

Crystal Multi-Point Calibration Procedure for Stressing Jacks GLR-Co1

1. SOFTWARE

Crystal Software ConfigXP Version 2.4

***** CAUTION ***** - When accessing batteries, DO NOT use excessive force when removing cover. Damage to the p.c. board may occur!

2. STRESSING JACK SETUP

Note: Be aware of the diameter of the cable strand being used by the load cell to prevent pulling the strand in half by overloading the rated load. Final point should not exceed the customer's normal maximum load applications. Personnel shall be removed from the jack area during the procedure.

- a. Install hollow load cell on stressing ram. Attach RS232 data cable to back of gauge and to a laptop RS232 port. Turn on gauge and open ConfigXP software on laptop. Click on CONNECT at top right of window. This will show the gauge's status. Uncheck all check boxes except "PSI" and "User Defined". Then click on UPDATE GAUGE. Then click "NO" in the next pop up window. The gauge is now ready to collect data. Close ConfigXP software by clicking "DISCONNECT".

At this point control the gauge by the buttons on the front of the gauge "PSI" and "User Defined" by pressing the "UNITS" button. Each time the UNITS button is pressed, the gauge will toggle between the two selections PSI and User Defined as needed.

- b. Open low range pressure regulator completely and high range pressure regulator half way open by turning counter-clockwise to unload hydraulic pressure. Note that high pressure adjustment feeds the low pressure controls.
- c. Zero Crystal gauge (+/- 15psi). Start the pump and record psi gauge reading. This is the first point -Zero (hydraulic fluid friction). No load showing on the load cell.
- d. Ensure Low Range pressure regulator has zero pressure. Select the Low Range or "Initial" and depress lever to pull against load cell. Record the gauge psi reading and load cell lbs. force reading by toggling the UNITS button. This is the second point.
- e. Turn the Low Range pressure regulator slowly while observing the load cell reading until 2,000 lbs. force is noted. Record the gauge PSI reading and load cell User Defined reading. This is the third point.

- f. Turn the Low Range pressure regulator slowly while observing the load cell reading until 3,000 lbs. force is noted. Record the gauge reading and load cell reading. This is the fourth point.
- g. Turn the Low Range pressure regulator slowly while observing load cell reading until 4,000 lbs. force is noted. Record both readings. This is the fifth point.
- h. Switch the range lever to “High Range” or “Final” and turn the High Range pressure regulator until 10,000 is noted on load cell. Record the gauge reading and load cell reading. This is the sixth point.
- i. Turn the High Range pressure regulator until 20,000 lbs. force is noted on the load cell and record the gauge and load cell reading. This is the seventh point.
- j. Unless additional points are warranted, this step should be the maximum load used by the customer for the diameter of the strand being used. Pull the wire until the load maximum value and record the gauge and load cell readings. This is the final point.
- k. Remove load from the wire strand.

3. INSTALLING VALUES IN GAUGE

- a. Return to the computer software.
- b. Click on the “User Defined” check box and the “PSI” check box.
- c. Click on the “User Units Wizard” located at the lower right screen area. A new screen will show a set of fields for typing in the readings collected.
- d. On the left side of the screen three columns containing PSI, Desired and Actual indication appears. Enter the zero point of recorded readings in PSI field from 2 c. above. Pressing the tab key will move to desired indication; record zero. Use the tab key to proceed to each field.
- e. Continue recording the PSI readings and load cell readings in this fashion.
- f. When finished, click the “OK” button at the lower right of the screen to return to Config XPOs main window by selecting OK on lower right of window. The original screen will return.
- g. Click on Update Gauge to deliver the readings. A window may appear in 10K gauges

saying (WARNING: The Gauge will display Err 2 when pressure exceeds 6110.31 PSI.) and will ask if you wish to proceed. Click YES. Uncheck PSI box. Check UPDATE GAUGE box. Upper right area of software has a Save Box where the calibration data can be saved for future reinstallation as needed instead of following this procedure again. Give it a name and number and click on the box. This will record the data to ConfigXP.

Notes:

- a. The gauge may display a negative or positive number that cannot be zeroed by pressing the Zero Button. This is the offset installed by ConfigXP and is the new "0". It represents cancelled error introduced by hydraulic friction. When the pump starts to apply pressure to the ram, note the gauge reads Zero at first ram movement.
- b. Grouping Readings: The User Units Wizard software is designed by Crystal Engineering to accept a large number of readings in excess of those given in this procedure. Grouping of extra readings close to the initial and final numbers will not ensure increased accuracies in those two areas. Readings taken closer than 100 psi intervals is not recommended. Too many readings will overload some areas and cause a shift in the "best fit" efforts of the software.

When done, stress the jack to desired target stress and note the reading. If the reading is out of range, return to ConfigXP and go to the Wizards page. Locate the grouping that is out and change the PSI reading up or down slightly until a desirable reading in the lbs. force field is noted. UPDATE GAUGE and check the load again.

- c. This splitting of differences will bring the gauge into range with practice. When the Wizard page is finished, return to the initial page and note the ZERO box on the left of the page. Enter a value ranging from 200 to 300 psi. UPDATE GAUGE. This disables the Zero button on the face of the gauge to stop the offset from being erased and throwing the calibration out.

Most gauges will read well with just three readings, Zero set, Initial and Final on high range. The gauge's accuracy can be increased by setting up the gauge in real time application of stressing operations. Have the laptop with ConfigXP software opened to the User Defined Wizard and stress the initial pull, take note, then the final and take note of elongation. If the elongation is too long, start by changing the PSI reading of that stress level downward. (Example: PSI reading at 300, drop to 275, update gauge and try the next strand. If the elongation is closer then repeat the lowering of PSI until desired effect is reached. The opposite applies to too short of elongation. Each jack is different. It is possible to achieve . 2% accuracy from strand to strand repeatability.