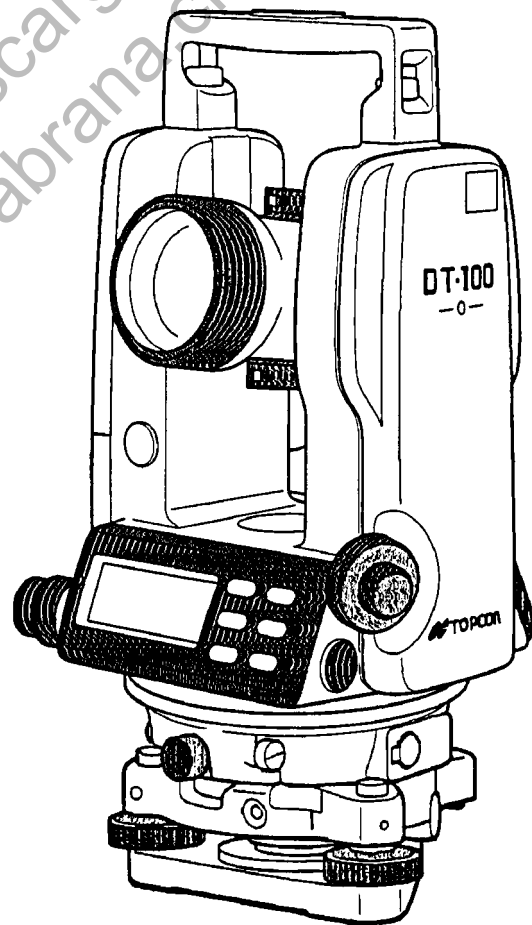


DIGITAL THEODOLITE

DT-101

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Foreword

Thank you for purchasing the TOPCON DIGITAL THEODOLITE, DT-101. For the best performance of the instruments, please carefully read these instructions and keep them in a convenient location for future reference.

GENERAL HANDLING PRECAUTIONS

1. Do not aim the instrument directly into the sun .

Aiming the instrument directly into the sun can result in serious damage to the eyes. Damage to the instrument could also result from exposing the instrument's objective lens to direct sunlight. The use of a solar filter is suggested to alleviate this problem.

2. Setting the instrument on a tripod

When mounting the instrument on a tripod, use a wooden tripod when possible. The vibrations that may occur when using a metallic tripod can effect the measuring precision.

3. Installing the tribrach

If the tribrach is installed incorrectly , the measuring precision could be effected. Occasionally check the adjusting screws on the tribrach. Make sure the base fixing lever is locked and the base fixing screws are tightened.

4. Guarding the instrument against shocks

When transporting the instrument, provide some protection to minimize risk of shocks. Heavy shocks may cause the measurement to be faulty.

5. Carrying the instrument

Always carry the instrument by its handgrip.

6. Do not expose the instrument to extreme heat.

Do not leave the instrument in extreme heat (+122 degrees F) longer than necessary. It could effect the performance of the instrument. Do not expose the instrument's objective lens to direct sunlight without a filter. Damage could occur inside the instrument.

7. Battery level check

Confirm battery level remaining before operating.

CONTENTS

1	NOMENCLATURE AND FUNCTIONS	1-1
1.1	Nomenclature	1-1
1.2	Display	1-3
1.3	Operating Key	1-3
1.4	Serial Signal RS-232C Connector	1-4
2	PREPARATION FOR MEASUREMENT	2-1
2.1	Setting Instrument up for Measurement	2-1
2.2	POWER Switch Key ON	2-2
2.3	Battery Power Remaining Display	2-2
2.4	Vertical Angle Tilt Correction	2-3
3	ANGLE MEASUREMENT	3-1
3.1	Measuring Horizontal Angle Right and Vertical Angle	3-1
3.2	Switching Horizontal Angle Right/Left	3-2
3.3	Measuring from the Required Horizontal Angle	3-2
3.4	Vertical Angle Percent Grade(%) Mode	3-3
3.5	Repetition Angle Measurement	3-3
4	DISTANCE/COORDINATE MEASUREMENT	4-1
4.1	Combined Use with EDM	4-1
4.2	How to connect DT-101 to EDM	4-1
4.3	Power supply	4-1
4.4	Distance Measurement (Continuous Measurement)	4-2
4.5	Distance Measurement (N-time Measurement)	4-3
4.6	Coordinate Measurement	4-4
4.7	Tracking Mode	4-5
5	THE OTHER FUNCTIONS	5-1
5.1	Stadia Surveying	5-1
5.2	Auto Cut Off	5-1
5.3	Setting Minimum Angle Reading	5-1
6	COMBINED USE OF INSTRUMENT WITH THE DATA COLLECTOR	6-1
6.1	Connecting DT-101 to the data collector	6-1
6.2	Mode Available with Data Collector	6-1
6.3	Stake-out	6-1
6.4	Coordinate Measurement with Data Collector	6-2
7	SELECTING MODE	7-1
7.1	Items of the Selecting Mode	7-1
7.2	How to Set Selecting Mode	7-1
8	HANDLING POWER SOURCE	8-1
9	CHECK AND ADJUSTMENT	9-1
	• Pointers on the Adjustment	9-1
	• Notes on the Tribrach	9-2
9.1	Checking /Adjusting the Plate Level	9-2
9.2	Checking /Adjusting the Circular Level	9-2
9.3	Adjustment of the Vertical Cross-hair	9-3
9.4	Collimation of the Instrument	9-4
9.5	Checking / Adjusting the Optical Plummet Telescope	9-5
9.6	Adjustment of Vertical Angle 0 Datum	9-6

10 CORRECTION FOR REFRACTION AND EARTH CURVATURE	10-1
10.1 Distance Calculation Formula.....	10-1
11 CORRECTION FOR H.I. VALUE.....	11-1
12 DETACH/ATTACH OF TRIBRACH	12-1
13 PRECAUTIONS	13-1
14 OPTIONAL ACCESSORIES.....	14-1
15 TARGET (PRISM) SYSTEM.....	15-1
16 ERROR DISPLAYS	16-1
17 SPECIFICATIONS.....	17-1

STANDARD SET COMPOSITION

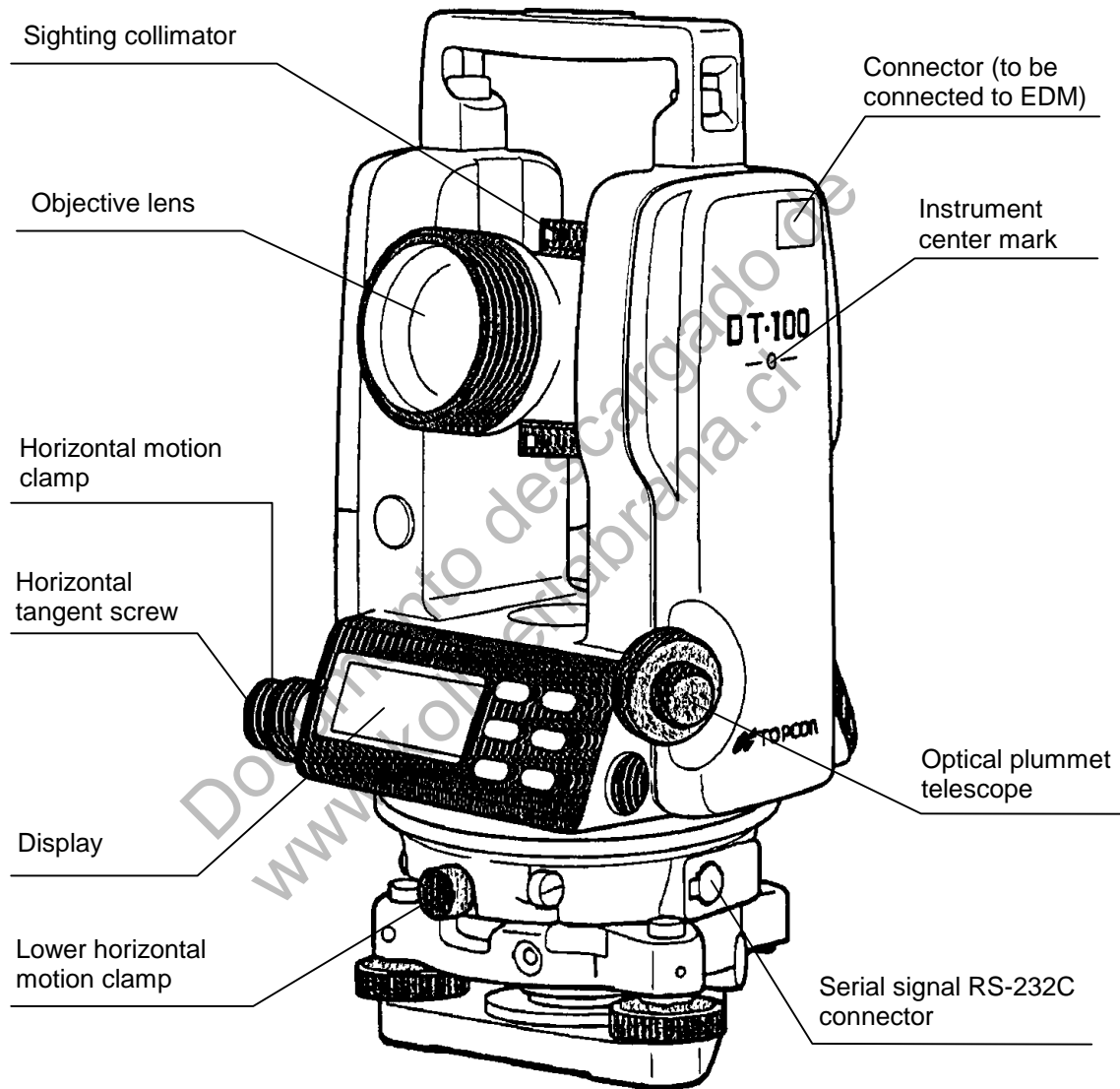
① Instrument (with lens cap)	1pc.
② Carrying case	1pc.
③ Plumb bob set	1set
④ Tool kit [Cleaning brush, Screw driver, Rod pin, Plumb bob hook]	1set
⑤ Sunshade.....	1pc.
⑥ AA Batteries	4pcs.
⑦ Cable PC-5S	1pc.
⑧ Plastic rain cover.....	1pc.
⑨ Silicon cloth.....	1pc.
⑩ Instruction manual.....	1pc.

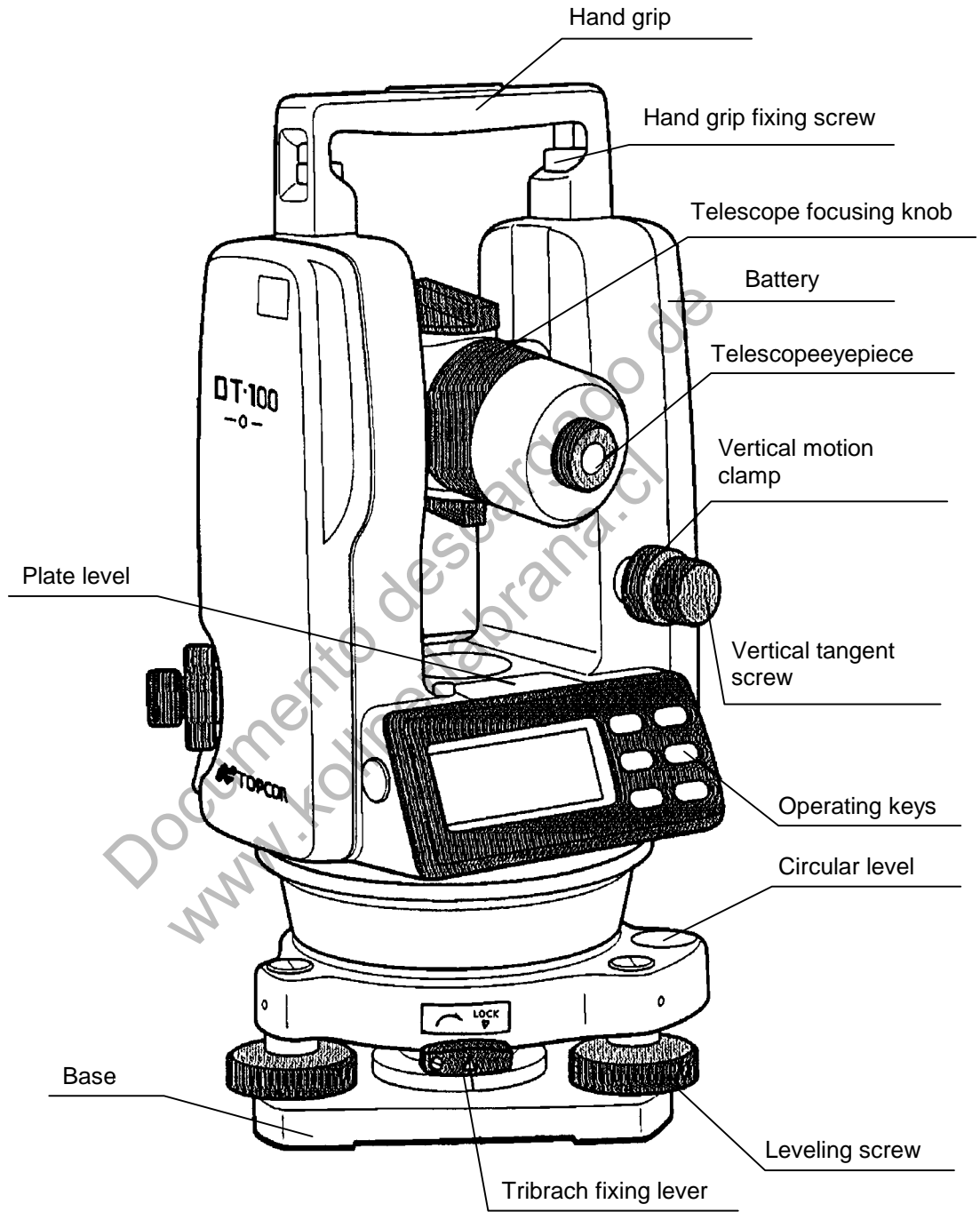
(Make sure that all of the above items are with the instrument when purchased.)

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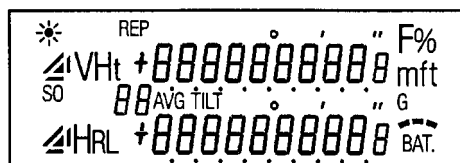
1 NOMENCLATURE AND FUNCTIONS

1.1 Nomenclature





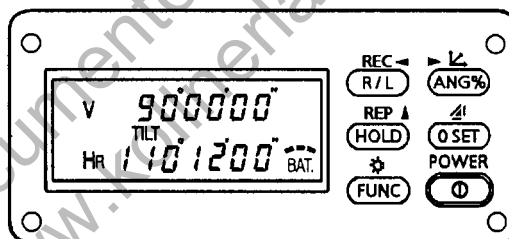
1.2 Display



● Display marks

Display	Contents	Display	Contents
V	V-angle	BAT.	Remaining Battery Capacity
HR	H-angle right	*	EDM working
HL	H-angle left	\nearrow	Horizontal distance
Ht	Repetition angle measurement	\nearrow	Relative elevation
NAVG	The number of repetition / Average of angle	\nearrow	Slope distance
REP	Repetition angle measurement	\nearrow	N coordinate
TILT	Tilt correction mode	\nearrow	E coordinate
F	Function key selection mode	\nearrow	Z coordinate
%	Percent grade	SO	Stake-out measurement
G	Unit display GON		

1.3 Operating Key



Keys	FUNCTION	Keys	FUNCTION
R/L	Selection for horizontal angle right / left measurement	REC	Pressing once : Data hold Pressing again : Data transmission
HOLD	Holding the horizontal angle	REP	Repetition angle measurement
FUNC	Upper function selection		Illumination of display and reticle ON/OFF
ANG%	V-angle display Selection for vertical angle/percent display	\searrow	Coordinate measurement mode Switching to display N, E/Z coordinate
0 SET	Horizontal angle 0set	\nearrow	Distance measurement mode Switching HD(\nearrow) / SD(\nearrow) / RE(\nearrow)
POWER	Power switch	\blacktriangleleft , \blacktriangleright	Moving the blinking digit to the left or right
		\blacktriangle	Increasing the blinking numeral

1.4 Serial signal RS-232C connector

The serial signal connector is used for connecting the DT-101 with a computer or TOPCON Data Collector, which enables the computer to receive measured data from the DT-101 or to send preset data of horizontal angle, etc. to it.

- **The following data will be output at each mode.**

Mode	Output
Angle mode	V, HR (or HL)
Horizontal distance, Relative elevation mode	HD, V, HR (or HL), VD
Slope distance mode	SD, V, HR (or HL), HD
Coordinate mode	N, E, Z, HR (or HL)
Repetition angle mode	Hm(Average), Hn(Total)

- **Output at the tracking mode is displayed as distance data only.**

The details necessary for the connection with the DT-101 are obtained from its Interface Manual which is optionally available. Please refer to the manual.

2 PREPARATION FOR MEASUREMENT

2.1 Setting Instrument Up For Measurement

Mount the instrument to the tripod. Level and center the instrument precisely to insure the best performance. Use tripods with a tripod screw of 5/8 in. diameter and 11 threads per inch, such as the Type E TOPCON wide- frame wooden tripod.

Reference: Leveling and Centering the Instrument

1. Setting up the Tripod

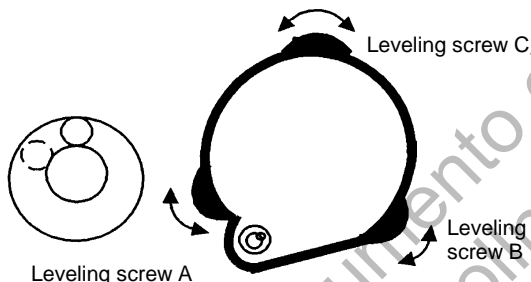
First, extend the extension legs to suitable lengths and tighten the screws on their midsections.

2. Attaching the Instrument on the Tripod Head

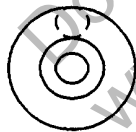
Place the instrument carefully on the tripod head and slide the instrument by loosening the tripod screw. If the plumb bob is positioned right over the center of the point, slightly tighten the tripod screw.

3. Roughly Leveling the Instrument by Using the Circular Level

- ① Turn the leveling screws A and B to move the bubble in the circular level. The bubble is now located on a line perpendicular to a line running through the centers of the two leveling screws being adjusted.

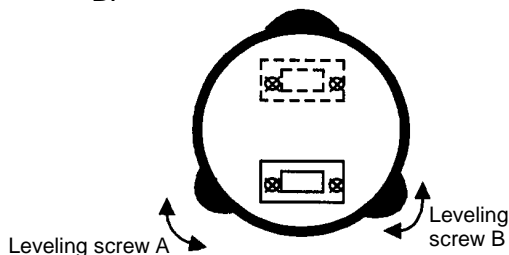


- ② Turn the leveling screw C to bring the bubble to the center of the circular level.

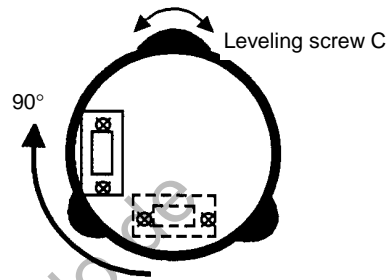


4. Centering by Using the Plate Level

- ① Rotate the instrument horizontally by using the Horizontal motion/clamp screw and place the plate level parallel with the line connecting leveling screws A and B, and then bring the bubble to the center of the plate level by turning leveling screws A and B.



- ② Rotate the instrument 90° (100g) around its vertical axis and turn the remaining leveling screw or C to center the bubble once more.

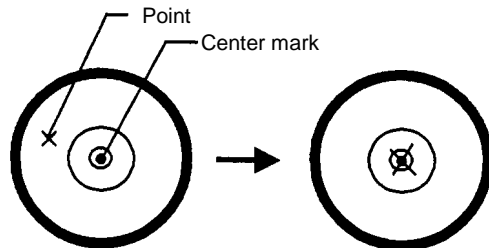


- ③ Repeat the procedures ① and ② for each 90° (100g) rotation of the instrument and check whether the bubble is correctly centered for all four points.

5. Centering by Using the Optical Plummet Telescope

Adjust the eyepiece of the optical plummet telescope to your eyesight.

Slide the instrument by loosening the tripod screw, place the point on the center mark, and then tighten the tripod screw. Sliding the instrument carefully not to rotate that allows you to get the least dislocation of the bubble.



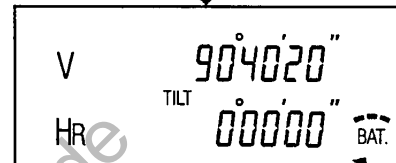
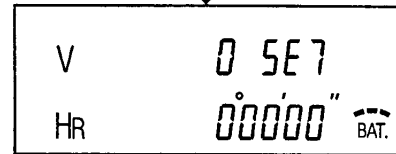
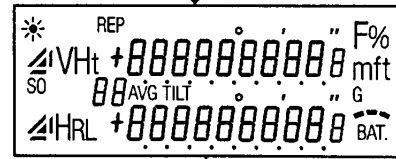
6. Completely Leveling the Instrument

Leveling the instrument precisely in a similar way to 4. Rotate the instrument and check to see that the bubble is in the center of the plate level regardless of telescope direction, then tighten the tripod screw hard.

2.2 POWER Switch Key ON

- ① Turn the power switch ON.
Display initializes for two seconds and shows ZERO SET.

POWER switch key ON.

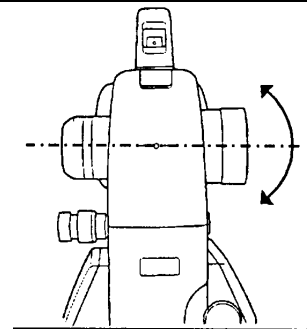


Battery Power Remaining Display

- ② Rotate the telescope to set the instrument at vertical angle reading of 0°

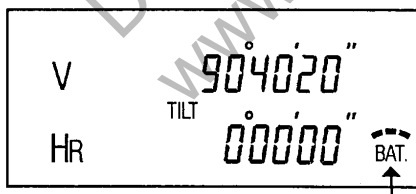
- Confirm the battery power remaining display. Confirm the battery power remaining display. Replace with battery when battery level is low. Refer to Chapter 2.3 "Battery Power Remaining Display" .

Note : For setting the vertical angle at 0°, an electronic datum 0 is provided on the vertical angle circle. If the telescope is turned and the sensor passes the datum 0, angle measurement begins. The datum 0 is placed near the level position of the telescope, the vertical angle setting of 0 can easily be set by rotating the telescope.



2.3 Battery Power Remaining Display

Battery power remaining display indicates the power condition.



Battery Power Remaining Display

Measurement is possible.

The power is poor. The battery should be recharged or replaced.

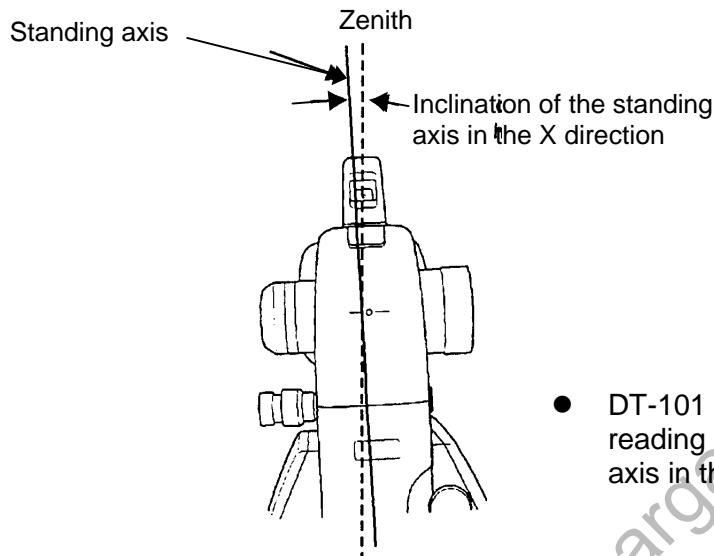
Measurement is impossible. Need to recharge or replace the battery.

- Note :
- 1) The battery operating time will vary depending on the environmental conditions such as ambient temperature etc. It is recommended for safety to charge the battery beforehand or to prepare spare full charged batteries.
 - 2) For general usage of the battery, see chapter 8" Power source and charging".

2.4 Vertical Angle Tilt Correction

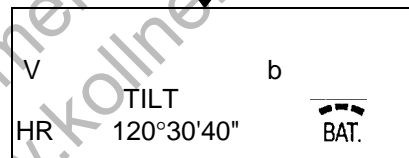
When the tilt sensors are activated, automatic correction of vertical and horizontal angle for mislevelment is displayed.

To ensure a precise angle measurement, tilt sensors must be turned on. The display can also be used to fine level the instrument. If the tilt over display "b" appears the instrument is out of automatic compensation range and must be leveled manually.



- DT-101 compensate the vertical angle reading due to inclination of the standing axis in the X direction.

When the instrument tilted over correction range.



Standing Axis in the X direction tilted over

- To set auto tilt correction from the moment that power is on, refer to chapter 7" Vertical Angle Tilt correction (Tilt ON/OFF)".
- The display of Vertical or Horizontal angle is unstable when instrument is on an unstable stage or a windy day. You can turn off the auto tilt correction function of V angle in this case.

3 ANGLE MEASUREMENT

3.1 Measuring Horizontal Angle Right and Vertical Angle

Make sure the mode is in Angle measurement.

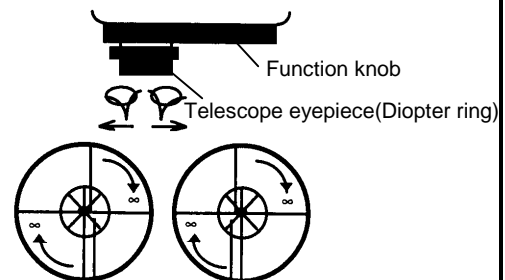
Operating procedure	Operation	Display				
① Collimate the 1st target (A).	Collimate A	<table border="1"> <tr> <td>V</td> <td>90°30'40"</td> </tr> <tr> <td>HR</td> <td>20°30'40"</td> </tr> </table>	V	90°30'40"	HR	20°30'40"
V	90°30'40"					
HR	20°30'40"					
② Set horizontal angle of target A at 0° 00' 00". Press the [0 set] key twice.	[0 SET] Twice	<table border="1"> <tr> <td>V</td> <td>90°30'40"</td> </tr> <tr> <td>HR</td> <td>0°00'00"</td> </tr> </table>	V	90°30'40"	HR	0°00'00"
V	90°30'40"					
HR	0°00'00"					
③ Collimate the 2nd target (B). The required V/H angle to target B will be displayed.	Collimate B	<table border="1"> <tr> <td>V</td> <td>98°40'40"</td> </tr> <tr> <td>HR</td> <td>123°45'20"</td> </tr> </table>	V	98°40'40"	HR	123°45'20"
V	98°40'40"					
HR	123°45'20"					

Reference

How to Collimate (Reference)

- ① Point the telescope toward the light. Turn the diopter ring and adjust the diopter so that the cross hairs are clearly observed.
(Turn the diopter ring toward you first and then backward to focus.)
- ② Aim the target at the peak of the triangle mark of the sighting collimator. Allow a certain space between the sighting collimator and yourself for collimating.
- ③ Focus the target with the focusing knob.

* If parallax is created between the cross hairs and the target when viewing vertically or horizontally while looking into the telescope, focusing is incorrect or diopter adjustment is poor. This adversely affects precision in measurement or survey. Eliminate the parallax by carefully focusing and using diopter adjustment.



3.2 Switching Horizontal Angle Right/Left

Make sure the mode is Angle measurement

Operating procedure	Operation	Display
① Collimate the 1st target (A).	Collimate A	V 90°10'20" HR 120°30'40"
② Press the [R/L] key. The mode Horizontal angle Right (HR) switches to (HL) mode.	[R/L]	V 90°10'20" H L 239°29'20"
③ Measure as HL mode.		
● Every time pressing the [R/L] key, HR/HL mode switches.		

3.3 Measuring from the Required Horizontal Angle (Holding the Angle)

Make sure the mode is angle measurement

Operating procedure	Operation	Display
① Set the required horizontal angle, using Horizontal tangent screw	Display angle	V 90°10'20" HR 130°40'20"
② Press the [HOLD] key. *1)	[HOLD]	V 90°10'20" HR 130°40'20"
③ Collimate the target.	Collimate	Blinks
④ Press the [HOLD] key to finish holding the horizontal angle.	[HOLD]	V 90°10'20" HR 130°40'20"
*1) To return to the previous mode, press any key except the [HOLD] and the [FUNC+FUNC] key.		

3.4 Vertical Angle Percent Grade(%) Mode

Make sure the mode is Angle measurement

Operating procedure	Operation	Display
① Press [F4]() key to get the function as on page 2.		V 90°10'20" HR 120°30'40"
② Press the [ANG%] key. *1)	[ANG/%]	V -0.30 % HR 120°30'40"
*1) Every time pressing the [ANG/%] key, the display mode switches. ● When the measurement is carried out over than ±45° (±100%) from the horizontal, the display shows [- - - -] .		

3.5 Repetition Angle Measurement

Make sure the mode is Angle measurement

Operating procedure	Operation	Display
① Press the [FUNC] key.	[FUNC]	V 90°10'20" F HR 120°30'40"
② Press the [REP] key.	[REP]	REP Ht 0°00'00" 0 H
③ Collimate the target A and press the [OSET] key twice.	Collimate A [OSET] [OSET]	REP Ht 0°00'00" 0 H
④ Collimate the target B using the horizontal clamp and tangent screw. Press the [HOLD] key.	Collimate B [HOLD]	REP Ht 130°25'20" 1 AVG H 130°25'20"
⑤ Recollimate target A using the horizontal clamp and tangent screw, and press the [R/L] key.	Recollimate A [R/L]	
⑥ Recollimate target B using the horizontal clamp and tangent screw, and press the [HOLD] key.	Recollimate B [HOLD]	REP Ht 260°50'40" 2 AVG H 130°25'20"
		2 measurements

⑦ Repeat ⑤ to ⑥ to measure the desired number of repetitions.

⑧ To return to the normal angle mode, press the [FUNC] key and [HOLD] key.

[FUNC]
[HOLD]

REP	
Ht	521°41'20"
4 AVG	
H	130°25'20"

[Example] 4 measurement

- Horizontal angle can be accumulated up to (2000°00'00" - minimum reading)(horizontal angle right) or -(2000°00'00" - minimum reading)(horizontal angle left) . In case of 5 second reading, horizontal angle can be accumulated up to $\pm 1999^{\circ}59'55''$.

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4 DISTANCE/COORDINATE MEASUREMENT

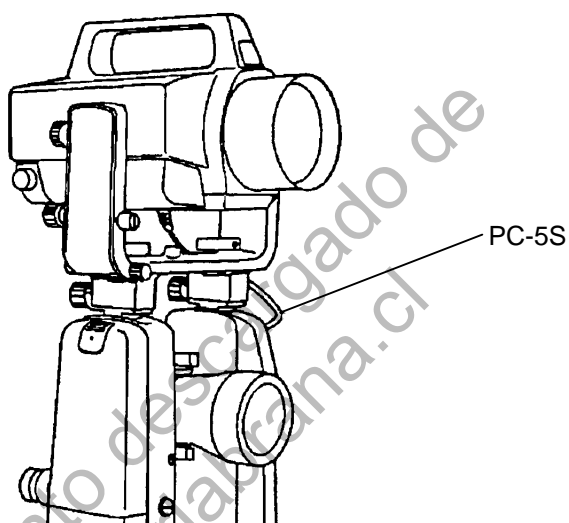
4.1 Combined Use with EDM

Before measuring distance, set the atmospheric correction and the prism constant of EDM.

For details, see the EDM Instruction manual.

4.2 How to connect DT-101 to EDM

Cable PC-5S is used

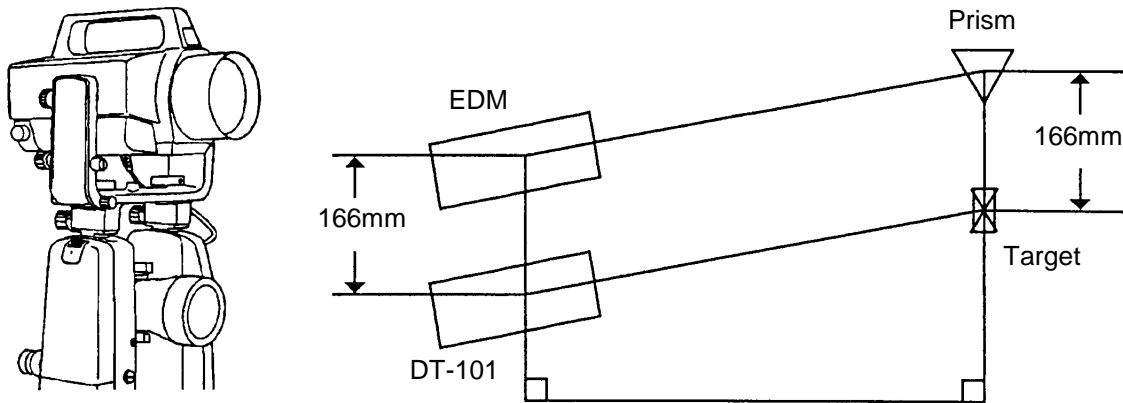


4.3 Power supply

Each on-board battery is used .

NOTE: It is not possible to supply the power to DT-101 and EDM from external battery .

4.4 Distance Measurement (Continuous Measurement)



Make sure the mode displays angle measurement.





Operating procedure	Operation	Display
<p>① Collimate the target by DT-101 and the center of the prism by EDM respectively.</p> <p>② Set the instrument for distance measurement mode (HR, \triangleleft) pressing the [FUNC] key and the [0SET] key to accept slope distance data from EDM.</p> <p>③ When EDM switch ON slope distance continuous mode in turn and measurement starts. *1)</p> <p>The data from EDM to DT-101 displays horizontal distance. *2),3)</p>	<p>Collimate</p> <p>[FUNC] [0SET]</p> <p>EDM Power ON</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: right;">m</p> <p>HR 120°30'40"</p> </div> <div style="text-align: center;">↓</div> <div style="border: 1px solid black; padding: 5px;"> <p>* \triangleleft 123.456 m</p> <p>HR 120°30'40"</p> </div>
<p>*1) When EDM is working, the "*" mark appears in the display.</p> <p>*2) The result is shown with buzzer sound.</p> <p>*3) Pressing the [FUNC] key and the [0 set] key again, the display changes to RE (\triangleleft), SD (\triangleleft) in turn.</p> <ul style="list-style-type: none"> ● It is possible to choose the display order ($\triangleleft \rightarrow \triangleleft \rightarrow \triangleleft$) or ($\triangleleft \rightarrow \triangleleft \rightarrow \triangleleft$) for initial measuring distance mode. Refer to Chapter 7 "SELECTING MODE". ● To return to the normal angle measuring mode, press the [ANG%] key. 		

4.5 Distance Measurement (N-time Measurement)

This is to get average of total number of distance measurement. Set the EDM for number of distance measurement mode and enter frequency number of measurement.

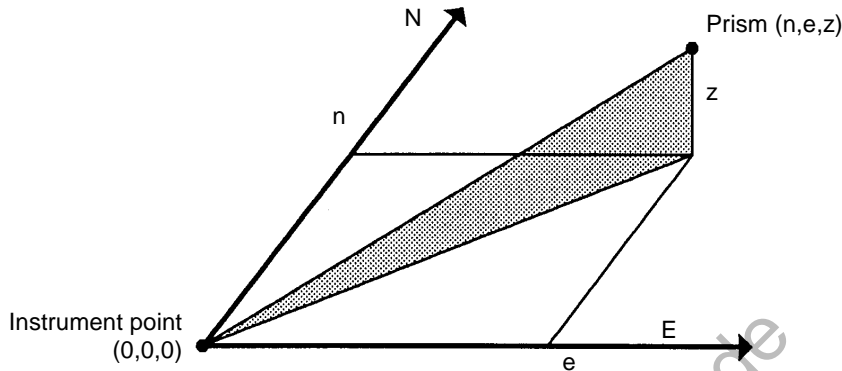
(To set EDM for number of distance measurement mode, refer to the EDM instruction manual.)

Make sure the mode displays angle measurement.

Operating procedure	Operation	Display
① Collimate the target by DT-101 and the center of the prism by EDM respectively.	Collimate	
② Set the instrument for distance measurement mode (HR, ) pressing the [FUNC] key and the [OSET] key to accept slope distance data from EDM. *1)	[FUNC] [OSET]	
③ EDM switch ON. Press the [MEAS] key of EDM, the number set will be measured and displayed each time, then the average value is displayed followingly.	EDM Power ON EDM [MEAS]	  3 measurements
*1) In the number of distance measurement, the measured value will not display on the DT-101 combined with other EDMs except DM-A5. Press [REC] key of EDM to display the data EDM at that time.		

4.6 Coordinate Measurement

The following description is for the coordinate measurement with the origin (0,0,0) at the instrument point. The coordinate measurement includes measurements for latitude, departure and relative elevation. If any other point than the instrument point is set as the coordinate point, use of DATA COLLECTOR is required to set the coordinate of the instrument point. Refer to chapter 6.4 "Coordinate measurement"



Make sure the mode displays angle measurement.






Operating procedure	Operation	Display
① Use the horizontal clamp and tangent screw to set the shown horizontal angle in the direction angle of point A and lock.	Display angle	V 90°10'20" HR 130°40'20"
② Press the [HOLD] key. 'HR' blinks.	[HOLD]	
③ Collimate the target A, and press the [HOLD] key to finish holding.	Collimate A [HOLD]	V 90°10'20" HR 130°40'20"
④ Collimate the target point B (prism) using the horizontal clamp and tangent screw.	Collimate B	
⑤ Set the instrument for coordinate measurement mode pressing the [FUNC] key and the [ANG%] key to accept slope distance data from EDM.	[FUNC] [ANG%]	↗ m ↘
⑥ EDM switch ON, the coordinate measurement starts. N coordinate (↗) and E coordinate (↘) is displayed.	EDM Power ON	* ↗ 123.456 m ↘ 23.456 m
⑦ Press the [FUNC] key and the [ANG%] key to display Z coordinate (↖)*1)	[FUNC] [ANG%]	* ↖ 3.456 m HR 95°30'40"
*1) Pressing the [FUNC] key and the [ANG%] key, N (↗), E (↘) and Z (↖) data is displayed alternately. ● Z coordinate measured by DT-101 is the difference in height between the horizontal position of the instrument telescope and target.		

4.7 Tracking Mode

This mode measures in shorter time than in fine mode.

It is very useful when tailing the moving object or carrying out stake-out work.

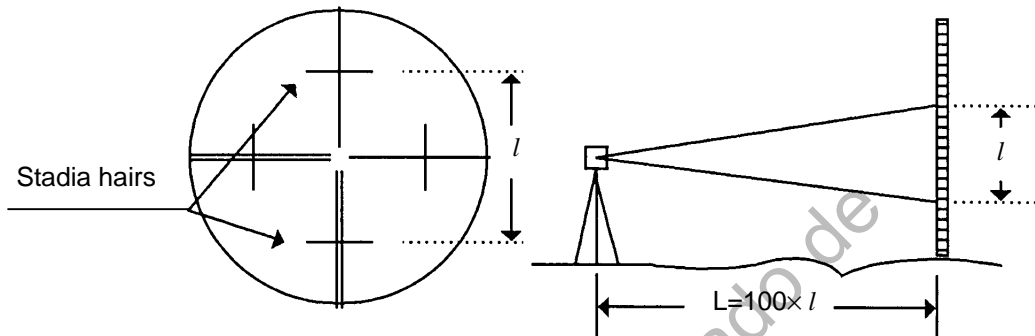
Tracking Mode :The unit to be displayed : 10mm

Operating procedure	Operation	Display
① Collimate the target by DT-101 and the center of the prism by EDM respectively.	Collimate	
② Set the instrument for distance measurement mode (HR, ) pressing the [FUNC] key and the [OSET] key to accept slope distance data from EDM.*1)	[FUNC] [OSET]	<div style="border: 1px solid black; padding: 5px; display: flex; justify-content: space-between;">  m </div> <div style="border: 1px solid black; padding: 5px; display: flex; justify-content: space-between;"> HR 120°30'40" </div>
③ EDM switch ON. Set the EDM to the slope distance mode in tracking.*2)	EDM Power ON EDM [MEAS]	<div style="border: 1px solid black; padding: 5px; display: flex; justify-content: space-between;"> *  123.456 m </div> <div style="border: 1px solid black; padding: 5px; display: flex; justify-content: space-between;"> HR 120°30'40" </div>
The data from EDM to DT-101 displays horizontal distance in tracking mode.		
The display unit is 1cm.		
*1) To measure the relative elevation () and slope distance () , press the [FUNC] and the [OSET] key. *2) At the condition of more than 2,000 m of measuring distance, the displayed value by the tracking mode is : Displayed value = Measured distance -2,000m In this case measurement must be done without atmospheric correction and correction for refraction calculation and correction for refraction and earth curvature way.		

5 THE OTHER FUNCTIONS

5.1 Stadia Surveying

DT-101 can be used for stadia surveying, which is simply a convenient method for measuring distance with the stadia hairs of the instrument, in combination with a graduated rod, such as leveling rod or stadia rod (which is preferable for long distances). The distance from the center of the instrument to the rod is found by sighting through the instrument on to the rod and multiplying the stadia interval or reading (i.e., the interval between the apparent locations of the bottom and top stadia hairs on the rod) by 100.



- ① First, set up the rod on the point.
- ② Then, sight through the telescope of the properly leveled instrument and determine the distance or interval "l" on the rod between the bottom and top stadia hairs.
- ③ The horizontal distance "L" from the plumb line center of the instrument to the rod is equal to 100 times the stadia interval or stadia reading or rod reading or "l".

$$L = 100 l$$

5.2 Auto Cut Off

If no key operation is given for more than 30 minutes, the power turns off automatically. To set this function, refer to Chapter 7 "SELECTING MODE".

5.3 Setting Minimum Angle Reading

Select minimum display unit for angle measurement. It is possible to select it as shown below.

To set this function, refer to Chapter 7 "SELECTING MODE".

1" / 5" (0.2mgon / 1mgon)

6 COMBINED USE OF INSTRUMENT WITH THE DATA COLLECTOR

A wider variety of applications is available if the instrument is used with the data collector.

For further information concerning the data collector, refer to data collector instruction manual.

6.1 Connecting DT-101 to the data collector

Connect serial signal connector of DT-101 with Data collector using P-1.

6.2 Mode Available with Data Collector

(1) Data input mode

The Data collector gives a prompt message guide the operation in the display window. The operator can enter the data by keyboard operation according to the message.

For further information concerning the Data collector, refer to Data collector instruction manual.

(2) DT-101 control mode

In this mode, setting a standard distance (for stake out), coordinate of instrument point and horizontal angle is possible.




(3) Data Storage

To store the data obtained by DT-101 to Data collector, use the [REC] key of DT-101. Press the key twice and the data will be output to the Data collector.




6.3 Stake-out

The difference between the measured distance and the distance preset by data collector operation is displayed.

Displayed value = Measured distance - Standard (Preset) distance

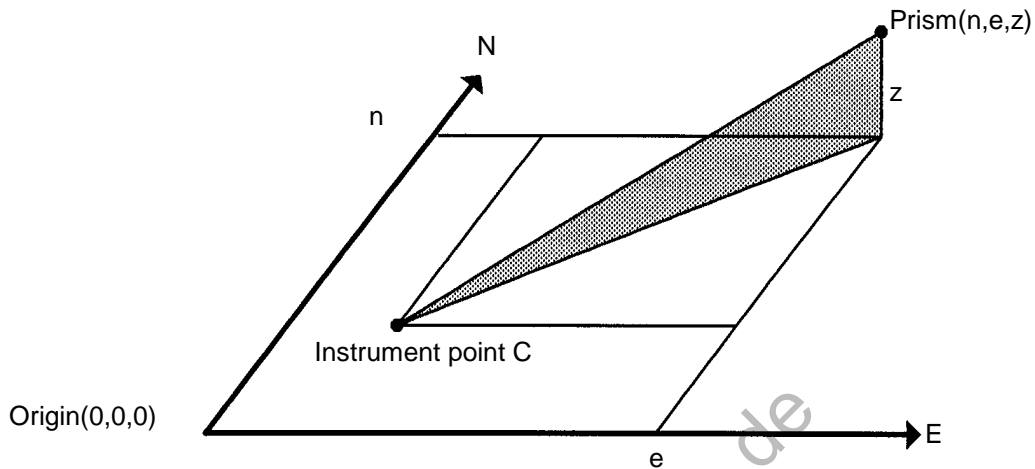
- Stake-out operation can be performed for horizontal distance (), relative elevation () or slope distance ().

Procedure

- ① Set the standard distance from Data collector.
 - ② Press the [FUNC] and the [OSET] key of the DT-101.
 - ③ Press the [FUNC] and [OSET] key, to select one of the distance measurement mode (, , )
 - ③ Set the EDM to the distance measurement mode in tracking.
The difference between the measured distance and the standard distance is displayed.
- To return to normal distance measurement mode, reset the standard distance to "0" or turn the power switch off once.
 - Stake-out operation can be carried out in the continuous measurement mode according to the similar operation procedure.

6.4 Coordinate Measurement with Data Collector

The coordinate measurement from a coordinate origine can be carried out after setting the coordinate of instrument point using Data collector.



Procedure


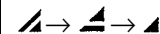
- ① Input the coordinate of instrument point from Data collector.
 - ② Collimate target A.
 - ③ Set the direction angle from Data collector.
 - ④ Collimate target B using horizontal tangent screw and horizontal motion clamp.
 - ⑤ Set the instrument for coordinate measurement mode pressing the [FUNC] key and the [ANG%] key to accept slope distance data from EDM.
 - ⑥ Set the EDM to the slope distance mode.
 N coordinate (\nearrow) and E coordinate (\searrow) from the set origin are measured repeatedly.
 Pressing the [FUNC] key and [ANG%] key, Z coordinate (\perp) key is measured repeatedly.
- Pressing the [FUNC] key and the [ANG%] key, N (\nearrow), E (\searrow) and Z (\perp) data is displayed alternately.
 - To return to the coordinate measurement with the origin at the instrument point, reset the coordinate of instrument point at (0,0,0).

7 SELECTING MODE

By operating the keys, the following modes are available.

7.1 Items of the Selecting Mode

Selecting Mode 1				
Digit No.	Items	Contents	Setting value 0	Setting value 1
1	Angle unit DEG/GON	Choose angle unit degree(DEG) or /gon(GON).	DEG	GON
2	Angle unit MIL	Choose angle unit MIL.	DEG/GON	MIL
3	V angle Z0 / H0	Choose the vertical angle reading from zenith or from horizontal.	Zenith 0	Horizontal 0
4	Minimum angle unit	Choose the minimum angle unit.	5"	1"
5	Tilt correction ON/OFF	Setting the function of tilt correction.	OFF	ON
6	Auto cut off ON/OFF	Setting the function of power off automatically when it is continued more than 30 minutes.	OFF	ON
7	REC TYPE	Select REC-A or REC-B for data output. REC-A : The measurement is started and new data is output. REC-B : The data being displayed is output.	REC-A	REC-B
8	CRLF	It is possible to output the data with carriage return and line feed.	OFF	ON

Selecting Mode 2				
Digit No.	Items	Contents	Setting value 0	Setting value 1
1	Distance unit	Choose measuring unit for distance meter or feet.	meter	feet
2	Distance display order	Choose the distance display order.		
3	H.I. error correction	Setting the function of the H.I. value (difference in instrument heights)	OFF	ON
4	W-Correction ON/OFF	Setting the function of the correction for refraction and earth curvature.	OFF	ON
5	W-Correction Coefficient	Set correction for refraction and earth curvature, coefficient of refraction as ; K=0.14	K=0.14	K=0.20
6	NEZ MEMORY	It is possible to retain the coordinate of instrument point after turning switch off.	OFF	ON
7	NEZ / ENZ	Select a coordinate displaying order either NEZ or ENZ.	NEZ	ENZ
8	Unused	—	—	—

7.2 How to Set Selecting Mode

● Selecting Mode 1

<Example Settings>: Minimum angle unit " 5" ", Tilt correction :OFF

Operating procedure	Operation	Display																																
① While pressing the [R/L] key, power ON. The current setting is shown with the digit No.1 blinking.	[R/L] + Power ON	<table border="1"> <tr><td>S</td><td>E</td><td>L</td><td>E</td><td>C</td><td>T</td><td> </td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td colspan="7"></td><td> </td></tr> <tr><td colspan="4">Digit No.8</td><td colspan="4">Digit No.1</td></tr> </table>	S	E	L	E	C	T		1	0	0	1	1	1	0	0	0									Digit No.8				Digit No.1			
S	E	L	E	C	T		1																											
0	0	1	1	1	0	0	0																											
Digit No.8				Digit No.1																														
② Let the digit No.4 to be set blink by pressing the [◀] key.	[◀]	<table border="1"> <tr><td>S</td><td>E</td><td>L</td><td>E</td><td>C</td><td>T</td><td> </td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td colspan="7"></td><td> </td></tr> <tr><td colspan="8">Blinking</td></tr> </table>	S	E	L	E	C	T		1	0	0	1	1	1	0	0	0									Blinking							
S	E	L	E	C	T		1																											
0	0	1	1	1	0	0	0																											
Blinking																																		
③ Press the [▲] key to set 0 for the digit.	[▲]	<table border="1"> <tr><td>S</td><td>E</td><td>L</td><td>E</td><td>C</td><td>T</td><td> </td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>	S	E	L	E	C	T		1	0	0	1	1	0	0	0	0																
S	E	L	E	C	T		1																											
0	0	1	1	0	0	0	0																											
④ Let the digit No.5 to be set blink by pressing the [◀] key.	[◀]	<table border="1"> <tr><td>S</td><td>E</td><td>L</td><td>E</td><td>C</td><td>T</td><td> </td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td colspan="7"></td><td> </td></tr> <tr><td colspan="8">Blinking</td></tr> </table>	S	E	L	E	C	T		1	0	0	1	1	0	0	0	0									Blinking							
S	E	L	E	C	T		1																											
0	0	1	1	0	0	0	0																											
Blinking																																		
⑤ Press the [▲] key to set 0 for the digit.	[▲]	<table border="1"> <tr><td>S</td><td>E</td><td>L</td><td>E</td><td>C</td><td>T</td><td> </td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>	S	E	L	E	C	T		1	0	0	1	0	0	0	0	0																
S	E	L	E	C	T		1																											
0	0	1	0	0	0	0	0																											
⑥ Press the [0 SET] key.	[0 SET]	<table border="1"> <tr><td>S</td><td>E</td><td>L</td><td>E</td><td>C</td><td>T</td><td> </td><td>1</td></tr> <tr><td colspan="7"></td><td>S</td><td>E</td><td>T</td></tr> </table>	S	E	L	E	C	T		1								S	E	T														
S	E	L	E	C	T		1																											
							S	E	T																									
⑦ Turn the power OFF.	Power OFF																																	
<ul style="list-style-type: none"> ● Pressing [▶] key, blinking digit moves to the right. Pressing the [▶] key while the digit No.1 is blinking, blinking digit moves to the digit No. 8. Pressing the [◀] key while the digit No.8 is blinking, blinking digit moves to the digit No.1. ● Every time pressing [▲] key, the blinking digit value 0/ 1 switches. 																																		

- **Selecting Mode 2**

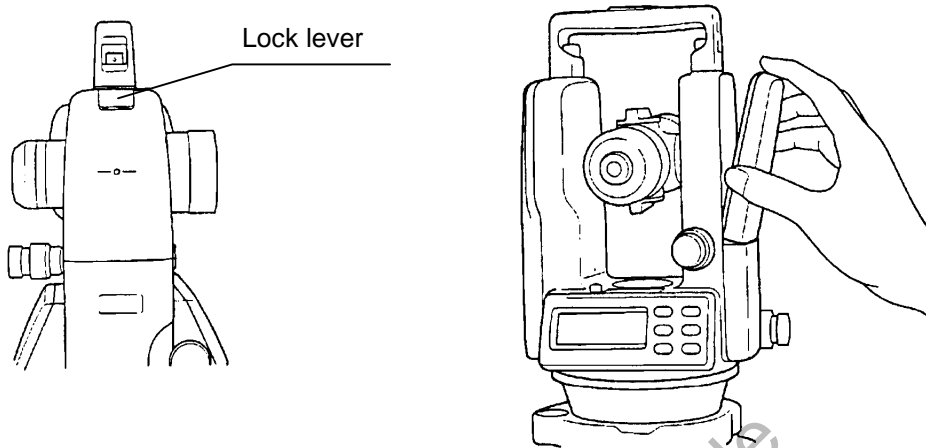
<Example Setting>:H.I. correction : ON , NEZ memory :ON

Operating procedure	Operation	Display
① While pressing the [ANG%] key, power ON. The current setting is shown with the digit No.1 blinking.	[ANG%] + Power ON	<pre> S E L E C T 2 0 0 0 0 0 0 1 0 Digit No.8 Digit No.1 </pre>
② Let the digit No.3 to be set blink by pressing the [◀] key.	[◀]	<pre> S E L E C T 2 0 0 0 0 0 0 1 0 Blinking </pre>
③ Press the [▲] key to set 1 for the digit.	[▲]	<pre> S E L E C T 2 0 0 0 0 0 1 1 0 </pre>
④ Let the digit No.6 to be set blink by pressing the [◀] key.	[◀]	<pre> S E L E C T 2 0 0 0 0 0 1 1 0 Blinking </pre>
⑤ Press the [▲] key to set 1 for the digit.	[▲]	<pre> S E L E C T 2 0 0 1 0 0 1 1 0 </pre>
⑥ Press the [0 SET] key.	[0 SET]	<pre> S E L E C T 2 S E T </pre>
⑦ Turn the power OFF.	Power OFF	
<ul style="list-style-type: none"> ● Pressing [▶] key, blinking digit moves to the right. Pressing the [▶] key while the digit No.1 is blinking, blinking digit moves to the digit No. 8. Pressing the [◀] key while the digit No.8 is blinking, blinking digit moves to the digit No.1. ● Every time pressing [▲] key, the blinking digit value 0/ 1 switches. 		

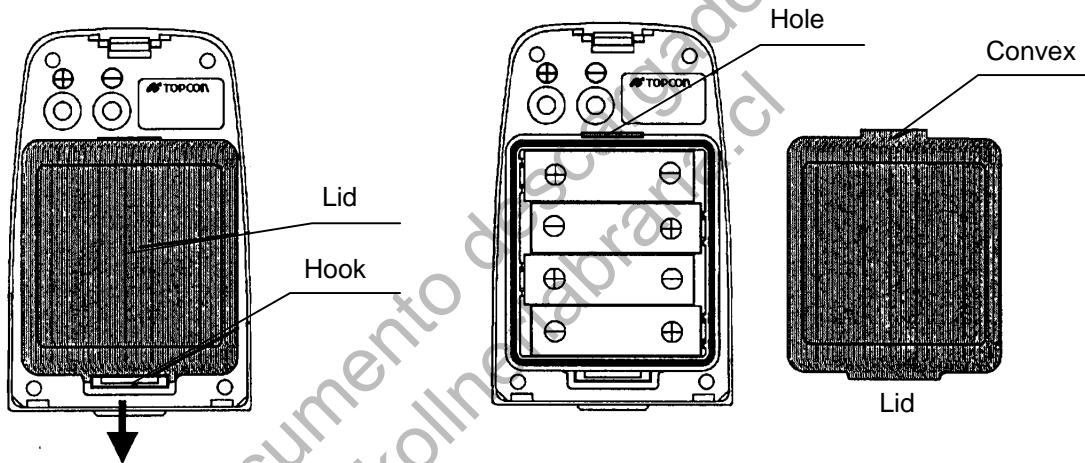
8 HANDLING POWER SOURCE

- **For removing**

Push the lock lever downward and pull out the battery



- **Replace of battery(DB-35)**



- ① Push the hook downward and take the lid out.
- ② Take out the old batteries and put new batteries as illustration shows in direction of $\oplus \ominus$.
- ③ Insert a convex in a upper hole. Click to close the lid by pressing it.

**Replace all 4 batteries to new ones at the same time.
Don't mix the old batteries to the new ones.**

- **For installing**

Place the base of the on-board battery into the main body, push the on-board battery toward the instrument side till the battery clicks into position.

9. CHECK AND ADJUSTMENT

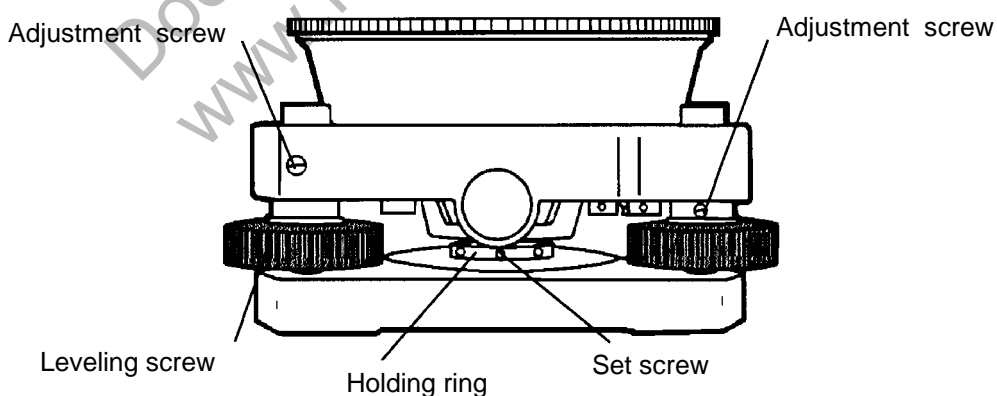
● Pointers on the Adjustment

- ① Adjust the eyepiece of the telescope properly prior to any checking operation which involves sighting through the telescope.
Remember to focus properly, with parallax completely eliminated.
- ② Carry out the adjustments in the order of item numbers, as the adjustments are dependent one upon another. Adjustments carried out in the wrong sequence may even nullify previous adjustment.
- ③ Always conclude adjustments by tightening the adjustment screws securely (but do not tighten them more than necessary, as you may strip the threads, twist off the screw or place undue stress on the parts).
Furthermore, always tighten by revolving in the direction of tightening tension.
- ④ The attachment screws must also be tightened sufficiently, upon completion of adjustments.
- ⑤ Always repeat checking operations after adjustments are made, in order to confirm results.

● Notes on the Tribrach

Note that the angle measuring precision may be effected directly if the tribrach has not been installed firmly.

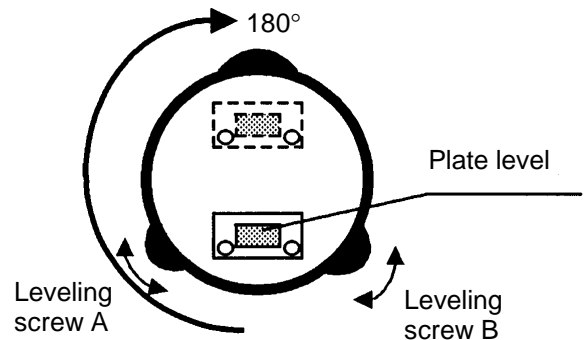
- ① If any leveling screw becomes loose and slack or if collimation is unstable due to the looseness of leveling screws, adjust by tightening the adjusting screws (in 2 places) installed over each leveling screw with a screwdriver
- ② If there is any slack between the leveling screws and the base, loosen the set screw of the holding ring and tighten the holding ring with adjusting pin, until it is properly adjusted. Re-tighten the set screw on completing the adjustment.



9.1 Checking /Adjusting the Plate Level

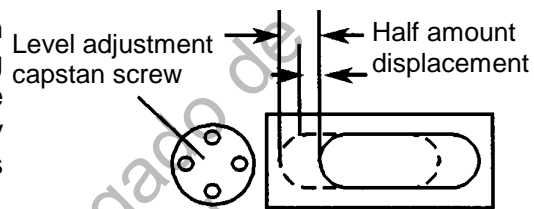
● Check

- ① Place the plate level parallel to a line running through the centers of two leveling screws, say, A and B. Use these two leveling screws only and place the bubble in the center of the plate level.
- ② Rotate the instrument 180° or 200° around the vertical axis and check bubble movement of the plate level. If the bubble has been displaced, then proceed with the following adjustment.



● Adjustment

- ① Adjust the level adjustment capstan screw, with the accessory adjusting pin and return the bubble towards the center of the plate level. Correct only one-half of the displacement by this method.
- ② Correct the remaining amount of the bubble displacement with the leveling screws.
- ③ Rotate the instrument 180° or 200° around the vertical axis once more and check bubble movement. If the bubble is still displaced, then repeat the adjustment.



9.2 Checking /Adjusting the Circular Level

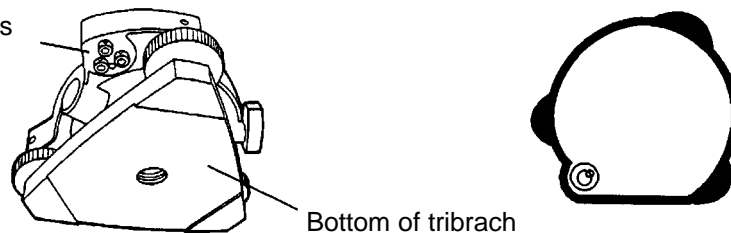
● Check

- ① Carefully level the instrument with the plate level only. If the bubble of the circular level is centered properly, adjustment is not required. Otherwise, proceed with the following adjustment.

● Adjustment

- ① Shift the bubble to the center of the circular level, by adjusting three capstan adjustment screws on the bottom surface of the circular level, with the accessory adjusting pin.

Capstan adjustment screws

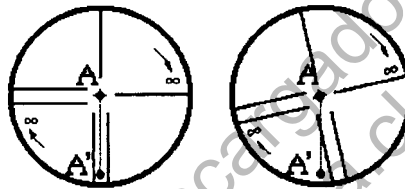


9.3 Adjustment of the Vertical Cross-hair

Adjustment is required if the vertical cross-hair is not in a plane perpendicular to the horizontal axis of the telescope (since it must be possible to use any point on the hair for measuring horizontal angles or running lines).

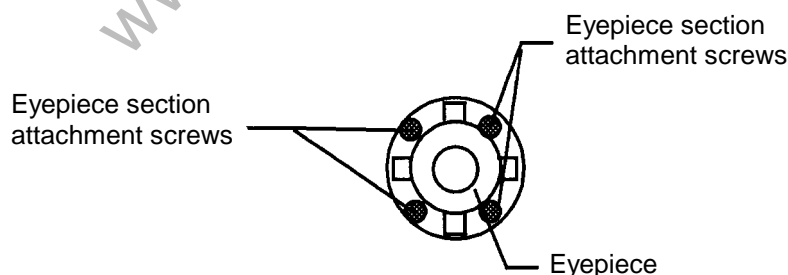
● Check

- ① Set the instrument up the tripod and carefully level it.
- ② Sight the cross-hairs on a well defined Point A at a distance of, at least, 50 meters (160ft.) .
- ③ Next swing the telescope vertically using the vertical jog and shuttle, and check whether the point travels along the length of the vertical cross-hair.
- ④ If the point appears to move continuously on the hair, the vertical cross-hair lies in a plane perpendicular to the horizontal axis (and adjustment is not required) .
- ⑤ However, if the point appears to be displaced from the vertical cross-hair, as the telescope is swung vertically, adjustment is required in the reticle plate.



● Adjustment

- ① Unscrew the cross-hair adjustment section cover, by revolving it in the counterclockwise direction, and take it off. This will expose four eyepiece section attachment screws.
- ② Loosen all four attachment screws slightly with the accessory screw-driver (while taking note of the number of revolutions).
Then revolve the eyepiece section so that the vertical cross-hair coincides to Point A'. Finally, re-tighten the four screws by the amount that they were loosened.
- ③ Check once more and if the point travels the entire length of the vertical cross-hair, further adjustment is not required.



Note : Perform following adjustment after complete above adjustment .

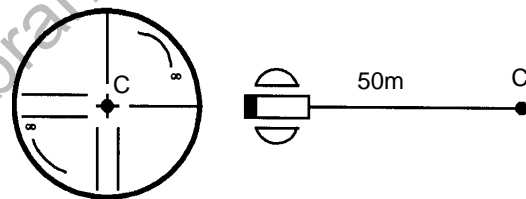
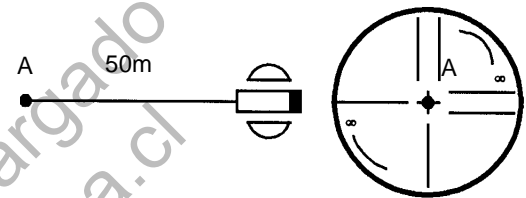
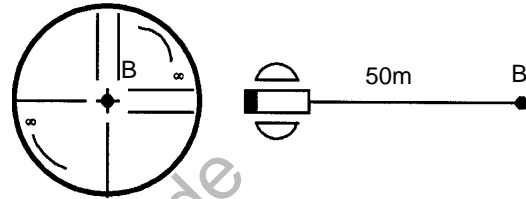
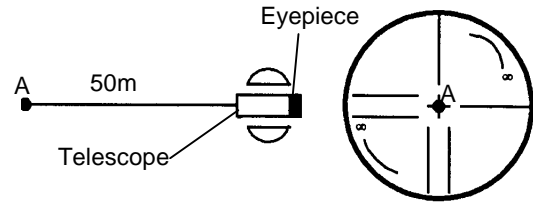
Chapter 9.4 "Collimation of the Instrument", Chapter 9.6 "Adjustment of Vertical Angle Zero Datum" .

9.4 Collimation of the Instrument

Collimation is required to make the line of sight of the telescope perpendicular to the horizontal axis of the instrument, as otherwise, it will not be possible to extend a straight line by direct means.

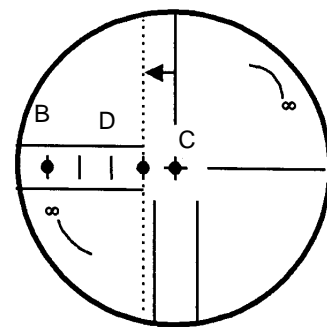
● Check

- ① Set the instrument up with clear sights of about 50 to 60 meters (160 to 200 ft.) on both sides of the instrument.
- ② Sight Point A at approximately 50 meters (160 t.) distance.
- ③ Use the vertical motion clamp and vertical tangent screw only and rotate the telescope 180° or $200g$ around the horizontal axis, so that the telescope is pointed in the opposite direction.
- ④ Sight Point B, at equal distance as Point A.
- ⑤ Use the horizontal motion clamp and horizontal tangent screw, and rotate the instrument 180° or $200g$ around the vertical axis. Fix a sight on Point A once more.
- ⑥ Use the vertical motion clamp and vertical tangent screw only and rotate the telescope 180° or $200g$ around the horizontal axis once more and fix a sight on Point C, which should coincide with previous Point B.
- ⑦ If Points B and C do not coincide, adjust in the following manner.

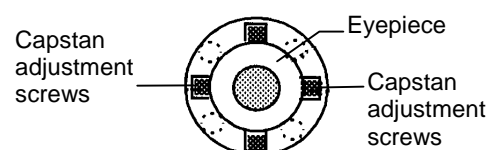


● Adjustment

- ① Unscrew the cross-hair adjustment section cover.
- ② Find Point D at a point between Points C and B, which should be equal to $1/4$ th the distance between Points B and C and measured from Point C. This is because the apparent error between Points B and C is four times the actual error since the telescope has been reversed twice during the checking operation.



- ③ Shift the vertical cross-hair line and coincide it with Point D, by revolving the left and right capstan adjustment screws with the adjusting pin. Upon completing the adjustment, repeat the checking operation once more. If Points B and C coincide, further adjustment is not required. Otherwise, repeat the adjustment.



Note1) : First, loosen the capstan adjustment screw on the side to which the vertical cross-hair line must be moved. Then tighten the adjustment screw on the opposite side by an equal amount which will leave the tension of the adjustment screws unchanged. Revolve in the counterclockwise direction to loosen and in the clockwise direction to tighten, but revolve as little as possible.

Note2) : Perform following adjustment after complete above adjustment . Chapter 9.6 "Adjustment of Vertical Angle 0 Datum".

9.5 Checking / Adjusting the Optical Plummet Telescope

Adjustment is required to make the line of sight of the optical plummet telescope coincide with the vertical axis (as otherwise the vertical axis will not be in the true vertical when the instrument is optically plumbed).

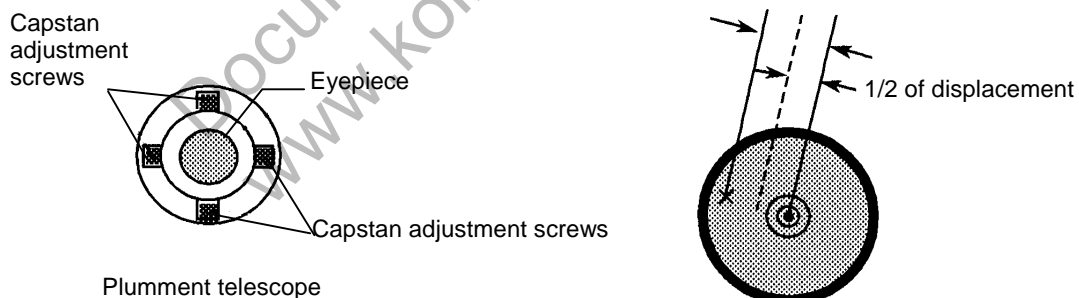
● Check

- ① Coincide the center mark and the point.
- ② Rotate the instrument 180° or $200g$ around the vertical axis and check the center mark.

If the point is properly centered in the center mark, adjustment is not required. Otherwise, adjust in the following manner.

● Adjustment

- ① Take off the adjustment section, rubber cap of the optical plummet telescope eyepiece, by revolving it in the counterclockwise direction, and take it off. This will expose four capstan adjustment screws which should be adjusted with the accessory adjusting pin to shift the center mark to the point. However, correct only one-half of the displacement in this manner.



- ② Use the leveling screws and coincide the point and center mark.
- ③ Rotate the instrument 180° or $200g$ around the vertical axis once more and check the center mark. If it is coincided to the point, then further adjustment is not required. Otherwise, repeat the adjustment.

Note : First, loosen the capstan adjustment screw on the side to which the center mark must be moved. Then tighten the adjustment screw on the opposite side by an equal amount which will leave the tension of the adjustment screws unchanged. Revolve in the counterclockwise direction to loosen and in the clockwise direction to tighten, but revolve as little as possible.

9.6 Adjustment of Vertical Angle 0 Datum

If when measuring the vertical angle of target A at telescope position normal (direct) and reverse settings, the amount of normal and reverse measurements combined is other than 360° (ZENITH-0), half of the difference from 360° is the error amount from corrected 0 setting. Carry out adjustment. As adjustment for vertical angle 0 setting is the criteria for determining instrument coordinate origin, use special care for adjustment.

Operating procedure	Operation	Display
① Level the instrument properly with the plate level.		
② While pressing the [OSET] key, turn the power switch ON.	[OSET] + Power ON	V 0 SET
③ Turn the telescope to do 0 set.	Turn Telescope	V TILT SETP 1
④ Collimate target A from the telescope properly in normal setting.	Collimate A (Normal)	
⑤ Press the [OSET] key.	[OSET]	V TILT SETP 2
⑥ Collimate target A in reverse telescope setting.	Collimate A (Reverse)	
⑦ Press the [OSET] key. Measured value is set and carry out normal angle measurement.	[OSET]	SET
⑧ Turn the power switch OFF.	Power OFF	
<ul style="list-style-type: none"> ● If there is any misoperation during checking, display for error appears. Then repeat the above procedure from the start. ● Check that the instrument works properly by sighting a target at normal and reverse telescope settings and check if the amount of normal and reverse setting is 360°. 		

10 CORRECTION FOR REFRACTION AND EARTH CURVATURE

The instrument measures distance, taking into account correction for refraction and earth curvature.

Note : If the telescope is positioned within $\pm 9^\circ$ from the nadir or zenith, no measurement will result even if the correction function for refraction and earth curvature works.
The display shows "E51".

10.1 Distance Calculation Formula

Distance Calculation Formula; with correction for refraction and earth curvature taken into account. Follow the Formula below for converting horizontal and vertical distances.

Horizontal distance $D=AC(\alpha)$ or $BE(\beta)$

Vertical distance $Z =BC(\alpha)$ or $EA(\beta)$

$D=L\{\cos\alpha-(2\theta-\gamma)\sin\alpha\}$

$Z=L\{\sin\alpha-(\theta-\gamma)\cos\alpha\}$

$\theta=L \cdot \cos\alpha/2R$

$\gamma=K \cdot L \cos\alpha/2R$

$K=0.14$ or 0.2

$R=6372\text{km}$

α (or β)

L

Earth curvature correcting item

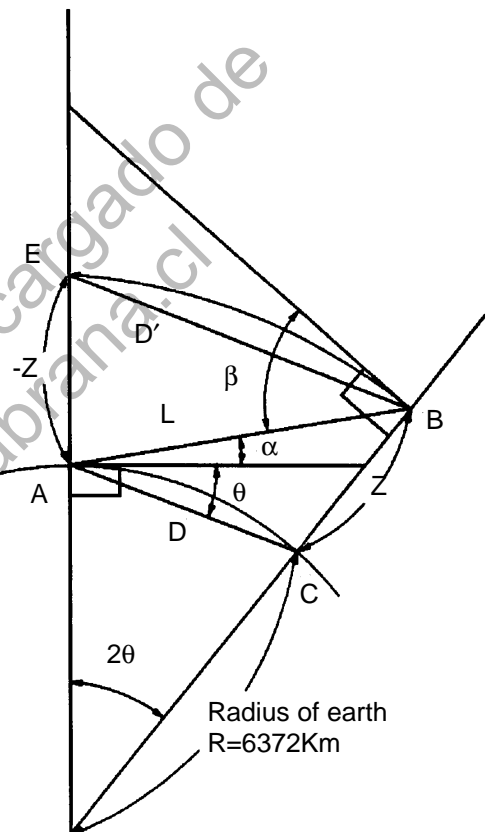
Atmospheric refraction correcting item

Coefficient of refraction

Radius of earth

Altitude angle

Slope distance



- The conversion formula for horizontal and vertical distances is as follows when correction for refraction and earth curvature is not applied.

$D=L \cdot \cos\alpha$

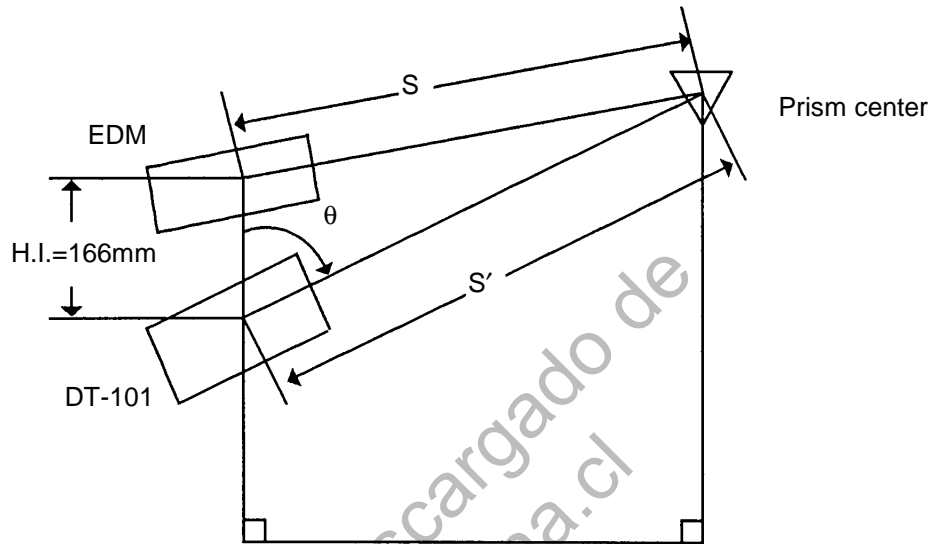
$Z=L \cdot \sin\alpha$

Note : The coefficient of the instrument has been set at 0.14 before shipment ($K=0.14$). if the "K" value is to be changed, refer to "13. Selecting mode".

11 CORRECTION FOR H.I. VALUE

If a measurement is performed as shown below without using a target, a slope distance measured with an EDM will be accompanied by an error corresponding to H.I. value (difference in instrument height).

DT-101 is available automatically taking into account correction for an error. Refer to chapter 7 "SELECTING MODE"



- **Calculation for H.I. Correction (Reference)**

H.I. error correction is obtained in the following manner.

$$S' = 0.166 \cos\theta + \sqrt{S^2 - (0.166 \sin\theta)^2}$$

- S' : Slope distance from DT-101
- S : Measured distance from EDM
- θ : Zenith angle from DT-101

12 DETACH/ATTACH OF TRIBRACH

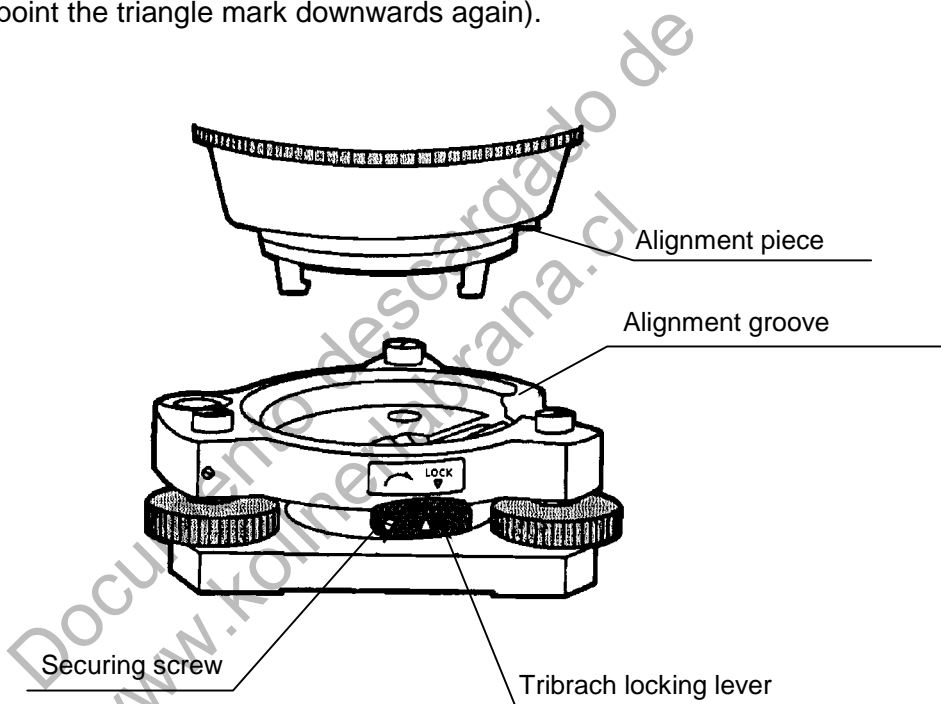
The instrument is easily detached or attached to the tribrach, with a tribrach fixing lever loosened or tightened for this purpose.

- **Detachment**

- ① Loosen the tribrach fixing lever, by revolving it 180° or 200g in the counterclockwise direction (which will point the triangle mark upwards).
- ② Grip the carrying handle firmly with one hand while holding the tribrach with the other. Then lift the instrument straight upwards and off.

- **Attachment**

- ① Hold the instrument by the carrying handle, with one hand, and carefully lower it on top of the tribrach while, at the same time, coinciding the alignment piece with the tribrach alignment groove on the instrument and tribrach respectively.
- ② When fully seated, revolve the tribrach fixing lever 180° or 200g clockwise (which will point the triangle mark downwards again).



- **Locking the Tribrach Fixing Lever**

The tribrach fixing lever can be locked, to prevent it be accidentally removed, especially if the upper instrument section is not being detached very often. Simply tighten the securing screw on the fixing lever with the accessory screwdriver, found in the case.

13 PRECAUTIONS

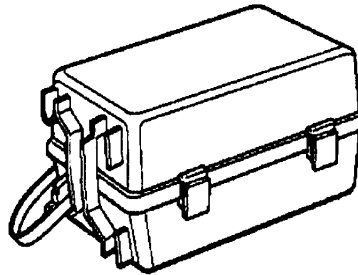
1. For transportation, hold by the handle or yoke of the instrument. Never hold by the lens barrel as it can affect the fixing bracket inside and reduce the accuracy of the instrument.
2. Never expose the instrument without a filter to direct sunlight. It may damage the components inside the instrument.
3. Never leave the instrument unprotected in high temperature. The temperature inside instrument may easily reach up to 70°C or above and will reduce the service life.
4. When a high degree of precision is required for measurement, provide shade against direct sunlight for the instrument and tripod.
5. Any sudden change of temperature to the instrument or prism may result in a reduction of measuring distance range, i.e. when taking the instrument out from a heated vehicle.
6. When opening the carrying case and taking out the instrument, place the case horizontally, then open the case.
7. When storing the instrument in the case, always align the white indication marks on the instrument, and set the telescope at the vertical position.
8. For transportation, provide dampening or a cushion appropriately to avoid sudden shock or vibration.
9. For cleaning the instrument after use, remove dust using a cleaning brush, then wipe off with a cloth.
10. For cleaning the lens surface, use a cleaning brush to remove the dust, then use a clean lintless cotton cloth. Moisten it with alcohol (or mixture with ether) to wipe gently in a rotational motion from the center out.
11. Even if any abnormality occurs, never attempt to disassemble or lubricate the instrument yourself. Always consult with TOPCON or your dealer.
12. To remove the dust on the case, never use thinner or benzine. Use a clean cloth moistened with neutral detergent.
13. Check each part of the tripod after extended use. Parts (screws or clamps) may work themselves free.

14 OPTIONAL ACCESSORIES

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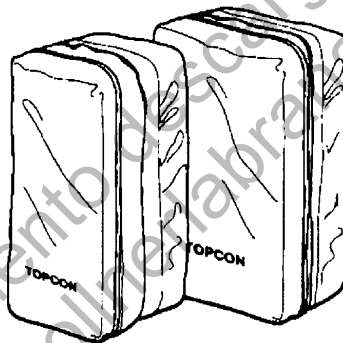
Data collector

Suitable for systemization of measuring instrument. Measuring data will be automatically stored and transferred to a computer system, making measuring operations more efficient and saving time and effort in such operation.

**Prism unit case, Model 3**

This is the plastic case to store and carry various sets of prisms. The case covers one of the following prism sets:

- Tilt single prism set
- Tilt single prism set with a target plate
- Fixed triple prism unit
- Fixed triple prism unit with a target plate
- External dimensions:
427(L)×254(W)×242(H) mm
- Weight:3.1kg

**Prism unit case, Model 6**

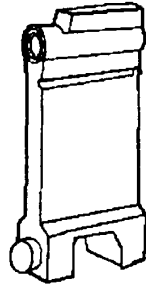
Fixed 9 prisms unit or tilting 3 prisms unit can be stored in this case. Especially, this is a very easy case to carry. Soft material is used.

- External dimensions:
250(L)×120(W)×400(H) mm
- Weight:0.5kg

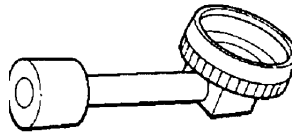
Prism unit case, Model 5

1 prisms unit or fixed 3 prisms unit can be stored in this case. Especially, this is a very easy case to carry. Soft material is used.

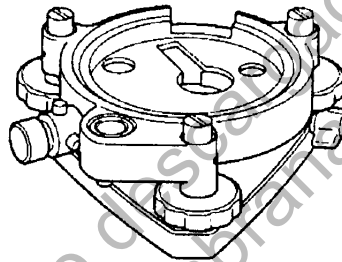
- External dimensions:
200(L)×200(W)×350(H) mm
- Weight:0.5kg

**Trough Compass-5**

The trough compass is simply mounted on top of the carrying handle

**Diagonal Eyepiece**

Observation in an easy posture will be provided up to the zenith position

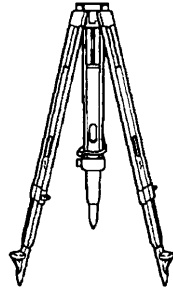
**Optical plummet tribrach**

This is detachable tribrach having built-in optical plummet telescope
(Compatible with Wild)

**Gadget case, Model 1**

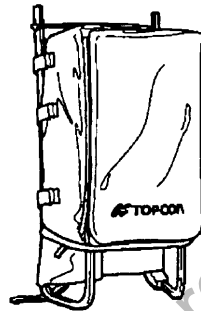
A case to store and carry accessories.

- External dimensions:
300(L)×145(W)×220(H) mm
- Weight:1.4kg



Wide-frame extension leg tripod, Type E (Wood)

- Flat head 5/8" × 11 threads with adjustable legs.



Back pack, Model 2

Convenient for use in mountainous terrain.

Prism sets

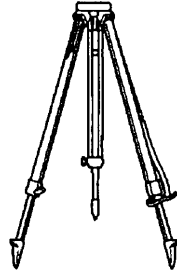
See the description on Chapter 15 "TARGET (PRISM) SYSTEM".

Eyepiece prism

The eyepiece prism is supplied with a single dark filter glass for use on the telescope and is very convenient when tilting the telescope up to 40° from the zenith. The images are observed upside down, but not reversed laterally.

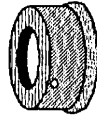
symbol 129 f "Wingdings" \s 10①“ Simply screw the eyepiece prism directly into the female screw mounts on the eyepiece of the telescope.

symbol 130 f "Wingdings" \s 10②“ Use the dark filter glass (with spring clips) on the eyepiece prism fixed to the telescope eyepiece, when observing the sun directly, otherwise take it off for normal use.



**Aluminum extension leg tripod,
Type E**

- Flat head 5/8" symbol 180 \f "Symbol" \s 10× 11 threads with adjustable legs.



Eyepiece (26symbol 180 \f "Symbol" \s 11x)



Solar reticle, Model 5

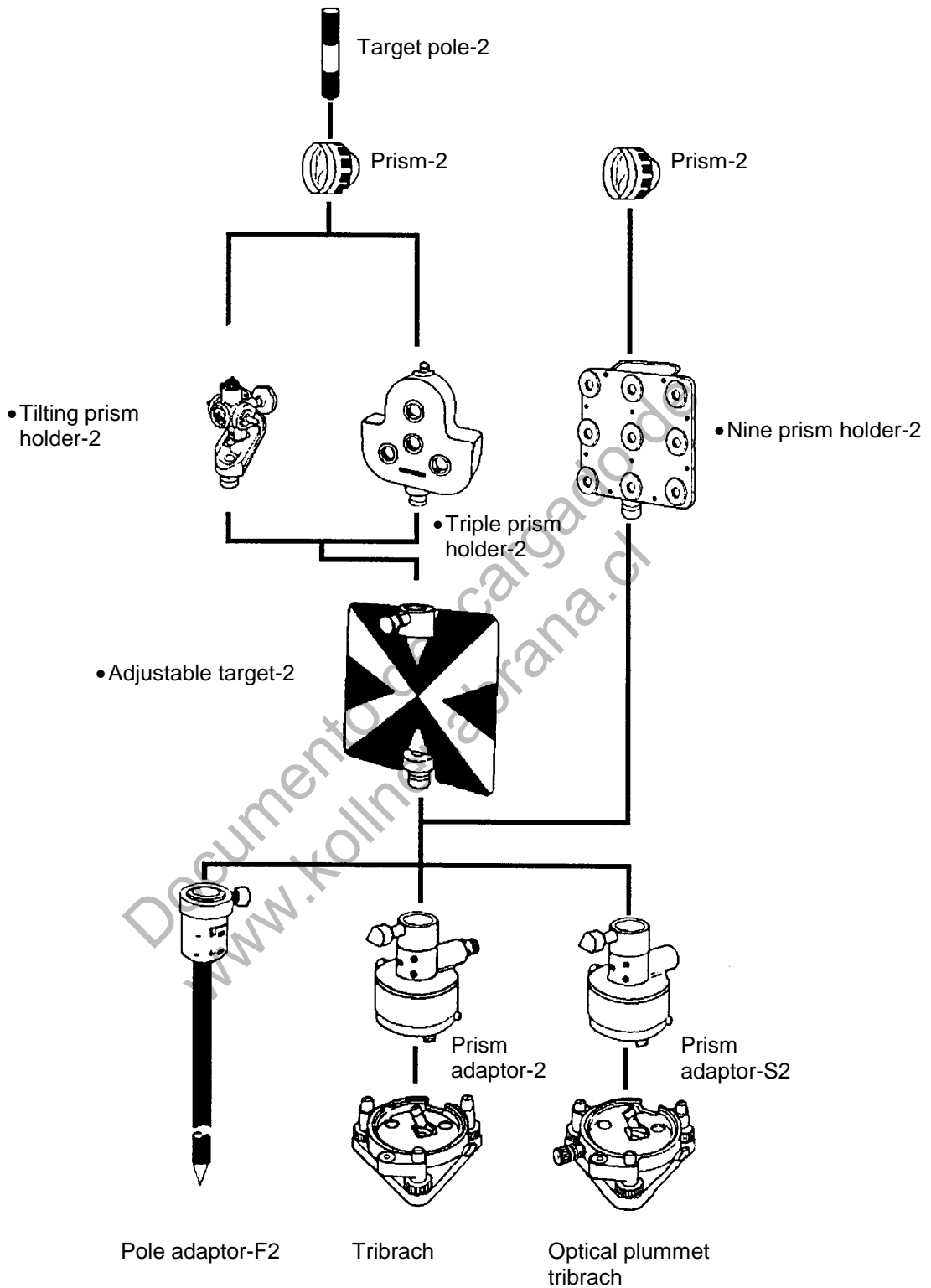
A reticle designed for collimation of the sun.
Can be used together with Solar Filter.



Solar filter

A filter designed exclusively for direct collimation of the sun.

15 TARGET (PRISM) SYSTEM



16 ERROR DISPLAYS

Display	Contents	Countermeasure
b	Instrument tilts over than 3 minutes.	Level the instrument properly.
E01	Displayed when the instrument rotated abnormally.	Pressing [0SET] key, returns to measuring mode.
E02	Displayed when the telescope rotated abnormally.	Press [0SET] key, and after display of "0 SET", set vertical angle zero set by rotating telescope.
E03	Displayed when a internal problem exists with the angle measuring system.	Switch OFF the power , then ON again. Sometimes error occurs when vibrates, clear the vibration.
E04	Displayed when the discrepancy value of each measuring is more than 30" while repetition angle measurement is operated.	Press [0SET] key, measure again from the beginning.
E51	Displayed when measurement carried out within $\pm 9^\circ$ from zenith or nadir at the Earth curvature and refraction correction mode is ON.	Set correction for refraction and earth curvature mode OFF or measure out of $\pm 9^\circ$ from the zenith or Nadir.
E70	When "Adjustment of Vertical Angle 0 Datum" is adjusted in wrong procedure. When "Adjustment of Vertical Angle 0 Datum" is carried out to the range out of $\pm 45^\circ$ from horizontal .	Switch OFF the power , then ON again. Confirm the procedure and adjust again.
E80's	Mainly at the time data transmission between DT-101 and external instrument.	Confirm the connection cables and the operation procedure are correct.
E99	Abnormality in internal memory system while "Adjustment of Vertical Angle 0 Datum" is operated.	Switch OFF the power , then ON again. Confirm the procedure and adjust again.

- If errors still persist after attempting to clear them, contact your local TOPCON dealer or TOPCON Head office.

17 SPECIFICATIONS

Telescope	Length	149mm
	Objective lens	45mm
	Magnification	30×
	Image	Erect
	Field of view	1°30'
	Resolving power	2.5"
	Minimum focus	90cm
	Stadia ratio	100
	Stadia constant	0
Electronic Angle Measurement	Method	Incremental reading
	Detecting	Horizontal: 2side Vertical: 2side
	Minimum reading	1"/5"(0.2mgon/1mgon)
	Accuracy *1)	2"
	Diameter circle	71mm
Display	Unit	2side
Illumination	Display	○
	Reticle	○
Compensator	Tilt sensor	Automatic vertical compensator
	Compensating range	±3'
Optical Plummet Telescope	Magnification	3×
	Field of view	5°
	Focusing	0.5m~∞
Level Sensitivity	Plate level	30" / 2mm
	Circular level	10' / 2mm
Power Supply	Battery	4 AA batteries
Operating Time	Alkaline manganese dry battery	12 hours
Size	Instrument height	176mm (6.93in)
	Dimension D×W×H(mm)	149×180×313 (5.87×7.09×12.3 in)
	Weight (Including batteries)	4.4 kg(9.7 lb)

*1) Standard deviation based on DIN 18723



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