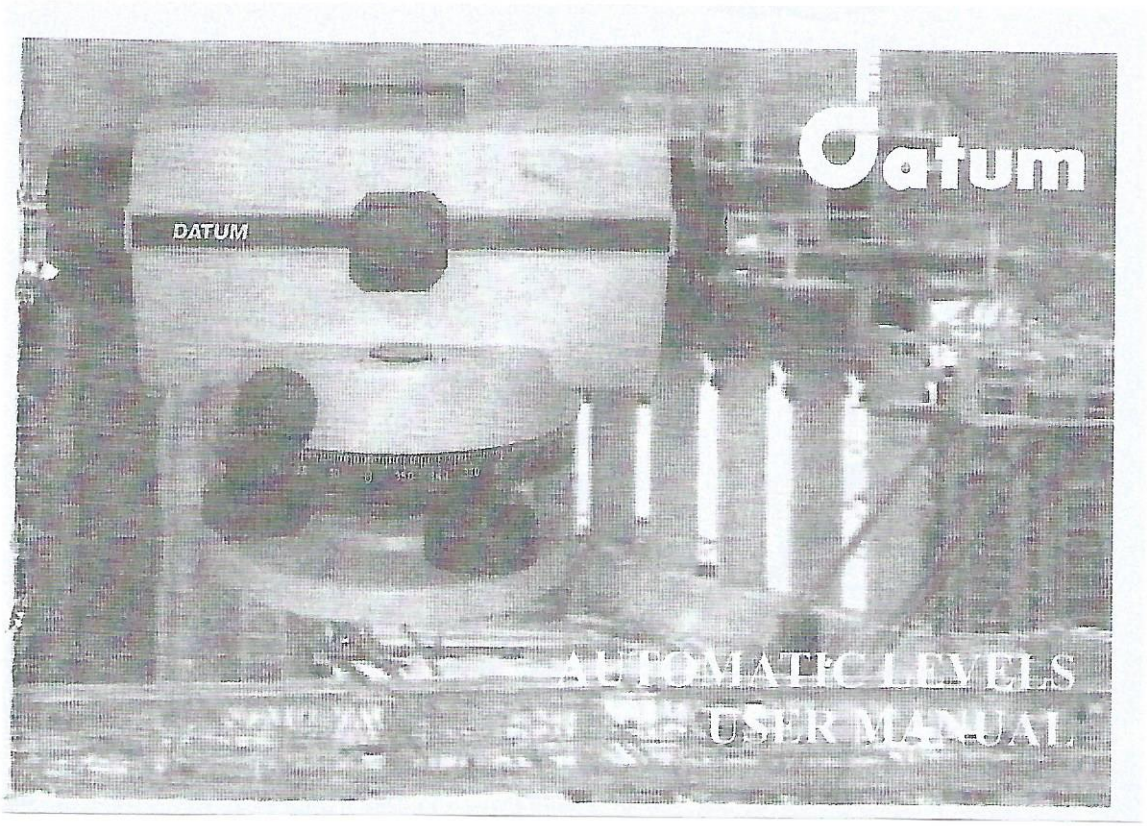

20x 24x 30x 32x

The DATUM Series of Automatic Levels

DATUM Products Limited presents itself in a unique manner, formally introduces to surveying and engineering circles the DATUM Automatic Levels, four models with four magnifications respectively which can satisfy the requirements of class level surveying, relative height, distance and angle measurement in all conditions.

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1. TECHNICAL DATA

	NA20	NA24	NA30	NA32
Standard deviation per 1km of double run levelling	2.5mm	2.0mm	1.5mm	1.0mm
Telescope	erect	erect	erect	erect
Magnification	20X	24X	30X	32X
Clear objective aperture	36mm	36mm	40mm	41mm
Field of view	1°20	1°20'	1°20'	1°20
Shortest focussing distance	0.6m	0.6m	0.6m	0.6m
Multiplication factor	100	100	100	100
Additive factor	0	0	0	0
Waterproof	yes	yes	yes	yes
Working range	±15'	±15'	±15'	±15'
Setting accuracy	±0.5	±0.5"	±0.4"	±0.3"
Sensitivity of bubble	8"/2mm	8"/2mm	8"/2mm	8"/2mm
Circle graduation	1°or 1 gon	1°or 1 gon	1°or 1 gon	1°or 1 gon

2. COMPOSITION STRUCTURE

- Manufactured meticulously using international standards
- Tightly sealed construction for use in any weather
- Fast accurate two-speed focusing
- Friction-braked rotation and endless horizontal drive
- Optical sight for quick pointing
- Recticle plate with unreflective field made by advanced technology
- Suitable for use with any 5/8" tripod
- Choice of horizontal circle:
  outer-360, outer-400gon, inner-360, inner-400gon
- Optional accessories: metal or wood tripod,aluminium staff, plumb bob, P.P.M.

The outside composition

1. Base plate
2. Circle
3. Circle indicator
4. Eyepiece
5. Cover around eyepiece
6. Circular bubble
7. Optical sight
8. Objective
9. Focusing knob
10. Horizontal drive
11. Footscrew

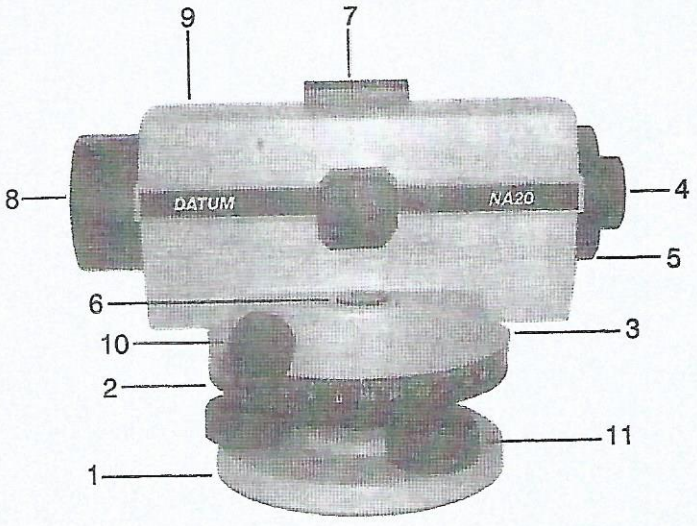
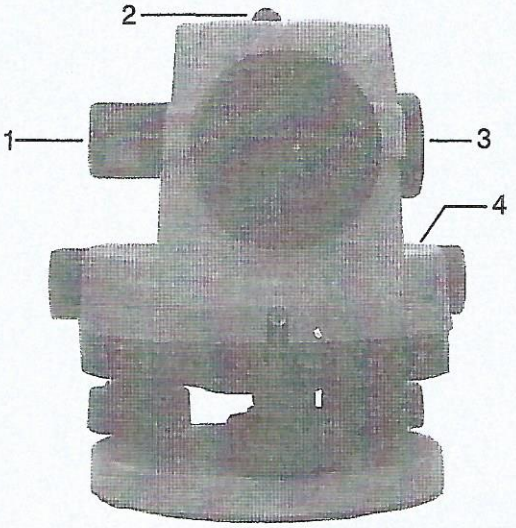


Fig.2 The outside composition

1. Pentaprism for viewing circular bubble
2. Optical sight
3. Course/fine focusing knob
5. Window for viewing inner-circle (optional)



3. APPLICATION

Fig.3
Setting up
the instrument

3.1 Setting up and bubble centring

1. Set up tripod and fix level by tightening connecting screw to tripod.
2. Extend or retract the tripod's legs until tripod's head is roughly horizontal. Centre circular bubble by turing forscrews. (See fig.4)

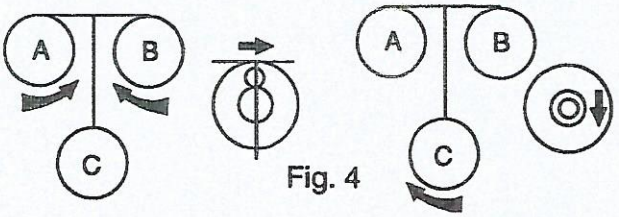
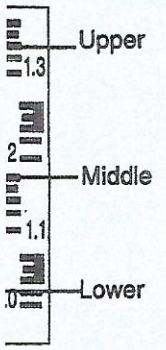


Fig. 4

Turn simultaneously A and B to bring the bubble to right side.

Turn footscrew C to move the bubble downward until it centres.



. 5 Reading the staff

3.2 Pointing and focusing

Stadia hairs: Direct telescope towards a bright background or point it towards a staff through optical sight. Turn the eyepiece until stadia hairs are clearly sighted.
Vision regulation: Turn coarse-fine wheel when locating distance object or backward when locating close-up one until clear image of staff can be sighted. Turn horizontal drive to set the image at the centre of the vision.

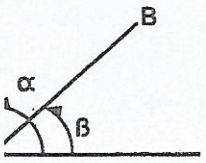
3.3 Reading the staff

3.3.1 Height

The middle stadia reading indicates the height as shown in fig. 5 which reads 1. 195m.

3.3.2 Distance

The distance between the level and staff is indicated by the formula: (Upper stadia reading less the Lower stadia reading) X 100 for example, in fig 5 the upper stadia reading is 1.352 and the lower one is 1.038, i.e (1.352 - 1.038) x 100 =31.4m



|. 6 Angle measurement

3.3.3 Angle

Direct vertical hairline toward target A and then read value α on the circle. Turn telescope toward target B and then read value ßon the circle, thus <AOB =α- ß.

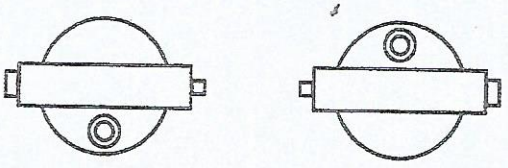
4. CHECKING AND RECTIFICATION

Although all the levels have undergone extremely strict examination before shipping, it is advisable to check the circular bubble and zero position.

4.1 Circular bubble

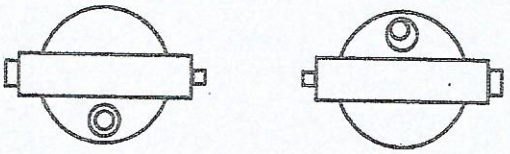
Centre circular bubble and turn the level 180, if the bubble is at the centre (see fig.7) the level is qualified. If not (see fig.8), rectification of bubble is needed.

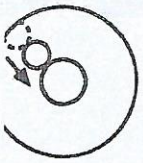
Fig.7 Bubble is centred.



If the bubble is no longer within its setting circle, it should be adjusted. (Fig. 8)

Fig.8 The bubble should be adjusted.



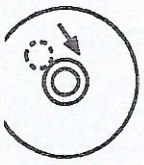


Turn footscrew
ng bubble halfway
ntre

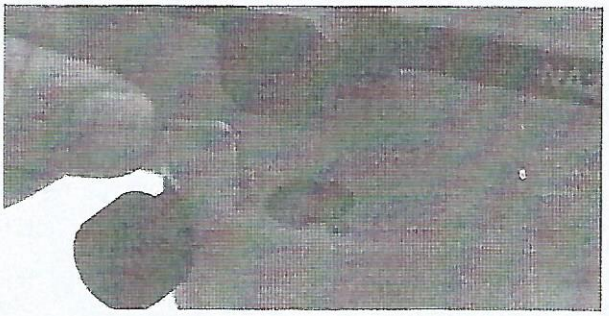
Steps for bubble regulation

a. Turn footscrews to bring the bubble halfway to the centre (fig. 9)

b. Then adjust the two regulating screws with turret spanner (attachment to the instrument) until the bubble is at the centre (see fig. 10)
Repeat the steps until no change of bubble position would occur when moving telescope base.



10 Turn adjustment
vs to centre the bubble

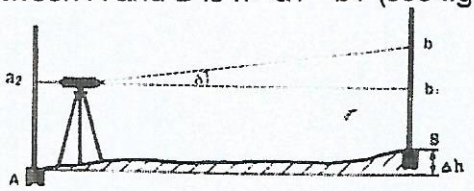


1 Adjusting the
lar bubble

4.2 Zero position

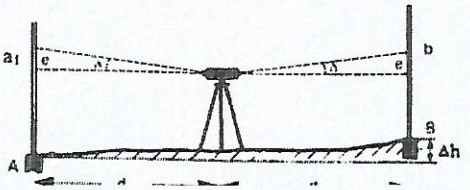
1. Set instrument between two staffs with distances of 30m and 50m respectively.
Level the instrument, reading staff A and B as a 1 and b1, thus the discrepancy in altitude between A and B is h=a1 - b1 (see fig.12).

Fig.12 Set the instrument halfway between A and B



2. Move the instrument to the place 1 - 2m away from staff A. Level the instrument, reading staff A and staff B as a2 and b2. If a2 - b2 = a1 - b1 = h, the sight line is horizontal. If not, adjust as follows:

Fig.13 Set up the instrument about 1m from staff A



3. Method of rectification; Take the value of h = a1 - b1 as a basis for rectifying zero position and correct the value of h = a2 - b2, aiming at staff B, take off the cover around the eyepiece and adjust the screw on the upper of the recticle with the poking needle (attachment to the instrument) until the value of b2 = b3 can be read.

4. Repeat step 1,2 and 3 until a1 - b1 = a2 - b2.

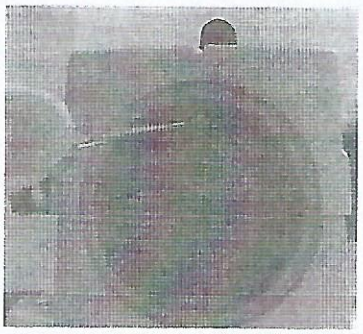


Fig. 14 Turn the adjusting screw.

5. PRECAUTION AND MAINTENANCE

Care should be taken to insure the accuracy and efficiency of the instrument.

1. After operation, the instrument should be kept clean and dry and put into the container.

2. Clean optical parts with a soft brush, lens paper or chammy. Never touch lens with your fingers.

3. If any breakdown or damage to the instrument occurs it is advisable to have it repaired by an experienced technician who is familiar with the composition of the instrument or send it to the manufacturer for repair.

4. A silica gel bag can be found in the container. If it loses efficiency, change it for a new one.

5. Preserve the instrument in a dry, dust proof and ventilated room.