

**AUTOMATIC LEVEL USER'S MANUAL**



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Standard Deviation 1 Km Double Run	1.0mm
Image	Erect
Magnification	32 times
Objective Aperture	38mm
Field of view	1° 20′
Minimum Focus	0.5m
Multiplication Constant	100
Additive Constant	0
Compensator Range	±15′
Compensator Setting Accuracy	±0.3″
Sensitivity of Bubble	8′ / 2mm

## 2. Outlook Structure



- 1. Base Plate
- 2. Horizontal circle
- 3. Horizontal Circle reference mark
- 4. Eyepiece
- 5. Eyepiece Cover
- 6. Optical Peep Site
- 7. Objective Cover
- 8. Focusing Knob
- 9. Horizontal Drive Knob
- 10. Footscrew
- 11. Bubble Viewing Prism
- 12. Circular Bubble

### 3. Use of Dumpy

3.1 Set up the tripod and attach the dumpy by tightening the tripod fixing screw.



3.2 Adjust the tripod legs until the tripod head is roughly level. Center the bubble by using the footscrews as shown in Fig. 2





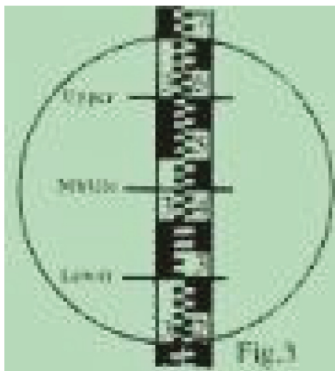
## 4. Pointing and Focusing

4.1 Point the dumpy towards a white background or hold a white sheet of paper in front of the dumpy. Adjust the eyepiece until the cross hairs are sharp and black.

4.2 Turn the level towards the staff using the optical peep sight.

4.3 Looking through the eyepiece, turn the focusing knob until the image of the staff is sharp and clear

4.4 Turn the horizontal drive knob to set the vertical cross hair to the centre of the staff.



## 5. Measuring

5.1 Height measurement: Read the staff where it is cut by the horizontal cross line.

5.2 Distance measurement: Read the staff where it is cut by the upper and lower stadia lines. The difference multiplied by 100 is the distance to the staff from the dumpy. In fig3 the upper and lower stadia lines read 3.601 and 3.309 meters.

The distance to the staff is  $(3.601 - 3.309) \times 100 = 29.2$  meters

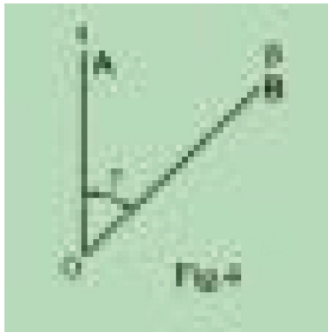
This can be useful when doing a quick survey of a site to check slope or fall.

The centre line reads 3.292m, the height of the dumpy 1.675m (for example)

$3.292 - 1.675 = 1.617\text{m}/29.2\text{m}$  or 1:18 (1 meter fall every 18 meters)

## 5.3 Angle Measurement

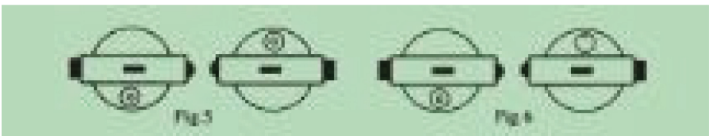
- 5.3.1 Sight point A with the vertical crossline and note the reading  $\alpha$  on the horizontal circle. (fig.4)
- 5.3.2 Turn the level to sight point B and note the reading  $\beta$
- 5.3.3 The angle  $AOB = \gamma = \alpha - \beta$



## 6. Checking and adjusting

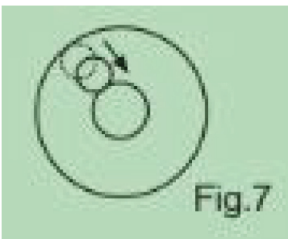
### 6.1 Circular bubble

6.1.1 Centre the bubble by using the footscrews, then turn the dumpy 180°, the bubble should remain centred (fig 5). If the bubble moves out of centre the bubble needs adjustment.



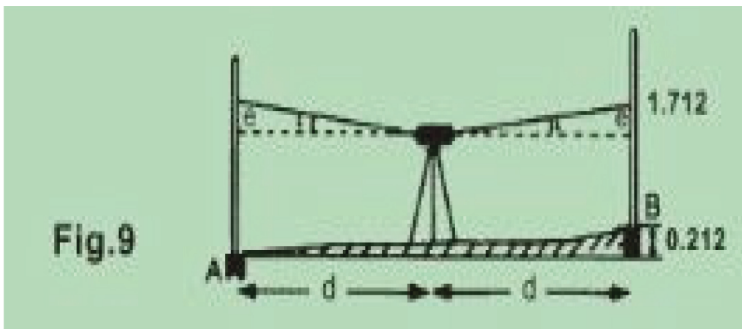
6.1.2 Turn the footscrews to bring the bubble halfway to the center (fig. 6). Using the allen key provided turn the two bubble adjustment screws to bring the bubble closer to the centre.

6.1.3 Repeat the procedure until the bubble stays centered when the dumpy is turned 180°.



## 6.2 Checking Horizontal level of line of sight.

6.2.1 The line of sight needs to be horizontal within 3.0mm of level to be accurate. Set up the dumpy level on a tripod halfway between the two staffs (fig. 9) set approximately 30m to 50m apart. Centre the bubble and read staff A, eg. 1.924m. Read staff B, eg. 1.712m.  $H = A - B$  which = +0.212 higher than A.



6.2.2 Move the dumpy level and set it up about 1m from staff A (fig 10), We know B is 0.212m higher than A. The reading to B should be 0.212m less than to A. Read on staff A e.g. 1.696 – 0.212 and the reading on B should be 1.484  $\pm 3.0$ mm and the line of sight is horizontal. If not adjust as follows:



Screw off the eyepiece cover. Turn the adjusting screw (fig. 11) until the middle cross line gives the required reading 1.484 on staff B. Screw the cover back on. Do not overtighten.