><div>Mensor</div></div><div><div>■</div><div>WIKA SCPI</div></div></div> <div>Others command sets on request</div>	
Response time	< 100 ms	

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



Base instrument		
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	

Approvals

Logo	Description	Region
	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	

1) 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
	PAC Russia Metrology, measurement technology	Russia
-	MChS Permission for commissioning	Kazakhstan
	PAC Belarus Metrology, measurement technology	Belarus
-	PAC China Metrology, measurement technology	China

Manufacturer's information and certificates

Logo	Description
-	China RoHS directive

Certificates

Certificates	
Calibration ¹⁾	
CPC8000	<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)
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⁾

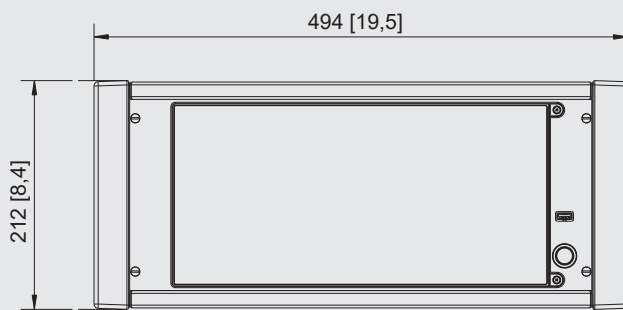
0	7 [105]	71 [1,015]	136 [2,015]	211 [3,015]	401 [6,015]
LP-NVR 0 ... 0.5 bar abs. [0 ... 7.5 psi abs.] ²⁾					
MP-NVR 0 ... 4.5 bar abs. [0 ... 65 psi abs.] ²⁾					
SP-NVR 0 ... 8 bar abs. [0 ... 115 psi abs.] ²⁾					
HP-NVR 0 ... 11 bar abs. [0 ... 160 psi abs.] ²⁾					
EP-NVR 0 ... 21 bar abs. [0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

1) Mixing of absolute pressure and gauge pressure sensors in a module is not possible

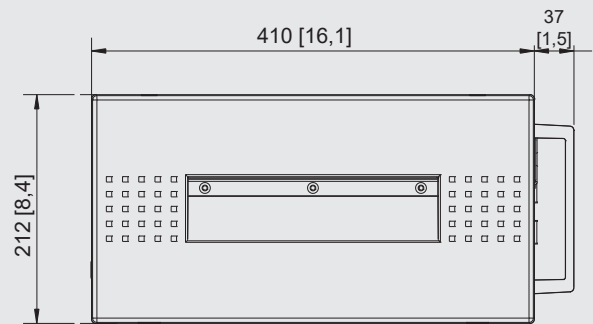
2) Smallest recommendable sensor range

Dimensions in mm [in]

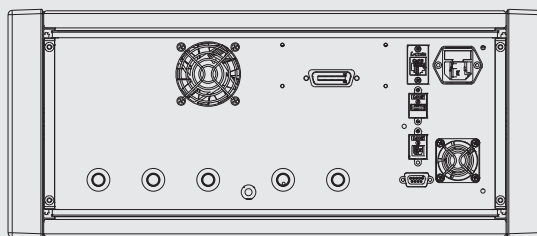
Front view



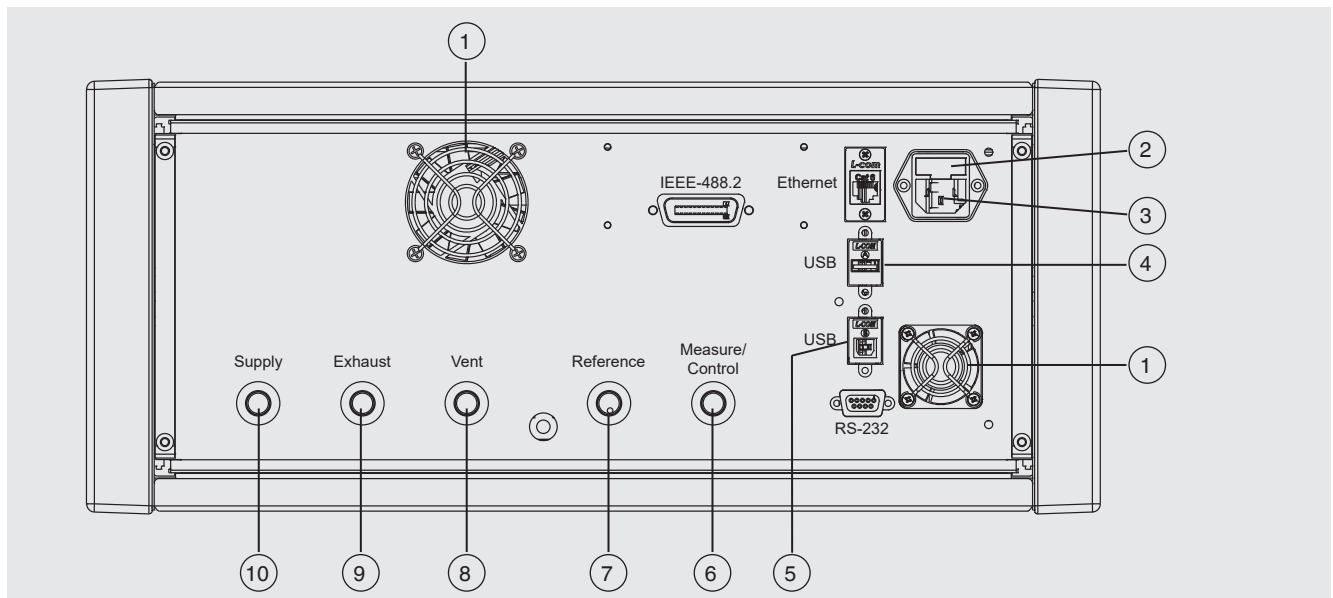
Side view (left)



Rear view



Electrical and pressure connections - rear view



- | | |
|---|--------------------------------------|
| ① Fan | ⑥ Measure/Control port (7/16-20 UNF) |
| ② Microfuse | ⑦ Reference port (7/16-20 UNF) |
| ③ Power supply | ⑧ Vent port (7/16-20 UNF) |
| ④ USB interface (host) for service | ⑨ Exhaust port (7/16-20 UNF) |
| ⑤ USB interface (instrument) for remote communication | ⑩ Supply port (7/16-20 UNF) |

Modular design of the CPC8000

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

Up to three reference pressure sensors possible

The controller offers at least one reference pressure sensor (optional are two or three), whose calibration data is stored in the sensor (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 sensors are possible. With two or three available reference pressure sensors, 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 sensors in a controller is 1:10. Each larger sensor must include the measuring range of the next smaller sensor.

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 sensors of different pressure ranges can be exchanged in just five minutes (plug-and-play).



Modular parts of the hardware with up to three reference pressure sensors per instrument

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 a short warm-up time of approx. 25 min. 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).

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 sensor 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 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 highly accurate pressure at the test port or Measure/Control port of the respective channel in accordance with the desired set point.
- 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 slow rate
- ⑨ Optionally adjustable: slow 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 level 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

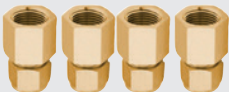

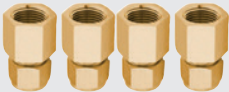

Three WIKA-Cal licences are available together with one CPC series pressure controller

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 your enquiry 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 your enquiry 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 for CPC8000		Order code
Description		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 sensors, 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 1/4" tube fitting (4 adapters) Max. 137 bar [2,000 psi] Material: brass	-I-
	Adapter set 1/4" tube fitting (4 adapters) Max. 400 bar [6,000 psi] Material: stainless steel	-E-
	Adapter set 1/8 BSPG female thread (4 adapters) Max. 137 bar [2,000 psi] Material: brass	-B-

Accessories for CPC8000		Order code
Description		CPX-A-C8
	Adapter set ¼ NPT female thread (4 adapters) Max. 137 bar [2,000 psi] Material: brass	-N-
	Adapter set ¼ NPT female thread (4 adapters) Max. 400 bar [6,000 psi] Material: stainless steel	-A-
	Adapter set ⅜ NPT female thread (4 adapters) Max. 137 bar [2,000 psi] Material: brass	-S-
	Adapter set ⅜ 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:		↓ []

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 sensor 1 / Reference pressure sensor 2 / Reference pressure sensor 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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