ACCURACY • PRESSURE MEASUREMENT

bar (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 30 bar and lower ranges only.

** Full Scale is the numerical value of the positive pressure range.

barA (Absolute Pressure with BARO Option)

▶ All absolute accuracies are equivalent to the gauge pressure accuracies, except as noted below.

3 bar Range: **Gauge Accuracy + 0.0003 barA**

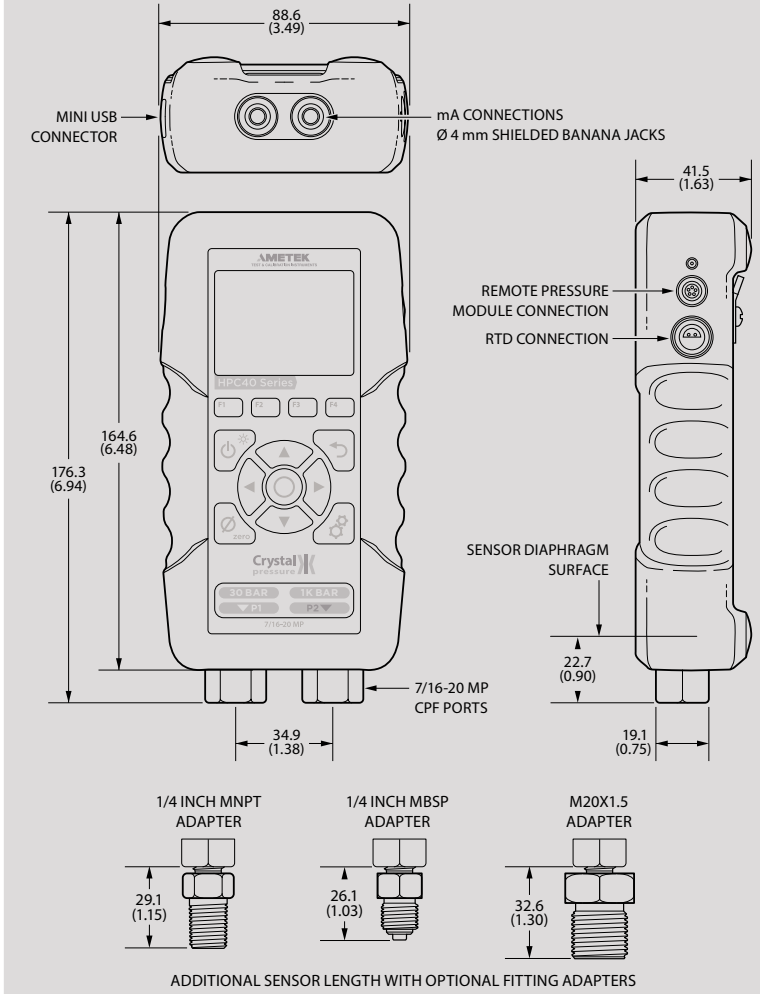
10 bar Range: **Gauge Accuracy +0.0001 barA**

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

All models indicate vacuum, *but vacuum specification applies to 3, 10, and 30 bar 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.

Full Scale Range of Both Sensors	The Greater of (+/–)					
bar	psi	mbar	inH_2O	mmH_2O		% of DP Reading
3	0.0005	0.04	0.014	0.4		
10	0.0015	0.10	0.04	1.0		
30	0.005	0.4	0.14	4.0		
100	0.02	1.0	0.4	10.0	or	0.035%
300	0.05	4.0	1.4	n/a		
700	0.2	10.0	4.0	n/a		
1000	0.3	15.0	6.0	n/a		

Unit is enabled in CrystalControl

▶ **Without tare function:**

±(0.05% of static line pressure reading)

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**

All welded, with a permanently filled diaphragm seal.

Metal to metal cone seal; O-ring can be removed if necessary.

1/4" medium pressure tube system compatible with HIP LM4 and LF4 Series, Autoclave Engr SF250CX Male and Female Series.

Includes your choice of NPT, BSP, or M20 CPF Adapter.

BAROMETRIC REFERENCE (BARO)

Accuracy: **± 0.5 mbar, ± 0.00725 psi**

Range: **700.0 to 1100.0 mbarA, 10.153 to 15.954 psiA**

Units and Resolution:

psi **0.001**
inHg **0.001**
mmHg **0.01**
mbar **0.1**

Pressure Connection: **Cylindrical sensor fitting of 5.8mm OD. A flexible 4.8 mm [3/16"] ID tube is recommended to connect for 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**

* *From 0.001 to 0.05 mA, add 0.02 mA to accuracy.*

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**

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

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**

Combine with part number 127387 for a -45 to 150°C temperature sensor. Contact us to add a calibration certificate.

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.

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

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**

LCD readable in sunlight.

Display Rate: **3 readings/second (standard)**
10 readings/second (switch test and peak hi/lo modes)

POWER

Type	Cell Voltage
Alkaline	1.5 V
NiMH	1.2 V
Lithium	1.5 V

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

Uses 4 alkaline AA (LR6) batteries.

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)**

Weight is for dual sensor model with protective boot installed.

Rating: **IP65**

LCD protected from impact damage by 0.5 mm (0.02") thick polycarbonate lens.

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.

RANGE & RESOLUTION TABLE

P/N	Range (bar)	Over-pressure	Display Resolution bar	mbar	kPa	MPa	psi	in H_2O	in Hg	mm Hg	mm H_2O	kg/cm^2
3BAR	3	3.0 x	0.0001	0.1	0.01		0.001	0.01	0.001	0.01	1	0.0001
10BAR	10	2.0 x	0.0001	0.1	0.01	0.00001	0.001	0.1	0.01	0.1	1	0.0001
30BAR	30	2.0 x	0.001	1	0.1	0.0001	0.01	0.1	0.01	0.1		0.001
100BAR	100	2.0 x	0.001		0.1	0.0001	0.1		0.1			0.001
300BAR	300	1.5 x	0.01		1	0.001	0.1		0.1			0.01
700BAR	700	1.5 x	0.01		1	0.001	1					0.01
1KBAR	1000	1.3 x	0.01		1	0.001	1					0.01

(Add one digit of resolution for differential mode.)

ORDERING INFORMATION

Number of Sensors	1st Pressure Range P/N	2nd Pressure Range P/N	BARO Option	Adapter	CPF* Fitting Kits	Pump System**	Liquid (Systems C-H)	Carrying Case~
HPC41 . . .(Single)			No . . . . (omit)	1/4 NPT . . . . (omit)	No . . . . . (omit)	No Pump. . . . .(omit)		
HPC42 . . . . (Dual)			Yes. . . -**BARO**	G 1/4 B. . . . . -**BSP**	NPT Kit (4013) . . . -**N**	System A (pneumatic) 0 to 2 bar. . . . . -**AXX**	Full . . . . . (omit)	Aluminum . . . (omit)
				M20x1.5 . . . -**M20**	BSP Kit (4015) . . . -**B**	System A (pneumatic) 0 to 40 bar. . . . . -**AHX**	Drained. . . . . -**E**	Waterproof. . . . . -**W**
						System B (pneumatic) -0.91 to 2 bar . . . . . -**BXX**		
						System B (pneumatic) -0.91 to 40 bar . . . . . -**BHX**		
						System C (oil) 0 to 200 bar. . . . . -**CXX**		
						System C (oil) 0 to 350 bar. . . . . -**CHX**		
						System D (oil) 0 to 350 bar. . . . . -**DOX**		
						System D (water) 0 to 350 bar. . . . . -**DWX**		
						System E (oil) 0 to 700 bar. . . . . -**EOX**		
						System F (oil) 0 to 1000 bar. . . . . -**FOV**		
						System F (water) 0 to 1000 bar . . . . . -**FWV**		
						System G (oil) 0 to 1000 bar. . . . . -**GOX**		
						System G (water) 0 to 1000 bar. . . . . -**GWX**		
						System H (oil/pneumatic) -0.91 to 40 bar and 0 to 350 bar . . . . . -**HOX**		

SAMPLE PART NUMBERS

HPC41-100BAR . . . . . Single Sensor (100 bar) HPC40 with a 1/4" NPT pressure fitting.

HPC42-300BAR-1KBAR-BARO-BSP . . . . . Dual Sensor (300 bar/1000 bar) HPC40 with the BARO option and a 1/4" BSP pressure fitting.

HPC42-100BAR-700BAR-GWX-W . . . . . Dual Sensor (100 bar/700 bar) HPC40 with a 1/4" NPT pressure fitting; a System G pump system; and a waterproof carrying case.

* CPF Fitting Kits can ***only*** be ordered as part of a Pump System. All fittings are rated to 700 bar, with the exception of the MPF-1/2QTF rated to 350 bar.

** Refer to the following page for a more detailed description of each Pump System.

~ The Waterproof Case is an ***option*** for Systems A, B, and C only. The Waterproof Case is ***the only option*** for Systems G and H.

▶ 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.

900 Series

600 Series

P-018-CPF

P014

T-1-CPF

GaugeCalHP

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…** AXX (T-960), AHX (T-970)
MPH-1 hose, bonded seals, o-ring kit, and teflon tape.

▶ **Systems B…** BXX (T-965), BHX (T-975-CPF)
MPH-1 hose, bonded seals, o-ring kit, and teflon tape.

▶ **Systems C…** CXX (T-620), CHX (T-620H-CPF)
MPH-1 hose, MPF-CAP, MPM-PLUG, bonded seals, and teflon tape.

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

▶ **System E…** EOX (P014)
Bonded seals and teflon tape.

▶ **Systems F…** FOV and FWV (T-1-CPF)
Bonded seals and teflon tape.

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

▶ **System H…** HOX (T-975-CPF and T-620H-CPF)
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
- Velco strap
- User manual
- Mini-USB Cable

COMPLEMENTARY PRODUCTS

Crystal Engineering offers a wide range of products that work with the HPC40 Series:

- 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

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