AUTO MATICAL LEVEL

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Before use

1、Operation

1) The automatic level is a precision instrument. Handle it carefully according to the engineering measurement regulations, and keep it away from heavy shocks and vibration.

2) Never place the instrument directly on the ground to avoid damage to the base surface or thread.

3) Before using, please check the compensator.

2、Maintenance

1) Use a neutral cleaning or water to clean the horizontal circle scale window and the instrument, never use an organic solvent.

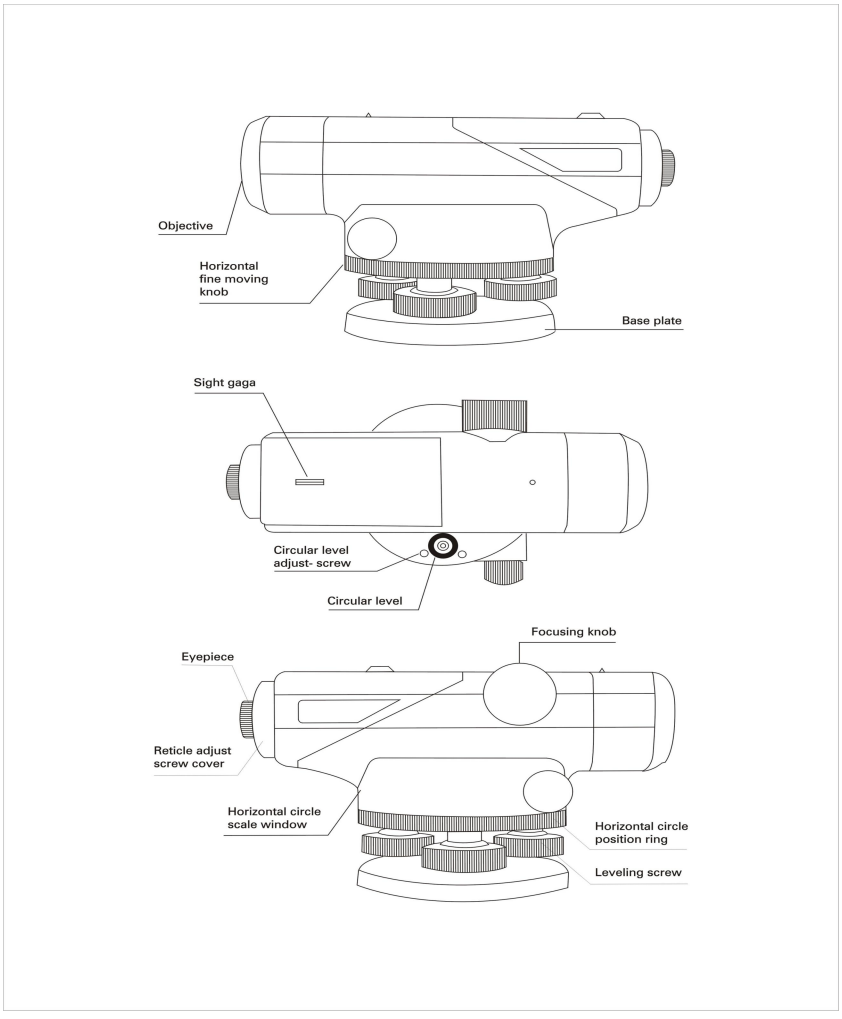
2) Use optical lens tissue to clean the objective and the eyepiece carefully.

3) Do not take down or assemble it yourself that is not mentioned in this manual.

4) After use, store it in a container to prevent dust, and put it in a dry and clean place.

5) In order to keep the high precision of the instrument, appraise the instrument regularly one or two times a year.

1. Nomenclature



2. Operation

2-1 Preparing before surveying

(1) Spread the tripod-legs so that the leg-tips form a regular triangle. Extend the legs until the tripod head is roughly at 10cm lower than your eye level and then fasten the extension clamp screws.
(2) Make sure that the tripod head is approximately level. Stamp the tripod-feet firmly into the ground.
(3) Set the automatic level onto the tripod head and tighten the center-screw.
(4) If using a spherical-head tripod, loosen the center screw and hold the base plate, then let the level to slide on the spherical-head tripod and get the bubble in the center (See fig.1).

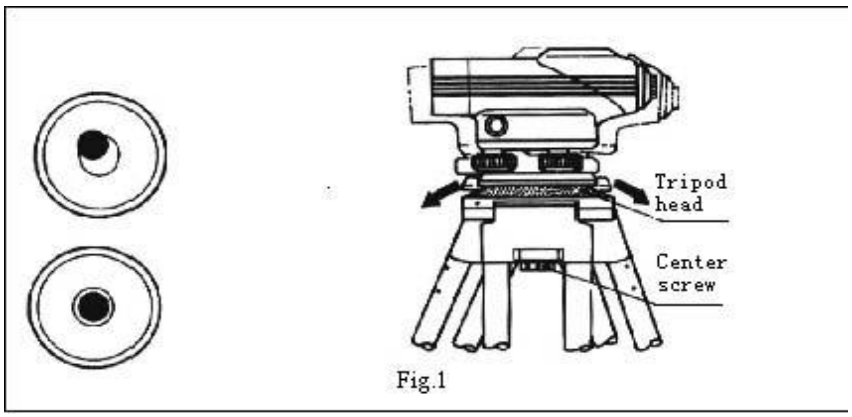


Fig.1

(5) Fasten the center-screw.
(6) Adjust the three leveling screws to get the bubble in the center (See fig.2).

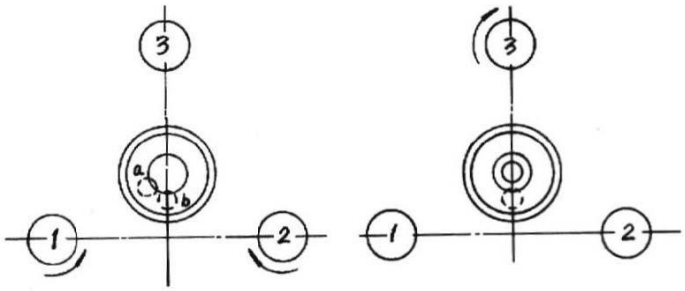


Fig.2

(7) Adjust the eyepiece until the image of the reticle is clear.
(8) Aim the objective at the staff through the sight gage of the instrument.
(9) Turn the focusing knob to get the staff image very clear. Shift your eyes around

in the field of view and make sure that there is no displace between the reticle and the staff, then the surveying and reading can be done. Adjust horizontal fine moving knob to aim the telescope at the target.

2-2Surveying method

2-2-1 Measuring altitude difference

(1) Set up the instrument at a point approximately halfway between points A and B. (See fig.3)
(2) Set up the staff vertically at point A, and take the reading a (backsight).
(3) Set up the staff vertically at point B, and take the reading b (foresight).
(4) The altitude difference h from B to A is h=a-b.
(5) If the distance between A and B is too long, or the altitude difference from B to A is too large, divide the distance into some regions, then carry on measuring in each region. (See fig.4)

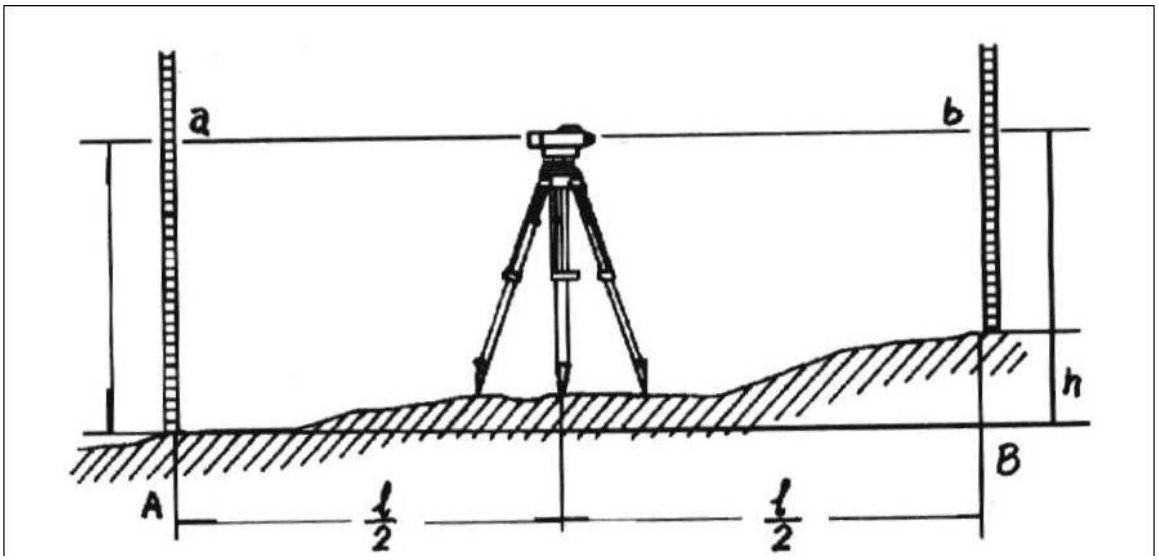


Fig.3

Calculation of altitude difference as follow:
Altitude difference=Sum of backsight-Sum of foresight
Altitude of the surveying point=Altitude of known point+Altitude difference

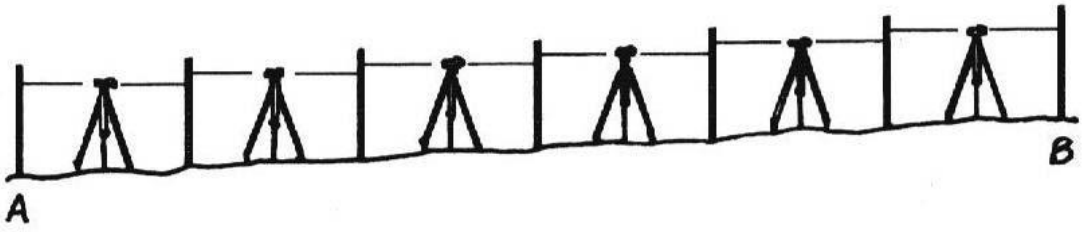


Fig.4

2-2-2 Measuring horizontal angle

The horizontal-circle-scale is graduated in minimum value of 1° and numbered every 10°.

(1)Use the plumb-bob to set the center of the instrument right above the surveying point.

(2)Aim the telescope at point A and set the horizontal-circle-scale to 0° by turning the horizontal circle positing ring.

(3)Aim the telescope at point B and take the angle reading. It's the angle of position between A and B. (See fig.5)

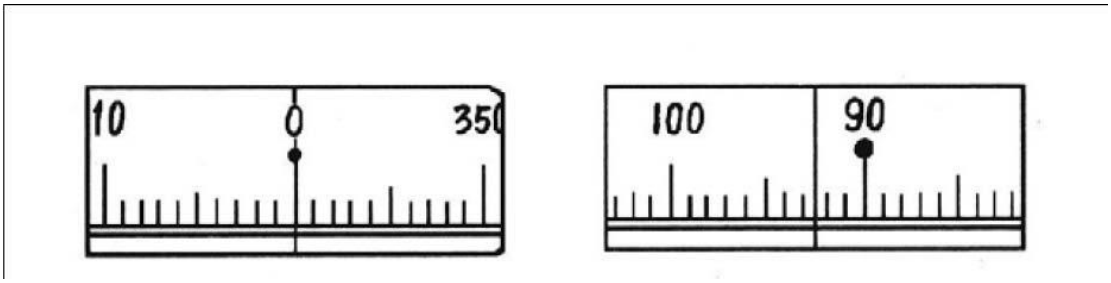


Fig.5

2-2-3Measuring distance using the stadia lines

Using the top and bottom stadia lines on the reticle, the distance between the center of the instrument and the staff can be measured approximately. Aim the telescope at the staff, read the number of

centimeters on the staff between two stadia lines, then transform it into number of meter by multiplying 100, and the number of meter is the distance between the center of instrument and the staff. (See fig6)

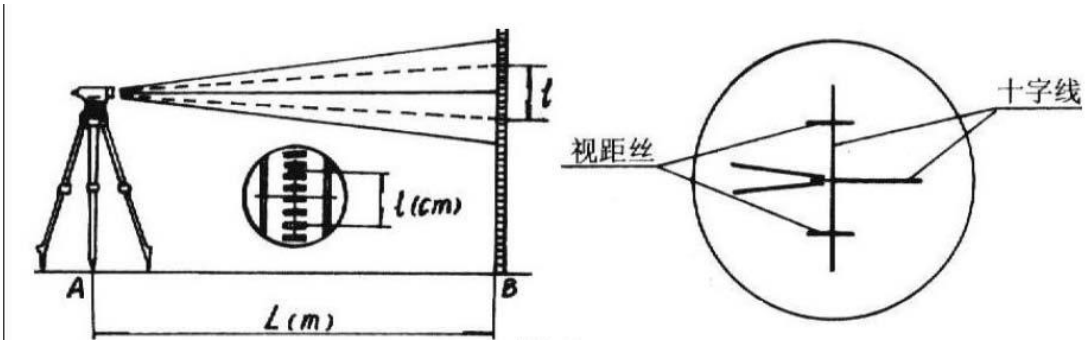


Fig.6

3.Regular checking /adjusting

3-1 Checking and adjusting of the circular level

(1)Adjust the leveling screws to center the bubble in the circular level.

(2)Turn the instrument 360°. If the bubble is still in the center, it means that the circular level is workable.

(3)If the bubble shifts away from the center, please adjust according to following

methods: Move the bubble one half of the shift to the center of the circular level by adjusting the leveling screws. Then get the bubble in the center of the circular level by adjusting the circular level adjust-screw with the hexagonal wrench. Repeat the above checking and adjusting, until the bubble does not shift when the instrument turns to any direction. (See fig.7)

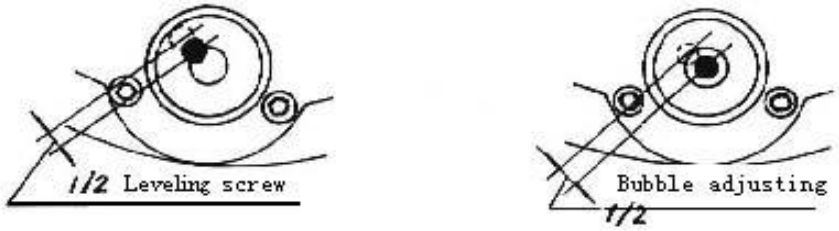


Fig.7

3-2 Checking of the compensator

(1) Center the bubble in the circular level, and aim the telescope at a target about 70m away.

(2) Turning the leveling screws to make the bubble slide out about 1/4 of the circular to any direction, if there is no deviation between the image of target and the horizontal cross-lines, it means that the working range and the precision of the compensator are stable. This checking must be done before surveying.

3-3 Checking of i Angle

(1) Set up the instrument at a point halfway between points A and B, the distance between staff A and staff B is about 50mm. Take reading a1 and b1. (See fig8)

(2) Set up the instrument at a point 2m from point A. Take the reading a2 and b2. (See fig.9)

Calculate: b2′ =a2-(a1-b1), If b2′ = b2, it means that the instrument is workable, otherwise adjust the instrument as follows:

Unscrew and remove the cover for the reticle adjusting screw. (See fig.10)

Use the adjusting pin to adjust the position of the cross line of reticle, if b2′ ＜b2, adjust downwards, otherwise, adjust upwards. (See fig11)

Repeat the adjustment until b2′ = b2 or the difference is smaller than 4mm.

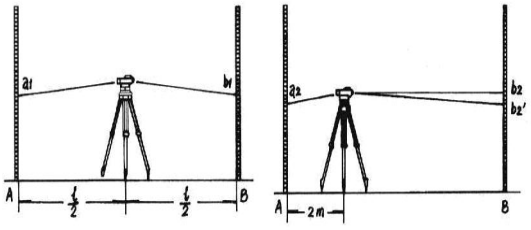


Fig.8,9

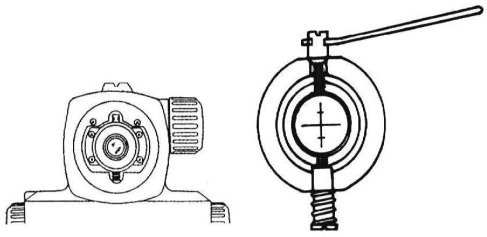


Fig.10,11