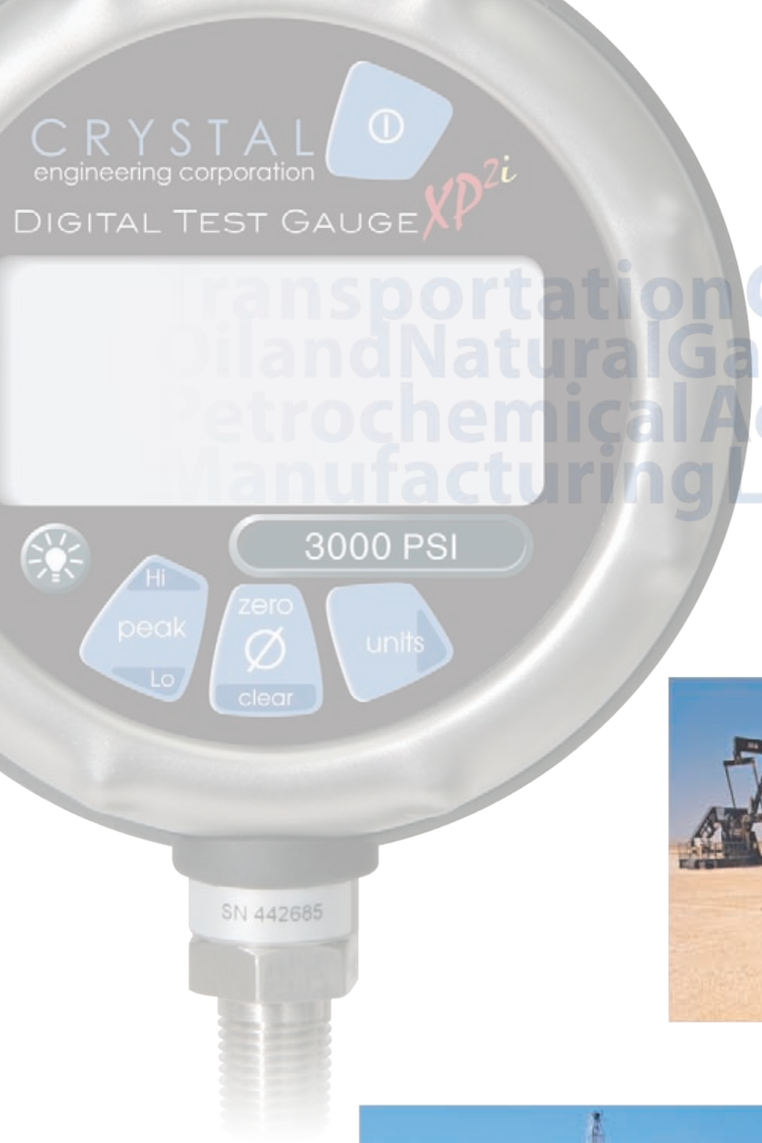
CRYSTAL
engineering corporation

The XP2i Pressure Gauge

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



Transportation Calibration Maritime Production
Oil and Natural Gas Nuclear Power Offshore Platforms
Petrochemical Aerospace Measurement Irrigation
Manufacturing Laboratory 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 o□shore platforms.

And that's just the beginning!

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

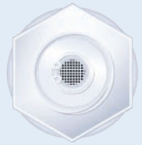
Crystal Engineering designed and manufactures the XP2i. Based on silicon sensor technology, the XP2i is the culmination of over 20 years devoted to engineering and manufacturing pressure calibrators, pressure gauges, and pressure measuring equipment for many di□erent applications. Crystal Engineering pioneered uncomplicated *of reading* speci□cations 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

ACCURACY & RELIABILITY

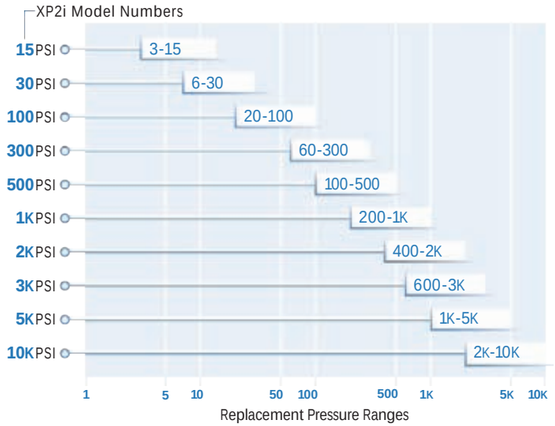
All Welded Stainless Steel Sensor



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.

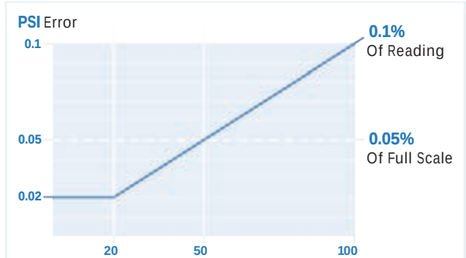
▸ Of Reading Performance

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.

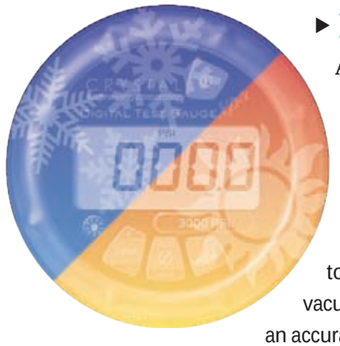


A single XP2i pressure gauge can replace multiple 0.1% *of Full Scale* gauges. As this chart illustrates, our 15 PSI gauge will provide accurate readings down to 3 PSI, while our 10K gauge is accurate over a remarkable range of 8000 PSI.

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.

▸ Calibration Certificate 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), because every XP2i is calibrated in an environmental test chamber using fully automated equipment. ▸ Vacuum Operation All XP2i gauges can be used to indicate vacuum. Gauges with a full scale range 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 stainless steel case helps prevent radio and electrical interference from affecting measurements. The LCD is protected by a hard polycarbonate lens (so dropping a tool on it won't break the display!) and all materials are compatible with common industrial fluids (including Skydrol™). The circuit board is conformally coated, and even the RS232 connection is sealed against leakage. ▸ Designed to be Dropped Since the internal circuitry is mounted to the inside of the gasket, 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.

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

▸ 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 intrinsically safe. The basic model is Class 1, Div 1, Groups A, B, C, and D. An ATEX and IECEx version is also available. *See ordering information on page 10 for details.*

Free Software

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

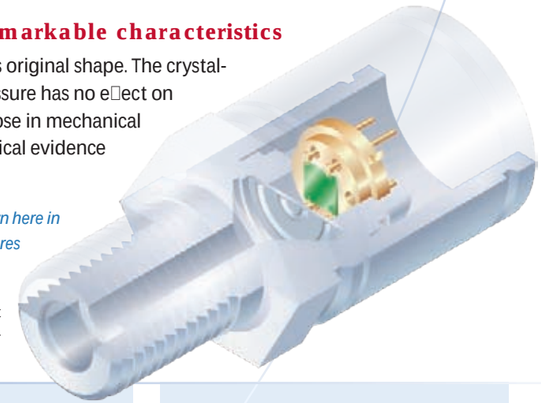
Download from www.xp2i.com.

▸ 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 diaphragm seal to ensure that water vapor or corrosive liquids do not degrade the electrical connections to the silicon chip.

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

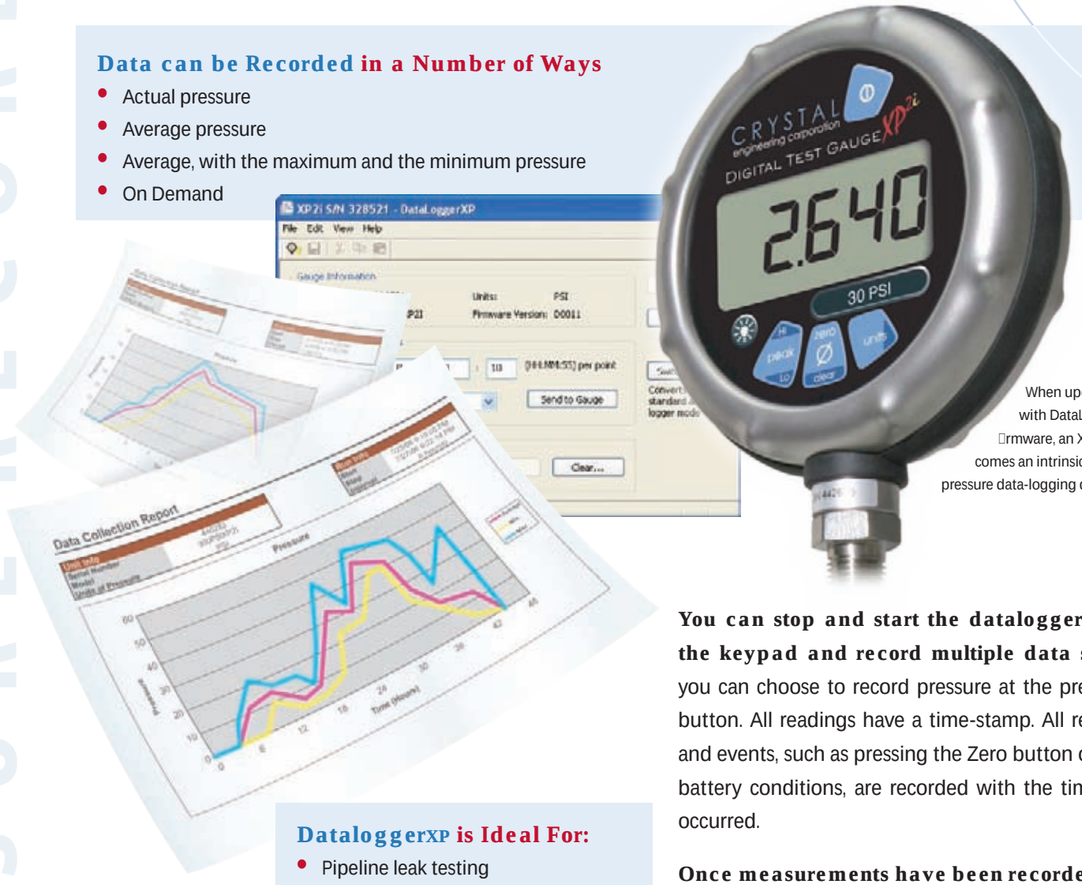
- Stainless steel case—not plastic!
- Easier to use
- Digital interface included

▸ 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.*

▸ 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

You can add features to the XP2i gauge, too:

- Enable averaging
- Enable tare
- Define new pressure units
- Expand the zero/tare range
- Store an identifier in the XP2i memory (Tag ID)

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 welded 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.

For rough service applications a Skydrol compatible elastomeric boot is available to increase shock resistance.

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!

Flush diaphragm and sanitary seals are available for pharmaceutical and food processing industries and other special applications. Many types are available. Contact the factory with your specific requirements.

Any XP2i

- can be cleaned for oxygen service.

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).

Vacuum, for 2000kPa (300 PSI) and lower pressure gauges:

0 to -99.9 kPa (-14.5 PSIG):
±(0.25% of Full Scale),
where F.S.: -99.9 kPa (-14.5 PSIG).
(Not recommended for continuous use at high vacuum.)

Pressure Ranges

See Ordering Information on next 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 ¼" BSP.

Electrical Connection:
DB9, RS-232 (environmentally sealed).

Media Compatibility

Liquids and gases compatible with 316 stainless steel.

Available cleaned for oxygen service.

Power

Battery: Three size AA (RS6) batteries.

Battery Life:
1500 hours typical (alkaline battery).

Enclosure

Description: 300 series SS sealed to NEMA4/IP66. (Excludes the WT Series)

Weight: 500g (17.6 oz.), including batteries.

Sensor

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

Intrinsic Safety

Exia Intrinsically Safe, Class I, Division 1, Groups A, B, C & D, Temperature code T4

ATEX/IECEx Certified Intrinsically Safe

Any XP2i pressure gauge can be ordered in an ATEX Certified configuration. The XP2i ATEX/IECEx pressure gauge meets all the requirements set forth by the EU (European Union) for equipment that may be operated in potentially explosive environments.

EEx ia IIC T4
KEMA 04 ATEX1053
IECEx Scheme Compliant
IECEx CSA 05.0001X
CE 0344 Ex II 1G

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.)

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 — see the accessories section on next page.

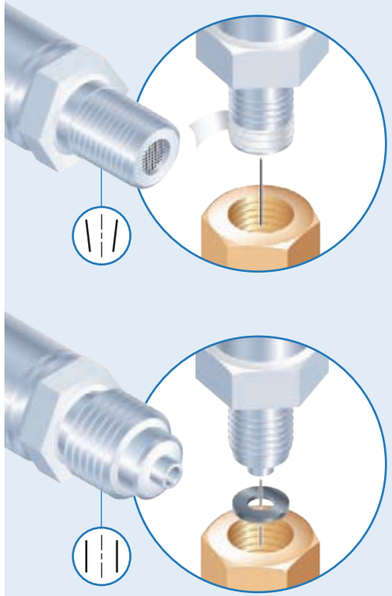
Rear Port Fitting—Option RP: The rear port fitting may be ordered separately, but is included automatically with the panel mount flange option (F4).

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

Cleaned for Oxygen Service—Option O

CE 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.

G 1/4 B
Parallel BSP threads require a washer to form a seal. BSP threads are available on ATEX gauges only.

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**

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

Protective Boot
P/N: **3193**

Software

DataLoggerXP
P/N: **DATALOGGERXP**

ConFigXP
P/N: **CONFIGXP**

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 | bar | kPa | Pressure Units and Resolution

P/N Pre□x	P/N Pre□x	P/N Pre□x	Over-pressure	PSI	kg/cm²	inch Hg	inch H_2O	mm Hg	mm H_2O	kPa	bar	mbar
15PSI	1BAR	100KPA	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	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 □ash, 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 de□ne every attribute of a speci□c 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 pre□x. The pre□x identi□es the pressure range and units of the gauge. For example, a **2KPSI** pre□x identi□es a gauge as a PSI model with a pressure range of 2000 PSI.

The gauge type indicator Crystal o□ers all of its gauges from 2000 PSI/140 bar and up, in an absolute (barometric) version, indicated by a **B** following the part number pre□x. For example, the part number for a 2000 PSI, absolute gauge would be 2KPSI**B**XP2I.

The options suffix Many part numbers include a su□x to identify the special options available on a particular gauge. For example, a **-DD** su□x indicates that a gauge is equipped with a dual line display, while an **-O** su□x 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 □ange (**-F4**) options. The cleaned for oxygen service option (**-O**) may be combined with any and all options.

The ATEX approved indicator Crystal o□ers all of its gauges in an ATEX certi□ed con□guration, indicated by placing an **AX** immediately before the part number pre□x. For example, the part number for an ATEX/IECEx certi□ed 140 bar gauge would be **AX**140BARXP2I.

Pressure fitting options You can order any XP2i with a ¼" NPT (standard). G ¼ B (BSP) pressure □ttings are available on ATEX gauges only, and are indicated by a **-BSP** su□x. The BSP □tting is designed to conform to EN 837-1 and utilizes G ¼ B parallel threads per ISO 228. Refer to the sidebar on page 9 for more information.

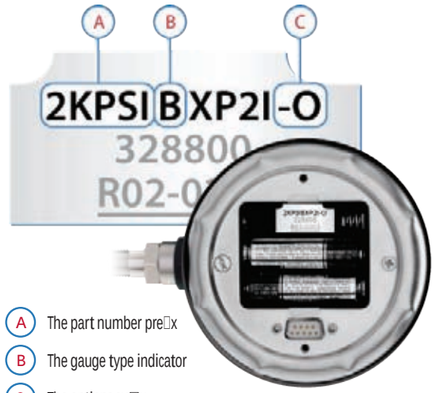
Sample part numbers:

300PSIXP2I . . . . . 300 PSI standard gauge

10KPSIBXP2I-F4. . . . . 10 000 PSI absolute gauge with the 4½" panel mount □ange option

AX140BARXP2I-BSP . . . . . ATEX approved 140 bar standard gauge, with a ¼" BSP pressure □tting

Anatomy of a part number



A The part number pre□x

B The gauge type indicator

C The options su□x

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 di□erences: the part number pre□x is preceded by the **WT** designation, and the gauge type is followed immediately by the option su□x—on a WT, this su□x is a code for a panel mount □ange for either 8.7" bolt center mounting (**-1000**) or 10.125" bolt center mounting (**-1500**).

For example, the part number for a 2000 PSI, absolute WT gauge with 10.125" bolt center mounting would be:

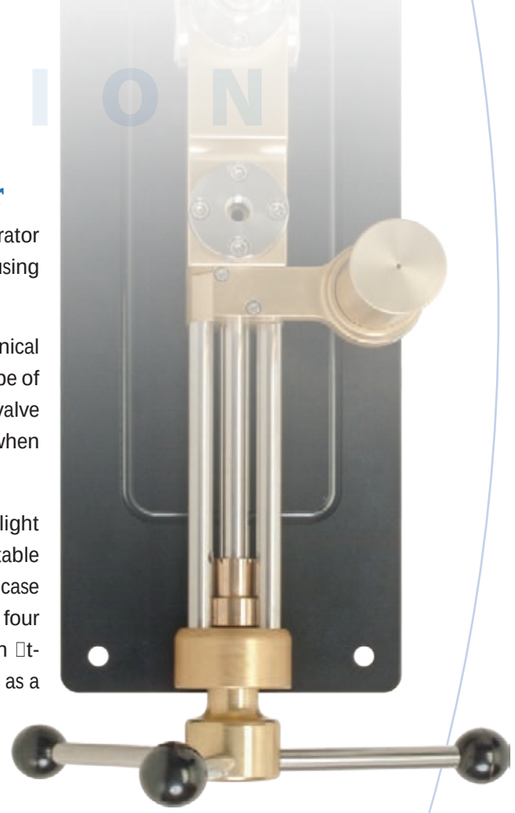
WT2KPSIB-1500

GaugeCalXP™ Pressure Comparator

GaugeCalXP is a self contained, precision hydraulic pressure generator (pressure comparator). It quickly and easily produces up to 10 000 PSI using water or oil as the hydraulic □uid.

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 □uid bottle, conversion □t-tings, 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.



FastCalXP™ Gauge Calibration Software

FastCalXP steps you through every phase of gauge calibration. It eliminates errors by recording the applied pressure digitally from Crystal pressure gauges or calibrators. Since FastCalXP was speci□cally designed to calibrate pressure gauges, it takes very little time to set up and learn to use. 10 point calibrations can be done in 3 minutes or less! Calibration reports use Excel, so you can keep using the forms you already have!

FastCalXP will save time, improve record keeping, and eliminate data-taking errors.

You'll wonder how you ever managed without it!

Set Up the Calibration

Take the As Received and As Left Data

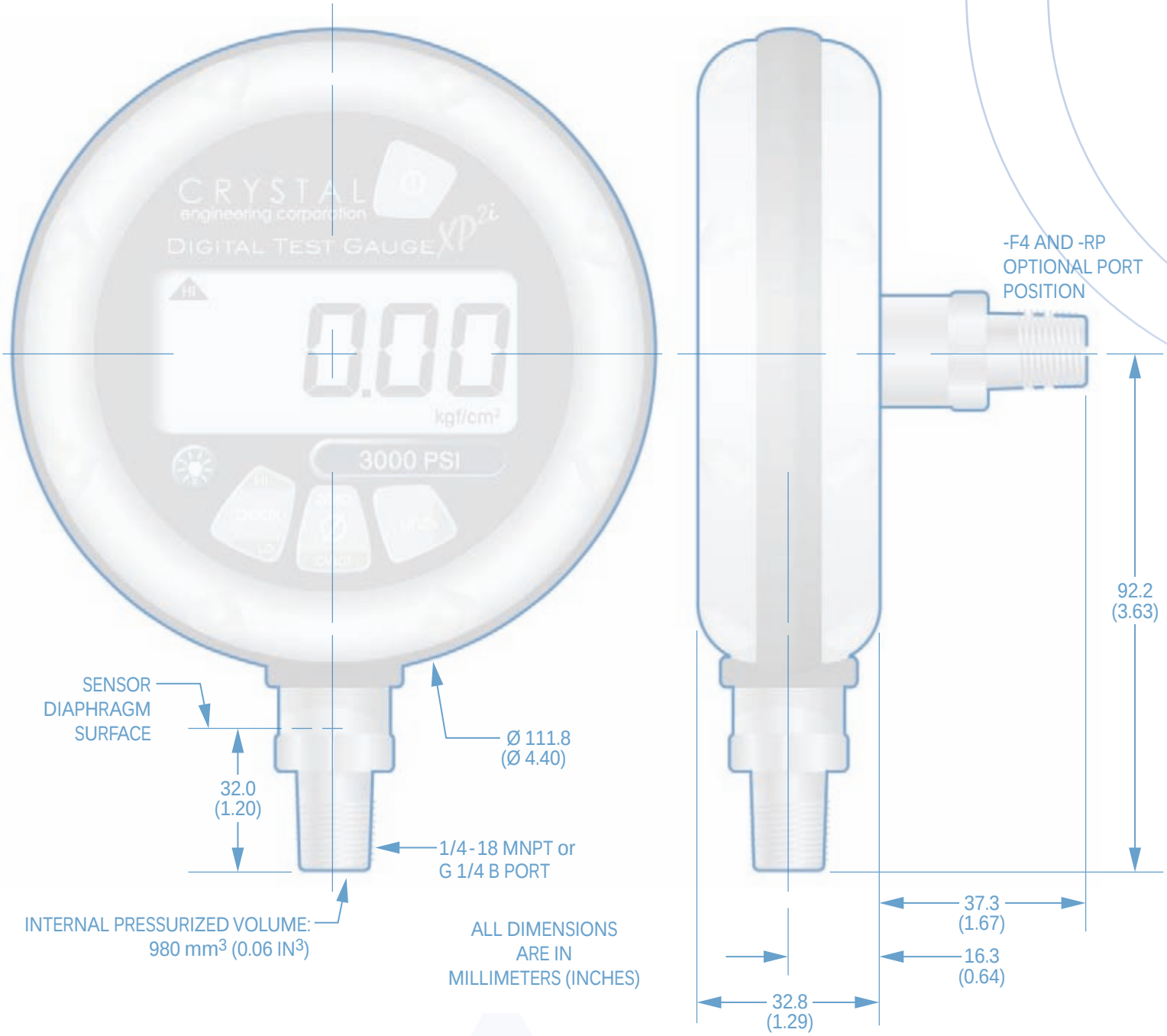
Generate and Print a Certi□cate

Excel is either a registered trademark or trademark of Microsoft Corporation in the United States and/or other countries.

Calibration Kits

Calibration kits o□er 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 precut locations. Refer to the *Crystal Handpumps and Accessories brochure* for complete descriptions of all of the pumps, □ttings, and calibration solutions we o□er.



CRYSTAL
engineering corporation

Visit us on the web at
www.crystalengineering.net

ISO 9001
BUREAU VERITAS
Certification
Nº 191559

PN: 3104—Rev B