

CRYSTAL
engineering corporation



The
XP2i
Pressure
Gauge



It's **not** like **other**
pressure gauges.



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XPD²ⁱ

DIGITAL TEST GAUGE

Transportation Calibration Manufacturing
Land Natural Gas Nuclear Power
 Petrochemical Aerospace Measurement
Manufacturing Laboratory Research

3000 PSI



488834
1/4" NPT



Maritime Production Offshore Platforms Measurement Irrigation Research Environment

The **XP2i** is **not** like other pressure gauges.

The performance, construction, and distinctive design of the XP2i sets it apart from any other pressure gauge you've ever seen.

Lighter and easier to use than a deadweight tester, and more rugged than any mechanical pressure gauge, the XP2i is used every day throughout the world: in workshops, calibration laboratories, and on offshore platforms.

And that's just the beginning!

In the following pages you'll learn why the XP2i is different—and what it can do for you!



Crystal Engineering designed and manufactures the XP2i. Based on silicon sensor technology, the XP2i is the culmination of over 20 years devoted to engineering and manufacturing pressure calibrators, pressure gauges, and pressure measuring equipment for many different applications. Crystal Engineering pioneered uncomplicated *of reading* specifications that eliminate the FINE PRINT that degrade and reduce accuracy when equipment is used in outdoor, real world conditions.

Pressure measuring equipment is the only thing we do, and that's why we say:

Pressure is Our Business



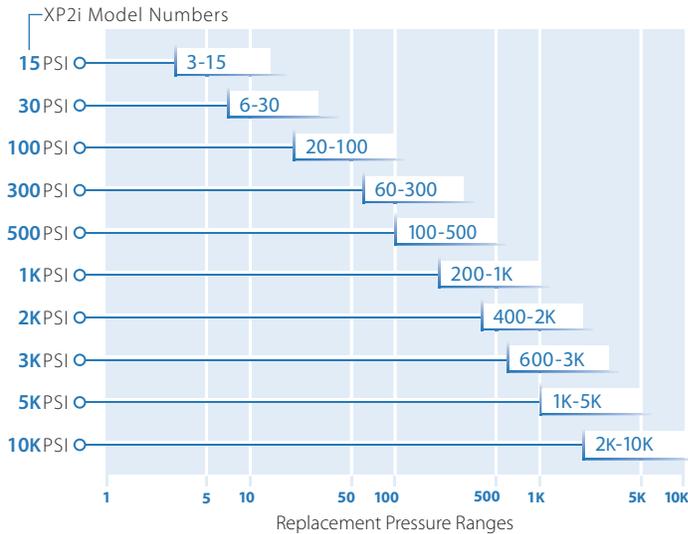
All Welded Stainless Steel Sensor



Unlike many digital pressure gauges, our sensor is all welded stainless steel. It does not use o-rings, thread tape, sealant, or epoxy. As a result the XP2i can be used safely with any liquid or gas compatible with 316 stainless steel; it can also be cleaned for oxygen service. NPT versions feature a built-in filter.

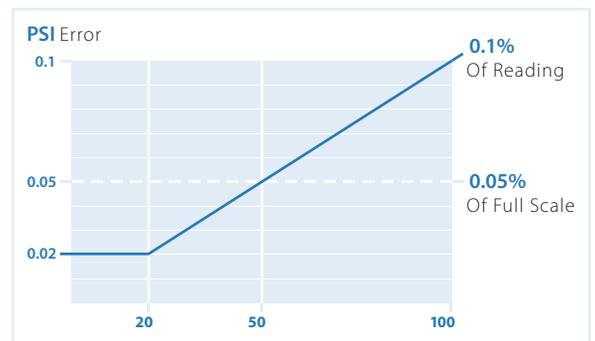
► Of Reading Performance

First and foremost, XP2i gauges are rated in percent of reading, like deadweight testers. Accuracy is 0.1% of reading, down to 20% of the range. One of reading gauge can replace multiple of scale gauges, leaving fewer gauges to maintain and calibrate every year.

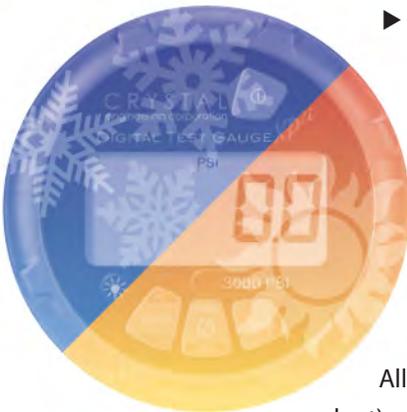


A single XP2i pressure gauge can replace multiple 0.1% of Full Scale gauges. As this chart illustrates, our 15 PSI gauge provides 0.1% accuracy down to 3 PSI, while our 10K gauge is 0.1% accurate over a range of 8000 PSI.

Other gauges are rated in percent of full scale, just like mechanical pressure gauges. (*How often do you use your gauge at precisely the full scale range?*)



A sample comparison of a 100 PSI of reading gauge to a 100 PSI of scale gauge.



► More than just Temperature Compensated

All digital pressure gauges are “temperature compensated”, but study the FINE PRINT and you will find that temperature can still have a *big effect on accuracy*. The XP2i is *fully temperature compensated*, and we prove it with every XP2i.

- **A2LA Accredited Calibration Lab** Every XP2i includes a factory calibration report that proves it meets its specifications at 5 different temperatures, from -10° to 50°C (14° to 122°F). Every XP2i is calibrated in an environmental test chamber using fully automated equipment. ► **Vacuum Operation** All XP2i gauges can be used to indicate vacuum. Gauge ranges up to 20 bar/300 PSI (or equivalent) are certified to have an accuracy of 0.25% of -99.9 kPa or -14.5 PSI on vacuum.



► Reliability through Strength

- **Rugged Housing** A nickel-plated, aluminum alloy case employs a gasket to seal the enclosure against dust and water. Even the RS-232 connector is fully sealed. Circuitry is mounted in shock absorbing elastomer supports. The LCD is protected by a hard polycarbonate lens, reducing the chance of breakage; and all materials are compatible with common industrial fluids, including Skydrol™. ► **Designed to be Dropped** Since the internal circuitry is shock mounted, the gauge can be dropped on to hard surfaces without damage. For extremely rough service, we recommend our optional (Skydrol resistant) boot for even greater shock resistance.



FEATURES & TECHNOLOGY

► No Menus. No Manual? No Problem!

The XP2i is very easy to use and you will never get lost in a multi-level menu system. In fact, you may never need to open the operation manual.



► Features and Capabilities

► **Backlight** The state-of-the-art display is easily viewable under any conditions thanks to the best backlight available for this type of gauge. ► **Display Options** The XP2i can capture maximum or minimum pressure, and can be set to average (dampen) unstable pressure readings. ► **Optional 2-Line Display** Ideal for relief

valve testing and leak rate testing. The top line indicates live pressure, while the second line indicates maximum, minimum, average, or leak rate. ► **Differential Pressure** One 2-line XP2i can also indicate the difference from a second XP2i, to form a wet/wet differential gauge. ► **Make it Simple** Use ConFigXP software to disable any features you don't need, turn on features you want, and even add password protection. See page 7 for more information on ConFigXP. ► **Intrinsically Safe** Every XP2i is Exia intrinsically safe, Class 1, Div 1, Groups A, B, C, and D; and is ATEX, IECEx, and CSA approved.

► Technology

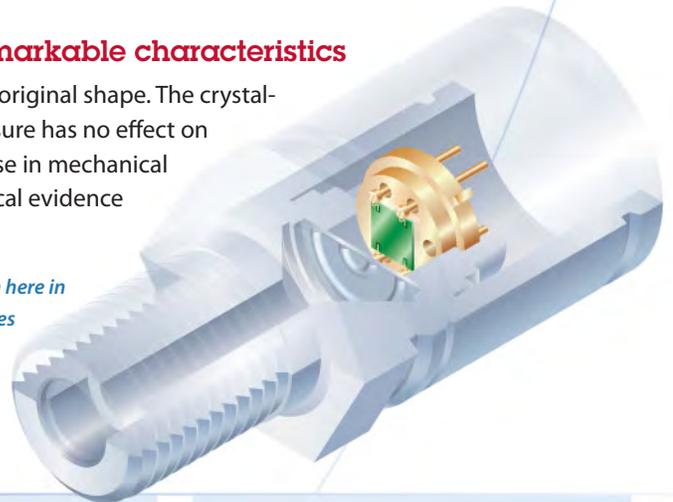
The XP2i uses state-of-the-art silicon pressure sensors. These sensors offer better stability and performance than older designs still in use.

► Silicon sensors have some remarkable characteristics

Silicon has a crystalline structure: when deformed silicon returns perfectly to its original shape. The crystalline structure is why silicon sensors are so highly repeatable, and why over-pressure has no effect on the accuracy of the gauge.* In contrast, metal sensing elements (including those in mechanical pressure gauges) are easily deformed by over-pressure, often without any physical evidence that the accuracy has been affected.

**Under extreme over-pressure conditions it is possible for a sensing element (shown here in green) to break. Our pressure ratings are extremely conservative, so sensor failures are very rare. When it does fail, the failure is instantaneous, like breaking a glass.*

All pressure ranges include a permanently filled 316 stainless steel diaphragm seal to ensure that water vapor or corrosive liquids do not degrade the electrical connections to the silicon chip.



► Key Features

- Easy to read display—day or night
- 5 full digits—great for leak testing
- Available in ranges from 15 PSI to 10000 PSI
- Pressure units are easily accessible
- Capture peak High or Low pressure for relief valve testing

Free Software

Most software for the XP2i is free, including Labview™ drivers, configuration software, and much more.

Download from www.xp2i.com.

Compared to Mechanical Test Gauges:

- Accuracy is not affected by over-pressure, temperature, shock (by being dropped) or rapid increases or decreases of pressure (e.g.: relief valve testing)
- Faster, accurate readings - no parallax errors
- Vibration does not affect the life of the gauge

Compared to Deadweight Testers

- Much lighter – easily portable
- Not affected by local gravity or temperature
- Easier to use – no special training required
- Significantly less expensive to calibrate and certify

Compared to Other Digital Pressure Gauges

- Rugged aluminium alloy case—not plastic!
- Easier to use
- Digital interface included

► Pressure Datalogging Made Easy When You Add DataLoggerXP™ to an XP2i

By upgrading an XP2i with DataLoggerXP firmware, you can record up to 6000 pressure measurements into non-volatile flash memory in the XP2i. The recording interval can be set to a minimum of 1 second to a maximum of 18 hours.

Data can be Recorded in a Number of Ways

- Actual pressure
- Average pressure
- Average, with the maximum and the minimum pressure
- On Demand



When upgraded with DataLoggerXP firmware, an XP2i becomes an intrinsically safe, pressure data-logging device.

You can stop and start the datalogger using the keypad and record multiple data sets, or you can choose to record pressure at the press of a button. All readings have a time-stamp. All readings and events, such as pressing the Zero button or weak battery conditions, are recorded with the time they occurred.

Once measurements have been recorded, connect the XP2i to any computer running the Windows DataLoggerXP application (available for free at: www.XP2i.com). Then download and save the data directly into a Microsoft® Excel spreadsheet (or if you prefer, a comma-separated text file). DataloggerXP can use Excel template files to automatically format your data — an example template file is included.

There is no easier system for accurately recording pressure!

DataloggerXP is Ideal For:

- Pipeline leak testing
- Wellhead monitoring
- Chart recorder verification
- Diagnostics – capture intermittent or transient events*
...and many more

Saves Time Because:

- Easy to use
- Output to spreadsheets
- High resolution saves time in leak testing
- Install on additional computers at no extra cost

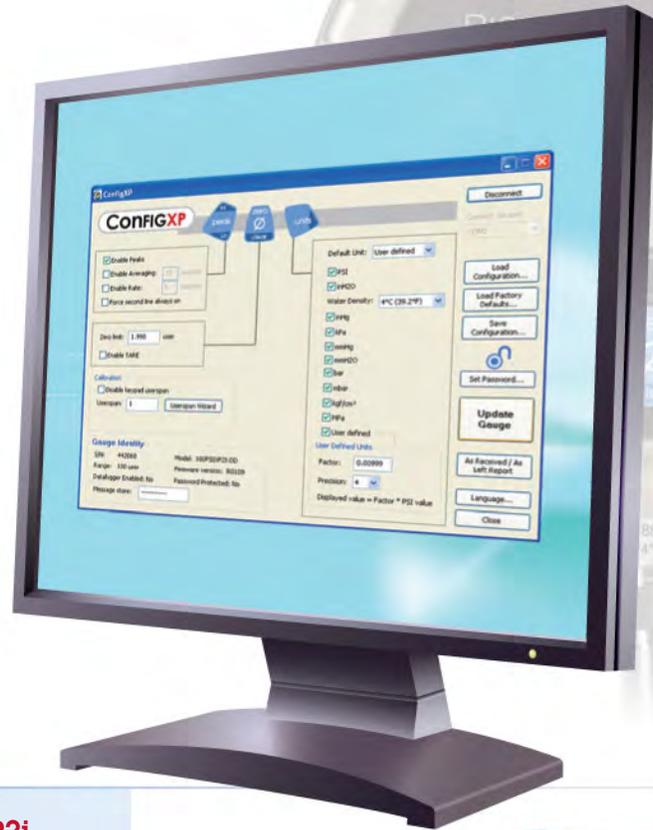
*Since all XP2i models can measure vacuum you can even capture pressure to vacuum transitions.

CUSTOMIZATION

► Customize Your XP2i with ConFigXP™ Software

An XP2i includes more features than you may actually need. ConFigXP provides an easy way to disable features you don't want (or to enable features you do). Using a computer running Windows® and ConFigXP software, and an ordinary serial cable or serial to USB cable, you can easily tailor your XP2i gauge to fit your specific needs. You can:

- Disable pressure units that you never use
- Disable peak high and low indication
- Limit the zero range, or even disable the zero button
- Disable all changes to the gauge with a password
- Save configuration to a file—use the file to quickly copy the configuration to additional gauges
- And much more



What you can do with ConFigXP and an XP2i

- Create special pressure units (e.g., feet of seawater)
- Convert pressure to display torque directly
- Eliminate operator errors by limiting features
- Prevent tampering

ConFIGXP



► ► ► ► ► ► ► ► ► ► ► You can add features to the XP2i gauge to:

- Enable averaging
- Enable Fast Pressure Safety Valve (PSV) test mode
- Enable tare
- Define new pressure units
- Store an identifier in the XP2i memory (Tag ID)
- Expand the zero/tare range

ConFigXP is a free, self-extracting application

- Download from www.XP2i.com

► **Get a Custom XP2i**

The XP2i is available in several panel mounted configurations.

For stationary installations, an XP2i can be ordered with a flange for panel mounting. Several flange diameters are available.

A universal AC power supply is also available and includes a set of plugs permitting use worldwide. In the event of a power failure, an XP2i powered by the AC power supply will automatically switch to its internal batteries.

- ► ► ► ► **Flange adapter kits** allow a panel mounted XP2i to fit into different mounting cutouts.

For portable applications we offer the WT version of the XP2i.

It has been designed to replicate the dimensions and pressure connections of the most common test gauges mounted in portable cases. The serial interface and batteries have been moved to the front of the gauge for easy access.



XP2i WT Key Features

- Drop-in replacement for most commonly used portable test gauges
- Easy access to the serial port and battery cover from the front of the enclosure
- Batteries supply power for 500 hours of continuous operation
- Not rated intrinsically safe

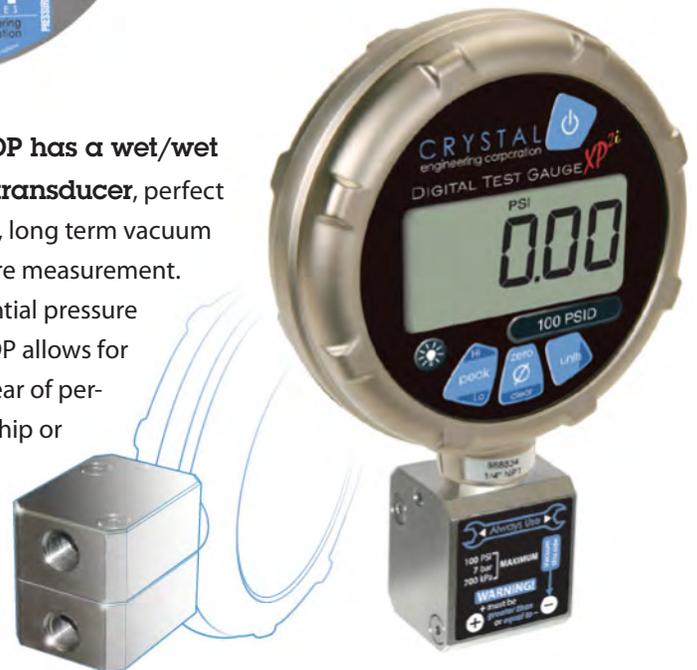
The WT is an excellent replacement for high precision test gauges. The WT is much more rugged and reliable than any mechanical test gauge and it costs *much* less. Most ranges are available for delivery within one week!

The XP2i-DP has a wet/wet differential transducer, perfect

for high accuracy, long term vacuum and differential pressure measurement.

The unique design of the differential pressure sensor integrated into the XP2i-DP allows for long term vacuum use without fear of permanent damage to the sensing chip or sensing package.

- ► ► ► ► **The XP2i** can be cleaned for oxygen service.
(EXCEPT WT AND -DP GAUGES)



CALIBRATION

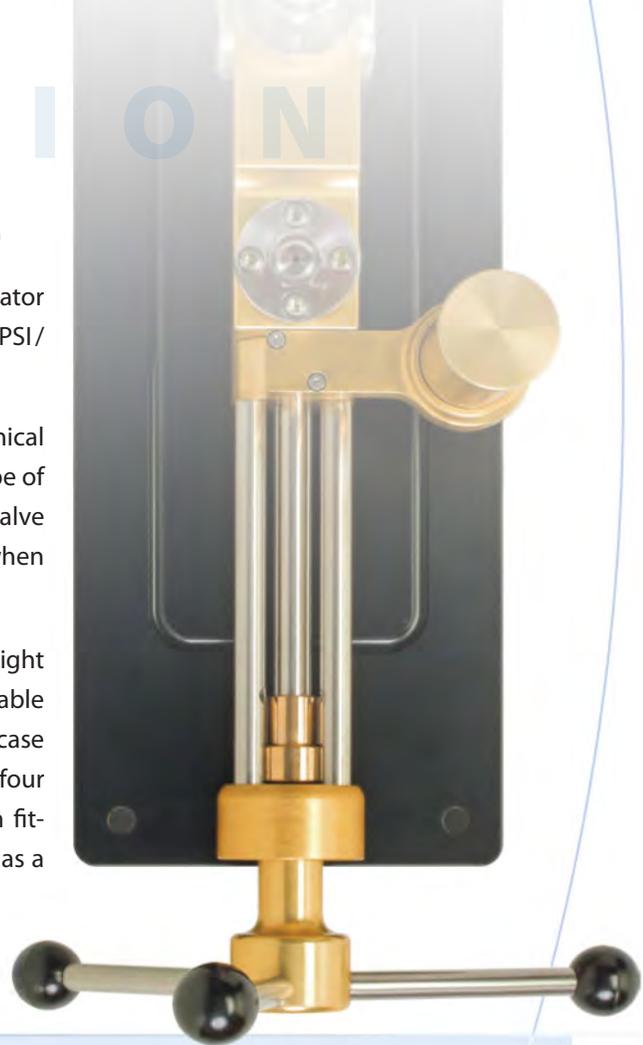
► GaugeCalxp™ Pressure Comparator

GaugeCalxp is a self contained, precision hydraulic pressure generator (pressure comparator). It can quickly and easily produce up to 10000 PSI/ 70 MPa/ 700 bar using water or oil as the hydraulic fluid.

The GaugeCalxp has a unique design that eliminates damage to mechanical pressure gauges—there are no external valves that would allow the type of rapid change in pressure that bends gauge needles. Instead, a hidden valve opens when pressure is reduced to almost zero (when the piston is near the minimum position).

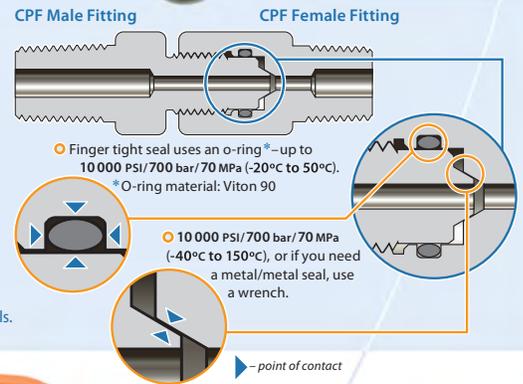


The comparator can be bench mounted, but is light weight and compact enough to use as a portable pressure supply. An ultra-compact rolling carry case is available with room for a comparator, up to four XP2i gauges, a hydraulic fluid bottle, conversion fittings, tools, and more. The case may also be used as a base for the comparator, and straps are included to attach the comparator on top of the case.



CPF Crystal Pressure Fittings™

The new Crystal Pressure Fittings (CPF) system quickly and safely makes leak free connections without the use of tools. ► A wide range of conversion fittings are available that convert CPF to all common thread types. Especially recommended are the NPT adapters that seal without thread tape or wrenches—a tremendous time saver! ► The GaugeCalxp is fitted with two CPF bases and two sets of CPF to female NPT conversion fittings, so it is ready to use with male 1/4NPT gauges. CPF fittings are compatible with fittings from HIP and Autoclave. See the CPF brochure for details.



► Calibration Kits

Calibration kits offer the most convenient and compact solutions available for carrying everything you need for field pressure calibration work.

All calibration kits come with an extremely rugged carry case, manufactured from high grade ABS plastic designed to withstand a drop of up to 2 meters (6 feet). The case is fully sealed and water tight, with a pressure equalization valve to allow easy opening after changes in altitude or temperature. A rigid, die-cut foam insert is custom designed to fit everything you need into the most compact space possible. Your XP2i pressure gauge, pump, fittings, hoses, leads, pipe thread tape, battery, and bottle of hydraulic fluid fit snugly into pre-cut locations. Refer to the [Crystal Handpumps and Accessories brochure](#) for complete descriptions of all of the pumps, fittings, and calibration solutions we offer.



About Resolution

Resolution refers to the smallest change in pressure that can be indicated for a given model and unit of measure. For instance, the smallest change in *pounds per square inch* of pressure that can be indicated on a 15 PSI XP2i is 0.001 PSI, while the smallest change in PSI that can be indicated on a 10 000 PSI XP2i is 1 PSI.

► Ordering Information

PSI ◀ P/N Prefix	bar ◀ P/N Prefix	kPa ◀ P/N Prefix	Over- pressure	Differential Overpressure (+/- ports)	Pressure Units and Resolution ◀								
					PSI	kg/cm ²	inch Hg	inch H ₂ O	mm Hg	mm H ₂ O	kPa	bar	mbar
15PSI	1BAR	100KPA	6.5 x	6.5 x / 6.5 x	0.001	0.0001	0.001	0.01	0.01	1	0.01	0.0001	0.1
30PSI	2BAR	200KPA	3.0 x		0.001	0.0001	0.001	0.01	0.1	1	0.01	0.0001	0.1
100PSI	7BAR	700KPA	2.0 x	2.0 x / 1.1 x	0.01	0.0001	0.01	0.1	0.1	1	0.01	0.0001	0.1
300PSI	20BAR	2KKPA	2.0 x		0.01	0.001	0.01	0.1	1		0.1	0.001	1
500PSI	30BAR	3KKPA	2.0 x		0.01	0.001	0.1	1	1		0.1	0.001	1
1KPSI	70BAR	7KKPA	2.0 x		0.1	0.001	0.1				0.1	0.001	MPa
2KPSI	140BAR	14KKPA	2.0 x		0.1	0.01	0.1				1	0.01	0.001
3KPSI	200BAR	20KKPA	1.5 x		0.1	0.01	0.1				1	0.01	0.001
5KPSI	300BAR	30KKPA	1.5 x		0.1	0.01	1				1	0.01	0.001
10KPSI	700BAR	70KKPA	1.5 x		1	0.01					1	0.01	0.001

Unneeded pressure units may be disabled via the RS-232 connector using ConFigXP software. • kPa models can display pressure in kPa and bar (or mbar) only. PSI and bar models can display all available units. • An XP2i will indicate pressure up to 10% above Range Pressure. Above 110%, the XP2i display will flash, indicating that the applied pressure exceeds the calibrated pressure range. If the calibrated pressure range is exceeded, the pressure displayed may not be accurate. • MPa is available on -DD models only.

► The XP2i part numbering system

XP2i part numbers are based on a simple system of numbers and letters that define every attribute of a specific gauge. Part numbers are located behind the battery cover, under a battery on the back of the gauge.

The part number prefix Every part number includes a part number prefix. The prefix identifies the pressure range and units of the gauge. For example, a **2KPSI** prefix identifies a gauge as a PSI model with a pressure range of 2000 PSI.

The gauge type indicator Crystal offers all of its gauges from 2000 PSI/140 bar and up, in an absolute (barometric) version, indicated by a **B** following the part number prefix. For example, the part number for a 2000 PSI, absolute gauge would be 2KPSI**B**XP2i.

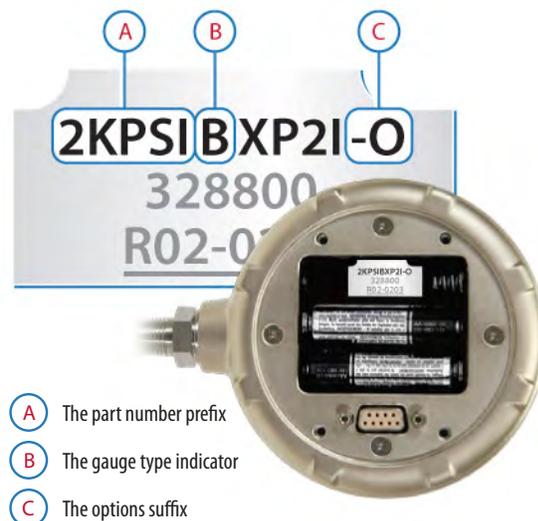
The options suffix Many part numbers include a suffix to identify the special options available on a particular gauge. For example, a **-DD** suffix indicates that a gauge is equipped with a dual line display, a **-DL** suffix indicates that data logging capability has been added to the gauge's firmware, a **-DP** suffix indicates the gauge is equipped with a differential pressure sensor, and an **-O** suffix indicates that a gauge has been cleaned for oxygen service. The dual line display option (**-DD**) may be combined with the rear port (**-RP**) or the 4½" panel mount flange (**-F4**) options. The data logging option (**-DL**) is available on all gauges, except those with the dual line display option (**-DD**). The cleaned for oxygen service option (**-O**) may be combined with all but the differential pressure option (**-DP**).

Pressure fitting options You can order any XP2i with a ¼" NPT (standard) or G ¼ B (BSP) pressure fitting (**-BSP**). The BSP fitting is designed to conform to EN 837-1 and utilizes G ¼ B parallel threads per ISO 228. Refer to the sidebar on the facing page for more information.

Sample part numbers:

- 300PSIXP2i 300 PSI standard gauge.
- 10KPSIBXP2i-F4 10 000 PSI absolute gauge with the 4½" panel mount flange option.
- 1BARXP2i-DP-RP 1 bar gauge with differential pressure sensor and rear port fitting option.
- 500PSIXP2i-BSP 500 PSI gauge, with a ¼" BSP pressure fitting (G1/4B).

Anatomy of a part number



- A The part number prefix
- B The gauge type indicator
- C The options suffix

To order a WT XP2i

WT part numbers are based on a system of numbers and letters similar to those used to order a standard XP2i, but with a just couple of differences: the part number prefix is preceded by the **WT** designation, and the gauge type is followed immediately by the option suffix—on a WT, this suffix is a code for a panel mount flange for either a 6" panel mount flange (**-1000**) or 8.5" panel mount flange (**-1500**).

For example, the part number for a 2000 PSI, absolute WT gauge with 8.5" panel mount flange would be:

WT2KPSIB-1500

SPECIFICATIONS

► Specifications and Options

► Accuracy

20% to 100% of Full Scale:
±(0.1% of Reading).

0 to 20% of Full Scale:
±(0.02% of Full Scale).

- **Differential Pressure:** Static line pressure effect is 0.0003 PSI per lowest applied test pressure.

Vacuum, for 300 PSI, 20 bar, 2000kPa and lower pressure gauges:
±(0.25% of Full Scale),

where F.S. = -14.5 PSIG, -1.0 bar, -99.9 kPa
(Differential Pressure model designed for continuous use at high vacuum. Standard model is not recommended for this application.)

► Pressure Ranges

See Ordering Information on facing page.

Note:

Density of water conversion can be selected via the keypad: 4°C, 60°F or 20°C /68°F.

► Display

Description: 5 Full (seven segment) digits.

Display rate: 3 readings per second.

Numeral Display height: 16.5mm (0.65") single line display • 14 mm (0.55") for main numerals of dual line display.

► Temperature

Operating & Compensated:
-10°C to 50°C (14°F to 122°F).

Storage: -40°C to 75°C (-40°F to 167°F)

► Connections

Pressure Connection:
¼" male NPT or G ¼ B.

- **Differential Pressure**
Pressure Connection: 1/8" Female NPT.

Electrical Connection: DB-9, RS-232 (environmentally sealed).

Warning:
Do not use in hazardous atmosphere.

► Media Compatibility

Liquids and gases compatible with 316 stainless steel.

Available cleaned for oxygen service.

- **Differential Pressure:** Liquids and gases compatible with 300 Series stainless steel and buna-n (o-ring).

► Power

Battery: Three size AA (LR6) batteries.

Battery Life:
1500 hours typical (alkaline battery).

► Enclosure PATENT PENDING

Description: Aluminum alloy, sealed to IP67 ratings. (Excludes the WT Series)

Weight: 555g (19.6 oz.), including batteries.

- **Differential Pressure** Weight: 860g (1.9 lbs), including batteries.

► Sensor

Description: All welded stainless steel, with a permanent fill diaphragm seal (filled with Dow Corning 200).
(Except Differential Pressure model)

- **Differential Pressure** Max Static Line Pressure: 100 PSI.

ATEX/IECEX/CSA Certified

Intrinsically Safe

XP2i pressure gauges are ATEX Certified* and meet all the requirements set forth by the EU (European Union) for equipment that may be operated in potentially explosive environments.



Ex ia Intrinsically Safe, Class I, Division 1
Groups A, B, C & D, Temperature Code T4



Ex ia IIC T4, KEMA 04 ATEX 1053 X
CE 0344 II 1 G



IECEX Scheme Compliant
IECEX CSA 05.0001X

*WT Series gauges are not rated intrinsically safe

► Options

Dual Line Display—Option DD: Adds a second line to the display which can be set to indicate peaks, average, leak rate, or the difference in pressure relative to a second XP2i connected via an ordinary DB-9 null modem cable. (The second XP2i can be any pressure range or model.)

- **Differential Pressure—Option DP:** A wet/wet differential transducer for DP or high accuracy, long term vacuum measurement.

Panel Mounting—Option F4: A panel mount flange allows an XP2i to fit in a 4½" gauge cut-out • An XP2i with the F4 option can also be adapted to fit into 6" or 8½" gauge cut-outs.

Rear Port Fitting—Option RP: The rear port fitting may be ordered separately, but is included automatically with the panel mount flange option (F4).

Data logging capability—Option DL

Absolute Pressure—Option B: Available for gauges rated at 2000 PSI or higher.

Cleaned for Oxygen Service—Option O



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

NPT & BSP pressure fittings



1/4–18 MNPT
NPT threads are tapered, and require thread tape or sealant to form a seal.



Crystal Pressure Fittings™ require no thread tape or sealant to form a seal.



G 1/4 B
Parallel BSP threads require a washer to form a seal.

► Accessories and Software

► Accessories

RS232 Cable for XP2i (6' [2m])
P/N: **2400**

USB to RS232 Adapter
P/N: **3313**

Flange Adapter Kit (6" [152mm])
P/N: **2955**

Flange Adapter Kit (8.5" [216mm])
P/N: **2956**

AC Adapter Kit
P/N: **2984**
(Warning: Do not use in hazardous atmosphere.)

Hardshell Carrying Case (black)
P/N: **3009**

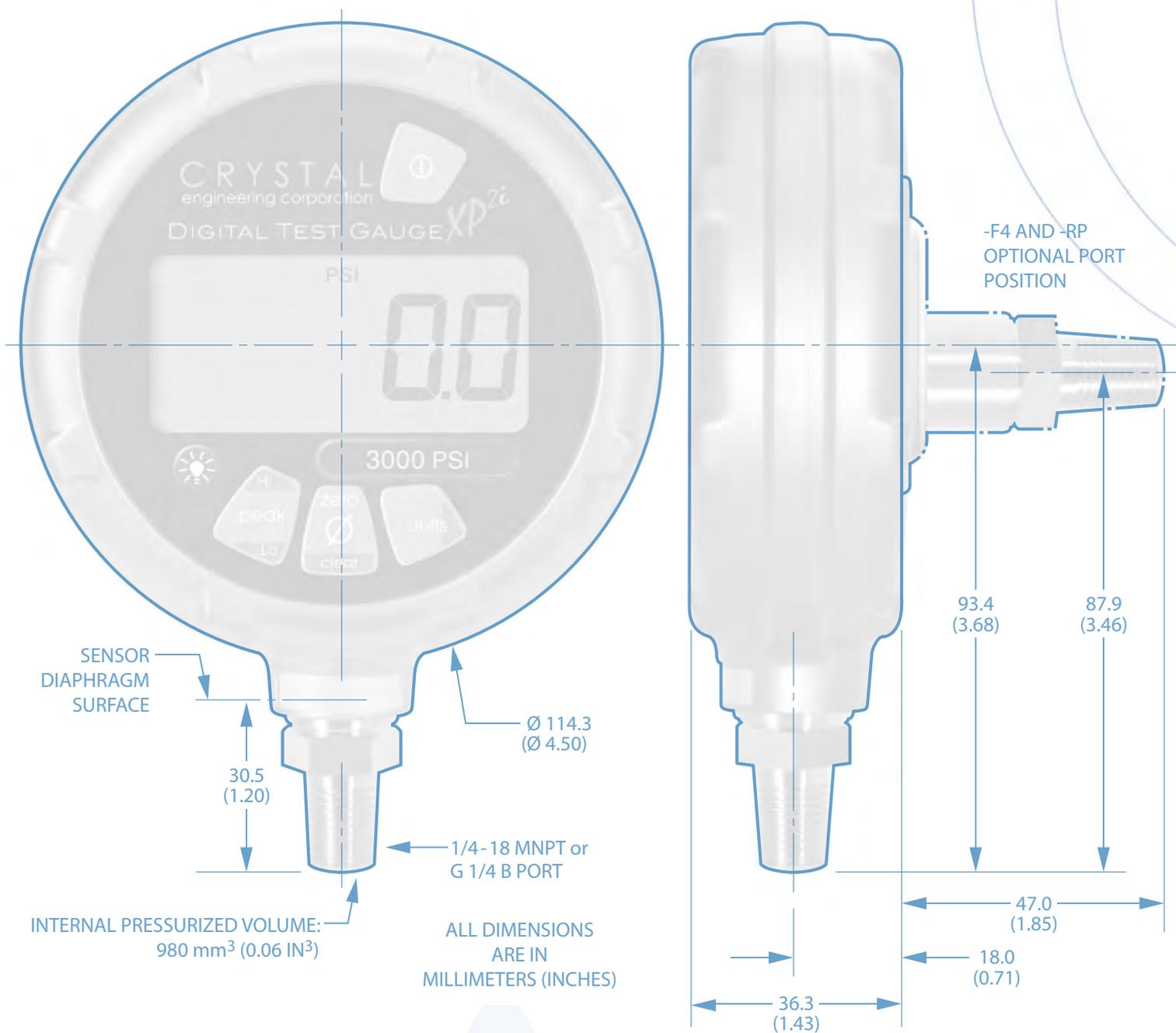
Protective Boot
P/N: **3696**

► Software

DataLoggerXP
P/N: **DATALOGGERXP**

ConFigXP
P/N: **CONFIGXP**





CRYSTAL
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