

Protocol Setup:

Bold Text = Conceptual Elements

Boxed Text = Buttons on the Total Station

Underlined Text = Input Values

There are 6 conceptual steps to operating the total station:

- 1) SET UP INSTRUMENT
- 2) SET UP STATION
- 3) SET UP CONTROL
- 4) SHOOT FEATURES
- 5) CHECK IN
- 6) CHECK OUT

Items and concepts to keep in mind:

Keys on the Total Station:

- The DSP key scrolls through various display parameters
- The REC/ENT records data, commits values entered on the key pad, or moves on to the next screen. Can be used to record a CP if held down for 1 second when recording a shot.
- The MSR1 measures distance to the target. Hold this key down for 1 second to switch between 'Prism' and 'Non-Prism' target modes.
- The STN key displays the station set up menus.
- The MENU key displays the menu screen.
- The MODE key toggles between numbers and letter when entering values. Used in the PT and CD fields.
- The HOT key displays the Height Of Target menus, with options to change prism settings.
- The ESC key escapes out of any menu without committing values.

Concepts:

- Don't forget to switch Target modes when shooting Prism and Non-Prism features.
- Don't forget to change the Height of Target if you change prism modes and or change the height on the rod.
- Use your notebook to keep track of shots, features, or anything else that you think may be necessary. It will be your record of the day's events when you are in the lab in a couple of weeks.

1) SET UP INSTRUMENT

A. Tripod

1. loosen legs
2. plant front leg
3. bring top plate to chin
4. roughly level top plate
5. tighten leg screws
6. roughly center over control point

B. Total Station

1. Mount

- a. unbox
- b. mount to top plate -> hand tight
- c. close box

2. Center

- a. optical plummet -> while looking through plummet, physically move back two tripod legs until you are centered over control
- b. set back two legs

3. Bulls Eye Level

- a. raise and/or lower back two legs separately until bubble is in the center

4. Plate Level

- a. set Face 1 parallel to back two leveling screws -> adjust only one to bring plate level into level
- b. rotate Face 1 - 90° (roughly perpendicular to front screw and back two screws.) -> adjust front screw only until plate level is level
- c. rotate Face 1 - 180° and check level. repeat steps a. & b. as necessary
- d. repeat step c.

5. Measure & Record

- a. HI once
- b. Hi twice
- c. angle to BS once
- d. angle to BS twice
- e. HT

2) SET UP STATION

- A. **Power On**
- B. **HOT** key
 1. **Target** key
 - a. **EDIT** softkey
 - I. #1 Prism 0.0 7.0 (sets first target set to 'Prism' with 0.0 prism constant and 7.0 HT -> this is for CP shots)
 - II. #2 N-Pri 0.0 0.0 (sets second target set to 'Non-prism' with 0.0 prism constant and 0.0 HT -> this is for Topo shots)
 - b. **SET** softkey to finalize
- C. **Check Settings**
 1. **Menu** key
 - a. **Settings**
 - I. **Coordinate** -> ENZ; **Label** -> XYZ; **AZ** -> North
 - II. **Unit** -> Degrees; Decimal Foot
 - III. **Recording** -> RAW+XYZ
- D. **Create New Job**
 1. **Menu** key
 - a. **Job**
 - I. **Create** softkey (under display)
 - II. Job Name (date)
- E. **Station Setup ****
 1. **STN** key
 - a. **Known**
 - I. Enter Station name or number. If this is a new station, it will prompt you for X, Y & Z coordinates. Use 100, 100, 100. Press Enter to confirm each coordinate. Station does not need to have a Code (CD).
 - II. Enter HI. Press **Enter**
 - III. Backsight screen **
 - i. **Angle**
 - ii. Input BS Point
 1. BS -> TBM1
 2. HT -> enter HT from your notes
 3. AZ -> enter AZ to BS from your notes
 - IV. Sight on BS and press **Enter**
 - V. Press **F2** softkey and sight BS with Face 2. Press **Enter** to measure

3) SET UP CONTROL

A. Create New Control Points: Nails with shiners in the ground

1. Create ~ 90° angle with new CPs and Station. **Long distances between Station**

& CPs is best practice.

2. Set HT to 7.0 ft

3. Rod person to new CP. Hold rod level.

4. Shoot CP1 with F1. MSR1 button.

a. HT -> 7.0

b. CD -> CP

c. F2 softkey. Flip face; sight CP; MSR1 button

5. Rod person to new CP. Hold rod level.

6. Shoot CP2 with F1. MSR1 button.

a. HT -> 7.0

b. CD -> CP

c. F2 softkey. Flip face; sight CP; MSR1 button

4) SHOOT FEATURES

A. TOPO SHOTS – Use the total station without prism rod to collect surface XYZ.

1. **HOT** key

a. **Target**

I. **#2 N-Pri** -> choose the Non-Prism target; HT = 0.0

II. **Enter** to set

2. Sight the ground

a. **MSR1** button

b. CD -> **BB**

3. Repeat Step #2 until surface is adequately captured

B. BREAK SHOTS – Prominent breaks in slope. Use the prism rod to collect XYZ.

1. **HOT** key

a. **Target**

I. **#1 Prism** -> choose the Prism target; HT = 7.0

II. **Enter** to set

2. Set rod height to 7.0 ft (HT = 7.0)

3. Rod person uses Prism to mark Break features. Hold rod level

4. Sight the Target

a. **MSR1** button

b. CD -> **BRK**

5) CHECK IN

A. Shoot BS

1. F1 / F2

2. CD -> TBM1 BS

6) CHECK OUT

A. +

B. TS to box.

1. Align storage marks on body and tribrach. Optical plummet faces down.

**** STATION SETUP ADDENDUM:**

This lab assumes that there are no known control points or benchmarks to set up the total station over. Therefore, this guide places the TS in a relative coordinate system (100, 100, 100.) The Forestry department possesses the proper GPS equipment to set up control points and benchmarks, however. If you are setting up over a known point, then you may simply input the known coordinates that you are setting up the station over.

If you are backsighting to another known control point, then you would use the Coordinate option in step 2. E. 1. a. III. i. (Set Up Station; Station Setup; Station Key; Known; Backsight; Coordinate). The TS will prompt you for the coordinates and name of the backsight point.

If you have input or downloaded a list of the control points or benchmarks into the TS already, then you can simply input the name of the point and the coordinates will be input for you or you can search for the points with one of the soft keys.