Crystal pressure

WT Series Operation Manual

for the WT Series Digital Test Gauge

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Overview

INTRODUCTION

Thank you for choosing the WT Series Digital Test Gauge from Crystal Engineering Corporation. The WT Series is a combination of leading edge technology and rugged industrial design. The WT Series Digital Test Gauge is designed to fit in 8" or 10" panel mount applications commonly found in portable test sets. The WT Series is based on the Crystal Engineering Corp. model XP2i digital pressure gauge. The WT Series pressure gauge has been repackaged so that it may be mounted in a portable enclosure, while retaining easy access to batteries and to the digital (RS-232) interface (both of which would otherwise be on the back of the gauge).

Accuracy is 0.1 percent of reading—so any WT Series can typically replace several gauges you may have been using. The WT Series is *fully temperature compensated*—so there is *no change in accuracy throughout the entire operating temperature range!*

The WT Series' case is made from rugged aluminum alloy utilizing a gasket to seal the enclosure against dust and water intrusion. Even the RS-232 connector is fully sealed (with or without the red cover or rubber boot). Circuitry is mounted in shock absorbing elastomer supports and the batteries are easily accessible by removing four screws. But you won't need to change the batteries often, since 3 AAA batteries provide up to 500 hours of continuous operation. The batteries are easily replaced by removing the two screws. Other features include:

- Continuous capture of peak and valley pressure readings
- PSV mode
- Programming interface
- User-defined units
-

Pressure is our Business™

Your WT Series can be customized, through the use of our free ConfigXP™ software. Your personal computer can disable, enable, or modify a variety of features of your WT Series. Look for the CONFIGXP PROGRAMMABLE 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
- Set the gauge to a different density of water factor (4° C, 60° F, or 68° F)
- Store a 12 digit ID or tag number in non-volatile memory
- Adjust calibration values

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OPERATING INSTRUCTIONS

The WT Series is shipped with batteries installed, so it's ready to use. Press and hold the (on/off) button. The WT Series will first test all LCD segments. Release the (on/off) button when the WT Series indicates pressure.

The WT Series 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 WT Series to your system.

! 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 WT Series 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 a WT Series 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 (CONFIGXP).

Some WT Series 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 ConfigXP). 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!

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Functions

Units Button

Pressing this button causes the WT Series to select the next available unit of pressure measurement.
See Pressure Ranges, Display Scales, & Resolution on page 13 or the list of pressure units available for your model.

CONFIGXP PROGRAMMABLE Units that you don't need or never use can be turned off. You can also define a special unit for your WT Series with ConfigXP. You can use the WT Series 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 Button

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

<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

* From the factory this setting is disabled. Use ConfigXP 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 WT Series is turned on or reset.

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

The WT Series 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 ConfigXP.

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

<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 *(remaining points displayed on lower line)*
TARE	Tare *
/min	Rate of change *
HI LO	Differential Mode *
HI LO + AVG	Average Differential Mode *

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Resetting (Clearing) Recorded Peak Values

Peak values can only be cleared when displaying either a Peak High or Peak Low recorded pressure. Press the (clear) 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 (clear) button while either the Peak High icon (HI) or the Peak Low icon (LO) 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

CONFIGXP PROGRAMMABLE If you attempt to zero the gauge while applying a pressure which exceeds the Zero Limit (set in ConfigXP, defaults to 20 PSI), the command will be ignored and - - *HI* - will be displayed.

▸ To Zero the WT Series

Turn off peak indication by pressing the (peak) button repeatedly until the Peak High icon (HI) and Peak Low icon (LO) 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 the WT Series

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.

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Tare (-DD, Dual-Line Display WT Series 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 ConfigXP. 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 (- - -).

CONFIGXP PROGRAMMABLE The Tare function is disabled by default, but can be enabled with ConfigXP.

Rate (-DD, Dual-Line Display WT Series 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 WT will indicate a more stable rate. However, the WT 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.

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

Differential Mode (-DD, Dual-Line Display WT Series Only)

Differential mode allows the WT Dual-Line Display gauge (the master) to be connected to a second WT gauge (the slave) and display the pressure difference between the two gauges. A standard RS232 cable (p/n 2400) and null modem adapter (p/n 3456) or a null modem cable are required to directly connect the gauges. You must use ConfigXP to enable this feature, and once enabled, use the (peak) button on the master gauge until the Peak High (HI) and Peak Low (LO) icons are displayed simultaneously. A WT Series gauge must be running firmware version R0114 or later, and a WT gauge must be running firmware version R0014 or later for this feature to work. Use DataLoggerXP version .6.10 or later to upgrade to the latest firmware.

CONFIGXP PROGRAMMABLE The differential mode is disabled by default, but can be enabled and configured with ConfigXP.

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Automatic Shut-off

The WT Series has a shutoff timer and will turn off automatically after 20 minutes of non-operation. Pressing any button or sending any command via the RS-232 connection resets the shutoff timer for another 20 minutes of operation. The WT Series will briefly display *Auto Off 20* when turned on.

To disable the shutoff feature, turn on the WT Series by pressing the (on/off) and (zero) buttons simultaneously. The WT Series 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 WT Series 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 ConfigXP 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 WT Series 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 WT Series, or press the (backlight) button repeatedly, to turn off the backlight.

Measuring Vacuum

All versions of the WT Series can be used to measure moderate vacuum, though only ranges of 300 PSI (and 20 bar or 2000 kPa) and lower are actually tested and certified for vacuum operation.

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

Absolute gauges (models with a "B" in front of "WT" 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 (- - -).

CAUTION: WT Series are not recommended for continuous use below -14.5 PSIG.

For continuous use below -14.5 PSIG with high accuracy, choose our XP2i-DP Differential Pressure Gauge.

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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 WT Series 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 WT Series can be set to use the density of water at 20° C (68° F) or 15.6° C (60° F) instead.

To check and/or change the water density setting from the keypad, turn on the WT Series by pressing the (on/off) button and the (peak) button simultaneously. The display will indicate either *4C*, *60F*, or *68F*.

Press the (units) button until the display cycles to the desired water density, then press the (zero) button to store the selection (this will not zero the gauge).

CONFIGXP PROGRAMMABLE Select and set the desired density of water.

Note: If the WT Series is password protected, or inches of water is disabled, you will not be able to view or change the water density from the keypad.

Overpressure Conditions

The WT Series will read pressure up to approximately 110% of the rated pressure range. Above 110% percent of the range the display will start flashing and the readings will not be reliable. ***The zero function does not affect the point at which the display starts flashing to indicate overpressure***, so depending on the zero value it is possible that the display can start flashing without the maximum pressure being displayed.

For instance, if a 100 PSI WT Series is zeroed when 30 PSI is being applied, it will indicate that the overpressure condition has been reached at 80 PSI (i.e., 110% x 100 PSI – 30 PSI = 80 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 13 for maximum overpressure.

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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 WT Series 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 ConfigXP 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) WT Series 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 (clear) button while the display shows the Peak High icon (HI) or Peak Low icon (LO).

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

Reset

If for some reason the WT Series needs to be reset, remove any battery for at least one minute, then reinstall the battery. If the reset is successful, the WT Series will start operating without pressing the (on/off) button. Reset will clear the zero, peak values will be reset to the current reading, and the WT Series will be set to the default engineering units.

Communications/Programming

The WT Series responds to a query-based command language which allows remote control of the gauge. Please refer to the XP2i Programming Instructions for documentation of this feature.

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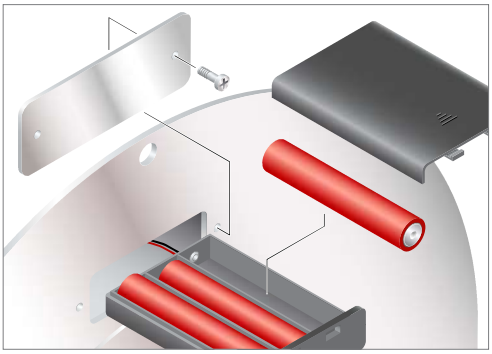
Low Battery Indication

The Battery icon ( ) uses three bars to display the battery level. When the icon displays all three bars, the batteries are full. The WT Series 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 WTSeries gauge uses 3 AAA alkaline batteries. The batteries are located above the gauge behind a metal panel. With a small flat blade screwdriver, unscrew the two panel screws to gain access to the battery compartment. Remove the battery holder and slide the cover off. After replacing the batteries, the gauge will start operating immediately (without having to press the button). This indicates that a complete reset has occurred, and is normal.



CAUTION: Do not mix battery types or manufacturers.

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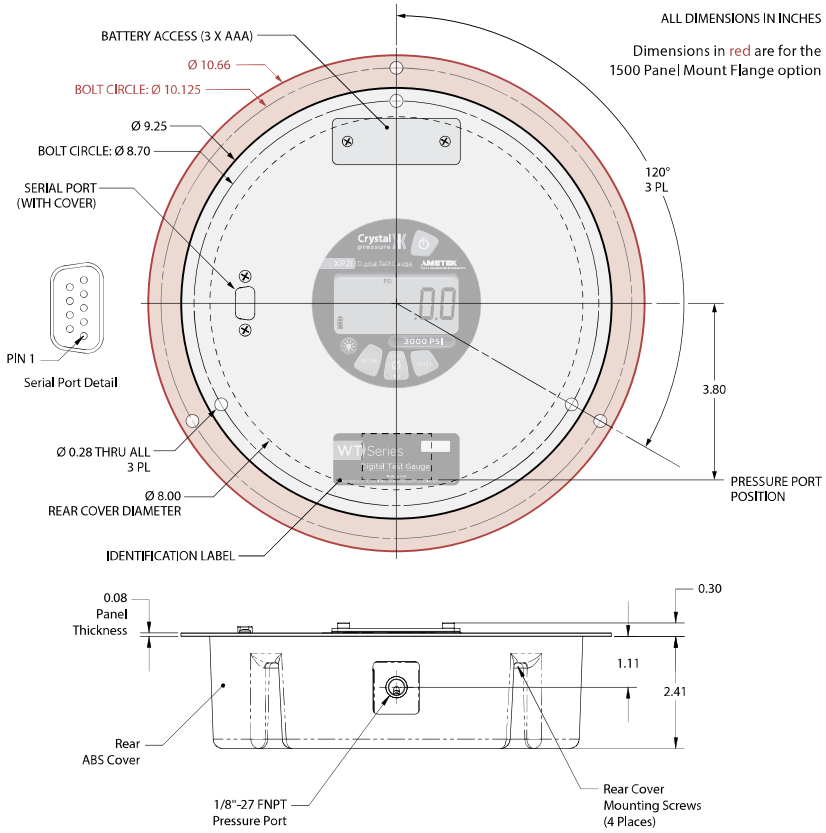
Enclosure

INFORMATION

Weight ..... 1.25 kg (2.7 lbs) (includes batteries)
Housing ..... Aluminum, Stainless Steel.
Keypad and Labels..... UV Resistant Polyester.



SERIAL NUMBERS

Serial Number Location

The serial number of your WT Series is located on the front panel. It is also stored digitally within the gauge.

You may also find your serial number using ConfigXP software. See ConfigXP for more information.

Serial Numbering System

Serial Numbers consist of 6 numbers, with the left most digit representing the year of manufacture. For example: 567358 was manufactured during 2015.

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Specifications

Accuracy

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 (if not an absolute model), rezeroed. 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.

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

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

Vacuum, for 300 PSI, 20 bar, 2000 kPa, and lower pressure gauges:

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

CAUTION: Not recommended for continuous use below -14.5 PSIG or 0.2 PSIA. Refer to the XP2i-DP data sheet for gauges that are intended for continuous high vacuum use.

Temperature

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

Non-condensing. 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.

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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

Communication .....DB-9, RS-232 (environmentally sealed).

Pressure Connection.....1/8" female NPT

Display

Screen .....5.5 digits.

Display Rate.....4 readings/second (standard).
8 readings/second (PSV mode).

Numerical Display Height.....16.9 mm (0.67") single line display. LCD readable in sunlight with bright backlight.

Sensor

Wetted Materials .....(Wrench Tight) 316 stainless steel
(Finger Tight) 316 stainless steel and Viton (internal o-ring)

Diaphragm Seal Fluid.....Dow Corning 200

POWER

Batteries .....Three size AAA batteries.

WARNING: **This product is not certified for use in hazardous locations.**

Battery Life.....500 hours typical (alkaline battery).

Ultra Low Power.....>1 year, typical with 20 minute recording interval in LT5 mode.

Battery Indicator.....3-segment Battery Icon:

( ) : Full Battery

( ) : Used Battery

( ) : Low Battery

Dead Battery Indication.....*batt*

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PRESSURE RANGES, DISPLAY SCALES, & RESOLUTION

PSI	bar	kPa	MPa	Overpressure
15PSI	1BAR	100KPA	0.1MPA	6.5 x
30PSI	2BAR	200KPA	0.2MPA	3.0 x
100PSI	7BAR	700KPA	0.7MPA	2.0 x
300PSI	20BAR	2KKPA	2MPA	2.0 x
500PSI	30BAR	3KKPA	3MPA	2.0 x
1KPSI	70BAR	7KKPA	7MPA	2.0 x
2KPSI	140BAR	14KKPA	14MPA	2.0 x
3KPSI	200BAR	20KKPA	20MPA	1.5 x
5KPSI	300BAR	30KKPA	30MPA	1.5 x
10KPSI	700BAR	70KKPA	70MPA	1.5 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

- Unneeded pressure units may be disabled via the RS-232 connector using ConfigXP software.
- kPa and MPa models can display pressure in kPa, MPa, and bar (or mbar) only. PSI and bar models can display all available units.
- WT Series will indicate pressure up to 10% above Range Pressure. Above 110%, the 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 pressure WT Series gauges are designated by a "B" following the part number.
- An Absolute pressure version is available only on ranges of 2000 PSI and higher.

PART NUMBERING SYSTEM

Model	P/N	Gauge Type	Panel Mount	Dual Display?	Data-logging?
WT	____	_____	_____	_____	_____
		Standard: (omit)	8.7": **-1000**	No.....(omit)	No: (omit)
		Absolute: **B**	10.125": **-1500**	Yes..... **-DD**	Yes: **-DL**
		Absolute only available on 2KPSI gauges and higher			

SAMPLE PART NUMBERS

WT300PSI-1000.....300 PSI standard WT Series gauge with 8.7" bolt centering panel

WT2KPSIB-1500.....2000 PSI standard WT Series Absolute gauge with 10.125" bolt centering panel

WT30KKPA-1500-DL....30 000 kPa standard WT Series gauge with 10.125" bolt centering panel, with DataLoggerXP firmware

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Support

TROUBLESHOOTING

The WT Series 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 a WT Series against a hydraulic dead weight tester or piston gauge, the reading on the WT 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 WT 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 WT 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 4 Displayed on -DD, Dual Line Display Gauge.

- **Reason:** The gauge is a master in differential mode that cannot detect the slave device.
- **Solution:**

1. Turn on the slave gauge.
2. Ensure you are using a null modem RS232 cable or standard cable with a null modem adapter.
3. Use ConfigXP to remove the differential mode from the gauge.

Err 5 or Err 6 Displayed

- **Reason:** The WT pressure sensor is exhibiting out of normal operating condition behavior.
- **Solution:** Contact factory for sensor replacement.

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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. We have the facilities to test your gauge at a variety of temperatures utilizing NIST traceable standards in our A2LA accredited laboratory, resulting in calibration certificates that provide performance data over temperature. 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 WT 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 WT to Crystal Engineering for calibration, ordinary recertification and/or adjustments may be performed by any qualified personnel with appropriate training and equipment.

Span Factor

There are no internal potentiometers. The WT contains a "span" factor, set to approximately 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 ConfigXP Configuration Software).

▶ 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 0.025% 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 WT, then record displayed pressure for two or more pressure points. Determine if the WT would benefit from an overall increase or decrease of the indicated pressures.

To change the span factor from the keypad, turn off the WT, 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 WTs, it is possible to correct for long term drift using a second calibration factor, zero value offset. ConfigXP 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 ConfigXP, 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 ConfigXP is 0.1 PSI, the new zero value offset would be 0.3 PSI (14.7 - 14.5 + 0.1 = 0.3).

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

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SOFTWARE

ConfigXP Configuration Software

Use ConfigXP to disable unwanted pressure units, set default pressure units, change water density, adjust calibration, and more via the RS-232 interface.

REPLACEMENT PARTS

The only user-replaceable parts are the batteries.

ACCESSORIES

P/N 2984 AC adapter kit
Permits operation of a WT Series 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, WTs will automatically revert to battery operation.

P/N 3313 USB-RS232 Adapter
USB B receptacle to RS232 DB9M.

P/N 2400 RS232 Cable
DB-9 male to DB-9 female straight pass-through cable.

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FACTORY SERVICE

Please complete the Return Material Authorization (RMA) form. It will generate an authorization number and provide return instructions.

TRADEMARK

"Pressure is Our Business" is a registered trademark of Crystal Engineering Corp.

WARRANTY

Crystal Engineering Corporation warrants the WT Series 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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