

reflector frame back and forth, so that center it. ( error allowed should be less than one quarter of the bubble length). Then fasten the adjusting screw of the reflector frame until tight.

(B) If no long level or level meter is unavailable, you can check and calibrate according to the following simple method.

As shown in Figure 6.

1. On the flat ground, choose two fixed targets of 20-30m (such as trees, poles, walls or put the level on the ruler pad). First make a mark at the height a on the measuring point A (the height at a is slightly lower than the height of the observer's eyes), center the level bubble, aim at the point b beyond the measuring point B at a and make a mark.

Then go to b at the observation point B, bubble centering after aiming at the measurement point A. If the aiming wire aiming exactly at point A, it shows the bubble placement accurate, do not need to correct.

If it is not coincide with point a, but a point C which is lower or higher, then make a mark at C, take the middle point m of a and c. Observe from b at point B, make the aiming wire aim at point m, adjust the level bubble correction screw for correction, make the level bubble to the center of the line.

As per above method, repeatedly check and calibrate, until the difference between the two ends of the bubble and the scale distance is less than 0.2mm.

2. After bubble centering correction, take a water basin, put a wooden block in the water basin. Wooden block should be uniform in texture, thickness, surface flat, the upper surface of the block parallel to the level, buoyancy more than 20 kg. Put the hand level on the wooden block, check if the level bubble is centered on the aiming wire, if not, loosen the reflector adjustment screw, moving the reflector frame back and forth, make it centered. ( error allowed should be less than one quarter of the bubble length). Then tighten the adjusting screw of the reflector frame.

Repeatedly check and calibrate according to the above method until the difference between the two ends of the bubble and the scale distance is less than 0.2mm.

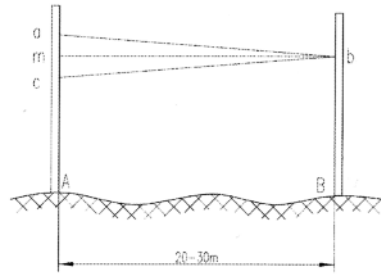
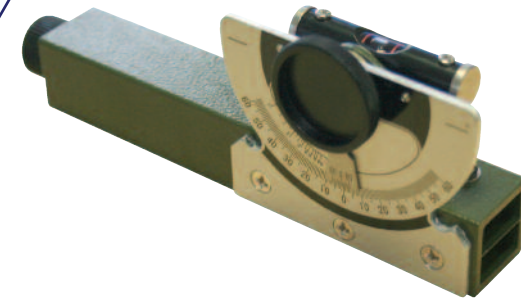


Figure6

# YORK Survey Supply

## 133mm Abney Level



Code: 36300

## Operating Instructions

**YORK**  
Survey Supply

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# Hand Level Instruction Manual

## Type: SSY-1

SSY-1 hand-held level meter (referred to as hand level) is a simple measuring instrument, which can measure the height difference between two points on the ground and the inclination angle (or slope) roughly. The instrument is light and dexterous convenient for field measurement and carrying. Suitable for highway, terrain survey and cross-sectional measurement. In the construction of small farmland and water conservancy, it can be applied in step survey, approx measurement and terraces construction, leveling land and small channels.

When observing, hand level is generally held in the hand. In order to improve the accuracy, it can also be fixed on the wooden frame or stick with moderate height ( 1.3- 1.5 m).

### Main Specifications.

Diameter of dial:  $\varnothing$  60mm

Graduation range: Angle  $+60^{\circ} - 0^{\circ} -60^{\circ}$

Slope ( $45^{\circ} - 0^{\circ} 35'$ ) 1:1 ~ 1:100

Dial indexing value: 1'

Vernier grid value: 10'

Long level angle value:  $20' / 2mm$

Size: 130×56×29 (mm)

Weight: 250g

### Structure of the instrument

As per Figure 1, Figure 2.

The reflector and reflector holder are installed in the square mirror tube, which is not marked on the drawing.

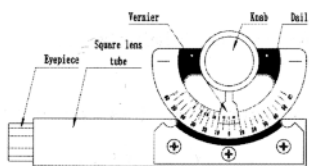


Figure 1

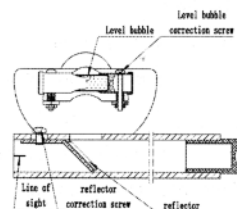


Figure 2

### Instruction:

(i) Measuring the difference in height between two places  
As shown in (Figure 3).

When measuring the height difference  $h$  between two points A and B, the observer stands in the middle of the two points, holding the hand level (or placed on the wooden

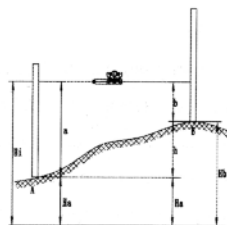


Figure 3

frame), vernier indicator line aligned with the dial  $0^{\circ}$ , aimed at the level of the measuring station A through the tube aiming wire, and make the level bubble on the middle of the aiming wire, read the behind sight a.

The observer turns around in the same place, aimed at the level of station B in the same method, read out the front sight b.

Then the height difference  $h$  between A, B two points is

$$h = a - b$$

If the elevation of point A is known to be  $H_a$ , then the elevation of point B  $H_b$  is

$$H_b = H_a + h$$

(b) Measure the angle of inclination (or slope) between two points

as shown in (Figure 4).

The observer stands at point A, install a marking pole at point B, make a mark on marking pole for easy aiming. (e.g., tie the red line). The height between the sign and the ground should be the same as the observer's eyes.

The left hand holds the hand level, aiming at the marking pole sign through the aiming tube, the right hand

turn the hand wheel, to make the level bubble at center of the aiming wire. The cursor indicates the

angle (or slope) is the angle (or slope) of inclination between A, B two points then.

As shown in (Figure 5), the readings:

Angle:  $+26^{\circ} 40'$

Slope: 1:2

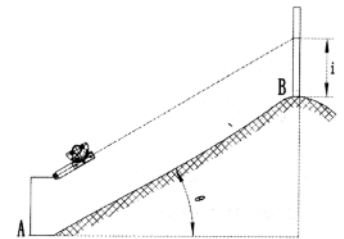


Figure 4

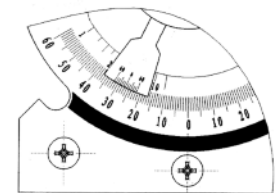


图 5

### Calibration of the instrument.

(a) Calibration with the level platform

Use long level or level meter to build a level platform (accuracy not less than  $5' / 2mm$ ).

1. Place the hand level on the level platform, and align the vernier indicator line to the scale 0.

If the level bubble is not centered on the engraved line, use the hand level bubble correction screw to correct to make it centered. (The difference between the two ends of the bubble and the distance of the line is less than 0.2mm)

2. After the bubble centering correction, check whether the level bubble is centered on the aiming wire, if not, then loosen the reflector frame adjustment screw, move the