



www.insize.com



**TSA-B33
TOTAL STATION
OPERATION MANUAL**

PLEASE SCAN QR CODE TO
WATCH THE OPERATION
VIDEO OF PRODUCTS.



Product Overview

- With rear intersection, setting out, overhang measurement, eccentricity measurement and other functions.
- Widely used in surveying and mapping engineering, engineering and many other precise measurement fields
- Safe Class 3R laser rangefinder with prism-free range up to 1500m
- Absolute coded goniometric technology, horizontal and vertical discs are easy to measure with a counterpoise probe
- Biaxial liquid photoelectric electronic compensator automatically corrects instrument leveling errors
- Built-in temperature and air pressure sensor automatically corrects distance measurement errors
- Can revise prism constant

Safety Instructions

1. Please read this quick reference guide carefully before using the instrument.
2. Avoid exposure of the instrument to the sun, do not direct the instrument telescope to the sun observation, to avoid damage to the human eye and the instrument.
3. When using the instrument, make sure that the instrument is firmly connected to the tripod.
4. When the instrument is transported, it should be packed in an instrument case and the vibration of the instrument should be reduced as much as possible.
5. After using the instrument in humid or rainy environment, the instrument should be dried up and placed in a ventilated environment to dry thoroughly before packing.
6. When wiping the surface of the instrument, you can not use alcohol, ether and other irritating chemicals, the surface of the optical parts to be wiped, to use the instrument is equipped with a mirror wipe;
7. If the instrument is not used for a long period of time, the battery box should be removed from the instrument and the capacity in the battery box should be emptied.

8. If the instrument is not used for a long time, the instrument should be removed from the instrument box, covered with a plastic bag and placed in a ventilated dry place.

Tutorial Guide

Background light, contrast, laser pointing, laser pointing and shortcut keys

1. Press ★ key, you can enter the star key mode (as below), and press twice to turn on the background light directly.

(1) By pressing [▲] or [▼] key, you can adjust the LCD contrast.

(2) Mode: Select different cooperative targets

(3) Tilt: Open the dual-axis tilt correction

(4) S/A: Enter the weather correction setting

(5) Pointing: open the laser under the pointing

2. Shortcut key

K1/K2: Long press can enter the user-defined shortcut key setting, optional functions include overhang measurement, edge measurement, area measurement, Z coordinate measurement, point to straight line, road measurement and back meeting, after confirming and then press K1/K2 can directly enter the selected function.

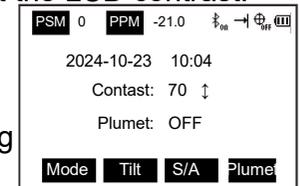
3. Quick key

[T]: Direct switching of measurement modes.

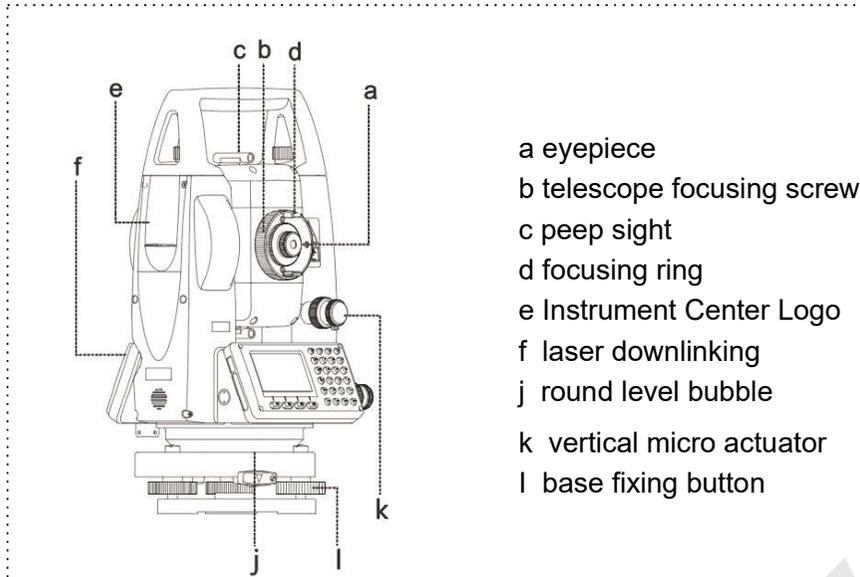
[S.O]: Direct access to the Coordinate Sampling Mode.

.: The laser pointing function can be switched on or off.

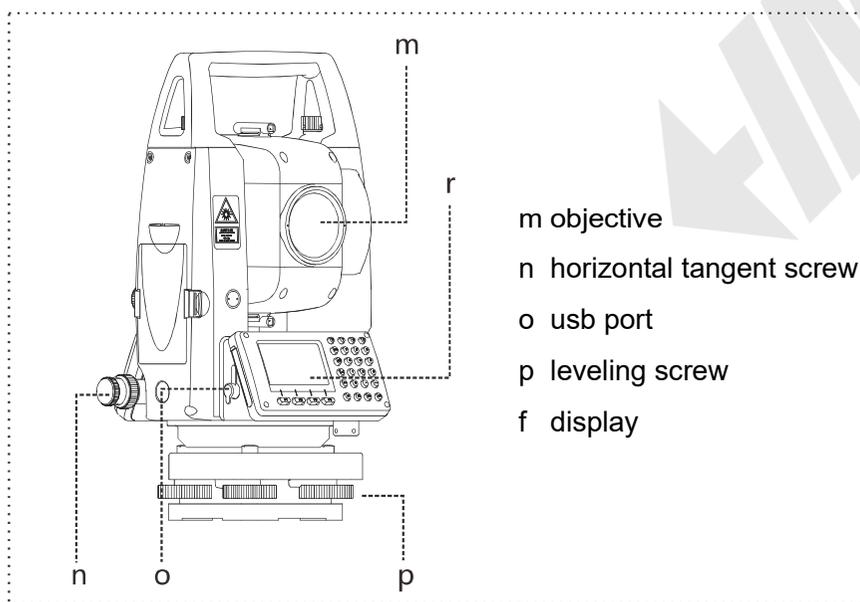
-.: The electronic bubble function can be turned on.



Instrument Components

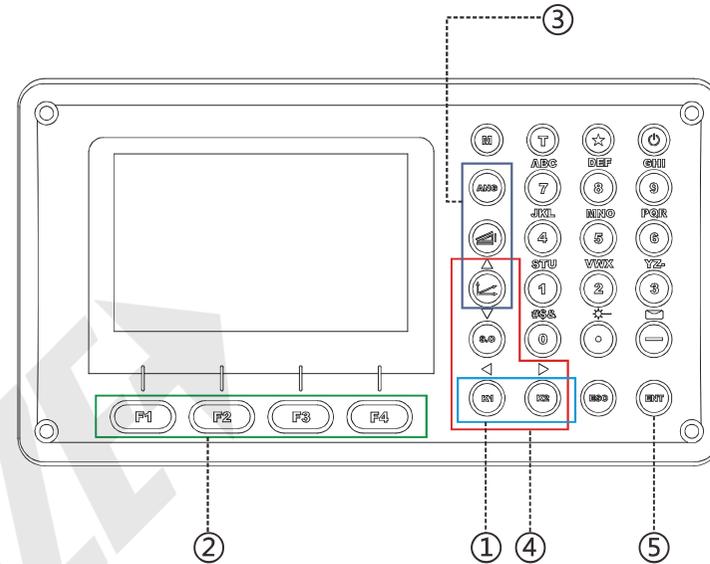


- a eyepiece
- b telescope focusing screw
- c peep sight
- d focusing ring
- e Instrument Center Logo
- f laser downlinking
- j round level bubble
- k vertical micro actuator
- l base fixing button



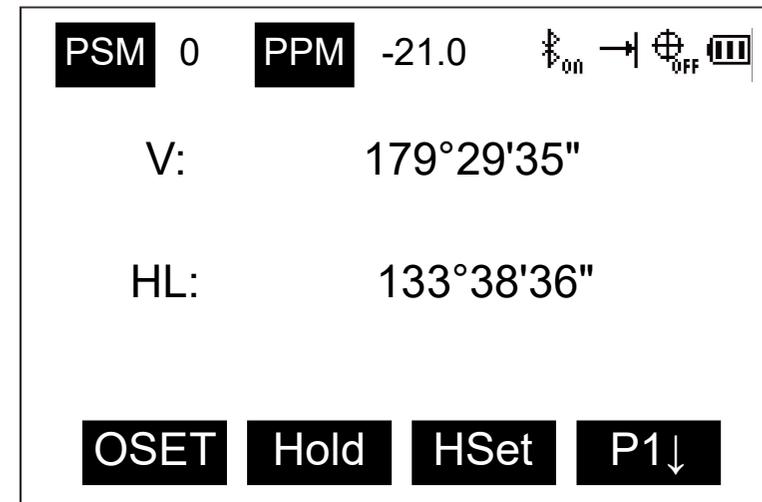
- m objective
- n horizontal tangent screw
- o usb port
- p leveling screw
- f display

knending board



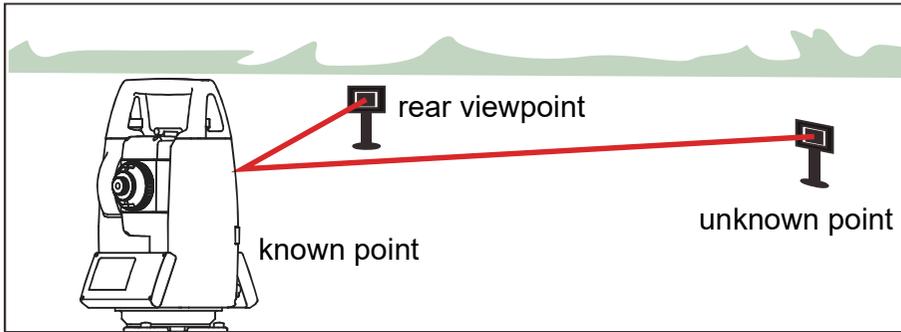
- ① shortcut key
- ② function key
- ③ measuring key
- ④ arrow key
- ⑤ carriage return

Screen

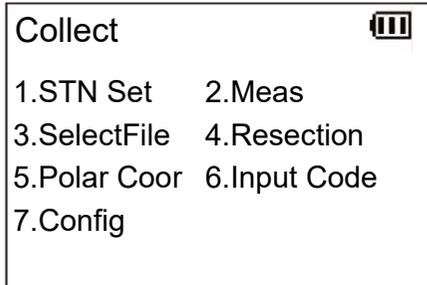


Site Construction

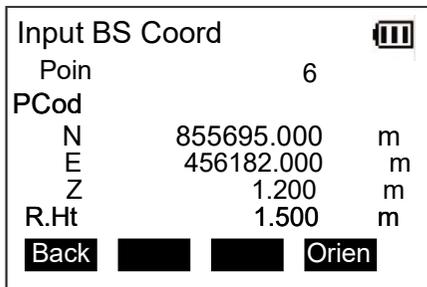
Purpose: for determining the measuring coordinate system



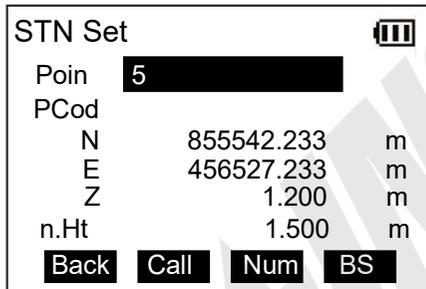
① Press M to enter the menu interface, press 1 to enter the data collection interface, call the file or new file



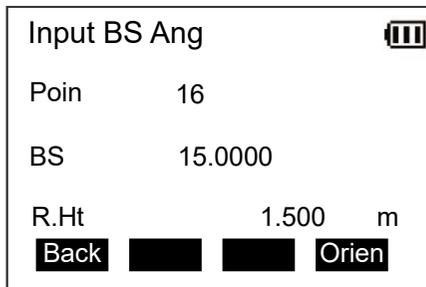
③ Rear view point to build the station as an example, respectively, enter the station and the rear view of the station can be built by pressing the BS orientation



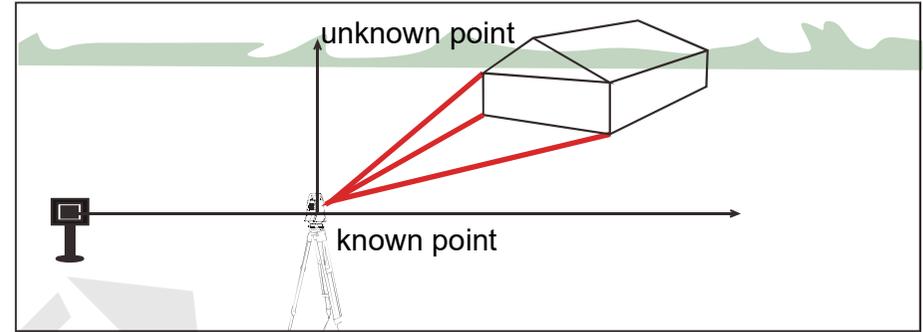
② Press 1 to enter the known point building station



④ Rear view interface press T key can switch the azimuth angle to build a station, input the rear view angle press F4 to directional can build a station

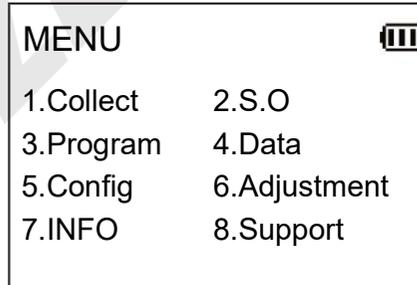


Data Acquisition

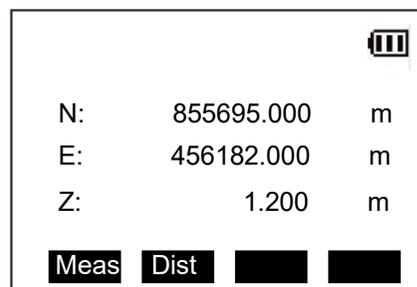


TSA-B33 Data Acquisition Procedure.

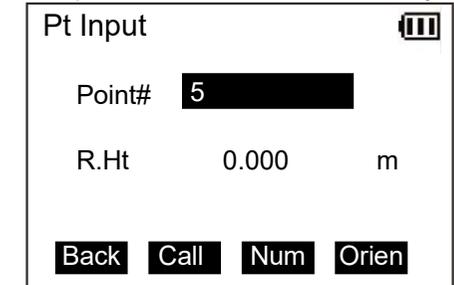
① After the station is built, press 2 in the data acquisition interface to enter the measurement interface.



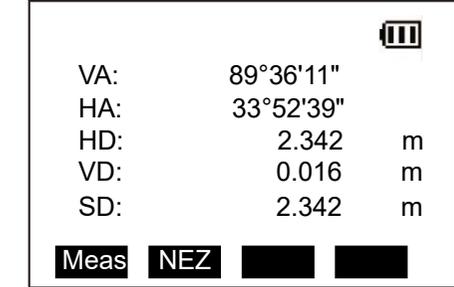
③ Rear view point to build the station as an example, respectively, enter the station and the rear view of the station can be built by pressing the F4 orientation.



② Enter the point name, code, and mirror height of the observation point, and press the F4 measurement key.

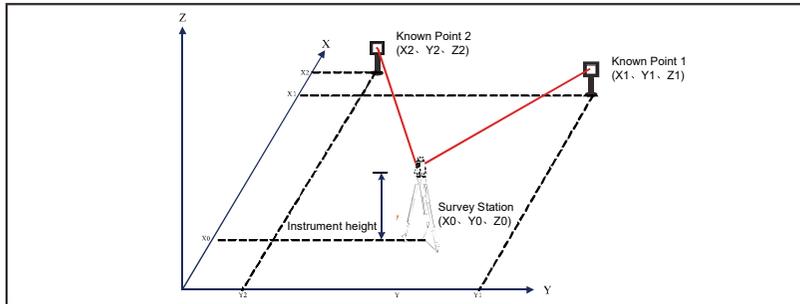


④ Light the target point, you can choose to measure the angle distance, press F4 to record.



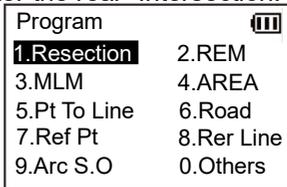
Rear Intersection

Purpose: Setting up a station only at the point to be determined, measuring the horizontal angle and distance information to two or more control points so as to calculate the coordinates of the point to be determined, known as Rear Intersection.

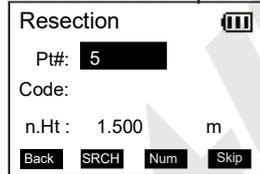


TSA-B33 Rear Intersection Procedure.

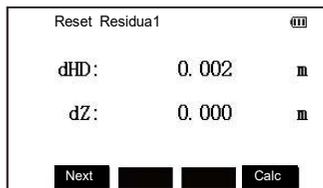
① Press 1 in the measurement program to enter the rear Intersection.



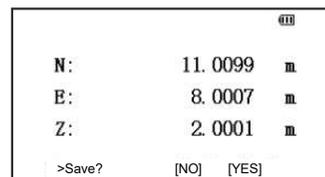
② Enter the file name, press ENT Enter to confirm, enter the station point name and instrument height and press ENT Enter to confirm then enter the point name of the first known point A.



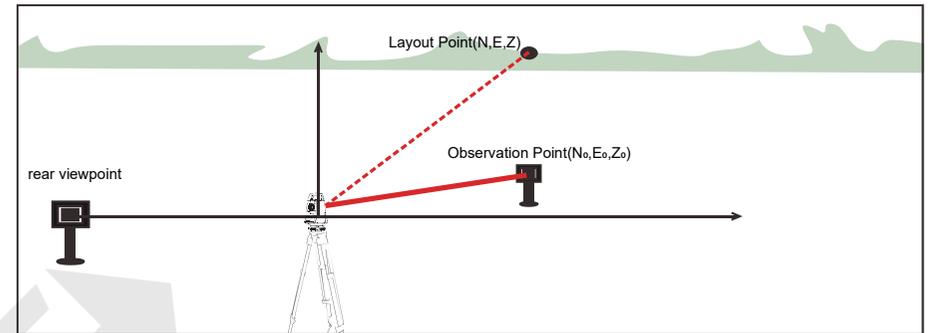
③ Press F4 (Yes) key, enter into the prism height input screen, enter the prism height, press ENT enter key to confirm, illuminate the known point A, press F1 (Measurement) key, enter into the known point B input display, follow the above steps to measure the known point B, complete the display of the posterior rendezvous residuals.



④ Press the F1 next step key to measure other known points up to a maximum of 7 points. If there are no other known points then press F4 Calculate to display the coordinates of the measurement points and the rear rendezvous is completed.



Layout

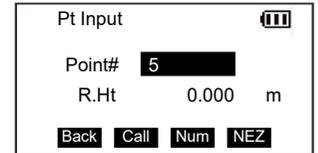


TSA-B33 Release Procedure:

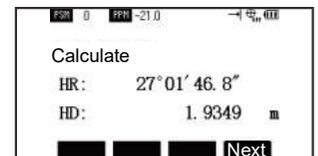
① Press 2 in the menu interface to enter the sampling interface, the first known point to build a station or rear rendezvous.



② Press 2 key to enter the release, first input the release point name, confirm the coordinates and then input the mirror height.



③ Check the release parameters HR and HD and press F4 to continue.



④ Adjust dHR to 0.

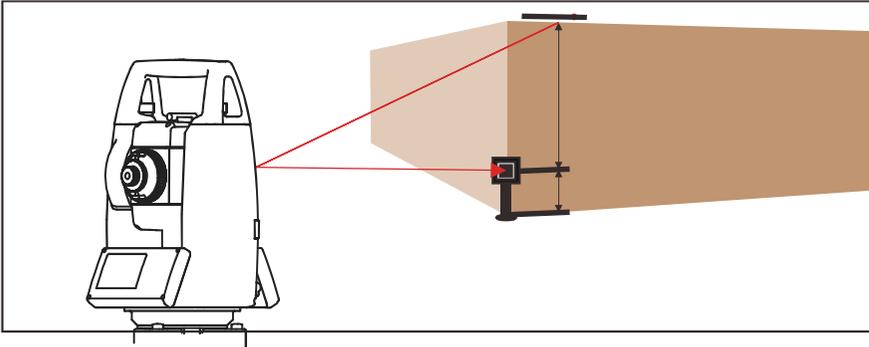


⑤ Click F1 Distance to view the left and right distances to fill in the excavation, after adjusting all three values to 0, you will find the location of the release point and then you can click F4 to change the point to continue releasing the sample.



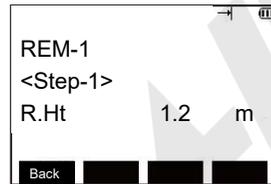
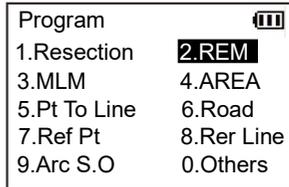
Overhang Measurement

Concept: Overhang measurement is the determination of the height of a point in the air from the ground. The height information is obtained by measuring a prism located on the ground directly below the target point.

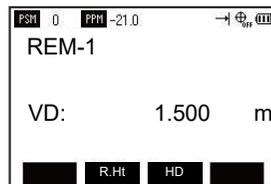


TSA-B33 Overhang Measurement Procedure:

- ① Press 3 in the menu interface to enter the program, and press 2 to enter the overhang height measurement interface.
- ② For example, to input the mirror height, press the F1 Input Mirror Height key to input the prism height.

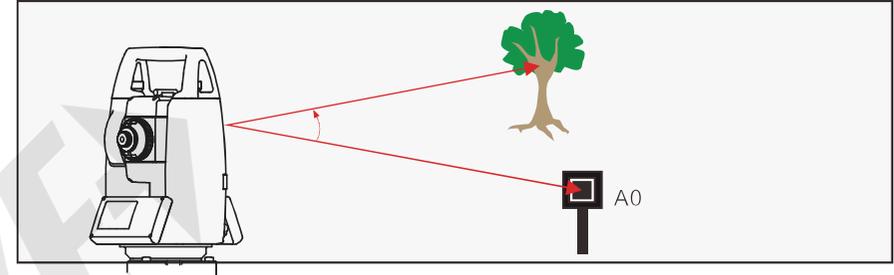


- ③ Press F1 Measurement key after illuminating the prism to display the horizontal distance HD between the instrument and the prism, and press F4 Setting key to confirm the prism position.
- ④ Point at the target point to display its vertical distance VD.



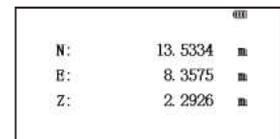
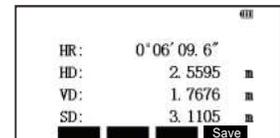
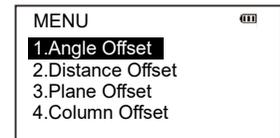
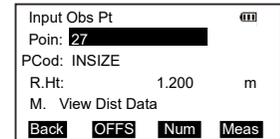
Angle Offset

Purpose: This mode is useful when it is difficult to set up the prism directly, e.g. in the center of a tree. Simply place the prism at the same point P as the instrument's flat distance. After setting the height of the instrument/prism, the coordinates of the center of the object to be measured can be obtained by taking an off-center measurement.



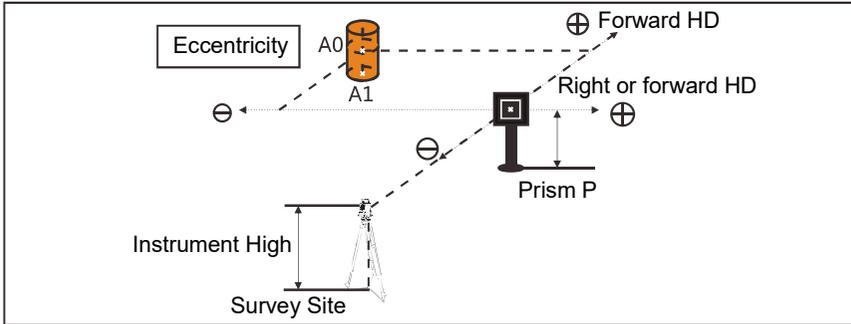
TSA-B33 Angle Offset Procedure:

- ① Press 1 for data acquisition in the slave menu screen, and press 2 for measurement after selecting the file.
- ② Press F2 Eccentricity key and then press 1 key Angle Eccentricity.
- ③ Illuminate the prism and press the F1 measurement key to measure, displaying HR (azimuth), HD (horizontal distance), VD (height difference), and SD (slant distance) of the target point.
- ④ Turn the horizontal micro-screw to illuminate the target point A0.
- ⑤ Press display the coordinates of the target point A0, press F4 record key to record the data, the display goes to the next target point measured.



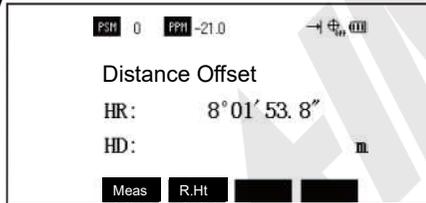
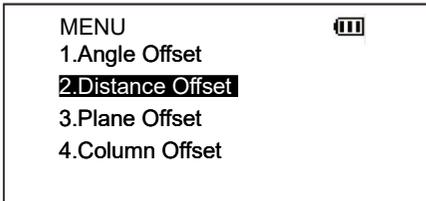
Distance Offset

Purpose: The position of a target can be determined by inputting the eccentric horizontal distance of the target point from the front, back, left and right sides of the reflecting prism.

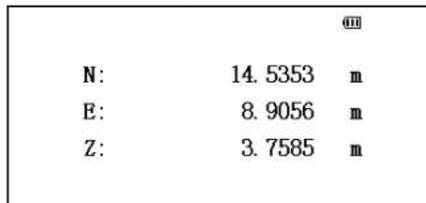
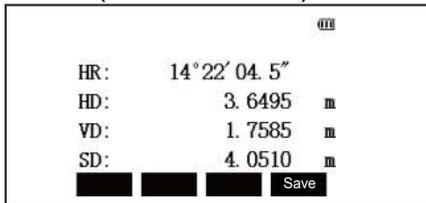


TSA-B33 Distance Offset Operating Procedure:

- ① Press 1 for data acquisition in the slave menu interface, select the file and press 2 for measurement, press F2 to enter eccentricity, press 2 to enter distance eccentricity
- ② Enter the left or right eccentricity and press ENT to confirm, then enter the forward eccentricity and press ENT to confirm.

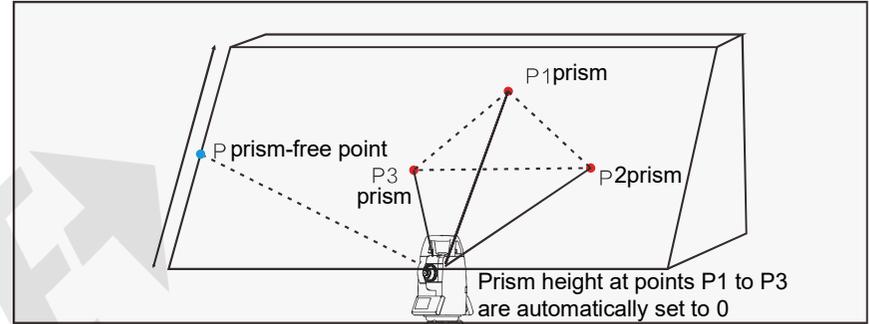


- ③ Illuminate the center of the prism and press the F1 measurement key to display the target HD (Horizontal Distance), VD (Height Difference), and SD (Slant Distance).
- ④ Press indicate the coordinates of the target point A0, press the F4 record key, the measurement data is recorded, and the display goes to the next target point measurement.



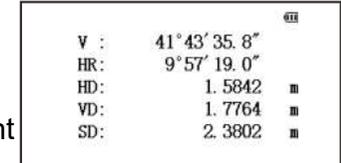
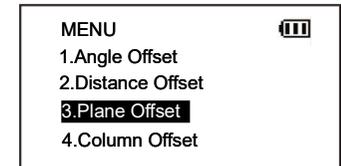
Plane Offset

Purpose: This function is used to determine points that cannot be measured directly, such as determining the distance or coordinates of a plane edge.



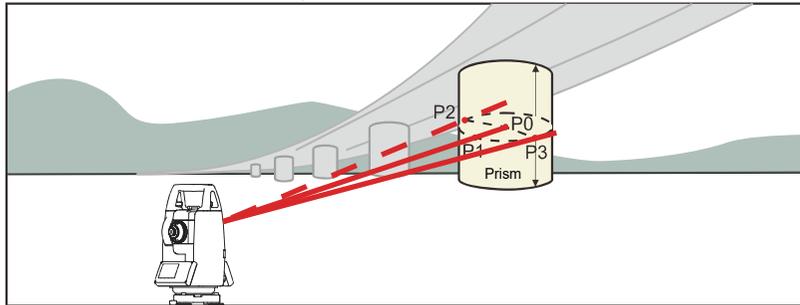
TSA-B33 Plane Offset Operation Procedure:

- ① Press 1 key for data acquisition from the menu interface, select the file and press 2 key for measurement, then press F2 to enter the eccentricity measurement.
- ② Press F3 to enter plane offset.
- ③ Illuminate the prism P1, press the F1 measurement key to start continuous measurement, the end of the measurement display prompts for the second point of measurement according to the same method for the second point and the third point of measurement of the instrument calculates and displays the coordinates of the intersection between the axis of visual alignment and the plane and the distance value.
- ④ Illuminate the target point P which is on the plane, then HR, HD, VD, SD of the point is displayed, press key, then will be ok.



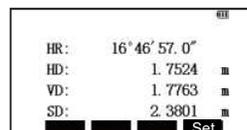
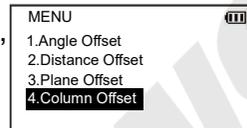
Column Offset

Usage: The center of a cylindrical bridge abutment or the center of a large tree is inaccessible to mirrors, and the eccentric measurement function provided by the total station can be used to derive the coordinates of its center point.



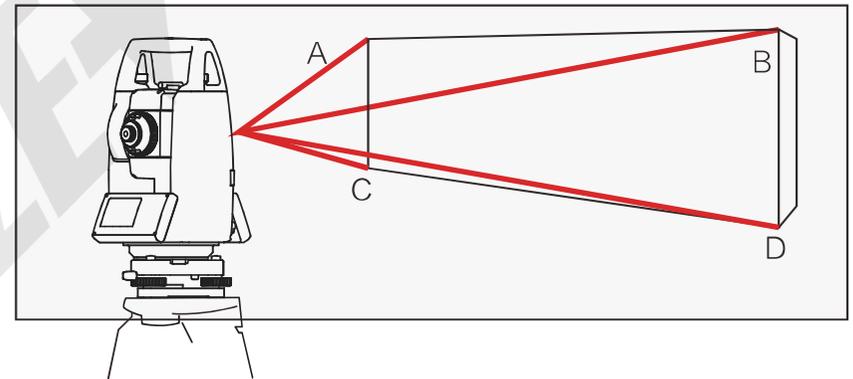
TSA-B33 Column Offset Operation Procedure:

- ① Press 1 for data acquisition from the menu interface, select the file and press 2 for measurement, then press F2 to enter eccentricity measurement, and press 4 to enter post column eccentricity.
- ② Illuminate the center P1 of the cylindrical surface, press the F1 measurement key to start the measurement, and when the measurement is finished, the display prompts for the angular observation of the left point P2.
- ③ After illuminating the left point P2 of the cylindrical surface and pressing the F4 setting key, the display prompts for the angular observation of the right point P3 after the measurement is finished.
- ④ Illuminate the point P3 on the right side of the cylindrical surface and press the F4 setting key, then HR, HD, VD and SD of the point are displayed.
- ⑤ Press  to display the coordinates of the target point P0. Press the F4 record key and the measurement data is stored. The display returns to a point name in data acquisition mode.



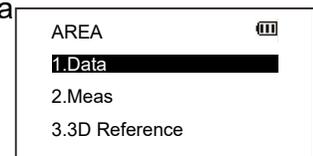
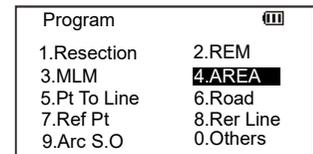
Area Measurement

Purpose: This mode is used to calculate the area of a closed figure. (Note: If the boundary lines of the graph cross each other, the area can not be calculated correctly; there is no limit to the number of points in the area calculation; the area of the graph calculated can not exceed 200,000 square meters).

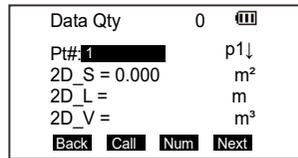


TSA-B33-E Area Measurement Procedure:

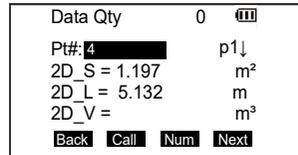
- ① In the menu interface, press 3 to enter the measurement program, and press 4 to enter the area measurement.
- ② Area calculation can be calculated with the coordinate data file to calculate the area or with the measurement data to calculate the area in two ways, here to calculate the area of the file data as an example; press the F1 file data key.



③ Enter the file name and press ENT Enter to confirm and enter the area calculation screen.



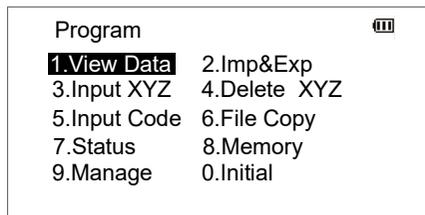
④ Press the F4 down point key after inputting the point name to display the next point number. Repeat pressing the F4 (down point) key to set the desired point number, and when more than 3 points are set, the area surrounded by these points is calculated and the result is displayed on the screen.



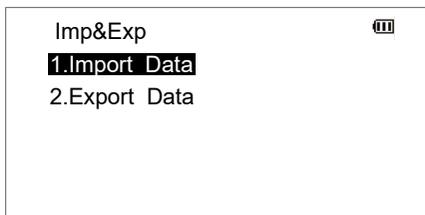
Data Transmission

TSA-B33 exporting data using a USB flash drive

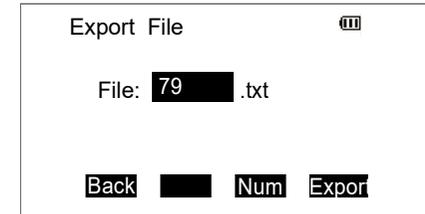
① Press 4 from the menu screen to enter the data screen



② Press 2 to select Import Export



③ Press 2 to export data, select USB disk as the mode, take the coordinate data as an example, select the folder for exporting.



④ Press F4 to select Export, select the coordinate format and then automatically export the data to a USB flash drive.



Packing list

Number	Name	Quantity	Remark
1	Case	1 pc	
2	Main body	1 set	
3	Lithium Battery	2 pcs	
4	Charger	1 pc	
5	Drying agent	1 bag	
6	Certificate	1 pc	
7	Quick reference guide	1 pc	
8	Main body	2 pcs	

SPECIFICATION

Distance measurement (With cooperation target)	measuring range	prism:5000m reflective patch (60mm×60mm):1000m
	accuracy	± (2+D/500)mm, D: measured distance,unit: m
	measuring time	continuous measurement: 0.25S, tracking measurement: 0.1S, single measurement: <1.0S
Prism-free distance measurement (Without cooperation target)	measuring range	1500m (Kodak Grey, 90% reflectivity)*
	accuracy	0-300m:± (3+D/500)mm 300-600m:± (5+D/500)mm >600m:± (10+D/500)mm, D: measured distance,unit: m
	measuring time	continuous measurement: 0.25S tracking measurement: 0.1S, single measurement: <1.0S
Angle accuracy		±2"
Minimum angular reading		0.1"/1" (selectable)
Telescope barrel length		152mm
Telescope magnification		30X
Field of view		1°30"
Frame rate		3"
Minimum focus distance		1.5m
Compensator		range: ±6', accuracy: ±1"
Tube level bubble		30"/2mm
Round level bubble		8'/2mm
Display	screen type	240×160 dot matrix high definition high brightness display
	screen size	3.1inch
digital display		maximum:99999999.9999m minimum:0.1mm
Data transmission		USB flash drive, bluetooth
Power supply		7.4V replaceable battery for 8 hours of continuous operation
Dimension (L×W×H)		206mm×180mm×353mm
Weight		5.4kg

* Good weather: overcast sky, light wind, no fog, visibility about 40km