

3130 Portable Pressure Calibrator Adjustment Procedure

FLUKE®

Calibration

This procedure is intended for Fluke Calibration customers and labs trained on the use and maintenance of the 3130 Portable Pressure Calibrator and the reference standards used to calibrate the 3130 Calibrator

Purpose

This document instructs how to perform a zero (offset) and span (gain) adjustment for the various quantities measured and output by the 3130 Portable Pressure Calibrator.

Note

A calibration is always done before adjustment unless it is not possible to do so. The results of the calibration are evaluated to determine if adjustment is necessary. Verification is usually done after adjustment. Calibration and verification can be done by using the keypad to set the mode of the calibrator and the readings can be read directly from the display, or read through the RS232 connection port (more details below).

Equipment and other requirements

1. 3130 Portable Pressure Calibrator Users Manual,
<http://us.flukecal.com/literature/product-manuals/3130-users>
2. DC voltage standard capable of sourcing 0 to 30 V
3. mA current standard capable of sourcing 0 to 24 mA
4. Pressure standard capable of sourcing -80 to 2000 kPa (-12 to 300 psi), gauge mode
5. Computer with a RS232 serial communications interface and software to communicate through the port
6. RS232 communications cable

Part Number: 667425

Description: (FLUKE-700SC) CABLE ASSEMBLY, SERIAL INTERFACE

Ordering Information: Contact the Orders Group in the Customer Care Center at 1(877) 355-3225 or email to the Fluke Calibration Orders Group at orders@flukecal.com

Overview

The calibrator is adjusted by sending commands to, and receiving readings from the calibrator's serial communications port. The commands can be sent and received by using a terminal program (e.g. HyperTerminal or Putty freeware from www.putty.org) or an automated calibration/adjustment program can be written using programs like COMPASS for Pressure, MET/CAL, Visual Basic, or LabVIEW. In this document only the terminal program method will be described. There are no mechanical adjustments and the adjustment is done without accessing the internal components of the calibrator.

Preparation

As long as the calibrator has been at a stable temperature, within the range of 20 to 26 degrees Celsius (68 to 79 degrees Fahrenheit) for an hour or more, the calibrator only needs 5 minutes to warm up. If temperature conditions were previously below 10 degrees Celsius (50 F) or higher than 40 degrees Celsius (104 F), then the unit must be allowed to stabilize for a minimum of 3 hours prior to calibration or adjustment.

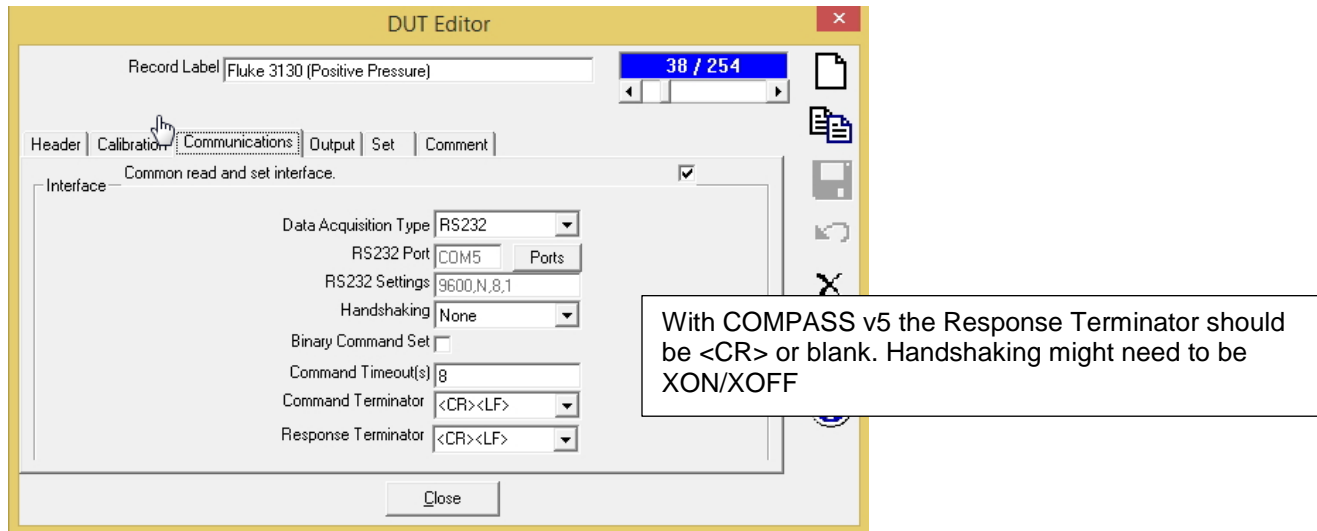
Initiating Communication: To perform serial communication, connect the port labeled "EXTERNAL PRESSURE MODULE" to a PC using the FLUKE-700SC RS232 serial communication cable, Fluke part number 667425. This cable is not supplied with the unit and needs to be purchased separately (see #6 above). The other end of the cable should be connected to the terminal/PC serial port. An adapter may be needed for terminals that use 25 pin

'D' serial connectors. An optically-isolated serial port adapter is recommended to eliminate potential ground loops.

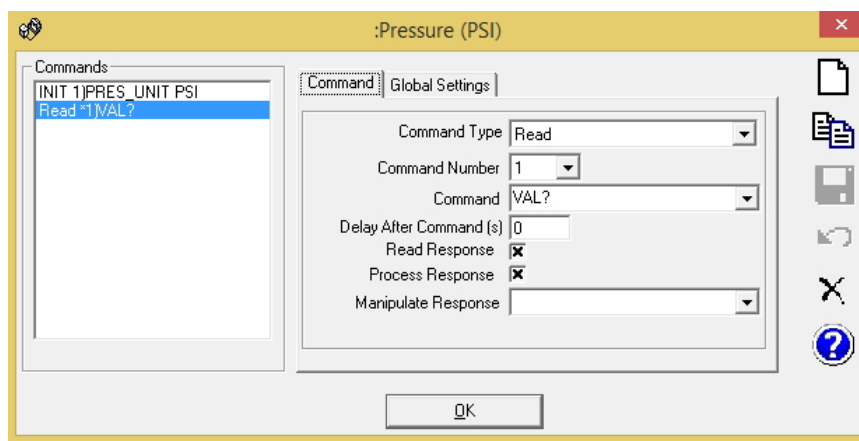
The terminal settings need to be set as follows:

- Baud rate: 9600 bits per second
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: none
- Local echo: on

Here is an example Communications setup screen from COMPASS for Pressure



Here is an example Command setup screen from COMPASS for Pressure using an initialize command to set the units of pressure to psi, and a read command of VAL?



Set the display: All calibration and adjustment commands are performed on the functions selected on the lower display. Use the following command sequence to turn off all but the lower display.

- DISPLAY UPPER, ON
- DISPLAY MIDDLE, ON
- DISPLAY LOWER, ON

Adjustment Procedure

Adjusting Voltage Input:

Connections:

Use the test lead set to attach the voltage output of the standard to the input of the calibrator

Procedure:

1. After you have made your connections, send the following command to put the unit in Voltage mode: FUNC LOWER,DCV
2. Use the voltage source to input 0V, when the reading is stable send the following command: CAL_POINT[0][0]
3. Use the voltage source to input 15V, when the reading is stable send the following command: CAL_POINT[0][1]
4. Use the voltage source to input 30V, when the reading is stable send the following command: CAL_POINT[0][2]
5. The voltage range is now adjusted. Use the voltage source to verify the calibration.

Adjusting mA Input:

Connections:

Use the test lead set to attach the milliamp output of the current source to the input of the calibrator

Procedure:

1. After you have made your connections, send the following commands to put the unit in current measure mode: FUNC LOWER,DCI then IO_STATE MEASURE
2. Use the current source to input 0mA, when the reading is stable send the following command: CAL_POINT[0][0]
3. Use the current source to input 12mA, when the reading is stable send the following command: CAL_POINT[0][1]
4. Use the current source to input 24mA when the reading is stable send the following command: CAL_POINT[0][2]
5. The milliamp measure range is now adjusted. Use the current source to verify the calibration.

Adjusting mA Source:

Connections:

Use a test lead to the short the positive contact to the negative contact of the calibrator.

Procedure:

1. After you have made your connection, send the following commands to put the unit in current source mode: FUNC LOWER,DCI then IO_STATE SOURCE
2. Once the calibrator is in the current source mode, send the following command: CAL_MA_SRC

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Electrical	RF	Temperature	Pressure	Flow	Software
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3. The calibrator will then adjust the source side by comparison to the measure circuit.
The process will take a minute or two.
4. The milliamp source range is now adjusted. Use the voltage measuring standard to verify the calibration.

Adjusting Pressure:

Connections:

The calibrator's pressure port labeled "OUTPUT" is used and is a 1/8" NPT female connection. Various adapters may be needed to connect to the pressure standard. Insure that the VENT valve is in the open position, the PRESSURE/VACUUM switch is in the PRESSURE position and the ISOLATION VALVE is in the CLOSED position.

Procedure:

1. After all connections have been made send the following command to put the unit in pressure mode: FUNC LOWER,P1
2. Send the OFFSET_ADJ? command. Note the value returned.
 - a. Use the pressure standard to input a value equal or close to the noted value.
 - b. When the pressure is stable send the following command: OFFSET_ADJ n
where n is the entered pressure.
3. Send the GAIN_ADJ? command. Note the value returned.
 - a. Use the pressure standard to input a value equal or close to the noted value.
 - b. When the pressure is stable send the following command: GAIN_ADJ n
where n is the entered pressure.
4. The pressure range is now adjusted. Use the pressure standard to verify the calibration.

End of Procedure