

Preface

We appreciate of your purchasing our autolevel series. In order to help you fully explore the instrument features, please read this manual carefully and save these instructions properly for future reference.

Notes:

- ☐ before start to operate the instrument or after long transportation, the leveling and display accuracy must be checked first.
- ☐ Protect the instrument against moisture, and keep the instrument away from direct sunshine.
- ☐ Never leave the instrument in vehicles for a long time.
- ☐ If the temperature has difference between the working spot and reserved place, please keep the instrument into case for a while until it suit to the working temperature before putting into operation.
- ☐ The measuring accuracy of the instrument can be impaired if exposing it under extreme temperatures or variations in temperature.
- ☐ Avoid of any impact to or dropping of the instrument onto the ground.
- ☐ Place the instrument into the provided carrying case during long transportation. The instrument should be avoid of extreme extrusion, bumping and shaking during transportation. Ensure that instrument is correctly placed in the transport case (When placing the instrument into case, the compensator should be locked, otherwise, it could be damaged in case of intense movement.)
- ☐ This instrument only allow the qualified specialists to repair and ensure of using the original spare parts. No one allow to separate the unit except of professional to avoid of any unnecessary damaged.

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1. Technical Data

1.1 DAL20-32 series & DAL20-32N series technical data

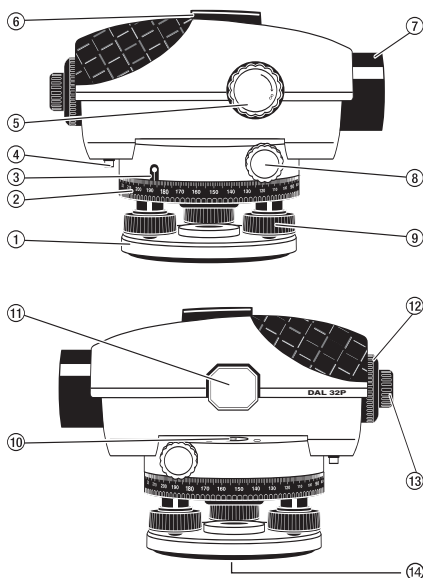
	DAL20-32 series			DAL20-32N series		
Magnification	20X	22X	24X	26X	28X	32X
Working Range	60m	90m	90m	105m	105m	120m
Height accuracy for an individual measurement	3mm/30m	3mm/30m	1.6mm/30m	1.6mm/30m	1.6mm/30m	1.6mm/30m
Clear objective aperture	36mm					
Compensator setting accuracy	±0.8"	±0.8"	±0.8"	±0.5"	±0.5"	±0.3"
Standard Deviation for 1 km	2.5mm	2.0mm	2.0mm	1.5mm	1.5mm	1.0mm
	double run leveling					
Telescope Image	erect					
Short focusing distance	0.3m					
Field of view	1°30'					
The working range of compensator	±15'					
Stadia ratio	100					
Stadia addition	0					
Accuracy of circular vial	8'/2mm					
Horizontal circle graduation	1° or 1gon					
Water resident	Yes					
Net weight	1.8kg					
Tripod mount thread	M16 or 5/8"					

1.2 DAL20-32P series & DAL20-32H series technical data

DAL20-32P series	DAL20-32H series
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Magnification	20X	22X	24X	26X	28X	32X
Working Range	60m	90m	90m	105m	105m	120m
Height accuracy for an individual measurement	3mm/30m	3mm/30m	1.6mm/30m	1.6mm/30m	1.6mm/30m	1.6mm/30m
Clear objective aperture	36mm	36mm	36mm	40mm	40mm	40mm
Compensator setting accuracy	±0.8"	±0.8"	±0.8"	±0.5"	±0.5"	±0.3"
Standard Deviation for 1 km	2.5mm	2.0mm	2.0mm	1.5mm	1.5mm	1.0mm
double run leveling						
Telescope Image	erect					
Short focusing distance	0.3m					
Field of view	1°30'					
The working range of compensator	±15'					
Stadia ratio	100					
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Accuracy of circular vial	8'/2mm					
Horizontal circle graduation	1° or 1gon					
Water resident	Yes					
Net weight	1.8kg					
Tripod mount thread	M16 or 5/8"					

2. The instrument parts description



- | | | |
|-------------------------------------|---------------------------|----------------------------|
| 1. base plate | 6. optical peep sight | 11. bubble observe mirror |
| 2. horizontal circle | 7. objective lens | 12. eyepiece cover |
| 3. horizontal circle reference mark | 8. horizontal drive screw | 13. eyepiece focusing knob |
| 4. compensator lock | 9. leveling screw | 14. tripod mount 5/8" |
| 5. focusing adjusting knob | 10. circular vial | (on the rear side) |

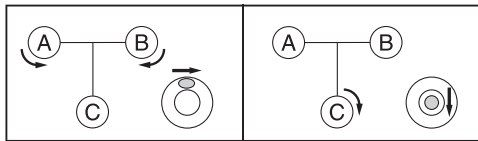
Other series Autolevel please refer to introduction on this page

3. Operation

3.1 Setting up

1. Set up the tripod stable and safe against tipping over or slipping off, and adjust tripod to the position of user's eyes level.
2. Place the instrument via the tripod mount 14 onto the male thread of the tripod and screw the unit tight with locking screw of the tripod.
3. Roughly level the tripod, over the short distance, the instrument can be carried by lifting the tripod. To ensure that the instrument is not damaged during this process the tripod must be held vertically and should not be lengthwise over the shoulder.
4. Align the instrument with leveling screw 9 so that the air bubble is in the center of the circular vial (see fig.1)

fig.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 circular vial.

3.2 Aiming and focusing

1. take away the objective lens cover 7, let the telescope shoot toward a bright object or hold a white sheet of paper in front of the objective lens 7, then turn the eyepieces 13 till dark black crosshair can be seen sharply.
2. Direct the telescope towards the leveling rod, it may required optical peep sight 6 to aim if necessary.
3. Turn focusing knob 5 till the graduation field of the leveling rod appears sharply.
4. Align the crosshair exactly to the center of the leveling rod by turning the horizontal drive screw 8.

4. Measuring Functions

4.1 Measuring Height

1. Place the instrument to the center of point of A and B (see fig2.)
2. Erect the leveling rod to the point of A vertically, focus the instrument against the leveling rod and adjust the crosshair to match the center of leveling rod, record the height value a of the leveling rod at the centre line of the crosshair. (see fig.3)
3. Erect the leveling rod to the point of B vertically, focus the instrument against the leveling rod and adjust the crosshair to match the center of leveling rod, record the height value b of the leveling rod at the center line of crosshair. (see Fig.4)
4. The Height Difference $h = 1.78 - 1.215 = 0.565\text{m}$

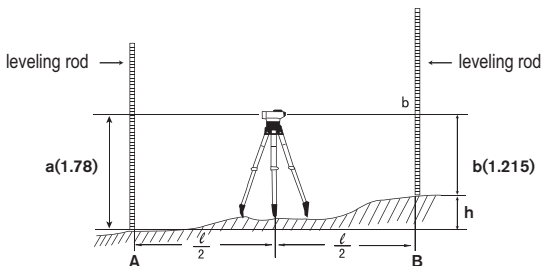


fig.2

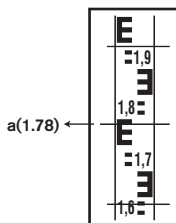


Fig.3

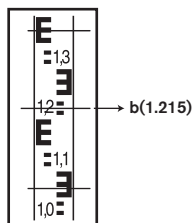


Fig.4

4.2 Measuring Distance

1. Aiming the leveling rod, record the value of upper and lower stadia hair (see fig.5)
2. Multiply the difference of both heights of stadia hair by 100 to receive the distance value from the leveling rod to the instrument.

distance measured in the figure: $(1.347 - 1.042) \times 100 = 30.5\text{m}$

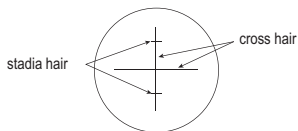


fig.5

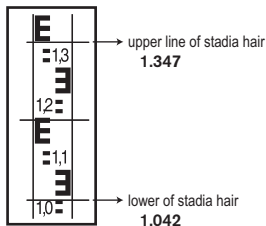


fig.6

4.3 Measuring Angles

1. Shoot the instrument toward A, rotate the horizontal circle 2 with "0" point toward the reference mark 3. (see fig.7)
2. Shoot the instrument toward B, read off the angle value at the reference mark 3 of horizontal circle. (see fig.7)

the measured angle in figure: 45°

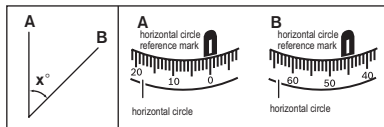


fig.7

5. Checking and Adjusting

Before using the instrument or after long transportation, the leveling accuracy and indication accuracy.

5.1 Check Circular Bubble Vial

1. Adjust the instrument with leveling screw knob 9, so that the air bubble is in the center of circular vial.
2. Rotate the unit by 180° , the air bubble should keep in center, if the air bubble moves out of center, the circular bubble vial must be readjusted.

5.2 Adjusting Circular Bubble Vial

1. Rotate the leveling screw knob 9 to ensure the air bubble moving toward to the center of circular bubble vial, the deviation should be at $1/2$ between the center and the end position(see fig.8)
2. Use align wrench turn the two adjustment screws till the air bubble moving to the center of circular bubble vial.(see fig.9)
3. Repeat the above step till the air bubble keep in the center of circular bubble vial no matter which direction the telescope turned.

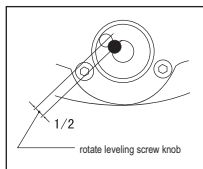


fig.8

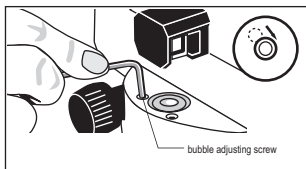


fig.9

5.3 Checking i angle

1. Checking should be done at a distance of 30m. Place the instrument in the center of this distance, put 2 leveling rod at the both end of measuring distance A and B separately. (see fig.10)
2. Read off the heights of this two leveling rod, calculate the difference d ; that is the difference between a_1 (the height of leveling rod A) and b_1 (the height of leveling rod B).

Example: $a_1=1.937\text{m}$ $b_1=1.689\text{m}$ so $a_1-b_1=0.248=d$

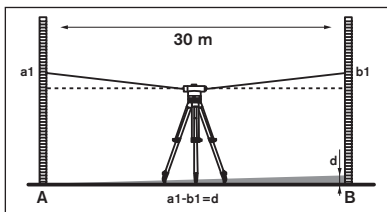


Fig.10

3. Place the instrument to the position of 1m away from leveling rod A, read height a_2 (the height of leveling rod A)
4. Calculate $b_2'=a_2-d$, then record the height b_2 (the height of leveling rod B), if the deviates value between b_2' and b_2 over 6mm (20x/22x) or 3mm(24x/26x/28x/32x), the crosshair must be readjusted.

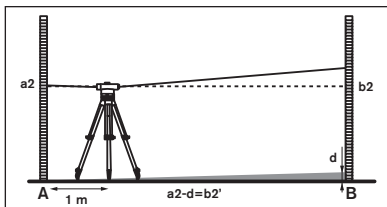


Fig.11

Example: $a_2=1.724\text{m}$ $d=0.248$ so $a_2-d=1.476=b_2'$

when measuring 20x/22x, the height b_2 should be $1.476\text{m} \pm 6\text{mm}$

when measuring 24/26/28/32x, the height b_2 should be $1.476 \pm 3\text{mm}$

5.4 adjust the i angle

take off the eyepiece cover, use adjusting pin turn adjusting screw clockwise or counterclockwise till the heights value b_2 and b_2' on leveling rod B are same. Screw on eyepiece cover again.

6. Maintenance and Service

Carefully use and maintain the unit, can guarantee the instrument accuracy and efficiency.

1. After measuring, wipe clean all the surface of the instrument and put into the carrying case.
2. Dust all optical parts with a soft brush and clean the lens with lens paper. Never touch the lens with your fingers.
3. If the instrument failed in function or damaged, repair or check should be done by experienced technician who fully understand the unit structure or returned to the factory for repair. Do not open the instrument by yourself.
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, clean, dust-free and air-flow condition with low humidity.

7. Packing List

Plastic Carrying Case.	1
The Unit	1
Adjusting Pin.	1
Hexagonal Wrench	1
Instruction Manual.	1
Plumb.	1
Silica Dry Gel.	1

Note: 400gon、5/8" tripod only for export purpose

