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Topcon AT-B4

Topcon AT-B4 24x Automatic Level User Manual

Model: AT-B4

1. Introduction

Thank you for choosing the Topcon AT-B4 24x Automatic Level. This instrument is designed for precise leveling applications in construction and surveying. This manual provides essential information for the safe and effective use, maintenance, and troubleshooting of your automatic level. Please read this manual thoroughly before operating the instrument to ensure optimal performance and longevity.

2. Safety Information

Always observe the following safety precautions to prevent injury and damage to the instrument:

- **Eye Protection:** Never look directly at the sun through the telescope, as this can cause severe eye damage.
- **Tripod Stability:** Ensure the tripod is securely set on stable ground to prevent the instrument from falling.
- **Handling:** Handle the instrument with care. Avoid dropping or subjecting it to strong impacts.
- **Environmental Conditions:** Do not use the instrument in extreme weather conditions beyond its specified operating range. Protect it from heavy rain and dust when not in use.
- **Cleaning:** Use only recommended cleaning materials and methods to avoid damaging optical components or the instrument's finish.

3. Package Contents

Verify that all items are present upon unpacking:

- Topcon AT-B4 Automatic Level
- Plumb Bob
- Tool Kit (adjusting pins, hex wrench)
- Lens Cap
- Vinyl Cover
- Carrying Case
- User Manual (this document)

4. Product Overview

The Topcon AT-B4 is a robust automatic level featuring a 24x magnification telescope and a magnetic-damped compensator for rapid and stable automatic compensation. It is designed for high precision and durability in various field conditions.



Figure 1: Topcon AT-B4 Automatic Level mounted on a tripod, showing its overall structure and yellow casing.



Figure 2: Detailed view of the Topcon AT-B4 level, illustrating the main body, objective lens, eyepiece, focusing knob, and fine horizontal adjustment knobs.

Key Components:

- **Telescope:** For viewing the leveling staff.
- **Focusing Knob:** Adjusts the clarity of the target image.
- **Circular Bubble (Vial):** Used for approximate leveling of the instrument.
- **Leveling Screws:** Three screws on the tribrach for precise leveling using the circular bubble.
- **Horizontal Circle:** For measuring horizontal angles.
- **Horizontal Tangent Screws:** For fine adjustment of the horizontal aiming.
- **Compensator:** Automatically levels the line of sight within a certain range once the instrument is roughly leveled.

5. Setup

Proper setup is crucial for accurate measurements.

5.1 Mounting the Instrument

1. **Set up the Tripod:** Extend the tripod legs to a comfortable height and spread them wide enough to ensure stability. Press the tripod shoes firmly into the ground. Ensure the tripod head is as level as possible.
2. **Attach the Level:** Carefully place the AT-B4 level onto the tripod head. Secure it by screwing the tripod's central screw into the base of the level until it is firm but not overtightened.

5.2 Rough Leveling with Circular Bubble

1. Adjust two leveling screws simultaneously in opposite directions until the circular bubble is centered between them.
2. Rotate the instrument 90 degrees.
3. Adjust the third leveling screw until the circular bubble is centered.
4. Rotate the instrument 180 degrees to check if the bubble remains centered. If not, repeat the process. The compensator will handle the fine leveling once the circular bubble is centered.

6. Operating Instructions

Once the instrument is set up and roughly leveled, you can begin taking measurements.

6.1 Focusing the Telescope

1. **Eyepiece Focus:** Point the telescope towards a bright, uniform background (e.g., the sky). Rotate the eyepiece until the reticle (crosshairs) appears sharp and clear.
2. **Target Focus:** Aim the telescope at the leveling staff. Rotate the focusing knob until the image of the staff appears sharp. Ensure there is no parallax (relative movement between the reticle and the staff image when moving your eye).

6.2 Taking a Reading

1. Once the staff is clearly focused and the compensator has stabilized the line of sight, read the value indicated by the horizontal crosshair on the leveling staff.
2. For precise work, use the stadia hairs (upper and lower short horizontal lines) to estimate distance or as a check.

6.3 Using the Horizontal Circle

The horizontal circle allows for measuring horizontal angles.

1. Loosen the horizontal clamp (if present, or use the endless tangent drive).
2. Rotate the instrument to align the horizontal circle to a known bearing or zero point.
3. Tighten the horizontal clamp (if applicable) and use the horizontal tangent screws for fine adjustment to the target.
4. Read the angle on the horizontal circle.

7. Maintenance

Regular maintenance ensures the accuracy and longevity of your AT-B4 level.

- **Cleaning:** After each use, wipe the instrument with a soft, clean cloth. For lenses, use a lens brush to remove dust, then a clean, soft lens cloth or lens tissue with a small amount of lens cleaning fluid. Avoid touching the lenses with your fingers.
- **Storage:** Store the instrument in its carrying case in a dry, cool place, away from direct sunlight and extreme temperatures. Ensure it is clean and dry before storage.
- **Calibration Check:** Periodically check the instrument's calibration, especially if it has been subjected to impact or rough handling. Refer to a qualified service technician for calibration adjustments if necessary.
- **Battery (if applicable):** While the AT-B4 is a mechanical automatic level and does not use batteries for its primary function, ensure any accessories are maintained according to their respective manuals.

8. Troubleshooting

Here are solutions to common issues you might encounter:

Problem	Possible Cause	Solution
Image is blurry or unclear.	Incorrect focusing of eyepiece or objective lens.	Adjust the eyepiece until the reticle is sharp, then adjust the focusing knob for the target. Eliminate parallax.

Problem	Possible Cause	Solution
Circular bubble not centered.	Instrument not roughly leveled.	Re-level the instrument using the three leveling screws as described in Section 5.2.
Line of sight appears tilted or inaccurate.	Instrument out of calibration or compensator stuck.	Gently tap the side of the instrument to free the compensator. If the issue persists, the instrument may require calibration by a qualified technician.
Horizontal circle difficult to rotate.	Horizontal clamp is tightened or mechanism is dirty.	Ensure the horizontal clamp is loosened. Clean around the base if debris is present.

9. Specifications

Technical specifications for the Topcon AT-B4 Automatic Level:

- **Brand:** Topcon
- **Model:** AT-B4
- **Magnification:** 24x
- **Compensator:** Magnetic-damped automatic compensator
- **Minimum Focusing Distance:** 20cm (7.9 in.)
- **Material:** Acrylonitrile Butadiene Styrene, Plastic
- **Color:** Yellow
- **Product Dimensions:** Approximately 14"L x 10"W (overall dimensions, including case or typical setup)
- **Style:** Automatic, Standard
- **Environmental Protection:** All-weather dependability (refer to IP rating if available in full product documentation)

10. Warranty Information

Topcon products are manufactured to high standards and are backed by a limited warranty. For specific warranty terms, conditions, and duration, please refer to the warranty card included with your product or visit the official Topcon website. Keep your proof of purchase for warranty claims.

11. Customer Support

Should you require technical assistance, service, or have questions regarding your Topcon AT-B4 Automatic Level, please contact Topcon customer support. Contact information can typically be found on the Topcon official website or on the product packaging. When contacting support, please have your model number (AT-B4) and serial number ready.

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