

## 20. DATA OUTPUT TO AN EXTERNAL DEVICE

• Key operations allow the SET B to output measured data via the data output connector to an external device using an interface cable. (For more information, see the Series B 2-way communication manual.)

- The contents of data which can be output are as follows.  
When measurement data is output, the target number, target code, target height, distance unit, angle unit, vertical indexing, horizontal indexing, and atmospheric correction value can be output, along with the following data.

S, V, H	→ Slope distance, vertical angle, horizontal angle
S, V, H (offset)	→ Prism direction and distance from target (only if input through offset measurement) Slope distance, vertical angle, horizontal angle
V, H, Tilt	→ Vertical angle, horizontal angle, X direction tilt angle, Y direction tilt angle
N, E, Z	→ N coordinate (E coordinate), E coordinate (N coordinate), Z coordinate
N, E, Z+S, V, H	→ N coordinate (E coordinate), E coordinate (N coordinate), Z coordinate Slope distance, vertical angle, horizontal angle
Note	→ Note
Station data	→ Date, instrument station number, code, instrument height, temperature, atmospheric pressure, curvature and refraction correction ON/OFF, prism constant correction, automatic tilt angle correction ON/OFF, instrument station N coordinate (E coordinate), E coordinate (N coordinate), Z coordinate
Instr ID	→ Instrument name, instrument number, software version number

## 20.1 Changing the Instrument options

- Confirm that following parameters are set according to your required measurement and the data output to an external device condition.
- To confirm or change the parameter options, see P.163 "23. CHANGING INSTRUMENT PARAMETERS".

No.	Parameter	Options
2	Recording	*1. Input 2. Non-input & skip
3	Tilt correction	*1. Input 2. Non-input & skip
5	V angle format	*1. Applied 2. Not applied
6	Angle resolution	*1. Zenith 2. Horizontal 0°-360° (0-400gon) 3. Horizontal ±90° (±100gon)
7	RS-232C format	*1.1" (0.2mgon) 2. 5" (1mgon) *1.5" (1mgon) 2. 10" (2mgon) *1.1200 baud 2. 2400 baud *1. No 2. Yes *1. No 2. Yes (even)
8	V indexing	*1. Auto 2. Manual
9	H indexing	*1. Auto 2. Manual
10	C+R correction	*1. Auto 2. Manual
11	Units	*1. No 2. Yes K=0.142 3. Yes K=0.20
		*1. metres 2. feet *1. Degrees 2. Gon *1. °C & hPa 2. °C & mmHg 3. Next 1. °F & mmHg 2. °F & hPa 3. °F & inchHg

\* Factory settings

## 20.2 Instrument data output

- With the SET B, the following items can be output to an external device as instrument data:
  - Instrument name
  - Instrument number
  - Software version number

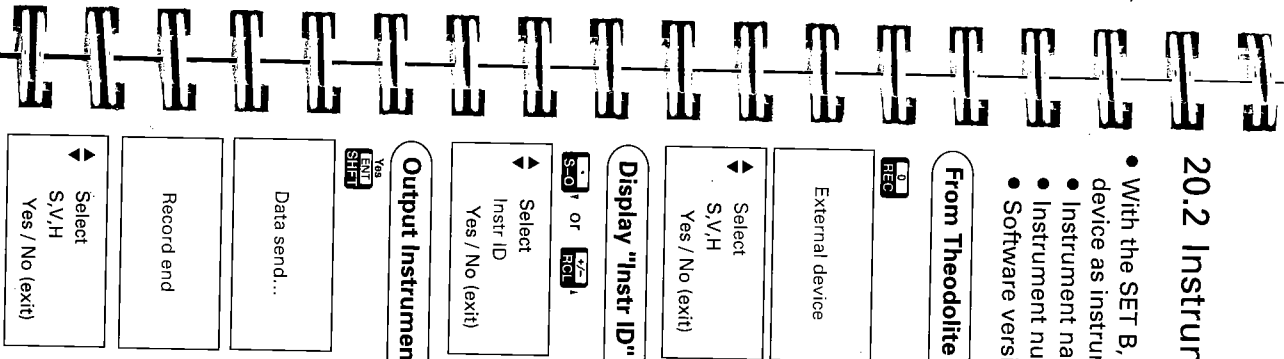
### From Theodolite or Basic mode to Record mode

- 1) In Theodolite mode or Basic mode, press **REC**.  
The display shows Record mode. And the display prompts for selection of the data format.

- 2) Press **S-O** or **FCT** to display "Instr ID".

- 3) Press **Yes** **ENT** **SHFT**.

Output of the instrument data is started.  
When output of the instrument data has been finished, the message "Record end" is displayed, and the display returns to the Record mode.



External device

Select S,V,H  
Yes / No (exit)

Display "Instr ID"

Select Instr ID  
Yes / No (exit)

Output Instrument data

Data send...

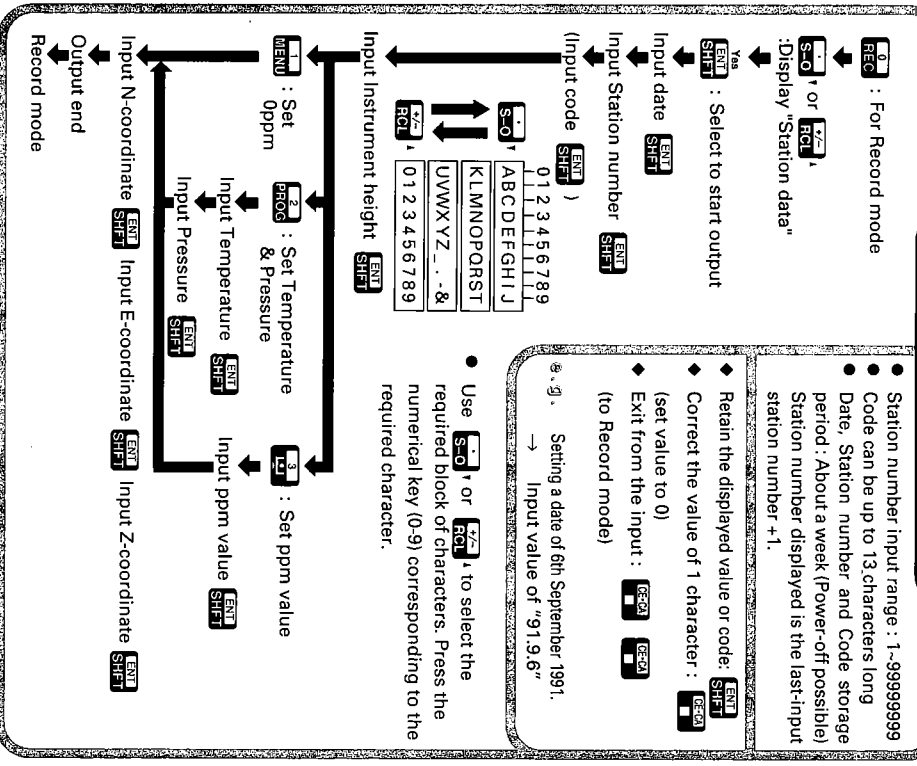
Record end

Select S,V,H  
Yes / No (exit)

## 20.3 Instrument station data output

- The SET B can output the following items as instrument station data:
  - Date, instrument station number, instrument station code, instrument height, temperature, atmospheric pressure, instrument station coordinates, curvature and refraction correction, prism constant, and automatic tilt angle correction.

### Procedure: Instrument station data output

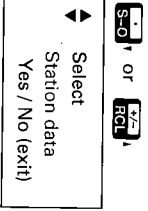


- Station number input range : 1~99999999
  - Code can be up to 13 characters long
  - Date, Station number and Code storage period : About a week (Power-off possible)
  - Station number displayed is the last-input station number +1.
  - ◆ Retain the displayed value or code: [ENT] [ENT]
  - ◆ Correct the value of 1 character : [ENT] [ENT]
  - ◆ (set value to 0) [ENT] [ENT]
  - ◆ Exit from the input : [ENT] [ENT]
  - (to Record mode)
- ⑧, ⑨. → Setting a date of 6th September, 1991.  
 Input value of "91.9.6"

- Use [S-O] or [RCL] to select the required block of characters. Press the numerical key (0-9) corresponding to the required character.

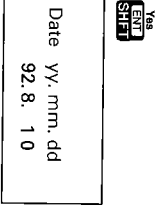
- To output the following instrument station data:
  - Date: October 4, 1992
  - Instrument station number: No. 100
  - Code: "HOME"
  - Instrument height: 1.45m
  - Temperature: 25°C
  - Atmospheric pressure: 980 hPa
  - Instrument station coordinates: N = 30, E = 30, Z = 10

### In Record mode, display "Station data"



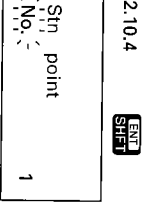
- 1) In Record mode, press [S-O] or [RCL] to display "Station data".

### Select the "Station data"



- 2) Press [YES] . The previously input date is displayed.

### Input the date



- 3) Input "92.10.4" and press [ENT] . The date "92.10.4" is input, and "No." flashes to prompt for the input of the station number.

**Input the station number**

100 **ENT** **SHIFT**

AB	CD	EFGHIJ
press	0123456789	
Cd	ABC	

4) Input "100" and press **ENT**.

"100" is input for the station number. "Cd" flashes to prompt for the input of the instrument station code.

**Note:** If the parameter of the code setting is set to Non-input, this procedure is omitted. Instead, go directly to step 6).

**Input the code**

**DEL** : Single-character delete

**7** : Input "H"

**S-0** : Display K to T

**4** : Input "O"

**2** : Input "M"

**PROG** : Display A to J

**4** : Input "E"

**ENT** **SHIFT** : Input finished

Inst	0.000m
HT	

5) Input the code.

Press **DEL** to delete one character to the left.

Press **7** to input "H".

Press **S-0** to display "K ~ T".

Press **4** to input "O".

Press **2** to input "M".

Press **PROG** to display "A ~ J".

Press **4** to input "E".

Press **ENT** **SHIFT**.

The code "HOME" is input, and "Ht" flashes to prompt for the input of the instrument height.

**Input the instrument height**

1.45 **ENT** **SHIFT**

- 0 set
- Temp & Press
- ppm value

6) Input "1.45" and press **ENT**.

An instrument height value of "1.45" is input, and the display turns to the ppm setting mode.

**Select the temperature and pressure input**

**2** **PROG** **ENT** **SHIFT**

T	15	°C
P	1013	hPa

7) Press **2**.

The previously stored values are displayed. "T" flashes to prompt for the input of the temperature.

**Input the temperature and pressure**

T	25	°C
P	1013	hPa

8) Input "25" and press **ENT**.

A temperature 25°C is input. "P" flashes to prompt for the input of the pressure.

**9** **ENT** **SHIFT** **REC** **ENT** **SHIFT**

N	30
E	30
Z	10

9) Input "980" and press **ENT**.

A pressure "980 hPa" is input. "N" flashes to prompt for the input of instrument station coordinates.

**Input the instrument station coordinates**

N = 30 **ENT** **SHIFT**

E = 30 **ENT** **SHIFT**

Z = 10 **ENT** **SHIFT**

10) Input the instrument station coordinates.

N = 30 **ENT** **SHIFT**

E = 30 **ENT** **SHIFT**

Z = 10 **ENT** **SHIFT**

Output of the station data is started. When the data has been output, the message "Record end" is displayed and the display returns to Record mode.

Data send...

Record end

Select S, V, H Yes / No (exit)

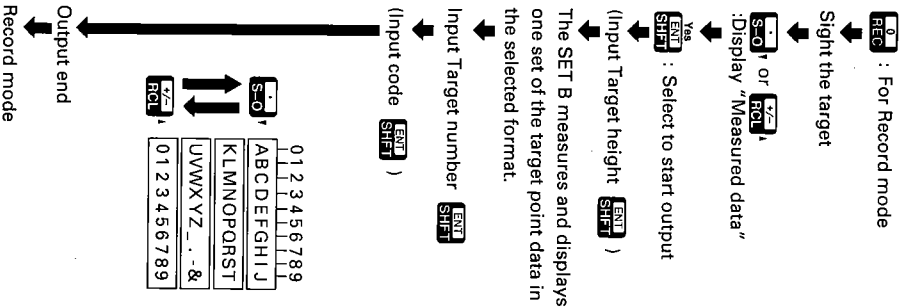
## 20.4 Measured data output

- The SET B can output the following items as measured data: Target number, target code, target height, distance unit, angle unit, vertical indexing, horizontal indexing, atmospheric correction measured data.
- The distance is measured in accordance with the selected distance measurement mode, but the measurement is done only once (single measurement).

Check! before recording the data:

- |                   |                                 |       |
|-------------------|---------------------------------|-------|
| S, V, H           | → Check No.1, 2, 3, 6 below.    | P.29  |
| S, V, H (offset)  | → Check No. 1, 2, 3, 6 below.   | P.41  |
| V, H, Tilt        | → Check No.1 below.             | P.128 |
| N, E, Z           | → Check No.1, 2, 4, 5, 6 below. | P.53  |
| N, E, Z + S, V, H | → Check No.1, 2, 4, 5, 6 below. | 44,56 |
1. The instrument parameters have been set. P.29
  2. The correct prism constant has been set. P.41
  3. The instrument station data has been output or else atmospheric correction has been set. P.128
  4. The instrument station data has been output or else the instrument height, atmospheric correction and instrument station coordinates have been set. P.53  
44,56
  5. The azimuth angle has been set. P.61
  6. The centre of the reflecting prism is being sighted and the return signal is adequate for measurement. P.48

### Procedure: Measured data output



- Target number input range : 1-99999999
- Code can be up to 13 characters long
- Target number, Code and Target height storage period : About a week (Power-off possible)
- Target number displayed is the last-Input station number +1.
- Retain the displayed value or code: (set value to 0)
- Correct the value of 1 character: (Exit from the input: (to Record mode))

- In Offset measurement, the SET B measures and displays the offset point data.  
 Select Distance inputting or Target sighting.  
 Select the direction of offset point from the Target and input the distance between the offset point and Target, or sight the target.
- Use or to select the required block of characters. Press the numerical key (0-9) corresponding to the required character.

To output the following offset measurement data

Target number : No. 2001  
 Code : "TREE1".  
 Target height : 1.23 m  
 Horizontal distance from target point to offset point : 1.8 m  
 Direction of prism from target : Front

**In Record mode, display "S, V, H (offset)"**

or   
 Select  
 S, V, H (offset)  
 Yes / No (exit)

1) In Record mode, press or to display "S, V, H (offset)".

**Select "S, V, H (offset)"**

or   
 Target  
 Ht.

2) Press .

The previously stored values are displayed. "Ht" flashes to prompt for the input of the target height.

**Note :** If the target height setting parameter is set to "Non-Input", this procedure is omitted. Instead, go directly to step 4).

**Sight reflection prism for offset point and input target height**

1.23  
  
 S dist.

S  
 ZA  
 HAR

Offset  
 1. distance  
 2. angle

3) Sight the reflection prism for the offset point.

Input "1.23" and press . A target height value of 1.23 m is input, and the Distance mode is accessed. Distance measurement is started. The display appears as at left and flashes. After about 4.7 seconds (Fine measurement mode), the distance value, the vertical angle and horizontal angle are displayed.

The display prompts you to select one of the following options:

1. Input of the horizontal distance from the target point to the offset point.
2. Sight the direction of the target point.

**Select "distance"**

Direction  
 prism : →  
 Yes / No(exit)

4) Press .

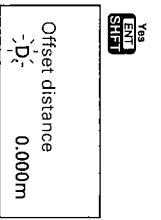
The display appears as at left and prompts for the selection of the direction from the target point to the reflecting prism.

**Select offset point direction**

or   
 Display "↓"  
 Direction  
 prism : ↓  
 Yes / No(exit)

5) Press or to display "↓".

**Note:**  
 → Prism is right of target  
 ← Prism is left of target  
 ↑ Prism is behind target  
 ↓ Prism is in front of target



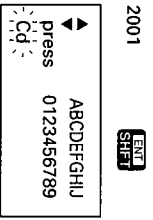
When "↓" appears, press **ENT**. "D" flashes to prompt for the input of the horizontal distance between the target point and offset point.

**Input the horizontal distance from the target point to the offset point**



6) Input horizontal distance of "1.8" and press **ENT**.

**Input the target point number**

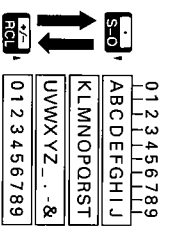


7) Input a target number of "2001" and press **ENT**.

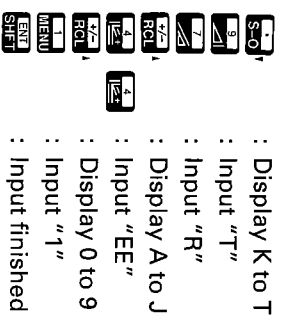
A target number value of "2001" is input. "Cd" flashes to prompt for the input of the target point code.

**Note :** If the parameter of the code setting is set to "Non-input", this procedure is omitted.

**Input the target point code**



8) If the displayed code is the required one, press **ENT** and go to step 9). Press **ENT** to delete one character to the left.



Press **S-O** to display "K to T". Press **9** to input "T". Press **7** to input "R". Press **RCL** to display "A to J". Press **RCL** to input "EE". Press **RCL** to display "0 to 9". Press **ENT** to input "1". And press **ENT**.

When the code has been input, the output is started.

9) When the target number is displayed, the output is finished.

The display then returns to Record mode.

**Note :** If the display returns to Record mode following a display like that at the left, there is an error in the output. Please check to see if there are any abnormalities in cables or external device, or if there is a problem with the program.

If the display returns to Record mode following a display like that at the left, there is an error in the measurement. Try leveling the instrument again, or sight the reflecting prism once again and start over from step 1).

