Pneumatic precision pressure controller Model CPC6000

mensor
WIKA Calibration Line

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 ... +100 bar (up to 4 sensors possible)
- Pressure type: positive and negative gauge pressure, absolute pressure and differential pressure via 2 control channels possible
- Control stability 0.003 % FS (of active sensor)
- Precision up to 0.005 % IS (IntelliScale)
- Accuracy up to 0.01 % IS (IntelliScale)

Pneumatic precision pressure controller CPC6000

Description

Design

Due to its modular design, the model CPC6000 pneumatic precision pressure controller offers the maximum flexibility in terms of configuration to customers' requirements. The instrument can be specified as a bench-top or as 19" rack-mount device, and is available with up to two separate channels. Each channel has its own controller unit and up to two reference pressure sensors, which can be quickly changed at any time and without the need for tools.

Application

Since up to four sensors can be integrated into the controller, the user is always offered an optimal calibration solution, even over a very wide pressure range. Moreover, the two separate controller units enable either two simultaneous calibrations or a true differential pressure calibration for static pressures, via the delta-function (channel A-B and/or channel B-A). As a result, the controller is especially suitable as a factory/working standard for the testing and calibration of all types of pressure measuring instrument.

Functionality

A colour touch-screen, combined with a very user-friendly menu, guarantees maximum operator convenience, and all this is available in a large number of languages. In addition to specifying a certain pressure setpoint either by entering it via touch-screen or sending it via remote interface, the pressure can also be changed in defined, programmable step-sizes by using the STEP buttons. Moreover, the user can also easily create extensive test programs using the instrument menu.

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

On request, customised mobile or stationary test systems can be engineered. There is an IEEE-488.2, a RS-232 and an ethernet interface for communication with other instruments, and thus the instrument can be integrated into an existing system.

Data sheets showing similar products and accessories:
Calibration software EasyCal; see Data Sheet CT 95.01

Specifications
CPC6000

Reference pressure sensors

Pressure range	Standard	Optional
Accuracy	0.01 % FS	0.01 % IS-50 [1]
Gauge pressure	0 ... 0.025 to 0 ... 100 bar [2]	0 ... 1 to 0 ... 100 bar
Bi-directional	-1 ... -0.025 to +0.025 ... +100 bar [2]	-
Absolute pressure	0 ... 0.350 to 0 ... 101 bar abs.	0 ... 1 to 0 ... 101 bar abs.
Precision	0.005 % FS	0.005 % IS
Optional barometric reference		
Function	The barometric reference can be used to switch pressure types [3], 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	552 ... 1172 mbar abs.	
Accuracy	0.01 % of measured value	
Pressure units	38 and 2 freely programmable	

1) 0.01 % IS-50 accuracy: 0 ... 50 % of the measuring span 0.01 % of half the measuring span and 0.01% of reading between 50 ... 100 % of span.
2) Measuring range ≤ 70 mbar Measuring span --> 0.03 % FS.
3) For a pressure type emulation, we recommend an 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 with frame and carry handle optional: 19" mounting with side panels
Channels/instrument	up to 2 separate control/measure modules
Sensors/channel	up to 2 pieces
Ingress protection	IP 31
Dimensions in mm	see technical drawings
Weight	approx. 16.5 (incl. all internal options)
Display	
Screen	7.0" colour LCD with touch-screen
Resolution	4 ... 6 digits
Warm-up time	approx. 15 minutes
Compensated temperature range	15 …. 45 °C
Connections	
Pressure connections	up to 8 ports with 7/16"- 20 F SAE. incl. adapters to 6 mm tube fitting
Filter elements	The instrument has 20-micron filters on all pressure ports through the manifold.
Permissible pressure media	clean, dry, non-corrosive gases
Overpressure protection	safety relief valve
Pressure generation	optional: internal, electrical pump (integrated in LP-pump module)
Permissible pressure	
Supply high port	~ 110 (The LP-pump controller module does not need any external pressure supply)
Test port	max. 110 % FS

Voltage supply	
Power supply	AC 100 ... 230 V, 50/60 Hz
Power consumption	max. 90 VA
Permissible ambient conditions	
Operating temperature	10 … 50 °C
Storage temperature	0 ... 70 °C
Humidity	5 … 95 % r. h. non-condensing
Mounting position	horizontal or slightly tilted
Shock/Vibration	maximum 2 g per MIL-T-28800
Control parameter	
Control stability	< 0.003 % FS of the active sensor
Slew rate modi	slow, medium, fast and variable
Control time	< 10 sec. (regarding a 10 % FS pressure increase in a 50 ml test volume)
Control range	0 ... 100 % FS
Test volume	50 ... 1,000 ccm (without throttle; leakage < 10^{-3})
Communication	
Interface	RS-232, Ethernet, IEEE-488.1
Instruction sets	Mensor, WIKA SCPI, others optional
Internal program	up to 64 sequences with up to 99 steps each

Approvals and certificates

CE conformity	
EMC directive [4)]	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 [5)]	Incl. 3.1 calibration certificate per DIN EN 10204

4) **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 intefere with other equipment under certain conditions. In such circumstances the operator is expected to take the appropriate measures.
5) Calibration in a horizontal position/operating position.

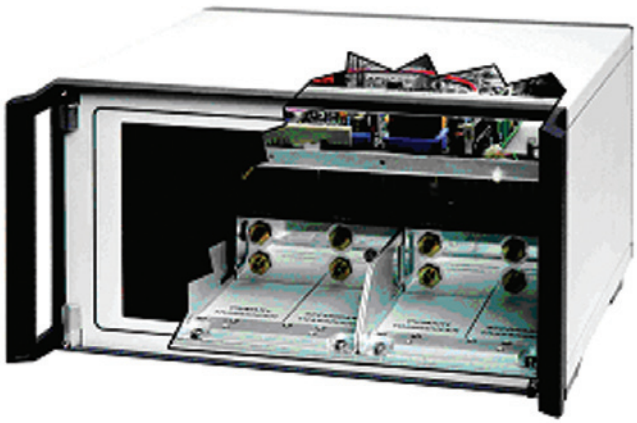
Modular design of the CPC6000

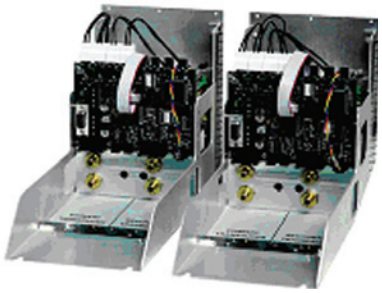
Due to its modular design, the CPC6000 brings a high degree of flexibility and offers a wide variety of configurations.

Up to two independent control/measure channels
One or two separate control/measure channels can be used in one CPC6000, which allows the user to perform two different calibrations at the same time (see figure on the right). Each channel will be equipped with its own controller module. The controller modules are based either on valve control units or on a special controller module with integrated pump (≤ 1 bar) so that in this case no external pressure source is necessary.

Up to four precision pressure sensors in total
Each measuring/control module can be equipped with a precision pressure sensor (or two as an option) whose calibration data are stored in the sensor.
Measuring ranges are available from 0 … 0.025 to 100 bar gauge pressure and 0 … 0.350 to 101bar absolute pressure and also bi-directional measuring ranges.
A module can be equipped either with two gauge pressure sensors or two absolute pressure sensors (see figure on the right). The two measuring ranges of one module can either be selected automatically via auto-range function or can be selected via menu. The maximum ratio of the reference sensors in a measuring module is 1:20.
Furthermore, an optional barometric reference allows switching between gauge pressure and absolute pressure.

Extremely easy to maintain
Since a pressure sensor can be dismounted and/or exchanged in just 30 seconds (plug and play) and a controller module in less than 5 minutes, the instrument offers a maximum in service and adaptability in shortest possible time because even sensors of different measuring ranges can be exchanged.





Up to two separate **controller/measure modules** (channel: A and B) per instrument

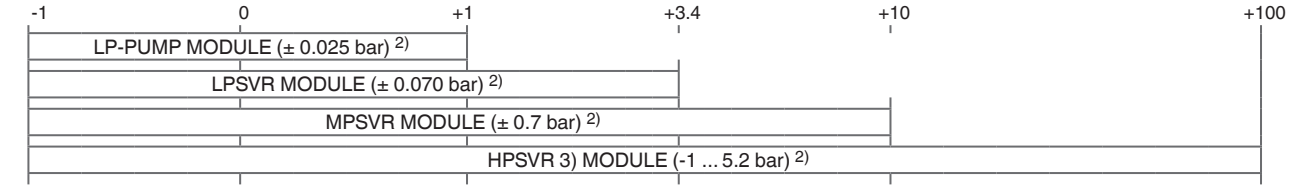
Up to two **pressure sensors** per controller/measure module (channel)

Optional: barometric reference sensor, integrated in the instrument

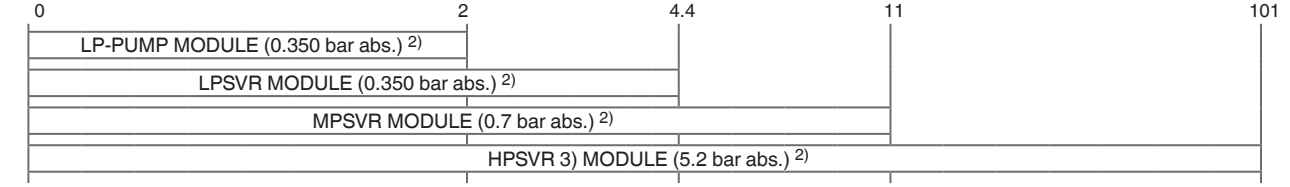
Modular parts of the hardware

Working ranges of the controller modules

Bi-directional or gauge pressure [bar] 1)



Absolute pressure [bar abs.] 1)



1) Mixing of absolute pressure and gauge pressure sensors in a module is not possible.
2) Smallest recommendable sensor range
3) When using a HPSVR module in an gauge pressure range above 10 bar, please make sure that the vacuum pump is disconnected at the Supply Low port. The pump could be damaged due to the gauge pressure. For controlling absolute pressure a vacuum pump connected at the Supply Low port is required.

Working range of the measuring module

Bi-directional or gauge pressure [bar] [1)]

Absolute pressure [bar abs.] [1)]

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

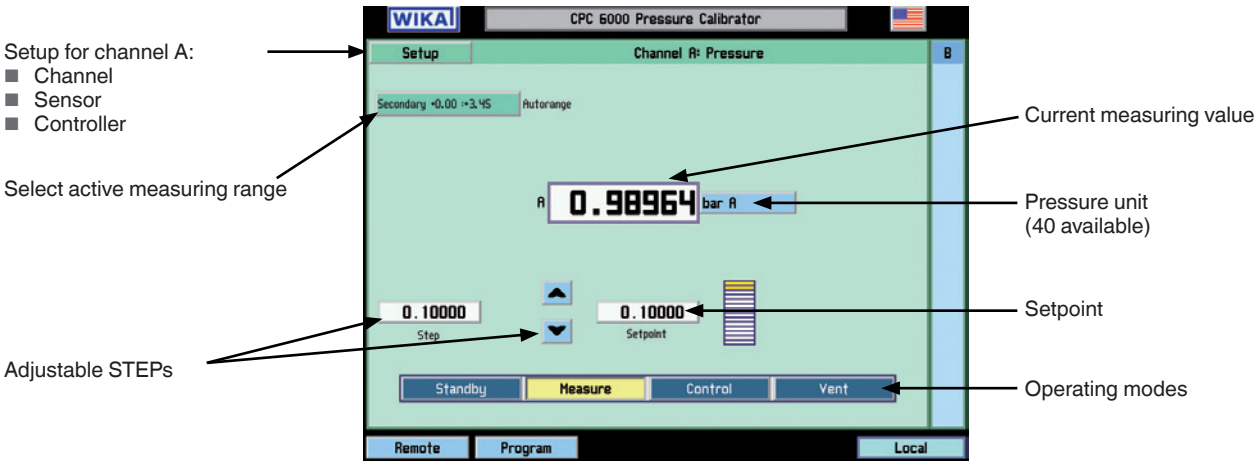
Screen representation and available functions

The instrument is available either with one or two internal precision pressure controllers (single- or dual-channel version); their representation incl. optional functions can be easily configured via touch-screen.

Except for the pressure unit which is configured directly via the pressure unit button, all settings can be easily accessed and configured via the SETUP button.

Single-channel version (up to two integrated precision sensors)

a) Standard screen representation (one control module incl. two sensors)

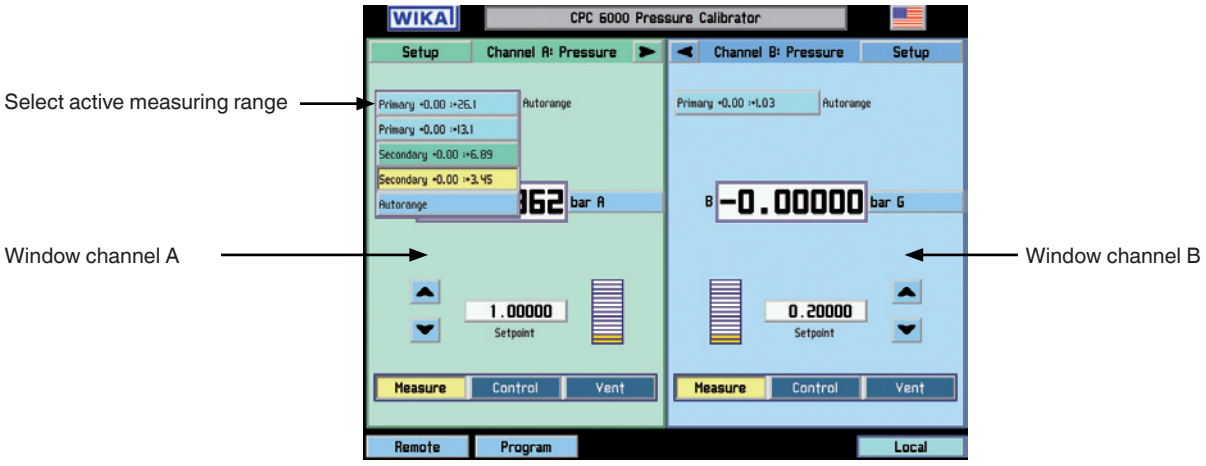


Further optionally available functions (configurable via SETUP menu)

- Head correction between reference and device under test
- Signal filtering
- Control speed
- Resolution

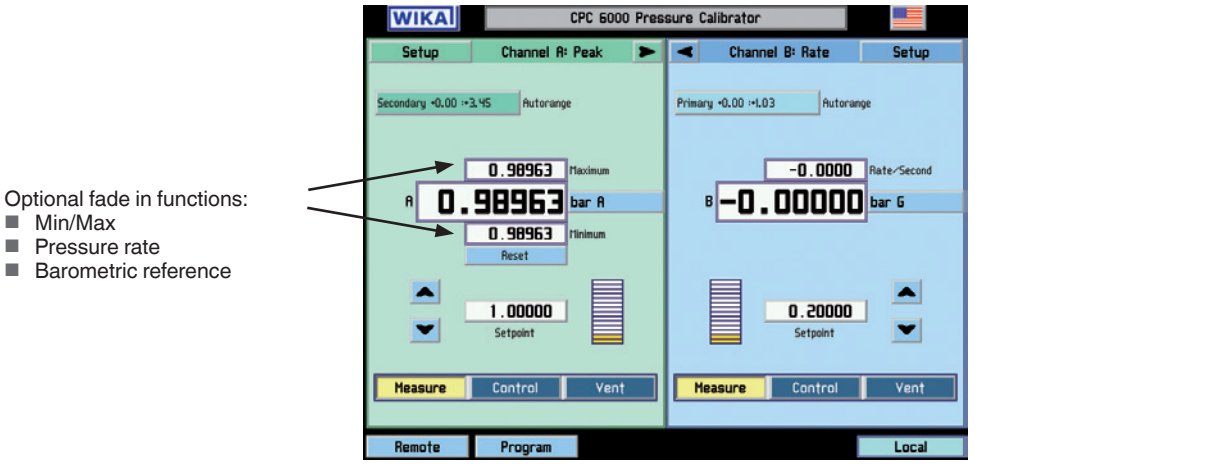
Dual-channel version (up to 4 integrated precision reference sensors) incl. some functions enabled

a) Standard screen representation (2 control channels incl. 4 sensors)



Each channel can be adjusted individually by pressing the button SETUP.

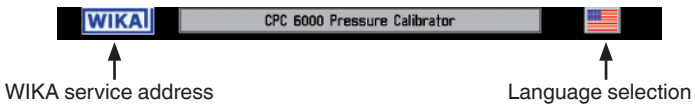
b) Screen representation incl. some functions enabled (via SETUP menu) adjustable



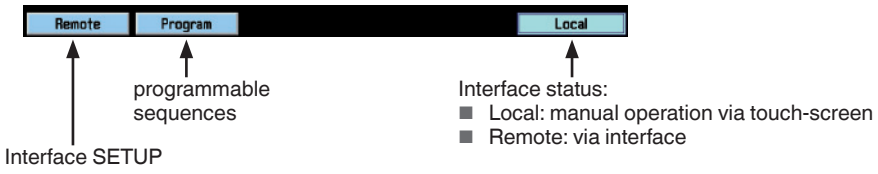
Explanations for the upper and lower toolbar

A toolbar with the following functions is located at the bottom of the display. By pressing a particular button the respective submenu will pop up.

a) Upper toolbar



b) Lower toolbar



Operating modes and start-up process

I. Selection of an operating mode

The selection bar for the operating mode is at the bottom of the display (during any operating mode):

Operating mode (select by pressing the correct button):

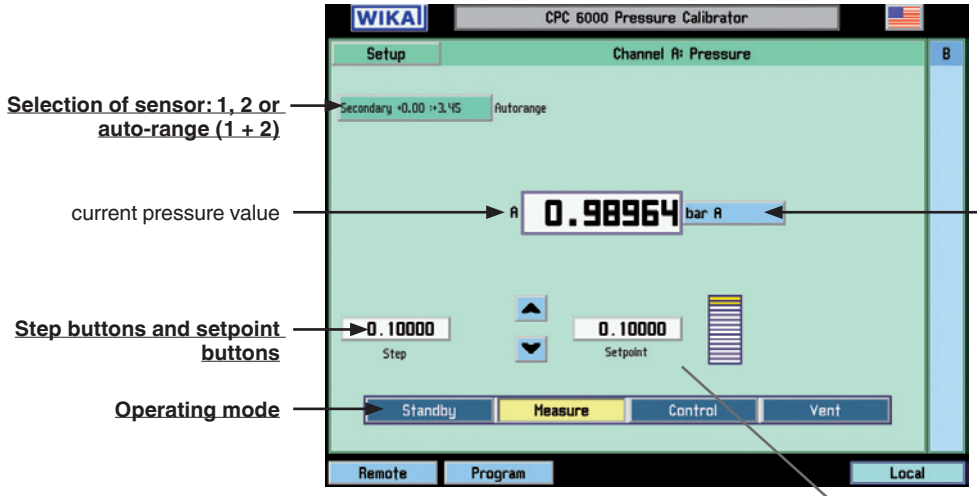
Standby
Closes all pressure ports of the respective control channel (the current pressure will be sealed inside the system/ channel)

Measurement
In measuring mode, the instrument measures the pressure connected to the test port of the respective channel very precisely (on changing from control mode: the last controlled pressure will be held/sealed in the connected test assembly).

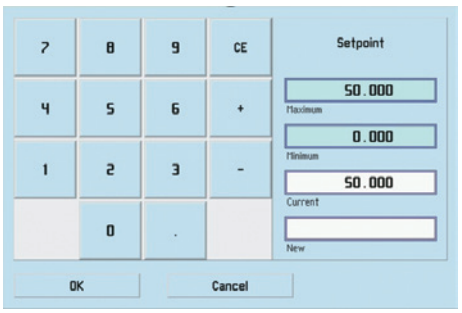
Control
In control mode the instrument provides a very precise pressure at the test port of the respective channel in accordance with the desired value setting.

Vent
Opens all pressure ports of the respective channel to atmosphere (ventilates the system/channel)

II. Entering a setpoint value in the control mode



XX.XXX = Touch-screen buttons for configuration, selection or input

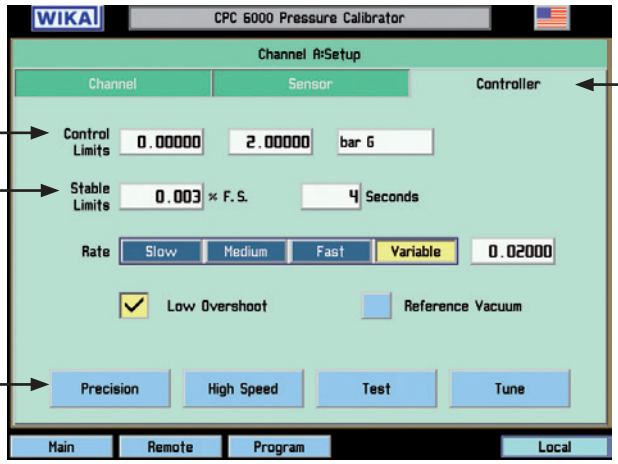


Pop-up input window for the setpoint

On pressing the setpoint button, an input window will appear to enter a new setpoint value. After confirming the input via the OK button, the controller immediately starts to control to the new setpoint. If the current value attains the accuracy class, the colour of the figure of the current pressure value changes from black to green.

A stepwise change of the pressure/set value is possible via the arrow-buttons, which are above and below the step and setpoint button. The step size is defined through the current value of the step button.

General settings via SETUP menu for channel A



Definition of control limits to protect test item

Definition of stable-flag

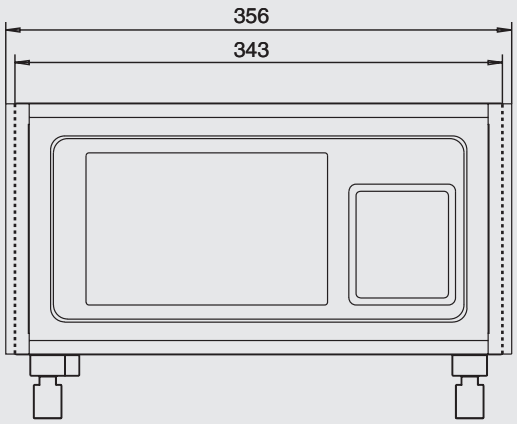
This menu is divided into three main tabs:
- Channel: resolution/filter
- Sensor: sensor information
- Controller: Stable limits/ control limits/control speed

Change of module-control performance
Precision control:
- Asymptotical control performance

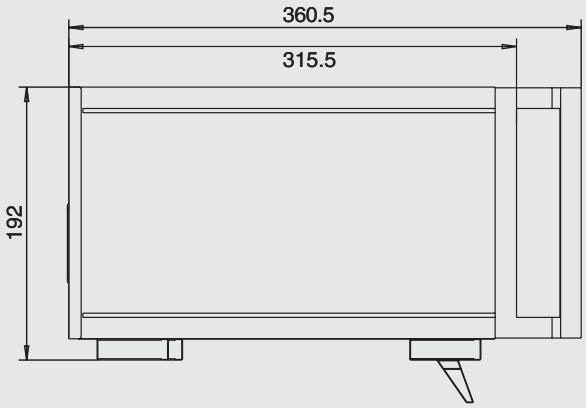
High speed:
- Fast control performance

Dimensions in mm

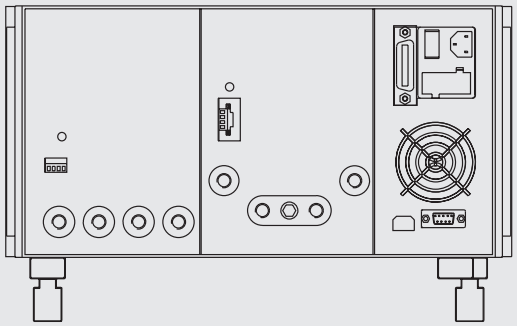
Front view



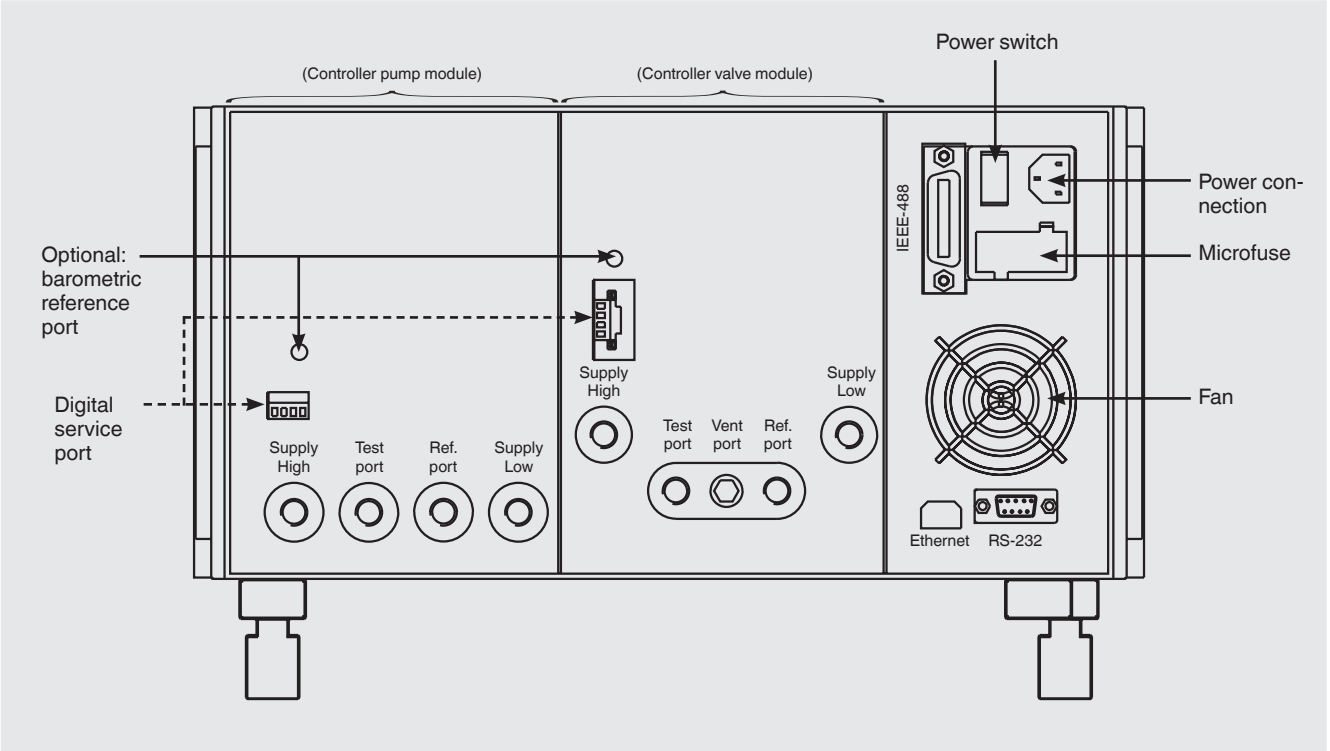
Side view



Rear view



Electrical and pressure connections - rear



Scope of delivery

- Precision pressure controller CPC6000 (desk top version)
- 1.5 m power cord
- Operating instructions
- 3.1 calibration certificate per DIN EN 10204
- DKD/DAkkS calibration certificate
- Second sensor/channel
- Second channel
- Delta function for differential pressure
- Barometric reference
- 19" rack mounting with side panels
- Customer-specific system

Accessories

- Rugged transport box
- Pressure adapter or manual quick-clamp connections
- Interface cable
- EasyCal Professional calibration software

Options

Ordering information

Model / Type of housing / Channel A: with working range / Channel A: pressure sensor 1 / Channel A: pressure sensor 2 / Channel B: working range / Channel B: pressure sensor 1 / Channel B: pressure sensor 2 / Delta function for 2-channel version / Barometric reference / Power cord / Pressure connection adapter / Additional order information

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