

### Applications

Digital Precise Levels are highly accurate instruments designed to measure sub-millimetre change in vertical height of assets and infrastructure.

They are used to measure arrays of monitoring points, typically either ground studs or barcode strips.

#### Typical applications include:

- Monitoring settlement at ground level for construction projects.
- Topographical surveys to determine the vertical position of a fixed point.
- Traverses to determine difference in elevation between distant points.
- Establish vertical heights to be used as reference or control points for setting out works.

### Installation

Generally, levelling surveys measure arrays of pre-installed studs, pins or barcodes established on pavements, roads or structures.

In most cases these survey points are installed by drilling small holes into monitored structures where the stud or target is secured using a strong adhesive.

A levelling survey requires a digital level, an invar staff and tripod.

Two operatives are needed to operate the instrument and hold the invar staff.

### Specifications

- Range:** 1.8m-110m
- Accuracy:** 0.3mm
- Resolution:** 0.01mm
- Memory:** 6000 measurements



### Operation

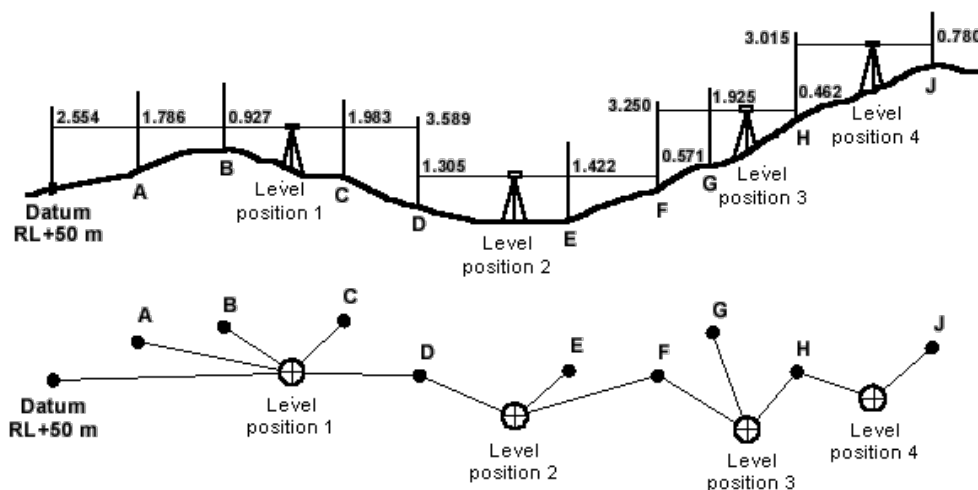
In each position it is essential that the instrument and staff are set up vertically. This is checked using level bubbles on the equipment before any reading is taken.

After the setup of the instrument and the positioning of the invar staff, an initial measurement is taken to a benchmark of known height.

The survey can progress through the monitored area via a series of backsights and foresights to measured points, moving the instrument setup and staff location as necessary. 'Intermediate' measurements can be taken of additional points visible from each setup.

A levelling line or run must always be closed onto the first benchmark, forming a 'loop'. This allows for identifying and adjusting for any errors cumulated across the survey. At this stage, a "misclosure" is calculated that gives an immediate indication of the quality of the survey.

After the survey, the collected data is processed, and measurements are compared with the baseline readings and those of previous surveys to determine if settlement or heave has occurred.



### Key Advantages

#### Automated calculations:

The reduced level of fixed points are calculated automatically using benchmark heights.

#### Efficient Surveys:

Invar staffs are read automatically by the instrument for fast reading acquisition.

#### Timely Data:

Digital recording of measurements dramatically reduces processing time and eliminates potential sources of error.