AUTO LEVEL
#4811-24
#4811-32

Automatic Level
OPERATION MANUAL

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Thank you for investing in the best!

SECO Mfg. Co., Inc.

Please read the manual carefully before use!

NOTES:

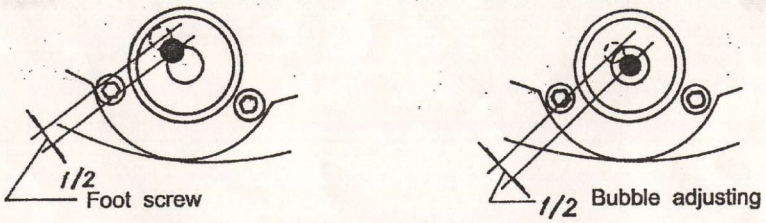

Fig.10

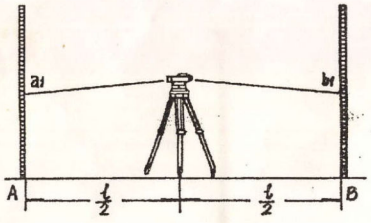

Fig.11

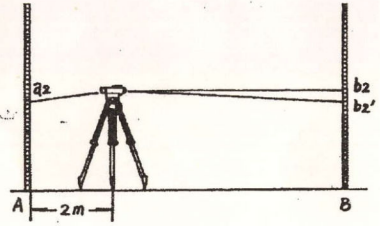

Fig.12

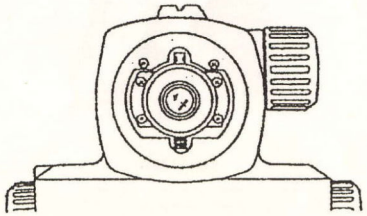

Fig.13

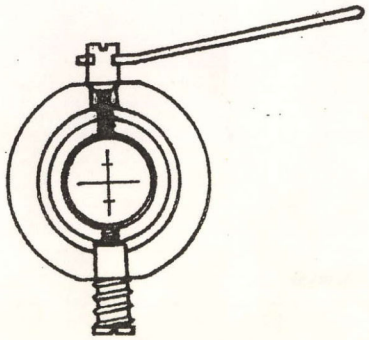

Fig.14

1. 4811-24 SERIES AUTOMATIC LEVEL

Your "SECO" automatic level is a precision surveying instrument, both optically and mechanically and will last a lifetime with a minimum of maintenance. It is built to high optical and mechanical standards.

The level is equipped with a horizontal metal scale and a magnetic damping autocompensator. The instrument can be leveled fast and coarsely by the circular level bubble, then it is ready for surveying tasks in civil engineering, architectural engineering and land surveys. The instrument ensures that standard deviation for 1km double - run leveling does not exceed ±3mm.

2. TECHNICAL SPECIFICATIONS

MODEL	4811-24	4811-32
Magnification	24X	32X
Image	Erect	Erect
Objective aperture	36mm	42mm
Field of view	1 degree 20'	1 degree 20'
Minimum focussing distance	0. 3m	0.3m
Stadia multiplication constant	100	100
Stadia additive constant(cm)	0	0
Working range of compensator	±15'	±15'
Double Run Leveling per 1km	2mm	1mm
Setting accuracy of compensator	≤0.5	≤0.5
Leveling time	≤ 2"	≤ 2"
Scale graduation range	360 degrees	360 degrees
Scale minimum value	1 degree	1 degree
Sensitivity of circular bubble	8'/2mm	8'/2mm

3. PREPARATION BEFORE SURVEYING

3.1. Spread the tripod legs so that the leg tips form a regular triangle. Extend the legs until the tripod head is roughly at 10 mm lower than your eye level and then fasten the extension clamp screws.

3.2. Make sure that the tripod head is approximately level. Stamp the tripod feet firmly into the ground.

3.3. Set the automatic level onto the tripod head and tighten the center screw.

3.4. If using a spherical or dome head tripod, loosen the center screw and hold the base plate. Let the level slide on the head of the tripod and get the bubble in the center. (See Fig.4)

3.5. Tighten the center screw.

3.6. Adjust the three foot-screws to get the bubble in the center. (See. Fig. 5)

3.7. Adjust the eyepiece until the image of the reticle is clear.

3.8. Aim the objective at the staff through the sight gage of the instrument.

3.9. Turn the focussing knob to get the staff image very clear. Shift your eyes around in the field of view and make sure that there is no displacement between the reticle and the staff, then the surveying and reading can be done.

4 SURVEYING METHOD

4.1. Measuring Altitude Difference

1) Set up the instrument at a point approximately halfway between points A and B. (See Fig. 6)
2) Setting up a staff vertically at point A, take the reading a (backsight)
3) Setting up a staff vertically at point B, take the reading b (foresight)
4) The altitude difference H of B from A is H = a - b
5) If the distance between A and B is too long, or the altitude difference of B from A is too large, divide the distance into several regions. Repeat steps 1 through 4 in each region. (See Fig. 8)
   Calulation of altitude difference as follows:
   Altitude difference = Sum of backsight - Sum of foresight
   Altitude of the surveying point = Altitude of known point - Altitude difference

4.2. Measuring Horizontal Angle

The horizontal angular scale is graduated in degrees and numbered every 10 degrees.

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 angular scale to 0 degrees by turning the horizontal circle position ring.

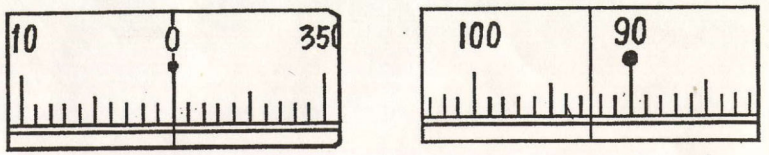

Fig.7

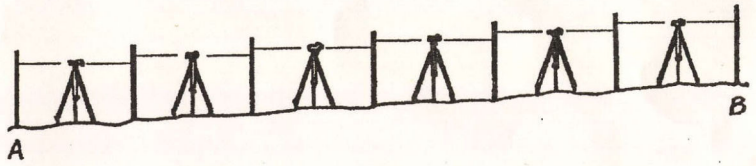

Fig.8

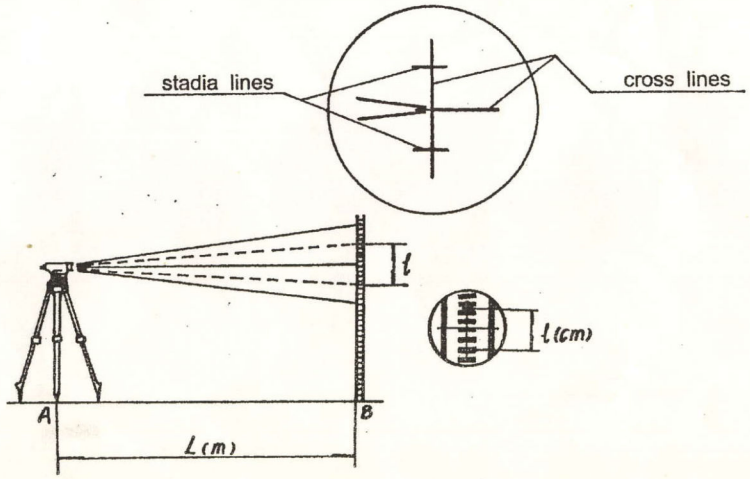

Fig.9

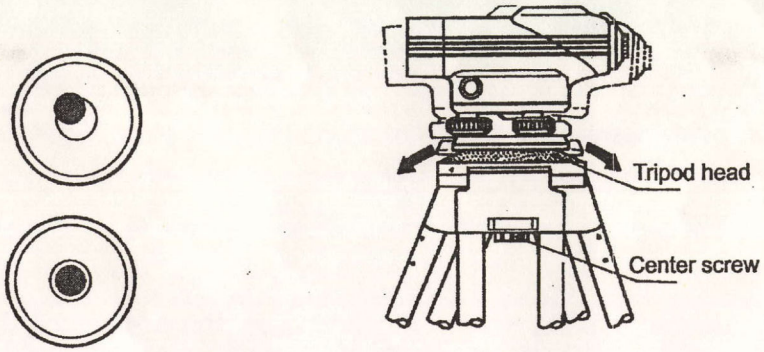

Fig.4

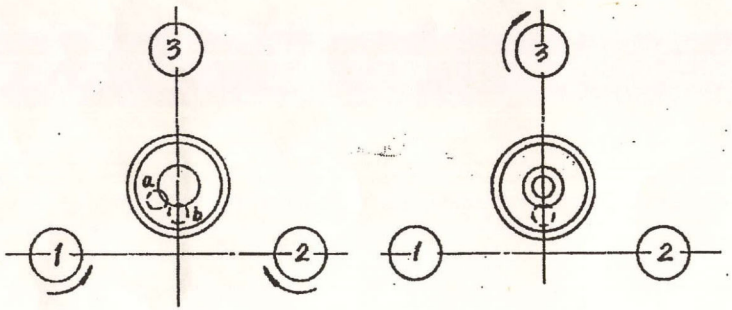

Fig.5

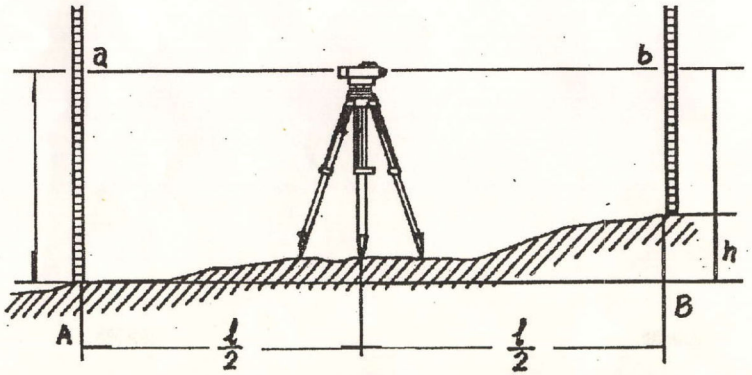

Fig.6

Aim the telescope at point B and take the angle reading. It's the angle of position between A and B. (See Fig. 7)

4.3. Measuring 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 the two stadia lines. Convert the reading to meters by multiplying the reading by 100. The result is the distance between the center of instrument and the staff. (See Fig. 9)

5. REGULAR CHECKING AND ADJUSTING

5.1. Checking and Adjusting of The Circular Level

1) Adjust the foot screws to center the bubble in the circular level.
2) Turn the instrument 180 degrees. If the bubble is still in the center, the instrument is level.
3) If the bubble shifts away from the center, adjust according to the following procedure:
   - Move the bubble one half of the shift to the center of the circular level by adjusting the foot screws. Then get the bubble in the center of the circular level by adjusting the circular level adjusting screw with the hexagonal wrench.
   - Repeat the above step, checking and adjusting the screw, until the bubble does not shift when the level is turned 360 degrees.

5.2. Checking of The Compensator

1) Center the bubble in the circular level, aim the telescope at a target about 70 m away.
2) Turning the foot screws to make the bubble slide out about 1/4 of the circle 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.

5.3. Checking of 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 50 m. Take readings at a1 and b1. (See Fig. 11)

2) Set up the instrument at a point 2 m from point A. Take readings a2 and b2. (See Fig. 12)

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

4) Unscrew and remove the cover for the reticle adjusting screw. (See Fig. 13) Use the adjusting pin to adjust the position of the cross line of reticle, if b2' < b2, adjust downwards, otherwise, adjust upwards. (See Fig. 13) Repeat the adjustment until b2' = b2 or the difference is smaller than 4 mrn.

6. MAINTENANCE

6.1. The 4811 series automatic level is a precision instrument. Handle it carefully and protect it from heavy shocks and vibration.

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

6.3. Use a neutral cleaner or water to clean the horizontal circle window and the instrument. Never use an organic solvent.

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

6.5 In order to keep the high precision of the instrument, inspect the instrument regularly for damaged parts and proper operation.

6.6 Repair of the instrument: Please contact our company or your sales agent nearest you.

6.7 Store the instrument in a dry and clean location.

7. ACCESSORIIES

Plumb Bob	Objective Cover
Optical Lens Tissue	Adjusting Pin
Operation Manual	Screwdriver

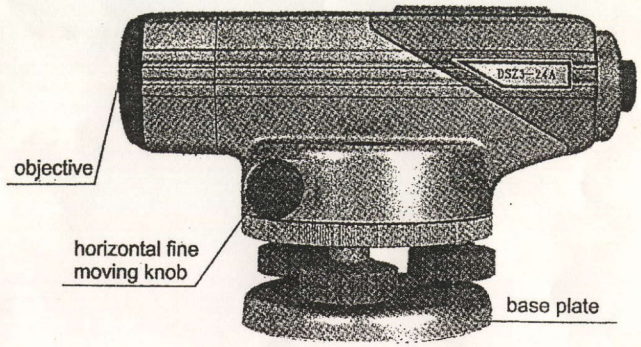

Fig.1

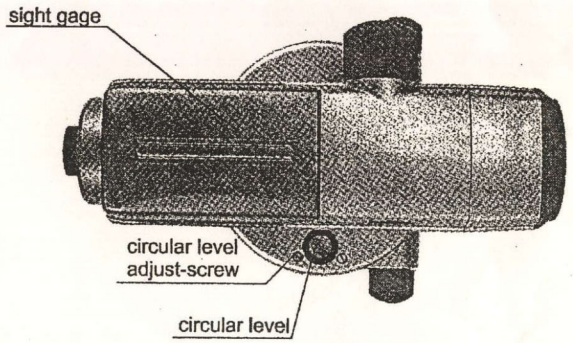

Fig.2

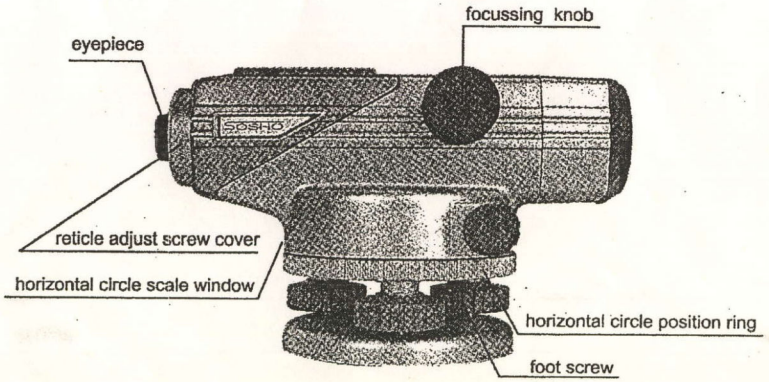

Fig.3