

OL24X

24x Optical Level



Instruction Manual

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Two Year Warranty

This warranty does not cover damage or defects caused by or resulting from misuse, accidental damage, unauthorised repair, abnormal use or calibration after despatch. This level has been calibrated prior to despatch and through normal use should not go out of calibration. However, CMI Lasers recommend that you check your equipment for calibration from time to time as units may go out of calibration with excessive vibration or after drops or knocks. Simple guides to checking calibration are supplied either as a card inside the lid of hard carry cases or outlined within the instruction manual for each unit.

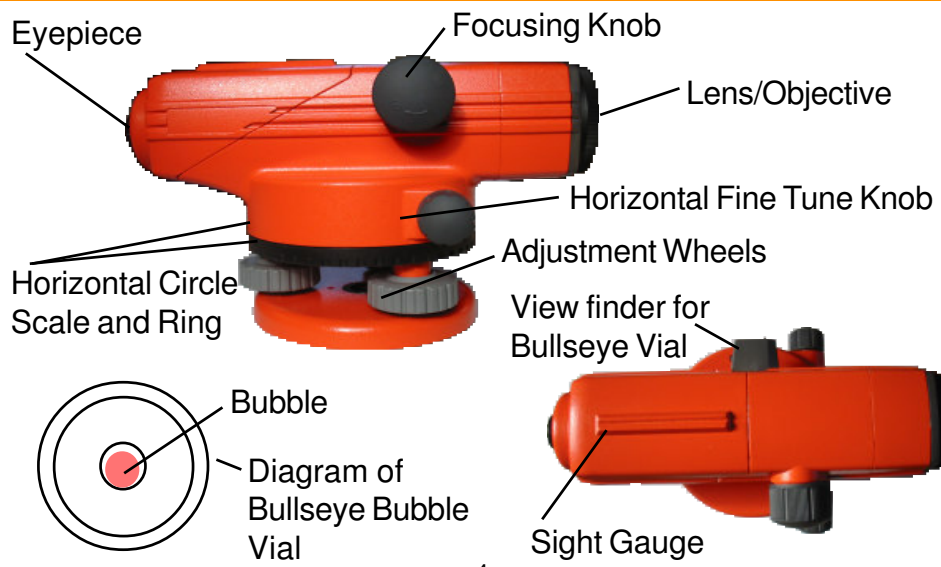
Introduction

Congratulations on purchasing the OL24X Precision Optical Automatic Level – an excellent tool suited to the needs of a wide range of trades. The OL24X is easy and convenient to use. Its features include; 24x optical magnification, auto compensating and is easily aimed with the horizontal fine tune knob and 360° circle display. The OL24X is constructed from a solid die cast casing and comes complete with a sturdy carry case.

Care and Maintenance

- CMI Lasers recommends that the OL24X is always stored in its protective case when not in use.
- The OL24X is a precision measuring device and will provide many years of accurate measurements providing it is not subjected to excessive forces such as dropping or shaking.
- CMI Lasers recommends that you test your level for accuracy on a regular basis. If servicing is required please contact your nearest CMI Lasers Stockist.

Diagrams



Setting up and using the OL24X

- Place the tripod in the required location. Extend the legs until the head of the tripod is 10cm below your eye level when you are standing in a comfortable position. Anchor the tripod in position by firmly pressing down on the tripods feet.
- Place the OL24X optical level onto the head of the tripod and tighten the center screw.
- The OL24X requires to be roughly leveled using the three adjustment wheels and the bullseye bubble vial. The bubble should be centrally located somewhere within the inner circle for the compensator to automatically level (page 4 & 5).
- Once successfully leveled, the compensating mechanism will fine tune the instrument providing the extreme accuracy.

NOTE: Centering the bubble exactly will NOT increase accuracy of leveling as this is achieved by the precision automatic compensator.

- Remove the lens cover and aim the OL24X towards the target/ staff using the sight gauge.
- Use the horizontal fine tuning knob in order to get the target/ staff exactly in the center of your field of view (see page 4).
- Adjust the focussing knob until the target/ staff is clear and in focus.
- The eyepiece may need adjusting for the cross hair reticle to become sharply in view. This is achieved by rotating the eye piece.

Your optical level is now ready for use.

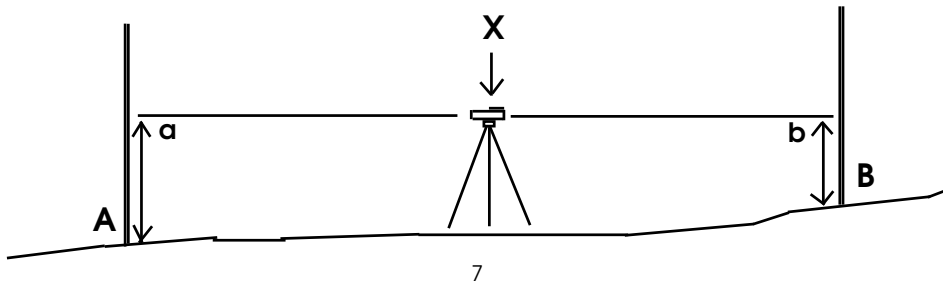
For best results use a CMI Heavy Duty Domed Tripod.

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Measuring Altitude Differences

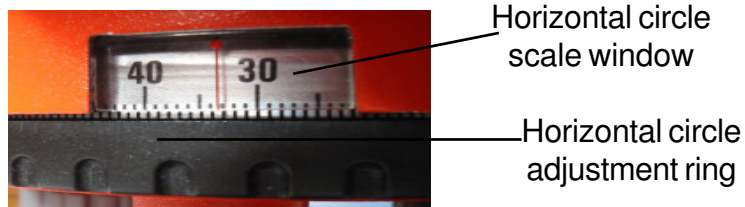
- Set up the OL24X at point **X** half way between **A** and **B**.
- Setting up a staff at point **A** take the reading **a**. making sure the staff is vertical. Move the staff to point **B** and take the measurement **b**.
- The altitude or height difference is **a - b**.
- If the distance between **A** and **B** is too large or the height difference too big then you divide this distance into a number of smaller zones and measure each individual zone the altitude difference of the total distance being the sum of **a**'s minus the sum of **b**'s.



Measuring Horizontal Angle

This is achieved by using the horizontal circle scale (see page 4).

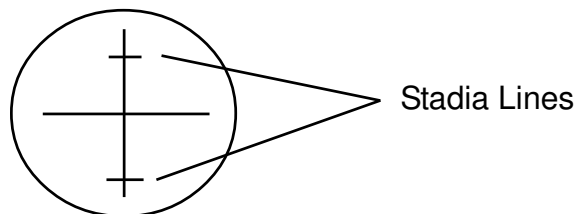
- Use the plumb bob to center the OL24X directly above the surveying point.
- Aim the optical level to your first reference point and set the circle scale to 0° using the black scale adjustment ring.
- Aim the OL24X at the second reference point. If you now look at the circle display you will see the angle between the two reference points measured in degrees.



Measuring Distance

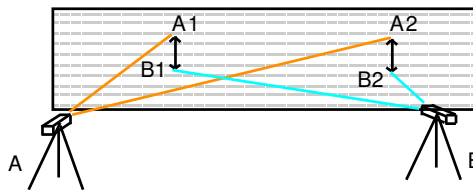
This is achieved by using the Stadia lines that are visible on the cross hair when looking through the eyepiece (see diagram below).

- Place the OL24X at the start of the distance you want to measure and the staff at the other end and aim the optical level at the staff.
- Looking at the staff through the eyepiece read the distance in centimetres between the top and bottom Stadia lines. For each centimetre measured between the Stadia lines there will be 1 metre between the level and staff eg. 10 cm Stadia line distance equals 10 metres between the level and staff.



Testing for Calibration

- Testing the bullseye vial. Level the OL24X with bulls eye vial. Rotate the level by 180° , if the bubble remains at least $3/4$ within the circle then the bullseye vial is within tolerance.
- Testing the compensator. Set up the OL24X as per normal and aim towards a target (eg. a staff or a wall of a house) making a note on how high up the feature the horizontal line is located. While looking through the eyepiece at the feature turn the front adjustment wheel so that the bubble slides just out of centre (but not out of the circle). Looking at the feature see if the cross hair horizontal line is still aligned on the same point as before. If it is not then the compensation mechanism may no longer be working correctly (test again to confirm).
- Testing for calibration. Set the level up at one end of a wall facing the wall A. Make a mark on the wall at the height of the horizontal hairwire A1. Rotate the level to the other end of the wall and again make a mark A2. Move the level to the other end of the wall B making a mark again at each end of the wall B1 and B2. If the height between A1 to B1 is the same as A2 to B2 then the level is calibrated.



Trouble Shooting

- *I cannot see the cross hair when looking through the eyepiece !*
The cross hair is out of focus and can be brought into focus by rotating the eyepiece. Note that looking at objects a different distances will require fine tuning of the cross hair focus.



- *Will I get a more accurate level with the bubble exactly in the center of the bullseye vial!*
No. The purpose of the bullseye vial is to get the unit level enough for the compensator to be able to auto level. It is the compensator that provides the accuracy of the unit.
- *I can hear a rattle inside the level!*
The rattle is most probably the sound of the compensator inside the level and is normal. The compensator is very durable and will not be damaged through normal use and movement.

TECHNICAL SPECIFICATIONS

- Magnification: 24X
- Objective aperture: 36mm diameter
- Accuracy: $\pm 10\text{mm}$ at 1Km
- Field of view: $1^{\circ}20'$
- Min focusing distance: 0.3m
- Compensator range: $\pm 15'$
- Compensator accuracy: $< 0.5''$
- Leveling time: $< 2''$
- Bubble vial sensitivity: $8' / 2\text{mm}$
- Operating temperature: -25°C to $+50^{\circ}\text{C}$

CMI Industries Pty Ltd

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Packaging and Instructions designed and printed in Australia.
OL24X packaged and checked in Australia. Made in China.