Datasheet P-502C
Digital Pressure Meter

> Technical specifications

**Measurement / Control system**
- **Accuracy**: ± 0.5% of full scale (FS)
- **Pressure rangeability**: 1:50 for pressure meter; 1:20 for P2-control; 1:5 for P1-control
- **Repeatability**: ≤ 0.1% RD
- **Response time sensor**: 2 msec
- **Operating temperature**: -10...+70°C
- **Temperature sensitivity**: 0.1% FS/°C
- **Leak integrity**: tested < 2 x 10⁻⁹ mbar l/s He
- **Attitude sensitivity**: < 0.3 mbar (at 90° change)
- **Warm-up time**: negligible

**Mechanical parts**
- **Material (wetted parts)**: stainless steel 316L or comparable
- **Process connections**: compression type or face seal couplings
- **Seals**: standard: Viton; options: EPDM, FFKM (Kalrez®)
- **Ingress protection (housing)**: IP40

**Calibration**
References verified by an ISO 17025 calibration laboratory, directly traceable to Dutch and international standards.

Although all specifications in this datasheet are believed to be accurate, the right is reserved to make changes without notice or obligation.

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**Electrical properties**
- **Power supply**: +15...24 Vdc
- **Power consumption**: Supply at voltage I/O at current I/O
  - (based on N/C valve)
  - 15 V: 67 mA; 24 V: 49 mA
  - Extra for fieldbus:
    - PROFIBUS DP: add 53 mA (15 V supply) or 30 mA (24 V supply)
    - PROFINET: add 77 mA (15 V supply) or 48 mA (24 V supply)
    - EtherCAT®: add 66 mA (15 V supply) or 41 mA (24 V supply)
- **Analog output**: 0...5 (10) Vdc, min. load impedance > 2 kΩ;
  - 0 (4)...20 mA (sourcing), max. load impedance < 375 Ω
- **Analog setpoint**: 0...5 (10) Vdc, min. load impedance > 100 kΩ;
  - 0 (4)...20 mA, load impedance > 250 Ω
- **Digital communication**
  - Standard (9-pin D-conn. male): RS232
  - By optional interface board: PROFIBUS DP, DeviceNet™, Modbus RTU/ASCII, FLOW-BUS, EtherCAT, PROFINET

**Electrical connection**
- Analog/RS232: 9-pin D-connector (male);
- PROFIBUS DP: bus: 9-pin D connector (female);
- power: 9-pin D-connector (male);
- DeviceNet™: 5-pin M12-connector (male);
- Modbus/FLOW-BUS: RJ45 modular jack
- EtherCAT®/PROFINET: 2 x RJ45 modular jack (in/out)

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**Sensor codes, ranges and burst pressure**

<table>
<thead>
<tr>
<th>Sensor code</th>
<th>Pressure ranges (min/max)</th>
<th>Burst pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>35⁰A (Absolute pressure)</td>
<td>2...100 / 7...350 mbar</td>
<td>1.4 bara</td>
</tr>
<tr>
<td>1K1A</td>
<td>.. ..</td>
<td>0.007..0.35 / 0.022...1.1 bara</td>
</tr>
<tr>
<td>6K0A</td>
<td>.. ..</td>
<td>0.022...1.1 / 0.12...6 bara</td>
</tr>
<tr>
<td>21K</td>
<td>.. ..</td>
<td>0.12...6 / 0.4...20 bara</td>
</tr>
<tr>
<td>M10A</td>
<td>.. ..</td>
<td>0.4...20 / 0.128...64 bara</td>
</tr>
<tr>
<td>35R (Relative pressure)</td>
<td>2...100 / 7...350 mbarg</td>
<td>1.4 barg</td>
</tr>
<tr>
<td>1KR</td>
<td>.. ..</td>
<td>0.007..0.35 / 0.022...1.1 barg</td>
</tr>
<tr>
<td>6KR</td>
<td>.. ..</td>
<td>0.022...1.1 / 0.12...6 barg</td>
</tr>
<tr>
<td>21KR</td>
<td>.. ..</td>
<td>0.12...6 / 0.4...20 barg</td>
</tr>
</tbody>
</table>

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Introduction
Bronkhorst High-Tech model P-502C digital electronic pressure meters have a well-proven compact thru-flow design. The instruments include a diaphragm type piezo-resistive pressure sensor for pressure measurement. The pressure meter performs with high accuracy and repeatability. EL-PRESS model P-502C can optionally be combined with a close-coupled control valve to act as a “back pressure controller” for upstream (P1) pressure control or a “forward pressure controller” for downstream (P2) pressure control.
Model number identification

- P - N N 2C - NNNA - A A A - NN - A

<table>
<thead>
<tr>
<th>Base</th>
<th>Sensor code</th>
<th>Analog output</th>
<th>Communication (I/O)</th>
<th>Seals</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pressure meter</td>
<td>Factory selected</td>
<td>A 0...5 Vdc</td>
<td>A RS232 + analog (nic control)</td>
<td>V  Viton (factory standard)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 0...10 Vdc</td>
<td>B RS232 + analog (n/o control)</td>
<td>E  EPDM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F 0...20 mA sourcing</td>
<td>D RS232 + DeviceNet (nic)</td>
<td>K  Kalrez® (FFKM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G 4...20 mA sourcing</td>
<td>E RS232 + DeviceNet (n/o)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>M RS232 + Modbus (nic)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N RS232 + Modbus (n/o)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>P RS232 + PROFIBUS DP (nic)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Q RS232 + PROFIBUS DP (n/o)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>R RS232 + FLOW-BUS (nic)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>S RS232 + FLOW-BUS (n/o)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>T RS232 + EtherCAT (nic)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>U RS232 + EtherCAT (n/o)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>V RS232 + PROFINET (nic)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>W RS232 + PROFINET (n/o)</td>
<td></td>
</tr>
</tbody>
</table>

Pressure rating
0  64 bar

Supply voltage
D  +15...24 Vdc

Funct

ional scheme of the pressure sensor

Model number identification

Measuring principle
The Bronkhorst High-Tech EL-PRESS pressure sensor is a piezo-
resistive bridge on the surface of a silicon chip, with a pressure
diaphragm, whose thickness determines the pressure range. When a
pressure acts on this chip, the diaphragm flexes, and the resistor
values of the bridge alter in proportion to the pressure. The measuring

cell is separated from the external pressure by a thin, sensitive
stainless steel diaphragm, and the sealed off cavity between
diaphragm and cell is filled with oil. Since the standard oil filling is
flammable, Bronkhorst advises to take precautions when oxygen or
any other explosive fluid is used.

State of the art digital design
Today's EL-PRESS series are equipped with a diaphragm type
piezoresistive pressure sensor and a digital pc-board, offering high
accuracy, excellent temperature stability and fast response. The
basic digital pc-board contains all of the general functions needed
for measurement and control. In addition to the standard RS232 and
RS485 output, the instruments also offer analog I/O. Furthermore, an
optionally integrated interface board provides DeviceNet™, PROFIBUS DP, Modbus RTU/ASCII, EtherCAT, PROFINET or
FLOW-BUS protocols via a separate connector.

Functional scheme of the digital PC-board

Functional scheme of the pressure sensor
Hook-up diagram for analog or RS232 communication

For the available fieldbus options we refer to the various hook-up diagrams as indicated below. If you are viewing this datasheet in digital format, you may use the hyperlink to each of the drawings. Otherwise please visit the download section on www.bronkhorst.com or contact our local representatives.
> Dimensions (mm) and weight (kg)

<table>
<thead>
<tr>
<th>Compression type</th>
<th>OD</th>
<th>Size A</th>
</tr>
</thead>
<tbody>
<tr>
<td>adapter 3 mm</td>
<td>26.1</td>
<td></td>
</tr>
<tr>
<td>adapter 6 mm</td>
<td>28.4</td>
<td></td>
</tr>
<tr>
<td>adapter 8 mm</td>
<td>29.4</td>
<td></td>
</tr>
<tr>
<td>adapter 10 mm</td>
<td>30.2</td>
<td></td>
</tr>
<tr>
<td>adapter 12 mm</td>
<td>32.5</td>
<td></td>
</tr>
<tr>
<td>adapter 1/8”</td>
<td>26.1</td>
<td></td>
</tr>
<tr>
<td>adapter 1/4”</td>
<td>28.4</td>
<td></td>
</tr>
<tr>
<td>adapter 3/8”</td>
<td>29.9</td>
<td></td>
</tr>
<tr>
<td>adapter 1/2”</td>
<td>32.7</td>
<td></td>
</tr>
</tbody>
</table>

Face-seal male:
- Size A
- 1/4” internal: 23.2

*) Dimension A is typical finger-tight.

> Options and accessories

- Free software support for operation, monitoring, optimizing or to interface between digital instruments and windows software.
- BRIGHT compact local Readout/Control modules
- E-8000 Power Supply/Readout Systems
- Interconnecting cables for power and analog/digital communication

> Alternatives

- IQ’FLOW, ultra-compact Pressure Meter / Controller
- IN-PRESS Pressure Meter with ‘industrial style’ (IP65) housing
- EL-PRESS Metal Sealed Pressure Meter / Controller