**ACCURACY - PRESSURE MEASUREMENT**

### MPa (Gauge Pressure)

- **18 to 28°C**
  - 0 to 30% of Range: ±(0.01% of Full Scale)
  - 30 to 110% of Range: ±(0.035% of Reading)
  - Vacuum*: ±(0.05% of Full Scale**)

- **-20 to 50°C**
  - 0 to 30% of Range: ±(0.015% of Full Scale)
  - 30 to 110% of Range: ±(0.050% of Reading)
  - Vacuum*: ±(0.05% of Full Scale**)

* Applies to 3 MPa and lower ranges only.
** Full Scale is the numerical value of the positive pressure range.

### MPa (Absolute Pressure with BARO Option)

- All absolute accuracies are equivalent to the gauge pressure accuracies, except as noted below.
  - 300 kPa Range: Gauge Accuracy + 0.03 kPaA
  - 1 MPa Range: Gauge Accuracy + 0.00001 MPaA

Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.

All models indicate vacuum, but vacuum specification applies to 300 kPa, 1 MPa, and 3 MPa models only.

Not recommended for continuous use at high vacuum. Refer to XP2i-DP data sheet for gauges that are intended for continuous high vacuum use.

The BARO option allows you to toggle between gauge and absolute pressure.
# Differential Pressure

The Tare function can improve differential pressure measurement uncertainties. Requires the use of an equalizing valve.

<table>
<thead>
<tr>
<th>Full Scale Range of Both Sensors</th>
<th>The Greater of (+/-)</th>
<th>Unit is enabled in CrystalControl</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPa</td>
<td>psi</td>
<td>mbar</td>
</tr>
<tr>
<td>300 (kPa)</td>
<td>0.0005</td>
<td>0.04</td>
</tr>
<tr>
<td>1</td>
<td>0.0015</td>
<td>0.10</td>
</tr>
<tr>
<td>3</td>
<td>0.005</td>
<td>0.4</td>
</tr>
<tr>
<td>10</td>
<td>0.02</td>
<td>1.0</td>
</tr>
<tr>
<td>30</td>
<td>0.05</td>
<td>4.0</td>
</tr>
<tr>
<td>70</td>
<td>0.2</td>
<td>10.0</td>
</tr>
<tr>
<td>100</td>
<td>0.3</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Without tare function:

±(0.05% of static line pressure reading)

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# Pressure Sensor

- **Wetted Materials:**
  - (Wrench tight) 316 stainless steel
  - (Finger tight) 316 stainless steel and Viton® (internal o-ring)

- **Diaphragm Seal Fluid:** Silicone Oil

- **Connection:** Crystal CPF Female

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# Barometric Reference (BARO)

- **Accuracy:** ±0.5 mbar, ±0.00725 psi
- **Range:** 700.0 to 1100.0 mbar, 10.153 to 15.954 psi
- **Units and Resolution:**
  - mbar: 0.1
  - psi: 0.001
  - inHg: 0.001
  - mmHg: 0.01
- **Pressure Connection:** Cylindrical sensor fitting of 5.8mm OD. A flexible 4.8 mm [3/16"] ID tube is recommended to connect for calibration.

Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.

Exposure to environmental extremes of temperature, shock, and/or vibration may warrant a more frequent recertification period.

Other units available depending on the installed modules.
## CURRENT & VOLTAGE MEASUREMENT

### Connection:
- 4 mm jacks
- Maximum Voltage: 45 VDC

### Current (mA) Input
- Accuracy: ±(0.015% of rdg + 0.002 mA)
- mA Range: 0 to 55 mA
- Percent Range: 0-20, 4-20, 10-50
- Max Allowable Current: 60 mA
- Resolution: 0.001 mA or 0.01%
- Units: mA and %
- Input Resistance: < 17.2 Ω
- Voltage Burden @ 20mA: < 0.35 V
- Voltage Burden @ 50mA: < 0.86 V
- HART Resistor: 250 Ω

Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.

Inputs protected by a resettable fuse.

mA can be displayed as a percentage, where 0 to 100% corresponds to either 0 to 20, 4 to 20, or 10 to 50 mA.

Jacks are compatible with safety sheathed banana plugs.

### Current (mA) Output
- Accuracy: ±(0.015 of rdg + 0.002 mA)
- Range: 0 to 25 mA
- Step Time: 1 to 999 seconds
- Ramp Time: 5 to 999 seconds

With internal or external loop supply.

### Voltage (VDC) Input
- Accuracy: ±(0.015 % of rdg + 2 mV)
- Range: 0 to 30 VDC
- Resolution: 0.001 VDC
- Input Impedance: > 1 MOhm

Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.

### Loop Power
- Fixed Output: 24 VDC
- Voltage Output Accuracy: ± 10%
- Maximum Output Current: 25 mA

### Switch Test
- Switch Type: Dry Contact
- Closed State Resistance: < 1K Ω
- Open State Resistance: > 100K Ω
- Sample Rate: 10 Hz

Switch test screen reports switch open, close, and deadband values.
TEMPERATURE MEASUREMENT

Accuracy: ±(0.015% of rdg) + 0.02 Ohm
Range: 0 – 400 Ohms
Resolution: 0.01 on all scales
Units: °C, K, °F, R, Ω
TCR: 0.003850 Ω/Ω/°C (IEC 60751)
Wiring: 2-, 3-, and 4-wire support
Connection: Lemo Plug, 1S Series, 304 insert configuration

The proper selection of the RTD sensing element is very important as the error associated with this device is the majority of the overall system measurement uncertainty. IEC 751 is the standard that defines the temperature versus resistance for 100Ω, 0.00385 Ω/Ω/°C platinum RTDs. IEC 751 defines two classes of RTDs: Class A and B. Class A RTDs operate over the -200 to 630°C range versus -200 to 800°C for the Class B elements. For example, the Class A uncertainty is about half that of the Class B elements as illustrated in the following table.

<table>
<thead>
<tr>
<th>Temperature °C</th>
<th>HPC40 Series Uncertainty</th>
<th>Class A Uncertainty</th>
<th>HPC40 + Class A Uncertainty</th>
<th>Class B Uncertainty</th>
<th>HPC40 + Class B Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>-200</td>
<td>±0.02 ±0.05</td>
<td>±0.24 ±0.55</td>
<td>±0.24 ±0.55</td>
<td>±0.56 ±1.30</td>
<td>±0.56 ±1.30</td>
</tr>
<tr>
<td>0</td>
<td>±0.04 ±0.09</td>
<td>±0.06 ±0.15</td>
<td>±0.07 ±0.17</td>
<td>±0.12 ±0.30</td>
<td>±0.12 ±0.31</td>
</tr>
<tr>
<td>200</td>
<td>±0.05 ±0.13</td>
<td>±0.2 ±0.55</td>
<td>±0.21 ±0.56</td>
<td>±0.48 ±1.30</td>
<td>±0.48 ±1.31</td>
</tr>
<tr>
<td>400</td>
<td>±0.06 ±0.17</td>
<td>±0.33 ±0.95</td>
<td>±0.33 ±0.96</td>
<td>±0.79 ±2.30</td>
<td>±0.79 ±2.31</td>
</tr>
<tr>
<td>600</td>
<td>±0.07 ±0.21</td>
<td>±0.43 ±1.35</td>
<td>±0.44 ±1.37</td>
<td>±1.06 ±3.30</td>
<td>±1.06 ±3.31</td>
</tr>
<tr>
<td>800</td>
<td>±0.08 ±0.25</td>
<td>±0.52 ±1.75</td>
<td>±0.53 ±1.77</td>
<td>±1.28 ±4.30</td>
<td>±1.28 ±4.31</td>
</tr>
</tbody>
</table>

OPERATING TEMPERATURE

Temperature Range: -20 to 50°C (-4 to 122°F)
< 95% RH, non-condensing. No change in pressure, electrical, or temperature accuracy over operating temperature range. Gauge must be zeroed to achieve rated specification.

DISPLAY

Screen: 320 x 240 pixel graphical display
Display Rate: 3 readings/second (standard)
10 readings/second (switch test and peak hi/lo modes)
LCD readable in sunlight.
POWER

<table>
<thead>
<tr>
<th>Type</th>
<th>Cell Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaline</td>
<td>1.5 V</td>
</tr>
<tr>
<td>NiMH</td>
<td>1.2 V</td>
</tr>
<tr>
<td>Lithium</td>
<td>1.5 V</td>
</tr>
</tbody>
</table>

Battery Life:  
- >12 hours non-sourcing
- >8 hours when sourcing 12 mA

Recharge Time: 16 hours* (Using Eneloop 2100 mA hr)

* Charging is done through USB.

DATA/COMMUNICATION

- Digital Interface: mini-USB
- The mini USB will power the HPC40 Series with or without the batteries installed.

ENCLOSURE

- Weight: 689 g (24.3 oz)
- Rating: IP65
- Housing: Machined Aluminum
- Keypad and Labels: UV Resistant Silicone

STORAGE TEMPERATURE

- Temperature Range: -40 to 75°C (-40 to 167°F)
- Batteries should be removed if stored for more than one month.

SPECIAL FEATURES

The following requires the use of our free CrystalControl software

- Remove: Unwanted pressure units.
- Auto Off: Adjust automatic shutoff settings.
- Calibration: Calibrate the modules and enter new Calibrated On and Calibration Due dates.
- User Defined Unit: Define and display any pressure units not included, or to use the gauge to display force, level or other pressure related parameters.

CERTIFICATIONS

- HPC40 Series complies with the Electromagnetic Compatibility and the Pressure Equipment Directives.
- This HPC40 Series complies with the Australian requirements for the C-tick mark. The instrument was tested against AS/NZS 3548, C-tick EMC/EMI requirements.

Additional Notes:

- Uses 4 alkaline AA (LR6) batteries.
- Weight is for dual sensor model with protective boot installed.
- LCD protected from impact damage by 0.5 mm (0.02") thick polycarbonate lens.
- Batteries should be removed if stored for more than one month.
- Uses 4 alkaline AA (LR6) batteries.
- The mini USB will power the HPC40 Series with or without the batteries installed.
## RANGE & RESOLUTION TABLE

<table>
<thead>
<tr>
<th>P/N</th>
<th>Range (MPa)</th>
<th>Over-pressure</th>
<th>Display Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>MPa</td>
</tr>
<tr>
<td>300KPA</td>
<td>300(kPa)</td>
<td>3.0 x</td>
<td>0.01</td>
</tr>
<tr>
<td>1MPA</td>
<td>1</td>
<td>2.0 x</td>
<td>0.00001</td>
</tr>
<tr>
<td>3MPA</td>
<td>3</td>
<td>2.0 x</td>
<td>0.0001</td>
</tr>
<tr>
<td>10MPA</td>
<td>10</td>
<td>2.0 x</td>
<td>0.0001</td>
</tr>
<tr>
<td>30MPA</td>
<td>30</td>
<td>1.5 x</td>
<td>0.001</td>
</tr>
<tr>
<td>70MPA</td>
<td>70</td>
<td>1.5 x</td>
<td>0.001</td>
</tr>
<tr>
<td>100MPA</td>
<td>100</td>
<td>1.3 x</td>
<td>0.001</td>
</tr>
</tbody>
</table>

(Add one digit of resolution for differential mode.)

## ORDERING INFORMATION

### SAMPLE PART NUMBERS
- **HPC41-10MPA** — Single Sensor (10 MPa) HPC40 with a 1/4” NPT pressure fitting.
- **HPC42-30MPA-100MPA-BARO-BSP** — Dual Sensor (30 MPa/100 MPa) HPC40 with the BARO option and a 1/4” BSP pressure fitting.
- **HPC42-10MPA-70MPA-GWX-W** — Dual Sensor (10 MPa/70 MPa) HPC40 with a 1/4” NPT pressure fitting; a System G pump system; and a waterproof carrying case.

### Ordering a Pump System Only
Any pump system, carrying case, and connection fittings for an HPC40 Series calibrator may be ordered separately from the gauge. Enter HPC40-NONE followed by the Pump System part number and the Carrying Case option code.

### SAMPLE PART NUMBERS
- **HPC40-NONE-GWX-W** — System G pump system with a waterproof carrying case.
PUMP SYSTEMS

All pump systems for the HPC40 Series include 1/4 NPT and BSP female fittings and a carrying case with custom insert. Additional fittings and accessories included with individual systems are listed below.

- **Systems A… AX (T-960), AH (T-970)**
  MPH-1 hose, bonded seals, o-ring kit, and teflon tape.

- **Systems B… BX (T-965), BH (T-975-CFP)**
  MPH-1 hose, bonded seals, o-ring kit, and teflon tape.

- **Systems C… CX (T-620), CH (T-620H-CFP)**
  MPH-1 hose, MPF-CAP, MPM-PLUG, bonded seals, and teflon tape.

- **Systems D… DOX and DWX (P-018-CFP)**
  Bonded seals and teflon tape.

- **System E… EO (P014)**
  Bonded seals and teflon tape.

- **Systems F… FO and FW (T-1-CFP)**
  Bonded seals and teflon tape.

- **Systems G… GOX and GWX (GaugeCalHP)**
  Carrying case hold-down straps.

- **System H… HOX (T-975-CFP and T-620H-CFP)**
  MPF-CAP, MPM-PLUG, bonded seals, o-ring kit, and teflon tape.

CPF FITTING KITS

- **NPT Kit… -N (4013)**
  Includes MPF-1/8QTF, MPF-1/4QTF, and MPF-1/2QTF.

- **BSP Kit… -B (4015)**
  Includes MPF-1/8BSPF, MPF-1/4BSPF, MPF-3/8BSPF, and MPF-1/2BSPF.

STANDARD DELIVERY

- HPC41 or HPC42
- Traceable calibration certificate with data at five temperatures
- 4 x AA batteries
- Your choice of adapters (NPT, BSP, and M20)
- Protective Boot
- Test Leads, red and black with clips
- Velcro strap
- User manual
- Mini-USB Cable

COMPLIMENTARY PRODUCTS

Crystal Engineering offers a wide range of products that work with the nVision:

- Fittings that connect without tools, safely and without leaks
- Lightweight, super flexible high pressure hoses
- Fitting kits and adapters
- Pneumatic hand pumps
- Hydraulic hand pumps
- Portable pressure comparators