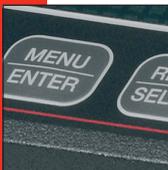


Adjustment Manual  
**Industrial Pressure Calibrator**  
JOFRA IPI & IPI Mk.II

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## Supervisory Mode and Calibration Instructions for IPI Industrial Pressure Indicator

### Using the Supervisory Mode

Push the CONFIG button to access the user-settable functions on the indicator. Each time the CONFIG button is pressed; the display advances to the next function. Press CONFIG repeatedly until “FUNc LOCK” is displayed.

Press ENTER when “FUNc LOCK” is displayed, 0<sup>PWRD</sup> will be displayed on the indicator. The password to enter supervisory mode is 101, set using the ▲ and ▼ keys. Holding a key continuously will cause the display to advance more quickly for faster setting. The password is factory set and cannot be changed.

1. Your IPI is shipped from the factory with all setting access “unlocked” or available to be changed.
2. In supervisory mode each of the parameters can be locked or unlocked using the ▲ and ▼ keys. Select LOC (lock) for those parameters you do not want to be accessible, and UnLOC (unlock) for those can be accessed.
3. In order, the functions that can be unlocked, locked or accessed are:
  - Zero function (enable/disable)
  - Set pressure units (enable/disable)
  - Auto shutdown adjustment (enable/disable)
  - Damping settings (enable/disable)
  - Sample rate setting (enable/disable)
  - Tare setting (enable/disable)
  - Custom engineering units (set scale factor)
4. Use the CONFIG key to scroll through the above choices, and the ▲ and ▼ keys to lock and unlock features. Press CONFIG to continue scrolling through the parameters, pressing ENTER at any point saves your settings and returns the indicator to normal operation.

When a function is “locked, it cannot be accessed or changed from its current state. To change a locked function, enter the supervisory mode, and unlock the function. Once it is changed, you may enter supervisory mode to lock access again.

5. Setting a custom engineering unit or scale: The last menu choice in supervisory mode is SET FACTR. This allows you to set a multiplier factor from 0.001 to 100, creating a custom scale. The set factor will be multiplied by the psi measured, the result will be displayed.

For example: 40 psi is the equivalent of 1000 lbs of product in a tank. You want to display the product weight , using a 100 psi range indicator. By setting a factor of 25, a 40 PSI pressure would display as 1000 (40 x 25). The engineering unit displayed on the IPI will be “Cust”.

## IPI Calibration Procedure

### Overview

Calibration adjustment of the IPI is performed electronically via internal software with the case closed. There are no mechanical adjustments; all calibration commands and adjustments are done via the keypad, using the display to guide the user through the calibration process.

Eight calibration points are used in the adjustment program, working from full scale to zero at pressures equaling 100%, 87.5%, 75%, 62.5%, 50%, 37.5%, 25%, 12.5%, and 0% of full scale plus vacuum.

**Note:** This is an ambient temperature calibration, and should be performed at an ambient temperature of  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$  ( $72^{\circ}\text{F} \pm 5^{\circ}\text{F}$ ). Calibration outside this temperature range will invalidate the temperature compensation program in the IPI.

### **Calibration Interval**

You should check performance of the IPI at the interval required by your calibration program. We recommend adjustment when measurement deviates by more than 75% of the specified accuracy, or 0.04%

### **Test Equipment**

Verification and calibration of the IPI requires pressure and/or vacuum standards able to produce and indicate pressures from vacuum to the full-scale range of the unit under test. In order to maintain the specified accuracy of the IPI, standards should have a TUR of 4:1 or better.

### **Connections**

The IPI uses a 1/4" NPT male connection in the pressure input port. Various adapters may or may not be needed to connect to the pressure standard. Always make sure the hose, tubing, and fittings etc have a rated working pressure at or above the pressure of the unit. Also it is important that there be no leaks when performing calibration; use Teflon tape where appropriate.

## **Manual Calibration**

### **Entering Calibration Mode:**

After you have made your connections, turn the power on while holding the CONFIG key. Use the arrow keys to enter the password. The password is 101. If you have entered calibration mode correctly the display should look as shown below. The pressure value displayed will be the full-scale value of the indicator.

### **Procedure:**

Screens shown in this manual represent the displays shown with a 500 psi indicator. The IPI will prompt the technician for the appropriate pressure at each calibration point.



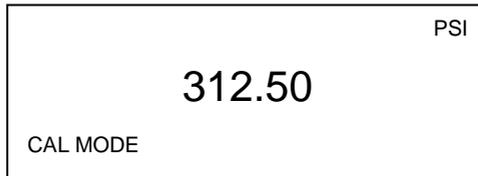
Use the Pressure Standard to output 500.00 psi (100%). After the output has stabilized, press the ENTER key to continue. As the unit takes readings, the screen will show ----- . When the readings are complete the screen should look as shown in the illustration that follows.



Use the Pressure Standard to output 437.50 psi (87.5%). After the output has stabilized, press the ENTER key to continue. As the unit takes readings, the screen will show ----- . When the readings are complete the screen should look as shown below.



Use the Pressure Standard to output 375.00 psi (75%). After the output has stabilized, press the ENTER key to continue. As the unit takes readings, the screen will show ----- . When the readings are complete the screen should look as shown below.



Use the Pressure Standard to output 312.50 psi (62.5%). After the output has stabilized, press the ENTER key to continue. As the unit takes readings, the screen will show ----- . When the readings are complete the screen should look as shown below.

	PSI
<b>250.00</b>	
CAL MODE	

Use the Pressure Standard to output 250.00 psi (50%). After the output has stabilized, press the ENTER key to continue. As the unit takes readings, the screen will show ----- . When the readings are complete the screen should look as shown below.

	PSI
<b>187.50</b>	
CAL MODE	

Use the Pressure Standard to output 187.50 psi (37.5%). After the output has stabilized, press the ENTER key to continue. As the unit takes readings, the screen will show ----- . When the readings are complete the screen should look as shown below.

	PSI
<b>125.00</b>	
CAL MODE	

Use the Pressure Standard to output 125.00 psi (25%). After the output has stabilized, press the ENTER key to continue. As the unit takes readings, the screen will show -----. When the readings are complete the screen should look as shown below.

PSI
<b>62.50</b>
CAL MODE

Use the Pressure Standard to output 62.50 psi (12.5%). After the output has stabilized, press the ENTER key to continue. As the unit takes readings, the screen will show -----. When the readings are complete the screen should look as shown below.

PSI
<b>0.00</b>
CAL MODE

Use the Pressure Standard to output 0.00 psi. After the output has stabilized, press the ENTER key to continue. As the unit takes readings, the screen will show -----. When the readings are complete the screen should look as shown below.

PSI
<b>-12.00</b>
CAL MODE

Use the Pressure Standard to output -12.00 psi. After the output has stabilized, press the ENTER key to continue. As the unit takes readings, the screen will show -----. When the readings are complete the unit will reset and power up in normal mode.

## Serial Calibration

### Entering Calibration Mode

The terminal communications can be setup using terminal communication software on a PC, such as Hyperterminal or PcPlus. Connect the RS232 cable to stereo jack on the back of the IPI. 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.

The terminal settings need to be set as follows:

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

To initiate the calibration mode use the terminal to send the CAL\_START command. The following will be displayed on the terminal.

Calibration is password protected  
Enter Password:

The password is FLD\_CAL. Enter the password correctly and the following will be displayed on the terminal.

Calibration Menu

- 1: Calibrate Temperature
- 2: Set Sensor Parameters
- 3: Calibrate Pressure
- 4: Reset Temp Compensation
- 5: First point above ambient Temp Comp
- 6: Second point above ambient Temp Comp
- 7: First point below ambient Temp Comp
- 8: Second point below ambient Temp Comp
- 9: Exit and save Data
- 10: Exit WITHOUT saving Data

Enter Selection:

## Procedure

After all connections have been made, type 3 {enter}. Use the Pressure Standard to input –approximately 200,150,100,50,0, and -12 psi as prompted. When the value is stable, type in the actual value at the keyboard. The screen should look as shown below.

### Calibration Menu

- 1: Calibrate Temperature
- 2: Set Sensor Parameters
- 3: Calibrate Pressure
- 4: Reset Temp Compensation
- 5: First point above ambient Temp Comp
- 6: Second point above ambient Temp Comp
- 7: First point below ambient Temp Comp
- 8: Second point below ambient Temp Comp
- 9: Exit and save Data
- 10: Exit WITHOUT saving Data

Input ~200.000000 psi, Enter the actual value when stable:  
Input ~150.000000 psi, Enter the actual value when stable:  
Input ~100.000000 psi, Enter the actual value when stable:  
Input ~50.000000 psi, Enter the actual value when stable:  
Input ~0.000000 psi, Enter the actual value when stable:  
Input ~-12.000000 psi, Enter the actual value when stable:

After inputting –12 psi the main calibration menu will reappear.

## Notes on Calibration Verification:

This procedure covers calibration only. When verifying a unit, as a rule of thumb the unit should never exceed 50% of its spec. For verification using the serial port use the VAL? command.

**Conversions for Calibration in SI units.**

Since the IPI calibration points do not have to be at the exact PSI values stated in the procedure, when calibrating in SI units similar values to the following conversion can be used (500 psi combination range example shown).

psi	bar conversion	bar calculated	bar used example	kPa conversion	kPa calculated	kPa used example
500.00	0.06894757	34.473785	35.00	6.894757	3447.3785	3500
437.50	0.06894757	30.164562	30.00	6.894757	3016.4562	3000
375.00	0.06894757	25.855339	26.00	6.894757	2585.5339	2600
312.50	0.06894757	21.546116	22.00	6.894757	2154.6116	2200
250.00	0.06894757	17.236893	17.00	6.894757	1723.6893	1700
187.50	0.06894757	12.927669	13.00	6.894757	1292.7669	1300
125.00	0.06894757	8.618446	9.00	6.894757	861.8446	900
62.50	0.06894757	4.309223	4.50	6.894757	430.9223	450
0.00	0.06894757	0.000000	0.00	6.894757	0.0000	0
-12.00	0.06894757	-0.827371	-0.80	6.894757	-82.7371	-80

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