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This addendum supplements the TruPulse 200/200B User's Manual 3rd Edition: February 2010.

New Firmware Version: A2.26; b2.51.

Section 1: Introducing the LTI TruPulse 200

Operating Modes (Page 3)

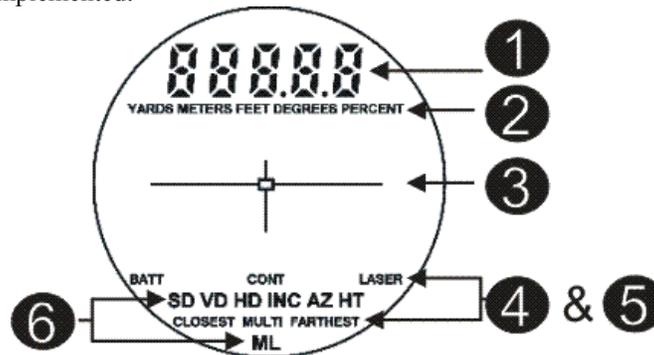Additional Operating Mode: Missing Line Routine

Buttons (Page8)

Powering Off the TruPulse

To conserve battery power, the TruPulse powers itself OFF if no button presses are detected after a specific length of time:
- TruPulse 200B with Bluetooth ON: previous default was 10 minutes, is now 30 Minutes.

Display Indicators (Page 9)

A new LCD display has been implemented:

New Figure # 6

❶ **Main Display**

888.8.8	Displays messages and measurement results.

❷ **Measurement Units**

YARDS METERS FEET	Distance measurement units. Selection available in the System Setup Modes.
DEGREES PERCENT	Inclination measurement units. Selection available in the System Setup Modes

❸ **Crosshair**

─┼─	Serves as the aiming point reference, both horizontally and vertically.

❹ **Status Indicators**

BATT	*Flashing:* battery voltage is low. *Steady:* battery voltage is too low for system operation. *Not Visible:* battery voltage is within acceptable range.
LASER	*Visible:* laser is firing. *Not Visible:* laser is not active.
MULTI	Multiple targets have been logged in the Closest or Farthest target mode.

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❺ **Target Modes**

CONT	The unit continuously acquires targets and displays measurements while 🔘 is held down. The distance to the most recently acquired target is displayed.
CLOSEST	The unit logs multiple targets while 🔘 is held down. Of the targets acquired, the distance to the closest target displays.
FARTHEST	The unit logs multiple targets while 🔘 is held down. Of the targets acquired, the distance to the farthest target displays.
Filter	'F' appears as the left-most character of the Main Display to indicate Filter Mode is active. Similar to Standard, single shot mode, but the laser's sensitivity is reduced so it only detects pulses returned from a reflector. The optional foliage filter must be used in conjunction with this mode.
Standard (No display indicator)	Standard, single shot strongest target mode.

❻ **Measurement Modes**

|	
SD Slope Distance	Straight line distance between the TruPulse and the target.
VD Vertical Distance	The distance between the target and the perpendicular to the path of the horizontal distance.
HD Horizontal Distance	The level distance between the TruPulse and the plane of the target.
INC Inclination	The angle of inclination between the TruPulse at level and the target.
AZ Azimuth	Not used in the TruPulse 200 or 200B.
HT Height	Three-step Height Routine. The final calculation represents the vertical distance between the points on the target represented by ANG1 and ANG2.
ML Missing Line	Two-step Missing Line Routine finds the connecting vector (or missing line) between two points. The final calculation shows the SD, VD, HD, and INC associated with the missing line.

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Section 4: System Setup Modes

Select Measurement Units (Page 15)

The TruPulse allows you to choose between PERCENT and DEGREES for inclination measurements:
To toggle the units selection:

1. From the Measurement Mode, press ▼ for 4 seconds to access the System Setup Mode. "UnitS" will appear in the Main Display as shown in Figure #12 below.
2. Press 🔘 to select the "UnitS" option.
3. Press ▲ or ▼ to display the previous or next distance unit option.
4. Press 🔘 to select the displayed distance unit.
5. Press ▲ or ▼ to select Inclination Units (PERCENT or DEGREES).
6. Press 🔘 to select the displayed inclination units and return to the Measurement Mode.
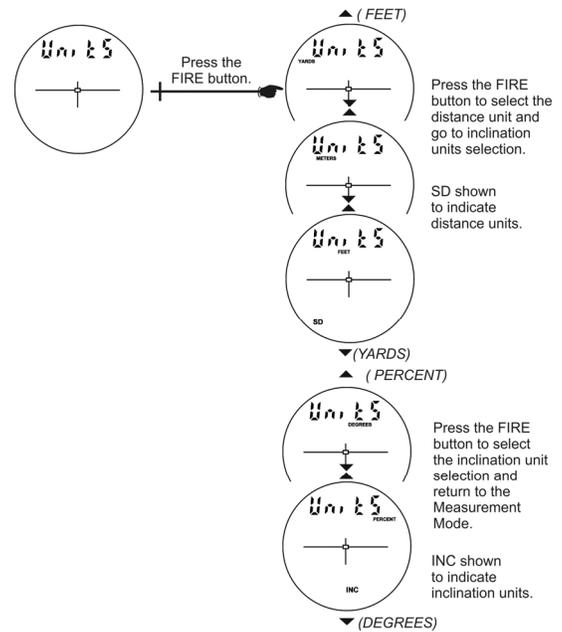
New Figure # 12

Section 5: Measurement Modes

Inclination Measurements (Page 20)

The laser is not active in the Inclination (INC) Measurement Mode. Generally, the inclination is measured when you press 🔘. However, in (1) the Continuous Target Mode and (2) in the Height Measurement Mode, the inclination reading appears in the Main Display and the display updates as your aiming point changes as long as you press 🔘.

Percent Slope

Percent slope (indicated by "PERCENT") is a calculation equal to 100 times the tangent of the inclination angle. It is a variant way of expressing the inclination. You can get percent slopes only in the basic measurement displays, never in the Height measurement displays. Note also that the instrument never downloads a percent slope. It always downloads the inclination angle.

> ⓘ An inclination angle of 5 degrees for example is equal to a slope of about 8.75 percent.

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NEW Vertical Missing Line Routine (Page 22)

The Vertical Missing Line Routine: Displays HD, VD, SD, INC between two remote points.

The Vertical Missing Line Routine calculates distances and angles to describe the relationship between two points in two-dimensional space (connecting vector). This routine is ideal for remote slope determinations and changes in elevation from one location.
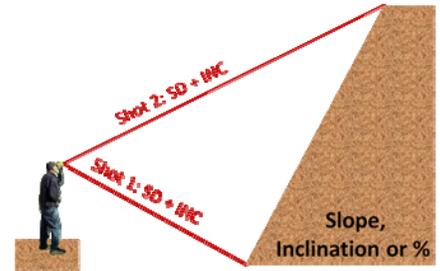
The simple routine prompts you to take two shots to targets: "Shot 1" and "Shot 2". The TruPulse uses the results to calculate four variables between the two points: slope distance, inclination, horizontal distance, and vertical distance as shown in figure to the right.
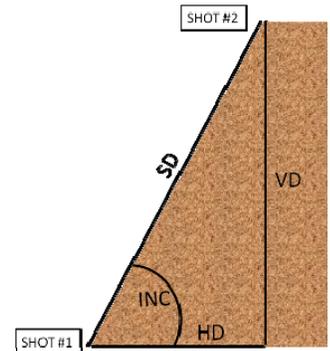
- HD: Horizontal Distance: Horizontal component of the missing line.
- VD: Vertical Distance: Change in elevation between point #1 and point #2.
- SD: Slope Distance: Length of the missing line.
- INC: Inclination between point #1 and point #2.

During the Missing Line Routine:
- Press ▲ to re-shoot Shot 1.
- Press ▼ to exit the Missing Line Routine.

1. Select your first target and look through the eyepiece, using the crosshair to aim to your target. The ML indicator displays steady and the HD indicator flashes; prompting you to measure the Horizontal Distance to the first target.
2. Press-and-hold 🔥. The LASER status indicator is displayed while the laser is active. The laser remains active for a maximum of 10 seconds while acquiring data about the target. The measured horizontal distance appears in the Main Display.
3. Once the 🔥 button is released, "SHot2" appears steady and the HD indicator flashes (with ML steady); prompting you to measure the Horizontal Distance to the second target. Looking through the eyepiece and using the crosshair to aim to the second target.
4. Press-and-hold 🔥. The LASER status indicator is displayed while the laser is active. The laser remains active for a maximum of 10 seconds while acquiring data about the target. The measured horizontal distance to the second target appears in the Main Display.
5. Once you release 🔥, HD and ML are steady and the calculated horizontal distance of the missing line is displayed. The measurement flashes one time and then displays steady until you press any button or the unit powers off.
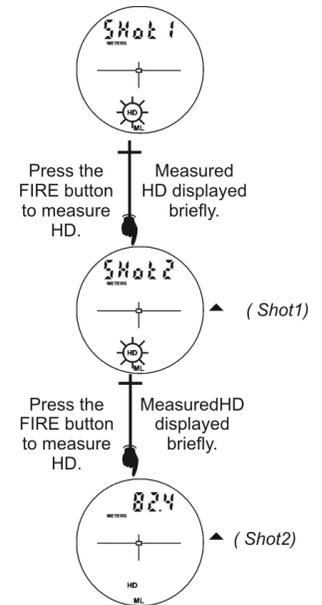
At this time, you can:
- Press ▲ or ▼ to scroll and see the other missing line measurements results (VD, SD, and INC).
- Reshoot Shot 2 by pressing ▲ or ▼ until Shot 2 and ML appear steady in the display as well as HD flashing, prompting you to measure the horizontal distance to the second target (or new target). Go to #4 above.
- Press 🔥 to exit the missing line results and return to Shot 1.

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Section 8: Serial Data Interface

NEW Missing Line (ML) Download Messages (page 29)

For "SHot1" and "SHot2" refer to Horizontal Vector (HV) Download Message

$PLTIT,ML,HD,HDunits,AZ,AZunits,INC,INCunits,SD,SDunits*csum<CR><LF>

$PLTIT,	is the Criterion message identifier.
ML,	Missing Line message type.
HD,	Specifies horizontal distance measurement value.
HDunits,	Specifies horizontal distance units. F=feet, M=meters, Y=yards.
AZ,	Azimuth dummy value (always 0.00)
AZunits,	Specifies azimuth units. D=degrees.
INC,	Specifies inclination measurement value.
INCunits,	Specifies inclination units. D=degrees.
SD,	Specifies slope distance measurement value.
SDunits	Specifies slope distance units. F=feet, M=meters, Y=yards.
*csum	An asterisk followed by a hexadecimal checksum. The checksum is calculated by XORing all the characters between the dollar sign and the asterisk.
<CR>	Carriage return.
<LF>	Line feed.

Example:

SHot1: $PLTIT,HV,6.00,Y,0.00,D,7.20,D,6.10,Y*68
SHot2: $PLTIT,HV,5.90,Y,0.00,D,11.60,D,6.00,Y*5D
Calculated Missing Line: $PLTIT,ML,8.10,Y,0.00,D,3.20,D,8.10,Y*74

(i)
- HDvalues, INCvalues, and SDvalues always include two decimal places:
  X X.Y$\underline{Y}$
         ↓
     0 = high quality target
     1 = low quality target
- In the example above, shots 1 and 2 both used high quality targets.

Uploading Serial Data (Page 30)

1. Download Tera Term Pro: http://www.sofotex.com/Tera-Term-(Pro)-download_L411.html
2. Setup Tera Term Pro.
3. Open the program.
4. Select serial and correct com port and click OK.
5. Enter into the setup tab and select serial and change the baud rate to 4800 or 38400 (whichever you are using), click on OK.
6. Enter into the setup tab again and select terminal, in the new line box and change the transmit and receive to CR+LF.
7. Check local Echo box and click on OK.
8. Type $ID and enter (If you get a response back, you have communication with the TruPulse).

Notes:
All commands are preceded with $
To ask for current value (units for example) just type: $DU
To change setting to Feet type: $DU,2

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NEW Upload Serial Data Commands (Page 30)

- **Get ID**
  - $ID
  - response: $ID,TP200 MAIN, 2.26,07-27-2011

  - $PLTIT,RQ,ID
    - response: $ID,TP200 MAIN, 2.26*08

- **Set Measurement Mode:**   MM
  Missing Line: 6

- **Get Instrument Status:**   TS,*n*
  Battery Voltage OK: 0
  Battery Voltage below Warning Level (2.15V)   2

- **Set Shutdown Timeout – Bluetooth OFF or no Bluetooth:**   NT,*n*
  n = Time in Minutes   (0…120)
  Never Shutdown: 0
  Default: 2

- **Set Shutdown Timeout – Bluetooth ON:**   BT,*n*
  n = Time in Minutes   (0…120)
  Never Shutdown: 0
  Default: 30

- **Turn Bluetooth ON/OFF:**   BO
  Bluetooth ON: 1
  Bluetooth OFF: 0