Precision pressure indicator
Model CPG2500

Applications

- Pressure standard for calibration laboratories
- Transfer standard with external sensor
- Pressure instrument manufacturing
- Differential pressure measurement
- Simultaneous 3-channel pressure monitoring

Special features

- Pressure ranges from 0 ... 25 mbar up to 0 ... 2,890 bar (0 ... 0.36 up to 0 ... 42,000 psi)
- Removable/interchangeable sensors
- Accuracy down to 0.008 % of IS (IntelliScale)
- External pressure ranges from 0.36 to 6,000 psi
- Precision 0.004 % FS

Description

Application
The model CPG2500 precision pressure indicator is used in calibration laboratories and manufacturing facilities as a source for precise pressure measurement. It is used to verify the accuracy of field pressure indicators/transmitters or as a laboratory standard and wherever there is a need for a high level of pressure accuracy in manufacturing, testing and calibration of pressure instruments or gauges.

Functionality
The CPG2500 can be configured with one, two or three pressure sensors. Two sensors are internal, and the third is external. The pressure sensors are pneumatically isolated so that one channel can be configured with a sensor as high as 690 bar (10,000 psi) and another as low as 25 mbar / 10 inH₂O. An optional barometric reference sensor can be added internally to display barometric pressure or used to emulate gauge or absolute pressure. Pressure ranges for each channel are specified by the customer. Standard and premium sensors are available internally. External sensors are Mensor's CPT6100 or CPT6180 digital pressure sensors.

See sensor chart on page 3 for ranges and uncertainty specification.

Advantages of IntelliScale and removable sensors
With the IntelliScale specification, each sensor is calibrated to give a percent of reading in the upper portion of the range. Three sensors can be configured so that the percent of reading portions of their ranges are contiguous, giving a percent of reading accuracy over a wide range. In addition, each sensor is removable and interchangeable which allows remote recertification and quick sensor range changes while minimising downtime. The CPT6180 or CPT6100 external pressure sensor is also available for remote applications.

In addition, each reference pressure sensor is removable and interchangeable which allows an external recalibration and range changes while minimising downtime. The model CPT6180 or CPT6100 external sensor is also available for remote applications.
Communication
The local user interface is displayed on a 7" colour LC display touchscreen. Navigation within the intuitive menu structure is easily learned. Recognisable touchscreen icons open screens for configuration and calibration.

Communicating to a remote computer is achieved through RS-232, IEEE-488, USB or Ethernet. Communication commands and queries are consistent with previous Mensor digital pressure gauges with added commands for the third channel.

Specifications
Model CPG2500

Standard reference pressure sensor, model CPR2550

<table>
<thead>
<tr>
<th>Pressure range</th>
<th>Accuracy 1) 0.01 % FS 2)</th>
<th>0.01 % IS-50 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge pressure</td>
<td>0 ... 25 mbar to 0 ... 700 bar</td>
<td>0 ... 1 to 0 ... 400 bar</td>
</tr>
<tr>
<td></td>
<td>(0 ... 0.36 to 0 ... 10,000 psi)</td>
<td>(0 ... 14.5 to 0 ... 6,000 psi)</td>
</tr>
<tr>
<td>Bi-directional pressure</td>
<td>-12.5 ... +12.5 mbar to -1 ... 700 bar</td>
<td>-1 ... 10 to -1 ... 400 bar</td>
</tr>
<tr>
<td></td>
<td>(-0.18 ... +0.18 psi to -14.5 ... 10,000 psi)</td>
<td>(-14.5 ... +145 to -14.5 ... 6,000 psi)</td>
</tr>
<tr>
<td>Absolute pressure 4)</td>
<td>0 ... 500 mbar to 0 ... 701 bar abs.</td>
<td>0 ... 1 to 0 ... 401 bar abs.</td>
</tr>
<tr>
<td></td>
<td>(0 ... 7.5 psi to 0 ... 10,016 psi abs.)</td>
<td>(0 ... 14.5 to 0 ... 6,016 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>

Media compatibility

Metals in contact with media: 6000/7000 series aluminium, 316 SS, brass

Non-metals in contact with media: PTFE (Teflon®), urethane, silicone, RTV, silicone grease, PVC, epoxy, Buna N, fluororubber (Viton®)

Sensor

Reading rate: 33 readings/second

Calibration adjustments: Internal zero adder and span multiplier, up to 11-point linearisation for each sensor

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 adjustment every 30 days.

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

3) 0.01 % IS-50 accuracy: Between 0 ... 50 % of the full scale, the accuracy is 0.01 % of half the full scale and between 50 ... 100 % of the full scale, the accuracy is 0.01 % of reading.

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

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) and above 400 bar (6,000 psi) gauge or absolute, and -1 ... 1 bar (-15 ... 14.5 psi) bi-directional. 365 days for the remainder of the specified ranges.

Teflon® is a registered trademark of DuPont Performance Elastomers.

Viton® fluororubber is a registered trademark of DuPont Performance Elastomers.
### Premium reference pressure sensor, model CPR2580

#### Pressure range

<table>
<thead>
<tr>
<th>Accuracy 1)</th>
<th>Pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.008 % IS-33 7)</td>
<td>0 ... 12 to 0 ... 16.5 psig</td>
</tr>
<tr>
<td>0 ... 17.5 to 0 ... 33 psig</td>
<td></td>
</tr>
<tr>
<td>0 ... 80 to 0 ... 110 psig</td>
<td></td>
</tr>
<tr>
<td>0 ... 120 to 0 ... 220 psig</td>
<td></td>
</tr>
</tbody>
</table>

**Gauge pressure**

<table>
<thead>
<tr>
<th>Precision 5)</th>
<th>Calibration interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.004 % FS</td>
<td>365 days</td>
</tr>
</tbody>
</table>

#### Pressure range

<table>
<thead>
<tr>
<th>Accuracy 1)</th>
<th>Pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.008 % IS-33 7)</td>
<td>0 ... 12 to 0 ... 16.5 psia</td>
</tr>
<tr>
<td>0 ... 18.4 to 0 ... 33 psia</td>
<td></td>
</tr>
<tr>
<td>0 ... 36 to 0 ... 50 psia</td>
<td></td>
</tr>
<tr>
<td>0 ... 80 to 0 ... 110 psia</td>
<td></td>
</tr>
<tr>
<td>0 ... 160 to 0 ... 220 psia</td>
<td></td>
</tr>
<tr>
<td>0 ... 240 to 0 ... 500 psia</td>
<td></td>
</tr>
</tbody>
</table>

**Absolute pressure**

<table>
<thead>
<tr>
<th>Precision 5)</th>
<th>Calibration interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.004 % FS</td>
<td>365 days</td>
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</tbody>
</table>

#### Pressure range

<table>
<thead>
<tr>
<th>Accuracy 1)</th>
<th>Pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01 % FS 3)</td>
<td>0 ... 8,000 to 0 ... 11,000 psia</td>
</tr>
</tbody>
</table>

**Absolute pressure**

<table>
<thead>
<tr>
<th>Precision 5)</th>
<th>Calibration interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.004 % FS</td>
<td>365 days</td>
</tr>
</tbody>
</table>

#### Media compatibility

- **Metals in contact with media**: 6000/7000 series aluminium, 316 SS, brass, Inconel
- **Non-metals in contact with media**: PTFE (Teflon®, urethane, silicone, RTV, silicone grease, PVC, epoxy, Buna N, fluoroelastomers (Viton®)

#### Sensor

<table>
<thead>
<tr>
<th>Reading rate</th>
<th>Calibration adjustments</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 readings/second</td>
<td>Internal zero adder and span multiplier, up to 11-point linearisation for each sensor</td>
</tr>
</tbody>
</table>

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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 adjustment every 30 days.

3) 0.01 % IS-50 accuracy: Between 0 ... 50 % of the full scale, the accuracy is 0.01 % of half the full scale and between 50 ... 100 % of the full scale, the accuracy is 0.01 % of reading.

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

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

7) 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.

8) 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.

Teflon® is a registered trademark of DuPont Performance Elastomers.
Viton® fluoroelastomer is a registered trademark of DuPont Performance Elastomers.
**Base Instrument**

**Instrument**

| Instrument version | Standard: desktop case  
| Option: - 19” rack mounting with side panels incl. rack-mounting kit for single instrument mount  
| - 19” rack mounting with side panels incl. rack-mounting kit for dual instrument mount |

| Dimensions | see technical drawings |

| Weight | 5.7 kg (12.5 lbs.) with all internal options |

| Warm-up time | approx. 15 minutes |

**Display**

| Screen | 7" colour LC display |
| Resolution | 4 ... 7 digits depending on range and units |
| Data entry | Touchscreen keypad |

| Measurement units | psi, psf, osi, atm, inH₂O (4 °C), inH₂O (20 °C), inH₂O (60 °F), mbar, bar, Dy/cm², pascal, hPa, kPa, MPa, inHg (0 °C), inHg (60 °F), mTorr, Torr, mmHg (0 °C), cmHg (0 °C), mHg (0 °C), mmH₂O (4 °C), cmH₂O (4 °C), mH₂O (4 °C), mmH₂O (20 °C), cmH₂O (20 °C), mH₂O (20 °C), mSW, ftH₂O (4 °C), ftH₂O (20 °C), ftH₂O (60 °F), inSW, ftSW, tsi, tsf, g/cm², kg/cm², kg/m², % of range, + 2 user-defined units (multiplier from psi, bar or pascal) |

| Rate units | /sec., /min., /hr., /3-hr |

| Languages | English, German, Spanish, French, Italian, Portuguese, Polish, Russian, Chinese, Japanese, Korean |

| Measurement filters | Off, Low, Normal (default), High |

**Connections**

| Number of integrateable sensors (selectable) | Standard: 1 reference pressure sensor  
| Option: 2nd reference pressure sensor, external pressure sensor and barometric reference |

| Pressure connections | up to 400 bar (6,000 psi): 7/16-20 F SAE/MS. 1/8” FNPT, adapter fittings selectable above 400 bar (6,000 psi): Autoclave F250C/HIF HF4 |

| Pressure adapters | Standard: without  
| Option: 6 mm Swagelok® tube fitting, 1/4” Swagelok® tube fitting, 1/8 NPT female fittings or 1/8 BSP female fittings |

| Overpressure limits | 110 % FS typical, optional external relief valves are available |

**Voltage supply**

| Power supply unit | AC 100 ... 120 V or AC 200 ... 240 V, 50 ... 60 Hz, 24 A max. |

| Power supply output | DC 12 V, 1.67 A (includes 4 region-specific plugs adapters) |

**Permissible ambient conditions**

| Storage temperature | 0 ... 70 °C (32 ... 158 °F) |

| Humidity | 0 ... 95 % r. h. (non-condensing) |

| Operating temperature | 15 ... 40 °C (59 ... 104 °F) |

**Communication**

| Interface | IEEE 488, RS-232, USB and Ethernet |

| Command sets | Mensor, WIKA SCPI |
### Approvals

<table>
<thead>
<tr>
<th>Logo</th>
<th>Description</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EU declaration of conformity</td>
<td>European Union</td>
</tr>
</tbody>
</table>
|      | ■ EMC directive 9)  
     |     | EN 61326 emission (group 1, class A) and immunity (industrial application)  
     |     | ■ Low voltage directive  
     |     | ■ RoHS directive     | European Union |
| EAC  | EAC         | Eurasian Economic Community |
|      | ■ EMC directive  
     |     | ■ Low voltage directive  
     |     | ■ Pressure equipment directive | Eurasian Economic Community |
|      | GOST        | Russia                   |
|      | KaznMetr    | Kazakhstan                |
|      | MTSCHS      | Kazakhstan                |
|      | BelGIM      | Belarus                   |
|      | UkrSEPRO    | Ukraine                   |
|      | Uzstandard  | Uzbekistan                |

9) **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.

### Certificates

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Description</th>
</tr>
</thead>
</table>
| Calibration 16)              | Standard: A2LA calibration certificate (standard on factory)  
     | Option: DKD/DAkkS calibration certificate                                |
| Recommended recalibration interval | 1 year (dependent on conditions of use)                                  |

10) Calibration in a horizontal position.

Approvals and certificates, see website
Dimensions in mm (in)

Desktop case

Front view

Side view (left)

19” rack mounting, front view

Single instrument

Dual instrument
Electrical and pressure connections - rear view

1. Connection for optional barometric reference
2. Measure port channel A (7/16-20 UNF)
3. Measure port channel B (7/16-20 UNF)
4. Power supply
5. USB interface (host) for service
6. Ethernet port
7. USB interface (instrument) for remote communication
8. RS-232 interface
9. IEEE-488 interface
10. External sensor connection

Communication panel
Reference pressure sensors versatility

One or two pressure sensors can be chosen (see specifications). In addition, a remotely measuring precision pressure sensor with a measuring range of ≤ 401 bar (≤ 6,015 psi) can be chosen from the “standard range” section. Remote pressure sensors are Mensor CPT6100 or CPT6180 models set to communicate via RS-232 with a baud rate that can be chosen from four selectable baud rates.

All internal pressure sensors are removable and interchangeable. Simply remove the four slotted screws on the rear panel, slide the reference pressure sensor out and remove the interface cable.

An optional removable internal barometric reference can also be ordered.

All CPG2500 reference pressure sensors can be calibrated while in the instrument using the instrument firmware. They can also be calibrated externally with an optional interface cable, power cord, calibration sled (needed for barometer only) and remote calibration software.

Application

There are a variety of applications for the CPG2500:
- Transfer standard to verify the accuracy of field or factory pressure sensors, digital or dial pressure gauges
- Laboratory pressure standard
- High-accuracy pressure indicator
- Differential pressure indication, for verification or calibration
- Precision barometer
- Component in an OEM application that requires pressure indication and precision pressure output
- Precision flow meter pressure monitoring
- Leak testing
- Remote indication of pressure in manufacturing processes

Communication via RS-232, IEEE-488, USB or Ethernet
Remote communication to PC or laptop
External reference pressure sensor model CPT6100 or CPT6180
Operator interface

Single-frame channel “A”

With auxiliary display of alternate units, peak and rate.

Example: Barometer units set to psi.

Dual-frame channel “A” and “B”

Without auxiliary display of alternate units, peak and rate.

Example: Barometer units set to psi.

Triple-frame channel “A”, “B” and “Remote”

With auxiliary display of alternate units, peak and rate, plus zero button displayed.

Example: Barometer units set to psi.

Local operation:
The intuitive operator interface of the CPG2500 provides visibility of one, two or three channels, each with or without the auxiliary display of "Alternate units", "Peak" and/or "Rate". Readings from the optional barometer can also be displayed in the lower right hand corner. Pressure units for each channel and the barometer can be selected from a list of 38 metric and imperial units. The setup “apps” are continuously visible for fast configuration for various applications.

Remote operation:
Remote control of the CPG2500 is achieved through the use of the IEEE-488, RS-232, Ethernet or USB interface.
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 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 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

- Precision pressure indicator model CPG2500
- Switching power supply with 1.5 m (5 ft) power cord
- Operating instructions
- A2LA accredited calibration certificate

Options

- DKD/DAkkS calibration certificate
- 19" rack-mounting kit
- Second internal sensor
- External pressure sensor (CPT6100 or CPT6180)
- Barometric reference
- Analogue output
- Single range barometer
- Pressure relief valve kit (to 400 bar (6,000 psi))

Accessories

- Robust transport case
- Pressure adapters
- Interface cable
- WIKA-Cal calibration software
- Barometer calibration sled

Ordering information

Model / Case type / Reference pressure sensor channel A / Reference pressure sensor channel B / External pressure sensor connection cable / Barometric reference / Type of certificate for barometric reference / Additional approvals / Additional ordering information