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Calibration technology

Modular pressure controller Model CPC6050

Applications

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



Modular pressure controller, model CPC6050

Special features

- Pressure ranges: -1 ... 210 bar (-15 ... 3,045 psi)
- Control speed 15 s
- Control stability < 0.003% FS
- Accuracy down to 0.01% IS (IntelliScale)
- Precision 0.004% FS
- Two year warranty

Description

Design

The highly configurable CPC6050 modular pressure controller offers maximum flexibility to best suit the customer's requirements. The instrument can have up to two independent pressure regulating channels which can operate simultaneously. Each channel can have up to two transducers. The instrument can also have an optional barometric reference for gauge or absolute pressure emulation. This instrument can be specified as a desktop or as a 19" rack-mounted device.

Application

The controller offers many applications within calibration laboratories and production environments because of its pressure range -1 … 210 bar (-15 … 3,045 psi) and accuracy down to 0.01% IS-50. Its ability to control pressures as low as 25 mbar (10" of H20) span with a high stability makes it the ideal calibration and verification solution for healthcare and aerospace industries. Simultaneous calibration channels along with interchangeable plug-n-play pressure transducers and an intuitive GUI makes CPC6050 an easy-to-use and maintain instrument.

Functionality

The touchscreen, along with an intuitive user interface, provide maximum ease-of-use. The large number of menu languages add to its operability. In addition to specifying a certain pressure set point either by entering it via touchscreen or sending it via remote interface. The pressure can 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. Depending on the application, the rate of control can be either pre-set precision, high-speed or a user defined variable rate.

Software

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

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.

Backward Compatibility

The highly configurable CPC6050 can also be used with pressure transducers of its predecessor model CPC6000. The transducers can be used individually or together with the CPR6050, hence providing the user a complete backward capability.

Data sheets showing similar products and accessories:
Pneumatic precision pressure controller; model CPC6000; see data sheet CT 27.61
High-end pressure controller; model CPC8000; see data sheet 28.01
WIKA-CAL calibration software; see data sheet CT 95.10

WIKA
Part of your business

Specifications
Model CPC6050

Reference pressure transducers model CPR6050

Pressure range	Standard	Optional
Accuracy [1]	0.01% FS [2]	0.01% IS-50 [3]
Gauge pressure	0 ... 0.025 to 0 ... 210 bar (0 ... 0.36 to 0 ... 3,045 psi) [4]	0 ... 1 to 0 ... 210 bar (0 ... 14.5 to 0 ... 3,045 psi) [4]
Bi-directional	-0.012 ... 0.012 to -1 ... 210 bar (-0.18 ... 0.18 to -15 ... 3,045 psi) [4]	-1 ... 10 to -1 ... 210 bar (-15 ... 145 to -15 ... 3,045 psi) [4]
Absolute pressure [5]	0 ... 0.5 to 0 ... 211 bar abs. (0 ... 7.5 to 0 ... 3,060 psi abs.)	0 ... 1 to 0 ... 211 bar abs. (0 ... 14.5 to 0 ... 3,060 psi abs.)
Precision [6]	0.004% FS	0.004% FS
Calibration interval	365 days [7]	365 days
Optional barometric reference		
Function	The barometric reference can be used to switch pressure types [8], absolute <=> gauge. With gauge pressure transducers, the measuring range of the transducers 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]	0.01% 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
3) 0.01% IS-50 accuracy: Between 0 ... 50% of the full scale, the accuracy is 0.01% of half of the full scale value and between 50 ... 100% of the full scale, the accuracy is 0.01% of reading.
4) Ranges from 1500 to 2000 psig will be sealed gauge transducers
5) The minimum calibrated range of absolute transducer(s) is 600mTorr
6) It is defined as the combined effects of linearity, repeatability and hysteresis throughout the stated compensated temperature range
7) 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 the specified ranges.
8) For a pressure type emulation, we recommend a native absolute pressure transducer, 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. 22.7 kg (50 lbs) incl. all internal options
Warm-up time	approx. 15 min
Display	
Screen	8.9" color LCD with resistive touchscreen
Resolution	4 ... 6 digits depending on range and units
Connections	
Pressure connections	up to 8 ports with 7/16”- 20 F SAE, up to 2 ports 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	Aluminum, 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 transducer and adjusted to customized 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. 210 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

Base instrument

Control parameter	SVR module [9]	LPPump module
Control stability	< 0.003% FS of the active range (typical 0.001 % FS [10])	< 0.003% FS of the active range (typical 0.001 % FS [10])
Control mode	precision, high speed and custom	external supply on / off
Control time	15 s [11]	25 s [11]
Control range	0 ... 100% FS	0 ... 100% FS
Minimum control pressure	0.0017 bar (0.025 psi) over exhaust pressure or 0.05 % FS, whichever is greater	0.0034 bar (0.05 psi) over exhaust pressure or 0.05% FS, whichever is greater
Overshoots	< 1% FS in high speed control mode (typical <0.05% FS in precision control mode)	< 1% FS in high speed control mode (<0.1% FS in pump only mode)
Test volume	50 ... 1,000 ccm	50 ... 300 ccm
Communication		
Interface	Standard: 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	

9) Represents LPSVR, MPSVR, HPSVR and EPSVR
10) Typical stability achieved 10 seconds after the stable indication, when controlling on pressure above atm
11) Regarding a 10 % FS pressure increase above atm. in a 50 ml test volume, in high speed mode (SVR) or external supply on (LPPump)

Approvals and certificates

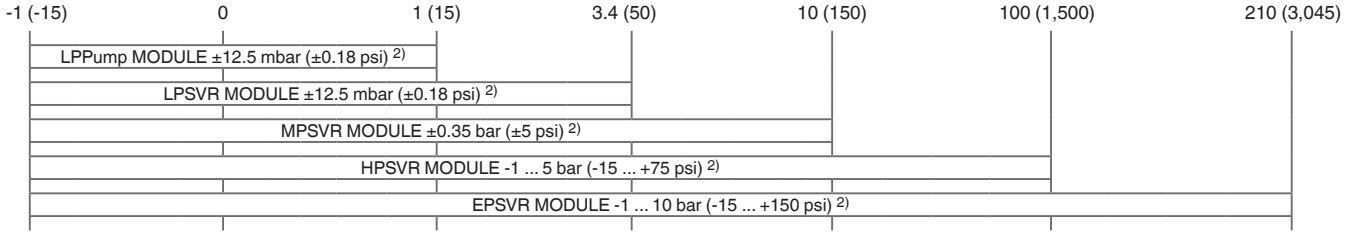
EC declaration of conformity	
EMC directive [12]	EN 61326-1 emission (group 1, class A) and interference immunity (industrial application)
Low voltage directive	EN 61010-1
RoHS directive	2011/65/EU, article 4
Certificate	
Calibration [13]	Standard: A2LA calibration certificate (standard on factory) Option: DKD/DAkkS calibration certificate

12) **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.
13) Calibration in a horizontal position/operating position.

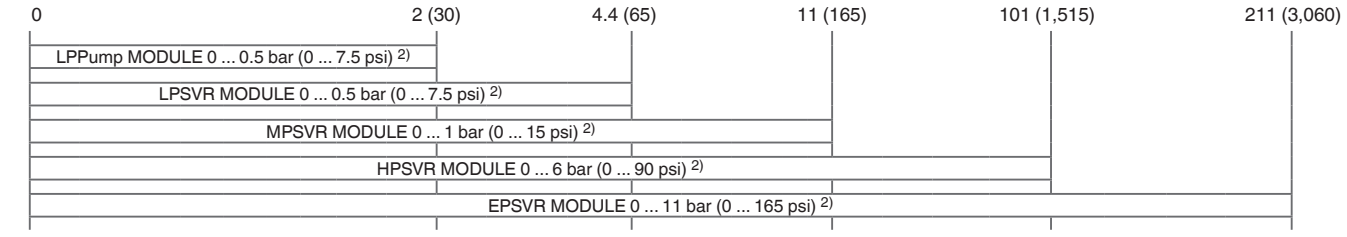
Approvals and certificates, see website

Working ranges of the controller modules

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



Absolute pressure [bar (psi)] [1]



1) Mixing of absolute pressure and gauge pressure transducers in a module is not possible.
2) Smallest acceptable transducer range
For controlling absolute pressure a vacuum pump connected at the Exhaust port is required.

Modular design of the CPC6050



Up to two independent control channels
The CPC6050 provides a high degree of flexibility by having two independent channels of operation within one instrument. This enables the user to perform two separate calibrations at the same time. The user can also perform delta function on the two channels to see the differential pressure. Each channel is equipped with its own pressure module and up to two pressure transducers.

The CPC6050 offers two different types of pressure modules, SVR module and LPPump module. The SVR modules are based on a special solenoid valve regulation technology and provide precise control over the set pressure. These are available in four different variations depending on the pressure range. The innovative low pressure pump module (LPPump) allows pressure generation and control at very low pressures without the need of any external pressure source, thus making CPC6050 a complete solution.



SVR pressure module equipped with up to two transducers

Up to four pressure transducers
Each independent channel can contain up to two internal pressure transducers and utilize the instrument's removable barometric reference for pressure mode emulation. Each transducer contains its calibration, characterization and communication functions and information. Each channel can be equipped either with two gauge or two absolute pressure transducer, thus providing the user a control range turndown of 20:1 per channel of the instrument. An optional calibration kit is available to calibrate the pressure transducers externally.

Auto-ranging capability
The modular pressure controller CPC6050 is capable of automatically selecting the transducer within a channel depending on the user's pressure set point. The transition between transducers is automatic and seamless without any interruption in the user's application.

LPPump module equipped with up to two transducers



Extremely easy to maintain
The modular design of the CPC6050 provides easy access and quick replacement of pressure transducers. The transducers can be replaced by opening the front panel in just 30 seconds and the control channels can be replaced in less than 5 minutes. These features make the instrument very easy to service and repair with least possible down time to the user.

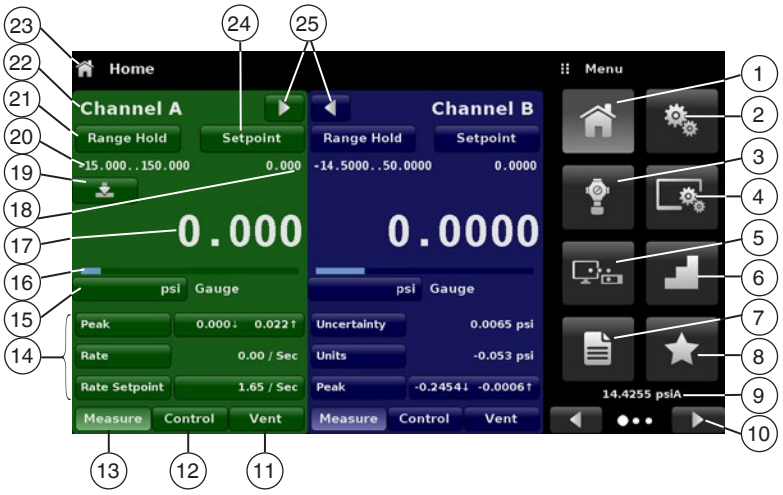


Modular design of the hardware

Easy operation via touchscreen

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** (13), **CONTROL** (12) and **VENT** (11) at the bottom of the screen.

Standard desktop/home screen



(1) Home application

(2) General settings

(3) Control settings

(4) Display settings

(5) Remote settings

(6) Step settings

(7) Sequence settings

(8) Favorites

(9) Barometric pressure reading (optional)

(10) Menu navigation (forward/ back)

(11) **VENT**
Immediately vents the system, including the test assembly connected to the Measure/Control port, to atmosphere.

(12) **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.

(13) **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 within the instrument maintained/locked, and any connected piping. Temperature changes or external leakage may impact the pressure reading in this state.)

(14) Auxiliary displays either uncertainty, peak, rate or alternate units

(15) Current pressure unit and type

(16) Optional bar graph

(17) Current measuring value

(18) Entered set point

(19) Zero or tare function

(20) Pressure range of the transducers

(21) Selection of the active transducer or auto-range

(22) Active channel

(23) Current application name

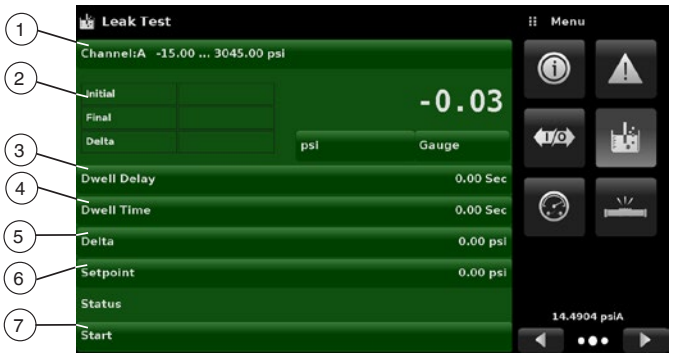
(24) Setpoint selection

(25) Screen collapse/ expand

Additional features of the CPC6050

Leak testing

The modular pressure controller CPC6050 is capable of performing pressure leak tests on a device or system with a dedicated Leak Test menu. The menu allows the user to set dwell parameters to monitor the pressure prior to the leak detection, the maximum allowed change in pressure during the test and the pressure value at which the test is run. The leak test indicates a pass (green) or fail (red) after the test is completed.



1. Channel selection
2. Results display
3. Delay prior to leak test
4. Time for monitoring leak
5. Maximum pressure change
6. Leak test point
7. Leak test start

Burst testing

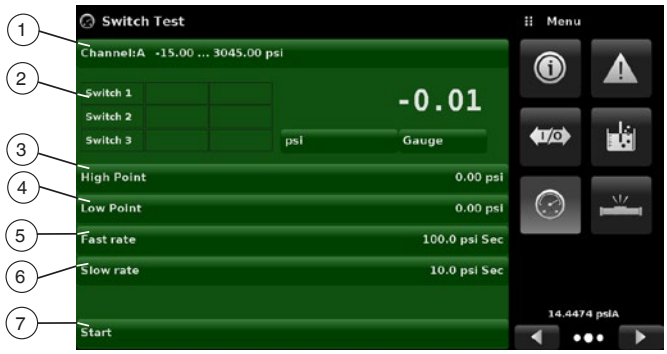
The CPC6050 is capable of measuring and detecting pressure bursts for various applications like rupture disk testing, overpressure testing and pneumatic pipe testing. The instrument requires the user to enter pressure points slightly higher and lower than the burst pressure along with a threshold rate to detect the burst. The CPC6050 also provides a means to set the rate of pressure control both prior to and during the burst window.



1. Channel selection
2. Burst test result - Pass/ Fail
3. Threshold burst rate
4. Pressure higher than burst
5. Pressure lower than burst
6. Rate of control till low point
7. Rate of control between low and high point
8. Burst test start

Switch testing

The CPC6050 has the ability to actuate and de-actuate pressure switches using the optional digital I/O connection. The CPC6050 provides an option of connecting up to three switches per channel. The user is asked to enter a pressure range (high point & low point) between which the switch is expected to be actuated, along with the rate of pressure control prior to and during the switching window. After finishing the switch test, the pressure switching value is recorded.



1. Channel selection
2. Switch test results
3. Higher pressure than switch actuation
4. Lower pressure than switch actuation
5. Rate of control till low point
6. Rate of control between low and high point
7. Switch test start

Versatility with single output and single supply



Plugged port, inactive

Single Measure / Control Output

Auto-channeling with Single Output

The modular pressure controller CPC6050 is available as a single output auto range option. The single output option allows the user to access the two channels of the instrument together as a single channel. The transition between the two channels and their internal transducers is automatic and provides the user a stable control over a wide dynamic pressure range.

The maximum control range turndown is as high as 400:1 between the full scale value of the lowest and highest transducer. When configured with four transducers that have contiguous ranges, the single output auto range option of the CPC6050 can calibrate an instrument over a wide range with the highest possible accuracy and test uncertainty ratio.

Dual pressure mode with Single Output/ Dual Channel

The single output / dual channel option allows the user to select either channel A or channel B as the active channel at any point during operation. This provides the unique ability to choose different pressure types between the channels, or a significant difference in pressure range between the two without significant change in the setup. The pressure output to the channels is combined and the same output port can be accessed when using either of the two channels. This reduces the total setup time and costs for manifold connections.

Single Measure / Control Output



Plugged ports

Single supply to both channels

The CPC6050 can be customized to have a single pressure supply to source both channels. The single supply option reduces the different pressure supply requirements and reduces the setup costs and resources needed. The single pressure supply is connected to the supply port of channel A and should be adequate to support the pressure supply requirements of the highest transducer installed. The instrument internally reduces this pressure supply to sustain the pressure on channel B as well. The single supply option can be configured with a standard two channel instrument or an auto ranging single output instrument.

Automatic Contamination Prevention System (A-CPS)

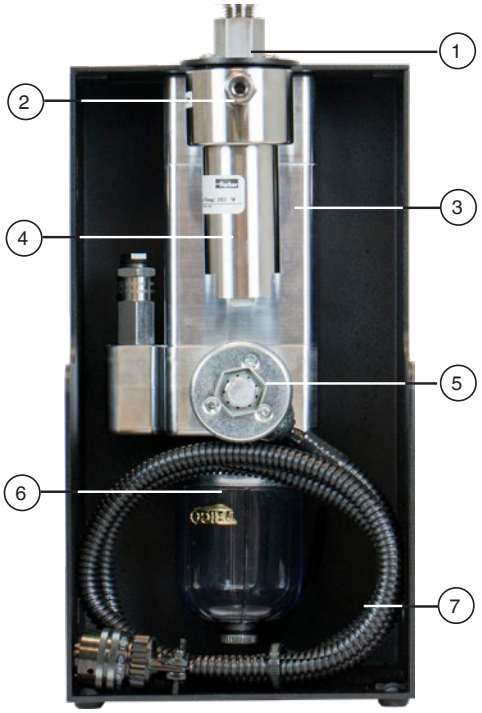
Active decontamination

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The Automatic Contamination Prevention System, or A-CPS, is an accessory to the CPC6050 Modular Pressure Controller that prevents particle, water or oil contaminants from entering the instrument through the device under test. The A-CPS primarily uses a liquid trap and an automatically actuated bleed valve to remove all fluid contaminants and then stores them in a transparent sump bottle for easy cleanup. The A-CPS also has a coalescing filter to remove any particle contaminants left in the pneumatic media before it enters the pressure controller.

The A-CPS allows hassle free operation between the device under test and the CPC6050 by reducing the additional process of deep cleaning the device prior to calibration. The A-CPS does not require an additional power source because it is driven completely by the pressure controller itself. The A-CPS also acts like a test gauge stand for easy mounting and setup of the device under test. This reduces the requirement of additional manifolds and setup.

Automatic Contamination Prevention System



1. Top mount device under test connection
2. Connection to the Measure/ Control port of the CPC6050
3. Integrated liquid trap
4. Integrated coalescing filter
5. Purge actuation valve
6. Sump collection bottle
7. Connection to the A-CPS backplate of the CPC6050

A-CPS Specification and Operation

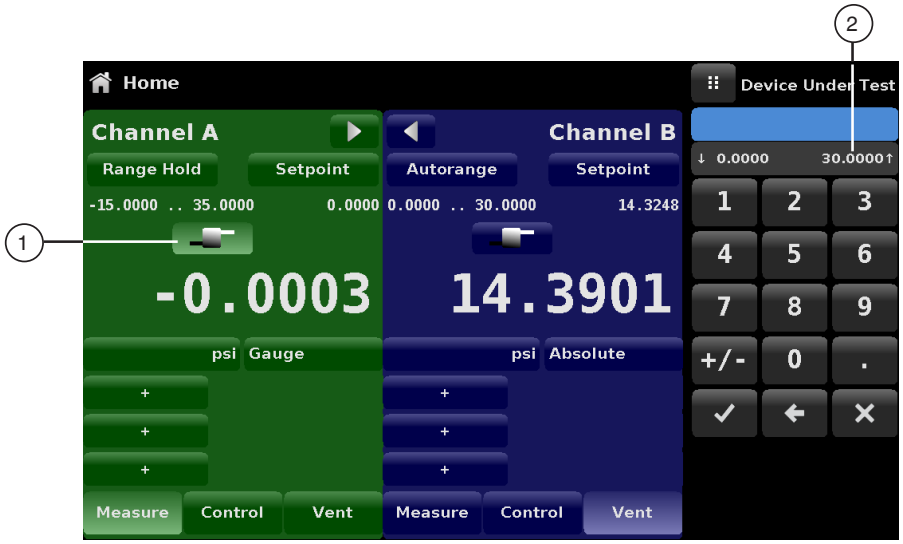
A-CPS Specifications

Base instrument	
Operating Conditions	
Maximum operating pressure	211 bar gauge (3,065 psig)
Maximum operating temperature	80 °C (176 F)
Voltage Supply	
Power supply	12 VDC
Power consumption	13 VA
Pressure Connection	
To the M/C port of CPC6050	1 port with 1/4" tube adapted to 7/16"- 20 F SAE
To the DUT	2 ports with 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 & Weight	
Dimensions	5.5 in x 10.5 in x 5.5 in (W x H x D)
Weight	3.9 kgs (8.8 lbs.)

A-CPS Operation

Automatic or manual purging with CPC6050

The Automatic Contamination System can be driven seamlessly with any channel on the CPC6050 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 device under test 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 device under test prior to normal operation with the modular pressure controller CPC6050.



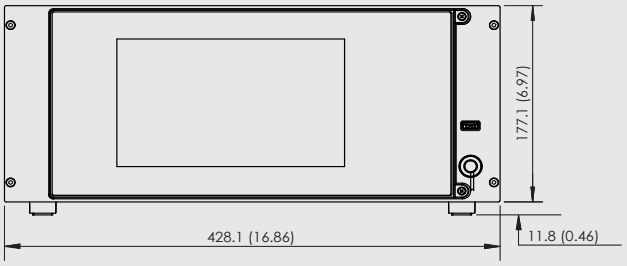
1 Purge button

2 Max purge pressure limit

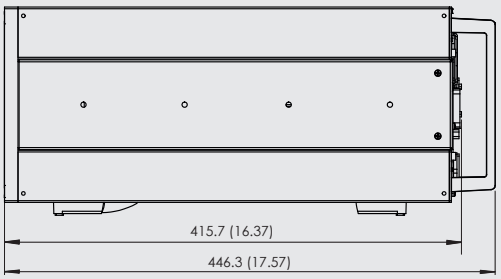
Dimensions in mm (in)

Desktop case

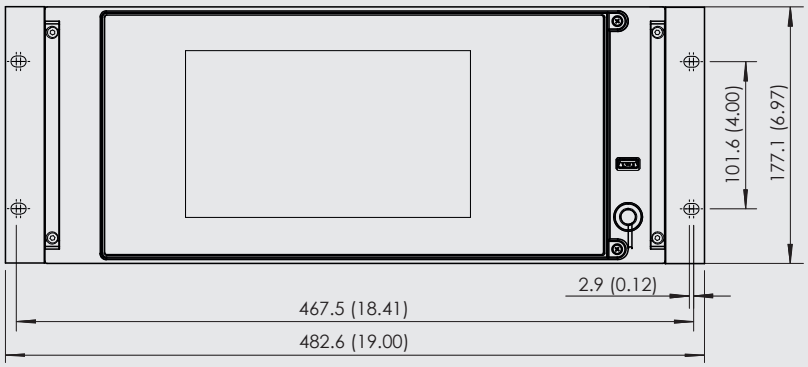
Front view



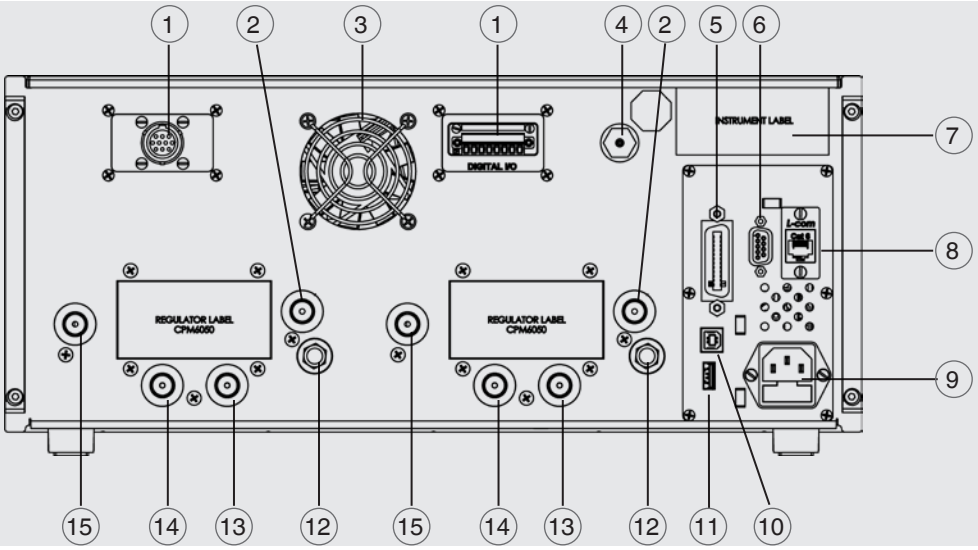
Side view (left)



19" rack-mounting kit, front view



Electrical and pressure connections - rear view



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

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.
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 key with the template has to be purchased.
The pre-installed demo version automatically changes to the selected full version when the USB key is inserted and is available as long as the USB key is connected to the computer.

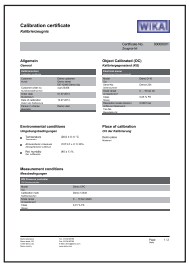
- Creation of calibration certificates for mechanical and electronic pressure measuring instruments
- Fully automatic calibration with pressure controllers
- Calibration of gauge pressure measuring instruments with absolute pressure references and vice versa
- A calibration assistant guides you through the calibration
- Automatic generation of the calibration steps
- Generation of 3.1 certificates per DIN EN 10204
- Creation of logger protocols
- User-friendly interface
- Languages: German, English, Italian and more due with software updates

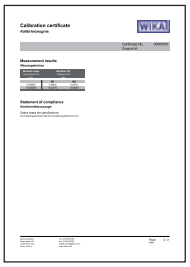
For further information see data sheet CT 95.10

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.







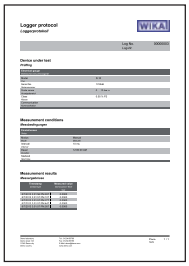
Cal Light
Generation of calibration certificates with no limitations on measuring points, without automatic initiation of pressures via a pressure controller.



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.

Scope of delivery

- Modular pressure controller model CPC6050 (desktop case)
- 1.5 m (5 ft) power cord
- Operating instructions (USB)
- A2LA calibration certificate (standard on factory)

Accessories

- Pressure adapters
- Interface cable
- Coalescing filter
- Block and bleed valve
- Pressure booster
- WIKA-CAL calibration software

Options

- DKD/DAkkS calibration certificate
- Barometric reference
- Spare reference pressure transducer
- Spare pressure module
- 19" rack-mounting kit
- Customer-specific system
- Adapters and fittings for pressure connections
- Digital I/O
- Automatic contamination prevention system
- Single output / auto range or dual channel version
- Single pressure supply for both channels
- Vacuum regulator

Ordering information

Model / Case type / Channel A: Pressure controller module/ Channel B: Pressure controller module/ Barometric reference/ Type of certificate for barometric reference/ Single output for 2-channel versions/ Single supply for 2-channel versions/ Backplate options/ Power cord/ Additional ordering information

Channel/ Regulator type/ Primary: Reference pressure sensor/ Secondary: Reference pressure sensor/ Vacuum regulator/ Pressure port adapters/ Additional ordering information

Reference pressure sensor/ Pressure unit/ Pressure type/ Minimum pressure range/ Maximum pressure range/ Accuracy/ Type of certificate/ Additional ordering information

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