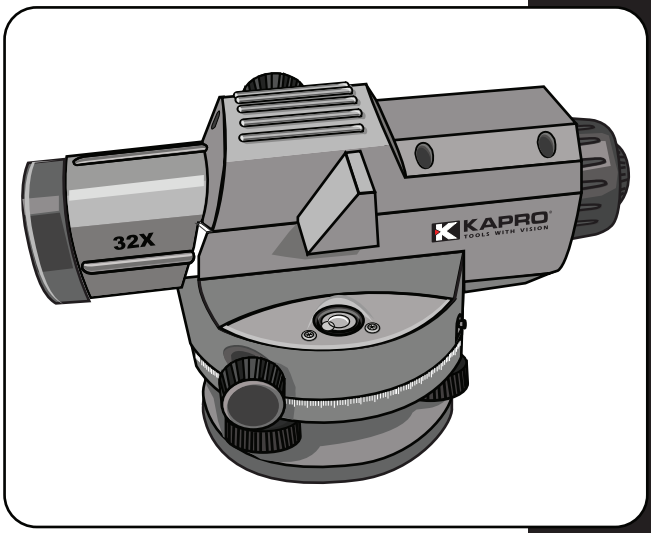
KAPRO
TOOLS WITH VISION

Automatic Optical level

Model No. 830

User Manual

scan for other languages



Thank you for purchasing Kapro's 830 Automatic Optical Level. This manual will show you how to get the most out of your optical level, so please read carefully and keep it for future reference.

APPLICATIONS

The 830 Automatic Optical level can be used for:

- Indoor and outdoor layout and leveling
- Road and plumbing infrastructure development
- Measuring or verifying points in the same horizontal plane
- Measuring height differences between points or objects
- Performing distance estimations from a reference point
- Angle estimation between changing objects in relation to a reference point

NOTE

Keep this user manual for future reference.

CONTENTS

REMARKS

- Always check the accuracy of the display before operating and after transporting it.
- Protect the device from contact with moisture and direct sunlight
- Do not leave the device in the car for long periods of time
- If the storage temperature is different than the ambient temperature, wait for the device to stabilize before operating it.
- The measurement accuracy of the device is influenced by exposure to extreme temperatures or temperature changes.
- Protect the device from falls or mechanical shock
- Store the device in its carrying bag during transport
- Avoid shaking the device during transport.
- To avoid damage during transport make sure the compensator lock (4) is engaged.
- Do not open the device or try to fix it or alter it.
- In the event of a problem, the repairs will be carried out by trained professionals with original spare parts.

NOTE

This device contains precision components sensitive to abrupt movement. External shock, impact or dropping it may compromise its functionality- handle with care to maintain its accuracy.

FEATURES

- Telescopic magnification X32
- Working range 120 meters.
- Measuring accuracy 1.6mm / 30 meters.
- 360° Rotating mechanism.
- Built-in lock mechanism for protection when transported.
- Tripod ready: 5/8" thread.

Includes:
Hard plastic carrying case, conical hook, Allen key and a tuning pin.

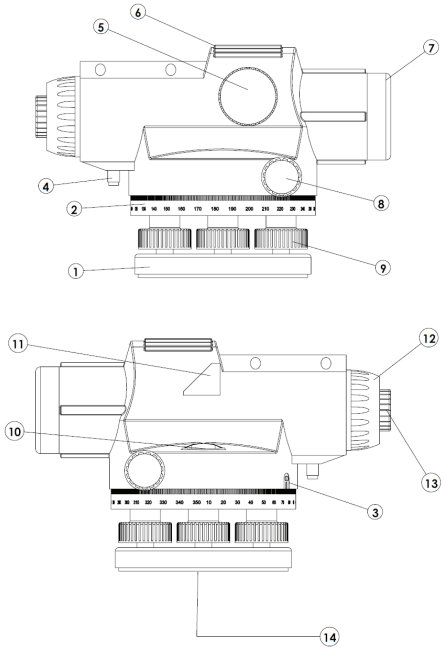
Optional:
Professional tripod and a 4m measuring rod.

SPECIFICATIONS

Telescopic magnification	X32
Working range	120m
Height measurement accuracy	1.6mm/30m
Clear objective aperture	40mm
Compensator accuracy	±0.3" (sec)
Standard deviation for 1km	1.0mm
Compensator working range	±15' (min)
Short focusing distance	0.3m
Stadia ratio	100
Circular vial accuracy	8'/2mm
Angular division	360°/ 400gon
Weight	1.8kg
Tripod thread	5/8" Female

The telescope comes in a padded hard carrying case

OVERVIEW



1. Base plate
2. Horizontal scale
3. Horizontal circle reference mark
4. Compensator lock
5. Focus adjusting knob
6. Optical peep sight
7. Objective lens
8. Horizontal drive screw
9. Leveling screw
10. Circular vial
11. Bubble observing mirror
12. Lens cover
13. Lens focusing knob
14. Tripod mount 5/8" (on bottom)

1.1 SETTING UP

1. Set up the tripod on a flat, stable area and adjust the tripod to the user's eye level.
2. Place the device on the tripod and screw the unit tightly with the 5/8" thread.
3. Align the instrument with the leveling screws (9) so that the air bubble is in the center of the circular vial. (see fig.1).

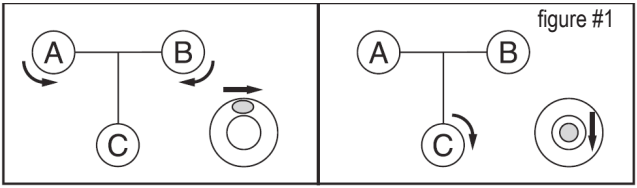


figure #1

Turn the first two leveling screws A and B to move the air bubble so that it is centered between the two leveling screws, then turn the leveling screw C until the air bubble is in the center of the circular vial.

The instrument can be carried by lifting the tripod, to ensure that it isn't damaged during this process, the tripod must be held vertically (do not put over the shoulder).

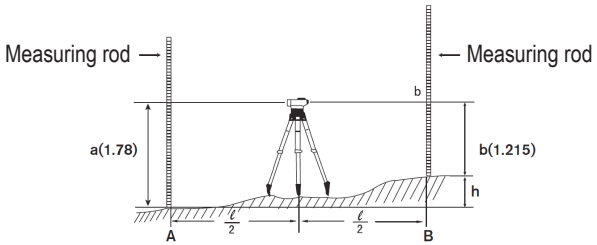
1.2 AIM AND FOCUS

1. Remove the objective lens cover (7), direct the telescope towards a bright object or hold a white sheet of paper in front of the objective lens (7) then, turn the lens (13) until a black crosshair can be seen clearly.
2. Aim the optical pee (6) to direct the telescope towards the measuring rod.
3. Turn the focus knob (5) until the gradation of the rod ap pears clearly.
4. Align the black crosshair exactly to the center of the measuring rod by turning the horizontal drive screw (8).

2.1 MEASURING HEIGHT

1. Place the instrument between two measuring points: A & B (see fig.2).
2. Position the measuring rod on point A, focus the telescope to the center of the rod and record the height value at the center of the crosshair (see fig.3).

figure #2



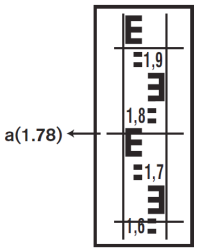


figure #3

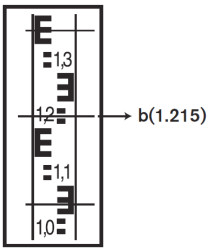


figure #4

3. Position the measuring rod on point B, focus the telescope to the center of the rod and record the height value at the center of the crosshair (see fig.4).
4. The height difference between the two points:
   h= 1.78 – 1.215 =0.565m

2.2 MEASURING DISTANCE

1. Aim the telescope at the measuring rod and record the values of the upper and lower stadia hairline (see fig. 5 & 6).

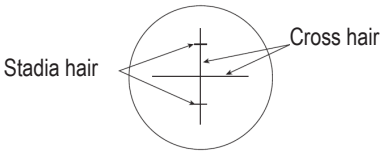


figure #5

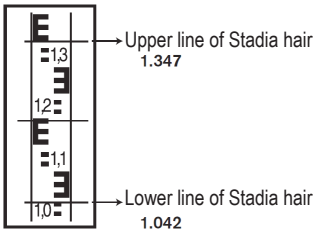


figure #6

2. Multiply the difference of both Stadia hairline height measurements by 100 to get the distance value of the measuring rod to the instrument:
   (1.347 – 1.042) x 100 = 30.5m

2.3 MEASURING ANGLES

1. Aim the telescope towards point A, rotate the horizontal scale (2) so that the zero points towards the reference mark (3) (see fig.7).
2. Aim the telescope towards point B, read off the angle value on the scale (2) at the reference mark (3) (see fig.7).

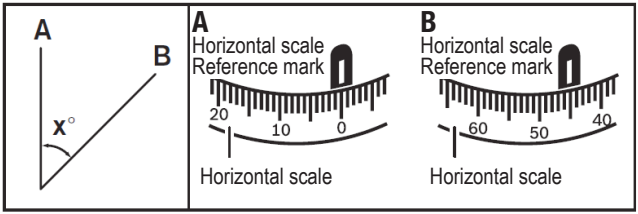


figure #7

TESTING AND TUNING

Before using this instrument or after a long transportation, the leveling and indication accuracy should be tested.

3.1 TESTING THE CIRCULAR BUBBLE VIAL

1. Adjust the telescope with the leveling screw knob (9) so that the air bubble is in the center of the circular vial (10).
2. Rotate the instrument by 180°, the air bubble should stay centered. If the bubble is not centered, the circular bubble vial must be readjusted.

3.2 ADJUSTING THE CIRCULAR BUBBLE VIAL

1. Rotate the leveling screw knob (9) move the air bubble toward the 1/2 of the distance to the center of the circular vial (see fig.8).
2. Use the Allen key to center the bubble to the middle of the circular vial (see fig.9).
3. Repeat the above steps until the air bubble stays in the center of the circular vial, no matter which direction the telescope in turned to.

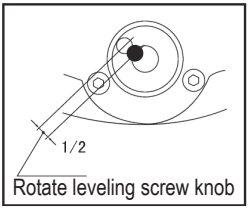


figure #8

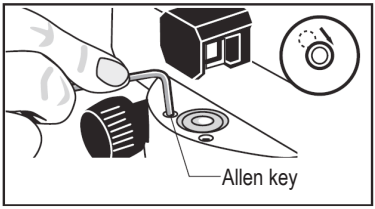


figure #9

TESTING ANGLES

1. The testing must be conducted at a distance of 30m. Place the telescope in the center between the two measuring points: A & B (see fig.10)
2. Read the heights of the two measuring rods and calculate the difference (d) between a1 and b1.
   Example: a1= 1.937m b1=1.689m a1-b1 = 0.248 = d

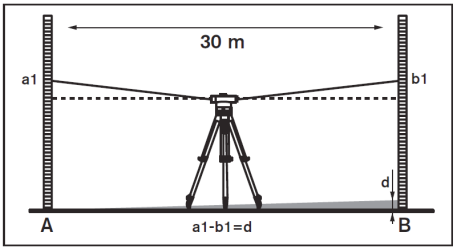


figure #10

3. Place the telescope at 1 meter distance from the measuring rod A, read and write down the height of a2 (on rod A).
4. Calculate b2'=a2- d , write down the height of b2 (rod B). If there is a difference of over 3mm between b2 and b2', the crosshair must be readjusted.

Example: a1= 1.724m d= 0.248 Then a2-d=1.476=b2'
When measuring the height b2 =1.476 ±2mm

b2'=a2-d

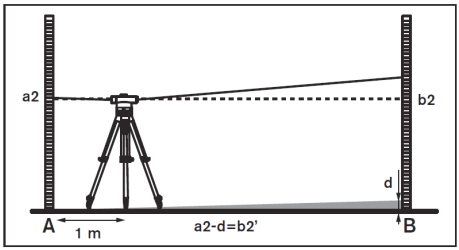
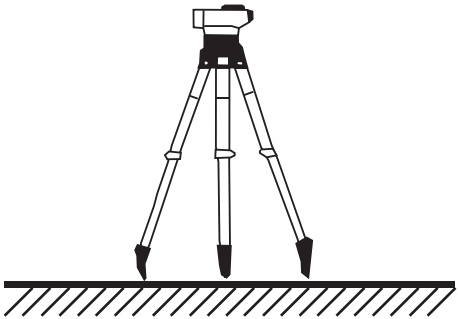


figure #11

3.3 ADJUSTING THE CROSSHAIR

1. Remove the lens cover. (12)
2. Using the adjusting pin, turn adjusting screw clockwise or counterclockwise until the height value of b2 and b2' on measuring rod B, are the same.
3. Return the lens cover on the lens.



MAINTENANCE AND SERVICE

Careful use and maintenance of the instrument can guarantee its accuracy and efficiency.

1. After measuring, wipe clean all the surfaces of the instrument and put into the carrying case.
2. Dust off all optical parts with a soft brush and clean the lens with lens tissue.
3. Only an experienced technician, familiar with the device structure will repair a damaged or malfunctioning device. Otherwise, the device should be sent to the factory for repair. Under no circumstances should the device be opened and repaired.
4. A bag of silica gel dryer is included in the case for the removal of residual moisture. Renew the bag of silica gel regularly.
5. The unit should be kept in a dry and dust-free environment.

WARRANTY

This product is covered by a two-year limited warranty against defects in materials and workmanship. It does no cover products that are used improperly, altered or repaired without Kapro approval. In the event of a problem with the product you have purchased, please return the product to the place of purchase with the proof of purchase.

Model #830