

## Calibrating the VI-410

For vibration studies, the x-axis, y-axis, and the z-axis are calibrated using an oscillating source. An optional hand-held shaker calibrator may be included in your start-up kit or is available to purchase via the parts listing. (Please see the price listing or contact Quest for more information.)

On the VI-410, there are two methods to calibrate.

- **By measurement** - this entails connecting a calibrator to the VI-410, turning it on, and allowing the output to stabilize. Once the desired frequency and amplitude has been reached, this is entered and stored into the VI-410 (or in QSP-II).
- **By sensitivity** – this entails manually entering in the instrument's calibrated measurement indicated on the instrument's certification papers. (The instrument is factory calibrated before it is shipped with certification papers.)

### Connecting the handheld shaker to the accelerometer

The handheld shaker produces a known vibration acceleration rate and frequency. It is used to adjust the instrument to a constant vibration level of 1 g.

When using, the accelerometer is attached to the shaker using either the threaded stud (for the z-axis) or with a supplied flat mounting plate and supplied bees-wax (for the x-axis and y-axis). Once connected, the shaker is turned on and the adjusted level is selected and stored on the instrument.

#### ➤ Connecting the shaker and accelerometer

##### 1. For the Z-axis, please follow these steps:

- Twist the threaded stud into the top of the shaker. (It will fit tightly.)
- Attach the accelerometer to the calibrator.



Attach the accelerometer to the calibrator by twisting it for a tight fit.

Figure 1-1: Attaching accelerometer to calibrator

- Attach the accelerometer cable to the accelerometer and then to the instrument.

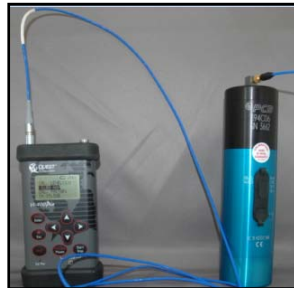


Figure 1-2: Attaching accelerometer cable to instrument

##### 2. For the X-axis and Y-axis, please follow these steps:

- Remove the threaded stud from the top of the shaker and place in the storage case.
- Place the flat mounting plate over the top crevice.
- Using the bees-wax as a type of adhesive, apply a very small amount with the tip of your finger nail and spread it on top of the flat mounting disc.
- Place the accelerometer in the **X-axis direction** onto the adhesive. (**Repeat this process for Y-axis**).
- Lastly, attach the accelerometer cable to the accelerometer and then to the instrument.  
**\*\*NOTE: when attaching the cable, be careful not to accidentally pull the accelerometer off of the adhesive/bees-wax.**

## Calibrating

Once you have connected the devices together you are ready to run a calibration test.

➤ **Menu path: Function>Calibration> >Channel X (1-3) >By Measurement>Calibration**

1. Connect the calibrator and accelerometer to the VI-410 (as explained above in “**Connecting the shaker and accelerometer**”).
2. Turn on the VI-410 by pressing **Proceed/Pause** key and **Menu/Enter** key.
3. Select the following menu path:
  - Press **Alt/f** key while pressing **Menu/Enter** key to access main menu.
  - The **Function** menu should be selected (if not press up/down arrow until selected). Next, press **Menu/Enter** key.
  - Arrow **▲▼** to **Calibration** sub-menu and press **Menu/Enter** key.
4. Arrow **▲▼** and select channel 1, channel 2, or channel 3.
5. Arrow **▲▼** to **By Measurement** and press **Menu/Enter** key.
6. The calibrator level screen will appear (see Figure 1-4).
7. Adjust the **Calibrator level** screen to **9.89** (or the appropriate setting on your calibrator).
  - To adjust the cal level, press the **right arrow**. To move up by ten increments, simultaneously press **right arrow** and **Alt/f** key.

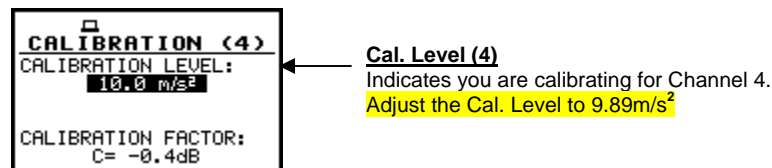


Figure 1-4: Example of calibration screen for vibration study

8. Turn on the calibrator.
  9. Start the VI-410 by pressing **Start/Stop** key.
    - The meter will flash “**Calibration**” with a 5 second countdown. It will proceed with “**Calibration Measure**” and then “**Calibration Result**”.
  10. Once the **Calibration Result** is displayed, press the **Menu/Enter** key to store the new calibration level.
- 🔊 **NOTE:** the “*Calibration result*” is displayed as the RMS value for the channel you selected (such as channel 1).
11. To calibrate each of the axes (or channels) for vibration study, press **Esc** twice until you return to the Channel selection screen and then repeat steps 4-10 (ensuring the VI-410, shaker, and accelerometer are connected appropriately).
  12. Once all channels are calibrated, press **Esc** key repeatedly to return to the main menu or the measurement menu.

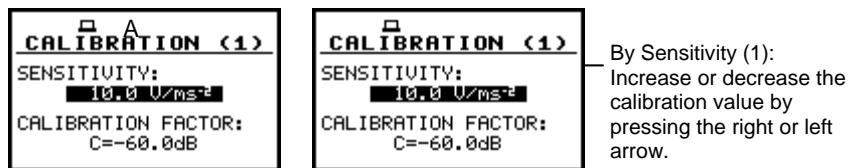
## Calibrating by certificate on VI-410

You can calibrate the instrument by inputting values from the instrument's calibration card/certificate.

*Note: on a yearly basis, you may want to send the VI-410 to Quest Technologies for factory calibration to ensure the instrument is setup correctly with the appropriate calibration.*

➤ **Main Menu path: Function>Calibration>Channel X >By Sensitivity >Sensitivity screen**

1. Select the menu path indicated by following these steps:
  - To access the main menu, press **AltF** key while pressing **Menu/Enter** key.
  - Select **Function** menu by pressing **▲▼** and press **Menu/Enter** key.
  - Press **▲▼** and select **Calibration**. Press **Menu/Enter** key.
2. Press **▲▼** to select the appropriate **Channel** and press **Menu/Enter** key.
3. Press **▲▼** to select **By Sensitivity** and press **Menu/Enter** key.
4. In the Calibration sensitivity screen, you can manually input a calibration reading. Press the **left or right** arrows to increase or decrease the current measurement setting. Press the **Menu/Enter** key to save your new setting.



By Sensitivity (1):  
Increase or decrease the calibration value by pressing the right or left arrow.

**Figure 1-5: Calibration by sensitivity**

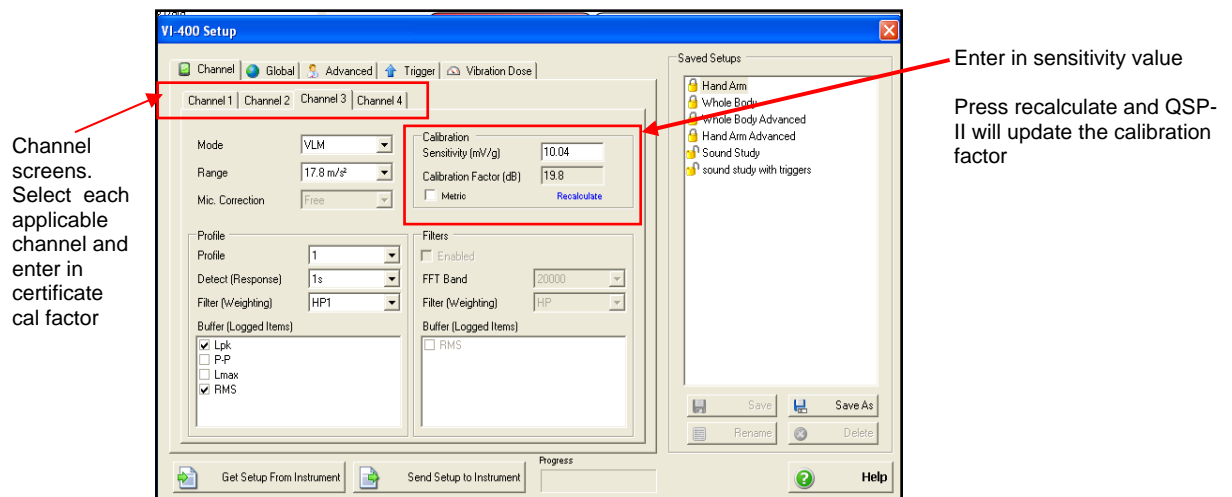
5. Press **Esc** twice and select the next channel (i.e., channel 2). Repeat steps 2-4 until each channel is re-calibrated.
6. When complete, press **Esc** until you return to the main menu screen or measurement screen.

## Calibrating by certificate using QSP-II

You can also adjust the calibration factor by entering in the appropriate “g” reading and plug this into QSP-II. Then, it will automatically calculate the calibration factor.

➤ **Adjusting calibration in QSP-II**

1. In QSP-II, ensure you are in the VI-410's window.
2. Select **Setup** key.
3. On each channel, modify or verify the appropriate setting (see Figure 1-5 for an explanation).



**Figure 1-6: Example of setting calibration by sensitivity in QSP-II**

4. To save, press **Save As** key and name the new setting.
5. To send to the instrument, ensure the VI-410 is connected via a USB cable to your pc. Press the "Send to Instrument" key.

## Viewing last calibration

### Calibration History

In **calibration history screen**, you can view up to 10 last calibration records.

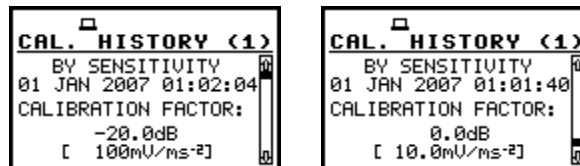
*To access the calibration history screen, follow below:*

- **Menu path:** Function>Calibration> >Channel x >Calibration history



**Figure 1-7: Calibration history screens**

1. Select the **Calibration history** screen.
  - To access the main menu, press **AltF** key while pressing **Menu/Enter** key.
  - Select **Function** menu by pressing **▲▼** and press **Menu/Enter** key.
  - Press **▲▼** and select **Calibration**. Press **Menu/Enter** key.
  - Press **▲▼** to select the appropriate channel and press **Menu/Enter** key.
  - Press **▲▼** to select **By Calibration History** and press **Menu/Enter** key.
2. The opened Calibration history screen contains a list of last calibration records. Each calibration is described by the method of how it was performed either by sensitivity or by measurement. It includes the date and time of the performed calibration measurement, the obtained calibration factor, and the calibration result.



**Figure 1-8: Calibration history with previous 2 cal. records**

- NOTE:** if calibration measurements were not performed the calibration history screen will state "calibration history is empty"