



The World Leader in Vibrating Wire Technology

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Instruction Manual
BGK-1850
Pendulum Wire Collimation Device

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Model BGK-1850 Manual Pendulum Wire Collimation Device

Instruction Manual

1. Introduction

The model BGK-1850 Pendulum Wire Collimation Device 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 $\pm 25\text{mm}$ 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 BGK-1850 pendulum wire collimation device consists of a base plate on which are mounted two Front Sights: two steel rule reading scales on which there are 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 BGK-1850. There are four mounting holes on the plate and the hole spacing is $256\text{mm} \times 95\text{mm}$ (important dimensions).

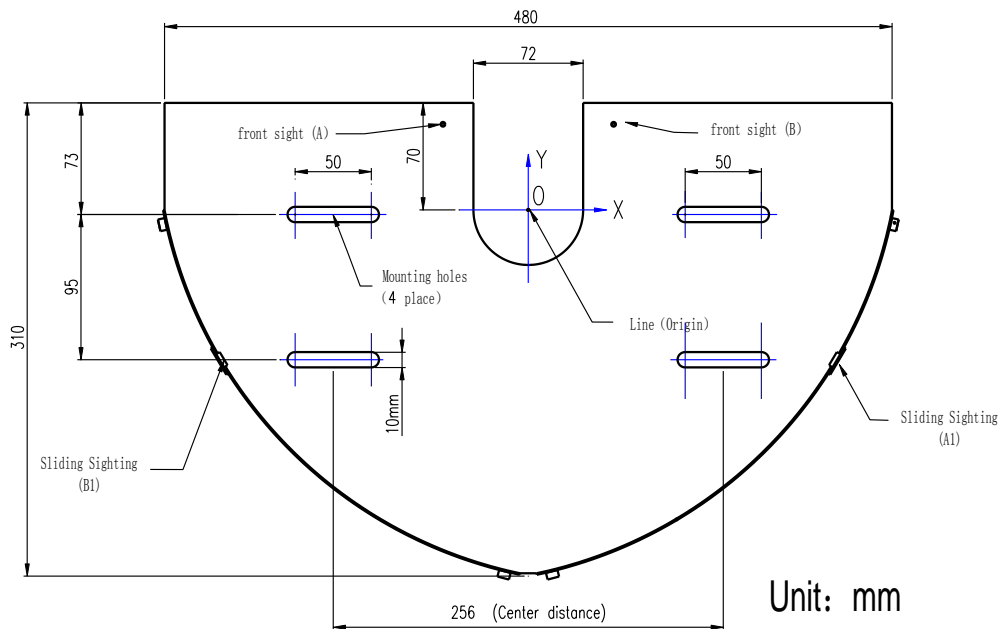


Figure 1: Plane Dimensions Drawing of BGK-1850 Pendulum Wire Collimation Device

Bolts and associated hardware are supplied with the base plate

- 1) Use either metric bolts: four M8X20mm stainless steel mounting bolts, including four nuts, four flat washers and four spring washers, or
- 2) Use inch bolts: four 5/16"-18 x 1.25", including four nuts, four flat washers and four spring washers.

3. Mounting

3.1 General

The BGK-1850 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. Also, 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 a close to the Origin Point shown in Figure 1. (But 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 1 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.

Use angle steel, (40 x 40mm or 45 x 45 mm), to fabricate a bracket based on the dimensions and structure shown in Figure 2-1 before mounting. It is recommended that the bracket should measure 296 to 306mm wide and 300mm deep and its height is considered proper if operation and reading are convenient. It is recommended that the height should be around 1 to 1.5 meters. Where a higher bracket is needed, the bracket can be mounted on a platform poured with concrete (refer to Figure 2-2). 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 on condition that the remaining dimensions do not affect mounting and operation.

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.

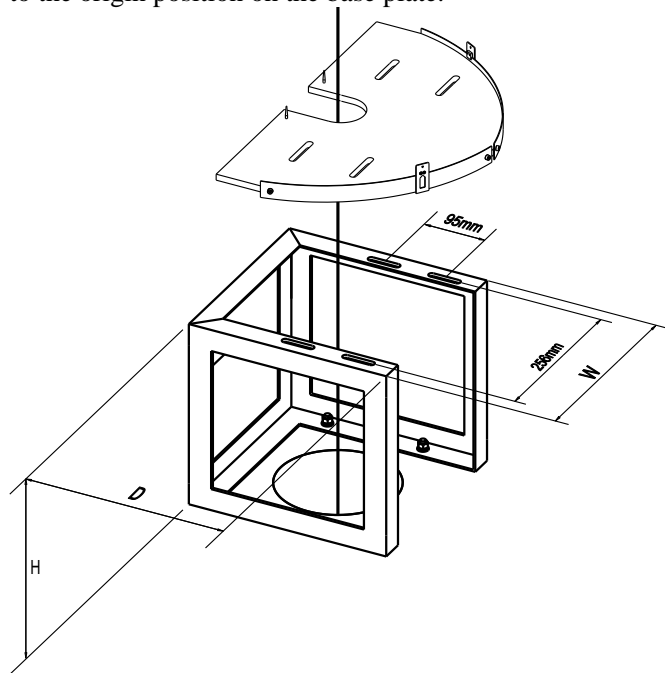


Figure 2-1 Key Dimensions of Floor Mounting Bracket

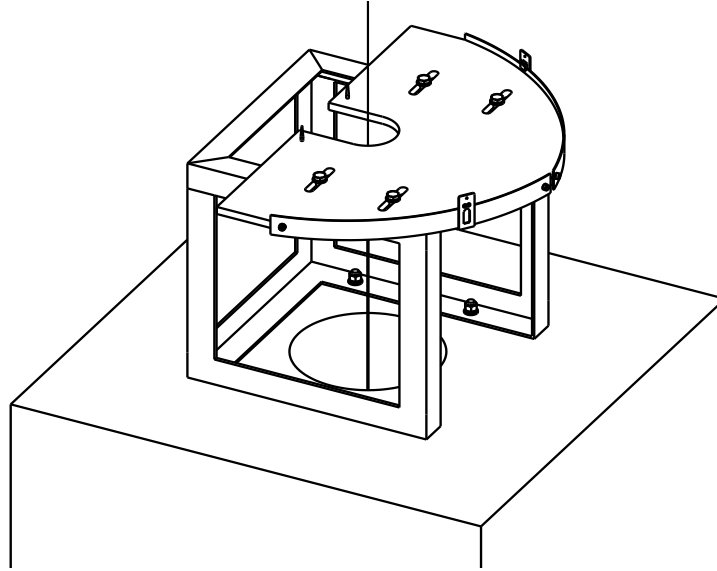


Figure 2-2 Schematic Drawing for Floor Mounting

3.3 Wall Mounting

When the distance from the perpendicular to the wall ranges between 100mm and 400mm, the wall fixation method can be used for mounting. Refer to Figure 2-3.

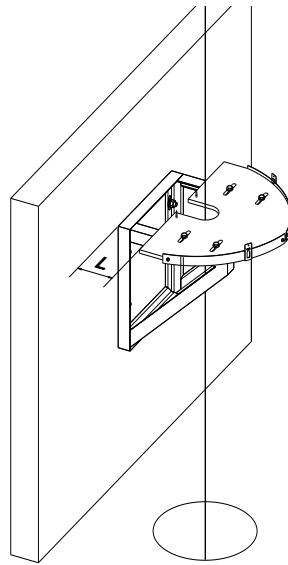


Figure 2-3 Schematic Drawing for Wall Mounting

Dimension L 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 = 70mm

At the time of mounting, consideration should be given to the distance, M , of the plumb wire away from the wall, and the bracket as shown in Figure 2-4 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.

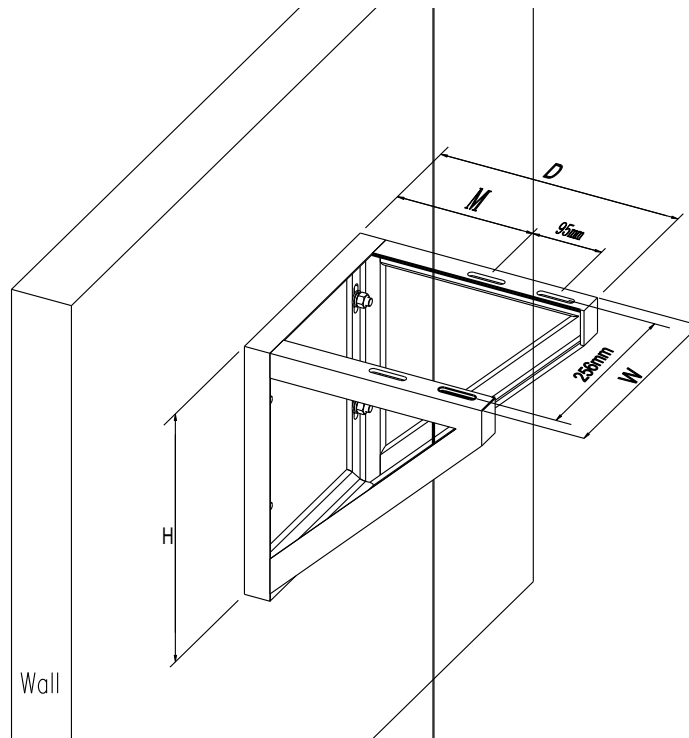


Figure 2-4 Schematic Drawing of Bracket Dimensions

The top height of the bracket should be about 1.5 meters from the floor so as to facilitate operation.

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 3 move the sliding sight, A1, so that when looking through the hole in the sight the pendulum wire lines up with front sight A. Read and record the reading on the steel rule to the nearest millimeter.
- 3 Repeat Step 2 for sliding sight B1 and front sight B, again 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 down-loaded off the Geokon website. Selecting the App brings up the screen-shot 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.

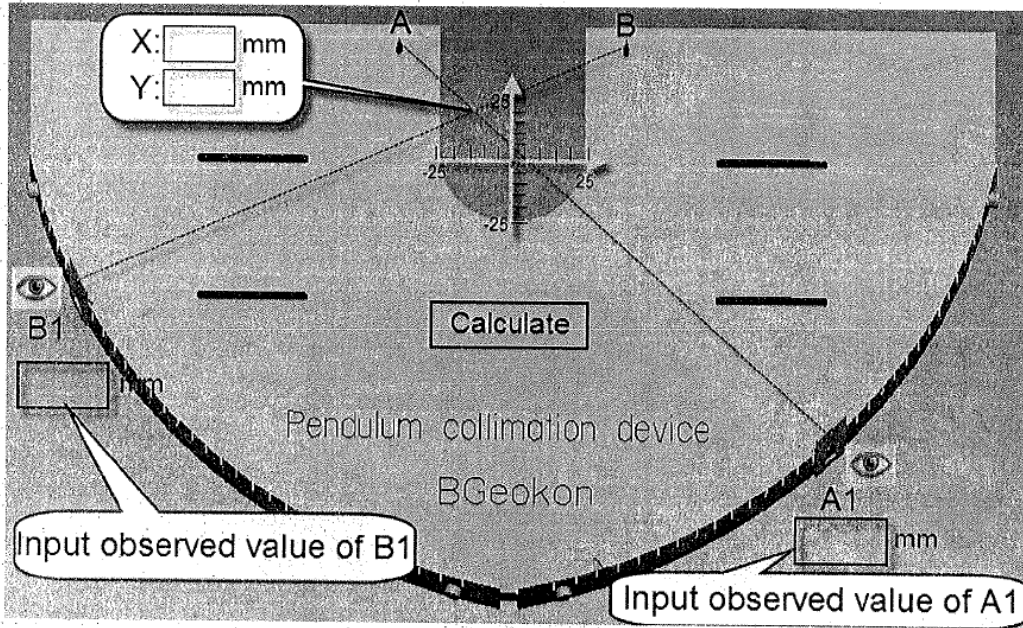


Figure 3 Showing the Collimation Process

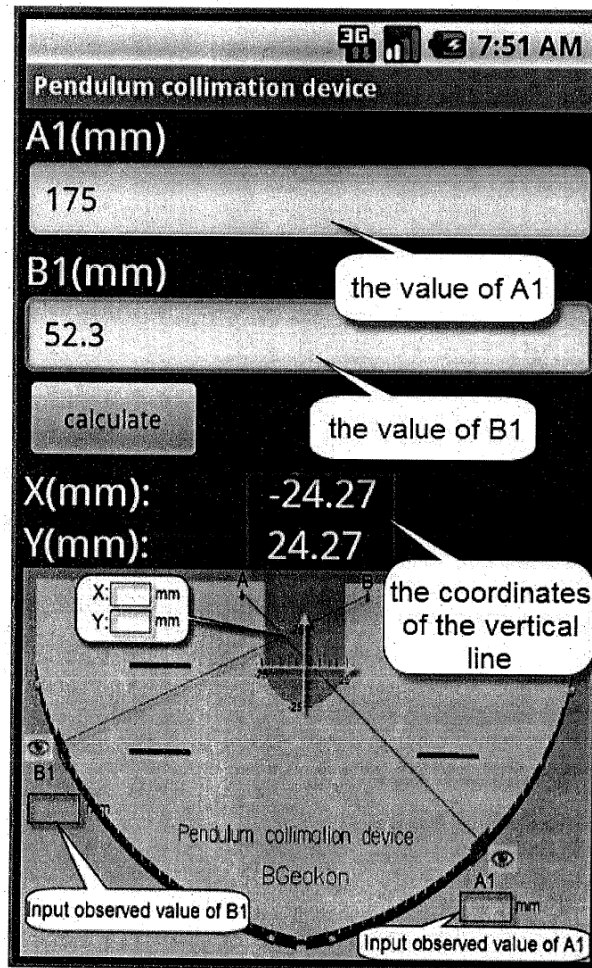


Figure 4 – Screen-Shot of the Android Software Output