



Calibration

Industrial pressure controller Model CPC4000



WIKA data sheet CT 27.40


 for further approvals see
page 3

Applications

- Oil and gas industry
- Industry (laboratory, workshop and production)
- Transmitter and pressure gauge manufacturers
- Calibration service companies and service industry

Special features

- Pressure ranges: -1 ... 210 bar (-15 ... 3,045 psi)
- Control speed 10 s
- Control stability < 0.005 % FS
- Accuracy to 0.02 % IS (IntelliScale)
- Precision 0.008 % FS



Industrial pressure controller, model CPC4000

Description

Design

The model CPC4000 industrial pressure controller offers a broad pressure range from -1 ... 210 bar (-15 ... 3,045 psi). This instrument is available as a desktop or as a 19" rack-mounting kit.

It can be installed with up to two reference pressure sensors and an optional barometer. The barometer can be used to display the barometric pressure or to emulate gauge or absolute pressure.

Application

Since the controller offers an accuracy of up to 0.02 % IS-50, and controls pressure with a high stability, it is particularly suited as a production tool for transmitter manufacturing, a calibration and maintenance tool for pressure measuring instruments or as a factory/working standard for the calibration of all types of pressure measuring instruments. The leak test and burst test special applications allow CPC4000 to be used as a pressure line testing equipment. The optional automatic contamination prevention system make the CPC4000 an ideal solution in oil and gas plants.

Functionality

Maximum ease-of-use is achieved through the touchscreen and the simple and intuitive menu navigation. In addition, the large number of menu languages add to its operability. The instrument can have up to two internal pressure sensors and the ranges for each reference pressure sensor are determined by the customer within the allowable range.

Depending on the application, the operator can choose between three set-point entry methods:

- 1) Direct entry of the pressure value (set point) which will be controlled via touchscreen keypad.
- 2) Define steps to reach the desired pressure value by either defining fixed pressure increments or a percentage of span value.
- 3) User-defined programmable test sequences.

Software

The WIKA-Cal calibration software enables the convenient calibration of pressure measuring instruments and the generation of test certificates. Additionally, the instrument can also be remotely controlled using the serial command formats, the Mensor standard, SCPI or further optional command sets 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.

Specifications Model CPC4000

Reference pressure sensors model CPR4000		
Pressure range	Standard	Optional
Accuracy ¹⁾	0.02 % FS ²⁾	0.02 % IS-50 ³⁾
Gauge pressure ⁴⁾	0 ... 0.35 to 0 ... 210 bar (0 ... 5 to 0 ... 3,045 psi)	0 ... 1 to 0 ... 210 bar (0 ... 15 to 0 ... 3,045 psi)
Bi-directional ⁴⁾	-0.17 ... 0.17 to -1 ... 210 bar (-2.5 ... 2.5 to -15 ... 3,045 psi)	-1 ... 10 to -1 ... 210 bar (-15 ... 145 to -15 ... 3,045 psi)
Absolute pressure ⁵⁾	0 ... 1 to 0 ... 211 bar abs. (0 ... 15 to 0 ... 3,060 psi abs.)	0 ... 1 to 0 ... 211 bar abs. (0 ... 15 to 0 ... 3,060 psi abs.)
Precision ⁶⁾	0.008 % FS	0.008 % FS
Calibration interval	365 days	365 days
Optional barometric reference		
Function	The barometric reference can be used to switch pressure types ⁷⁾ , absolute <=> gauge. With gauge pressure sensors, the measuring range of the sensors must begin with -1 bar (-15 psi) in order to carry out a complete absolute pressure emulation.	
Measuring range	552 ... 1,172 mbar abs. (8 ... 17 psi abs.)	
Accuracy ¹⁾	0.02 % of reading	
Pressure units	39 and two freely programmable	

1) It is defined by the total measurement uncertainty, with the coverage factor ($k = 2$) and includes 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 with recommended zero point adjustment every 30 days.

2) FS = Full span = end of measuring range - start of measuring range

3) 0.02 % IS-50 accuracy: Between 0 ... 50 % of the full scale, the accuracy is 0.02 % of half of the full scale value and between 50 ... 100 % of the full scale, the accuracy is 0.02 % of reading.

4) For pressure ranges from $\geq 100 \dots \leq 138$ bar [$\geq 1,500 \dots \leq 2,000$ psi] gauge will be sealed gauge sensor.

5) The minimum calibrated range of absolute sensor(s) is 600mTorr.



6) It is defined as the combined effects of linearity, repeatability and hysteresis throughout the stated compensated temperature range.

7) 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	Standard: desktop case Option: 19" rack-mounting kit
Dimensions	See technical drawings
Weight	approx. 12.7 kg (28 lbs) incl. all internal options
Warm-up time	approx. 15 min
Display	
Screen	7.0" colour LC display with resistive touchscreen
Resolution	4 ... 6 digits depending on range and units

Base instrument	
Connections	
Pressure connections	4 ports with 7/16" - 20 F SAE, 1 port with 1/8" F NPT and 1 port with 10-32 UNF female
Filter elements	The instrument has a 40-micron filters on all pressure ports.
Pressure port adapters	Standard: without Option: 6 mm tube fitting, 1/4" tube fitting, 1/4" female NPT fittings, 1/8" female NPT fittings or 1/8" female BSP fittings
Barometer port adapters	Standard: barb fitting Option: 6 mm tube fitting, 1/4" tube fitting
Permissible pressure media	Dry, clean air or nitrogen (ISO 8573-1:2010 class 5.5.4 or better)
Wetted parts	Aluminium, brass, 316 and 316L stainless steel, Buna N, FKM/FPM, PCTFE, PEEK, PTFE, PPS, glass-filled epoxy, RTV, ceramic, silicone, silicone grease, Urethane
Overpressure protection	Safety relief valve fixed to reference pressure sensor and adjusted to specific customised measuring range
Permissible pressure	
Supply port	110 % FS or 0.69 bar (10 psi), whichever is greater
Measure/Control port	max. 105 % FS
Voltage supply	
Power supply	AC 100 ... 120 V, 50/60 Hz; AC 220 ... 240 V, 50/60 Hz
Power consumption	max. 150 VA
Permissible ambient conditions	
Storage temperature	-20 ... +70 °C (-4 ... +158 °F)
Humidity	5 ... 95 % r. h. (relative humidity non-condensing)
Compensated temperature range	15 ... 45 °C (59 ... 113 °F)
Mounting position	horizontal
Control parameter	
Control stability	< 0.005 % FS of the primary range in precision mode
Control mode	precision, high speed and customised
Control time	10 s (regarding a 10 % FS pressure increase above atmosphere in a 50 ml test volume)
Control range	0 ... 100 % FS
Min. control pressure	0.0017 bar (0.025 psi) over exhaust pressure or 0.05 % FS whichever is greater
Overshoots	< 1 % FS in high-speed control mode (typical < 0.1 % FS in precision control mode)
Test volume	50 ... 1,000 ccm
Communication	
Interface	Ethernet, IEEE-488, USB, RS-232
Command sets	Mensor, WIKA SCPI, others optional
Response time	approx. 100 ms
Internal program	up to 24 sequences with up to 99 steps each

Approvals

Logo	Description	Country
	EU declaration of conformity ■ EMC directive ⁸⁾ EN 61326-1 emission (group 1, class A) and interference immunity (industrial application) ■ Low voltage directive ■ RoHS directive	European Union
	EAC (option) ■ EMC directive ■ Low voltage directive	Eurasian Economic Community

8) **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.

Logo	Description	Country
	GOST (option) Metrology, measurement technology	Russia
	KazInMetr (option) Metrology, measurement technology	Kazakhstan
-	MTSCHS (option) Permission for commissioning	Kazakhstan
	Uzstandard (option) Metrology, measurement technology	Uzbekistan
	BelGIM (option) Metrology, measurement technology	Belarus

Certificates

Certificate	
Calibration ¹⁾	Standard: A2LA calibration certificate (standard on factory) Option: DKD/DAkkS calibration certificate
Recommended recalibration interval	1 year (dependent on conditions of use)

Approvals and certificates, see website

Working ranges of the controller modules

Bi-directional or gauge pressure [bar (psi)] ²⁾

-1 (-15)	0	3.4 (50)	10 (150)	100 (1,500)	210 (3,045)
LPSVR MODULE ± 0.17 bar (± 2.5 psi) ³⁾					
MPSVR MODULE ± 0.35 bar (± 5 psi) ³⁾					
HPSVR MODULE -1 ... 5 bar (-15 ... +75 psi) ³⁾					
EPSVR MODULE -1 ... 10 bar (-15 ... +150 psi) ³⁾					

Absolute pressure [bar (psi)] ²⁾

0	4.4 (60)	11 (165)	101 (1,515)	211 (3,060)
LPSVR MODULE 0 ... 1 bar (0 ... 15 psi) ³⁾				
MPSVR MODULE 0 ... 1 bar (0 ... 15 psi) ³⁾				
HPSVR MODULE 0 ... 6 bar (0 ... +90 psi) ³⁾				
EPSVR MODULE 0 ... 11 bar (0 ... 165 psi) ³⁾				

1) Calibration in a horizontal position/operating position.

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

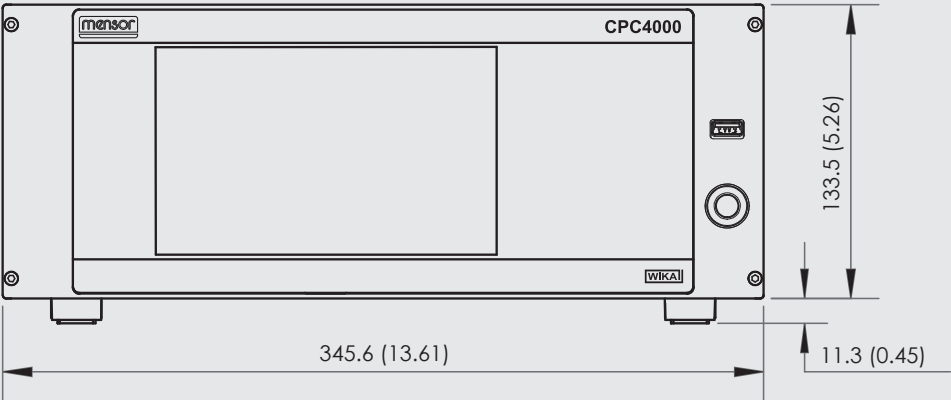
3) Smallest acceptable sensor range

For controlling absolute pressure a vacuum pump connected at the exhaust port is required.

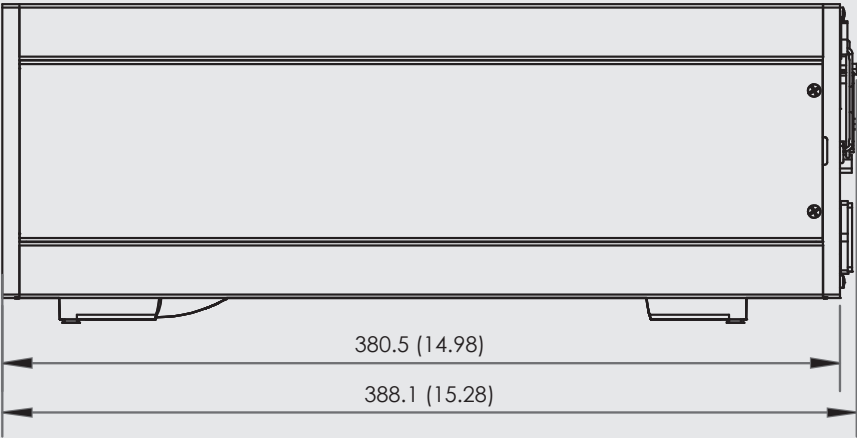
Dimensions in mm (in)

Desktop case

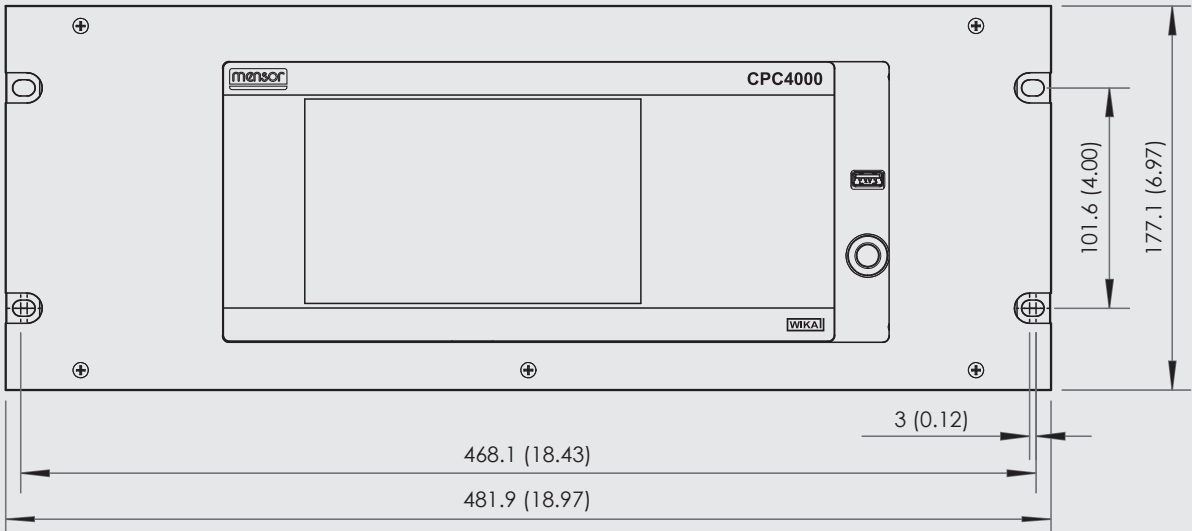
Front view



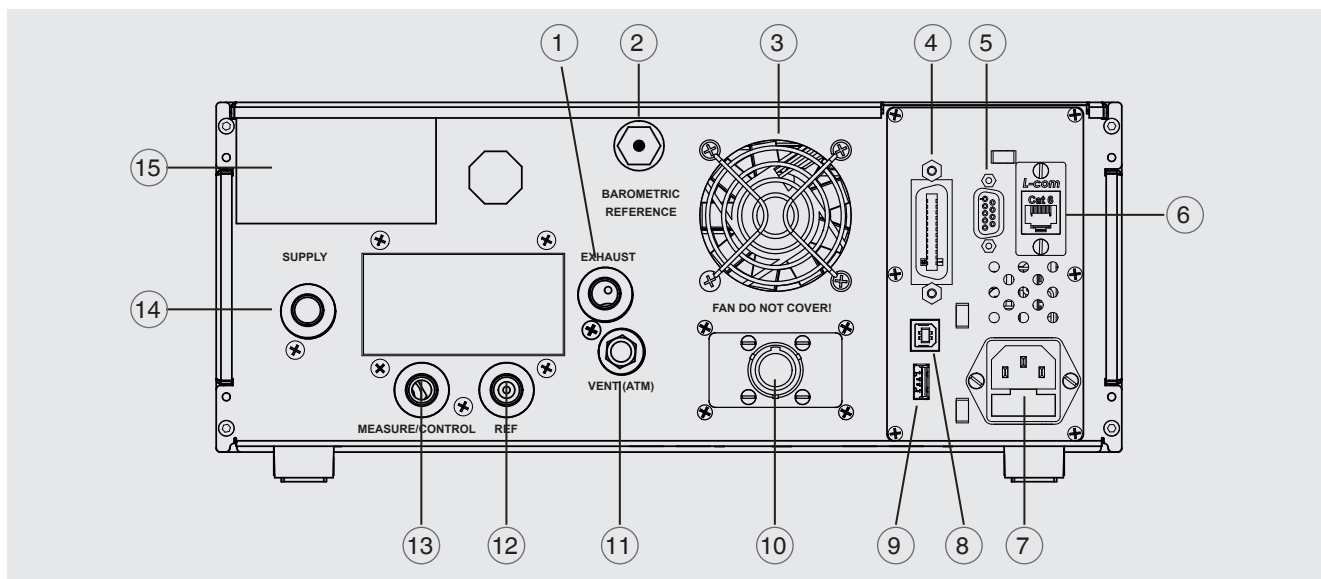
Side view (left)



19" rack-mounting kit, front view



Electrical and pressure connections - rear view

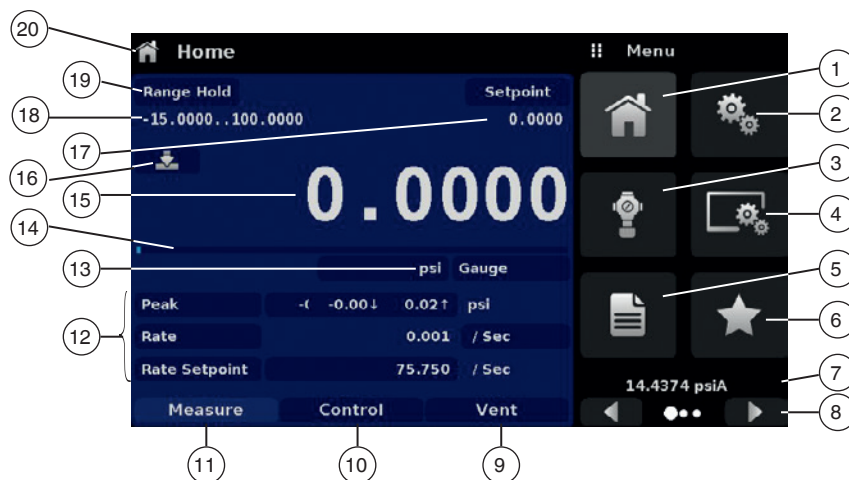


- | | |
|---|--------------------------------------|
| ① Exhaust port (7/16-20 UNF) | ⑨ USB interface (host) for service |
| ② Barometric reference port (10-32 UNF) | ⑩ Automatic CPC connector |
| ③ Fan | ⑪ Vent (ATM) |
| ④ IEEE-488 interface | ⑫ Reference port (7/16-20 UNF) |
| ⑤ RS-232 interface | ⑬ Measure/Control port (7/16-20 UNF) |
| ⑥ Ethernet port | ⑭ Supply port (7/16-20 UNF) |
| ⑦ Power supply | ⑮ Instrument label |
| ⑧ USB interface (instrument) for remote communication | |

Touchscreen and intuitive operator interface

Shortly after power-up, the standard main screen (see following picture) is displayed. In this menu screen, one can switch between the operating modes using the buttons **MEASURE**, **CONTROL** and **VENT**. The instrument is a precision pressure controller, whose setup (incl. optional functions) can be easily configured via the touchscreen.

Standard desktop/main screen



① Home application

② General settings

③ Control settings

④ Display settings

⑤ Programs

⑥ Favourites

⑦ Barometric pressure reading (optional)

⑧ Menu scroll features forward / back

⑨ **VENT**

Immediately vents the system, including the test assembly connected to the Measure/Control port, to atmosphere.

⑩ **CONTROL**

In control mode the instrument provides a highly accurate pressure at the Measure/Control port of the respective channel in accordance with the desired set point.

⑪ **MEASURE**

In measure mode, the pressure present at the 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).

⑫ Auxiliary displays either peak, rate or alternate units

⑬ Current pressure unit and type

⑭ Optional bar graph

⑮ Current measuring value

⑯ Zero or Tare function

⑰ Entered set point

⑱ Pressure range of the sensors

⑲ Selection of the active sensor or auto-range

⑳ Current application name

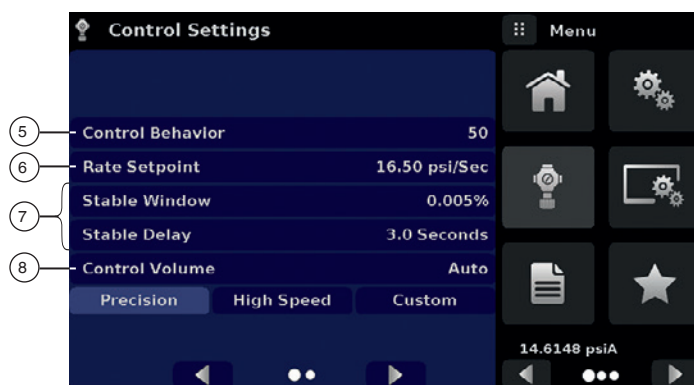
Simple instrument configurations

A) General settings of the instrument



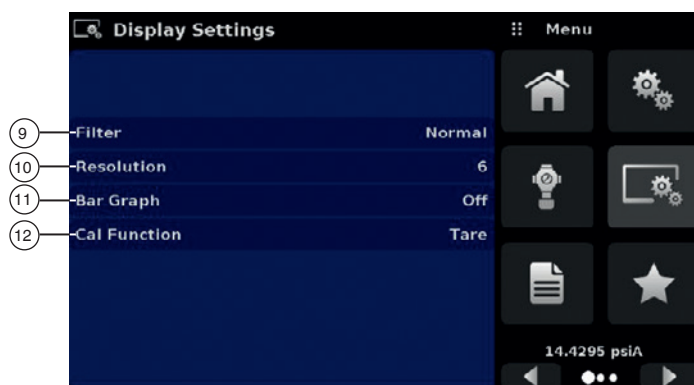
- ① Instrument language, screen brightness and volume settings
- ② User-defined measurement units
- ③ Unit for the optional barometer
- ④ Multiple user-specific configurations to create and save for ease of access

B) Control settings of the instrument



- ⑤ Control behavior between low overshoot and high speed
- ⑥ The control rate can be entered by the user as a factor of current units/sec.
- ⑦ The stability of the control can be defined by the user by setting the stable window as "% FS" and by setting the stable delay.
- ⑧ The pressure control volume can be adjusted by the user or set to "Auto" for dynamic automatic detection

C) Sensor settings and auxiliary display settings of the instrument



- ⑨ Electronic filter to smooth the pressure measurement
- ⑩ The resolution of the sensor display can be changed
- ⑪ Switching the bar graph on or off
- ⑫ Easy zeroing and tare features

Automatic Contamination Prevention System (A-CPS)

Specifications

Model A-CPS

Base instrument	
Operating conditions	
Maximum operating pressure	211 bar (3,065 psi)
Maximum operating temperature	80 °C (176 °F)
Voltage supply	
Power supply	DC 12 V
Power consumption	13 VA
Pressure connection	
To the M/C port of CPC4000	1 port with 1/4" tube adapted to 7/16" - 20 F SAE
To the test item	2 ports Standard: 7/16" - 20 F SAE Option: 6 mm tube fitting, 1/4" tube fitting, 1/4" female NPT fittings, 1/8" female NPT fittings or 1/8" female BSP fittings
Dimensions	
Dimensions (W x H x D)	139.7 x 266.7 x 139.7 mm (5.5 x 10.5 x 5.5 in)
Weight	3.9 kg (8.8 lbs.)

A-CPS operation

Active decontamination

The **A**utomatic **C**ontamination **P**revention **S**ystem, or A-CPS, is an accessory to the CPC4000 industrial pressure controller that prevents particles, water or oil contaminants from entering the instrument through the test item. The A-CPS uses a coalescing filter and an automatically actuated vent valve to remove all the contaminants and then stores them in a transparent sump bottle for easy cleanup.

The A-CPS allows hassle-free operation between the test item and the CPC4000 by reducing the additional process of deep cleaning the instrument prior to calibration. The A-CPS does not require an additional power source because it is controlled completely by the pressure controller itself.

The A-CPS also acts like a test gauge stand for easy mounting and setup of the test item. This reduces the requirement of additional manifolds and setup.

Automatic or manual purging with CPC4000

The A-CPS can be driven seamlessly with the CPC4000 in manual or auto mode. The auto mode will engage the purge sequence every time the controller switches from vent to control mode.

The manual mode provides an option for pre-cleansing the system by purging the test item several times. A purge button appears on the instrument's home screen when the A-CPS is activated. The purge button enables setting the desired maximum pressure for decontaminating the test item prior to normal operation with the model CPC4000 industrial pressure controller.

WIKA-Cal calibration software

Easy and fast creation of a high-quality calibration certificate

The WIKI-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.

A template helps the user and guides him through the creation process of a document.

In order to switch from the demo version to a full version of the respective template, a USB stick with the template has to be purchased.

The pre-installed demo version automatically changes to the selected full version when the USB stick is inserted and is available as long as the USB stick is connected to the computer.



- Creation of calibration certificates for mechanical and electronic pressure measuring instruments
- Fully automatic calibration with pressure controllers
- Calibration of gauge pressure measuring instruments with absolute pressure references and vice versa
- A calibration assistant guides you through the calibration
- Automatic generation of the calibration steps
- Generation of calibration certificates per DIN EN 10204
- Creation of logger protocols
- User-friendly interface
- Languages: German, English, Italian and more due with software updates

For further information see data sheet CT 95.10

Calibration certificates can be created with the Cal-Template and logger protocols can be created with the Log-Template.



Cal Demo

Generation of calibration certificates limited to 2 measuring points, with automatic initiation of pressures via a pressure controller.



Cal Light

Generation of calibration certificates with no limitations on measuring points, without automatic initiation of pressures via a pressure controller.



Cal

Generation of calibration certificates with no limitations on measuring points, with automatic initiation of pressures via a pressure controller.



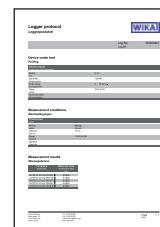
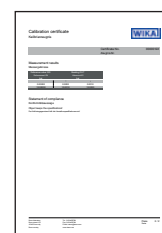
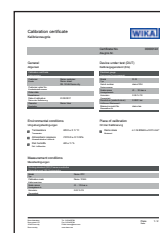
Log Demo

Creation of data logger test reports, limited to 5 measured values.



Log

Creation of data logger test reports without limiting the measured values.



Accessories for CPC4000		Order code
Description		CPX-A-C4
	19" rack mounting kit with side panels	-R-
	Barometric reference Measuring range 552 ... 1.172 mbar abs. (8 ... 17 psi abs.) Accuracy to 0.02 % of reading	-6-
	Measuring range 552 ... 1.172 mbar abs. (8 ... 17 psi abs.) Accuracy to 0.01 % of reading	-3-
	Calibration adapter for reference pressure sensors, voltage supply and software	-4-
	for barometric reference, voltage supply and software	-5-
	Transport case	-7-
	Adapter set 1/8" BSPG female thread (4 adapter)	-B-
	1/4" tube fitting (4 adapter)	-I-
	6 mm Swagelok® male thread (4 adapter)	-M-
	1/4" NPT female thread (4 adapter)	-N-
	1/8" NPT female thread (4 adapter)	-S-
	Block and bleed valve, ≤ 400 bar	-8-
	Coalescing filter ≤ 240 bar	-9-
	Automatic contamination protection, ≤ 210 bar	-O-
	Replacement filters for automatic CPS	-2-
Ordering information for your enquiry:		
1. Order code: CPX-A-C4 2. Option:		↓ []



Scope of delivery

- Industrial pressure controller model CPC4000 (desktop case)
- 1.5 m (5 ft) power cord
- Operating instructions
- A2LA calibration certificate (standard on factory)

Options

- DKD/DAkkS calibration certificate
- Second reference pressure sensor model CPR4000
- Barometric reference
- 19" rack-mounting kit
- Customer-specific system
- Adapters and fittings for pressure connections
- Automatic contamination prevention system (CPS)

Ordering information

Model / Case / Pressure range base instrument / Pressure unit / Pressure type / Minimum pressure range / Maximum pressure range / Accuracy / Type of calibration certificate / Barometric reference / Type of certificate for barometric reference / Digital interface / Pressure port adapters / Power cord / Additional ordering information

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