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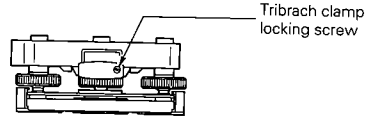
<Important>

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

<Important>



When the new NET2B is shipped, the tribrach clamp is fixed with a screw.
Loosen it and leave it loose.
And if the NET2B is again shipped, fix the tribrach clamp with the screw to stop the tribrach becoming detached from the instrument.

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.

FEATURES

< NET2B ADVANCED MEASUREMENT FUNCTIONS >

- Resection measurement
- Traverse-style coordinate measurement
- Offset measurement
- REM measurement
- Missing line measurement
- Setting-out measurement

< COORDINATE DATA CAN BE STORED IN AN INTERNAL MEMORY >

- 100 coordinate data can be stored in an internal memory for about a week.
- These coordinate data can be used as instrument station coordinates, backsight station coordinates, known station coordinates (for the resection measurement), and setting-out coordinates.
- These coordinate data can be displayed.

< TILT ANGLE COMPENSATION >

- Dual axis tilt sensor
- The index error of the tilt angle can be eliminated

< COLLIMATION PROGRAM >

- The collimation error between the centre of the telescope reticle and the sighting line can be calculated, and the correction value specified is set. (for angle measurement of high accuracy.)

< DATA OUTPUT >

- The NET2B RS232C-compatible data output connector allows 2-way communication with an external device.

QUICK GUIDE TO THIS MANUAL

- Ensure that the battery is charged before measurement.

Preparation for measurement 1

- Battery mounting ⑰
- Setting up Instrument <Centring ⑱/Levelling ⑲> ● Power on ㉑
- Indexing V & H circles ㉓ ● Focussing & target sighting ㉖
- Display & Reticle illumination ㉘ ● Setting instrument options ㉙

Angle & Distance measurement 2

- Angle <Set H angle to 0 ㉝/Set H circle to a required value ㉟/ H angle right/left ㊲>
- Distance <Measurement mode ㊳/Atmospheric correction ㊶/ Prism constant correction ㊺/Return signal checking ㊽/Measurement ㊾>

Coordinate measurement 3

- Measurement mode ㊷ ● Instrument height & Target height input ㊸
- Instrument station & Backsight station coordinates input ㊻
- Setting the azimuth angle ㊶
- 3-Dimensional coordinate measurement ㊷

Advanced measurement functions 4

- Resection measurement ㊼ ● Traverse-style measurement ㊻
- Offset measurement ㊽ ● REM measurement ㊽
- Missing line measurement ㊿
- Setting-out measurement ㊾

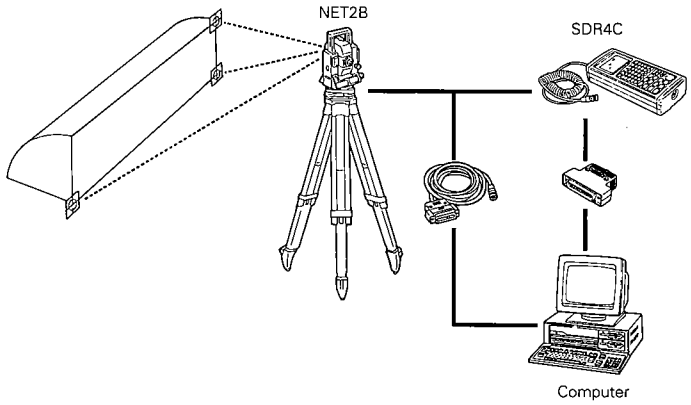
Coordinate data input and using 5

- Coordinate data input/deleting ⑩
- Coordinate data using ⑭
- Coordinate data reviewing ⑰

Troubleshooting... ● Error messages ⑱ 6

3-D MEASUREMENT SYSTEM (MONMOS)

- NET2B can be operated as a 3-D station with the following combination:



- Please refer to "SDR4C User's guide" when using this combination.

INTRODUCTION

1. PRECAUTIONS

- **Never place the NET2B directly on the ground.**
  Avoid damaging the tripod head and centring screw with sand or dust.

- **Do not aim the telescope at the sun.**
  Avoid damaging the LED of the EDM.

- **Protect the NET2B with an umbrella.**
  against direct sunlight, rain and humidity.

- **Never carry the NET2B on the tripod to another site.**

- Handle the NET2B with care. Avoid heavy shocks or vibration.

- When the operator leaves the NET2B, the vinyl cover should be placed on the instrument.

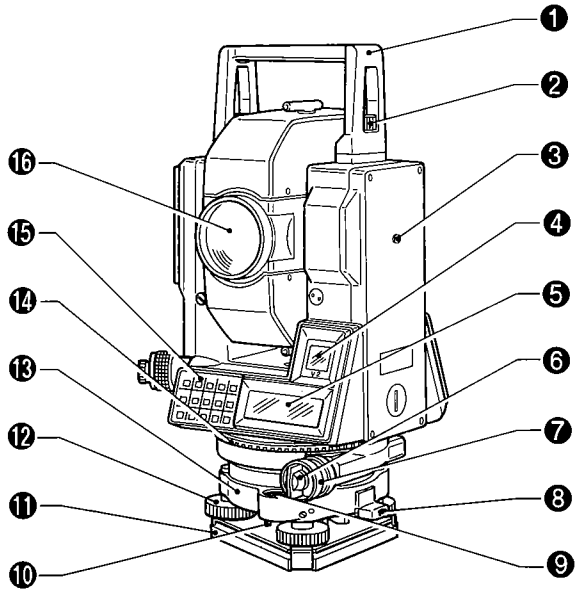
- Always switch the power off before removing the standard battery.

- Remove the standard battery from the NET2B before putting it in the case.

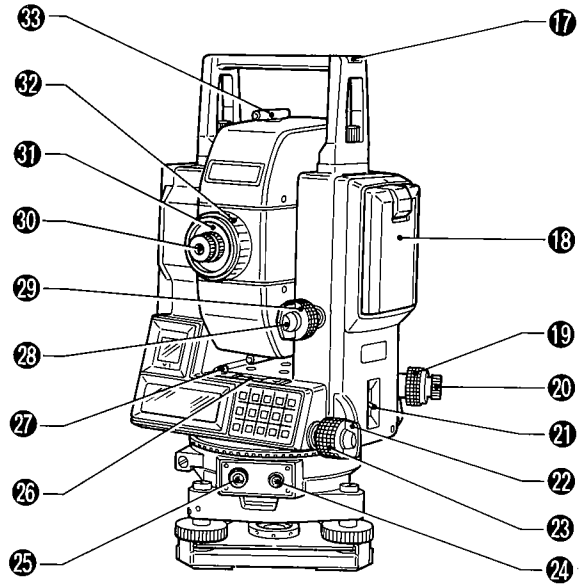
- When the NET2B is placed in the carrying case, follow the layout plan.

- Make sure that the NET2B and the protective lining of the carrying case are dry before closing the case. The case is hermetically sealed and if moisture is trapped inside, damage to the instrument could occur.

2. PARTS OF THE INSTRUMENT



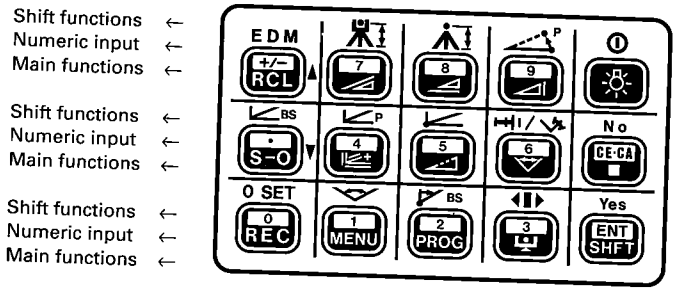
❶ Handle
❷ Handle securing screw
❸ Instrument height mark
❹ Sub display
❺ Main display
❻ Lower clamp
❼ Lower clamp cover
❽ Tribrach clamp
❾ Circular level
❿ Circular level adjusting screws
⓫ Base plate
⓬ Levelling foot screw
⓭ Tribrach
⓮ Horizontal circle positioning ring
⓯ Keyboard
⓰ Objective lens



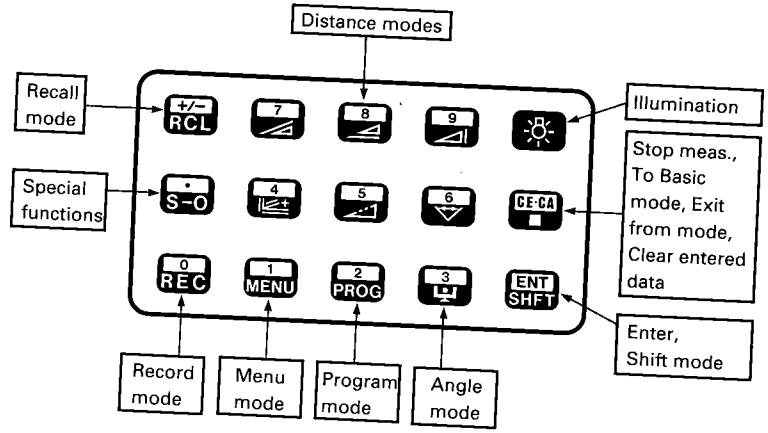
⓱ Tubular compass slot
⓲ Battery BDC25
⓳ Optical plummet focussing ring
⓴ Optical plummet eyepiece
㉑ Power switch
㉒ Horizontal clamp
㉓ Horizontal fine motion screw
㉔ Data output connector
㉕ External power source connector
㉖ Plate level
㉗ Plate level adjusting screw
㉘ Vertical clamp
㉙ Vertical fine motion screw
㉚ Telescope eyepiece
㉛ Telescope reticle adjustment cover
㉜ Telescope focussing ring
㉝ Peep sight

Note: Fine motion screws.
The horizontal and vertical fine motion screws have 2-speed (coarse and fine) motions. The motion is coarse when the screws feel heavy to rotate. The opposite turning direction gives a moveable fine motion "window".

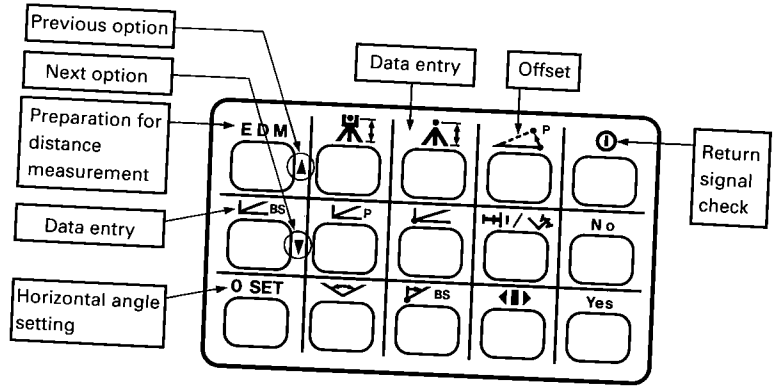
3. KEY FUNCTIONS



<Main functions>



<Shift functions>



○< ENT SHFT +>: Distance mode/Prism constant/ppm

● (Data input mode): Change the sign of the data input value
(Parameter/Input mode): Move to previous option

● **Recall data from the memory**

○< ENT SHFT +>: Input Backsight station coordinates

● (Data input mode): Input "." (Decimal point)
(Parameter/Input mode): Move to next option

● **Setting out measurement (+ mode key)**

○< ENT SHFT +>: Set Horizontal angle to 0/
In Missing line measurement, change the starting point

● (Data input mode): Input "0"

● **Output data to an External device**

○< ENT SHFT +>: Input Instrument height

● (Data input mode): Input "7"

● **Measure Slope distance**

○< ENT SHFT +>: Input coordinates of point to be set out

● (Data input mode): Input "4"

● **Measure 3-Dimensional coordinates**

○< ENT SHFT +>: Set horizontal angle to the required value

● (Data input mode): Input "1"

● **Menu mode: Configuration/Coordinate data settings**

○< ENT SHFT +>: Input target height

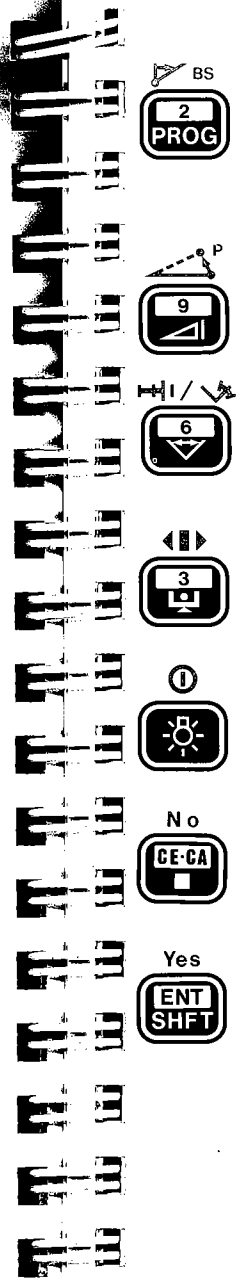
● (Data input mode): Input "8"

● **Measure Horizontal distance**

○< ENT SHFT +>: Input Instrument station coordinates

● (Data input mode): Input "5"

● **Measure remote elevation**



○< ENT SHFT +>: Set Azimuth angle from Instrument station and Backsight station coordinates

● (Data input mode): Input "2"

● **Program mode: Resection/Correction/ Set Instrument station coordinates and azimuth angle**

○< ENT SHFT +>: Offset measurement

● (Data input mode): Input "9"

● **Measure Height difference**

○< ENT SHFT +>: Input distance & horizontal angle setting out data

● (Data input mode): Input "6"

● **Missing line measurement**

○< ENT SHFT +>: Select horizontal angle right or left

● (Data input mode): Input "3"

● **Transfer to Theodolite mode / Display tilt angle (when instrument is in Theodolite mode and: "Tilt correction" parameter is on)**

○< ENT SHFT +>: Return signal check(stop: CE·CA)

● **Display and Reticle illumination ON/OFF**

● Input "No"

● (Data Input mode): Clear input data

● **Stop measurement and transfer to Basic mode/ Exit from mode**

● Input "Yes"

● (Data input mode): Input data into memory

● **Select/Release Shift mode**

4. MODE DIAGRAM

Switch on → H & V circle indexing

Angle display
- Tilt angle display
- Select H angle right/left
- Set H angle to 0

Basic mode

Horizontal angle setting
- Set H angle to a required value
- Set Azimuth angle

Data input
- Instr station coordinates
- BS station coordinates
- S-O Distance & H angle
- S-O coordinates

Preparation for Distance measurement
- Distance mode
- Prism constant
- ppm

Return signal checking

Distance measurement mode
- Slope distance
- Horizontal distance
- Height difference
- Coordinates
- Missing line

Menu mode
- Configuration
- Coord. data settings

Program mode
- Resection
- Correction
- Set Instrument station coordinates & Azimuth angle

Record mode
Output data to External device

Recall mode

Setting out measurement

5. DISPLAY SYMBOLS

<Sub display>

ppm/P.C./MODE

V1

ppm(Atmospheric correction value)
P.C.(Prism constant correction value)

⊥+	:	Tilt angle compensation on
SHFT	:	Shift
SO	:	Setting-out measurement mode
MENU	:	Menu mode
PROG	:	Program mode
REC	:	Record mode
RCL	:	Recall mode
Stn	:	Instrument station coordinates
BS	:	Backsight station coordinates
Pt	:	Coordinate setting-out data

<Main display>

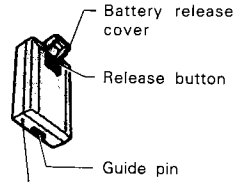
▲▼	:	Select options
ZA	:	Zenith angle (Z 0°)
VA	:	Vertical angle (H 0°) Vertical angle (H 0°±90°)
HAR	:	Horizontal angle right
HAL	:	Horizontal angle left
dHA	:	Horizontal angle from setting-out data
X	:	Tilt angle in sighting direction
Y	:	Tilt angle in horizontal axis direction
S	:	Slope distance
H	:	Horizontal distance
V	:	Height difference
Ht	:	REM value/Instrument height/Target height
D	:	Distance setting-out data/ Offset distance

PREPARATION FOR MEASUREMENT

6. MOUNTING THE BATTERY

- Charge the battery fully before measurement. ☞ P.173

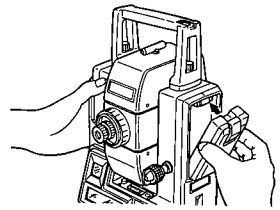
Note: Turn off the power supply switch ㉑ before replacing the battery.



BDC25

< 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.

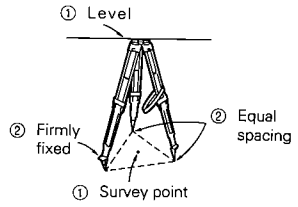
- If the power is to be turned on immediately after replacing the battery, please refer to P. 21.

7. SETTING UP THE INSTRUMENT

- Mount the battery in the instrument before performing this operation, because the instrument will tilt slightly if the battery is mounted after levelling.

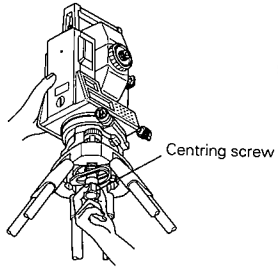
7.1 Centring

Set up the tripod



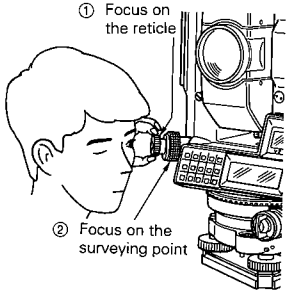
1) Make sure the legs are spaced at equal intervals and the head is approximately level.
2) Set the tripod so that the head is positioned over the surveying point.
3) Make sure the tripod shoes are firmly fixed in the ground.

Install the instrument



4) Place the instrument on the tripod head.
5) Supporting it with one hand, tighten the centring screw on the bottom of the unit to make sure it is secured to the tripod.

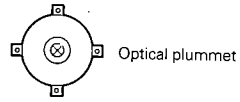
Focus on the surveying point



6) Looking through the optical plummet eyepiece, turn the optical plummet eyepiece ⓴ to focus on the reticle.
7) Turn the optical plummet focussing ring ⓳ to focus on the surveying point.

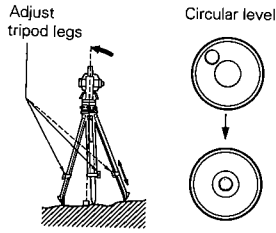
7.2 Levelling

Centre the surveying point in the reticle



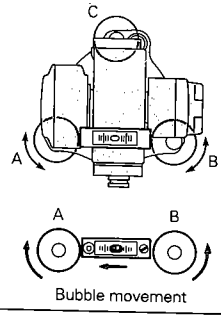
1) Adjust the levelling foot screws ⓬ to centre the surveying point in the optical plummet reticle.

Centre the bubble in the circular level



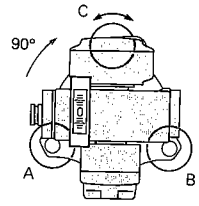
2) Observe the off-centre direction of the bubble in the circular level ❾, and shorten the nearest tripod leg, or extend the leg farthest from that direction to centre the bubble.
3) One more tripod leg must be adjusted to centre the bubble.

Centre the bubble in the plate level



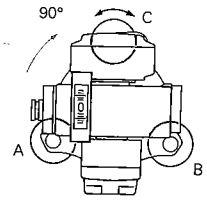
4) Loosen the horizontal clamp ㉒ to turn the upper part of the instrument until the plate level ㉖ is parallel to a line between levelling screws A and B.
5) Centre the air bubble, using levelling screws A and B.
Note : The bubble moves towards a clockwise rotated foot screw.

Turn 90° and centre the bubble



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

Turn another 90° and check bubble position

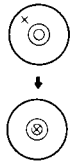


8) Turn the upper part of the instrument a further 90° and check to see if the bubble is in the centre of the plate level ㉖.
If the bubble is off-centre, perform the following:
① Adjust levelling screws A and B in equal and opposite directions, to remove half of the bubble displacement.
② Turn the upper part a further 90°, and use levelling screw C to remove half of the displacement in this direction.
Or try the adjustment described on P.145, under "22.1 Plate level".

Check to see if bubble is in same position in any direction

9) Turn the instrument and check to see if the air bubble is in the same position for any position of the upper part.
If it is not, repeat the levelling procedure.

Focus on the centre of the reticle again



10) Loosen the centring screw slightly.
11) Looking through the optical plummet eyepiece, slide the instrument over the tripod head until the surveying point is exactly centred in the reticle.
12) Retighten the centring screw securely.

Check plate level bubble again

13) Check again to make sure the bubble in the plate level is centred. (If not, repeat the procedures starting from step 4).)

8. POWER ON

- When the power is turned on, a self-check is run to make sure the instrument is operating normally.

Turn on the power

Name NET2B
No. 88132
Ver. 84-xx

Self check ok

or

Memory cleared

Battery level 3

0: less than 20%
1: less than 50%
2: less than 80%
3: less than 100%

Battery is low

1) Turn on the power switch ㉑ after completing sections 6 and 7.

2) The instrument name, instrument number, and software version are displayed for several seconds, an audio tone sounds, and the instrument performs self-diagnostic checks.
On successful completion of the checks, "Self check ok" is displayed for 2 secs.

Note: After power-off for more than 1 week, the previously stored data have been cleared from the short-term memory and "Memory cleared" is displayed.

3) The remaining battery power is then displayed for 3 seconds as a numeric value.
(BDC25, Coarse meas. mode, Single meas., Temperature 25°C.)

If the battery is at the "low" level, the message "Battery is low" will be displayed, and an audio tone sounds. Turn the power off and charge the battery.
If the battery power becomes low during surveying, the same message will be displayed.

ZA	0 SET
HAR	0 SET

4) This display indicates that the instrument is ready for vertical and horizontal circle indexing.

- If the parameter horizontal indexing is set to "Manual", a horizontal angle of 0° is displayed, when the power is turned on.

If this error message is displayed, the instrument tilt sensor is indicating that the instrument is off-level. Relevel the instrument once again, using the plate level bubble.

Out of range
X > ⊥ < Y

- When "Face 1" is displayed for the vertical angle, please refer to P.179 (Appendix 1: Manually indexing the vertical circle).

Instrument parameter No.8 ☞ P.163
Parameter No.8 can change the indexing method. Options are indexing by transitting the telescope or indexing by face left, face right sightings.

[Note: Changing the brightness of the display]

- If the display appears too dim or too bright, the keyboard can be used to adjust the brightness level (6 levels).
  For a brighter display → Press [ENT SHFT] and [+/- RCL] at the same time .
  For a dimmer display → Press [ENT SHFT] and [. S-O] at the same time .

[Note: Power-saving cut-off]

- NET2B switches off automatically 30 minutes after the last key operation.

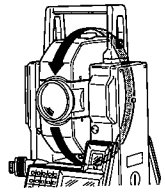
Instrument parameter No.12 ☞ P.163
- Parameter No.12 can be changed so that the NET2B will not switch off automatically after 30 minutes.

9.PREPARATION FOR MEASUREMENT

9.1 Indexing the vertical and horizontal circles

(H and V circle indexing parameters - "Auto")

Vertical circle indexing

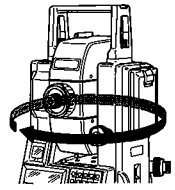


ZA	91° 04' 30"
HAR	0 SET

1) Loosen the vertical clamp ㉘ and transit the telescope completely. (Indexing occurs when the objective lens crosses the horizontal plane in face left.)
2) An audio tone sounds, and the vertical angle (ZA) is displayed.

Vertical indexing has been completed.

Horizontal circle indexing



ZA	91° 04' 30"
HAR	350° 39' 00"

3) Loosen the horizontal clamp ㉒ and rotate the upper part of the instrument completely. (Indexing occurs when the plate level ㉖ passes the 0 mark of the horizontal positioning ring.)
4) The audio tone sounds, and the horizontal angle (HAR) is displayed.
Horizontal indexing has been completed.

Note : Each time the instrument is switched on, the vertical and horizontal indexes must be redetermined.

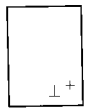
[Note: Horizontal angle back-up]

- The parameter No.9 default setting allows for the memorization of the previous horizontal 0 position at power-off for about 1 week. ("Memory cleared" is displayed after more than 1 week of power off.) H and V circles are each provided with a 0 index. When next switching on the NET2B and indexing the horizontal circle again, the horizontal angle is recovered at the previously-memorized 0 position. This feature is useful when the battery voltage becomes low during measurement or after automatic power-off has occurred.

Instrument parameter No. 9 ☞ P.163

- Parameter No.9 can be used to change the horizontal circle indexing method. Options are indexing by rotating the upper part or indexing and zero setting at power-on.

[Note: Automatic tilt angle compensation]



- When the ⊥+ symbol is shown on the sub-display, the vertical and horizontal angles are automatically compensated for small tilt errors using the 2-axis tilt sensor.

- Read the compensated angle after the displayed angle value becomes steady.
- The formula used for calculation of the compensation value applied to the horizontal angle uses the tilt and vertical angles as shown below:

$$\text{Compensated horizontal angle} = \text{Measured horizontal angle} + \frac{\text{Tilt in angle Y}}{\tan(\text{Vertical angle})}$$

Therefore, when the NET2B is not perfectly levelled, changing the vertical angle by rotating the telescope will cause the displayed (compensated) horizontal angle value to change. (The displayed horizontal angle value will not change during telescope rotation when the instrument is correctly levelled.)

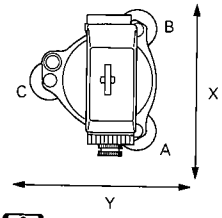
- When the measured vertical angles are within ±1° of the zenith or nadir, tilt compensation is not applied to the horizontal angle. In this situation, the displayed horizontal angle value flashes to show that the tilt compensation is not being applied.

Instrument parameter No.3 ☞ P.163

- Parameter No.3 can be used to switch off and on the automatic tilt angle compensation; for example, the automatic compensation should be switched off if the display is unsteady due to vibration or strong wind.

[Note: Levelling using the tilt angle display]

- For levelling, the tilt angle X and Y values can be displayed for use as a 2-axis (X,Y) tilt sensor. The tilt angle values are used to automatically correct the vertical and horizontal angles for error due to the non-verticality of the vertical axis. The measurement range is ±3'. The "Tilt correction (Dual axis)" parameter must be set to "Yes".



[3] Tilt angle display

Tilt angle	
X	0° 01' 20"
Y	−0° 00' 40"

X: Levelling foot screws AB
Y: Levelling foot screw C
(in above illustration)

Tilt angle minimum display unit :1"

Out of range			
X	> ⊥	<	Y

[3] To Theodolite mode
[CE·CA] To Basic mode

1) In Theodolite mode, turn the upper part of the instrument until the telescope is parallel to a line between levelling foot screws A and B and tighten the horizontal fine motion screw ㉘.

2) Press [3].

3) The X and Y tilt angles are displayed.

   X : Tilt angle in sighting axis direction
   Y : Tilt angle in horizontal axis direction

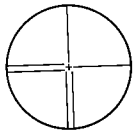
4) Set both tilt angles to 0° by turning the levelling screws A and B for the X direction and C for the Y direction.

- "Out of range" indicates that the tilt angle exceeds the ±3' measurement range.

5) To exit from the tilt angle display, press [3] to return to Theodolite mode or press [CE·CA] to go to Basic mode.

9.2 Focussing and target sighting

Focus on the reticle

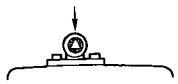


1) Look through the telescope eyepiece ㉛ at a bright and featureless background.

2) Turn the eyepiece clockwise, then counterclockwise little by little until just before the reticle image goes out of focus.
Using this procedure, frequent reticle refocussing is not necessary, since your eye is focussed at infinity.

Sight the target

Line the target with the white arrow in the peep sight



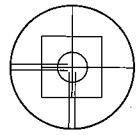
3) Loosen the vertical ㉘ and horizontal ㉒ clamps, and use the peep sight ㉝ to bring the target into the field of view.

4) Tighten both clamps.

5) Turn the focussing ring ㉜ to focus on the target.

6) Turn the vertical ㉙ and horizontal ㉓ fine motion screws to align the target object with the reticle.

The last adjustment of each fine motion screw should be in the clockwise direction.



<Reflective target>

- The relation between the target and the reticle is shown in the illustration at the left.

7) Align the centre of the reflective target to the target first, then sight the reticle of the telescope to the centre of the reflective target.

8) Readjust the focus with the focusing ring ㉜ until there is no parallax between the target image and the reticle.

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

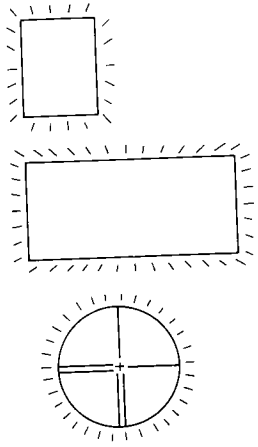
[Note: Parallax]

- 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 refocussing.

9.3 Display and reticle illumination

Illuminate the display and reticle

- Press the ☼ to turn the display and reticle illumination on and off.



Instrument parameter No.13 ☞ P.163

- Parameter No.13 can be used to switch ON/OFF the 30-second illumination automatic cut-off facility.

Instrument parameter No.15 ☞ P.163

- Parameter No.15 can be used to change the brightness of the reticle illumination.

9.4 Setting the Instrument options

- Confirm that these parameters, indispensable for measurement, are set according to your required measurement.
- Data storage period : Until next changing (Power-off possible)
- To confirm or change the parameter options, please refer to P.163 "23. CHANGING INSTRUMENT PARAMETERS".

No.	Parameter		Options
3	Tilt correction		Correction YES* / Correction NO
4	Coordinate format		N, E, Z*/E, N, Z
5	Vertical angle format		Zenith angle (zenith 0°) * / Vertical angle (horizontal 0°) / Vertical angle (horizontal 0° ± 90°)
6	Angle resolution		1" (0.2 mgon) * / 5" (1 mgon)
10	C + R correction		No correction * / Yes K = 0.142 Yes K = 0.20 ☞ P. 187
11	1	Distance unit	metres*/mm/feet/inch
	2	Angle unit	Degree* / Gon
	3	Temperature/Pressure units	°C & hPa* / °C & mmHg / °F & hPa/ °F & mmHg/ °F & inchHg

* Factory setting

- For other parameters, please refer to P.163 "23. CHANGING INSTRUMENT PARAMETERS".

MEASUREMENT

10. ANGLE MEASUREMENT

Check! before measurement:

1. NET2B is set up correctly over the surveying point. ☞ P.18
2. The V and H circles have been indexed. ☞ P.23
3. The instrument parameters have been set. ☞ P.29

10.1 Measure the horizontal angle between two points

< Horizontal angle 0 >

- Set the horizontal angle of the target direction.

Horizontal angle 0 set

Theodolite mode

↓

ENT SHFT 0 SET 0 REC : Set H angle to zero

↓

ZA	
HAR	0 00' 00"

e.g. • Measure the angle between two points.

Sight the first target

1) Using the horizontal clamp ㉒ and fine motion screw ㉓.
Sight the first point.

Set the horizontal angle to 0°

ENT SHFT 0 SET 0 REC

2

ZA	92° 36' 40"
HAR	0° 00' 00"

2) In Theodolite mode, press ENT SHFT and 0 SET 0 REC .

The horizontal angle display has been set to "0°".

Sight the second target

ZA	90° 30' 20"
HAR	140° 44' 20"

3) Using the horizontal clamp ㉒ and fine motion screw ㉓.
Sight the second point.

The displayed horizontal angle is the angle between the two points.

10.2 Set Horizontal circle to a required value

• Set the horizontal circle of the target direction to a required value.

Set Horizontal circle to a required value

Theodolite mode or Basic mode

↓

ENT SHFT 1 MENU : For H angle input mode

↓

H	angle
HAR	

↓

Input H angle value ENT SHFT

↓

ZA	
HAR	90° 30' 20"

- Input range : 0° to 359°59'59"
- Least input : 1"

◆ Correct the value : CE-CA (set value to 0)

◆ Exit from the input : CE-CA CE-CA (To Theodolite mode)

e.g. Setting 90° 30' 20"
→ Input value of 90.302

2

e.g. • Set the horizontal angle of reference target R to 60° 00'20".

Sight target R

1) Using the horizontal clamp ㉒ and fine motion screw ㉓. Sight target R.

From Theodolite mode or Basic mode to H Angle Input mode

2

[ENT SHFT] [1 MENU]

```
     H  angle
   HAR
```

2) In Theodolite mode or Basic mode, press [ENT SHFT] [1 MENU].

The display appears as at left, and "HAR" flashes to prompt for the input of the horizontal angle value.

Input the horizontal angle

[6] [0 REC] [. S-O] [0 REC] [0 REC] [2 PROG]

```
     H  angle
   HAR  60.002
```

3) Input "60.002".

[ENT SHFT]

```
ZA    90° 30' 00"
HAR   60° 00' 20"
```

4) Press [ENT SHFT] to finish inputting. The instrument returns to Theodolite mode. Here, the horizontal angle for target R has been set to 60° 00'20".

10.3 Horizontal angle display

< Horizontal angle right/left>

Horizontal angle right/left

Theodolite mode (angle right)

↓

[ENT SHFT] [3] : H angle left

↓

```
ZA
HAL   260° 20' 40"
```

↓

[ENT SHFT] [3] : H angle right

↓

```
ZA
HAR   90° 30' 20"
```

2

11. DISTANCE MEASUREMENT

- The following preparations are required for Distance measurement.

11.1 Measurement mode selection

- Select the measurement mode from the following according to your required measurement.

Measurement mode	Measurement time	Units
Fine Repeat	First 6.5 secs & every 4.7 secs	0.1 mm
Coarse Repeat	First 5.0 secs & every 3.3 secs	1 mm

Measurement mode selection

Theodolite mode or Basic mode

↓

ENT SHFT EDM +/- RCL : For preparation mode

↓

1. Meas mode
2. Prism const.
3. ppm

↓

1 MENU : For selection mode of Distance measurement

↓

1. Fine meas
2. Coarse meas

↓

1 MENU : Select Fine meas

2 PROG : Select Coarse meas

↓

Preparation mode

- Data storage period : Until next changing (Power-off possible)

◆ Exit from the selection : CE·CA CE·CA (to Basic mode)

e.g. • Selecting the Fine measurement option.

From Theodolite mode or Basic mode to Preparation mode

ENT SHFT EDM +/- RCL

1. Meas mode
2. Prism const.
3. ppm

1) In Theodolite mode or Basic mode, press ENT SHFT EDM +/- RCL .

The display appears as at left, showing Preparation mode.

2 **To Selection mode of Distance measurement mode**

1 MENU

1. Fine meas
2. Coarse meas

2) Press 1 MENU .
The display appears as at left, and the previously selected measurement type flashes.

Select Fine measurement

1 MENU

1. Meas mode
2. Prism const.
3. ppm

3) Press 1 MENU .
Fine measurement modes are set, and the instrument returns to Preparation mode.

- To return to the Basic mode after this , press CE·CA .

11.2 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. ☞ P.185, Appendix 3

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.185, Appendix 3

- The NET2B is designed so that the correction factor is 0 ppm for a temperature of +15°C (+59°F) and an atmospheric pressure of 1013 hPa (29.9 inch Hg). 2

- By inputting the temperature and pressure values, the correction value is calculated and set into the memory. The formula used is as follows:

$$ppm = 278.96 - \frac{0.2904 \times P\ (hPa)}{1+0.003661 \times T\ (°C)}$$

- To input ppm value, read the correction factor from the table on P.198.

- For precise distance measurement, relative humidity should be taken into account together with atmospheric pressure and ambient temperature. See P.185.

ppm setting mode

- T. input range : –30 to 60°C
  T. least input : 1°C
- P. input range : 500 to1400hPa
  P. least input : 1 hPa
- ppm input range : –499 to 499ppm
  ppm least input : 1ppm
- Data storage period :
  About a week
  (Power-off possible)

- ◆ Retain the displayed value : [ENT SHFT] [ENT SHFT]
- ◆ Correct the value : [CE·CA] (set value to 0)
- ◆ Exit from the input : [CE·CA] [CE·CA]
  (to Basic mode)

Theodolite mode or Basic mode

↓

[ENT SHFT] [EDM +/– RCL] : For Preparation mode

↓

[3] : For ppm setting mode

↓

1. 0 set
2. Temp & Press
3. ppm value

- [1 MENU] : Set 0ppm → Basic mode
- [2 PROG] : Set Temperature & Pressure

T	15°C
P. 1013	hPa

  → Input Temperature [ENT SHFT] → Input Pressure [ENT SHFT] → Basic mode
- [3] : Set ppm value

ppm value	
ppm	0

  → Input ppm value [ENT SHFT] → Basic mode

e.g. • Temperature of 20°C and
Atmospheric pressure of 1010 hPa

From Theodolite mode or Basic mode to Preparation mode

[ENT SHFT] [EDM +/– RCL]

1. Meas mode
2. Prism const.
3. ppm

1) In Theodolite mode or Basic mode, press [ENT SHFT] [EDM +/– RCL] .
The display appears as at left, showing Preparation mode.

To ppm setting mode

[3]

ppm
0.0

← Sub-display

1. 0 set
2. Temp & Press
3. ppm value

2) Press [3] .
The display appears as at left, showing the ppm setting mode.

Select the input of Temperature and (atmospheric) Pressure

[2 PROG]

T	15	°C
P.	1013	hPa

3) Press [2 PROG] .
The previously stored values are displayed.
"T" flashes to prompt for the input of the temperature.

Input Temperature and Pressure

[2 PROG] [0 REC] [ENT SHFT]

```
T.   20     °C
P.   1013   hPa
```

4) Input "20" and press [ENT SHFT].

The temperature "20°C" is input. "P" flashes to prompt for the input of the pressure.

[1 MENU] [0 REC] [1 MENU] [0 REC] [ENT SHFT]

```
T.   20     °C
P.   1010   hPa
```

5) Input "1010" and press [ENT SHFT].
The pressure "1010 hPa" is input, and the instrument returns to Basic mode.

```
6
0.0
```
← Atmospheric correction value

The atmospheric value coefficient is calculated, and is displayed on the first line of the sub-display.

```
Press function
keys to select
operation
```


11.3 Prism constant input

- Each reflective target type has a different prism constant value. Here, we will input the constant correction value for the reflective target being used.
- The prism constant correction values for reflective targets made by Sokkia are referred to p.175.

Prism constant input

Theodolite mode or Basic mode

↓ [ENT SHFT] [EDM +/- RCL] : For Preparation mode

↓ [2 PROG] : Prism constant input mode

↓

```
Prism constant
p.c      0.0   mm
```

↓ Input corrected value [ENT SHFT]

↓ Preparation mode

- Input range : –99.9 to 99.9mm
- Least input :0.1mm
- Data storage period : Until next changing (Power-off possible)

◆ Retain the displayed value : [ENT SHFT] (to Basic mode)
◆ Correct the value : [CE·CA] (set value to 0)
◆ Exit from the input : [CE·CA] [CE·CA] (to Basic mode)

e.g. • Set a prism constant of 27 mm (correction value: –27)

From Theodolite mode or Basic mode to Preparation mode

ENT SHFT E D M +/– RCL

1. Meas mode
2. Prism const.
3. ppm

1) In Theodolite mode or Basic mode press ENT SHFT E D M +/– RCL .
The display appears as at left, showing Preparation mode.

2

Prism Constant Setting mode

2 PROG

2) Press 2 PROG .

6
p.c ← Sub-display

Prism constant
p.c 0.0mm

The previously stored correction value is displayed, and "p.c" flashes to prompt for the input of the correction value.

Input the prism constant correction value

+/– RCL 2 PROG 7

3) Input "–27".

Prism constant
p.c – 27

A prism constant correction value of –27 is input.

ENT SHFT

4) Press ENT SHFT .

6
– 27 ← Prism constant correction value

1. Meas mode
2. Prism const.
3. ppm

The correction value is input, and the instrument returns to Preparation mode.
The entered value is displayed on the second line of the sub-display.

CE·CA : To Basic mode

2

• To return to Basic mode after this, press CE·CA .