Height Gages

**Nomenclature**

**Vernier Height Gage**
- Fine adjuster for main scale
- Beam
- Column
- Main scale
- Fine adjustment device
- Clamp
- Locking device
- Slider
- Vernier scale
- Stylus clamp
- Measuring and scribing stylus
- Scribing stylus
- Measuring face, stylus
- Fixing device
- Reference surface, beam
- Reference surface, base
- Base

**Mechanical Digit Height Gage**
- Strut
- Main pole
- Sub pole
- Column
- Locking device
- Feed handle
- Slider
- Measuring and scribing stylus
- Scribing stylus
- Measuring face, stylus
- Fixing device
- Reference surface, base
- Base

**Digimatic Height Gages**
- Strut
- Main pole
- Sub pole
- Column
- Preset mode, ball diameter compensation mode button
- Power ON/OFF key
- Zero set button / ABS (Absolute) button
- Hold / data button
- Digimatic data socket
- Number up/down button, presetting
- Direction switch / digit shift button, presetting
- Base
- Reference surface, base
- Battery cap
- Stylus clamp
- Scribing stylus
- Measuring face, stylus
- Fixing device
- Touch probe connector
- Measuring and scribing stylus
- Battery cap
- Stylus clamp
- Measuring face, stylus
- Scribing stylus
- Base
- Reference surface, base

**Quick Guide to Precision Measuring Instruments**
# Height Gages

## How to read

### Vernier Height gage

![Vernier Height gage diagram]

- **Graduation**: 0.02 mm
  - (1) Main scale: 79 mm
  - (2) Vernier: 0.36 mm
  - Reading: 79.36 mm

## General notes on use of Height Gages

1. **Potential causes of error**
   - Like the caliper, the error factors involved include parallax effects, error caused by excessive measuring force due to the fact that a height gage does not conform to Abbe’s Principle, and differential thermal expansion due to a temperature difference between the height gage and workpiece.
   - There are also other error factors caused by the structure of the height gage. In particular, the error factors related to a warped reference edge and scriber installation described below should be studied before use.

2. **Reference edge (column) warping and scriber installation**
   - Like the caliper, and as shown in the following figure, measurement errors result when using the height gage if the reference column, which guides the slider, becomes warped. This error can be represented by the same calculation formula for errors caused by nonconformance to Abbe’s Principle.
   - \[ f = \frac{h^2}{L} \]

   Installing the scriber (or a lever-type dial indicator) requires careful consideration because it affects the size of any error due to a warped reference column by increasing dimension \( h \) in the above formula. In other words, if an optional long scriber or lever-type dial indicator is used, the measurement error becomes larger.

   **Example**: Effect of measuring point position
   - When \( h \) is 150 mm, the error is 1.5 times larger than when \( h \) is 100 mm.

3. **Lifting of the base from the reference surface**
   - When setting the scriber height from a gauge block stack, or when scribing, securely lock the slider in position using the clamping arrangements provided. It is advisable to confirm the setting after clamping because the act of clamping on some height gages can alter the setting slightly.
   - If this is so, allowance must be made when setting to allow for this effect.

4. **Parallelism between the scriber measuring face and the base reference surface**
   - The tip of a height gage scriber is very sharp and must be handled carefully if personal injury is to be avoided.
   - Do not damage a digital height gage scale by engraving an identification number or other information on it with an electric marker pen.

5. **Notes on using the height gage**
   - Keep the column, which guides the slider, clean. If dust or dirt accumulates on it, it becomes difficult, leading to errors in setting and measuring.
   - When scribing, securely lock the slider in position using the clamping arrangements provided. It is advisable to confirm the setting after clamping because the act of clamping on some height gages can alter the setting slightly.
   - If the main scale of the height gage is moved, move it as required to set the zero point, and securely tighten the fixing nuts.
   - Keep the scriber and other parts securely fixed in place during measurement.
   - If the main scale of the height gage can be moved, move it as required to set the zero point, and securely tighten the fixing nuts.
   - Remove any dust or burrs on the mounting surface when installing the scriber or lever-type dial indicator before measurement. Keep the scriber and other parts securely fixed in place during measurement.
   - If a digital height gage will not be used for more than three months, remove the battery before storage.
   - If a protective cover is provided, use the cover during storage to prevent dust from adhering to the column.