

**PENTAX ENGINEERS LEVEL**

**L-30**

**INSTRUCTION BOOK**

**ASAHI PRECISION CO., LTD.**

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# NOMINATION & ROLES OF PARTS

## 1. Focusing knob

This knob is for focusing when collimating to the staff.

## 2. Circular split level

This device is for making the instrument almost level, to level the circular level correctly, loosen the spherical base clampscrew (⑩) and tilt the instrument forward and backward or right and left.

## 3. Tilting tangent screw

Use the tilting tangent screw to make the bubbles in the telescope coincide with each other.

## 4. Aiming collimator

This makes it easy to collimate to a staff. A small white triangle mark is provided in the aiming collimator. After putting this mark on the staff, collimate the telescope, and you can see the staff.

## 5. Reticle illumination knob

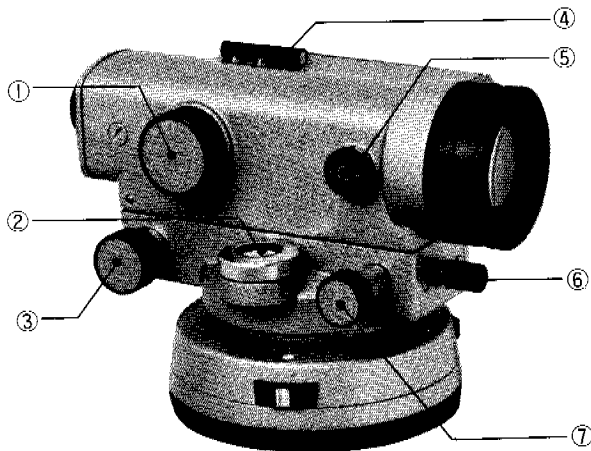
When the illumination equipment is used, the brightness inside the telescope can be adjusted by turning this knob.

## 6. Horizontal clamp screw

This is for locking up the horizontal of the instrument.

## 7. Horizontal drive screw

This is for slightly turning the instrument horizontally.



**8. Socket for illuminator**

The attaching place for illuminator device.

**9. Reflector**

This reflector enables light to brighten the bubbles in the telescope.

**10. Spherical base clampscrew**

Loosening this screw enables you to tilt the instrument right and left, or forwards and backwards. This permits quick leveling action.

**11. Bubble image adjustment screw**

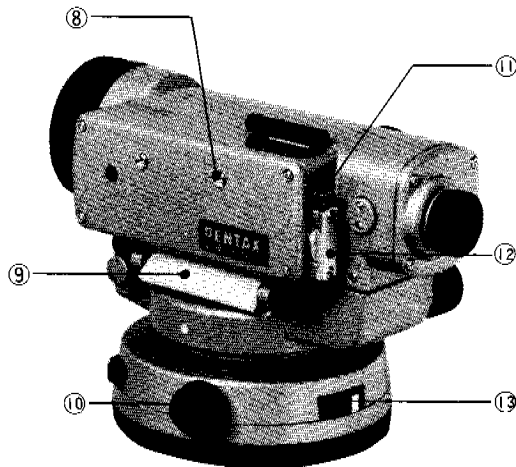
The slightest deviation in the bubble can be adjusted to satisfaction.

**12. Bubble adjustment cover**

Remove the cover when adjusting a noticeable deviation in the bubble.

**13. Leveling screw**

This screw is used when leveling the circular level.



# SPECIFICATION

## TELESCOPE

Type:	Internal focusing annalactic optics with coated lenses    coa
Image:	Erect (Prism erect image)
Magnification power:	32X
Effective aperture:	42mm
Field of view:	1° 12'
Minimum focus:	1.5m
Stadia ratio:	100
Stadia constant:	0

## SENSITIVITY OF SPIRIT LEVELS

Type of main spirit level:	Bubble image coincide type
Main spirit level:	40" / 2mm
(Effective sensitivity):	(7" / 2mm)
Circular level:	10' / 2mm

## TRIPOD ATTACHING SCREW

Diameter:	5/8 inch
Pitch:	11 threads per inch

## DIMENSION AND WEIGHT

Instrument:	202×116×135mm(2.4kg)
Plastic case:	320×190×215mm(1.6kg)

## LIST OF COMBINATION SET

Instrument:	1
Plastic case:	1
Lens hood:	1
Lens cap:	1
Driver:	1
Adjustment pins:	2
Cleaning brush:	1

# HOW TO USE

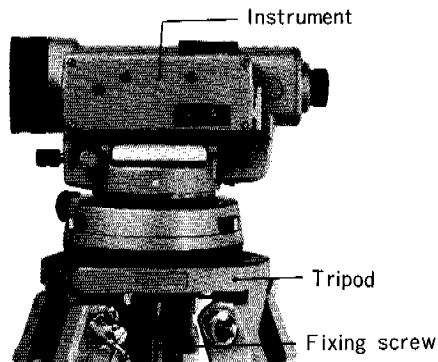


Fig. 1

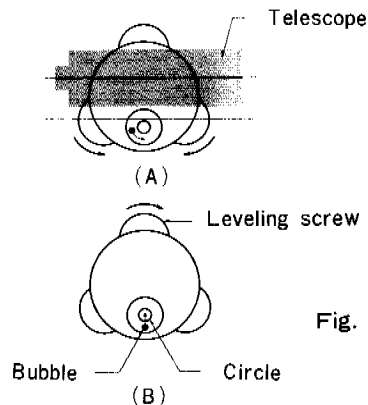


Fig. 2

## 1. Installation of instrument

- 1) A tripod with a thread of  $5/8" \times 11$  shall be used.
- 2) Place the tripod its top is as level as possible, mount the instrument on it, and fasten it securely with fixing screw. (See fig. 1)

## 2. Leveling

- 1) Each notch on the three leveling screws should be positioned at the center of the rotation range.
- 2) Loosen the spherical base clampscrew and tilt the instrument forward and backward, or right and left until the bubble of the circular is brought to the about position.
- 3) When the circular level is set about position, tighten the clampscrew completely.
- 4) Adjust three leveling screws individually until the bubble of the circular level is brought to the right position. (See fig. 2)

NOTE: Be sure to reverse the circular level  $180^\circ$  to confirm the deviation of the bubble. If the bubble deviates when the level is reversed adjustment is required.

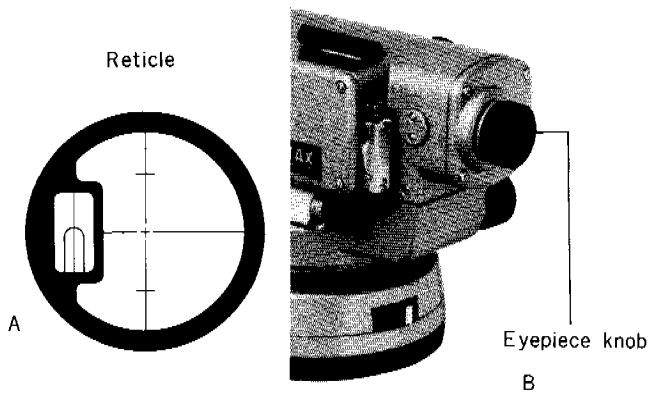
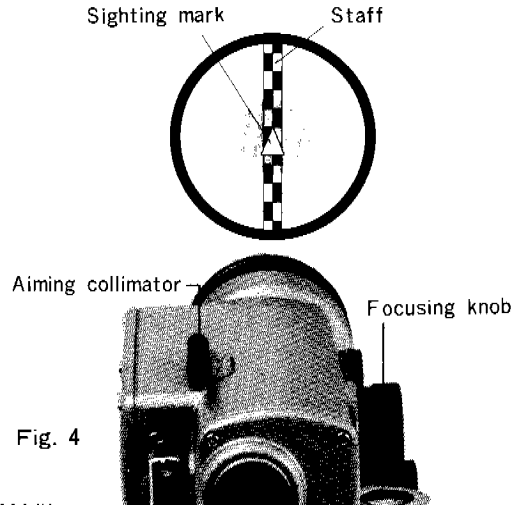


Fig. 3



### 3. Eyepiece adjustment

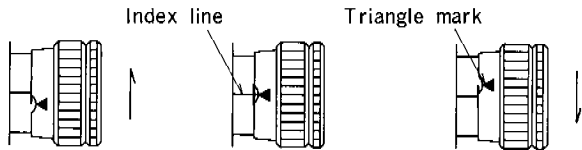
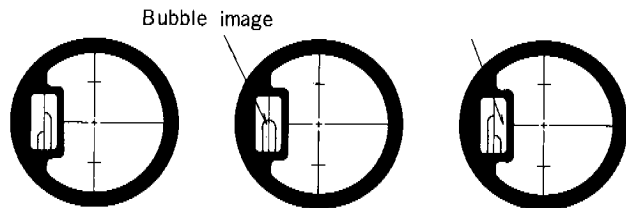
- 1) Remove the the telescope lens cap, and attach the lens hood, if necessary.
- 2) Rotate the eyepiece knob to the left and temporarily pull out the eyepiece. (See fig. 3-B)
- 3) Look through the eyepiece and rotate the eyepiece knob to the right until the reticle appears as its maximum sharpness. (See fig. 3-A)

### 4. Sighting

- 1) Staff the telescope at the object using the collimator. (See fig. 4) Tighten horizontal clampscrew.
- 2) Look through the eyepiece and finally adjust the focusing knob until the staff is perfectly focused. If focusing is correct, the staff and the cross hair should be clearly observed even when you move your eyes left and right when looking through the eyepiece. Stop rotation there.
- 3) Turn the drive screw and align correctly the staff and the cross hairs.

## 5. Reading the staff

- 1) Match the triangle mark on the tilting screw to the index line.
- 2) While looking through the eyepiece, turn the reflector so that the bubble image in the telescope can be seen at it's brightest.
- 3) Turn the tilting screw to coincide the right and left bubbles exactly.
- 4) Read of the staff. (See fig. 6)

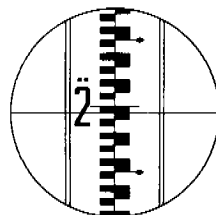


Telescope looking upwards

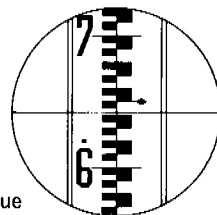
Telescope set horizontally

Telescope looking downwards

Fig. 5



Read value  
2.195m



Read value

Read value  
1.642m

Fig. 6

## 6. Stadia reading

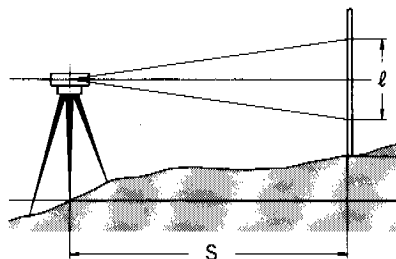
The stadia provides a method of measuring distance and difference in elevation merely sighting a staff.

(see fig.7)

## MAINTENANCE AND PACKING

### 1. Maintenance

- 1) After using the instrument, wipe off dust and moisture and store it in the case.
- 2) When cleaning exposed parts, first remove dust with the clearing brush, then wipe with a soft cloth.
- 3) To clean the lens surface, first remove dust with the cleaning brush, then gently wipe with a clean cotton cloth to which a small amount of alcohol has been applied. Be sure the cloth used is not oily or sticky.
- 4) If water drops and clouds are discovered in telescope, either remove the ventilation port cap and the bubble adjustment cover to admit dry air inside, or leave the entire instrument alone in a dry room for a long time. Use a coin to take off the cap.



S: Horizontal distance  $S = 100 l$   
 $l$ : Difference in top and bottom stadia hair readings

Fig. 7

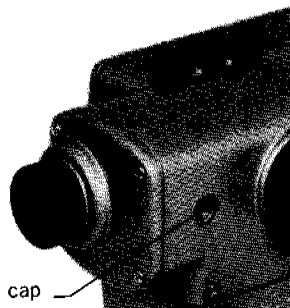


Fig. 8

## 2. Packing

When placing the instrument pack into the case, do the following. o

- 1) Loosen the horizontal clampscrew and then align the two yellow packing marks. (fig. 9A)
- 2) After tightening the horizontal clampscrew, place the instrument in to the case in such a way that it may settle as softly as possible. (fig. 9B)
- 3) Close the cover of the case and latch it. (fig. 9C)

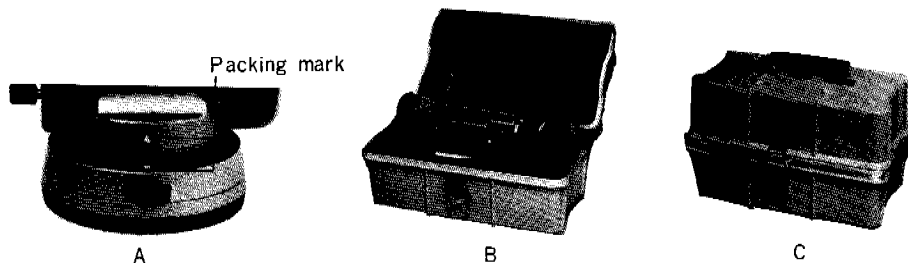


Fig. 9

# ADJUSTMENT

## I. Adjusting the Circular Level

- 1) Firmly screw the instrument to the tripod. Center the circular bubble.
- 2) Turn the telescope  $180^\circ$  horizontally.
- 3) If the bubble moves out of the center, turn 3 circular level adjusting screws until the bubble is halfway back toward the center.
- 4) Turn the leveling screws again to bring the bubble completely back to the center of the circle. Repeat Steps 2 and 3 so that the bubble will always stay in the center of the circle.

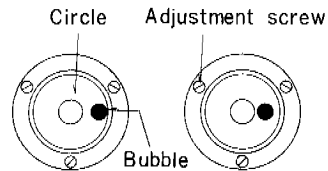
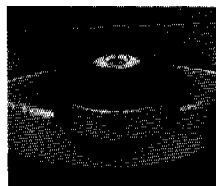


Fig. 10



Circular level

Adjustment screw

Fig. 11

## 2. Adjusting the collimation axis horizontally

### 1. Checking

- 1) Two charts having the same scale are used for leveling. The instrument is set at the center between two walls separated from each other from 50 to 100m. Make collimation to both walls alternatively in a way as shown in item 4, for sighting and item 5 for reading the staff to fix the charts on the walls by determining such positions that the height of both charts will be the same. (see fig. 12-A)
- 2) Move the instrument to a position about 2m away from one chart and level it. (See fig. 12-B)
- 3) Again, read off the scales of both charts, respectively.
- 4) If the reading from both charts is the same, no further adjustment is needed.

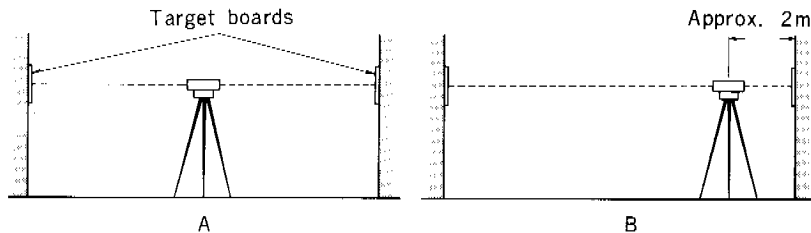


Fig. 12

## 2. Adjusting

- 1) If the reading thus obtained is not the same, direct the telescope to a chart farther away from it.
- 2) Turn the tilting tangent screw, moving the telescope up and down so that the reading from the chart may be the same as that from the one closer to it.
- 3) Turn the bubble image adjustment screw with the adjustment pin to coincide the split bubble.
- 4) For checking, see if the adjustment can be done correctly by repeating the procedures starting from item 4.



Bubble image  
adjustment screw

Bubble adjustment  
screw

Fig. 13

In item 3, when you fail to have the split bubble perfectly coincided without deviation, first remove the bubble adjustment cover and turn the bubble adjustment screw with the adjustment pin to roughly coincide the split bubble. Then, perform adjustments as shown in item 3, again.

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