6.2 Distance measurement

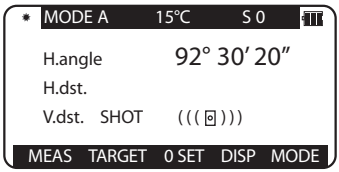
The R-300X series has two distance measurement modes of primary MEAS and second MEAS. Pressing the [F1] [MEAS] one time goes to MEAS and twice goes to second MEAS. You can freely select and allocate your desired measurement mode in primary MEAS and second MEAS by the Initial Setting 2. The "MEASURE SHOT" is set at primary MEAS and "TRACK CONT" is set at second MEAS as a Factory default setting.

- MEASURE SHOT means the distance measurement by the shot mode.
- MEASURE CONT means the distance measurement by the continuous mode.
- TRACK SHOT means the fast distance measurement by the shot mode.
- TRACK CONT means the fast distance measurement by the continuous mode.

Confirm the target constant before beginning the distance measurement.

Example: "MEASURE SHOT" at primary MEAS (Factory default setting)

Collimate the telescope at a target and press the [F1] [MEAS] once to start measuring the distance. Once distance measurement has been started, the distance measurement mark remains displayed. Upon reception of a reflected light from the target, the instrument beeps and displays the

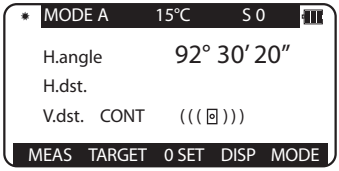


- mark to start the shot measurement automatically.
- If the instrument is in mode B, press the [F5] [MODE] to switch to mode A and press [F1] [MEAS].
- Pressing the [F1] [MEAS] after collimating the telescope at the prism starts shot distance measurement with the "MEAS" text blinking. Distance measurement is completed and the "MEAS" text stops blinking the moment the distance measured by shot measurement is displayed. During continuous measurement, the "MEAS" text keeps on blinking. Pressing the [F1] [MEAS] again terminates both distance measurement and blinking the "MEAS" text.
- Pressing [F4] [DISP] cycles through the sets of display items: "H.angle/H.dst./V.dst.", "H.angle/V.angle/S.dst.", and "H.angle/V.angle/H.dst./S.dst./V.dst."
- Pressing the [ESC] or [F2] [TARGET] or [F5] [MODE] during distance measurement stops it.

- If the shot count for distance measurement has been set to 2 or more in "Initial Setting 2", the distance is measured for the specified number of times to display the averaged value.
- If the automatic distance measurement: [AUTO MEAS] in "Initial Setting 2" has been set to "MEAS" the first measurement is started only by aiming at the Target. Press [F1] [MEAS] for each measurement after the first one.
- If the automatic distance signal: [MEAS SIGNAL] in "Initial Setting 2" has been set to VALUE, a two-digit number representing the AIM value appears as soon as measurement starts (The AIM value varies depending on the distance and atmospheric conditions.)
- The minimum distance unit : [MEAN. MIN DISP] COARSE or FINE can be selected by the initial setting 2.

Example: "TRACK CONT" at second MEAS (Factory default setting)

Collimate the telescope at a Target and press [F1] [MEAS] twice in succession to start measuring the distance, upon reception of a reflected light from the target, the instrument beeps and displays the _ mark to start the TRACK distance measurement.

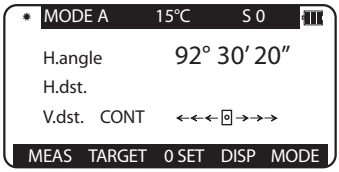


- If the instrument is in mode B, press [F5] [MODE] to switch to mode A and press [F1] [MEAS] twice.
- Pressing [F1] [MEAS] twice after collimating the telescope at the Target starts Continuous distance measurement at fast speed with the "MEAS" text blinking. It remains blinking during the measurement. If you press the [F1] [MEAS] again, Distance measurement is completed and the "MEAS" text stops blinking.
- Pressing [F4] [DISP] cycles through the sets of display items: "H.angle/H.dst./V.dst.", "H.angle/V.angle/S.dst.", and "H.angle/V.angle/H.dst./S.dst./V.dst."
- Pressing the [ESC] or [F2] [TARGET] or [F5] [MODE] during fast distance measurement stops it.

6.3 Quick mode

The Quick Mode is to shorten the measuring time using prism or reflector sheet.

- The Quick Mode is effective to measure the distance up to 500M using prism or reflector sheet.
- After selecting Quick Mode from the Quick Mode setting screen, the distance measurement is done in Quick Mode.
- If the quick mode is selected, the distance measurement mark, "<-<- ->->", instead of "((( )))", is displayed



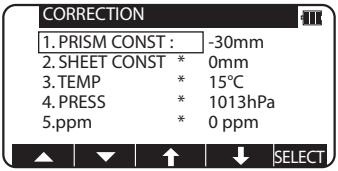
7. CORRECTION MODE

7.1 Changing the target constant

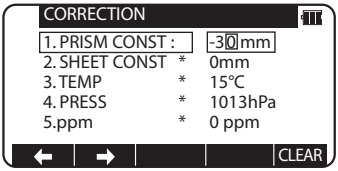
Changing the Target Constant can be performed only when the Reflector sheet and Prism Constant settings are "INPUT" in Initial Setting 1.

Example: Prism Constant - 25mm setting

Press [F4] [CORR] in mode B.
(If the instrument is in mode A,
press [F5] [MODE] to enter mode B.)
(SHEET CONST: Reflector sheet constant)

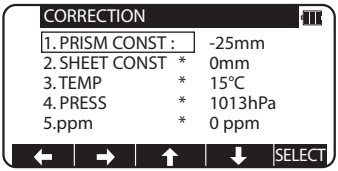


Press the [F5] [SELECT] to enable
the Prism Constant to be changed.

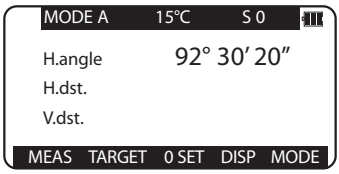


Clear the exiting values by pressing [CLEAR] key. Input 25 by pressing the numeric keys.

Press the [ENT] key to accept the Prism
Constant to -25mm.



Pressing the [ENT] key returns the instrument
to mode A.



- To set the Reflector sheet constant to "0" select "0" for "Prism Constant" in "Initial Setting 1".
- To set the Prism constant to "0" or "- 30" select "0" or "- 30" for "Prism Constant" in "Initial Setting 1".
- When the "Reflector sheet Constant" has been set to "0" in Initial Setting 1 and "Prism Constant" has been set to "0" or "- 30", " " is displayed to the left of "0" or "- 30" on the correction menu screen. When " " is on the screen, the Constant cannot be changed (by entering a numeric key).

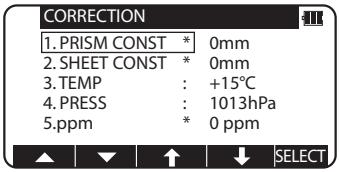
- Once set, the Reflector sheet Constant and Prism Constant remains on the measurement screen as "S 0" or "P 0".
- The factory initial of Reflector sheet Constant and Prism Constant are 0.
- Once set, each Constant remains in memory even after the power is turned off.

7.2 Changing the temperature

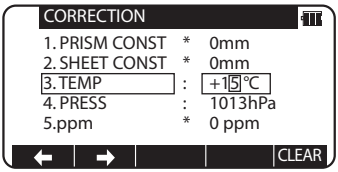
The temperature setting can be changed only when "Atmospheric Correction" has been set to "ATM INPUT" in "Initial Setting 1".

Example: Setting the temperature to +22℃

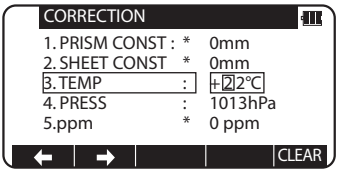
Press [F4] [CORR] in mode B.
(If the instrument is in mode A,
press [F5] [MODE] to enter mode B.)



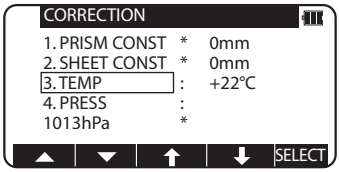
Press [F4] [⇧] to move the cursor to "3.TEMP"
and press the [F5] [SELECT]
to enable the temperature to be changed.



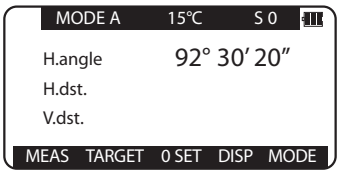
Clear the exiting values by pressing [CLEAR] key.
Input 22 by pressing the numeric keys.



Press the [ENT] key to accept the
temperature to +22℃.



Pressing the [ENT] key returns
the instrument to mode A.



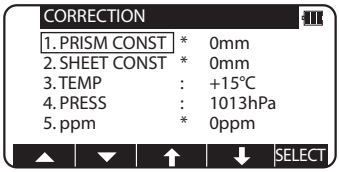
- The valid range of Temperatue input is from -30°C to +60°C.
- When "Atmospheric Correction" in "Initial Setting 1" has been set to "1 . AUTO" or "4. NIL", " " is displayed to the left of the temperature value on the correction menu screen. When " " is on the screen, the temperature cannot be changed.
  If "Atmospheric Correction" in "Initial Setting 1" has been set to "3. ppm INPUT", no temperature is displayed on the correction menu screen.
- Once set, the temperature is displayed at the center of the top of the measurement screen.
- The factory initial of temperature is "1. AUTO".
- Once set, the temperature remains in memory even after the power is turned off.
- Temperature correction is based on 15°C.
  If this instrument is used without correcting the temperature, a distance error per 100m is about -0.1mm per +1°C as a temperature difference from 15°C.
  A distance error per 100m is about 0.1mm per -1°C as a temperature difference from 15°C. (For more accurate values, See "13.4 Error when no Atmospheric Correction is made".)

7.3 Changing the atmospheric pressure

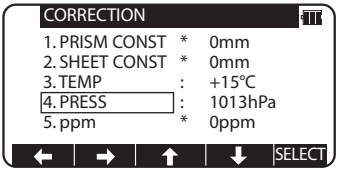
The atmospheric pressure setting can be changed only when "Atmospheric Correction" has been set to "ATM INPUT" in "Initial Setting 1".

Example: Setting the pressure to 900hPa

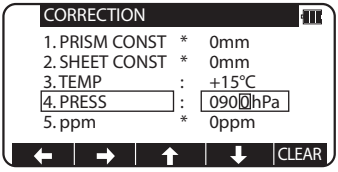
Press [F4] [CORR] in mode B.
(If the instrument is in mode A, press [F5] [MODE] to enter mode B.)



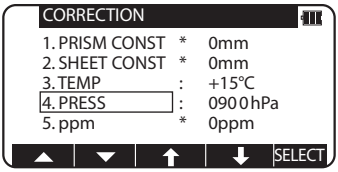
Press [F4] [⇧] to move the cursor to "4.PRESS" and press the [F5] [SELECT] to enable the temperature to be changed.



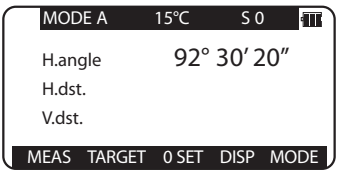
Clear the exiting values by pressing [CLEAR] key.
Input 900 by pressing the numeric keys.



Press the [ENT] key to accept the PRESS to 900hPa.



Pressing the [ENT] key returns the instrument to mode A.



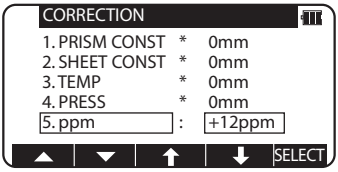
- The valid range of Pressure input is from 600 to 1120hPa. (420 - 840mmHg)
- When "Atmospheric Correction" in "Initial Setting 1" has been set to "1. AUTO" or "4. NIL", " " is displayed to the left of the pressure value on the correction menu screen. When " " is on the screen, the pressure cannot be changed. If "Atmospheric Correction" in "Initial Setting 1" has been set to "3.ppm INPUT", no pressure is displayed on the correction menu screen.
- Once set, the pressure is displayed at the center of the top of the measurement screen.
- The factory initial of pressure is "1. AUTO".
- Once set, the pressure remains in memory even after the power is turned off.
- Pressure correction is based on 1013 hectopascals (hPa).
- If this instrument is used without correcting the pressure, a distance error per 100m is about -0.3mm per -10hPa as a pressure difference from 1013hPa. (For more accurate values, see "13.4 Error when no Atmospheric Correction is made".)

7.4 Changing the ppm value

The ppm value can be changed only when "Atmospheric Correction" has been set to "ppm INPUT" in "Initial Setting 1". "TEMP" and "PRESS" are not displayed.

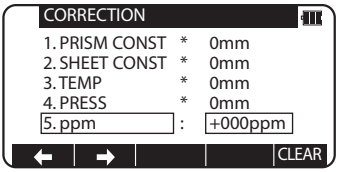
Example: Setting the ppm value to 31 ppm

Press [F4] [CORR] in mode B.
(If the instrument is in mode A, press [F5] [MODE] to enter mode B.)

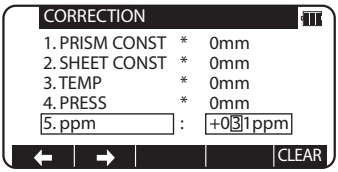


Press [F4] [⇧] to move the cursor to "3. ppm" and press the [F5] [SELECT] to enable the temperature to be changed.

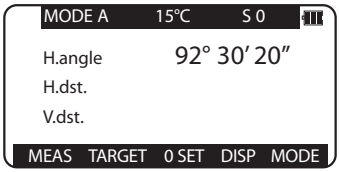
Press the [CLEAR] key.



Input 31 by pressing numeric keys.



Pressing the [ESC] key returns the instrument to mode A.



- The valid range of ppm values is from -199 to +199.
- Once set, the ppm value is displayed at the center of the top of the measurement screen.
- The factory initial of ppm value is "1. AUTO".
- Once set, the ppm value remains in memory even after the power is turned off.

8. INITIAL SETTING

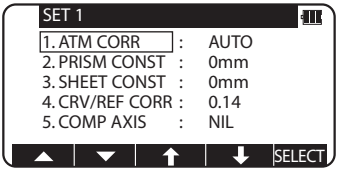
8.1 Overview

For the R-300X series, you can select and save the desired setting for a variety of prescribed instrument conditions, called Initial Setting.
The Initial Setting is saved in five modes, "Initial Setting 1", "Initial Setting 2", "Initial Setting 4", "Initial Setting 5", and "Setting of Date and Time " in which you can select and save the instrument conditions described below.
The factory default for each of these conditions is marked by ☐ .
To change Initial Setting, follow the operating procedures for entering each Initial Setting mode on "8.2" and the operating procedures for changing an Initial Setting on "8.2".

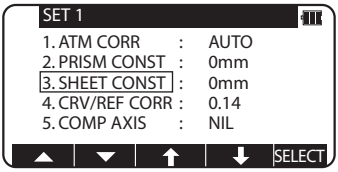
- There is no Date and Time setting with the models R-315EX, R-325EX, R-326EX and R-335EX.

8.2 Entering the mode for initial setting 1

Press the [POWER] key while holding [F1] key down to access the screen for Initial Setting 1.

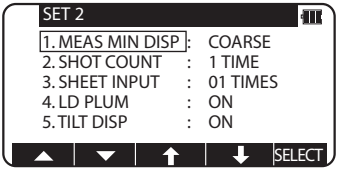


Press [F3] [⇧] or [F4] [⇩] to position the cursor at the item of interest.



8.3 Entering the mode for initial setting 2

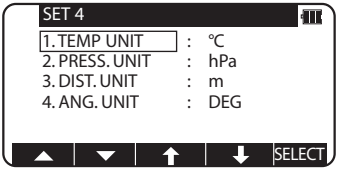
Press the [POWER] key while holding [F2] key down to access the screen for Initial setting 2.



- Select the item of interest in the same way as in the mode for Initial setting 1.
- Pressing [F2] [▽] scrolls the screen down five items; pressing [F1] [△] scrolls it up five items.

8.4 Entering the mode for initial setting 4

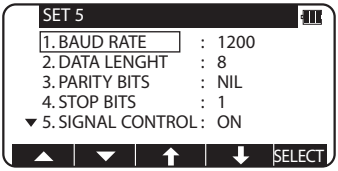
Press the [POWER] key while holding [F4] key down to access the screen for Initial setting 4.



- Select the item of interest in the same way as in the mode for Initial setting 1.

8.5 Entering the mode for initial setting 5

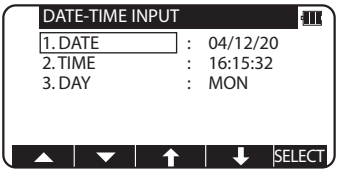
Press the [POWER] key while holding [F5] key down to access the screen for Initial setting 5.



- Select the item of interest in the same way as in the mode for Initial setting 1.
- Pressing [F2] [▽] scrolls the screen down five items; pressing [F1] [△] scrolls it up five items.

8.6 Setting of [date and time]

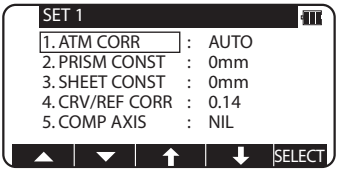
(Except the R-315EX, R-325EX, R-326EX and R-335EX)
Turn on the power while pressing the [F3] key. Then the screen showing date and time appears.



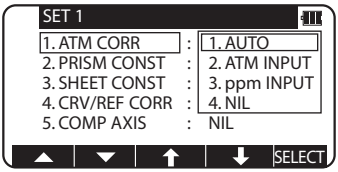
8.7 Example of changing an initial setting content (selection of atmospheric correction)

This section describes the operating procedures for selecting "1.ATM CORR" in Initial Setting 1 as an example of changing an Initial Setting content. Use this example as a reference when changing other items because it is also applicable to the operating procedures for changing them.

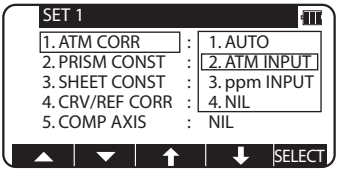
Access the screen for Initial Setting 1 by taking procedures "8.2 Entering the Mode for Initial Setting 1".



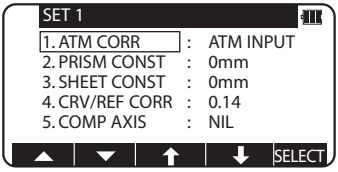
Press [F5] [SELECT] to open the screen for selecting the atmospheric correction.



Press [F3] [⇧] or [F4] [⇩] to position the cursor at the desired item, then press [ENT] key to select that item.
Pressing the [ENT] key settles the change of selected item. Pressing the [ESC] key invalidates the change of selected item.

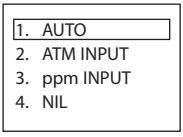


Pressing again the [ESC] key or [ENT] key quits the initial setting screen and usual start screen appears.

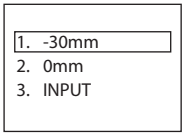


8.8 Initial setting 1

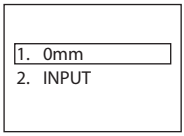
1. Selection of **Atmospheric Correction**: [ATM CORR]
   Select whether Atmospheric Correction is to be performed by using the automatic measurement correction function with a atmospheric sensor, by entering the atmospheric temperature and pressure measured with a thermometer and barometer, by entering ppm value, or by fixing the ppm value to 0 (NIL) not to perform Atmospheric Correction.



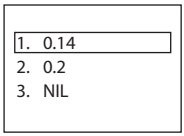
2. Selection of **Prism Constant**: [PRISM CONST]
   Select whether the Prism Constant to be input is set to 0mm, -30mm or to an arbitrary value to be entered from the keyboard.



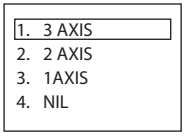
3. Selection of **Reflector sheet Constant**: [SHEET CONST]
   Select whether the target constant to be input is set to 0mm, or to an arbitrary value to be entered from the keyboard.

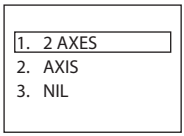


4. Selection for **Refraction & Curvature Corrections**: [CRV/REF CORR]
   Select whether the correction factor to be input for both differences (Refraction, Curvature) is set to 0.14, 0.2 or none (NIL). Selecting "3. NIL" results in no correction of both values.



5. Selection of **Tilt Compensation**: [COMP AXIS]
   Select whether Tilt Compensation is to be single-axis compensation, dual-axis compensation, or disabled (NIL)

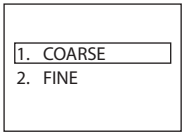




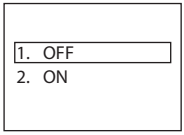
- The factory default for each instrument condition is marked by [ ].

8.9 Initial setting 2

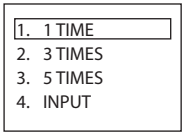
1. Selection of **Minimum Distance measurement unit**: [MEAS. MIN DISP]
   COARSE or FINE:



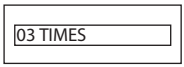
2. Setting of the Quick Mode: [QUICK MEAS]
   OFF or ON:



3. Selection of the **Shot count**: [SHOT COUNT]
   Select whether the shot count for Shot distance measurement is to be 1,3, 5 or an arbitrary count to be entered.

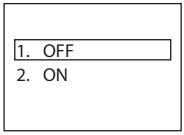


4. Setting the **Shot input**: [SHOT INPUT]
   Set the shot number for Shot distance measurement.

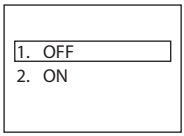


   • The valid range of values for the shot number is from 1 to 99.
   • This setting is enabled only when the shot number (Above 2.) has been set to "4. INPUT".

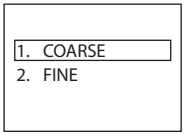
5. Selection of **Laser plummet**: [LD PLUM.]
   Laser plumb ON/OFF is selected.



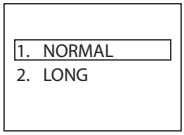
6. Selection of **Tilting angle display**: [TILT DISP.]
   X and Y tilting values are displayed.



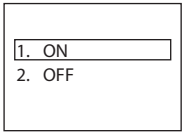
7. Selection for **Minimum tilt display**: [TILT DISP. UNIT]
   COARSE or FINE:



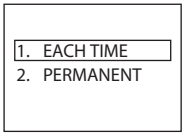
8. Selection of **Reflectorless range**: [RANGE]
   If you need the Normal or Long range.



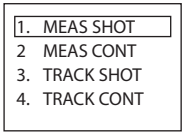
9. Selection of **Long range message**: [MESSAGE]
   If you need the long range message.



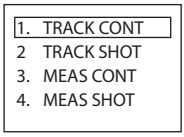
10. Selection of **Long range setup**: [SET UP]
    If the above No.7 selection is required each time or permanent.



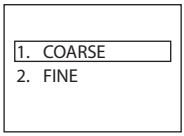
11. Selection of **primary MEAS setting**: [PRIM. MEAS KEY]
    Select whether the primary distance measurement is MEAS SHOT or MEAS CONT or TRACK SHOT or TRACK CONT.



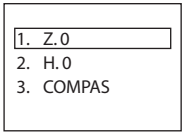
12. Selection of **second MEAS setting**: [SEC. MEAS KEY]
Select whether the second distance measurement is TRACK CONT or TRACK SHOT or MEAS CONT or MEAS SHOT.



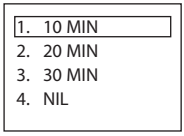
13. Selection of **Minimum angle display**: [MIN UNIT ANG]
Select whether to set the minimum angle display mode to "COARSE (5 seconds)" or "FINE (1 second)".



14. Selection of **Vertical angle style**: [V. ANG. STYLE]
Select whether the 0 point for vertical angle is set to be "Z.0", "H.0" or "COMPAS".

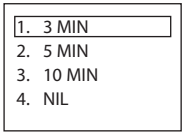


15. Selection for **Automatic power-off function**: [AUTO OFF]
Select the time interval (10, 20 or 30 minutes) for activating the automatic power-off function, or select NIL, disabling the function.



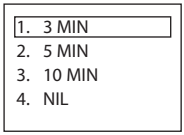
- The automatic power-off function automatically turns the power supply off after the specified period of time (in minutes) when no operation for distance measurement or for key entry has been performed with the angle remaining unchanged.

16. Selection for **Distance measurement automatic power-off function**: [EDM OFF]
Select the time interval (3, 5 or 10 minutes) for activating the distance measurement automatic power-off function or select NIL, disabling the function.

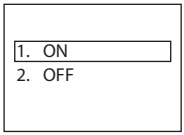


- The distance measurement automatic power-off function automatically poweroff distance measurement after the specified period of time when no key operation has been performed with the measured value remaining unchanged (over about 0.1m) during measurement.

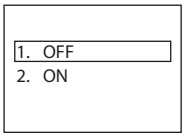
17. Selection for **Automatic illumination power-off function**: [ILLU. OFF]
Select the time interval (3, 5 or 10 minutes) for activating the automatic illumination power-off function or select NIL, disabling the function.



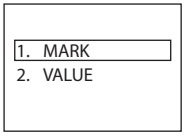
18. Selection for **Distance measurement buzzer**: [DIST. BUZ]
Select whether to enable or disable the beep when the prism receives a light during distance measurement or during repeated distance measurement.



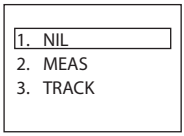
19. Selection for **H. angle 90° buzzer**: [QUAD BUZ]
Select whether to enable or disable the beep at every 90° during angle measurement.



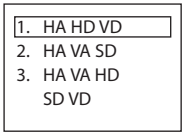
20. Selection of **Distance measurement signal**: [MEAS. SIGNAL]
Select whether to display a signal indicator or AIM value to be displayed from when distance measurement is started to when measured data is displayed.



21. Selection of **Automatic distance measurement**: [AUTO MEAS.]
Automatic distance measurement repeats measurement automatically when the telescope has been collimated at the prism. Select NIL, MEAS or TRACK.

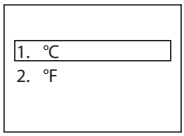


22. Selection for **priority Display**: [PRIORITY DISP]
Select the display order of the sets of display items which pressing the [DISP] key cycles through. The set of display items selected here appears first after the power is turned on.

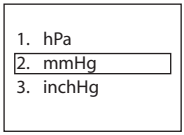


8.10 Initial setting 4

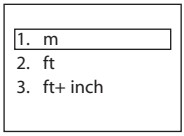
1. Selection of **Temperature unit setting**: [TEMP. UNIT]
   Select ℃ or ℉ as the unit for Temperature.



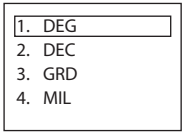
2. Selection of **Pressure unit setting**: [PRESS UNIT]
   Select hPa (hectopascal), mmHg, inchHg as the unit for pressure to be input.



3. Selection of **Distance unit setting**: [DIST. UNIT]
   Select m or ft or ft+inch as the unit for Distance.

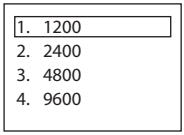


4. Selection of **Angle unit setting**: [ANG. UNIT]
   Select DEG or DEC or GRD or MIL as the unit for Angle.

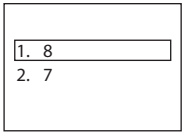


8.11 Initial setting 5

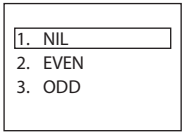
1. Selection of Transfer rate (baud rate): [BAUD UNIT]
   Select a baud rate of 1200, 2400, 4800 or 9600.



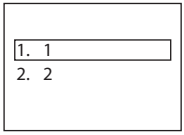
2. Selection of Data bits: [DATA LENGTH]
   Select a data length of 8 bits or 7 bits.



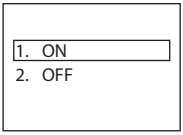
3. Selection of Parity: [PARITY BITS]
   Select no (NIL) parity bit, even parity or odd parity.



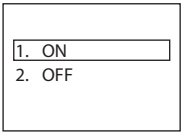
4. Selection of Stop bit: [STOP BITS]
   Select the number of stop bits to be used: 1 or 2.



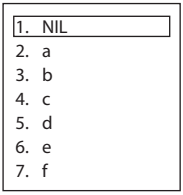
5. Selection of Control signal: [SIGNAL CONTROL]
   Select whether the control signal is effective or not.



6. Selection of XON/XOFF: [XON/XOFF]
   Select whether to enable or disable XON/XOFF.



7. Selection of Through command: [THROUGH COMMAND]
   Select whether to disable data output without receiving any data request command or enable the "a" to "f" command data output.

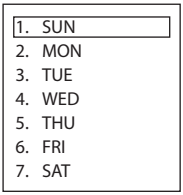


8.12 Initial setting of date and time

1. Input of date
   Set date using [numeric keys].
   Year / month / date (05/12/24)

2. Input of time
   Set time using [numeric keys].
   Time : minute : second (21:55:48)

3. Selection of week day
   Select week day.



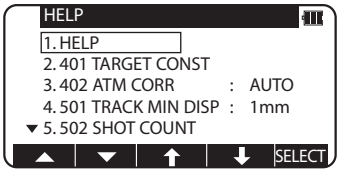
- The date Clock is powered by the built-in lithium battery. The lithium battery needs to be replaced in five years. When the message " Li-batt.voltage is low." is shown on the display screen, have the lithium battery replaced by the dealer from whom the instrument was purchased. The timing of battery replacement varies depending on the frequency of use and the environment of where the instrument is stored while not in use.

9. ACCESSING THE FUNCTIONS

9.1 Accessing by help key

You can use the [HELP] key to display specific initial setting (such as the prism constant and priority mode).

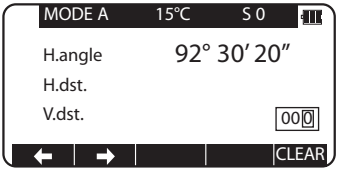
Press the [ILLU]+[ESC] key in mode A or B.



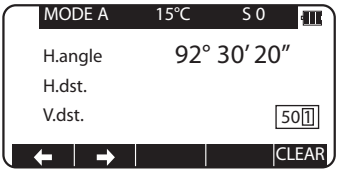
The help menu will then be displayed. Press [F1] [△] [F2] [△] or [F3] [⇩] [F4] [⇧] to position the cursor to the desired item.

9.2 Accessing by 007

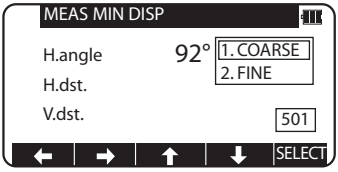
The R-300X allows you to enter a special code of 007 with the alphanumeric keys to display specific initial setting. (such as the prism constant and priority mode).



Press the numeric keys [0] [0] [7] in mode A or B. The screen will then change to the command input screen.



Press the numeric keys for the desired command number in the Command No. Table.
(For example, press [5] [0] [1] for MEAS. MIN DISP.)



Press the [ENT] key to access the MEAS. MIN DISP.

[Instrument setting items]

007	Code HELP menu list		Default	Other options
401	TARGET CONST	PRISM CONST	-30mm	0mm, INPUT
		SHEET CONST	0mm	INPUT
402	ATM CORR		AUTO	ATM INPUT, ppm INPUT, NIL
501	MEAS. MIN DISP		COARSE	FINE
502	SHOT COUNT	SHOT CONT	1 time	3 times, 5 times, INPUT
		SHOT INPUT	01 times	(input)
503	CRV/REF CORR		0.14	0.2, NIL
504	MIN UNIT ANG.		COARSE	FINE
505	V. ANG. STYLE		Z.0	H.0, COMPASS
508	DIST.BUZ		ON	OFF
509	QUAD BUZ		OFF	ON
510	AUTO OFF		10 MIN	20 MIN, 30 MIN, NIL
511	EDM OFF		3 MIN	5 MIN, 10 MIN, NIL
512	ILLU.OFF		3 MIN	5 MIN, 10 MIN, NIL
514	MEAS.SIGNAL		MARK	VALUE
515	PRIORITY SELECT	PRIM.MEAS KEY	MEAS SHOT	MEAS CONT, TRACK SHOT, TRACK CONT
		SEC.MEAS KEY	TRACK CONT	TRACK SHOT, MEAS CONT, MEAS SHOT
		AUTO MEAS.	NIL	MEAS., TRACK
		PRIORITY DISP	HA/HD/VD	HA/VA/SD, HA/VA/HD/SD/VD
517	COMP AXIS		3 Axis (2"/3" model) or 2 Axis	2 Axis (2"/3" model), 1 Axis , NIL
520	LD PLUM.&E.VIAL	LD PLUM.	OFF (LD plummet is OFF when Power ON)	ON (automatically ON)
		TILT DISP.	OFF	ON
		TILT DISP.UNIT	COARSE	FINE
521	REF.LESS RANGE	RANGE	NORMAL	LONG
		MESSAGE	ON (when Range is LONG)	OFF
		SETUP	EACH TIME (w/ Power ON)	PERMANENT
522	QUICK MEAS		OFF	ON
701	ATM UNIT	TEMP.UNIT	℃	℉
		PRESS UNIT	hPa	mmHg, inchHg
702	DIST.UNIT		m	ft, ft+inch
703	ANG.UNIT		DEG	DEC, GRD, MIL
801	SET UP COM.	BAUD RATE	1200	2400, 4800, 9600
		DATA LENGTH	8	7
		PARITY BITS	NIL	EVEN, ODD
		STOP BITS	1	2
		SIGNAL CONTROL	ON	OFF
		XON/XOFF	ON	OFF
		THROUGH	NIL	a, b, c, d, e, f
		COMMAND	0	0

10. CHECKS AND ADJUSTMENTS

- Checks and adjustments should be performed before and during measurement.
- The instrument should be checked after long storage and transportation.
- The checks should be performed in the following order.

[Cautions on CHECKS AND ADJUSTMENTS]

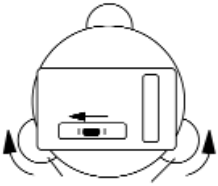
- When adjustment is completed, be sure that adjusting screws are completely tightened. When finishing turning adjusting screws, be sure that screws are turned in a direction for tightening.
- Repeat check after adjustment, and check if the instrument has been adjusted properly.
- When adjustment is completed, be sure that adjusting screws are completely tightened. When finishing turning adjusting screws, be sure that screws are turned in a direction for tightening.
- Repeat check after adjustment, and check if the instrument has been adjusted properly.

10.1 Electronic vial

[Checks]

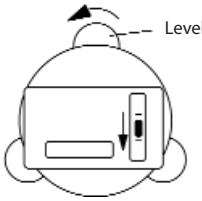
① Align the electronic vial in parallel with a line joining any two of the leveling screws. Then, adjust the two screws to center the bubble in the eelectronic vial.
② Turn two leveling screws in an opposite direction mutually and have the bubble of the side of the electronic vial to the center.
③ Make the bubble of the length of the electronic vial to the center by operating the leveling screw of one remainder.
④ Rotate the instrument by 180° and confirm the position of the bubble of the electronic vial. At this time, it is not necessary to adjust it if the bubble of the electronic vial is in the vicinity of the center.

(A)



Leveling screws

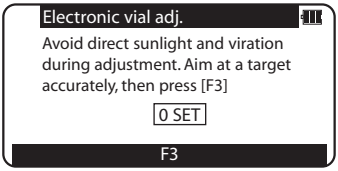
(B)



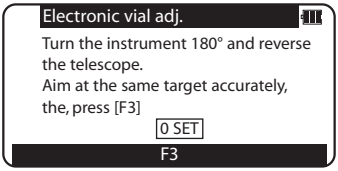
- Please check the electronic vial in a steady environment that has no vibration or rapid temperature change.
- When the electronic vial is checked outdoors and on a tripod, avoid sunlight influence by using a sunshade. Please wait for a while until the instrument and tripod are at the same temperature as the surrounding air.
- When the instrument is seen at the position of "Left circle", movement and the inclination of the instrument become the same on the screen in the electronic vial. Please note that the movement of the bubble becomes opposite direction if it is seen at the position of "Right circle".

[Adjustments]
It is necessary to adjust as following when the bubble is not in the vicinity of the center in the confirmation of ④.

[Procedure to adjust the electronic vial]
Press the [POWER] and [LASER] key simultaneously.
Following screen is viewed.



Aim at a target and press [F3] key.
Following screen is viewed.



Turn the instrument 180° and reverse the telescope. Aim at the same target accurately, then press [F3].
Following screen is viewed.

Pressing the [ENT] key completes the adjustment.

10.2 Circular vial

[Checks]
① Adjust by the electronic vial beforehand.
② Confirm the position of the bubble of the circular vial.
At this time, it is not necessary to adjust if the bubble is at the center of the circle.

[Adjustments]
When the bubble of the circular vial comes off from the center according to check procedure ②, it is necessary to adjust.
Turn the bubble adjustment screw with a hex wrench (L type wrench) and put the bubble in the center of the circle.

[Only the detaching type model]
Turn the bubble adjustment screws with the reticle adjustment pin and put the bubble in the center of the circle.