

# Scintrex CG-6 Gravimetry Data Acquisition

## Introduction

The Scintrex CG-6 Gravimeter measures gravity relative to a base station (also to account for drift) in mGal. Background reading on gravity can be found here:

*[Eriksen and Milsom \(2011\). Field Geophysics. Chapter 2. John Wiley & Sons.](#)*

*[Keary, Brooks, and Hill. 2013. 3<sup>rd</sup> ed. An introduction to exploration geophysics, Chapter 6.](#)*

*[Lowrie, & Fichtner. 2020. Fundamentals of Geophysics \(3<sup>rd</sup> ed.\) Chapters 3 & 4.](#)*



Scintrex CG-6 Gravimeter

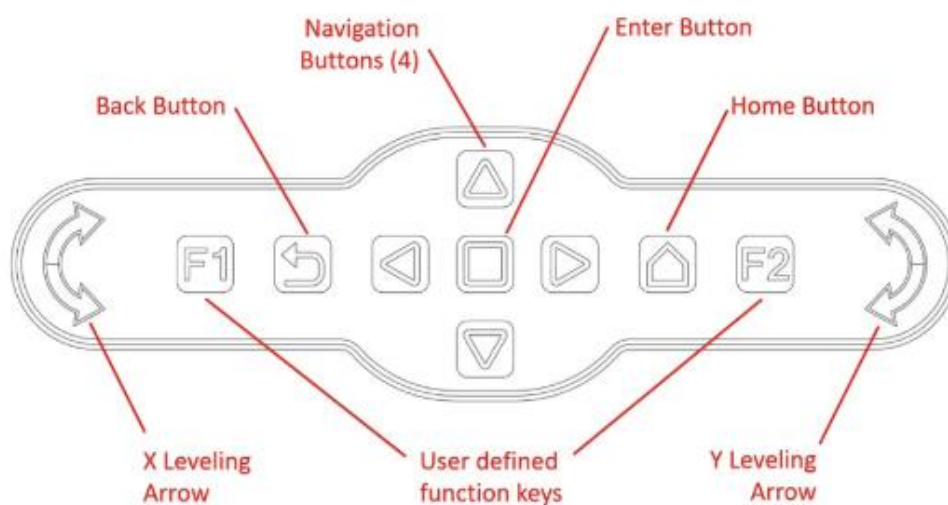
## Measuring Gravity

Gravimeters are quite sensitive and must be treated with care. The equipment is not difficult to use but is slightly bulky and somewhat heavy, make sure to transport it with care and attention. It is generally good practice to turn the equipment to standby when it is not in use in order to conserve battery whenever it is not in use..

The CG-6 is powered by an internal battery pack which, when fully charged, this should be sufficient for a full day of surveying. It is important that the battery remains fully charged as the gravimeter needs to maintain a stable temperature to operate properly. The battery charge is listed at the top of the main screen.

The CG-6 measures gravity in mGal but *does not* provide an absolute value, unless it is calibrated against a base station with a known absolute value. Otherwise, in the field, the survey will only be relative compared to the base station. Provided the instrument has been correctly set up it will not have any internal, instrumental drift, however tidal drift will have to be accounted for by taking base-station measurements on a periodic basis (every 2-3 hrs should be sufficient).

Gravimetric surveys of this sort are most easily carried out by three to five people. One person carries and balances the CG-6 itself, while the second notes down the readings. A third and fourth person can make the Terrain Correction estimates, while a fifth person can operate the Emlid GPS and take location measurements. With fewer people jobs will have to be shared and may take slightly longer. It is important that people remain still while readings are being taken and remain short distance away from the gravimeter to avoid affecting the reading, especially due to vibrations from movement.



*The Scintrex CG-6 Control Panel*

In order to take a series of gravity readings follow this process:

1. Place the CG-6 stand on the ground in a stable location at the station point and get the levelling bubble as close to the centre as possible – make sure the stand is solid and does not move easily.
2. Place the CG-6 unit itself on top of the stand with the correct orientation, so that it is locked into place.
3. Press the “Enter” button to turn the CG-6 on to its home screen.
4. Level the CG-6 using the arrows on either side of the control panel and the digits on the screen by turning the dials on its feet.
  - a. The arrows will turn green when it is levelled to  $\pm 5$  (arc seconds) on either side
5. Use the arrows on the control panel to navigate to the button marked “RECORD” on the home screen and press the “Enter” key.
  - a. The recording will have a delay of 5 seconds to recover from the vibrations associated with pressing the button, and to allow people to remain still
  - b. The CG-6 will now automatically record 3 readings of 30 seconds each – once all three are finished the arrows will flash white and the results will be displayed.
    - i.  $>3$  readings allows for calculation of error for each station.
6. Write down the new results on the pro-forma sheet, or in your notebook. This data can also be downloaded at a later date.
7. Once the readings are complete make the estimates for each local zone of the Hammer Terrain Correction circles and write these down on the proforma sheet or in your notebook before moving on.
8. Once the readings and terrain correction estimates are complete then move to the next station location.
  - a. Make sure to consider the spacing between stations, the length of your profile, and the time available for the survey.
  - b. After all readings have been taken at the station, and the gravity team has moved on, the GPS logger can take the relevant point. Make sure to periodically check that the GPS and Gravity stations are the same (so that no GPS points have been missed)
9. At the end of the survey (as a minimum) return to the base station and take another set of readings
  - a. To account for tidal variation across the survey during data reduction.

10. After completion of the survey, the data must be digitised and shared amongst the rest of your group.
  - a. It's a good idea to photograph the data recording sheet following the end of the survey, in case it gets lost or damaged before it can be digitised.