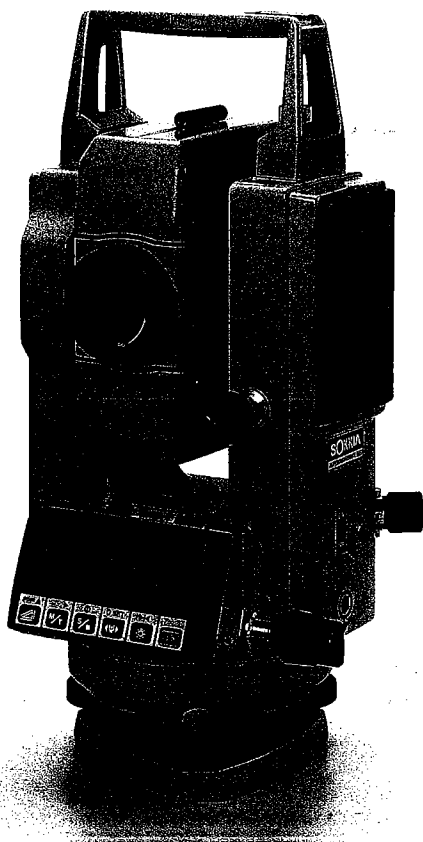


SOKKIA

SET6E SET6ES

Electronic Total Station



OPERATOR'S MANUAL



Ni-Cd

- [English] CONTAINS NICKEL-CADMIUM BATTERY. MUST BE RECYCLED OR DISPOSED OF PROPERLY.
- [Deutsch] MIT NiCd AKKU. EFORBERT RECYCLING ODER FACHGERECHTE ENTSORGUNG.
- [Français] CONTIENT UNE BATTERIE AU CADMIUM NICKEL. DOIT ÊTRE RECYCLÉE OU DONNÉE A UN ORGANISME DE RETRAITEMENT.
- [Italiano] CONTIENE NiCd BATTERIA. DEVE QUINDI ESSERE RICICLATA O ELIMINATA IN MODO APPROPRIATO.
- [Nederlands] BEVAT EEN NiCd BATTERIJ. DIENT GERECYCLEERD TE WORDEN OF OP EEN CORRECTE MANIER VERNIETIGD TE WORDEN.
- [Español] CONTIENE UNA NiCd BATERÍA. DEBE RECICLARSE O ELIMINARSE ADECUADAMENTE.
- [Português] CONTEM BATERIA DE NÍQUEL CÁDMIO. DEVERÁ SER RECICLADA OU DECARTEADA CONVENIENTEMENTE.
- [Svensk] INNEHÅLLER NiCd BATTERI. BÖR ÅTERVINNAS ELLER FÖRSTÖRAS PÅ ETT SÄKERT SÄTT.
- [Suomi] SISÄLTÄÄ NIKKELI-KADMIUM AKUN. HÄVITETTÄESSÄ KÄSITELTÄVÄ ONGELMAJÄTTEENÄ.
- [Norsk] NiCd BATTERIER MÅ RESIRKULERES ELLER KASTES PÅ EN FORSVARLIG MÅTE.
- [Dansk] INDEHOLDER NiCd BATTERI. SKAL GENVINDES ELLER KASSERES PÅ FORSVARLIG MÅDE.
- [Ελληνικά] ΠΕΡΙΕΧΕΙ ΜΠΑΤΑΡΙΑ ΝΙΚΕΛΙΟΥ-ΚΑΔΜΙΟΥ. ΠΡΕΠΕΙ ΝΑ ΑΝΑΚΥΚΛΩΝΕΤΑΙ Η ΝΑ ΚΑΤΑΣΤΡΕΦΕΤΑΙ ΜΕ ΤΟΝ ΚΑΤΑΛΛΗΛΟ ΤΡΟΠΟ.

For U.S.A. ATTENTION:

The product that you have purchased contains a rechargeable battery. The battery is recyclable. At the end of it's useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local solid waste officials for details in your area for recycling options or proper disposal. Use the standard battery charger.

Die Schweiz: Nach Gebrauch der Verkaufsstelle zurückgeben.

La Suisse: Après usage à rapporter au point de vente.

Swizzera: Ritornare la pila usate al negozio.

Congratulations on your purchase of the SET6E!
Before using the instrument, please read this operator's
manual.

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- The specifications and general appearance of the instrument may be altered at any time and may differ from those appearing in catalogues and this operator's manual.

QUICK GUIDE

- Ensure that the battery is charged before measurement.

1 **Setting up the instrument**

- Battery mounting  P. 7
- Centring/Levelling/Focussing  P. 8

2




Preparation for power on

 P. 12

- Prism constant correction/Distance mode/Distance units/Earth curvature and refraction/Vertical angle display/Angle units



3

Power on/V circle indexing

- Power on/Instrument self-check  P. 13
- Vertical circle indexing  P. 15
- Target sighting  P. 17




4

Angle measurement

- Measure the angle between two points  P. 19
- Set the horizontal circle to a required value  P. 20

5

Distance measurement

- Atmospheric correction  P. 23
- Return signal check  P. 25
- Distance and angle measurement  P. 27

Note: The instrument parameters are set to default settings at the factory. Before use, ensure that the parameters are set to your required options. See Section 2.

FEATURES

〈Light in weight, highly accurate total station〉

- The total weight of the instrument is 4.8 kg including the handle and battery. For total station operations, all keys on the keyboard can be used for two or more functions.

〈Automatic tilt compensation of vertical angles〉

- The tilt angle of the vertical axis is measured by an internal sensor. The vertical angle value can be automatically compensated for this tilt angle and the compensated value displayed.

〈Instrument parameter settings stored in memory〉

- The SET6E has an internal memory which stores the instrument parameter settings. The parameter settings can be changed by key operation and the new settings are memorized even after power off.

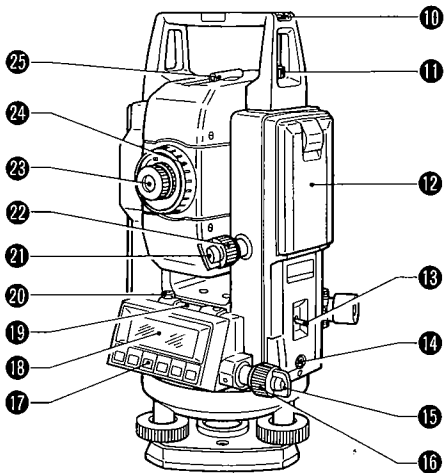
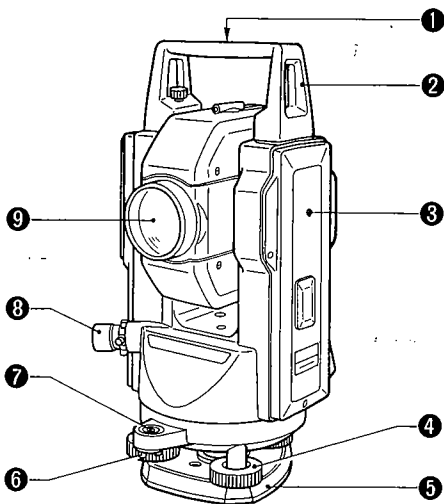
〈Rechargeable battery〉

- The SET6E is powered by a rechargeable battery. For continuous angle measurement, a fully-charged battery supplies power for about 21 hours, and for angle and distance measurement, the battery will allow operation for about 10 hours (at an ambient temperature of 25°C).

〈Data output function〉

- An RS-232C data output connector is provided for use with a data collector or external computer. The SET6E can transmit slope distance and horizontal and vertical angle data to an external device.

1. NAMES OF PARTS



Above figures are SET6E.

- ① Instrument centre mark
- ② Handle
- ③ Instrument height mark
- ④ Levelling foot screw
- ⑤ Base plate
- ⑥ Circular level adjusting screw
- ⑦ Circular level
- ⑧ Optical plummet eyepiece
- ⑨ Objective lens
- ⑩ Tubular compass slot
- ⑪ Handle securing screw
- ⑫ Battery BDC25
- ⑬ Power switch
- ⑭ Data output connector
- ⑮ Horizontal clamp
- ⑯ Horizontal fine motion screw
- ⑰ Keyboard
- ⑱ Display
- ⑲ Plate level
- ⑳ Plate level adjusting screw
- ㉑ Vertical clamp
- ㉒ Vertical fine motion screw
- ㉓ Telescope eyepiece
- ㉔ Telescope focussing ring
- ㉕ Peep sight

IMPORTANT:

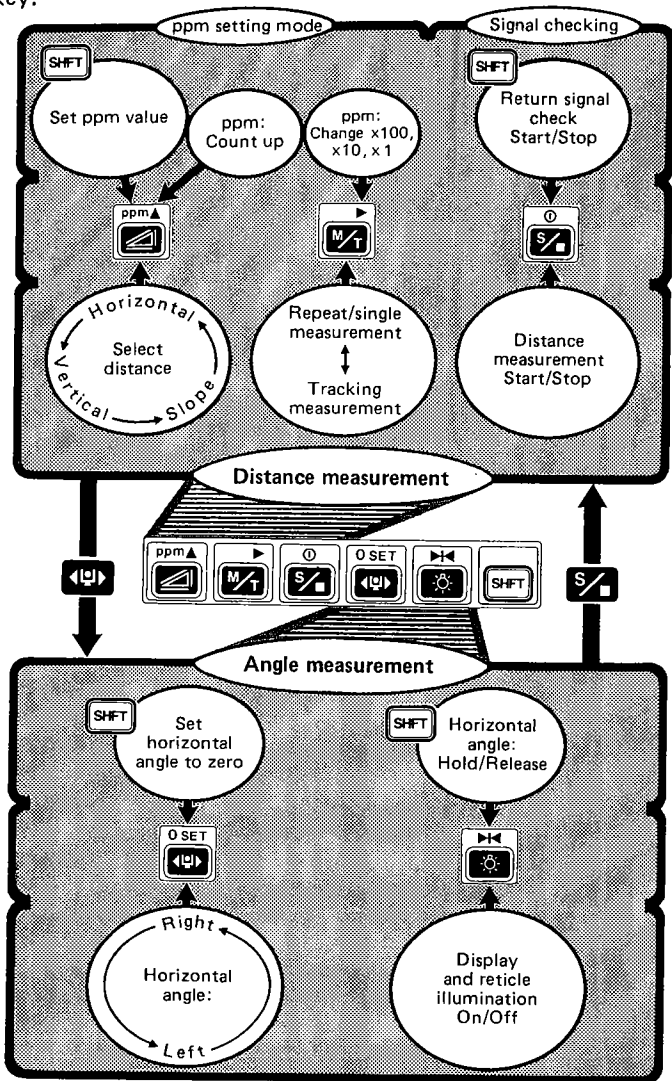
The battery has not been charged at the factory. Please charge the battery fully before using.

2. PRECAUTIONS

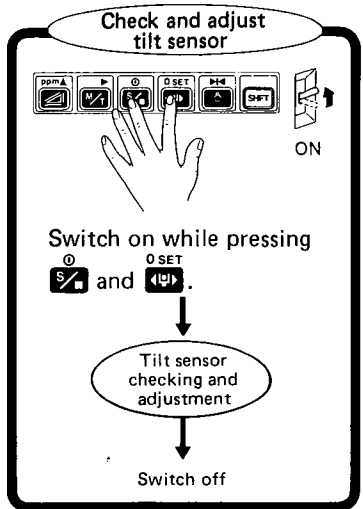
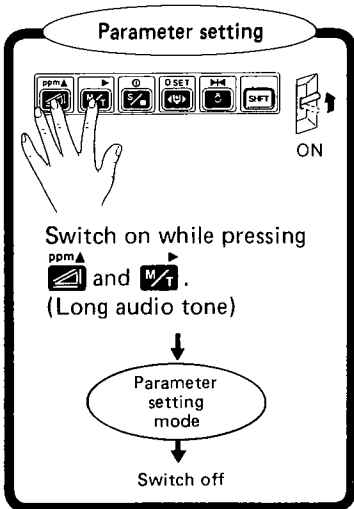
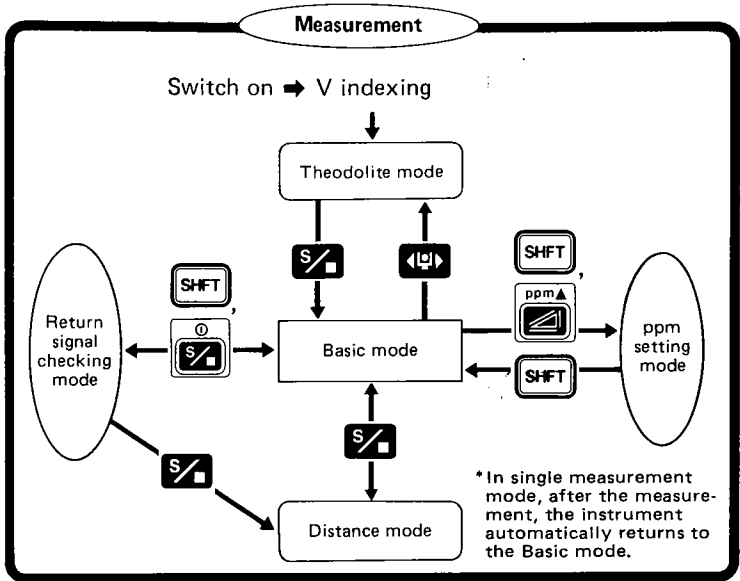
- 1) When the SET6E is not used for a long time, check it at least once every three months.
- 2) Handle the SET6E with care. Avoid heavy shocks or vibration.
- 3) When removing the SET6E from the carrying case, never pull it out by force. The empty carrying case should then be closed to exclude dust.
- 4) If any problems are found with the rotatable portion, screws or optical parts (e.g. lens), contact our agent.
- 5) Never place the SET6E directly on the ground.
- 6) Never carry SET6E on the tripod to another site.
- 7) Protect the SET6E with an umbrella against strong sunlight and rain.
- 8) When the operator leaves the SET6E, the vinyl cover should be placed over the instrument.
- 9) Do not aim the telescope at the sun.
- 10) Always remove the battery from the SET6E before returning it to the case.
- 11) Always switch the power off before removing the internal battery.
- 12) Do not wipe the display 16, keyboard 17 or the carrying case with any organic solvent.
- 13) When the SET6E is placed in the case, follow the layout plan.
- 14) Make sure that the SET6E and the protective lining of the carrying case are dry before closing the case. (The case is hermetically sealed; if moisture is trapped inside, damage to the instrument could occur.)

3. KEY FUNCTIONS

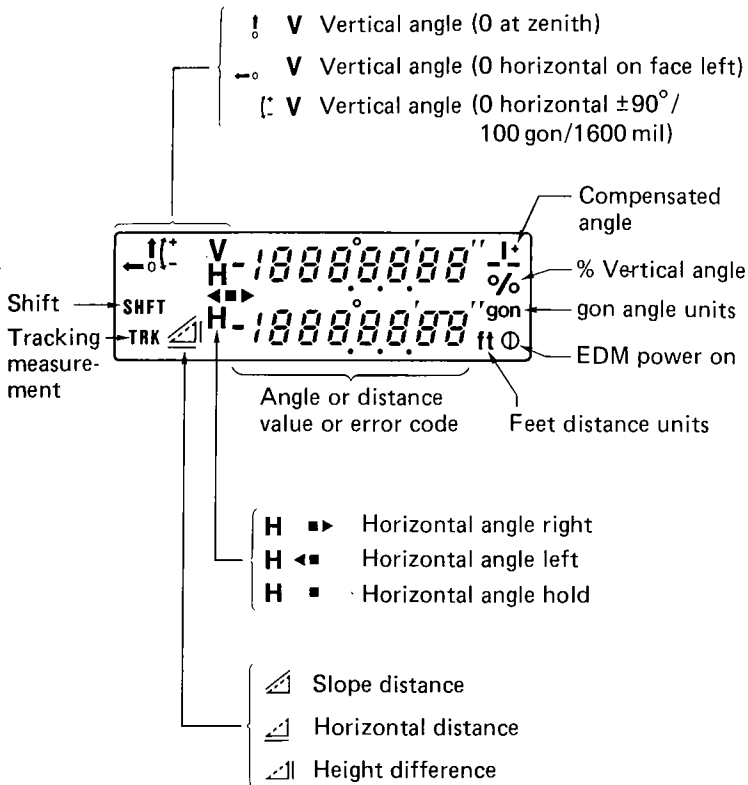
- The upper functions are accessed by pressing **SHIFT** and the required key.



4. MODE DIAGRAM



5. DISPLAY SYMBOLS



6. BATTERY BDC25: MOUNTING

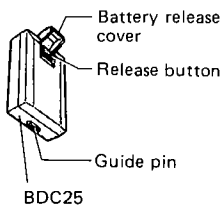
- Charge the battery before measurement.

☞ P. 48

* Ensure that the power switch **ⓑ** is OFF.

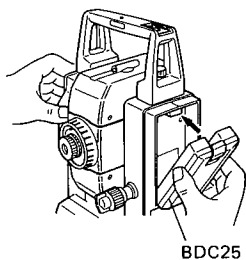
〈Mounting the battery〉

- 1) Close the battery release button cover. ↑
- 2) Match the battery guide with the hole in the instrument battery recess.
- 3) Press the top of the battery until a click is heard.



〈Removing the battery〉

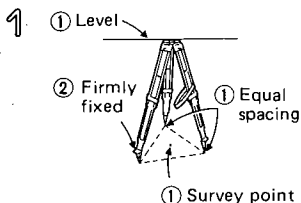
- 1) Open the battery release cover.
- 2) Press the release button downward.
- 3) Remove the battery.



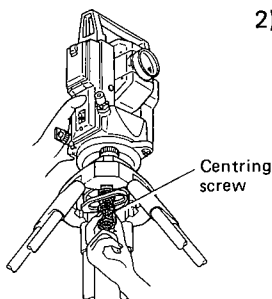
7 SETTING UP THE INSTRUMENT

- Mount the battery in the instrument before performing this operation.

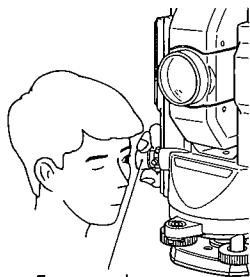
7.1 Centring



- 1) Ensure that:
- ① The tripod head is approximately level, and over the surveying point.
 - ② The tripod shoes are firmly fixed in the ground.

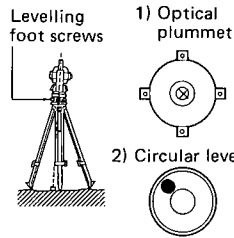


- 2) Place the SET6E on the tripod head. Support it with one hand and insert and tighten the centring screw with the other.



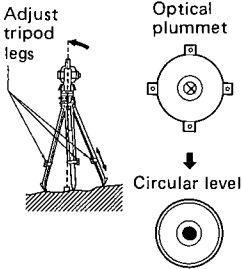
- 3) Turn the optical plummet eyepiece ⑧ to focus on the reticle circles. Note the position of the surveying point with respect to the reticle centre.

7.2 Levelling



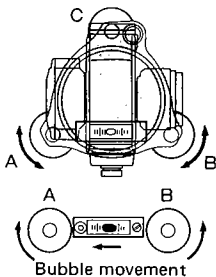
1) Adjust the levelling foot screws ④ to centre the surveying point in the optical plummet reticle.

2) Observe the off-centre direction of the circular level ⑦ bubble.



3) Shorten the tripod leg nearest the bubble direction or extend the leg farthest from this direction.

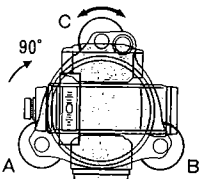
Generally, two tripod legs must be adjusted to centre the bubble.



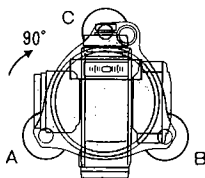
4) Using the horizontal clamp ⑮, turn the upper part of the instrument until the plate level ⑰ is parallel to a line between levelling screws A and B.

5) Centre the plate bubble using levelling screws A and B.

Note: The bubble moves towards a clockwise-rotated foot screw.



6) Turn the upper part through 90°. The plate level is now perpendicular to a line between levelling screws A and B. Centre the plate level bubble using levelling screw C.



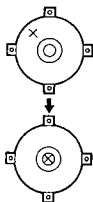
- 7) Turn the upper part a further 90° and check the bubble position.

If the bubble is off-centre, either perform the plate level adjustment described on page 31 or carefully adjust levelling screws A and B in equal and opposite directions to remove half of the bubble displacement. Again turn the upper part a further 90° and use levelling screw C to remove half of the displacement in this direction.

- The bubble should now remain in the same position for any position of the upper part. (If it does not, repeat the levelling procedure.)

The following steps are different for the SET6E and SET6ES.

<SET6E>



- 8) Look through the optical plummet eyepiece. Loosen the centring screw slightly, then carefully slide the instrument over the tripod head until the surveying point is exactly centred in the reticle. Re-tighten the centring screw.

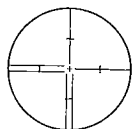
- 9) Repeat procedures 4)–8) until the instrument is correctly levelled and centred over the surveying point.

<SET6ES>

- 8) Turn the tribrach shifting clamp anti-clockwise. Adjust the instrument position on the tribrach to centre the surveying point. Tighten the shifting clamp to fix the instrument in the centre position.

Note: The SET6ES shifting tribrach can be adjusted up to ± 8 mm.

7.3 Focussing



- 1) Look through the telescope at a bright, featureless background.
- 2) Turn the eyepiece **23** clockwise, then anticlockwise until just before the reticle image goes out of focus. Using this procedure, frequent reticle re-focussing is not necessary, since **your** eye is focussed at infinity.

↑

8. PREPARATION FOR POWER ON

The SET6E instrument parameters are set at the factory to the options tabulated below. Before using the instrument for the first time, check that these parameters are set to your required options.

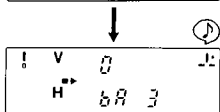
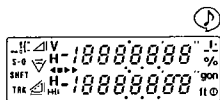
- To change the parameter options, see "INSTRUMENT PARAMETERS" on page 41.

Parameter No.	Function	Options
1	Prism constant correction	<u>-30mm</u> (adjustable from 0 to -90mm in 10mm steps.)
2	Distance mode	<u>Repeat</u> /Single measurements ☞ P. 42
3	Distance units	<u>Metres</u> or feet
4	Earth curvature and refraction correction	<u>Not applied</u> or applied ☞ P. 56
6	Vertical angle	<u>Zenith 0</u> /Horizontal 0/ Horizontal 0±90° (100 gon/1600 mil)/ % vertical angle
9	Angle resolution	<u>20"</u> (5 mgon/0.1 mil) or 10" (2 mgon/0.05 mil)
10	Angle units	<u>Degrees</u> or gon or mil

(Underlined values are the factory settings.)

- See page 41 for a complete list of the instrument parameters.

9. POWER ON AND INSTRUMENT CHECKS



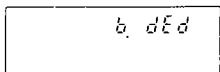
1) Turn the SET6E power switch **ON**.
The audio tone sounds and all the display symbols are shown on the display while the instrument performs self-diagnostic checks.

2) On successful completion of the checks, the battery power is displayed as a numeric code for three seconds.

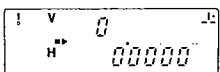
(Temperature = 25°C, every one distance measurement in repeat measurement mode, Measurement interval = every 30 secs)

0	...	10	~	0%
1	...	90	~	10%
2	...	98	~	90%
3	...	100	~	98%

or



If *b. dEd* is displayed, the battery voltage is too low for measurement. Turn the power switch off and re-charge the battery. (This display also occurs during measurement when the battery power is low.)



3) The "V 0" display indicates that the instrument is ready for vertical circle indexing.

E 114, *E 115*, *E 116* or *E 117* is displayed when the tilt angle exceeds 10'. Re-level the SET6E using the plate level bubble.

[Note: Power-saving cut-off]

- If the power switch is left on, the SET6E has the option to switch off automatically 30 minutes after the last key operation.

Instrument parameter No. 11 P. 41

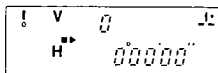
- Parameter 11 can be used to switch off and on the 30-minute power cut-off facility.

10. PREPARATION FOR MEASUREMENT

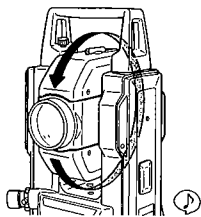
10.1 Indexing the vertical circle

(When V circle indexing parameter is set to "A".)

Turn the SET6E power switch **13** ON.



..... Waiting for vertical circle indexing

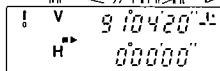


<Vertical circle indexing>

1) Loosen the vertical clamp **21**, and transit the telescope completely.

(Indexing occurs when the objective lens crosses the horizontal plane in face left.)

The audio tone sounds and the vertical angle (V) is displayed.



- Angle measurement can now begin.
(The instrument is now in the theodolite mode.)

Note: Each time the instrument is switched on, the vertical index must be re-determined.

Instrument parameter No. 7 P. 41

- Parameter 7 can be used to change the vertical circle indexing. Options are indexing by transitting the telescope or indexing by face left, face right sightings. P. 54

[Note: Automatic vertical angle compensation]

Automatic vertical angle
compensation mark



- When the compensation mark is shown on the display, the vertical angle is automatically compensated for small tilt errors.

- Read the compensated vertical angle after the displayed angle value becomes steady.

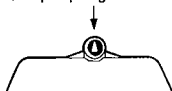
Instrument parameter No. 8  P. 41

- Parameter 8 can be used to switch off and on the automatic vertical angle compensation; for example, the automatic compensation should be switched off if the display is unsteady due to vibration or strong wind.



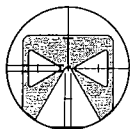
10.2 Target sighting

Line the target with the white arrow in the peep sight.

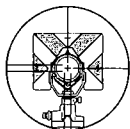


- 1) Loosen the vertical and horizontal clamps ②①, ①⑤ and use the peep sight ②⑤ to bring the target into the field of view.
- 2) Re-tighten both clamps.
- 3) Turn the focussing ring ②④ to focus on the target.
- 4) Use the vertical and horizontal fine motion screws ②②, ①⑥ to sight the target precisely. The last adjustment of each fine motion screw should be in a clockwise direction.

Position of the target in relation to the reticle:



(Target centre)



(Prism centre)

- Angle only measurement:
Use the reflecting prism or the target.

- Distance and angle measurement:
Use the reflecting prism.

Note: Observe to the same point of the reticle when the telescope face is changed.

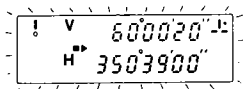
- 5) Check that there is no parallax between the target image and the reticle.



[Note: Parallax]

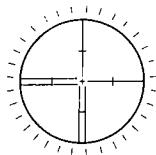
- This is the relative displacement of the target image with respect to the reticle when the observer's head is moved slightly before the eyepiece.

Parallax will introduce reading errors and must be removed before observations are taken. Parallax can be removed by re-focussing.

10.3 Display and reticle illumination




- Press  to illuminate the display and reticle of the SET6E.
Press  again to switch the illumination off.



Instrument parameter No. 12  P. 41 _____

- Parameter 12 can be used to switch on/off the 30-second illumination automatic cut-off facility.

Instrument parameter No. 13  P. 41 _____

- Parameter 13 can be used to select the illumination brightness (2 steps).

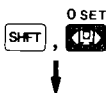
11. ANGLE MEASUREMENT

Check! before angle measurement:

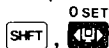
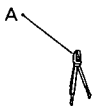
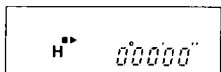
1. The SET6E is set up correctly over the surveying point. ☞ P. 8
2. The remaining battery power is adequate. ☞ P. 13
3. The vertical angle display mode and angle units are correct. ☞ P. 12
4. The vertical circle has been indexed. ☞ P. 15

11.1 Measure the horizontal angle between two points — Zero set —

Note: **Horizontal angle 0 set**



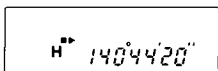
- Press SHFT, O SET to set the horizontal angle to zero.



- 1) Sight the first target A.



- 2) Press SHFT, O SET to set the horizontal angle display to zero.
- 3) Use the horizontal clamp 15 and fine motion screw 16 to sight target B.




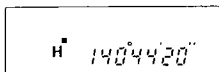
The displayed horizontal angle is the angle between points A and B.


11.2 Set the horizontal circle to a required value — Angle hold —

Note: **Horizontal angle hold**




- Press **SHFT**,  to hold the displayed horizontal angle.

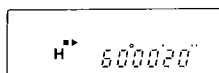




- The hold symbol  is displayed.




- To release the horizontal angle hold, again press **SHFT**, .

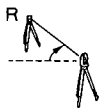
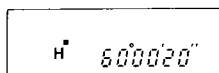
e.g. Set $60^{\circ}00'20''$ to reference target R.



- 1) Use the horizontal clamp  and fine motion screw  to turn the theodolite until an angle of $60^{\circ}00'20''$ is shown on the display.




- 2) Press **SHFT**,  to hold the horizontal display, as above.



- 3) Use the horizontal clamp and fine motion screw to turn the theodolite to sight on the reference target R.



- 4) Press **SHFT**,  to release the display hold.
Reference target R has now been set to $60^{\circ}00'20''$.

11.3 Select the horizontal display – Angle right/left –

Note: **Horizontal angle right/left**

• Select the required horizontal angle display using the key.

(Display symbol : horizontal angle right)

(Display symbol : horizontal angle left)

- The horizontal left angle display selection is lost after the power is switched off.

12. DISTANCE MEASUREMENT

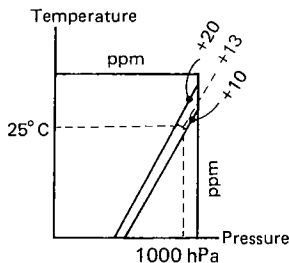
12.1 Atmospheric correction

- The atmospheric correction is necessary for accurate distance measurement, because the velocity of light in air is affected by the temperature and atmospheric pressure.

The SET6E is designed so that the correction factor is 0 for a temperature of +15°C (+59°F) and an atmospheric pressure of 1013hPa (29.9 inchHg).

Note: To obtain the average refractive index of the air throughout the measured light path, you should use the average atmospheric pressure and temperature. Take care when calculating the correction factor in mountainous terrain. P. 55

- Measure the temperature and pressure with a thermometer and a barometer and read the correction factor from the table on page 63.



e.g. Temperature: +25°C
Atmospheric pressure: 1000 hPa
Read correction value from the table.
The correction value is +13 ppm.

The correction value can be calculated from:

$$X = 278.96 - \frac{0.2904 \times P \text{ (hPa)}}{1 + 0.003661 \times t \text{ (}^\circ\text{C)}}$$

where: P = Atmospheric pressure in hPa
t = Temperature in Centigrade

To convert inchHg to hPa, divide by 0.0295.

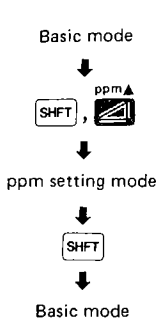
To convert temperature from Fahrenheit to Centigrade, use the formula:

$$^\circ\text{C} = \frac{5 \text{ (}^\circ\text{F} - 32)}{9}$$

- The atmospheric correction value can be input to the SET6E as a value between -499 ppm and +499 ppm in 1 ppm steps.
- The input atmospheric correction value is stored in the memory for about 15 hours after the power is switched off.
- If the atmospheric correction is not required, set the ppm value to zero.



Note: ppm setting mode



- Press SHFT, ppm▲ to go to the ppm setting mode from the Basic mode.
- ppm▲ Count up
- M/T Change between the $\times 100$ (-), $\times 10$ and $\times 1$ ppm columns.
- SHFT Stores the value and exits to the Basic mode.

e.g. Set a ppm value of 13 ppm

From Basic mode:

Press SHFT, ppm▲ to go to the ppm setting mode.

The $\times 100$ (-) ppm column flashes.

Set this column to 0 using ppm▲.
(-0, 0, 1, 2, 3, 4, -4, -3, -2, -1)

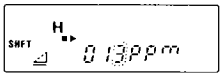
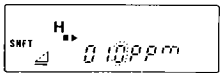
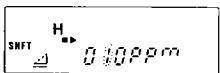
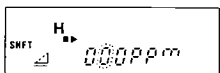
Press M/T to change to the $\times 10$ ppm column. (Value flashes)

Set 1 to this column using ppm▲.

Press M/T to change to the $\times 1$ ppm column. (Value flashes)

Set 3 to this column using ppm▲.

Press SHFT to return to the Basic mode.



- The entered ppm value is stored in the memory for about 15 hours after the power is switched off.

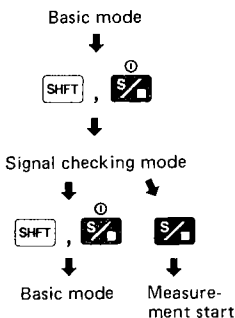
12.2 Prism sighting and return signal check

- Especially for long distances, it is useful to check that the return signal is adequate for measurement.



Note:

Return signal checking mode



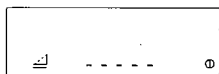
- Sight the centre of the reflecting prism with the telescope. P. 17

- Press **SHIFT**, **S**^① to go to the return signal checking mode.

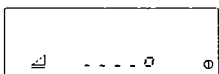
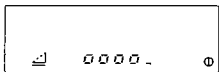
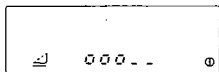
Check the signal strength.

- Press **SHIFT**, **S**^① to return to the Basic mode, or press **S**^① to start measurement.

- The return signal level is displayed according to its strength. An optional audio tone is output when the signal strength is adequate.



No return signal. Sight the prism centre again. P. 17




Adequate for measurement.

Note:

Because of a slight mis-sighting, "E 201" or "5 ---" is displayed although the return signal level is adequate.

Make sure that the prism is sighted correctly.








Return signal is too strong. If this display persists, please contact our agent.

Return signal audio tone on/off  P. 41

- Parameter 5 can be used to switch on/off the return signal audio tone.

12.3 Distance and angle measurement

Check! before distance and angle measurement:

1. The SET6E is set up correctly over the surveying point.  P. 8
2. The remaining battery power is adequate.  P. 13
3. The prism constant, the distance mode, the distance units and the curvature and refraction correction have been correctly set.  P. 12
4. The vertical angle format and angle units have been correctly set.  P. 12
5. The vertical circle has been indexed.  P. 15
6. The SET6E is in the Basic mode.
7. The atmospheric correction is correctly set.  P. 23
8. The centre of the reflecting prism is being sighted and the return signal is adequate for measurement.  P. 25

- For simultaneous measurement of distance and horizontal angle, the horizontal angle can be set to zero or a required value. For horizontal angle operations, see page 19—.



- 1) In Basic mode, select repeat/single* or tracking measurement. (Tracking measurement = Distance value displayed at first after 1.5 sec, then every 0.4 sec in cm units.)





The TRK symbol is shown on the display in tracking mode.

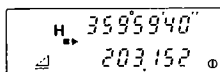
* Repeat or single measurement can be selected by instrument parameter No. 2.


 P. 42

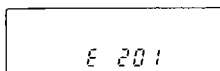



TRK


-  : Horizontal distance
-  : Height difference
-  : Slope distance
-  : Measurement start




 : Measurement stop



2) Select the distance measuring mode by pressing .

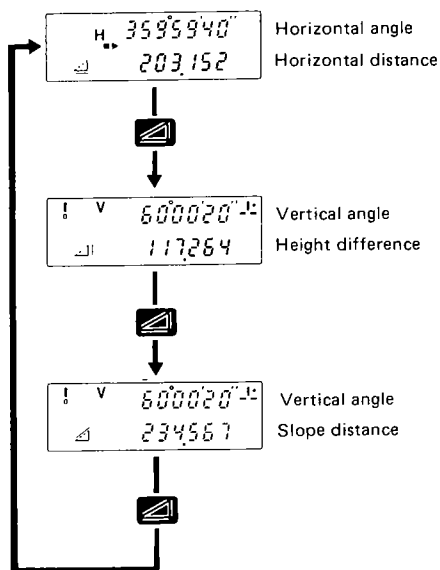
3) Press  to start the measurement. The display flashes to show that the measurement is being performed.



4) The selected distance and angle will be displayed after measurement. In repeat or tracking measurement mode, press  to stop the measurement.

- In single measurement mode, the stop key does not need to be pressed.

Note: If *E 201* is displayed, the return signal is absent or the prism is mis-sighted. In this situation, sight the prism correctly and re-measure. If any other error code is displayed, see page 30.

- After the measurement has been stopped, the horizontal distance, height difference and slope distance, and vertical and horizontal angle data are stored in the memory.



- The horizontal angle and horizontal distance, the vertical angle and height difference or the vertical angle and slope distance can be displayed by pressing .
- Press  to go to the Theodolite mode from the Basic mode.

13. ERROR CODES

- If there is any fault in the SET6E operation, the error codes shown below will be displayed.

Display	Meaning	Action
b. dEd	Battery voltage is too low.	Replace the battery with a charged one, or charge the battery.
E 100*	Error when measuring a horizontal angle.	Press [SHIFT] , [0SET] to set the horizontal angle to zero.
E 101*	Error when measuring a vertical angle.	Index the vertical circle again.
E 114	Tilt angle of trunnion direction exceeds -10'.	Re-level the SET6E.
E 115	Tilt angle of sighting direction exceeds -10'.	
E 116	Tilt angle of trunnion direction exceeds +10'.	
E 117	Tilt angle of sighting direction exceeds +10'.	
S ---**	Incoming reflection was disturbed Or measurement conditions are bad.	Re-sight the prism. Increase the number of prisms for long distances. Remeasure the distance after confirming the return signal.
S OFF E 201**	Incoming reflection was totally absent at start of measurement. Or measurement condition is bad.	

*If the SET6E telescope or upper part is rotated faster than four revolutions per second, the error indication "E 100" or "E 101" is displayed.

**Because of a slight mis-sighting, "E 201" or "S ---" is displayed although the return signal level is adequate. Make sure that the prism centre is sighted correctly.

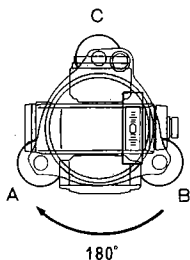
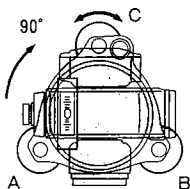
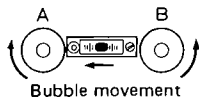
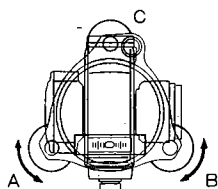
- When an error indication persists, or if an error indication "E xxx" is displayed with any number other than those displayed above, please contact our agent.

14. CHECKS AND ADJUSTMENTS

- It is important that the SET6E is periodically checked and adjusted. In addition, the instrument should be checked after transportation, long storage or when damage to the instrument is suspected to have occurred.

14.1 Plate level

- The glass tube of the plate level is sensitive to temperature change or shock. Check and adjust as follows:



< Check >

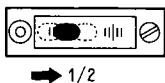
- Turn the upper part of the instrument until the plate level is parallel to a line between levelling foot screws A and B. Centre the plate level bubble using levelling screws A and B.

Note: The bubble moves towards a clockwise-rotated footscrew.

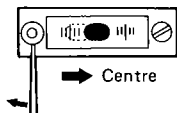
- Loosen the horizontal clamp **15** and turn the upper part 90° , i.e. The plate level is perpendicular to a line between levelling screws A and B. Centre the plate level bubble using levelling screw C.

- Turn the upper part through 180° and check the bubble position. If the bubble is still centred, no adjustment is necessary. If the bubble is not centred, adjust as follows:

- 4) Use levelling screws



- 5) Use adjusting pin



< Adjustment >

- 4) Correct half of the bubble displacement using levelling screw C.

- 5) Correct the remaining half displacement with the adjusting pin.

Note: The bubble moves away from a clockwise rotation of the adjusting screw.

- 6) Repeat the procedures from 1) until the bubble remains centred for any position of the upper part.

If the bubble is not still centred in the plate level, please contact your SOKKIA agent.

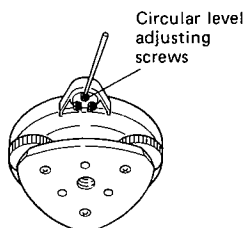
14.2 Circular level

< Check >

- 1) Perform the plate level adjustment as in 14.1, or carefully level the instrument using the plate level.
- 2) Check the position of the circular level bubble. If the bubble is off-centre, adjust as follows:

< Adjustment >

- 3) Note the off-centre direction of the bubble.
- 4) Loosen the adjusting screw farthest from this direction to centre the bubble.
- 5) Adjust all three adjusting screws until the tension of each screw tightening is the same, and the bubble is centred.



Warning: Over-tightening the adjusting screws may damage the circular level. Unequal tightening of the screws may mean that the bubble will go out of adjustment.

If the bubble is not still centred in the circular level, please contact your SOKKIA agent.

14.3 Tilt sensor

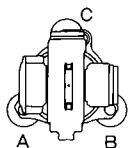
- If there is a tilt 0 point error, the tilt angle is not 0 when the instrument is properly levelled, and it causes an angle error. This tilt 0 point error can be checked and adjusted as follows.

< Check >

1) Carefully level the SET6E.

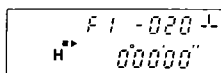


2) Press the and keys and switch the SET6E on at the same time.



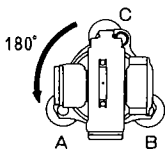
3) The tilt angle is displayed at the upper line, and the horizontal angle is displayed at the lower line.

Note the tilt angle value A, e.g. -20".



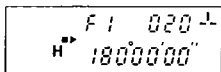
Tilt angle A

Horizontal angle



4) Loosen the horizontal clamp and turn the upper part through $180^\circ \pm 5'$ watching the display of horizontal angle.

Note the tilt angle value B at the 180° position, e.g. 20".



= B

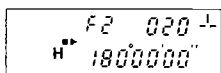
Calculate the offset value: $(A + B)/2$

e.g. $(-20 + 20)/2 = 0$

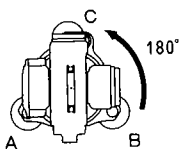
$$(A + B)/2 \leq \pm 20''$$

- If the offset value is $\pm 20''$ or less, no adjustment is necessary, and switch the power off to finish the check.
- If the offset value is greater than $\pm 20''$, the sensor index should be adjusted as follows:

< Adjustment >

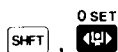
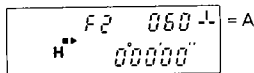


5) Press , to input the tilt angle B at the 180° position.



- 6) Loosen the horizontal clamp and turn the upper part back to the 0° horizontal angle position.

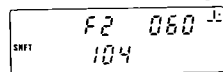
The tilt angle for this position is displayed.



- 7) Press **SHIFT**, **O SET** to input this displayed tilt angle A.

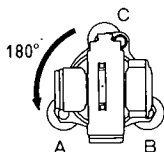
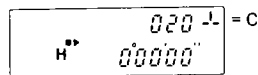
The audio tone sounds and the tilt 0 point data is displayed.

(If the tilt 0 point data is greater than 100 ± 12 , please contact your SOKKIA agent.)



After three seconds, the adjusted new tilt angle value is displayed.

Note this tilt angle value C, e.g. 20°.



- 8) Loosen the horizontal clamp and turn the upper part to the 180° horizontal angle position.

Note the tilt angle value D, e.g. -20°.

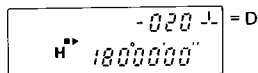
Calculate the new offset value: $(C + D) / 2$

e.g. $\{20 + (-20)\} / 2 = 0$

Confirm that the offset value is $\pm 20''$ or less and switch the power off.

If the offset value is greater than $\pm 20''$, switch the power off and repeat the adjustment procedures from 1).

If the offset value is greater than $\pm 20''$ in spite of repeating the adjustment, please contact your SOKKIA agent.



$$(C + D) / 2 \leq \pm 20''$$



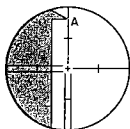
Switch off

14.4 Reticle

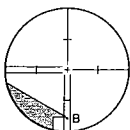
Note: Before this procedure, check the tilt sensor as in 14.3.

Perpendicularity of the reticle to the horizontal axis

< Check >

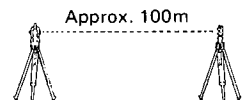


- 1) Carefully level the SET6E.
Select and sight a clear target on the upper part A of the reticle line.



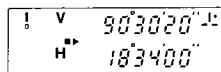
- 2) Turn the telescope vertical fine motion screw until the target is on the lower part of the reticle B.
Check that the target is still positioned centrally within the reticle lines.
If the target is off-centre, please contact your SOKKIA agent.

Vertical and horizontal reticle line positions



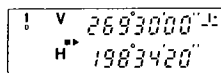
< Check >

- 1) Set up a clear target 100 m (330 ft) from the SET6E. Carefully level the SET6E, switch on and index the vertical circle.



Face left

- 2) Sight the target on face left.
Read the horizontal and vertical angles.
e.g. H: 18°34'00" a_l
V: 90°30'20" b_l



Face right

- 3) Now sight the target on face right and read the horizontal and vertical angles.
e.g. H: 198°34'20" a_r
V: 269°30'00" b_r
- 4) Subtract the horizontal face left angle from the horizontal face right angle.
The difference should be $180^\circ \pm 40''$.
Add the vertical face left and face right angles. The sum should be $360^\circ \pm 40''$.
 $a_r - a_l = 180^\circ 00' 20''$
 $b_r + b_l = 360^\circ 00' 20''$
- 5) If either of the values are greater than $\pm 40''$, repeat the above procedures. If, after repeating the procedures, the values are still greater than $\pm 40''$, please contact your SOKKIA agent.

14.5 Optical plummet

〈 Check 〉

1) Carefully level the SET6E and exactly centre a surveying point in the reticle of the optical plummet.



2) Turn the upper part 180° and check the position of the surveying point in the reticle. If the surveying point is still centred, no adjustment is necessary.

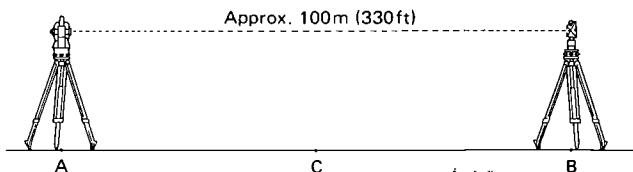
If the surveying point is not still centred in the optical plummet, please contact your SOKKIA agent.

14.6 Additive distance constant

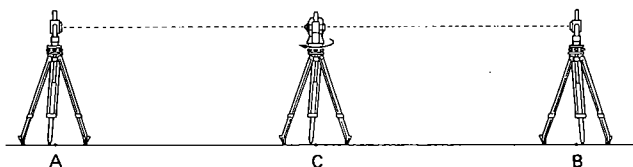
- The additive distance constant of the SET6E is adjusted to 0 before delivery. However, the additive constant can change with time and so should be determined periodically and then used to correct distances measured.

< Check >

- 1) Select points A and B on flat ground about 100 m (330 ft) apart, and C in the middle.



- 2) Set up the SET6E at A and measure the distance AB.
- 3) Move the SET6E to C, and measure the distance CA and CB.



- 4) Compute the additive distance error K using the formula:

$$K = \overline{AB} - (\overline{CA} + \overline{CB})$$

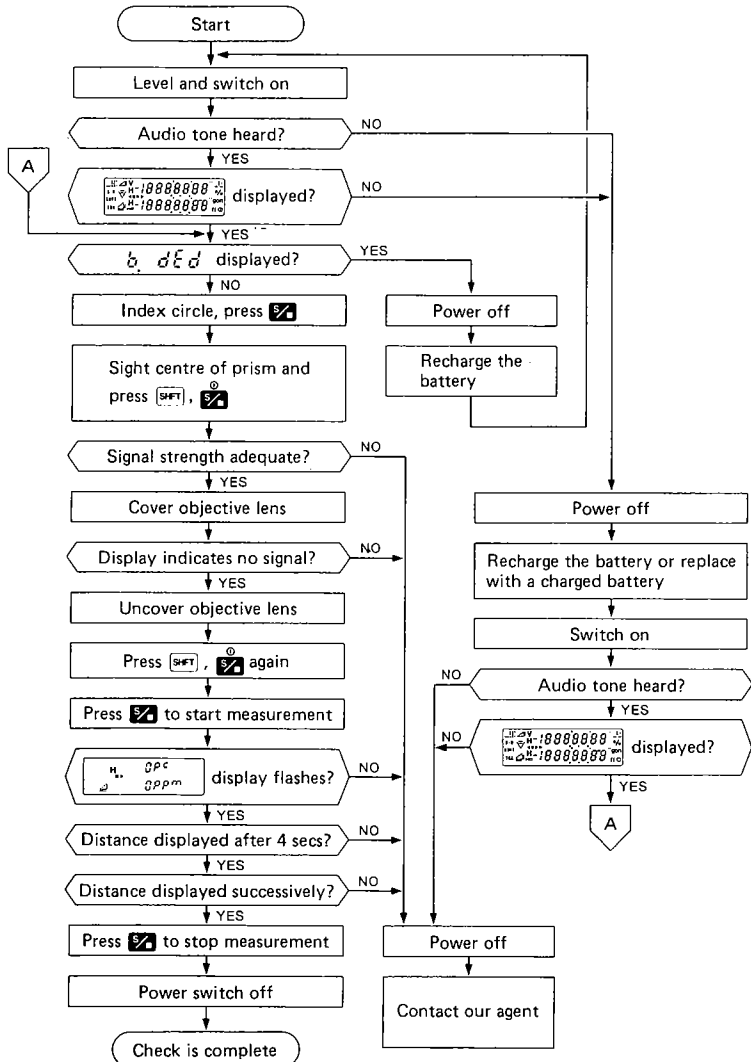
\overline{AB} , \overline{CA} , \overline{CB} : Average of ten measurements.

- 5) Obtain the K value three times. If all K are greater than ± 5 mm, please contact your SOKKIA agent.

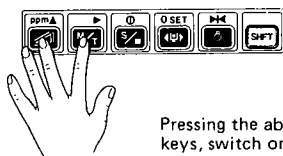
Note: Ensure that the prism height is the same as the height of the SET6E objective lens centre. If the ground is not level, use an automatic level to set the correct instrument heights of all points.

14.7 Distance measurement check flow chart

- Before this check, set the distance measuring mode to repeat measurement mode, then perform the procedures in the flow chart below.



15. INSTRUMENT PARAMETERS





Pressing the above keys, switch on




After setting parameters, switch off



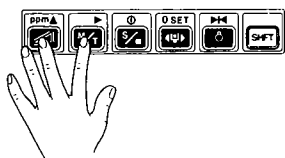
Parameter setting mode

- Change parameter options : 
- Move to next parameter : 

No.	Parameter		Options
1	Prism constant correction	F0	0mm
		*F3	-30mm
		F9	-90mm
2	Distance measurement mode	*F0	Repeat measurements
		F1	Single measurement
3	Distance units	*F0	m (metres)
		F1	ft (feet)
4	Earth curvature and refraction correction	*F0	Not applied
		F1	Applied
5	Audio for return signal	*F0	On
		F1	Off
6	Vertical angle display format	*F0	Zenith 0
		F1	Horizontal 0 face left
		F2	Horizontal 0 ± 90° / 100gon / 1600mil
		F3	% vertical angle
7	Vertical circle indexing	*F0	Rotate telescope
		F1	Observe face left, face right sightings
8	Auto vertical angle compensation	*F0	Applied
		F1	Not applied
9	Angle resolution	*F0	20" (5 mgon/0.1 mil)
		F1	10" (2 mgon/0.05 mil)
10	Angle units	*F0	360°
		F1	400gon
		F2	6400mil
11	Auto power cut-off	*F0	Auto power cut-off after 30 minutes
		F1	Switch on/off with the SET5 switch
12	Auto illumination cut-off	*F0	Illumination on/off using 
		F1	Illumination auto off after 30 seconds
13	Reticle illumination brightness	F0	High (Bright)
		*F1	Low (Dim)

* Parameter settings when the instrument left the factory.

- The parameter options selected are stored in the permanent memory even after power off.
- Parameter setting method:



- While pressing and , switch the power on.

No. 1 Prism constant correction

SHFT 1 PC
F3 -30

ppm

SHFT 1 PC
F4 -40

...

SHFT 1 PC
F0 0

F3: -30mm AP01S+AP01

3cm

F4: -40mm AP01

4cm

} Possible to set a value between 0 and -90mm in 10mm steps.

F0: 0mm CP01

0 cm



Confirm option and move to next parameter.
(To exit, press , then switch off.)

No. 2 Distance mode

SHFT 2
F0 REP

ppm

SHFT 2
F1 SING


F0: Repeat measurements:

- Initial measurement time is 4.3 seconds, then every 3.2 seconds in mm units.

F1: Single measurement:

- Measurement time 1.5 seconds in mm units.



Confirm option and move to next parameter.
(To exit, press , then switch off.)

No. 3 Distance units

SNFT 3
F0 m


F0: Distance values displayed in metres



SNFT 3
F1 ft

F1: Distance values displayed in feet



Confirm option and move to next parameter.
(To exit, press , then switch off.)

No. 4 Earth curvature and refraction correction

SNFT 4 cr
F0 off

F0: Not applied


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SNFT 4 cr
F1 on

F1: Earth curvature and refraction correction applied



Confirm option and move to next parameter.
(To exit, press , then switch off.)

No. 5 Audio for return signal


SNFT 5 A-b
F0 on

F0: On (In return signal checking mode, audio tone sounds when signal is adequate for measurement.)

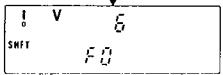


SNFT 5 A-b
F1 off

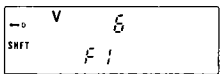
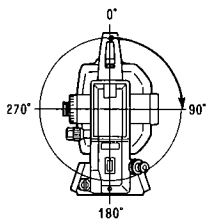
F1: Off

Confirm option and move to next parameter.
 (To exit, press , then switch off.)

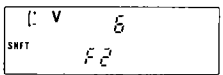
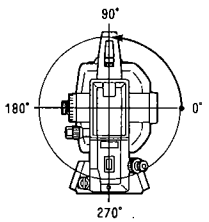
No. 6 Vertical angle mode



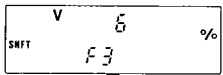
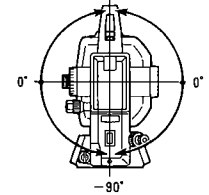
F0: Vertical angle (0 at Zenith)



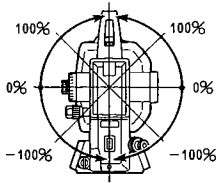
F1: Vertical angle (0 Horizontal face left)




F2: Vertical angle (0 Horizontal $\pm 90^\circ$ / 100 gon/1600mil)



F3: % vertical angle (up to 1000%)





Confirm option and move to next parameter.
(To exit, press , then switch off.)

No. 7 Vertical circle indexing

V 7
SHFT F0 8

F0: Rotate telescope to index circle




V 7
SHFT F1 5E7

F1: Observe face left, face right sightings

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Confirm option and move to next parameter.
(To exit, press , then switch off.)

No. 8 Vertical angle tilt compensation

8
SHFT F0 on


F0: Applied



8
SHFT F1 off

F1: Not applied



Confirm option and move to next parameter.
(To exit, press , then switch off.)

No. 9 Angle resolution

V 9
SHFT H F0 20"


F0: 20" (5 mgon/0.1 mil)

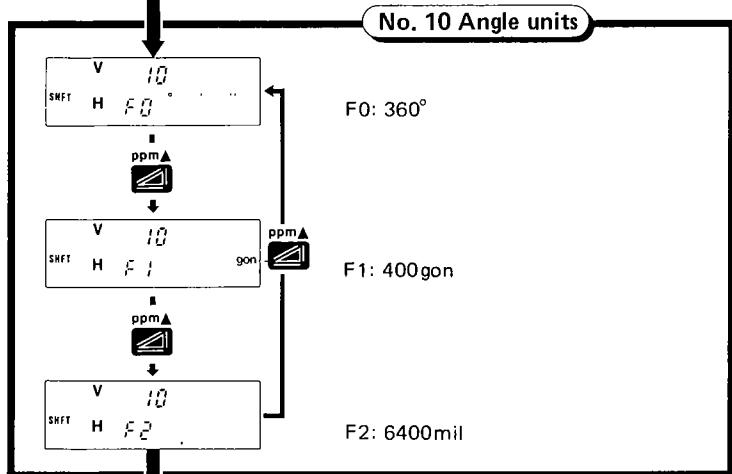



V 9
SHFT H F1 10"

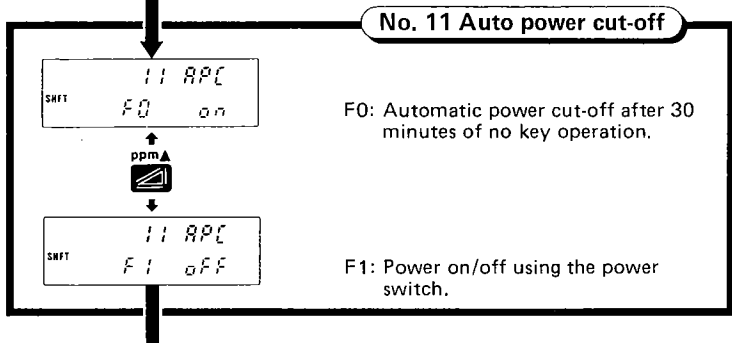
F1: 10" (2 mgon/0.05 mil)

To next page


Confirm option and move to next parameter.
(To exit, press , then switch off.)



Confirm option and move to next parameter.
(To exit, press , then switch off.)




To next page

Confirm option and move to next parameter.
(To exit, press , then switch off.)

No. 12 Illumination auto cut-off


12 LAC
SNFT F0 OFF

F0: Illumination on/off using the illumination key .



12 LAC
SNFT F1 ON

F1: Automatic illumination cut-off after 30 seconds.

Confirm option and move to next parameter.
(To exit, press , then switch off.)

No. 13 Reticle illumination brightness


13 L L
SNFT F1 L

F1: Low (Dim)



13 L L
SNFT F0 H

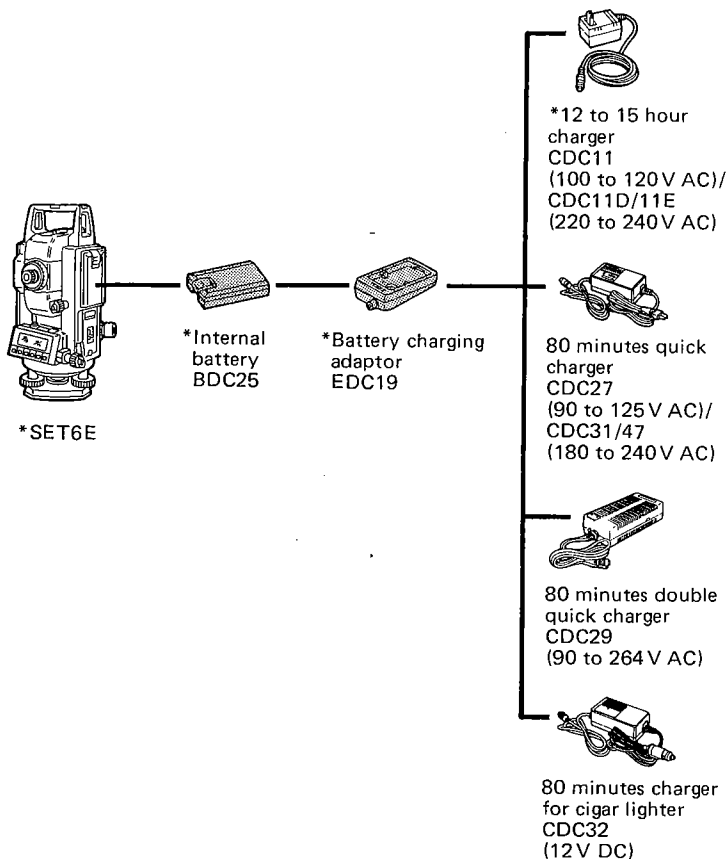
F0: High (Bright)

Confirm option and move to next parameter.
(To exit, press , then switch off.)

To Parameter No. 1 Prism constant correction

16 POWER SYSTEM

- The SET6E can be operated with the following combinations.



*Standard equipment. Items not marked with * are optional accessories.

Use the SET6E only with the combinations shown here.

1) Battery BDC25

- Battery operating life is shortened at extreme temperatures because of its property of Ni-Cd battery.
- The battery can be recharged about 300 times under the ordinary use (Temperature = 20°C, Humidity = 65%).

Note: • Do not disassemble, mutilate, incinerate, heat or short circuit may cause burn or burst.

- Use only the recommended charger to avoid burning.
- The storage temperature is between 0°C and 40°C.
- Do not use the battery for any other equipment or purpose.
- Remove the battery from SET 6 to avoid damaging the battery when not in use.

Specifications: Output voltage: DC6V
Size: 58 x 23 x 92mm

Capacity: 1200mAh
Weight: 0.2kg

2) Battery charger CDC11

- The battery charger normally becomes warm while charging.
- How to charge: Connect the charger to the power supply, connect the adaptor to the battery charger and mount the battery in the adaptor. The charging light is on during charging and it becomes lighting off when the charging is finished.

Note: • Do not disassemble, mutilate, heat or short circuit may cause burn or burst.

- Use it only for the recommended batteries to avoid burning.
- The charging temperature is between 10°C and 40°C.
- Charge the battery until the light remains on.
- Do not use the battery for any other equipment or purpose.
- Remove the plug from the power source.

Specifications: Input: CDC11: AC100V ~ AC120V, 50/60Hz, 5VA
CDC11D/E: AC220V ~ AC240V, 50/60Hz, 5VA

Output: DC7.45V, 120mA

Charging time at 25°C: about 12 ~ 15 hours

Size: CDC11/11D: 51 x 42 x 65mm

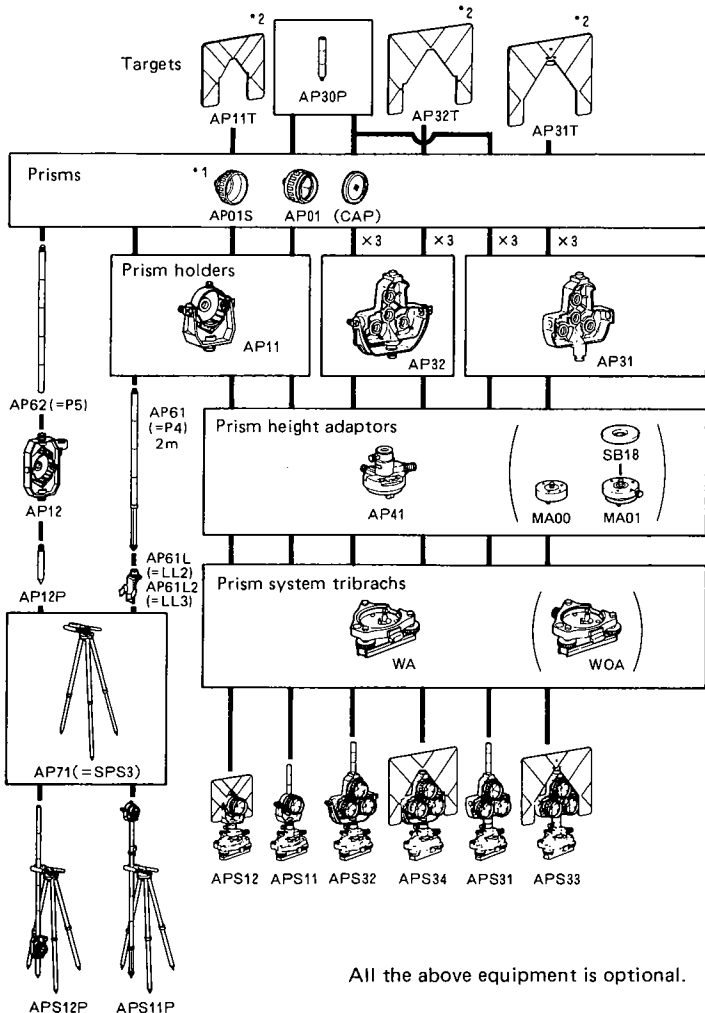
Weight: 0.3kg

CDC11E: 61 x 51 x 116mm

Weight: 0.55kg

17. REFLECTING PRISMS AND ACCESSORIES

- All SOKKIA reflecting prisms and accessories have standardized screws (5/8" x 11 thread) for easy compatibility.

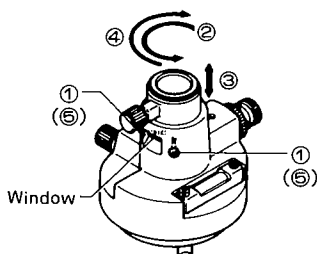


All the above equipment is optional.

*1: To change the stored prism constant value, see page 42.

*2: Fluorescent target paint finishing allows clearer sighting in adverse observing conditions.

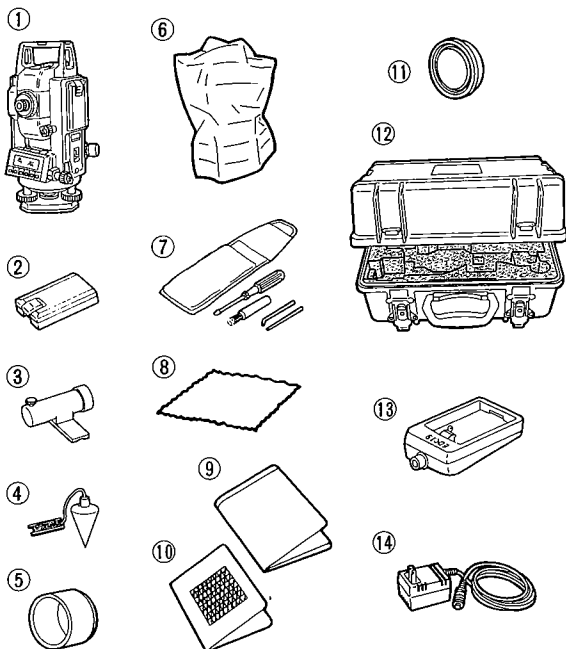
- 1) Precautions for use of reflecting prisms.
 - Carefully face the reflecting prism towards the instrument; sight the prism target centre accurately.
 - To use the triple prism assembly AP31 or AP32 as a single prism (e.g. for short distances), mount the single prism AP01 in the centre hole of the prism holder.
- 2) Precautions for use of the instrument height adaptor AP41.
 - Check the optical plummet of the AP41 as described in Section 14.5.
 - The height of the AP41 can be adjusted as follows:



- ① Loosen the two fixing screws.
- ② Turn the centre part counter-clockwise to unlock it.
- ③ Move it up or down until the height appears in the window.
- ④ Turn the centre part clockwise to lock it.
- ⑤ Tighten the fixing screws.

- 3) Precautions for use of tribrach.
 - Use the plate level on the AP41 to adjust the tribrach circular level as described in Section 14.2.

18. STANDARD EQUIPMENT



- | | |
|--|---|
| ① SET6E/SET6ES main unit | 1 |
| ② Internal battery BDC25.. | 1 |
| ③ Tubular compass CP7 . . . | 1 |
| ④ Plumb bob | 1 |
| ⑤ Lens hood | 1 |
| ⑥ Vinyl cover | 1 |
| ⑦ Tool pouch | 1 |
| Screwdriver | 1 |
| Lens brush | 1 |
| Adjusting pins | 2 |
| ⑧ Cleaning cloth | 1 |
| ⑨ Operator's manual | 1 |
| ⑩ Atmospheric correction chart | 1 |
| ⑪ Lens cap | 1 |
| ⑫ Carrying case | 1 |
| SET6E use: SC134 | |
| SET6ES use: SC135 | |
| ⑬ Battery charging adaptor EDC19 | 1 |
| ⑭ Battery charger CDC11/11D/11E | 1 |

19. MAINTENANCE

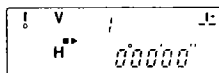
- 1) Wipe off moisture completely if the instrument gets wet during survey work.
- 2) Always clean the instrument before returning it to the case.
The lens requires special care. Dust it off with the lens brush first, to remove minute particles. Then, after providing a little condensation by breathing on the lens, wipe it with a soft, clean cloth or lens tissue.
- 3) Store the SET6E in a dry room where the temperature remains fairly constant.
- 4) If the battery is discharged excessively, its life may be shortened. Store it in a charged state.
- 5) Check the tripod for loose fit and loose screws.
- 6) If any trouble is found on the rotatable portion, screws or optical parts (e.g. lens), contact our agent.
- 7) To maintain the accuracy of the SET6E, check it for proper adjustment periodically.

APPENDIX 1: MANUALLY INDEXING THE VERTICAL CIRCLE

- Like all theodolites, the SET6E will have a vertical index error. The vertical index can be determined, and the index error removed, by the following procedure.

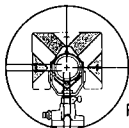
- Set parameter 7 to "Indexing vertical circle by face left, face right readings".

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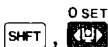


- Carefully level the SET6E and switch the instrument on.

The prompt \uparrow is displayed.

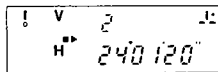


Face left

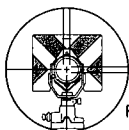


- In the face left position, accurately sight a clear target at a horizontal distance of about 30 m (100 ft).

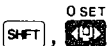
Press **SHFT**, **O SET**.



The prompt \uparrow is displayed.

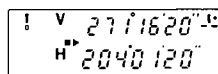


Face right



- On face right, accurately sight the same target.

Press **SHFT**, **O SET** again.



- When the vertical circle has been indexed, the vertical angle is displayed.

The horizontal circle should now be indexed.

Note: The vertical and horizontal circles must be re-indexed each time the SET6E is switched on.

APPENDIX 2: ACCURACY OF MEASUREMENT OF ATMOSPHERIC CONDITIONS

1) Atmospheric conditions

- The SET6E uses a beam of infra-red light to measure the distance. The velocity of this light in the atmosphere varies according to the temperature and pressure.

For a variation in temperature of 1°C, the distance is changed by 1 ppm.

For a variation in pressure of 3.6 hPa, the distance is changed by 1 ppm.

(A 1 ppm change is 1 mm for every 1 km of distance measured.)
Consequently, temperature and atmospheric pressure must be carefully measured to correct the measured distances. (Temperature should be measured to the nearest 1°C and pressure to within 3.8 hPa.)

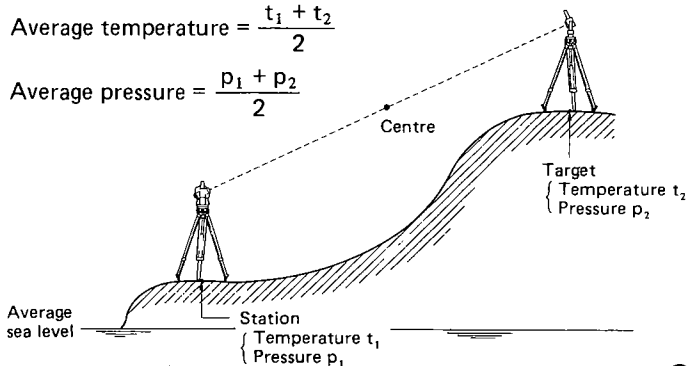
- The ppm correction does not need to be applied when the calculated ppm value is within ± 5 ppm and the distances are less than 200 m.

2) To obtain the average velocity along the measured light path, the average temperature and pressure is required.

- In flat terrain, measure the temperature at the midpoint of the line.
- In mountainous terrain, if the temperature and pressure at the midpoint can not be measured, take the temperature and pressure at the instrument and target and calculate the average values.

$$\text{Average temperature} = \frac{t_1 + t_2}{2}$$

$$\text{Average pressure} = \frac{p_1 + p_2}{2}$$



APPENDIX 3: EARTH CURVATURE AND REFRACTION CORRECTION

- The curvature and refraction correction can be selected using parameter No. 4. This correction is applied in the measurement of horizontal distance and height difference and uses an atmospheric refraction constant of 0.142.

〈When the correction is not applied〉

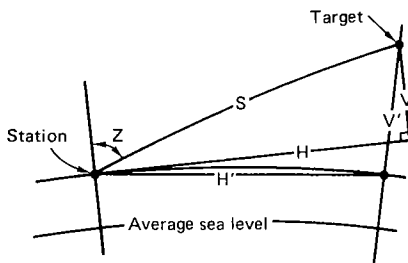
Horizontal distance: $H = S \sin Z$

Height difference: $V = S \cos Z$

〈When the correction is applied〉

Horizontal distance: $H' = S \times \sin Z - \frac{1 - \frac{K}{2}}{R} \times S^2 \times \sin Z \times \cos Z$

Height difference: $V' = S \times \cos Z + \frac{1 - \frac{K}{2}}{2R} \times S^2 \times \sin^2 Z$



S: Slope distance after atmospheric correction

Z: Vertical angle (0 at zenith)

K: Atmospheric refraction constant (0.142)

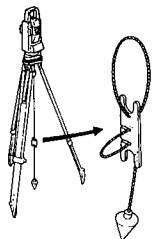
R: Radius of the earth (6.372×10^6 m)

e.g. Amount of correction for a zenith angle of 70°

Distance S (m)	100	300	500
$H' - H$ (m)	-0.0005	-0.004	-0.012
$V' - V$ (m)	0.0006	0.005	0.015

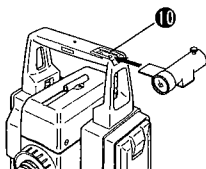
Note: The horizontal distance is a distance measured at the height of the surveying point above sea level. If required, reduce this distance to the average sea level and apply the local projection correction.

APPENDIX 4: STANDARD ACCESSORIES



1) Plumb bob

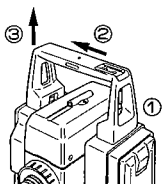
If the weather is calm, or for initial tripod centring, the plumb bob can be used for centring. To use, unwind the plumb bob cord and attach it to the hook inside the centring screw. Use the cord grip piece to adjust the cord length.



2) Tubular compass CP7.

To mount the CP7, slide it into the tubular compass slot. To use, loosen the clamping screw to free the compass needle. Turn the instrument in the face left position until the compass needle bisects the index lines. The telescope will be nearly aligned with magnetic north. After use, tighten the clamp and remove the compass from the slot. Place it in the specified position in the carrying case.

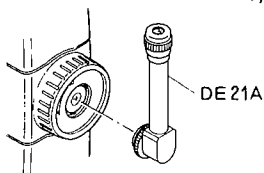
Note: Magnetism and metal will influence the tubular compass, making it incapable of projecting true magnetic north. Do not use the magnetic north indicated by this compass for base line surveying.



3) Handle

The carrying handle can be removed from the instrument by unscrewing the handle securing screw and sliding the handle to the side. When replacing the handle, ensure that the securing screw is fully tightened.

APPENDIX 5: OPTIONAL ACCESSORIES



1) Diagonal eyepiece DE21A

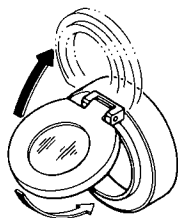
The diagonal eyepiece is convenient for near-vertical observations and in places where space around the instrument is limited. Remove the telescope eyepiece by unscrewing the mounting ring, and screw in the diagonal eyepiece.



OF1

2) Solar filter OF1/OF1A

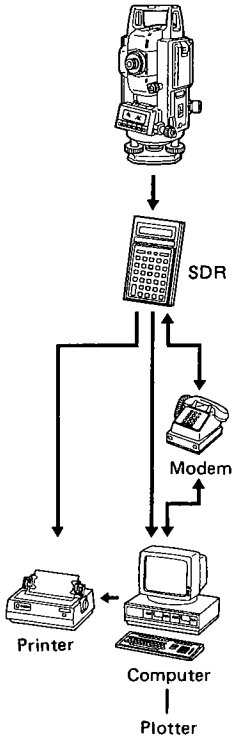
For observations to the sun, and where glare is present. The OF1 and OF1A (flip-up type) filters are mounted on the objective lens.



OF1A

3) Electronic field books SDR

The SDR series can collect and store all angle and distance values output from the SET6E data output connector 14. The stored data can be verified and printed in the field, then transmitted by cable or modem to an IBM-compatible office data processing system for final computation, printing and plotting.



SDR features:

- Simple operation with clear menu and program display prompts.
- Wide choice of recording parameters.
- Recorded data can not be cleared from the memory until it has been transmitted or printed.
- Additional programs or data can be input to the SDR from an external computer.

SPECIFICATIONS

Telescope

Length:	165 mm
Aperture:	45 mm
Magnification:	26x
Resolving power:	3.5"
Image:	Erect
Field of view:	1°30' (26m/1,000m)
Minimum focus:	1.3m (4.3ft)
Reticle illumination:	Brightness selectable in 2 levels

Angle measurement

Horizontal circle

Type:	Incremental
Minimum display:	20" (0.005 gon/0.1 mil)/10" (0.002 gon/0.05 mil) (Selectable with parameter)

Vertical circle

Type:	Incremental with zero index
Minimum display:	20" (0.005 gon/0.1 mil)/10" (0.002 gon/0.05 mil) (Selectable with parameter)

Angle range:

0°00'00" to 359°59'50"
0.000 gon to 399.998 gon
0.00 mil to 6,399.95 mil
±999.909 %

Accuracy:

Standard deviation of mean of
measurement taken in positions
I and II (DIN 18723)
7" (2.2 mgon/0.03 mil)

Automatic compensator:

Selectable on/off

Type: Liquid

Range of compensation: ±10'

Measuring mode

Horizontal angle: Right/left/hold

Vertical angle: 0 at zenith

0 horizontal on face left

0 horizontal ±90°/100 gon/1,600 mil

% vertical angle

Measuring time:

Less than 0.5 sec

Distance measurement

Maximum range: (When using SOKKIA reflecting prisms)

Average conditions: (Slight haze, visibility about 20 km,
sunny periods, weak scintillation)
Compact prism (CP series)

300 m (900 ft)

1-prism (AP series) 500 m (1,600 ft)

Accuracy: $\pm (5 + 5 \text{ ppm} \times D) \text{ mm}$

(unit: mm, Repeat measurement)

Distance display range: 1,999.999 m/6,561.66 ft

Display of feet units: Selectable

Minimum display: Repeat 1 mm (0.01 ft)

Single 1 mm (0.01 ft)

Tracking 10 mm (0.1 ft)

Measuring modes: Repeat/Single/Tracking

Measuring times:

Distance mode	Measurement mode		
	Repeat	Single	Tracking
Slope distance	4.3s, then every 3.2s	1.5s	1.5s, then every 0.4s
Horizontal distance			
Height difference			

Atmospheric correction: -499 to +499 ppm (in 1 ppm steps)

Prism constant correction: 0 to -90mm (in 10mm steps)

Earth curvature and

refraction correction: Selectable on/off

Audio target acquisition: Selectable on/off

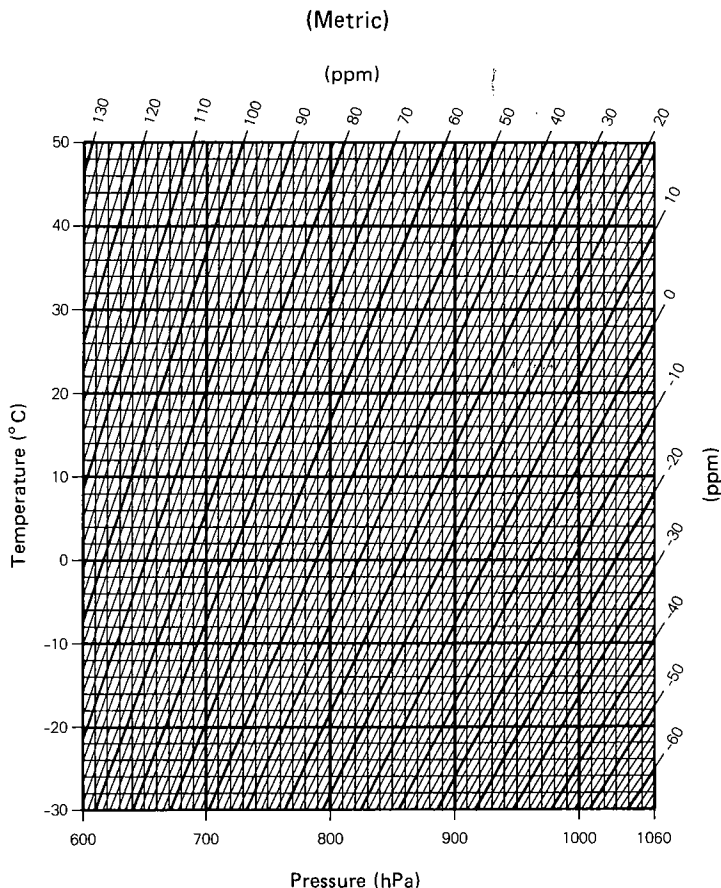
Signal source: Infra red LED

Light intensity control: Automatic

General

Display:	LCD 2-line, 8-digit display on one face
Sensitivity of levels	
Plate level:	60"/2 mm
Circular level:	10'/2 mm
Optical plummet	
Image:	Erect
Magnification:	2 x
Focus:	Fixed at 1.3 m (4.3 ft)
Data output:	Asynchronous serial, RS-232C compatible
Self-diagnosis:	Provided
Power-saving cut-off:	30 minutes after last key operation (Selectable on/off)
Operating temperature:	-20°C to +50°C (-4°F to +122°F)
Power source:	Ni-Cd rechargeable battery BDC25 (6V)
Working duration: (at 25°C/77°F)	About 21 hrs 40 min (Angle measurement only) About 10 hrs (About 1200 points) (Every one distance measurement in repeat measurement mode, Measurement interval = every 30 secs)
Charging time:	12 to 15 hrs (using standard charger CDC11/11D/11E)
Instrument height:	210 mm
Size (with handle and battery):	150 (W) × 165 (D) × 328 (H) mm (5.9 (W) × 6.5 (D) × 12.9 (H) inches)
Weight (with handle and battery):	4.8 kg (10.6 lbs)

ATMOSPHERIC CORRECTION CHART



- This chart shows the correction every 2 ppm, while the atmospheric correction can be input to the SET6E for every ppm.
To convert a pressure in mmHg to one in hPa, divide by 0.75.
e.g. $719 \text{ mmHg} = (719 \div 0.75) = 959 \text{ hPa}$

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