Crystal pressure
AMETEK

XP3i Operation Manual

for XP3i Digital Test Gauge (Standard and Dual-Display(DD))

AMETEK®
SENSORS, TEST & CALIBRATION

Contents

Overview

INTRODUCTION

Thank you for choosing the XP3i Digital Test Gauge from Crystal Engineering Corporation. Your XP3i is a combination of leading edge technology and rugged industrial design.

Accuracy is 0.05% "of reading", 0.02% "of Full Scale" or 0.05% "of Full Scale"—so any XP3i can typically replace several gauges you may have been using. The XP3i is ***fully temperature compensated***—so there is ***no change in accuracy throughout the entire operating temperature range!***

The XP3i's case is made from rugged aluminum alloy, fully sealed against dust and water intrusion. Even the USB port is sealed. Circuitry is mounted in shock absorbing elastomer supports and the batteries are accessible by removing four screws. But you won't need to change the batteries often, since 3 AA batteries operate the XP3i for up to 1500 hours of continuous use. Other features include:

- Bluetooth® Low Energy interface to CrystalConnect Mobile App
- Optional Data Logger with extremely large capacity
- Continuous capture of peak and valley pressure readings
- PSV (Pressure Safety Valve) mode
- Programming interface
- User-defined units
- Intrinsically Safe - meeting the latest standards as a digital test gauge
- All welded 316 stainless steel sensor (ranges above 15 psi / 1 bar)
- Calibration due reminder

We hope your XP3i meets your expectations, and we're interested in any comments or suggestions you may have. You can send us a note at: crystal@ametek.com. *Many features in this and our other products are a direct result of your comments!*

Crystal Engineering is the company that designs, manufactures, markets, and services the nVision reference pressure recorder, XP3i, and 30 Series pressure calibrators, m1 Pressure Gauge, and a variety of industry specific pressure measuring equipment. Crystal Engineering pioneered features like full temperature compensation and "of reading" rated gauges and calibrators. Pressure measuring equipment is the only thing we do and that's why we say:

Pressure Is our **Business** ™

Your XP3i can be customized, through the use of our free CrystalControlWeb software. Your personal computer can disable, enable, or modify a variety of features of your XP3i. Look for the logo for programmable features, like:

- A user defined pressure scale, and/or disable unused pressure units
- Password protection to prevent unauthorized changes
- Disable keypad recalibration, (peak) button, and/or (units) button
- Expand or decrease allowable Zero range
- Store an asset ID or tag number in non-volatile memory
- Adjust calibration values

OPERATING INSTRUCTIONS

The XP3i is shipped with batteries installed, so it's ready to use. Press the (on/off) button. The XP3i will first test all LCD segments, and then indicate pressure.

The XP3i always resumes operation in the mode and the units of the pressure last used, and it *does not automatically rezero when turned on.*

Connect the XP3i to your system.

CAUTION: Use a wrench (¾" or 19mm) for installation and removal of XP3i! There is a limit to how much rotational force can be applied to the case, so don't rely on, or use, the case to screw the XP3i into a fitting, and don't use the case to remove the XP3i fitting, either.

CAUTION: Never insert any object into the pressure connection! The sensor diaphragm is very thin and can be damaged or destroyed by solid or sharp objects. Cleaning of the sensor must be done with appropriate solvents only.

WARNING: Severe injury or damage can occur through improper use of pressure instruments! Do not exceed recommended pressure limits of tubing and fittings. Be certain all pressure connections are secured.

Most XP3i's are intended for gauge pressure measurement. That is, they indicate the difference between applied pressure and ambient barometric pressure. However, the (zero) button can be used to force an XP3i to read zero pressure at any applied pressure, up to the full scale rating of the gauge. The factory default setting limits the maximum zero value to 20 psi, but this limit can be changed with CrystalControlWeb.

Some XP3i's are rated for absolute pressure. Absolute gauges indicate the difference between applied pressure and an internal vacuum reference. Absolute pressure is always positive. For instance barometric pressure at sea level is on average about 14.7 psi (approximately 100 kPa or 1 bar), so at sea level this is the lowest expected pressure indication. However, absolute gauges can be "zeroed" (unless prevented by CrystalControlWeb). After zeroing an absolute gauge it is possible to indicate a negative or positive gauge pressure.

WARNING: This gauge can display zero pressure when connected to a source of pressure! Do not rely on the display indication before disconnecting—it may not be indicating true pressure. Never disconnect pressure instrumentation without first relieving system pressure!

Functions

units Units Button

Pressing this button causes the XP3i to select the next available unit of pressure measurement.
See Pressure Ranges, Display Scales, & Resolution on page 22 or the list of pressure units available for your model.

Units that you don't need or never use can be turned off. You can also define a special unit for your XP3i with CrystalControlWeb. You can use the XP3i to display directly in a unit not otherwise available, such as feet of seawater, or foot-pounds of torque. When you select your custom unit from the keypad, the screen displays the USER icon.

peak Peak Button

On the XP3i, pressing the (peak) button causes the display to cycle through the following , depending on your setting in CrystalControlWeb.

<No Icon>	Live Pressure display
HI	Maximum detected pressure
LO	Minimum detected pressure
(blinking) HI	PSV Mode, maximum *
(blinking) LO	PSV Mode, minimum *
AVG	Average pressure
REC	DataLoggerXP datalogging mode (only appears on DL upgraded gauges)

* From the factory this setting is disabled. Use CrystalControlWeb to enable.

Peak High and Peak Low values are not saved when the gauge shuts off; they will reset to the current reading when the XP3i is turned on or reset.

In some cases the ability to display a peak value may not be needed, or may even be dangerous. CrystalControlWeb allows you to disable this button.

XP3is can average 1 to 10 readings, recalculated every time pressure is measured (4 times per second). Enable and set the number of readings to be averaged with CrystalControlWeb.

On the -DD, optional dual-line display XP3i, pressing the (peak) button causes the display to cycle through the following, depending on your setting in CrystalControlWeb:

<No Icon>	Live Pressure display
HI	Maximum detected pressure
LO	Minimum detected pressure
(blinking) HI	PSV Mode maximum *
(blinking) LO	PSV Mode minimum *
AVG	Average pressure
REC	DataLoggerXP datalogging mode
TARE	Tare *
/min	Rate of change *

Resetting (Clearing) Recorded Peak Values

Peak values can only be cleared when displaying either a Peak High or Peak Low recorded pressure. Press the (zero) button for at least ½ second. Dashed lines will briefly appear across the display indicating that both Peak values have been cleared. Both Peak High and Peak Low values will then display the current applied pressure. Pressing the (zero) button while either the Peak High (HI) or Peak Low (LO) icon is displayed will not affect the zero value. If you need to rezero the gauge, you must turn off both peak icons by pressing the (peak) button.

Zero

If you attempt to zero the gauge while applying a pressure which exceeds the Zero Limit (set in CrystalControlWeb, defaults to 20 psi), the command will be ignored and "--HI-" will be displayed.

To Zero the XP3i

Turn off peak indication by pressing the (peak) button repeatedly until the HI and LO icons are off, then press the (zero) button for at least ½ second when the gauge is vented to atmosphere.

The display will then briefly flash all dashed lines (- - - - -), indicating that it has been re-zeroed. Absolute gauges will now indicate gauge pressure.

! WARNING: This gauge can display zero pressure when connected to a source of pressure! Do not rely on the display indication before disconnecting—it may not be indicating true pressure. Never disconnect pressure instrumentation without first relieving system pressure!

To Clear the Zero Value on an XP3i

Turn off peak indication as described above, then press and hold the (zero) button until the display changes from (- - - - -) to (- - -).

This is especially useful for absolute gauges that have been zeroed to use for gauge pressure measurement.

Bluetooth and Settings

A quick press of the settings buttons will indicate the current gauge settings. Depending on the model, it may indicate the auto-off settings, calibration due alert, calibration warning, datalogger status, or model details.

To toggle Bluetooth on or off, press and hold the settings button. If Bluetooth is off, holding the button will turn it on, and the Bluetooth icon will blink while it's available. Once connected, the icon will turn solid and remain on while connected. If Bluetooth is currently active (connected or available), pressing and holding the settings button will turn It off, and the icon will turn off.

Starting in firmware version 1.1.0, the XP3i will always be available to connect to once Bluetooth is on and will no longer turn off 30 seconds after disconnecting. The Bluetooth icon will blink while it's available.

Tare (-DD, Dual-Line Display XP3i Only)

Tare is a constant value subtracted from the true pressure. For instance, if you were mixing gases by partial pressure, you might want to fill a tank to 1760 psi with air, then add another 440 psi of helium. To reduce the chance of error, you could tare the gauge at 1760 psi. Then you would add helium until the indication reached 440.

Fill to pressure

Press the Tare button

Top-off with helium

In contrast to the Zero function discussed previously, Tare is not subject to the Zero Limit set in CrystalControlWeb. Tare is available only when the **TARE** icon is on. To use the Tare feature, press the (peak) button repeatedly until the screen displays the **TARE** icon. The **TARE** icon will flash to remind you that live pressure may not be indicated on the screen. Apply pressure to the gauge until you reach the desired value. Press the (zero) button. The top line will change from true pressure to zero. The amount of the tare will be displayed on the second line.

To clear the tare, press and hold the (zero) button until the tare value changes from (-----) to (- - -).

The Tare function is disabled by default, but can be enabled with CrystalControlWeb.

Rate (-DD, Dual-Line Display XP3i Only)

Rate is the measurement of pressure change per minute. When in Rate mode, the second line will display the rate, and the **/min** icon will display. Rate is calculated at every pressure measurement (4 times per second), and the displayed value is the average of the most recent 3 to 10 calculations. By increasing the number of calculations in the average, the XP3i will indicate a more stable rate. However, the XP3i will react more slowly to changes in rate.

To use the rate feature, press the (peak) button repeatedly until the **/min** icon displays. As pressure changes, the second line will indicate rate of change.

The rate function is disabled by default, but can be enabled and configured with CrystalControlWeb. The number of calculations can also be set with the digital interface.

Automatic Shut-off

The XP3i has a shutoff timer and will turn off automatically after 20 minutes (or the time set in CrystalControlWeb) of non-operation. Pressing any button or sending any command via the USB port resets the shutoff timer for another 20 minutes of operation. The XP3i will briefly display ***Auto Off 20*** when turned on.

To disable the shutoff feature, turn on the XP3i by pressing the (on/off) and (zero) buttons simultaneously. The XP3i will briefly display the words ***No Auto Off*** to indicate that it will not turn off. The shutoff feature can be enabled again when turning the XP3i on, by pressing the same (on/off) and (zero) buttons. These settings are retained when the product is powered down.

Note: This key combination will not toggle the auto-shutoff feature if CrystalControlWeb is set to require a password before changing settings.

Backlight

Pressing the (backlight) button instantly lights the display at maximum brightness. Hold down the button for 1 second to keep it on. The display will flash briefly, indicating that it will stay on for 1 minute. If you press the (backlight) button again, the backlight will go into a lower brightness setting to extend battery life, and remain on for 2 minutes after the last key is pressed. Press the (backlight) button once more and the light will go out.

If you start the XP3i in the No Auto Off mode, you may select the brightness level in the same way. The light will never time out and turn off. Turn off the XP3i**,** or press the (backlight) button repeatedly, to turn off the backlight.

Measuring Vacuum

All versions of the XP3i can be used to measure moderate vacuum, though only ranges of 500 psi (and 30 bar or 3000 kPa) and lower are actually calibrated and certified for vacuum operation.

When measuring pressure less than ambient barometric conditions, a minus (-) sign will appear.

Absolute gauges (models with a "A" in front of the pressure range in the part number) ***will NOT*** indicate a negative sign when vacuum is applied, unless the (zero) button has been pressed while a pressure greater than full vacuum is applied to the gauge. If your absolute gauge does indicate a negative pressure, you can clear the zero value ("unzero") by pressing the (zero) button until the display changes from (`-----`) to (`- - -`).

Water Density (Inches of Water)

The following applies *only* to models where inches of water is a selectable pressure unit. As shipped from the factory, the XP3i is set to display inches of water corresponding to the density of water at 4° C (39.2° F). You may require a different water density for your application, so the XP3i can be set to use the density of water at 20° C (68° F) or 15.6° C (60° F) instead.

Press the (units) button until the display cycles to the desired unit and then the desired water density.

Select and set the desired density of water.

Overpressure Conditions

The XP3i will read pressure up to approximately 115% of the rated pressure range. Above 115%, the display will indicate *+OL*, and readings will stop updating. The zero function does not affect when the display will indicate *+OL*, so depending on the zero value it is possible that the display will indicate *+OL* without the maximum pressure being displayed.

For instance, if a 100PSIXP3i is zeroed when 30 psi is being applied, it will indicate that the overpressure condition has been reached at 85 psi (i.e., 115% x 100 psi – 30 psi = 85 psi).

Overpressure can affect accuracy, but the effect is only temporary unless the sensor has been destroyed. See Pressure Ranges, Display Scales, & Resolution on page 22 for maximum overpressure.

PSVtest Mode

PSVtest mode is designed for PSV and PRV ("Pressure Safety Valve" and "Pressure Relief Valve", respectively) as well as for Rupture Disc (also known as "Burst Disc") testing. It increases the measurement rate of the XP3i gauge to approximately eight times per second, to capture the peak pressure when the valve opened, and adds a method of *automatically* capturing the closing reseat pressure.

Use CrystalControlWeb to activate PSVtest Mode. When the Peak High icon (HI) flashes, PSVtest mode is enabled. A special feature of PSVtest is that Peak Low is automatically reset to the Peak High value whenever a new Peak High value is detected. Once pressure stops increasing, as when a PSV opens (and the pressure drops below the maximum pressure) XP3i detects the new minimum pressure values (the Peak Low), capturing the closing pressure of a PSV.

Press the (peak) button once to view the captured reseat pressure. The Peak Low icon (LO) will flash on the display.

To clear the peaks, press the (zero) button while the display shows the High (HI) or Low (LO) icons.

Application note *AN-006—Pressure Safety Valve Testing* detailing the operation of the PSVtest mode is available on our website, and includes examples on how to use the gauge in relief valve and burst disk testing.

Calibration Due Reminder

The XP3i has a calibration reminder feature that can help to assure that you never use the gauge after its calibration certificate has expired. It can be programmed to alert you prior to, on, and after the gauge's calibration due date. Due dates, reminder times, and message types can be set through our free

CrystalControlWeb software.

▶ Calibration Reminder Alert

Enter the Cal Due date and the notification time prior. Once the defined time prior is reached, the XP3i will flash ***Cal Soon*** three times during the startup process. It will do this on every start-up until the calibration due date is reached, or the dates are updated.

▶ Calibration Due Alert

Once the calibration due date has been reached, the XP3i has three options to choose from. On Startup, will flash ***Cal Due*** three times during the startup process. After this, no additional warnings will occur until power is recycled again. Alternate, will alternate displaying ***Cal Due*** and live pressure readings. Always, will display ***Cal Due*** until a button is pressed and then the gauge operates normally. After this, no additional warnings will occur until power is recycled. Add Password Protection to make the gauge non-operational and always display ***Cal Due***.

Note: Protect the settings by using password protection.

Low Battery Indication

The Battery icon () uses three bars to display the battery level. When the icon displays all three bars, the batteries are full. The XP3i will continue to operate accurately while the icon is visible. When the batteries are exhausted, the letters ***batt*** will appear across the display. After ***batt*** appears, no pressure measurements will be possible until the batteries are replaced.

Battery Replacement

The XP3i uses 3 AA batteries. Loosen the four rear panel screws to gain access to the battery compartment. These four panel screws are captive inside the panel and are not removable. The foam gasket material inside the battery cover used to secure the batteries can make removal of the cover difficult. After all four screws have been loosened, the cover can be easily removed by prying gently on the hanging bracket with a flat head screwdriver or similar tool. Pull the panel up to expose the battery compartment. After replacing the batteries, the XP3i will start operating immediately (without having to press the (on/off) button). This indicates that a complete reset has occurred, and is normal.

WARNING: Do not remove or change the batteries in hazardous locations.

WARNING: T3 or T4 Temperature Class and ambient temperature range is based on selection of approved battery. See the table on page 21**.**

CAUTION: Do not mix battery types or manufacturers.

WARNING: Do not use the USB port in hazardous locations.

Reset

If for some reason the XP3i needs to be reset, remove any battery for at least one minute, then reinstall the battery. If the reset is successful, the XP3i will start operating without pressing the (on/off) button.

WARNING: Do not remove or change the batteries in hazardous locations.

Communications/Programming

The XP3i responds to a query-based command language which allows remote control of the gauge. Please refer to the XP3i Programming Instructions for documentation of this feature.

Data Logging with DataLoggerXP

WHAT IS DATALOGGERXP?

DataLoggerXP is an optional data logging mode available for the XP3i gauge. You may purchase the DataLoggerXP option with your original order or add it later.

With the XP3i's long battery life, and Ultra Low Power (ULP) mode, you can log data over an entire year, without the need for external power supplies or battery replacements.

With an XP3i and DataLoggerXP you can:

- Record up to 200 million pressure measurements (data points) into non-volatile flash memory.
- Save battery life and record over an entire year with Ultra Low Power (ULP) mode.
- Change data collection parameters, with or without a computer.
- Start and stop multiple collection runs from the keypad.
- Record pressure readings at intervals as fast as ten times per second or as slow as once every 18 hours.
- Record the averages, averages and peaks, or just the pressure indication.
- Store an indicated pressure by pushing one button.
- View the data on any Windows-equipped computer, our mobile application (CrystalConnect), or our cloud software (CrystalControlWeb).
- Save the data files directly into a Microsoft® Excel workbook, or as comma separated text files.

XP3I DATALOGGERXP GAUGE OPERATION

When in data logging mode, some of the standard functionality of the standard XP3i is suspended. This includes the ability to change units. Please ensure you have the correct units selected prior to entering data logging mode.

Maximum Number of Readings

An XP3i with the authorized DataLoggerXP option can record up to 200 million data points. By holding down the (units) button you can see the number of available data points on the gauge after the status is displayed. To avoid starting a recording, release the (units) button after you see the number of available points. For -DD models, the second line will show the number of recorded measurements in the current log while recording. When not recording, the second line will show the total number of measurements recorded across all logs.

Recording Pressure

1. Press the (peak) button repeatedly until the record icon (REC) illuminates in the top left corner.
2. Connect the gauge to the pressure line to be monitored.
3. Press and hold the (units) button on the gauge until it says ***Start***—data is now being logged.
   The units icon will blink to indicate a logging run is in progress.
4. Once the test is complete, press and hold the (units) button again until it says ***Stop***.

Keypad Usage

The following buttons and button combinations are used to control data logging runs on the XP3i. Where two keys are indicated, the operation is executed by pressing and holding down the first key, then pressing and holding down the second key until the action is completed.

Note: Start by turning off the gauge. Then use the following keypad shortcuts, in the order they appear.

▶ Units + Power: Setting Logging Parameters (Mode and Interval) 

Used only when the gauge is turned off, this allows you to select the logging type and interval from the keypad.

Press the (peak) button repeatedly to cycle through the logging types. Press the (units) button to accept the format.

 Actual - The gauge stores the value displayed on the gauge at each logging interval.

 Average - The gauge calculates and stores the average of all readings taken during each logging interval.

 Average with Peaks - The highest and lowest value of each logging interval is recorded along with the average value.

 On Demand - Press the (peak) button to store the displayed pressure value and the current timestamp. No logging interval applies.

 Actual Ultra Low Power - Similar to Actual; Ultra-Low Power mode extends recording time to over an entire year on one set of batteries. The gauge will display ULP instead of the live pressure.

For further information, see Ultra Low Power (ULP) Mode on page 14.

▶ Setting the Logging Interval

The display will advance to the logging interval, displayed in seconds. The (peak) button lengthens the logging interval. The (zero) button shortens the logging interval. The (units) button accepts the logging interval and the display reverts to normal.

Note: At this point, the record icon (REC) will illuminate on the display.

Note: If you select the On Demand logging type, you will not be asked to select a logging interval.

▶ Units 

Pressing and holding the (units) button briefly causes the XP3i to display information about the logging state. If you continue to hold the (units) button, a logging run will begin or end. Immediately after pressing the (units) button, the gauge will display the operating mode as one of these values:

The XP3i is currently logging data.

The XP3i is logging in On Demand logging type.

The XP3i is not currently logging data and it contains stored data.

If you continue to hold the (units) button, the number of remaining data points available in memory is displayed.

Holding the (units) button even longer will then cause the operating state to change as follows:

- If the gauge is in a Clear or Off state, the gauge will briefly display ***Start***, begin logging data, and change its state to On.
- If the gauge is in an On state, it will stop logging, briefly display ***Stop***, and change its state to Off.
- The Full state will not change by holding the (units) button. In order to get out of the Full state, you must clear the logging memory.

▶ Peak 

When the logging type is set to On Demand (***Pb***), hold down the (units) button to begin recording. The units icon will flash. Press the (peak) button to record the displayed reading. Each time a data point is stored, the Peak High () and Peak Low () icons will blink. Hold down the (units) button again to stop recording mode.

Ultra Low Power (ULP) Mode

The XP3i can log for extended periods with Ultra Low Power Mode, activated by the key combinations explained in Keypad Usage on page 12.

Ultra Low Power Mode takes readings in Actual Mode when the recording interval is 20 minutes or longer. The letters ***ULP*** replace the live pressure reading during
a recording. You must stop the recording to view the live pressure.

To begin or end a recording hold down the (units) button.

Note: To maximize battery life and recording time in ULP Mode, limit your use of the backlight.

Operating Behavior

While recording the REC, Peak High, and Peak Low icons will flash at 1 second intervals.

XP3i Reset or Battery Change

Data collected by the XP3i will not be lost with a gauge reset or battery change, although any run in progress will be stopped.

DataLoggerXP Clock Accuracy

The DataLoggerXP clock accuracy is 100 ppm.

CRYSTALCONTROLWEB

While the XP3i collects and stores the data, the CrystalControlWeb cloud software provides the interface to manage, analyze, download, and store the reports.

Upload stored data from the XP3i to CrystalControlWeb (CCW) is done in one of two ways:

▶ **Through Device Agent**
Connect to the XP3i with a standard USB cable. Install the Device Agent software from our website, www.ametekcalibration.com. Device Agent will then walk you through the process to transfer the data from the XP3i to CCW.

CrystalControlWeb Organizations

When you initially create your free CrystalControlWeb account, you will link your account to an organization. You can create a new organization or join an existing organization using an invite code. Joining organizations with your colleagues allows you to quickly and easily store all data from all XP3i gauges within your organization.

For more information on organizations, including creating them and sending and accepting invites, see www.crystalcontrolweb.com in the help section or www.ametekcalibration.com/products/software/configuration-software/crystalcontrolweb-cloud-service for walkthrough videos..

CRYSTALCONNECT

To connect wirelessly to the XP3i, please download our CrystalConnect mobile application from your favorite app store. With CrystalConnect you can download and save recorded runs from your XP3i and also view live data.

INFORMATION

Weight ..... 580 g (20.7 oz) (includes batteries)
Housing ..... Diecast, nickel plating over low copper, marine grade aluminum.
Rating ..... IP67 and IP66.
Keypad and Labels ..... UV Resistant Polyester.

SERIAL NUMBERS

Serial Number Location

The serial number of your XP3i is located in two places; on the stem above the pressure fitting and behind the battery cover under the battery furthest from the USB connection.

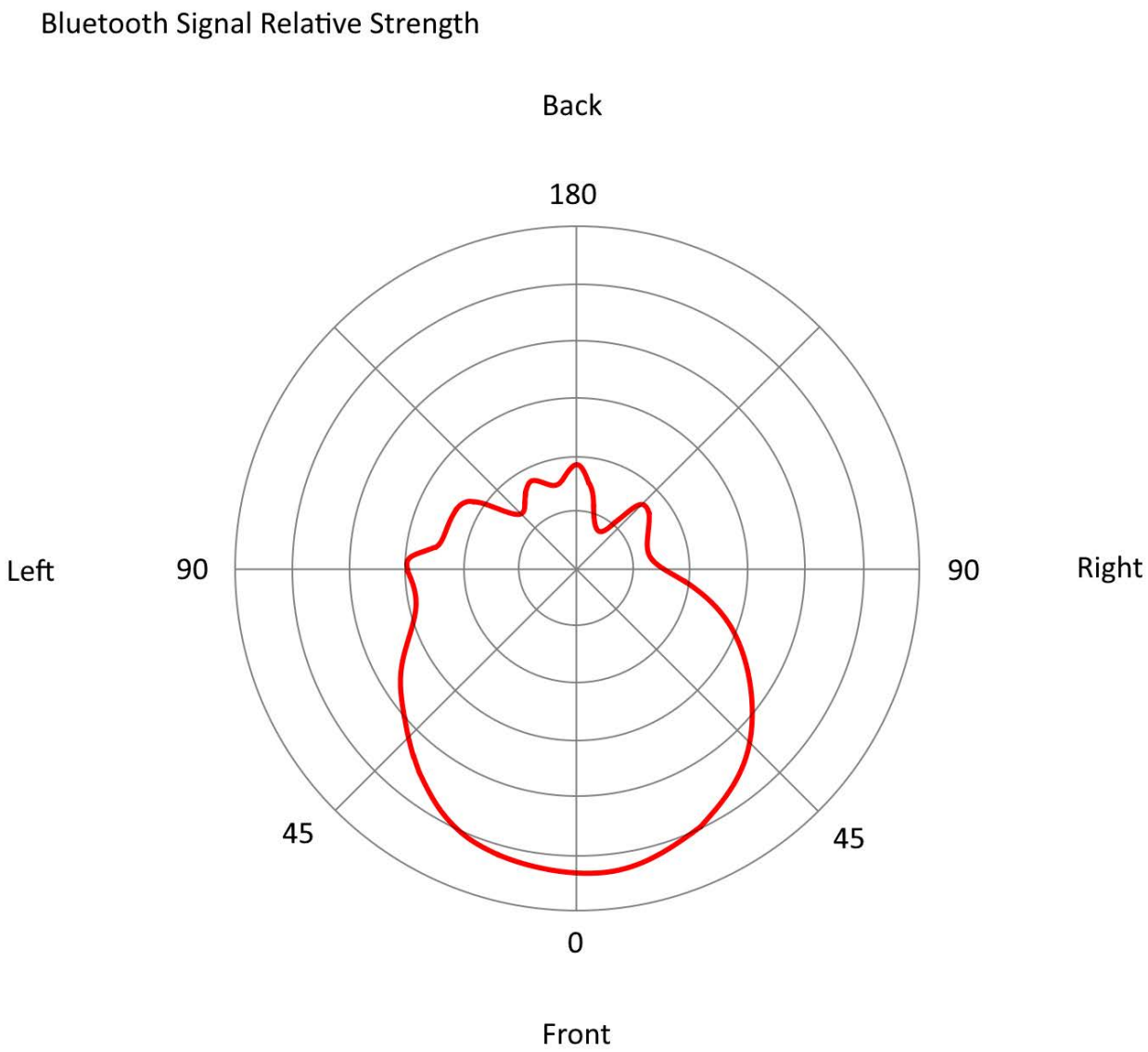
You may also find your serial number using the CrystalControlWeb or Device Agent softwares. See CrystalControlWeb for more information.

Serial Number

Serial Numbers consist of 6 numbers, with the left most digit representing the year of manufacture. For example: 467358 was manufactured in 2024.

BLUETOOTH SIGNAL

The XP3i's Bluetooth signal has been optimized to be most effective directly in front of the gauge. With a direct line of sight in front of the gauge, distances of over 100 feet are possible. The diagram below illustrates the variation in signal strength around the gauge as viewed from above. Zero degrees represents a direct line of sight in front of the gauge. One hundred and eighty degrees represents directly behind the gauge.



Specifications

Accuracy — Gauge Pressure

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

Gauges must be exercised whenever exposed to significant changes in environmental conditions to achieve these specifications, and then re-zeroed. To exercise a gauge, cycle the gauge between zero (ambient barometric pressure) and the pressure of interest. A properly exercised gauge will return to a perfect zero reading (or return to the same ambient barometric reading).

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

▶ Standard Accuracy Version

0 to 40% of Range . . . . . ±(0.02% of Full Scale*).

40 to 110% of Range . . . . . ±(0.05% of Reading).

Vacuum . . . . . ±(0.25% of Full Scale), where F.S. = -14.5 psig, -1.0 bar, -100.0 kPa.

▶ –S5 Accuracy Option

Vacuum to 110% of Range . . . . . ±(0.05% of Full Scale*).

▶ –S2 Accuracy Option

Vacuum to 110% of Range . . . . . ± (0.02% of Full Scale*)

* Full Scale is 100% of the Range.

Note: All models indicate vacuum, but vacuum specification applies only to 500 psi / 30 bar / 3000 kPa and lower pressure gauges.

Accuracy — Absolute Pressure

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

Gauges must be exercised whenever exposed to significant changes in environmental conditions to achieve these specifications. To exercise a gauge, cycle the gauge between zero (ambient barometric pressure) and the pressure of interest. A properly exercised gauge will return to a perfect zero reading (or return to the same ambient barometric reading).

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

▶16 psiA - 1,1 barA - 110 kPaA Ranges

-S5 Option: . . . . . ± (0.05% of Full Scale)

Note: 16 psiA, 1,1 barA, and 110 kPaA range gauges are only available with the -S5 accuracy option.
Note: Calibrated in Vertical Orientation. Orientation Effect = ± 0.004 psi or 0.0003 bar or 0.03 kPa (based on model).

▶100 and 500 psiA - 10 and 30 barA - 1000 and 3000 kPaA Ranges

0 to 40% of Range . . . . . ±(0.02% of Full Scale).

40 to 110% of Range . . . . . ±(0.05% of Reading).

-S2 Option: . . . . . ± (0.02% of Full Scale)

-S5 Option: . . . . . ± (0.05% of Full Scale)

▶1000, 2000, 3000, 5000, 10 000, and 15 000 psiA - 70, 140, 200, 300, 700, and 1000 barA - 7000, 14 000, 20 000, 30 000, 70 000, and 100 000 kPaA Ranges

15 psiA* to 40% of Range . . . . . ±(0.02% of Full Scale).

40 to 110% of Range . . . . . ±(0.05% of Reading).

-S2 Option: . . . . . ± (0.02% of Full Scale)

-S5 Option: . . . . . ± (0.05% of Full Scale)

Note: 1000, 2000, 3000, 5000, 10 000, and 15 000 psiA (and equivalent barA and kPaA) models indicate pressure from 0 psiA (0 barA, 0 kPaA) to Full Scale, but are only specified from 15 psiA (1 barA, 100 kPaA) to Full Scale. *15 psiA or 1 barA or 100 kPaA (based on model).

Temperature

Operating . . . . . -20 to 50° C (-4 to 122° F).

No change in accuracy over operating temperature range. Gauge must be zeroed to achieve rated specification.

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

Battery should be removed if stored for more than one month.

Media Compatibility

Liquids and gases compatible with 316 Stainless Steel. The 15 psi / 16 psia versions have a Viton o-ring seal. See the CPF pressure connection below for additional details.

Pressure Conversions

1 psi = 27.6806 inches of water column (water at 4° C [39.2° F])

27.7070 inches of water column (water at 15.6° C [60° F])

27.7292 inches of water column (water at 20° C [68° F])

2.03602 inches of mercury (mercury at 0° C [32° F])

51.7149 millimeters of mercury (mercury at 0° C [32° F])

703.087 millimeters of water column (water at 4° C [39.2° F])

0.070307 kilograms per square centimeter

68.948 millibar

6.8948 kilopascals

0.068948 bar

0.006895 megapascals

Connections

Power/Communication . . . . . USB Type C (environmentally sealed), 5.0 V, 1.0 A.

WARNING: Do not use USB in hazardous locations. The USB connector shall only be used in a non-hazardous location with Um = 6V.

Pressure Connection . . . . . Crystal CPF◆ Female (1/4" medium pressure tube system). ◆U.S. Patent No. 8,794,677

Compatible with HiP LM4 and LF4 Series, Autoclave Engr SF250CX Male and Female Series.

CPF o-ring size and material: AS568A-012, Viton 80 durometer (P/N 3981).

CAUTION: To achieve CPF maximum allowable working pressures no o-ring substitutions are allowed. See Crystal Engineering's CPF brochure and CES-003 CPF Safety Instructions for further detail.

Display

Screen . . . . . 5.5 digits.

Display Rate . . . . . 4 readings/second (standard).

Numerical Display Height . . . . . 17 mm (0.68") single line display. The main display on the dual display version is 16.8 mm (0.66").

Sensor

Wetted Materials . . . . . (Wrench Tight) 316 stainless steel

(Finger Tight) 316 stainless steel and Viton (internal o-ring)

Fill Fluid . . . . . Silicone Oil

POWER

Batteries .....Three size AA (LR6) batteries.

! WARNING: Do not remove or change the batteries in hazardous locations. The USB connector shall only be used in a non-hazardous location with Um = 6V.

Approved Batteries

The XP3i is Intrinsically Safe only if powered by one of the following battery types:

Approved Battery Type	Ta=	ATEX Markings	CSA Temp. Class
Energizer EN91	-18 to 45° C	Ex ia IIC T4 Ga	T4
Varta 4906 Longlife Power	-10 to 45° C		
Varta 4706 Max Tech	-20 to 45° C		
Energizer E91	-18 to 50° C	Ex ia IIC T3 Ga	T3C
Energizer EN91			
Rayovac 815	-20 to 50° C		
Duracell MN1500			
Varta 4106 Longlife	-10 to 45° C		
Panasonic LR6XWA	-20 to 45° C		

Replace batteries with approved type in non-hazardous locations only

Many other battery types and models have been tested but failed to meet the requirements for Intrinsic Safety—do not assume other models are equivalent.
The XP3i can be operated from external USB power (5.0 V, 1.0 A) only in a non-hazardous location.

Do not mix battery types or manufacturers.

! WARNING: Do not use USB power in hazardous locations.

Battery Life .....1500 hours typical (alkaline battery). Typical battery life when operating without backlight or Bluetooth communication.

Ultra Low Power .....> 1 year, typical - enabled when datalogging interval is 20 minutes or longer.

Battery Indicator.....3-segment Battery Icon: ( ) = Full Battery; ( ) = Used Battery; ( ) = Low Battery

Dead Battery Indication.....***batt***

PRESSURE RANGES, DISPLAY SCALES, & RESOLUTION

psi	psi (abs)	bar	bar (abs)	kPa	kPa (abs)	Overpressure
15PSI	A16PSI	1BAR	A1,1BAR	100KPA	A110KPA	3.0 x
30PSI		2BAR		200KPA		3.0 x
100PSI	A100PSI	7BAR	A10BAR	700KPA	A1KKPA	2.0 x
300PSI		20BAR		2KKPA		2.0 x
500PSI	A500PSI	30BAR	A30BAR	3KKPA	A3KKPA	2.0 x
1KPSI	A1KPSI	70BAR	A70BAR	7KKPA	A7KKPA	2.0 x
2KPSI	A2KPSI	140BAR	A140BAR	14KKPA	A14KKPA	2.0 x
3KPSI	A3KPSI	200BAR	A200BAR	20KKPA	A20KKPA	1.5 x
5KPSI	A5KPSI	300BAR	A300BAR	30KKPA	A30KKPA	1.5 x
10KPSI	A10KPSI	700BAR	A700BAR	70KKPA	A70KKPA	1.5 x
15KPSI	A15KPSI	1KBAR	A1KBAR	100KKPA	A100KKPA	1.3 x

psi	inH_20	inHg	mmHg	mmH_20	kg/cm^2	bar	mbar	kPa	MPa
0.001	0.01	0.001	0.01	1	0.0001	0.0001	0.1	0.01	0.00001
0.001	0.01	0.001	0.1	1	0.0001	0.0001	0.1	0.01	0.00001
0.01	0.1	0.01	0.1	1	0.0001	0.0001	0.1	0.01	0.00001
0.01	0.1	0.01	1		0.001	0.001	1	0.1	0.0001
0.01	1	0.1	1		0.001	0.001	1	0.1	0.0001
0.1		0.1			0.001	0.001		0.1	0.0001
0.1		0.1			0.01	0.01		1	0.001
0.1		0.1			0.01	0.01		1	0.001
0.1		1			0.01	0.01		1	0.001
1					0.01	0.01		1	0.001
1					0.01	0.01		1	0.001

CPF Adapter Fitting is not included.

- Unneeded pressure units may be disabled via the USB port using CrystalControlWeb software.
- kPa models can display pressure in kPa, MPa, and bar (or mbar) only. psi and bar models can display all available units.
- XP3i will indicate pressure up to 10% above Range Pressure. Above 115%, the XP3i 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.
- Absolute (abs) pressure XP3i's are designated by an "A" before the range in the part number.

PART NUMBERING SYSTEM

Model	Range	Dual Display?	Accuracy	Adapter: Type	Connection: Location	Panel Mount?	Data-logging?
XP3i-	_____	_____	_____	_____	_____	_____	_____
		No . . . . . (omit)	0.05% of reading . . (omit)	NPT. . . . . (omit)	Bottom . . (omit)	No . . . . . (omit)	No . . . . . (omit)
		Yes. . . . . **-DD**	0.02% of FS . . . . . **-S2**	G 1/4 B. . . . . **-BSP**	Back . . . . . **-RP**	Yes. . . . . **-F4**	Yes. . . . . **-DL**
			0.05% of FS . . . . . **-S5**	M20x1.5 . . . **-M20**	**"omit"** for -F4 panel mount	Includes -RP option	

-RP option Rear Pressure Fitting

-F4 option Panel Mount Flange

SAMPLE PART NUMBERS

XP3I-300PSI . . . . . 300 psi standard gauge

XP3i-200BAR-DD . . . . . 200 bar dual-line display gauge

XP3i-A2KPSI . . . . . 2000 psi Absolute gauge

XP3i-700KPA-S2 . . . . . 700 kPa gauge with 0.02% of FS accuracy

Safety & Certifications

HAZARDOUS LOCATIONS

Every XP3i pressure gauge includes the following Intrinsic Safety approvals:

II 1G Ex ia IIC T3...T4 Ga
FTZU 23 ATEX 0015X

Ex ia IIC T3...T4 Ga
IECEx FTZU 23.0017X

CSA24CA80188655X
Exia Intrinsically Safe for Hazardous Locations:
Class I, Division 1, Groups A, B, C and D, Temperature Code T4/T3C.
Class I, Zone 0, AEx ia IIC T3c...T4 Ga

All surfaces are fully static dissipative (surface resistance < 1 GΩ), meeting EN IEC 60079-0:2018 requirements for avoidance of a build-up of electrostatic charge on portable equipment.

! WARNINGS: The following warnings apply to the XP3i:

- **Do not use the USB connector in hazardous locations. The USB connector shall only be used in a non-hazardous location with Um = 6V.**
- **Replace batteries in non-hazardous locations and with approved types only.**
- **Do not mix battery types or manufacturers.**
- **Do not remove the battery cover in hazardous locations.**
- **Substitution of components may impair intrinsic safety.**
- **Special conditions for safe use:**
  - **Because the enclosure of the XP3i and XP3i-DD is made of aluminium, if it is mounted in an area where the use of EPL Ga or category 1 G apparatus is required, it must be installed such that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.**
  - **To avoid sparking caused by electrostatic discharge, the XP3i must be grounded during use in hazardous locations. This may be accomplished by providing an appropriate and continuous path to ground through the pressure fitting, the metal enclosure or the hand of the user.**
  - **T3 or T4 Temperature Class and ambient temperature range is based on selection of approved battery.** See Approved Batteries on Page 21.

CERTIFICATIONS

The XP3i has been tested and certified to comply with a variety of international standards.

FCC (US) Statements

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications to the XP3i could void the user's authority to operate the equipment.

ISED (Canada) Statements

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

This device has been evaluated for RF exposure for normal use at 20 cm from the user.

L'émetteur/récepteur exempt de licence contenu dans la présente unité est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux deux conditions suivantes:

1. l'unité ne doit pas produire de brouillage.
2. l'utilisateur de l'unité doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

L'unité a été évalué pour l'exposition aux RF pour une utilisation normale à 20 cm de l'utilisateur

MIC (Japan) Statements

This equipment contains specified radio equipment that has been certified to the Technical Regulation Conformity Certification under the Radio Law.

This equipment complies with Ordinance Item 19 of Article 2-1.

ATEX/IECEX SAFETY INSTRUCTIONS

Bezpečnostní Instrukce Pro Prostředí s Nebezpečím Výbuchu – ČESKY (Czech)

- V prostředí s nebezpečím výbuchu nepoužívejte přípojku USB. Konektor USB by měl být používán pouze v bezpečném prostředí s Um = 6 V.
- Baterie vyměňujte pouze v bezpečném prostředí. Používejte pouze schválené baterie.
- Za správné použití tohoto přístroje v prostředí s nebezpečím výbuchu odpovídá jeho uživatel.
- Neodstraňujte kryt baterie na nebezpečných místech.
- Aby se zabránilo jiskření způsobenému elektrostatickým výbojem, musí být XP3i při používání v nebezpečných místech uzemněn. Toho lze dosáhnout poskytnutím vhodné a kontinuální cesty k zemi skrz tlakovou armaturu, kovový kryt nebo ruku uživatele.
- Výměna součástí může narušit jiskrovou bezpečnost.
- Zařízení musí být nainstalováno takovým způsobem, aby ani v ojedinělých náhodných případech nemohlo dojít ke vzniku zdroje vznícení způsobeného jiskrami vzniklými nárazy a třením.

▶ Schválené Baterie – ČESKY (Czech)

XP3i je jiskrově bezpečný systém, pouze pokud je napájen jedním z typů baterií uvedených na straně 21.

Mnoho dalších druhů a typů baterií bylo zkoušeno, ale nesplnily požadavky na jiskrovou bezpečnost—nepředpokládejte, že jiné typy jsou rovnocenné.

Sicherheitshinweise Für Explosionsgefährdeten Orten – DEUTSCH (German)

- Die USB Schnittstellenverbindung darf niemals in einer explosionsgefährdeten Umgebung benutzt werden. Der USB-Anschluss darf nur an einem ungefährlichen Ort mit Um = 6 V verwendet werden.
- Der Batteriewechsel muß ausschließlich in sicherer Umgebung mit den vom Hersteller vorgeschriebenen Batterie-Typen erfolgen.
- Der Benutzer ist für den richtigen Umgang des Digitalmanometers in explosions—gefährdeter Umgebung verantwortlich.
- Entfernen Sie die Batterieabdeckung nicht an explosionsgefährdeten Orten.
- Um Funkenbildung durch elektrostatische Entladung zu vermeiden, muss das XP3i beim Einsatz in explosionsgefährdeten Bereichen geerdet werden. Dies kann erreicht werden, indem ein geeigneter und kontinuierlicher Erdungspfad durch die Druckarmatur, das Metallgehäuse oder die Hand des Benutzers geschaffen wird.
- Der Austausch von Bauteilen kann die Eigensicherheit beeinträchtigen.
- Das Gerät muss so installiert werden, dass selbst bei seltenen Vorfällen Zündquellen aufgrund von Anprall, Stoß oder Reibung vermieden werden.

▶ Vom Hersteller Vorgeschriebene Batterien – DEUTSCH (German)

Das XP3i ist nur dann ein eigensicheres System, wenn es mit einem der auf Seite 21 aufgeführten Batterietypen betrieben wird.

Es wurden viele andere Batterietypen vom Hersteller getestet, aber diese haben den Hersteller—Anforderungen für Eigensicherheit nicht entsprochen.
Aus diesem Grund dürfen nur vom Hersteller vorgeschriebene Batterie-Typen in das Gerät eingesetzt werden, um die Eigensicherheit zu gewährleisten.

Safety Instructions for Hazardous Locations – ENGLISH (English)

- Do not use the USB connector in a hazardous location. The USB connector shall only be used in a non-hazardous location with Um = 6V.
- Replace batteries in non-hazardous locations, with approved batteries, only.
- It is the users responsibility to understand the proper application of this product in potentially explosive atmospheres.
- Do not remove the battery cover in hazardous locations.
- To avoid sparking caused by electrostatic discharge, the XP3i must be grounded during use in hazardous locations. This may be accomplished by providing an appropriate and continuous path to ground through the pressure fitting, the metal enclosure or the hand of the user.
- Substitution of components may impair intrinsic safety.
- The equipment shall be installed in such a way, that even in the event of rare incidents, ignition sources due to impact and friction sparks shall be avoided.

▶ Approved Batteries – ENGLISH (English)

The XP3i is an Intrinsically safe system only if it is powered by one of the battery types listed on page 21.

Many other battery types and models have been tested but failed to meet the requirements for Intrinsic Safety—do not assume other models are equivalent.

Instrucciones De Seguridad Para Zonas Peligrosas – ESPAÑOL (Spanish)

- No use el conector USB en zona clasificada. El conector USB sólo se debe utilizar en un lugar no peligroso con Um = 6 V.
- Cambie las pilas en zona no clasificada, solo con pilas aprobadas.
- Es responsabilidad del usario comprender la aplicación de este producto en atmósferas potencialmente explosivas.
- No retire la tapa de la batería en lugares peligrosos.
- Para evitar chispas causadas por descargas electrostáticas, el XP3i debe estar conectado a tierra durante su uso en lugares peligrosos. Esto se puede lograr proporcionando un camino apropiado y continuo a tierra a través del accesorio de presión, la carcasa metálica o la mano del usuario.
- La sustitución de componentes puede afectar la seguridad intrínseca.
- El equipo se deberá instalar de tal modo que, incluso en el caso de un accidente, las fuentes de ignición debido a chispas por fricción o impactos sean evitadas.

▶ Pilas Aprobadas – ESPAÑOL (Spanish)

El XP3i es un sistema intrínsecamente seguro sólo si está alimentado por uno de los tipos de batería enumerados en la página 21.

Se han probado muchos otros tipos de baterías pero han fallado el cumplimiento de los requisitos para la seguridad intrínseca—No asuma que otros modelos son equivalentes.

Instructions De Sécurité Pour Les Zones Dangereuses – FRANÇAIS (French)

- Ne pas utilisez le connecteur USB dans une Zone Dangereuse. Le connecteur USB ne doit être utilisé que dans une zone non dangereuse avec Um = 6 V.
- Remplacez les piles dans des Zones non-dangereuses, avec les piles appropriées, uniquement.
- Il est de la responsabilité de l'utilisateur de bien comprendre l'application appropriée de ce produit en atmosphères explosives.
- Ne retirez pas le couvercle de la batterie dans des endroits dangereux.
- Pour éviter les étincelles causées par une décharge électrostatique, le XP3i doit être mis à la terre lors d'une utilisation dans des endroits dangereux. Ceci peut être accompli en fournissant un chemin approprié et continu vers la terre à travers le raccord à pression, le boîtier métallique ou la main de l'utilisateur.
- La substitution de composants peut compromettre la securité intrinseque.
- L'équipement doit être installé de manière à ce que, même lors d'incidents rares, les sources d'allumage suite à un impact et des étincelles de friction soient évitées.

▶ Piles Approuvées – FRANÇAIS (French)

Le XP3i est un système intrinsèquement sûr uniquement s'il est alimenté par l'un des types de batteries répertoriés à la page 21.

Beaucoup d'autres types et modèles de Piles ont été examinés mais ne conviennent pas pour répondre aux conditions de sécurité intrinsèque—Ne jamais supposez que d'autres modèles pourraient être équivalents.

Prescrizioni Di Sicurezza Per Area Pericolosa – ITALIANO (Italian)

- Non utilizzare il connettore USB in Area Pericolosa. Il connettore USB deve essere utilizzato solo in un luogo non pericoloso con Um = 6 V.
- Sostituire le batterie in Aree non Pericolose e solamente con Batterie approvate.
- E' responsabilità dell'utilizzatore comprendere l'adatta applicazione di questo prodotto in atmosfere potenzialmente esplosive.
- Non rimuovere il coperchio della batteria in luoghi pericolosi.
- Per evitare scintille causate da scariche elettrostatiche, XP3i deve essere collegato a terra durante l'uso in aree pericolose. Ciò può essere ottenuto fornendo un percorso adeguato e continuo verso terra attraverso il raccordo a pressione, la custodia metallica o la mano dell'utente.
- La sostituzione dei componenti può compromettere la sicurezza intrinseca.
- L'apparecchiatura deve essere installata in modo tale che, anche nell'ipotesi remota di un incidente, vengano evitate fonti di ignizione dovute a scintille da impatto e da frizione.

▶ Batterie Approvate – ITALIANO (Italian)

L'XP3i è un sistema a sicurezza intrinseca solo se è alimentato da uno dei tipi di batterie elencati a pagina 21.

Molti altri tipi e modelli di batteria sono stati testati ma non sono risultati conformi alle richieste per Sicurezza Intrinseca–non supponete che altri modelli siano equivalenti.

Veiligheidsinstructie Voor Gebruik In Een Explosie Gevaarlijke Omgeving – NEDERLANDS (Dutch)

- Het gebruik van de USB interface is niet toegestaan in een explosie gevaarlijke omgeving. De USB-connector mag alleen worden gebruikt op een ongevaarlijke locatie met Um = 6V.
- Vervang de batterijen uitsluitend in een niet explosie gevaarlijke omgeving en gebruik alleen batterijen welke zijn goedgekeurd en toegestaan.
- De gebruiker dient er mee bekend te zijn welke gevaren er kunnen optreden in een explosie gevaarlijke ruimte bij gebruik van dit product
  Het is de verantwoordelijkheid van de gebruiker om dit product op een juiste wijze toe te passen.
- Verwijder het batterijdeksel niet op gevaarlijke locaties.
- Om vonken veroorzaakt door elektrostatische ontlading te voorkomen, moet de XP3i geaard worden tijdens gebruik op gevaarlijke locaties. Dit kan worden bereikt door te zorgen voor een geschikt en ononderbroken pad naar de grond via de drukfitting, de metalen behuizing of de hand van de gebruiker.
- Vervanging van componenten kan de intrinsieke veiligheid in gevaar brengen.
- De apparatuur dient dusdanig geïnstalleerd te worden, dat ontstekingsbronnen als gevolg van impacts- en wrijvingsvonken zelfs in geval van zeldzame incidenten vermeden dienen te worden.

▶ Batterijen Welke Zijn Goedgekeurd – NEDERLANDS (Dutch)

De XP3i is alleen een intrinsiek veilig systeem als het wordt gevoed door een van de batterijtypen die op pagina 21 staan vermeld.

Bij gebruik van andere niet gecertificeerde batterijen vervalt de intrinsiek veilige ATEX certificering. Een aantal andere batterij merken en types zijn getest maar voldeden niet aan de ATEX voorwaarden voor intrinsieke veiligheid, U mag er daarom niet van uitgaan dat andere equivalente types wel geschikt zullen zijn.

Instrukcja Bezpieczeństwa Dla Srefy Zagrożonej Wybuchem– POLSKI (Polish)

- Połączenie USB może być używane tylko poza strefą zagrożenia wybuchem. Złącze USB może być używane wyłącznie w miejscach bezpiecznych z Um = 6 V.
- Wymiana baterii tylko poza strefą zagrożenia wybuchem, używaż tylko zatwierdzony typ baterii.
- Odpowiedzialnością użytkownika jest używanie tego produktu we wlaściwy sposób w strefie zagrożonej wybuchem.
- Nie zdejmować pokrywy baterii w miejscach niebezpiecznych.
- Aby uniknąć iskrzenia spowodowanego wyładowaniami elektrostatycznymi, XP3i należy uziemić podczas użytkowania w niebezpiecznych miejscach. Można to osiągnąć poprzez zapewnienie odpowiedniej i ciągłej ścieżki do uziemienia poprzez złączkę ciśnieniową, metalową obudowę lub rękę użytkownika.
- Zamiana komponentów może pogorszyć bezpieczeństwo iskrobezpieczne.
- Wyposażenie należy instalować w taki sposób, aby nawet podczas rzadkich zdarzeń unikać źródeł zapłonu spowodowanego iskrzeniem z uderzeń lub tarcia.

▶ Zatwierdzone Baterie. – POLSKI (Polish)

XP3i jest systemem iskrobezpiecznym tylko wtedy, gdy jest zasilany jednym z typów akumulatorów wymienionych na stronie 21.

Wiele innych typów i modeli baterii przetesowano lecz nie spelniały wymagań Iskrobezpieczeństwa—nie przyjmuje się że inne modele są równoważne.

Räjähdysvaarallisten Tilojen Turvallisuusohjeita – SUOMEN KIELI (Finnish)

- USB väylää/liitintä EI saa käyttää räjähdysvaarallisissa tiloissa. USB-liitintä saa käyttää vain vaarattomassa paikassa, jossa Um = 6 V.
- Käytettävä ehdottomasti ja ainoastaan hyväksyttyjä paristoja.
- Käyttäjän vastuulla on laitteen käyttö räjähdysvaarallisissa tiloissa. Mittausovellus ja käyttöympäristö on ehdottomasti selvitettävä ennen käyttöä.
- Älä irrota akun kantta vaarallisissa paikoissa.
- Sähköstaattisen purkauksen aiheuttamien kipinöiden välttämiseksi XP3i on maadoitettava käytön aikana vaarallisissa paikoissa. Tämä voidaan saavuttaa järjestämällä sopiva ja jatkuva reitti maahan paineliittimen, metallikotelon tai käyttäjän käden läpi.
- Komponenttien vaihtaminen voi heikentää luontaista turvallisuutta.
- Laite tulee asentaa siten, että siinä epätodennäköisessä tapauksessa, että hankaus aiheuttaa kipinöitä, ei lähellä ole syttyviä materiaaleja.

▶ Käyttöön Hyväksytyt Paristot – SUOMEN KIELI (Finnish)

XP3i on luonnostaan vaaraton järjestelmä vain, jos se saa virtansa jostakin sivulla 21 luetelluista akkutyypeistä.

Monia muita paristotyyppejä on testattu, mutta on osoittautunut, etteivät ne täytä räjähdysvaarallisten tilojen vaatimuksia.

Support

TROUBLESHOOTING

The XP3i is a very high performance gauge. Due to the high resolution of this product, you may observe conditions that appear to be defects in the product, but are in fact a result of being able to resolve and measure pressure to a degree not possible with other instruments.

Noisy or Unstable Reading When Used with Fluids

When calibrating or comparing the indicated pressure from an XP3i against a hydraulic dead weight tester or piston gauge, the reading on the XP3i may appear unstable—the least significant digit jumps up and down several counts.

▶ **Reason:** Gas (usually air) is trapped in the line between the gauge and the deadweight tester. What is actually happening is the mass is oscillating up and down, and the combination of gas and fluid is acting like a spring. At higher pressures (above 2000 psi, typically) this may eventually diminish, as the gas dissolves into the fluid.

▶ **Solution:** Evacuate all tubing with a vacuum pump, before introducing fluid into the system.

Non-repeatability of Pressure Measurements

When checking the gauge against a hydraulic deadweight, increasing pressure measurements do not match decreasing pressure measurements.

▶ **Reason:** As in the previous note, gas has dissolved into the hydraulic fluid. When decreasing the pressure, the dissolved gas then leaves the fluid, but at an uneven rate, so small pressure differential (due to fluid head pressure) may exist between the reference deadweight and the gauge being tested.

▶ **Solution:** Evacuate all tubing with a vacuum pump, before introducing fluid into the system.

Err 1 Displayed

▶ **Reason:** The XP3i checks the integrity of internal calibration coefficients every time it's turned on. If any coefficients have been corrupted in any way, "Err 1" is displayed.

▶ **Solution:** Contact factory for instructions on how to restore the memory to the original factory settings.

Err 2 Displayed

▶ **Reason:** The XP3i has tried to display a number too large for the display (i.e., more than 5 digits). May be due to an electrical malfunction or numerical error.

▶ **Solution:** Contact factory for further instructions.

Err 5 or Err 6 Displayed

▶ **Reason:** The XP3i pressure sensor is exhibiting out of normal operating condition behavior.

▶ **Solution:** Contact factory for sensor replacement.

Contact the factory if any other Error Message is displayed.

CALIBRATION

Factory Adjustment

If adjustment is required, we recommend returning the unit to the factory. Factory service offers benefits you won't find anywhere else, utilizing NIST traceable standards in our A2LA accredited laboratory (#2601.01). Furthermore, upgrades may be available to add or enhance operating features. We designed the product to last, and we support it so that you can get the most from your investment.

Calibration Frequency

Under normal operating conditions, we recommend the XP3i be calibrated on an annual basis. Your quality system may require more or less frequent calibration, or your experience with the gauge, or operating environment may suggest longer or shorter intervals.

Although we prefer that you return the XP3i to Crystal Engineering for calibration, ordinary recertification and/or adjustments may be performed by any qualified personnel with appropriate training and equipment. To return the XP3i to one of our factories, please visit our RMA Webpage to complete a request form.

Span Factor

There are no internal potentiometers. The XP3i contains a "span" factor, set to 1 (as shipped from the factory). As components age this may need to be changed to a value slightly higher or lower, to slightly increase or decrease all readings. This adjustment can be made with or without a computer (see CrystalControlWeb Configuration Software on page 15).

▶ Span Factor adjustment

Note: The following instructions are ONLY intended for such qualified personnel with appropriate test equipment. We recommend that the calibration standards used have a minimum rated accuracy of 0.015% of reading, or equivalent in terms of percent of full scale. This level of accuracy requires the use of piston (deadweight) gauges or very high performance pressure controllers.

"Zero" the XP3i, then record displayed pressure for two or more pressure points. Determine if the XP3i would benefit from an overall increase or decrease of the indicated pressures.

To change the span factor from the keypad, turn off the XP3i, then press the (on/off), (units), and (peak) buttons simultaneously. The firmware version will be briefly displayed, followed by the word *cal*, followed by the actual span value. The span factor may be adjusted by pressing either the (units) or (peak) button to increase or decrease the value, respectively. The value changes in 0.0001 increments. Press the (zero) button to store the new value in memory, or the (on/off) button to cancel the change.

For absolute XP3is, it is possible to correct for long term drift using a second calibration factor, zero value offset. CrystalControlWeb and a barometric reference with accuracy of 0.1 psi or better is required to perform the calibration. To calibrate the zero offset, clear the zero as described earlier in this manual by pressing and holding the (zero) button until (- - -) appears. Once cleared, subtract the displayed pressure from barometric pressure, add this difference to any existing zero value offset in CrystalControlWeb, and update the gauge (new value = barometric – displayed + existing). For example, if the displayed value is 14.5 psi, barometric pressure is 14.7 psi, and the existing zero value offset in CrystalControlWeb is 0.1 psi, the new zero value offset would be 0.3 psi (14.7 - 14.5 + 0.1 = 0.3).

CrystalControlWeb The span factor and zero value offset can be viewed and set directly by CrystalControlWeb. Span factor adjustment through the keypad can be disabled by CrystalControlWeb through the disable span factor feature or by password protecting the XP3i .

SOFTWARE

Programming Instructions

The XP3i shares the same programming information as the XP2i. For more information, see the XP2i Programming Instructions. Integrate XP3is into your test environment!

CrystalControlWeb Configuration Software

Use CrystalControlWeb to disable unwanted pressure units, set default pressure units, change water density, adjust calibration, and more.

REPLACEMENT PARTS

The only user-replaceable parts are the batteries and the included CPF adapter fitting.

ACCESSORIES

P/N 7190 USB Universal Adapter, Wall Mount, USB-A
Permits operation of an XP3i from an AC supply of 90 - 264 VAC and 47 - 63 Hz. Includes interchangeable international plugs (for USA, Europe, U.K., and Australia).
Adapter will not charge batteries, but in the event of AC power loss, XP3is will automatically revert to battery operation.

! WARNING: Do not use the USB Adapter Kit in hazardous locations.

P/N 3009 Plastic Carrying Case
35.6 cm (14")L x 27.9 cm (11")W x 8.3 cm (3¼")H with egg-shell foam interior.

! WARNING: Do not use the Plastic Carrying Case in hazardous locations.

P/N 7095 Protective Boot
Skydrol™ resistant protective boot.

P/N 7236 6" Gauge Adapter Kit
Adapts the 4½" Panel Mount (F4 option) to fit into a 6" gauge cutout.

P/N 7237 8½"Gauge Adapter Kit
Adapts the 4½" Panel Mount (F4 option) to fit into an 8½" gauge cutout.

P/N 5203 Magnetic Hanging Strap
Magnetic hanging strap for the XP3i.

! WARNING: Do not use the Magnetic Hanging Strap in hazardous locations.

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*ISO 17025 accredited calibration lab, (A2LA #2601.01).

If calling, have ready the model number, serial number, date of purchase, and reason for return. You will receive instructions for returning the device to us.

FACTORY SERVICE

Please complete the Return Material Authorization (RMA) form at https://www.ametekcalibration.com/support/product-return-rma. It will generate an authorization number and provide return instructions.

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WARRANTY

Crystal Engineering Corporation warrants the XP3i Digital Test Gauge to be free from defects in material and workmanship under normal use and service for one (1) year from date of purchase to the original purchaser. It does not apply to batteries or when the product has been misused, altered or damaged by accident or abnormal conditions of operation.

Crystal Engineering will, at our option, repair or replace the defective device free of charge and the device will be returned, transportation prepaid. However, if we determine the failure was caused by misuse, alteration, accident or abnormal condition of operation, you will be billed for the repair.

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