



The World Leader in Vibrating Wire Technology

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Instruction Manual
6850-7 / 6850-8
Manual Sighting and Reading Table

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1. INTRODUCTION

Models 6850-7 and 6850-8 Manual Sighting and Reading Tables is a manual measurement device for detecting and measuring the horizontal displacement, inside a dam embankment, of a pendulum wire relative to the station inside the dam embankment at which the sighting device is mounted. The maximum range of the device is ± 25 mm in two horizontal orthogonal directions X and Y. The sighting device can either be secured to a wall with a bracket or mounted to a table fixed to the floor depending on the space limitations of the station location.

The Manual Sighting and Reading Table consists of a base plate on which is mounted two steel rule, reading scales and two sliding sighting devices. By moving the two sighting devices over the reading scales they can both be aligned in such a way that, when looking through the hole in each sliding device, the pendulum wire lines up with one of the front sights. In this position, the two values on the underlying scale can be read and entered into the Pendulum Collimation Software to yield the X and Y coordinates of the pendulum wire.

2. INSTALLATION

Figure 1 is a dimension drawing indicating the location of the mounting holes of Manual Sighting and Reading Table. There are four mounting holes on the plate. The hole spacing is 256 mm \times 95 mm (10.07 \times 3.74 inches). Four stainless steel bolts are included in both metric (M8 \times 20 mm) and standard (5/16" - 18 \times 1.25") sizes. Also included are four nuts, four flat washers, and four spring washers.

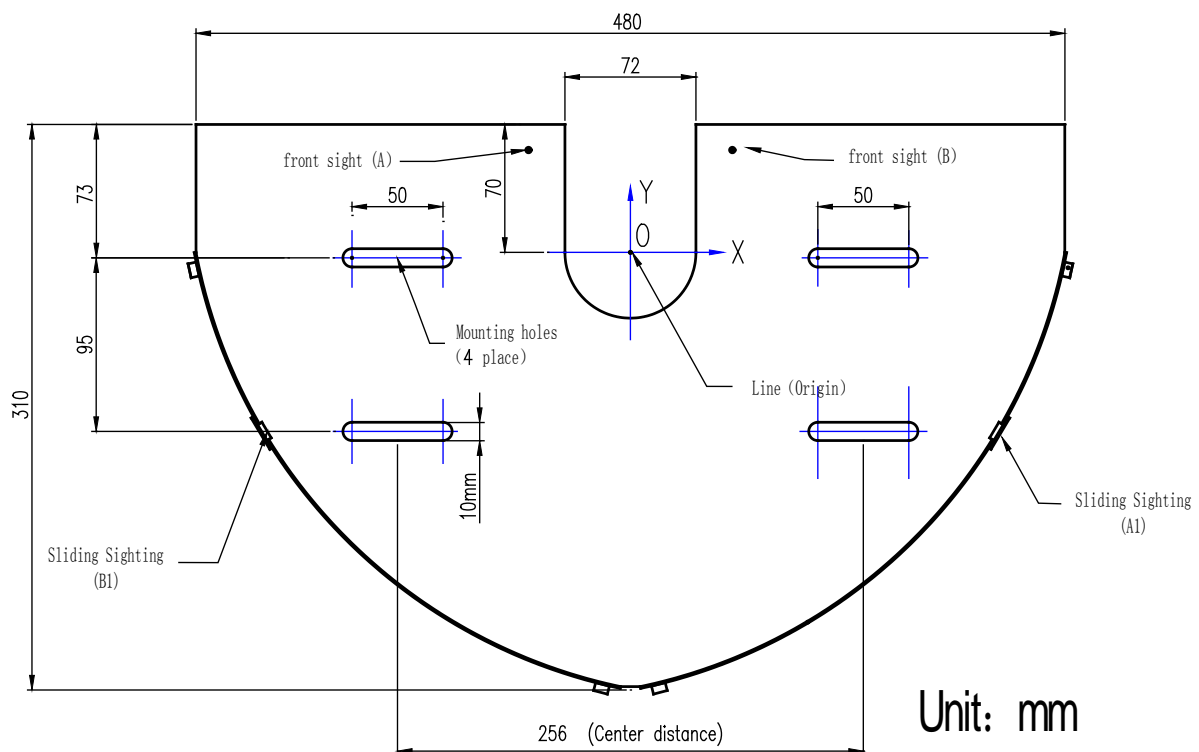


Figure 1 - Plane Dimensions Drawing of Manual Sighting and Reading Table

3. MOUNTING

3.1 General

The Manual Sighting and Reading Table can be mounted in two ways: floor fixation or wall fixation.

No matter in what way it is mounted, it must be ensured that directions X and Y correspond to the expected directions, Y being typically oriented directly Upstream/ Downstream.

The base plate must be leveled using a spirit level. For the software to work over the full range (± 25 mm in both X and Y axes), the base plate must be positioned so that the initial position of the pendulum wire is as close to the Origin Point shown in Figure 1 as possible. (Due regard should be given to the current position of the pendulum wire within its annual cycle of movement due either to temperature or reservoir level).

The base Plate should be installed 1.5 to 1.6 meters above the ground and a one-meter space should be kept free in front of the steel scales

3.2 Floor Mounting

In most cases, this mounting method can be used when the pendulum wire is far away from the wall. When mounting this bracket, users can make adjustment in X/Y direction in order to keep the pendulum wire close to the origin position on the base plate.

Use angle steel, (40 mm x 40 mm or 45 mm x 45 mm), to fabricate a bracket based on the dimensions and structure shown in Figure 2.

It is recommended that the bracket should measure 296 to 306 mm wide and 300 mm deep and its height is considered proper if operation and reading are convenient. It is recommended that the height should be around one to one and a half meters. Where a higher bracket is needed, the bracket can be mounted on a platform poured with concrete (refer to Figure 3). The slotted hole in the brackets should be 50 mm long.

Except for important dimensions, users may adjust the dimensions and structure of the bracket providing that the new dimensions do not affect mounting and operation.

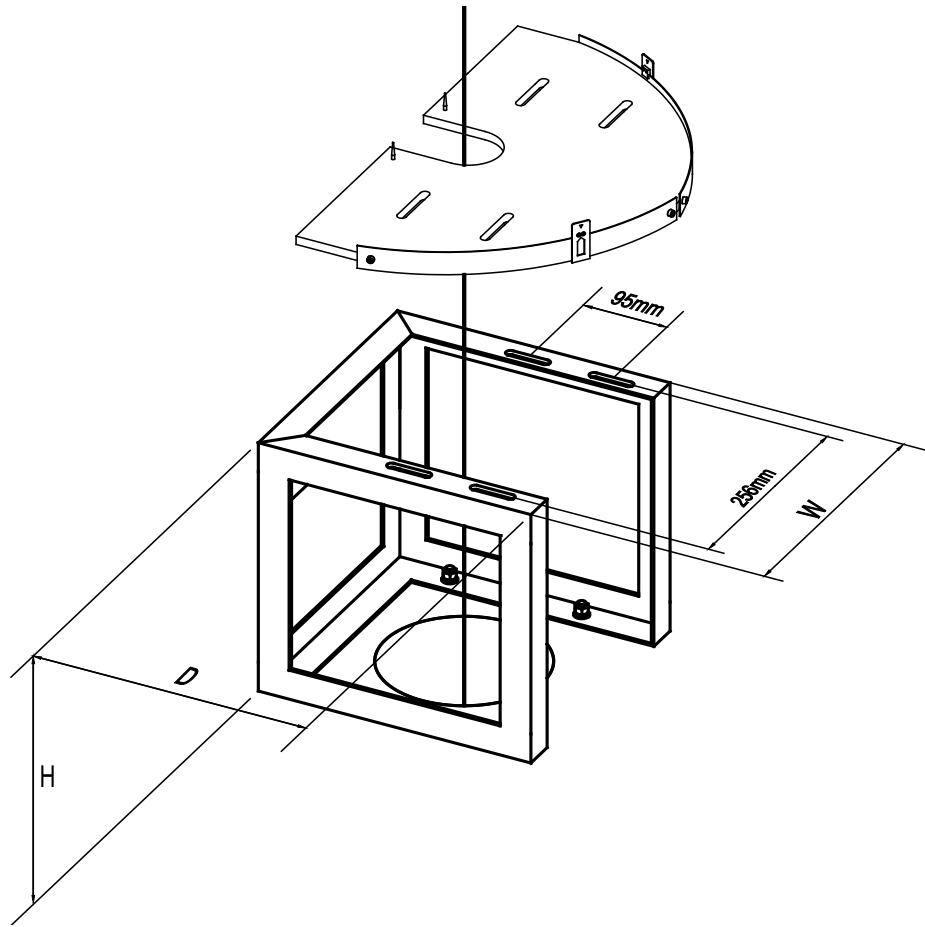


Figure 2 - Key Dimensions of Floor Mounting Bracket

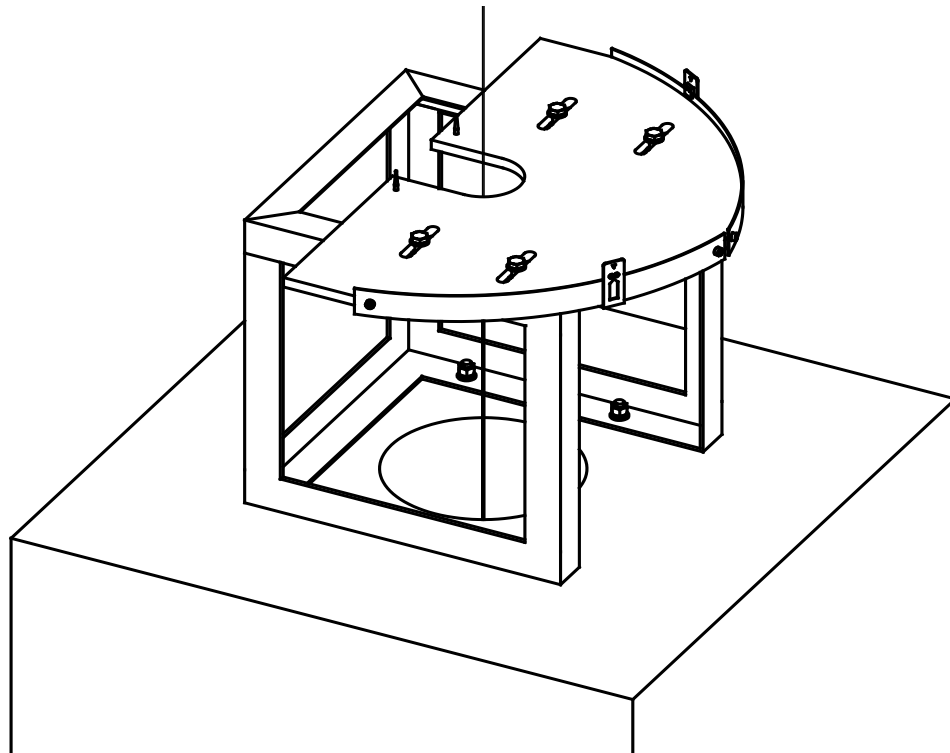


Figure 3 - Schematic Drawing for Floor Mounting

3.3 Wall Mounting

When the distance from the perpendicular to the wall ranges between 100 mm and 400 mm, the wall fixation method can be used for mounting. Wall brackets can be provided by Geokon with the Manual Sighting and Reading Table.

Dimension L in Figure 4 is the distance from the straight side of the base plate to the wall. Generally, L, the distance from the plumb wire to the wall = 70 mm

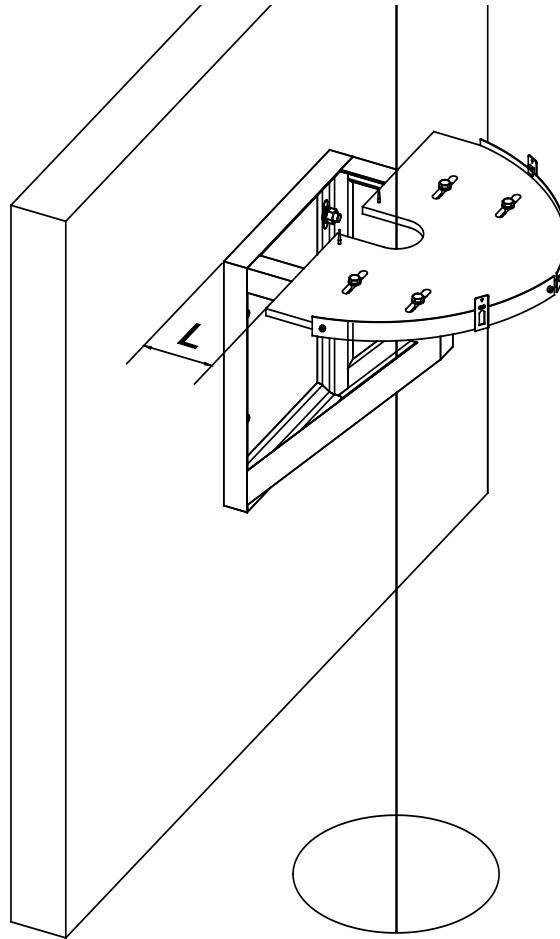


Figure 4 - Schematic Drawing for Wall Mounting

At the time of mounting, consideration should be given to the distance, M, of the plumb wire away from the wall. The bracket, as shown in Figure 5, should be designed so that $M = (L + 73)$ mm. Dimensions D and H depend on the distance from the plumb wire to the wall, which also determines the width and height of the bracket. Dimension W corresponds to what is mentioned in Section 2. The top height of the bracket should be about 1.5 meters from the floor to facilitate operation.

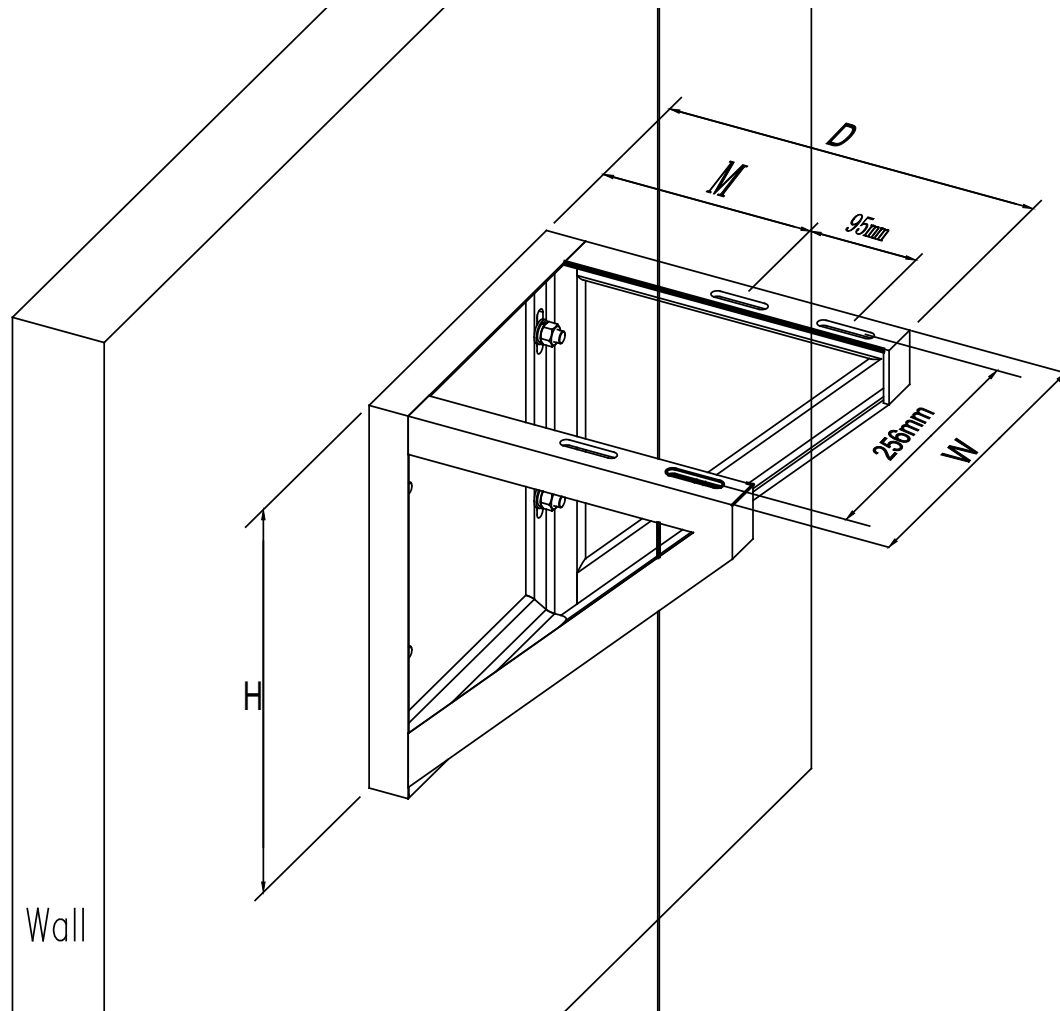


Figure 5 Schematic Drawing of Bracket Dimensions

4. OPERATION

- 1) Remove the cover protecting the base plate surface (The Base Plate should be kept covered when not in use.)
- 2) Referring to Figure 6, move the right sliding sight (A1) so that when looking through the hole in the sight, the pendulum wire lines up with the left front sight (A). Read and record the reading on the steel rule to the nearest millimeter.
- 3) Repeat Step 2 for the left sliding sight (B1), aligning it with the pendulum wire and the front right sight (B). Read and record the steel rule reading to the nearest millimeter.
- 4) The calculation of the X and Y coordinates is done by software loaded as an app onto an Android smart phone. The software can be downloaded off the Geokon website. Selecting the App brings up the screenshot shown in Figure 4. Using the touch screen, enter the values of A1 and A2 in millimeters and then touch the 'calculate' icon whereupon the X and Y coordinates appear in the center of the screen.

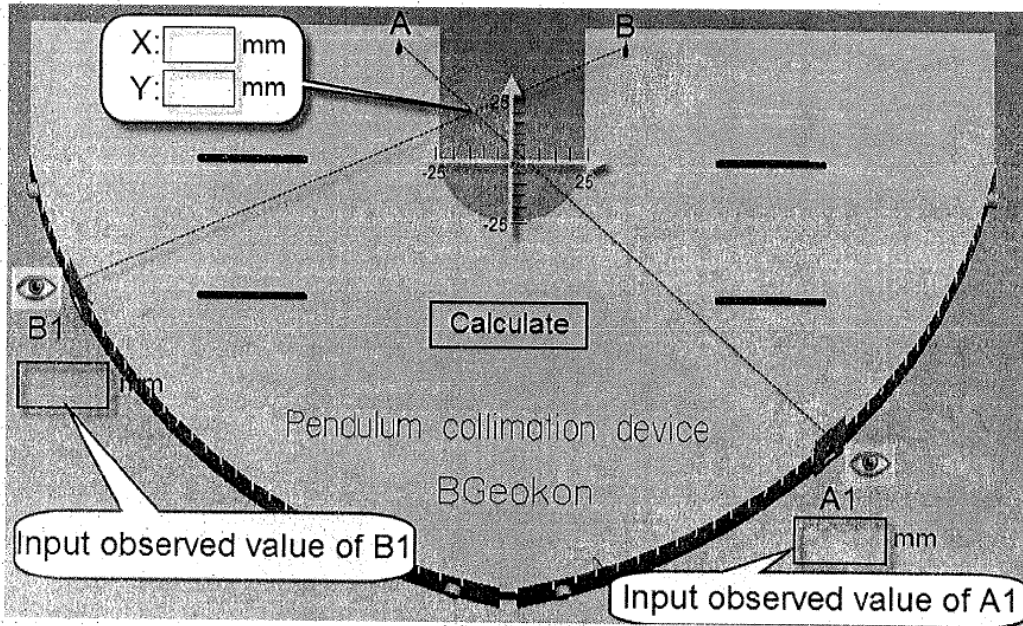


Figure 6 - Showing the Collimation Process

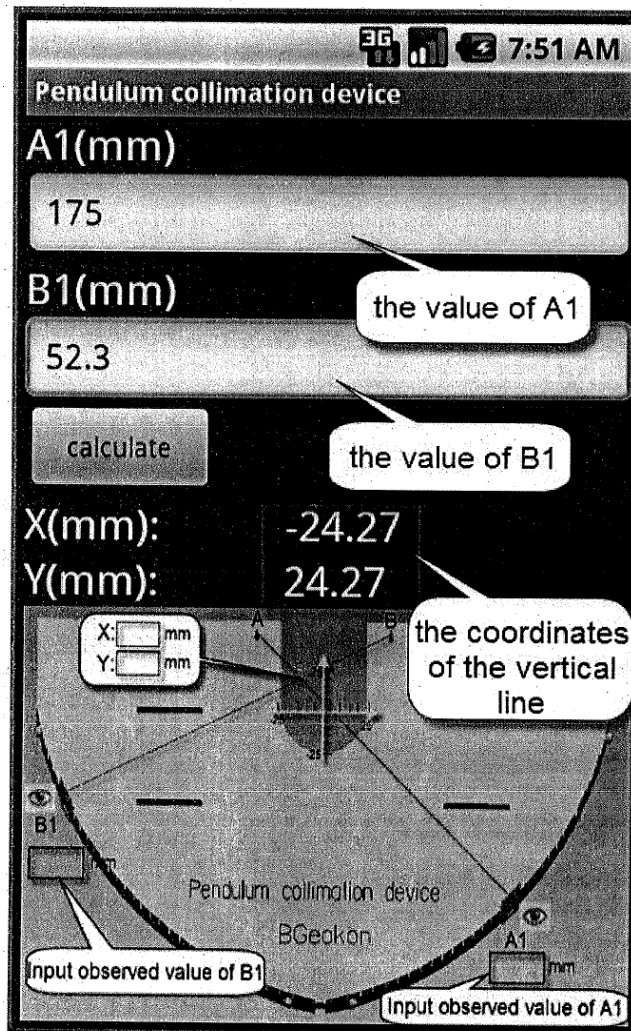


Figure 7 - Screen-Shot of the Android Software Output

5. DATA REDUCTION FORMULAS FOR MANUAL SIGHTING and READING TABLE

An alternative way to calculate the X Y coordinates is to use the following equations:

Step 1: Let 'The scale reading B1(mm)' = B1 , 'The scale reading A1(mm)'=A1

Step2: Let $\theta=0.23539256$ (rad)

Step3: Define k_1 , k_2 , where:

$$\begin{cases} k_1 = -\tan\left(\theta + \frac{340 - A1}{300}\right) \\ k_2 = \tan\left(\theta + \frac{B1 - 10}{300}\right) \end{cases}$$

Step 4: Output

Coordinates X (mm):

$$X = \frac{56 \times (k_1 + k_2)}{k_2 - k_1}$$

Coordinates Y (mm):

$$Y = 56 + \frac{112 \times k_1 \times k_2}{k_2 - k_1}$$

Note: Demo calculation XLS for Manual Sighting and Reading Table attached.