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

Special features
- Pressure ranges: -1 ... 210 bar (-15 ... 3,045 psi)
- Control speed 15 s
- Control stability < 0.003 % FS (typical 0.001 % FS)
- Accuracy down to 0.01 % FS (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% FS. Its ability to control pressures as low as 25 mbar (10" of H2O) 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. 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.

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.
Specifications
Model CPC6050

Reference pressure transducers model CPR6050

<table>
<thead>
<tr>
<th>Pressure range</th>
<th>Standard</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy 1)</td>
<td>0.01 % FS 2)</td>
<td>0.01 % IS-50 3)</td>
</tr>
<tr>
<td>Gauge pressure</td>
<td>0 ... 0.025 to 0 ... 210 bar</td>
<td>0 ... 1 to 0 ... 210 bar</td>
</tr>
<tr>
<td></td>
<td>(0 ... 0.36 to 0 ... 3,045 psi)</td>
<td>(0 ... 14.5 to 0 ... 3,045 psi)</td>
</tr>
<tr>
<td>Bi-directional</td>
<td>-0.012 ... -0.012 to -1 ... 210 bar</td>
<td>-1 ... 10 to -1 ... 210 bar</td>
</tr>
<tr>
<td></td>
<td>(-0.18 ... -0.18 to -15 ... 3,045 psi)</td>
<td>(-15 ... 145 to -15 ... 3,045 psi)</td>
</tr>
<tr>
<td>Absolute pressure 4)</td>
<td>0 ... 0.5 to 0 ... 211 bar abs.</td>
<td>0 ... 1 to 0 ... 211 bar abs.</td>
</tr>
<tr>
<td></td>
<td>(0 ... 7.5 to 0 ... 3,060 psi abs.)</td>
<td>(0 ... 14.5 to 0 ... 3,060 psi abs.)</td>
</tr>
<tr>
<td>Precision 5)</td>
<td>0.004 % FS</td>
<td>0.004 % FS</td>
</tr>
<tr>
<td>Calibration interval</td>
<td>365 days 6)</td>
<td>365 days</td>
</tr>
</tbody>
</table>

Optional barometric reference

Function
The barometric reference can be used to switch pressure types 7), 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) The minimum calibrated range of absolute transducer(s) is 60mTorr
5) It is defined as the combined effects of linearity, repeatability and hysteresis throughout the stated compensated temperature range
6) 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.
7) 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 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 ... 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**

<table>
<thead>
<tr>
<th>Control parameter</th>
<th>SVR module</th>
<th>LPPump module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control stability</td>
<td>&lt; 0.003 % FS of the active range (typical 0.001 % FS)</td>
<td>&lt; 0.003 % FS of the active range (typical 0.001 % FS)</td>
</tr>
<tr>
<td>Control mode</td>
<td>precision, high speed and custom</td>
<td>external supply on / off</td>
</tr>
<tr>
<td>Control time</td>
<td>15 s</td>
<td>25 s</td>
</tr>
<tr>
<td>Control range</td>
<td>0 ... 100 % FS</td>
<td>0 ... 100 % FS</td>
</tr>
<tr>
<td>Minimum control pressure</td>
<td>0.0017 bar (0.025 psi) over exhaust pressure or 0.05 % FS, whichever is greater</td>
<td>0.0034 bar (0.05 psi) over exhaust pressure or 0.05 % FS, whichever is greater</td>
</tr>
<tr>
<td>Overshoots</td>
<td>&lt; 0.15 % FS in high speed control mode (typical &lt;0.05% FS in precision control mode)</td>
<td>&lt; 0.3% FS in high speed control mode (&lt;0.1% FS in pump only mode)</td>
</tr>
<tr>
<td>Test volume</td>
<td>50 ... 1,000 ccm</td>
<td>50 ... 300 ccm</td>
</tr>
</tbody>
</table>

**Communication**

| Command sets            | Mensor, WIKA SCPI, others optional |
| Response time           | approx. 100 ms |
| Internal program        | up to 24 sequences with up to 99 steps each |

8) Represents LPSVR, MPSVR, HPSVR and EPSVR
9) External supply is turned off for primary transducer pressure ranges < 0.2 bar (3 psi)
10) Regarding a 10 % FS pressure increase 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 11) EN 61326-1 emission (group 1, class A) and interference immunity (industrial application)

Low voltage directive EN 61010-1

**Certificate**

Calibration 12) Standard: A2LA calibration certificate (standard on factory)

Option: DKD/DAkkS calibration certificate

11) 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.

12) 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) 2)**

<table>
<thead>
<tr>
<th></th>
<th>LPPump MODULE</th>
<th>LPSVR MODULE</th>
<th>MPSVR MODULE</th>
<th>HPSVR MODULE</th>
<th>EPSVR MODULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1 (-15)</td>
<td>±12.5 mbar (±0.18 psi)</td>
<td>±12.5 mbar (±0.18 psi)</td>
<td>±0.7 bar (±5 psi)</td>
<td>-1 ... 5 bar (-15 ... +75 psi)</td>
<td>-1 ... 10 bar (-15 ... +150 psi)</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (15)</td>
<td>3.4 (50)</td>
<td>10 (150)</td>
</tr>
<tr>
<td>10</td>
<td>100 (1,500)</td>
<td>100 (1,500)</td>
<td>210 (3,045)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Absolute pressure [bar (psi)] 1)**

<table>
<thead>
<tr>
<th></th>
<th>LPPump MODULE</th>
<th>LPSVR MODULE</th>
<th>MPSVR MODULE</th>
<th>HPSVR MODULE</th>
<th>EPSVR MODULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.5 bar (0 ... 7.5 psi)</td>
<td>0 ... 6 bar (0 ... 90 psi)</td>
<td>0 ... 11 bar (0 ... 165 psi)</td>
</tr>
<tr>
<td>2</td>
<td>2 (30)</td>
<td>2 (30)</td>
<td>4.4 (65)</td>
<td>11 (165)</td>
<td>101 (1,515)</td>
</tr>
<tr>
<td>4.4 (65)</td>
<td>4.4 (65)</td>
<td>4.4 (65)</td>
<td>11 (165)</td>
<td>101 (1,515)</td>
<td>211 (3,060)</td>
</tr>
</tbody>
</table>

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.

**Communication**


Command sets: Mensor, WIKA SCPI, others optional.

Response time: approx. 100 ms.

Internal program: up to 24 sequences with up to 99 steps each.

8) Represents LPSVR, MPSVR, HPSVR and EPSVR.
9) External supply is turned off for primary transducer pressure ranges < 0.2 bar (3 psi).
10) Regarding a 10 % FS pressure increase in a 50 ml test volume, in high speed mode (SVR) or external supply on (LPPump).

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Certificate


Option: DKD/DAkkS calibration certificate.

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12) 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) 2)
  - LPPump MODULE: ±12.5 mbar (±0.18 psi)
  - LPSVR MODULE: ±12.5 mbar (±0.18 psi)
  - MPSVR MODULE: ±0.7 bar (±5 psi)
  - HPSVR MODULE: -1 ... 5 bar (-15 ... +75 psi)
  - EPSVR MODULE: -1 ... 10 bar (-15 ... +150 psi)

- Absolute pressure [bar (psi)] 1)
  - LPPump MODULE: 0 ... 0.5 bar (0 ... 7.5 psi)
  - LPSVR MODULE: 0 ... 0.5 bar (0 ... 7.5 psi)
  - MPSVR MODULE: 0 ... 1 bar (0 ... 15 psi)
  - HPSVR MODULE: 0 ... 6 bar (0 ... 90 psi)
  - EPSVR MODULE: 0 ... 11 bar (0 ... 165 psi)

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.

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-channeling and 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. Additionally the CPC6050 is also available as a single output option, thus allowing the user to access the two channels of the instrument together as a single channel. The transition between the two channels is automatic and provides the user a very 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.

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.
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
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
- A2LA calibration certificate (standard on factory)

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
- Vacuum regulator

Accessories

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

Ordering information

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

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