

STANLEY[®]

GB

24X AUTOMATIC LEVEL KIT

AL24[™]



INSTRUCTION MANUAL



77-159 • 77-160

Fig. 1

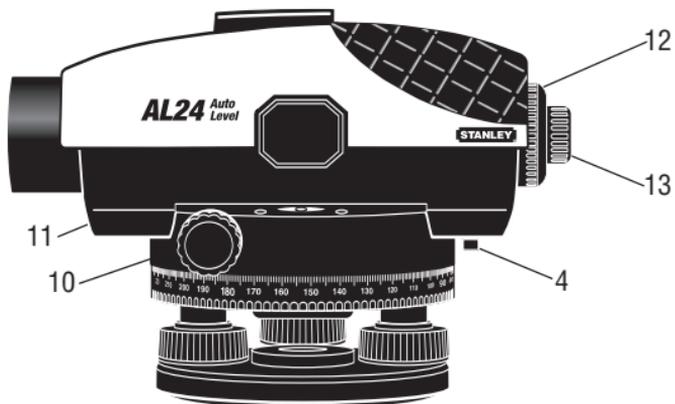
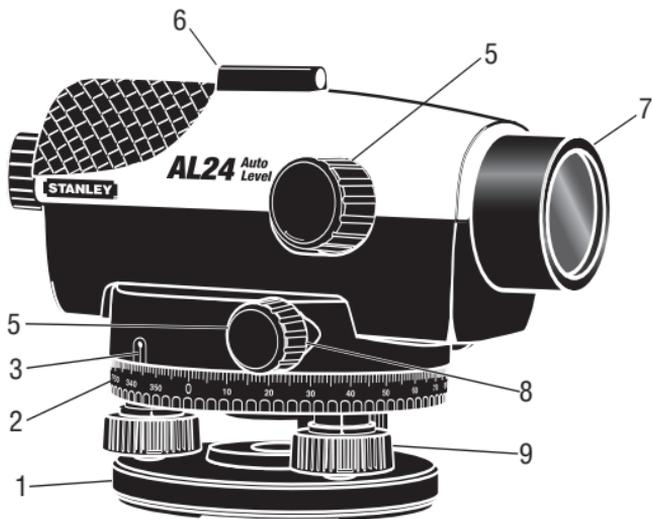


Fig. 2



FEATURES (Fig. 1)

- | | | | |
|----|----------------------------------|----|------------------------|
| 1 | Base Plate | 2 | Horizontal Circle |
| 3 | Horizontal Circle Reference Mark | 4 | Compensator Lock |
| 5 | Focusing Knobs | 6 | Optical Peep Sight |
| 7 | Sunshade / Objective Lens | 8 | Horizontal Drive Screw |
| 9 | Leveling Screw | 10 | Circular Bubble Vial |
| 11 | Vial Sighting Prism | 12 | Eyepiece Cover |
| | | 13 | Eyepiece Focusing Knob |

FEATURES

- **Wire-hung, magnetically dampened compensator** for optimum range and accuracy.
- **Compensator lock** protects instrument during transport or storage; the lock can also be used as a handy compensator checking tool.
- **Large effective aperture** and minimum focus of 0.3 m.
- **Top-mounted optical peep-sight** for quick reference.
- **Large, easy-to-use precise focusing knob.**
- **Easy-to-read horizontal circle.**
- **Penta prism** for easy bubble viewing.
- **Sealed, dust-protected leveling screws.**
- **Water resistant, sealed construction** plus sunshade for use in various weather conditions.
- **Fine adjustment knobs** on left and right sides with friction-braked rotation, endless horizontal drive.
- **1:100 stadia** for distance estimation.
- **5/8" x 11 threads** to fit standard tripods.

INTRODUCTION

Thank You for purchasing one of our Automatic Levels.

This instrument was carefully inspected and calibrated within tight tolerances before shipment. We properly package the instruments for shipment, but we cannot control how the package is handled during shipment. We advise that you check the instrument using the test shown in the “Line-of-Sight” Section before using.

“Measure Twice, Cut Once”...

After doing any job using any instrument, it is advised that you check your work. To check your work, set up the instrument in a different location from the place where you originally set up (approx. 16 m) and reshoot a few of your original targets. The new readings should agree with the first readings.

If the new readings do not agree, you should have the instrument checked by a STANLEY Authorized Repair Center, or try the Line-of-sight adjustment.

USING THE INSTRUMENT

Setting up the instrument and centering the bubble

1. Set up the tripod and attach the level using the tripod mounting screw.
2. Adjust the tripod legs until the tripod head is roughly level. Center the bubble within the vial by turning the leveling screws as shown in Fig. 2.
A – Turn screws A and B to move the bubble to the right side.
B – Turn screw C to center the bubble.

Focusing the instrument

1. **Focus the cross hairs** (Fig. 3) by pointing the telescope towards a bright background or holding a white sheet of paper in front of the objective lens, then turning the eyepiece until the cross hairs are sharp and black.

2. **Focus the telescope** by locating a target, such as a leveling rod, using the optical peep sight. Looking through the eyepiece, use the focusing knob to bring the target into sharp focus. Center the vertical hair within the target using the horizontal drive knobs on either side of the instrument.

Reading measurements using a leveling rod

Height reading

Read the rod where it is intersected by the horizontal hair. For example, the height reading in Fig. 4 is 1,195 m.

Distance measurement

Read the rod where it is intersected by the upper and lower stadia hairs; in Fig. 4 these readings are at 1,352 m and 1,038 m. The stadia ratio is 1:100; therefore, the distance from the instrument to the rod is: $(1,352 - 1,038) \times 100 = 31,41$ m.

Angle measurement

As shown in Fig. 5, sight point A and rotate the horizontal circle until the reference mark is on "0". Rotate the level and sight point B; the reference mark will indicate the angle between A and B.

CALIBRATION

Your AL24 Automatic Level has been factory calibrated; however, you should occasionally check your level for errors caused by shipment or rough handling.

Compensator lock button

Check the compensator for proper operation before use or anytime the operation of the instrument is in question. Push and release the compensator lock button to shake the compensator. The compensator should return to the exact horizontal position sighted before the lock button was pressed.

Circular bubble vial

Center the vial bubble using the leveling screws, then rotate the instrument 180° . The bubble should remain centered (Fig. 6). If the bubble moves out of center, the vial needs adjustment (Fig. 7).

Turn the leveling screws to bring the bubble halfway to center (Fig. 8). Using the Allen wrench, turn the two vial adjustment screws to center the bubble (Fig. 9).

Repeat the above procedure until the bubble remains centered when the level is rotated 180° .

Line-Of-Sight

The line-of-sight needs to be horizontal within 3 mm of level to be accurate.

Set up and level the instrument on a tripod midway between two leveling rods set approximately 30m to 50m apart. Sight rods A and B; the height readings are a_1 and b_1 (Fig. 10). The value "H" is equal to $(a_1 - b_1)$. Move the instrument to within 6 feet (2m) of rod A and re-level. Again sight rods A and B; these height readings are a_2 and b_2 (Fig. 11).

If $a_1 - b_1 = a_2 - b_2 = H$, the line-of-sight is horizontal. If not, the level should be adjusted as follows.

Because the instrument is set halfway between A and B, any error in the line-of-sight causes both readings to be erroneous by the same amount. Error "e" cancels out, so the value $a_1 - b_1 = H$ is correct. Therefore, $a_2 - H = b_3$, the adjusting value.

To adjust, unscrew the eyepiece cover. Turn the adjusting screw with the adjusting pin (Fig. 12) until the horizontal cross hair gives the reading b_3 , on rod B. Repeat the above procedure until $\{(a_1 - b_1) - (a_2 - b_2)\} \leq 3$ mm.

MAINTENANCE

Care must be taken to maintain the accuracy of the instrument.

- After each use, the instrument should be wiped clean and kept in its carrying case.
- Remove dust from the lenses with a soft brush or a nonabrasive wipe. Never touch the lenses with your fingers.
- Store the instrument in a dust-free area with low humidity.
- A bag of silica gel dryer is included with each instrument; if it has stopped working effectively, bake it to remove moisture or replace with a new bag.

TECHNICAL DATA

Telescope

	Erect
Telescope length	0.8" (202mm)
Magnification	24 x
Leveling accuracy	1,6 mm at 45 m
Working range	300' (90 m)
Clear objective aperture	36mm
Field of view	1°20'
Shortest focusing distance	1' (0.3m)
Stadia ratio	100
Stadia addition	0
Water resistant?	Yes

Compensator:

Working range	+/- 15'
Setting accur.	+/- 0.8"
Magnet dampening	Yes
Sensitivity of bubble	8'/2mm
Circle graduation	1° or 1 gon
Standard deviation for 1km	2.0mm double-run leveling
Instrument net weight	1.8kg (4 lbs)
Mounting thread	5/8" x 11 (M16)

WARRANTY

Five Year Warranty (GW)

Stanley Tools warrants its electronic measuring tools against deficiencies in materials or workmanship for five year from date of purchase. Deficient products will be repaired or replaced, at Stanley Tools' option, if sent together with proof of purchase to:-

Stanley UK Sales Limited,

Gowerton Road,
Brackmills,
Northampton
NN4 7BW

This Warranty does not cover deficiencies caused by accidental damage, wear and tear, use other than in accordance with the manufacturer's instructions or repair or alteration of this product not authorised by Stanley Tools.

Repair or replacement under this Warranty does not affect the expiry date of the Warranty. To the extent permitted by law, Stanley Tools shall not be liable under this Warranty for indirect or consequential loss resulting from deficiencies in this product. This Warranty may not be varied without the authorisation of Stanley Tools.

This Warranty does not affect the statutory rights of consumer purchasers of this product. This Warranty shall be governed by and construed in accordance with the laws of England and Stanley Tools and the purchaser each irrevocably agrees to submit to the exclusive jurisdiction of the courts of England over any claim or matter arising under or in connection with this Warranty.

Subject to change without notice

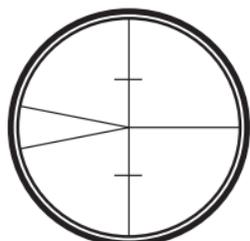


Fig. 3

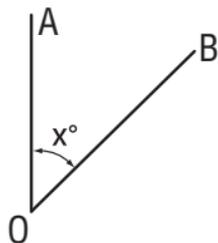
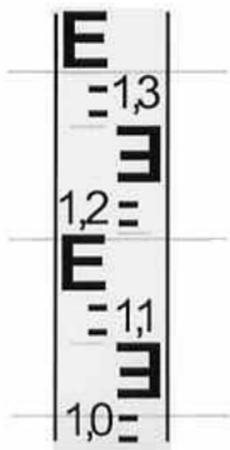


Fig. 4

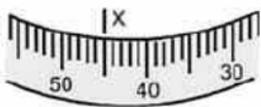
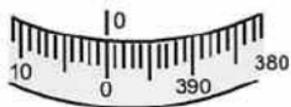


Fig. 5

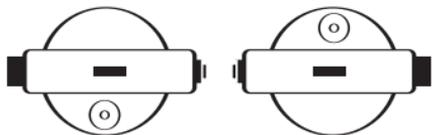


Fig. 6

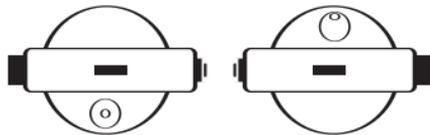


Fig. 7

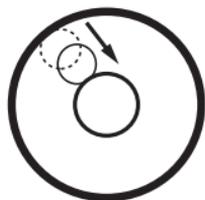


Fig. 8



Fig. 9

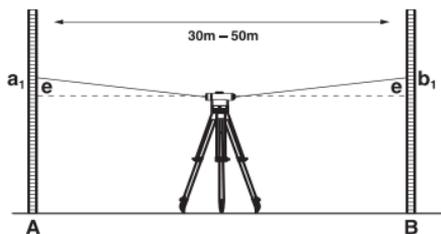


Fig. 10

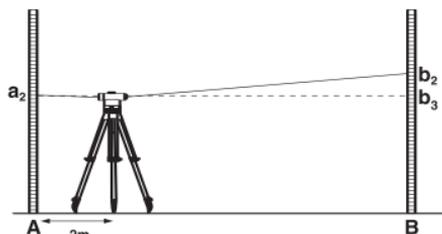


Fig. 11

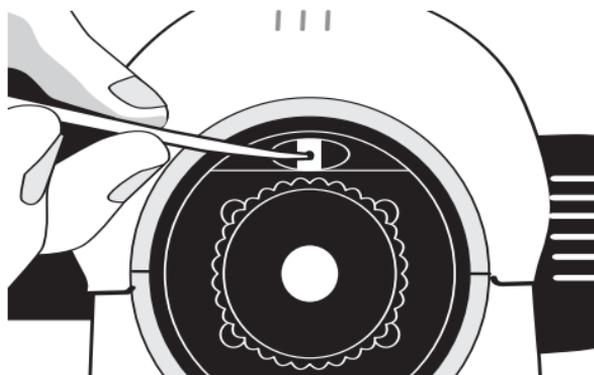


Fig. 12



©2004 THE STANLEY WORKS:
www.stanleyworks.com

Z93-77159CST (0404)