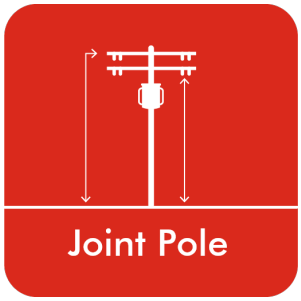
LaserSoft®

Joint Pole

User's Guide



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Section 1 - Introducing Joint Pole

Thank you for purchasing LaserSoft® Joint Pole from Laser Technology, Inc. (LTI). Joint Pole is a field data collection program that Electric Utility professionals use to measure the location, condition, attachment heights and make-ready measurements on utility poles. The user fills out a series of Tabs of customizable information about the pole and any equipment attached to it. Graphic prompts will trigger measurements from Laser Tech's TruPulse lasers to record all the necessary height, span, sag and clearance values. The user can take photos and enter descriptions for the poles and the attachment points will be overlain on the image.

LTI surveying instruments automatically send data to Joint Pole, which uses it to perform the calculation desired for each routine. If desired, GPS can be used to geo-reference the data so it will match up with existing maps and satellite imagery.

Joint Pole Report files can be downloaded to a computer and imported into most analysis programs capable of reading a TXT or CSV file. A PDF report that includes all images makes a nice deliverable to the client. Report files can also be opened in many GPS visualization programs capable of reading a GPX or KML format.

Technical Specifications

LaserSoft Joint Pole has been designed to run on Android operating platforms for use in conjunction with Laser Technology surveying instruments.

Specification	Description
Operating Systems	Android version 10+* * Please check Google Play Store for current compatibility.
Supported Devices	Most smart devices running Android 10 or later.
Connectivity	Bluetooth®
Compatible Lasers	• TruPulse 200*** with Bluetooth • TruPulse 200X • TruPulse 360R** • TruPulse 360** with Bluetooth ** Only TruPulse 360, 360R, and 200 Bluetooth-enabled lasers displaying the menu option "BT_Enc" in the heads-up display are compatible for use with a TruAngle. Older models of these lasers may not display this option and are not compatible for use with a TruAngle. *** To send commands from the Android device to TruPulse 200 Bluetooth-enabled lasers (i.e. utilize remote fire), the laser firmware version must be A 2.26 B 2.51 or newer.
Hardware	• Optional - MapStar TruAngle for use with TruPulse 200/360/200X laser • Recommended X-Grip & Mounting Claw for phones/tablets if using with a tripod, 7" version available via LTI, other sizes available here: http://www.rammount.com/search?search_type=search&query=xgrip
Supported Languages	English; template is available for translation

Warranty Information

For purchases including lasers, a copy of the LTI Limited Warranty should have shipped with the order. If needed, please contact LTI to obtain a copy of the LTI Limited Warranty. See the inside front cover for LTI contact information.

NOTE The Data Collector/Tablet package includes the associated product literature, such as manuals and warranties. It is your responsibility to contact the manufacturing company to register the Data Collector.

Main Features

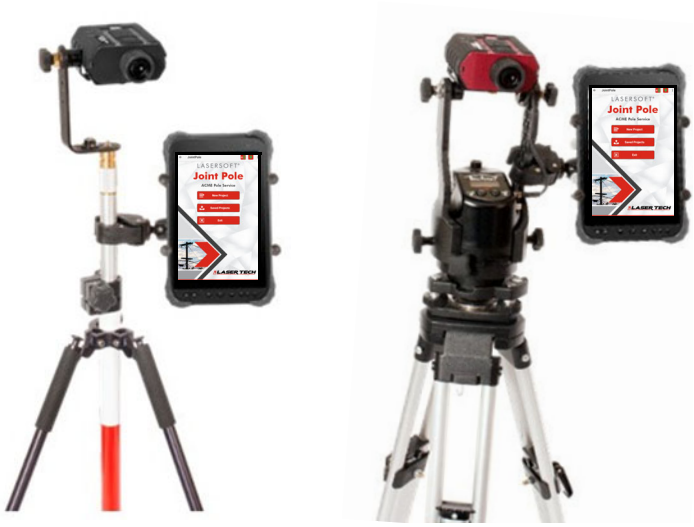
Laser Tech's Joint Pole is a field data collection program that Electric Utility professionals and their contractors use. Measurements for make ready engineering work, pole loading analysis and other overhead inspections can all be accommodated.

- Works on any device running Android 10 +
- Seamlessly integrate GPS positioning into the projects
- Create a record for each pole and edit the file
- Measure total pole length, lean and span with the laser
- Measure Height of Attachment for equipment on the pole
- Record the condition of the pole and any defects or issues
- Include Photos with the measurement data
- Generate industry standard output files for further analysis and documentation

Instrument Configurations

Joint Pole is designed to work with all different LTI instrument configurations:

- TruPulse 360B/R with or without TruAngle (shown without in Figure 1A)
- TruPulse 200X with or without TruAngle (shown with in Figure 1B)
- TruPulse 200B with or without TruAngle (not pictured)



(A) (B)

Figure 1

NOTE There are only two measurement routines in the app that require an Azimuth (TP360) or Angle (TruAngle) to complete. The rest can be accomplished with any of the 200 or 360 models. They are:

1. The GPS Offset shot
2. The 2-Shot Span (HD to next pole) sequence

Section 2 - Get Started with Joint Pole

This section describes the download and installation procedure necessary to get started with Joint Pole. It explains how to get the app from Google Play and then launch it. Once the application has been successfully launched, follow the instructions in this section to understand the main menu and configure the settings.

Get Joint Pole from Google Play

Joint Pole downloads free from the Google Play Store and will work unlicensed for a 30-day trial period from the date of initial download. After 30 days, it will require a license key purchased from Laser Technology to run. To get the Joint Pole app from Google Play:

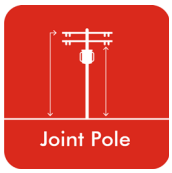


Figure 2

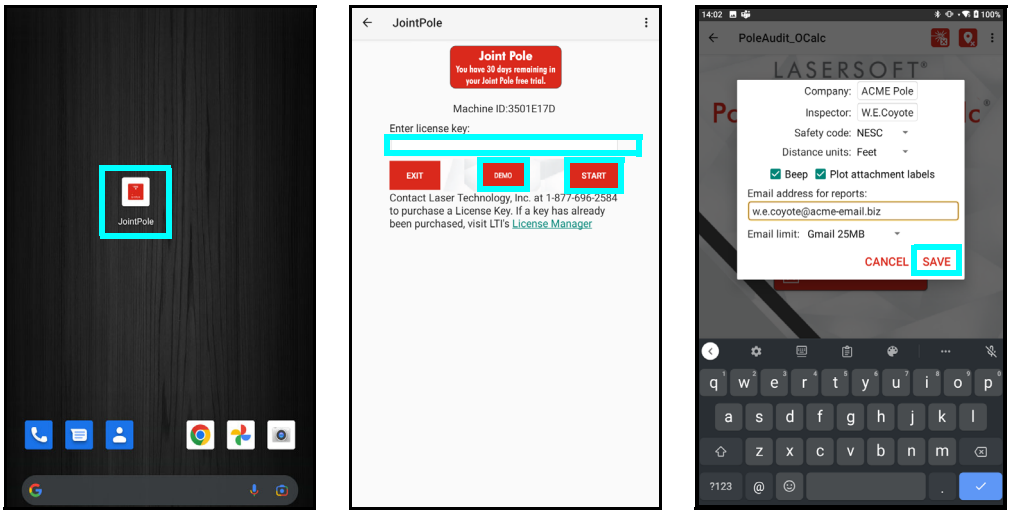
1. Use the Google Play search function to find "LaserSoft Joint Pole."
2. Tap install when you see the Joint Pole icon as you would any other Google Play app (Figure 2).

   NOTE Joint Pole will need permission to take pictures, access location information and to access photos and files.

Launch Joint Pole

To launch the Joint Pole app:

1. Find the Joint Pole icon on the smart device (Figure 3A) and tap it.
2. Accept all permissions and the License screen will display (Figure 3B).
3. Tap the DEMO button or enter your license key and tap the START button. The Settings screen will display (Figure 3C).
4. Enter all values and tap SAVE:
   - **Company**: enter company name (also displays on Main Menu)
   - **Inspector**: enter equipment operator
   - **Safety code**: NESC, GO95 or Other
   - **Distance units**: Feet or Meters to match laser
   - **Beep**: Check for device to emit a beep when it receives laser data
   - **Plot attachment labels**: Requires screen calibration; uncheck to not plot labels and bypass screen calibration
   - **Email address for reports**: Enter an email address to be used when sending Joint Pole report files.



(A) (B) (C)

Figure 3

Program Licensing

Upon any purchase of Joint Pole, Laser Technology generates a customer account on its License Manager website (http://license.lasertechpartners.com/CustomerLogin.aspx) that allows you to generate license keys. Joint Pole can be used for 30 days from the date of download before a license key is required (Figure 4A). Tap the Demo button to proceed past the licensing screen and use the program. At the end of 30 days, Joint Pole cannot be used without a license key.

About the 30-day Trial:

- The Demo Status is located in the box below the App title. The status changes depending on how may days are left in the trial.
- Joint Pole is fully functional during the trial period. Data collected during this time are accessible during the trial and can be re-accessed when the program is licensed.
- Contact an authorized dealer near you to purchase a license key or call LTI for more information (1-877-696-2584 or 1-303-649-1000).

To generate a license key:

1. Notate the temporary password you received from licensing@lasertechpartners.com and open License Manager, http://license.lasertechpartners.com/CustomerLogin.aspx. If you follow the "License Manager website" link from Joint Pole licensing screen on your smart device, **your Machine ID was automatically copied to the clipboard.**
2. Tap the "Email" field to bring up the keyboard. Enter the email address associated with your purchase and the temporary password. Click [Submit] to log in (Figure 4B). If you do not have your temporary password, click the [Request Password] link at the top of the screen. Once successfully logged in, the "Obtain License Key" page displays.
3. Upon logging in, your purchase is displayed (Figure 4C).
   - **Machine ID**: If you followed the link from your smart device (Figure 4A), tap and hold the Machine ID field to paste the value. Or enter the Machine ID manually (Figure 4C).
   - **Purchase ID**: Copy, tap and hold the "Purchase ID" in the Purchases Table (Figure 4D) and select the "Copy" option. Paste, tap and hold the "Purchase ID" field and select the "Paste" option (Figure 4E).

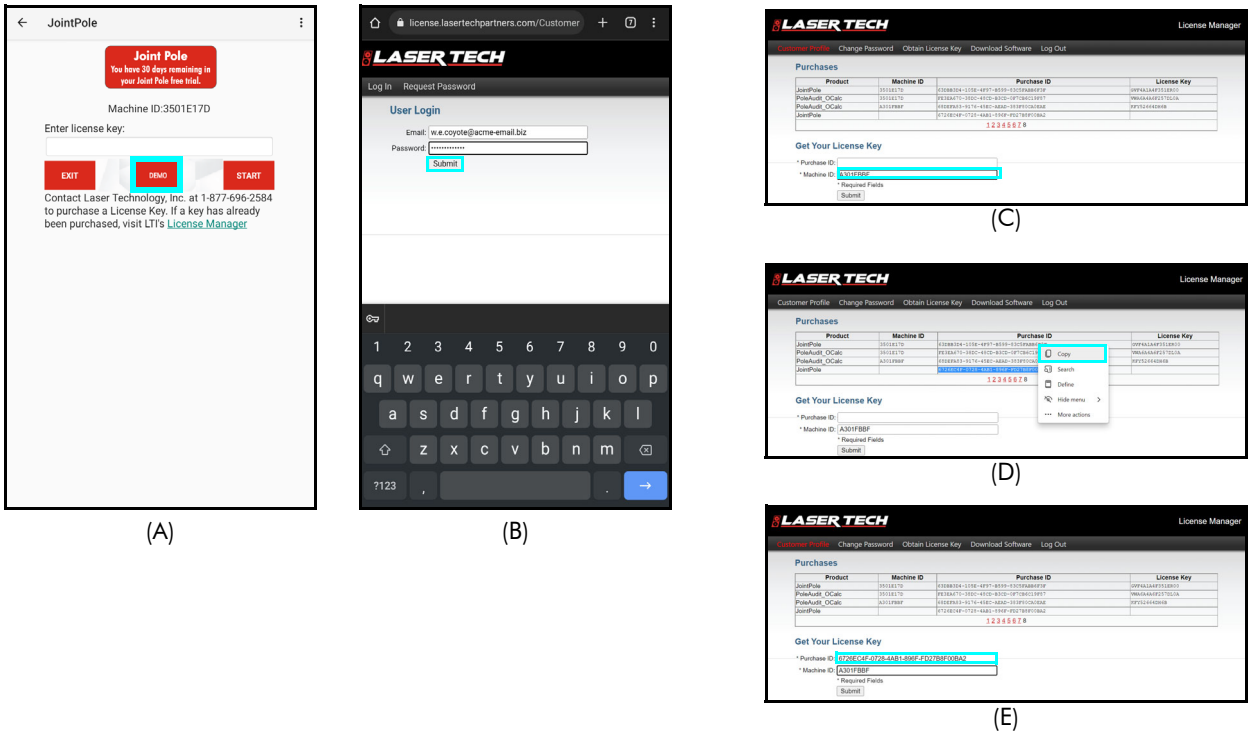


Figure 4

4. Click [Submit] and your license key will display below the entry fields, as well as in the Purchases Table (Figure 5A).
5. **Copy**, tap and hold, or notate the License Key (Figure 5B) and return to Joint Pole.
6. **Paste** or enter the key in the "Enter License Key" field, tap and hold to display a prompt for pasting (Figure 5C).
7. Tap [Start].

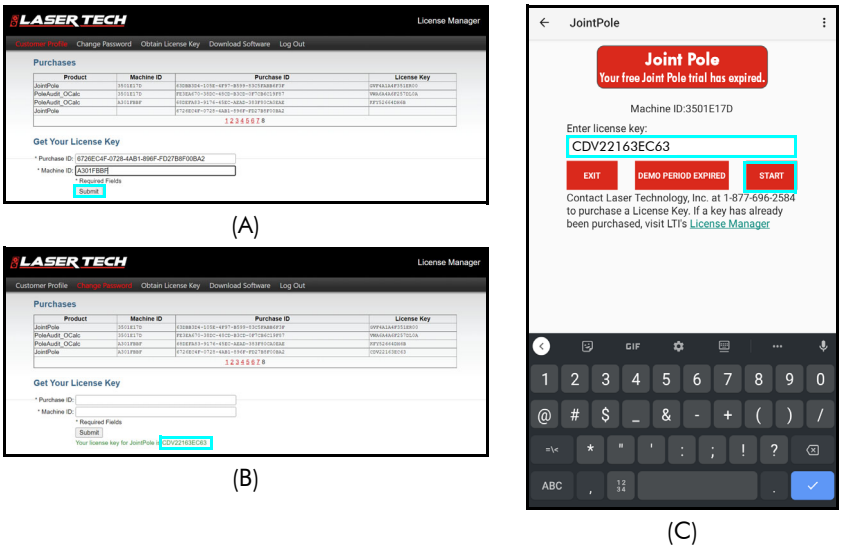


Figure 5

If an incorrect key is entered, the app will not start and will remain at the Licensing screen.

For assistance contact: Licensing@lasertechpartners.com or call 1-877-696-2584. Please provide your name, company name, purchase ID (if known) as well as the Machine ID displayed on the Licensing screen.

About the Main Menu

Figure 6 shows the Joint Pole Main menu.

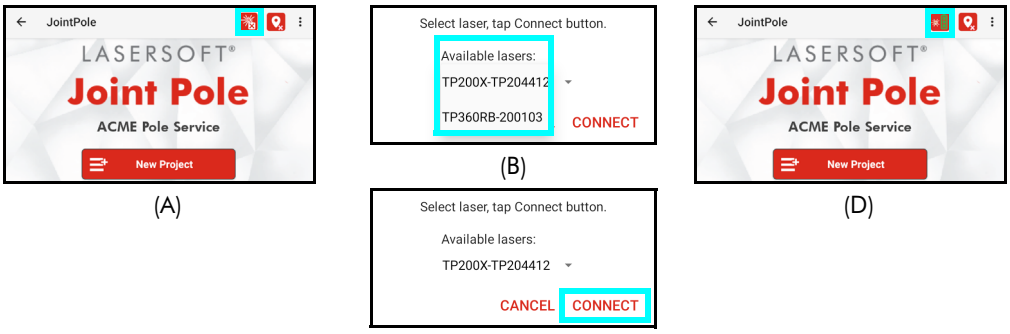
Figure 6

Tap the:

- Back arrow ← at the top of the screen to leave Joint Pole.
- Connection icon to connect a laser
- GPS setting icon to configure and enable GPS
- Menu button ⋮ in the upper right corner of the screen to access:
  - Help
  - Joint Pole Settings
  - List Values
  - Calibrate Screen
  - About Joint Pole
- [New Project] button to begin a new project (Page 15).
- [Saved Projects] button to manage existing projects (Page 27).
- [Exit] button to close Joint Pole and return to the Android device main screen.

Laser Connection

1. Tap the Connection icon from the Main menu (Figure 7A) and a configuration screen will appear.
2. Choose your laser from the list of Available lasers (Figure 7B) and tap CONNECT (Figure 7C).
   If a PIN is required, enter it and continue. Note the Connection icon turns green (Figure 7D).
   If it is colored yellow, replace the laser batteries and restart this process.



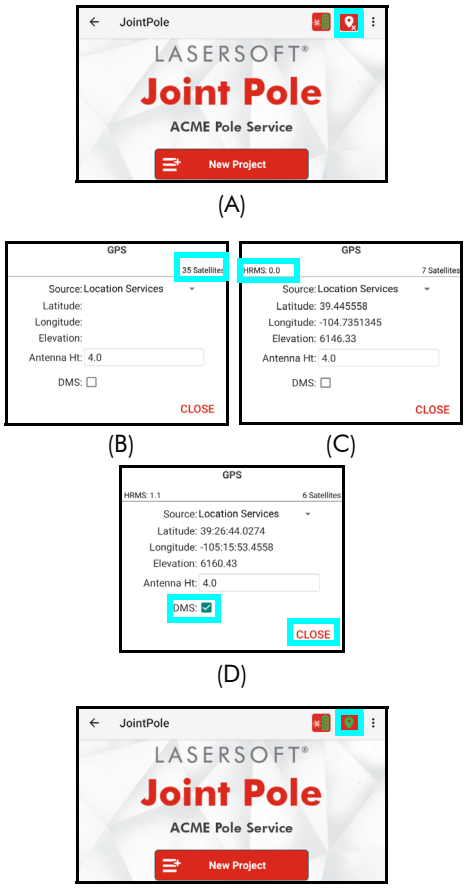
(A) (B) (C) (D)

Figure 7

Enable GPS

1. Tap the Enable GPS icon from the Main menu (Figure 8A) and a configuration screen will appear (Figure 8B).
2. Location Services will display. To select a different source, pull down the list and select your device.
3. Enter the Antenna Ht to calculate a good ground Elevation.
4. Wait for coordinates to display and note the HRMS value, which is an accuracy indicator for the position (Figure 8C). The lower the number the better; and it will automatically update and improve with time.
5. Check the DMS box to store coordinates in Degrees, Minutes and Seconds instead of the default Decimal Degrees (Figure 8D).
6. Tap CLOSE to save settings and return to the Main menu.

   Note the GPS icon has turned green (Figure 8E).



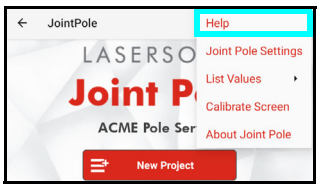
(A) (B) (C) (D) (E)

Figure 8

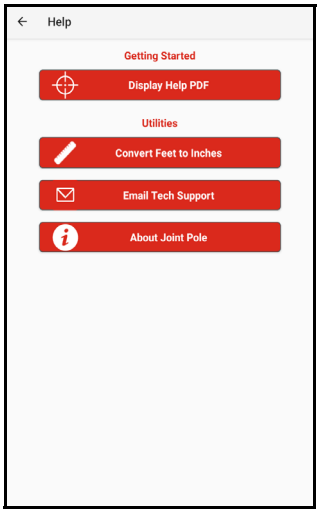
Help Menu

Joint Pole Help includes information about connecting lasers to devices, the meaning of each information tab and laser measurement routine; and the ability to send data and diagnostic files to LTI Tech Support. Help is located as a menu option in the upper right corner of the Joint Pole screen at any time the program is open (Figure 9A).

Tap [Help] from the menu to display the Joint Pole Help Menu (Figure 9B).



(A)



(B)

Figure 9

Help Menu Options:

Getting Started

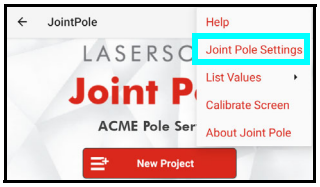
- **Display Help PDF** - Description and measurement tips for each information tab:
  - Pole
  - Inspection
  - Attachments
  - Notes
  - Photos

Utilities

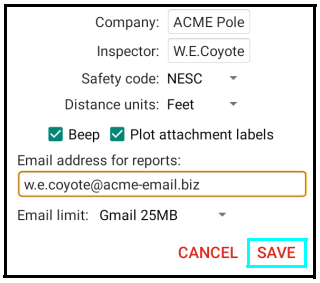
- **Conversion Chart** - convert inches to decimal feet.
- **Email Tech Support** - If a crash happens, re-open the project and use this feature to send a diagnostics file and/or the data file to technical support for assistance.
- **About Joint Pole** - find the software version number, Laser Technology contact information and a link to the user's manual.

Joint Pole Settings

Tap [Joint Pole Settings] from the menu (Figure 10A) to display the Settings screen (Figure 10B).



(A)



(B)

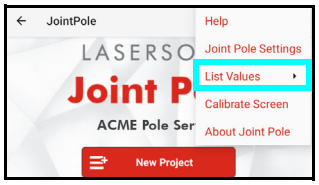
Figure 10

1. Enter/Select the following:
   - **Company**
   - **Inspector**
   - **Safety code** - NESC, GO95 or other
   - **Distance units** - Feet or Meters to match laser.
   - **Beep** - Check for the Android device to emit a beep when it receives measurement data.
   - **Plot attachment labels** - Check to show the Pole ID, total height, attachment heights and equipment on photos.
   - **Email address for reports** - Enter an email address that will automatically be used when sending Joint Pole reports.
   - **Email limit** - choose provider, for sending reports and photos.
2. Tap:
   - SAVE - to record any changes that have been made and return to the previous menu.
   - CANCEL - to exit screen without making any changes.

List Values

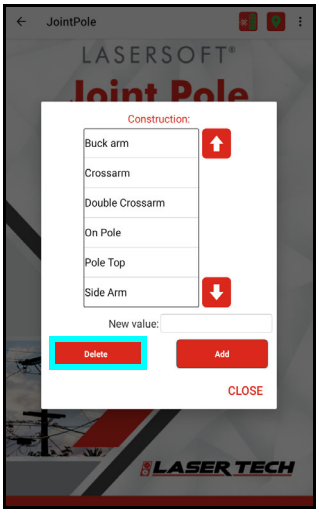
Tap List Values from the menu (Figure 11A) to display the menu of lists (Figure 11B).

1. Tap the list you want to edit
2. Select and entry and tap the Delete button to remove it (Figure 11C)
3. Enter a New value and Abbreviation and tap ADD (Figure 11D)
4. When the list is good, tap CLOSE (Figure 11E)
5. Repeat this procedure for any other list that needs editing.

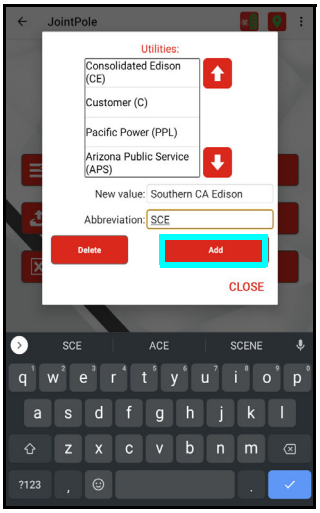


(A)

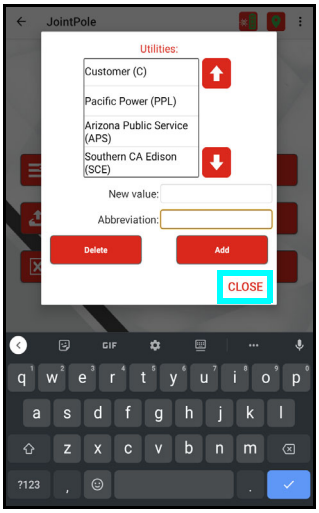
(B)



(C)



(D)



(E)

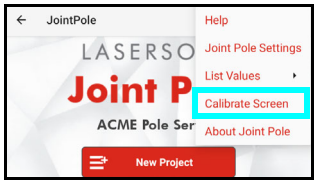
Figure 11

Calibrate Screen

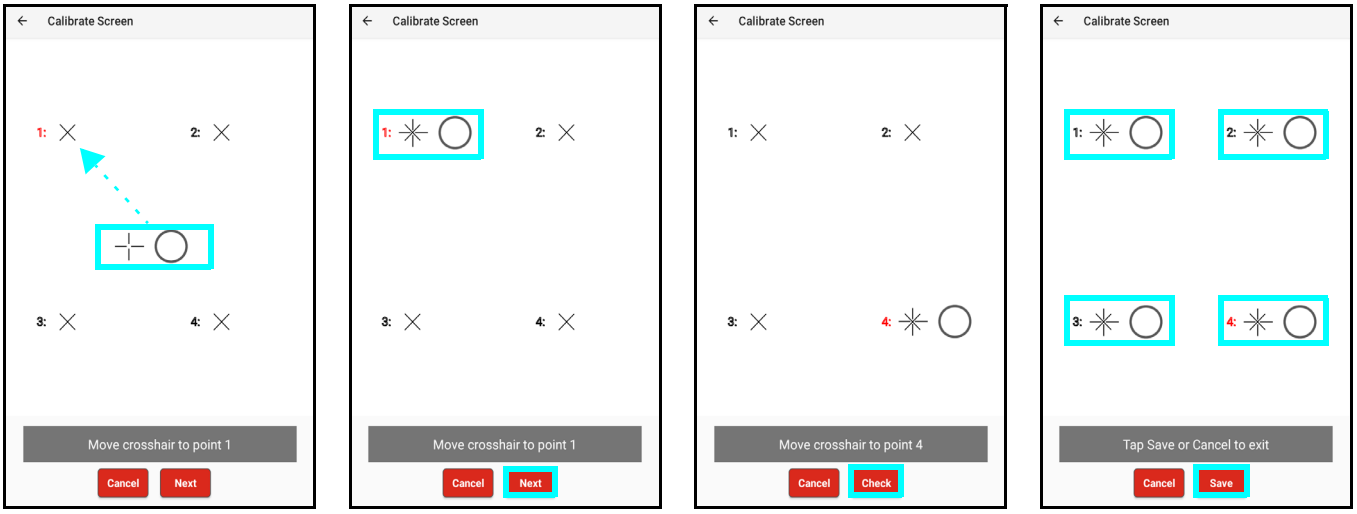
Upon taking a photo of a pole, there is an option to plot labels onto it, showing the Pole ID, total height, attachment heights and equipment (see Settings Screen on Page 8 and PHOTO Tab on Page 24). To do this, a screen calibration process must be completed.

NOTE If you do not require the photo labels, the screen calibration can be bypassed.

1. Tap [Calibrate Screen] from the menu (Figure 12A).
2. Tap and hold in the circle next to the crosshair and slide it across the page (Figure 12B).
3. Move the crosshair until it matches up with the **X** by **1** (Figure 12C).
4. Tap the **Next** button.
5. Repeat this procedure for the **X**'s next to **2**, **3** and **4** (Figure 12D).
6. Then tap the **Check** button to confirm the calibration is good.
   - If it fails, repeat the procedure.
   - If it passes, all crosshairs will display and then tap the **Save** button (Figure 12E).



(A)



(B) (C) (D) (E)

Figure 12

About Joint Pole

(A) (B)

Figure 13

Tap [About Joint Pole] from the menu (Figure 13A).

The About screen (Figure 13B) displays the:

- Product name
- Version number
- LTI contact information
- Machine ID
- Link to the user's manual
- Link to the Privacy Statement.

Section 3 - Collect Data

Once the equipment has been configured, the software has been installed and licensed, it is time to begin collecting data. Ensure all equipment is powered on.

If at any time the smart device shuts down or locks up during the data collection process, power the device back on and re-open Joint Pole to resume data collection. Data is automatically saved after each measurement to allow data collection to continue seamlessly.

Laser Setup Notes

TruPulse 200 / 360B/R:
Ensure that the laser's measurement mode is set to HD (Horizontal Distance) or SD (Slope Distance). When using a Filter mode, ensure the electronic filter is turned on AND that the mechanical foliage filter is affixed to the laser lens. The laser Bluetooth function needs to be turned on with "BT_On" selected. If using a TruAngle, select the Bluetooth options "BT_Enc" instead. Set the desired measurement units in the laser to feet or meter. Refer to the TruPulse 200B, 360B or TruPulse 360R manual for further instruction.

TruPulse 200X:
Ensure that the laser's measurement mode is set to HD (Horizontal Distance) or SD (Slope Distance). When using a Filter mode, ensure the electronic filter is turned on AND that the mechanical foliage filter is affixed to the laser lens. The laser Bluetooth function needs to be turned on with "BT_Enc" selected if using a TruAngle, and "BT_On" selected if not. Set the desired measurement units in the laser to feet/in or meter/cm. Refer to the TruPulse 200X manual for further instruction.

NOTE When mapping with a retro reflector, ensure that the electronic filter is turned on AND that the mechanical filter is affixed to the laser's receive lens. If these filters are not used, close range measurements (10 ft or less) may permanently damage the laser. Please see the hardware manual for further details.

Calibrate the Compass in a TruPulse 360B/R

1. Stand outdoors facing +/-15° of North; ensure there are no large metal objects in close vicinity. See Appendix D (Page 34) for more details on magnetic hygiene.
2. While looking through the scope of the laser, long press the down arrow button until "Units" displays.
3. Short press the down arrow until "H_Ang" displays and press Fire to select the option.
4. Short press the down arrow until "HACAL" displays and press Fire to select the option.
5. Short press the down arrow one time so the display rotates between "HACAL" and "Yes." Press fire to select the option ("C1_Fd" will display in the scope) and begin this routine:

   NOTE At each laser position, starting with ❶ shown in Figure 14, press Fire and wait about one second before shifting the laser to the next position:

Figure 14

6. Once the calibration is complete, look through the scope to see a message of "PASS" which means you are good to go. Press Fire to return to the menu. If the display reports a "FAIL" message, make sure you are aiming North and repeat the calibration making each rotation/fire press deliberate and one second each. If the unit continues to Fail perform the Tilt calibration and then repeat the Compass cal. See TruPulse 360/R user's manual for further assistance with compass calibration.

MapStar TruAngle

The MapStar TruAngle provides the horizontal angle necessary for 3D mapping from one position using the Radial with Angle mapping method. A user-defined zero is set and all angle measurements from that specific position are based upon that zero.

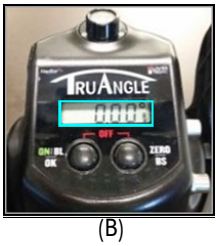
To operate this device:

- Connect the laser to the TruAngle with the 4-pin cable included in the mapping package. Make sure to connect it to the port labeled "LASER" on the TruAngle.
- Ensure the laser Bluetooth option is set for BT_Enc.

Quick Start for TruPulse 200X + TruAngle System

1. Connect laser to TruAngle with 4-pin to 4-pin cable.
2. Power on the TruAngle, screen displays "ind" (index) (Figure 15A).
3. Rotate the TruAngle until screen displays flashing "0.00."
4. Turn on Bluetooth (BT_ENC) in the laser and pair it to the Android device (see Page 6 for further explanation).
5. Aim the laser at the desired reference (0) point and press the left-hand button (or fire the laser) to zero. The "0.00" will stop flashing (Figure 15B).

(A)



(B)

Figure 15

Pair a Laser with an Android Device

For data to be received from the laser to an Android Device, the two must be paired via Bluetooth. Once the laser has been paired to a Android device via Bluetooth, the pairing process described here does not have to be done again unless the laser is intentionally unpaired or the Android device is reformatted.

Bluetooth Setup - TruPulse 200X, 360B, 360R, 200B

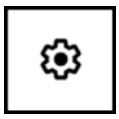
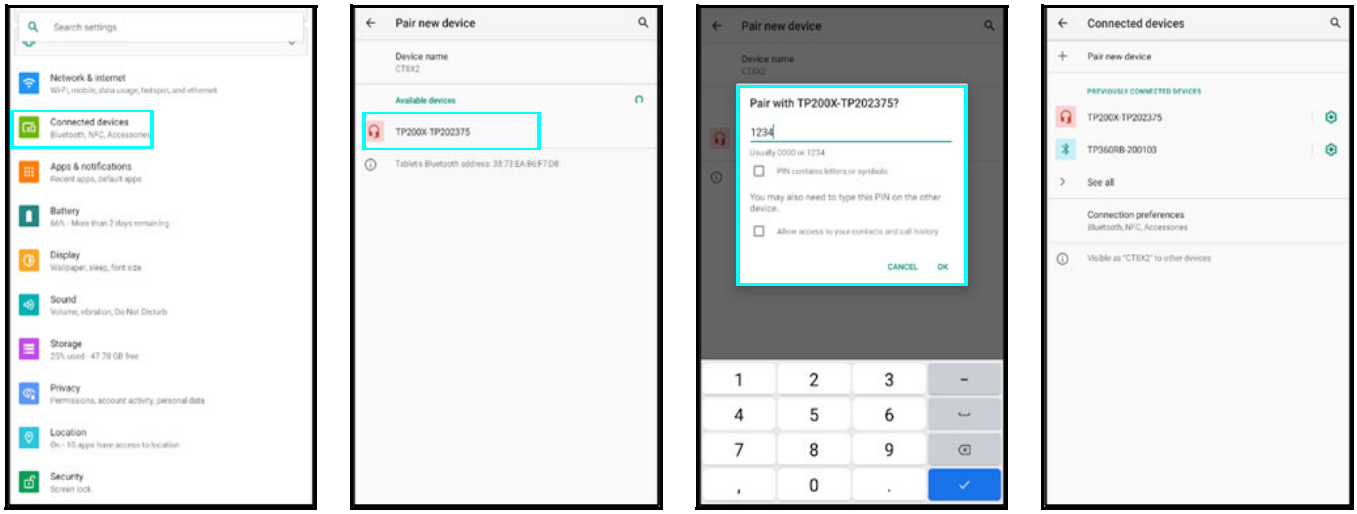


Figure 16

1. Find and tap the Settings icon on the Android Device (Figure 16).
2. Tap [Bluetooth] on the Settings list (Figure 17A).
   If Bluetooth is listed as "OFF," toggle it to "ON."
3. Tap the laser device's serial number which should be listed in the AVAILABLE DEVICES section (Figure 17B). If it is not listed, tap search (or scan) for devices and/or ensure that the laser's Bluetooth is set to "BT_On" or "BT_Enc" if connected to a TruAngle.

   Bluetooth PIN Information: TruPulse 200X PIN = 1234
   TruPulse 200B/360B/360R PIN = 1111
4. Accept any Passkey by tapping [Pair], if prompted (Figure 17C).
5. Once successfully paired, the laser serial number will display in the Paired Devices section (Figure 17D).



(A) (B) (C) (D)

Figure 17

NOTE If the laser is powered off when viewing the current or available Bluetooth devices in range of the Android device, the laser may be described as "Not Connected" even if the two have already been paired. Power the laser on and the device should then display as a paired device.

Additional Information

Localization

English is the default language for most Android devices; however, it can be changed.

To change the language:

1. Power on the Android device.
2. Tap the Settings icon on the device home screen.
3. Tap [Language & Input].
4. From the list of languages displayed, select the language to use for the text display on the device.
5. Press the Home button on the device to return to the device Home screen.

Serial Data Format

The Joint Pole app accepts data from LTI instruments that use a data format which is based on the NMEA 0183 Standard for Marine Electronic Navigational Devices, Revision 2.0. For more detailed information about serial data format, refer to the user's manual that shipped with the LTI instrument.

Start a New Project

From the Main Menu, tap New Project to collect new Joint Pole measurements. The New Project Settings screen will display (Figure 18).

1. Enter/Select the following:
   - **Project Name** - May include any combination of alphanumeric characters (1500 max). Four invalid characters include / \ & or space. An error message will be displayed if the file name includes invalid character(s). Clear the message by clicking [OK] and enter a name using valid characters. Duplicate project names are not allowed. If an existing name is entered, a prompt will appear indicating that a Duplicate Project Name was entered. To proceed, the name must be changed.
   - **GPS** - Will be used when checked to set the coordinates for the Origin point of your measurements. This will allow you to plot the data on Google Earth or a similar program.
   - **Inspector** - Is carried over from the Settings screen or can be entered here. It is the person performing the data collection.
   - **Default owners** - Choose the default owner for each Attachment type.
     Project note - Is a general description for the work and may include any characters (1500 max).

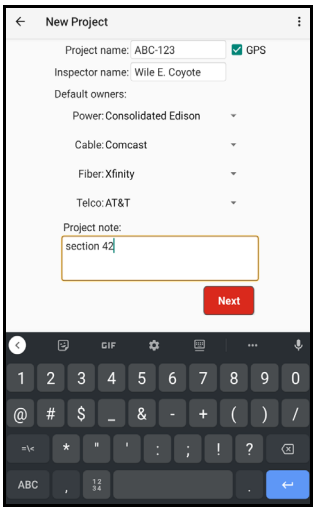


Figure 18

2. Tap the NEXT button to save the New Project entries that have been made and advance to the Pole Record List for the project.

New Pole Record

Tapping [Next] from the New Project screen advances to the Pole Record List for the project (Figure 19).

Figure 19

Tap the  button at the bottom right of the screen to start a new Pole record.

Pole Record Overview

The information tabs now display for the current pole (Figure 20).
The particular fields displayed are dependent on the configuration file being used. Working from left to right across the page:

Figure 20

- **POLE** - Enter all the data for the pole, including the location, Type, Species and Class, as well as measure the height, span and lean with the laser.
- **INSPECTION** - Identify whether the pole passes or fails, the conditions present at the site and the issues found.
- **ATTACHMENTS** - Add equipment to the pole and measure height and midspan sag values with the laser.
- **NOTES** - Enter a Note for the pole.
- **PHOTO** - Take an image of the pole and overlay attachment labels onto the photo.

POLE Tab

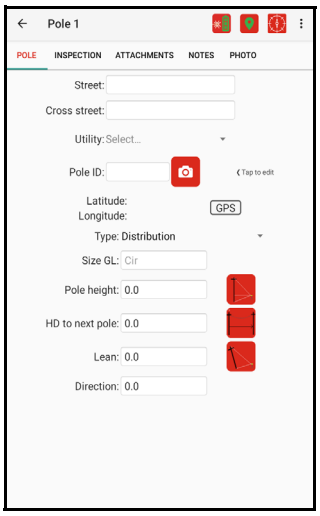


Figure 21

- **Street** - Road on which pole is located.
- **Cross street -** Nearest intersecting road.
- **Utility** - Select the pole owner. This list can be edited in List Value (Page 9).
- **Pole ID** - Enter alpha/numeric pole ID and/or take a picture of the ID.
- **GPS** - When GPS is enabled, tap the button to display the Latitude, Longitude and Elevation of the pole.
- **Type** - Choose from Distribution, Service, Streetlight, Transmission. This list can be edited in List Value (Page 9).
- **Size GL** - The circumference of the pole at ground level.
- **Pole Height** - Tap the measure button and follow the prompts with the laser.
- **HD to next pole** - Tap the measure button and follow the prompts with the laser.
- **Pole lean** - Tap the measure button and follow the prompts with the laser.
- **Direction** - Compass bearing of pole lean.

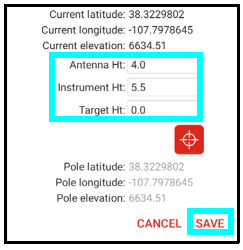
NOTE there are two types of red buttons that will take measurements with the laser:


Fire button: For single shot measurements, put the cursor in this field and fire the laser to receive the data.

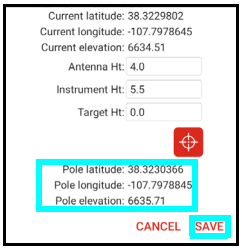

Measurement Routine button: for multi-shot sequences, tap this button and follow the prompts in the pop-up window.

Tap the [GPS] button to display the coordinates (Figure 22A).

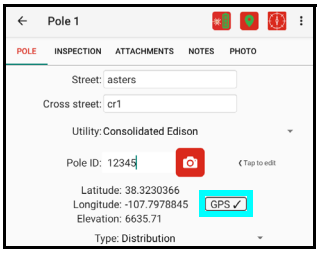
1. Enter the Antenna height to get an accurate ground Elevation
2. If you have the antenna at the pole, tap SAVE.
3. If you are offset from the pole and want to locate it with a TruPulse 360, enter the Instrument and Target Heights for the shot.
4. Shoot to the pole and the coordinates at the bottom will turn from gray to black (Figure 22B)
5. Tap SAVE to store these coordinates for the pole and a check mark appears on the [GPS] button (Figure 22C).



(A)



(B)



(C)

Figure 22

Measure the Height with the Laser

Tap the  button (Figure 23) and follow the prompts. This data will be saved to the tab.

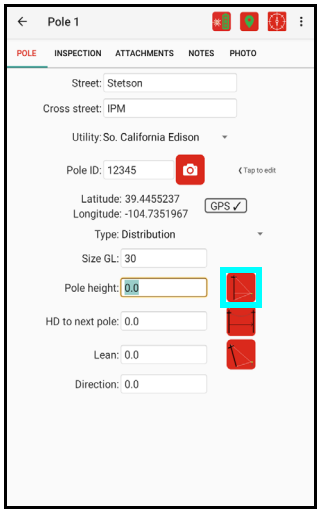
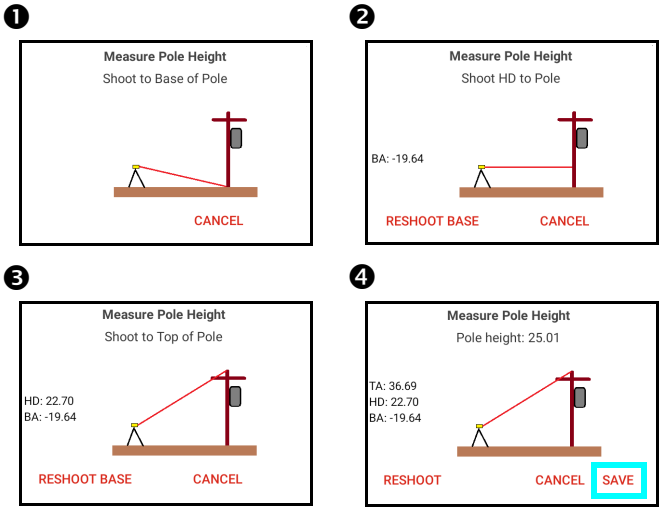


Figure 23



Measure the HD to next Pole with the Laser

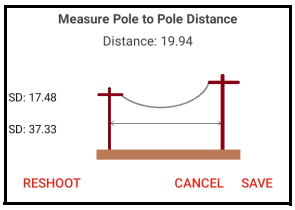
Tap the  button (Figure 24), choose the method, and follow the prompts. This data will be saved to the tab.

Figure 24

1 Shot: Pole to Pole:

Stand at one pole and measure with the laser to the other pole.

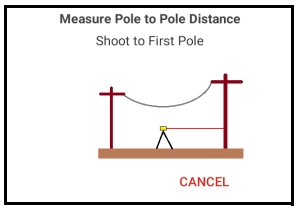
❶



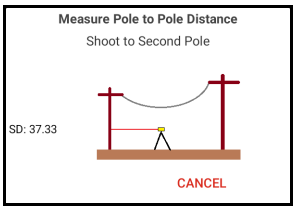
2 Shots: 1 to each Pole:

Stand in between the poles with a TruPulse 200 laser and measure to each, or stand anywhere with a TruPulse 360 laser and measure to each pole.

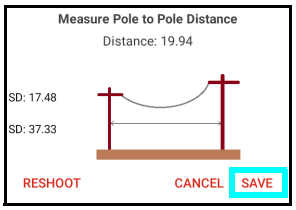
❶



❷



❸



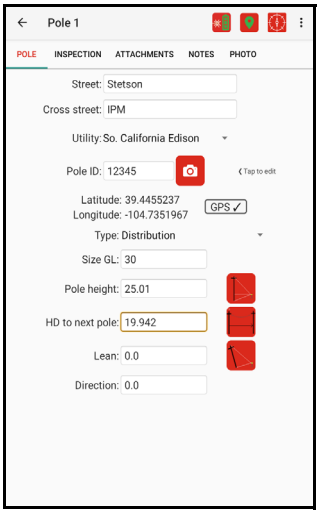
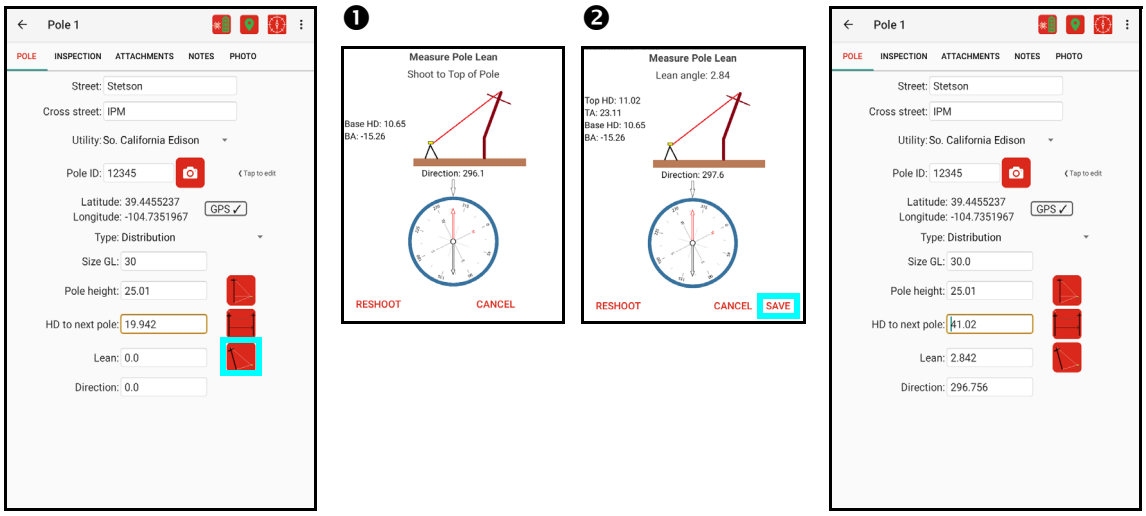


Figure 25

Measure the Lean of the Pole with the Laser

Tap the button (Figure 26A) and follow the prompts.
This data will be saved to the tab (Figure 26B).



(A) (B)

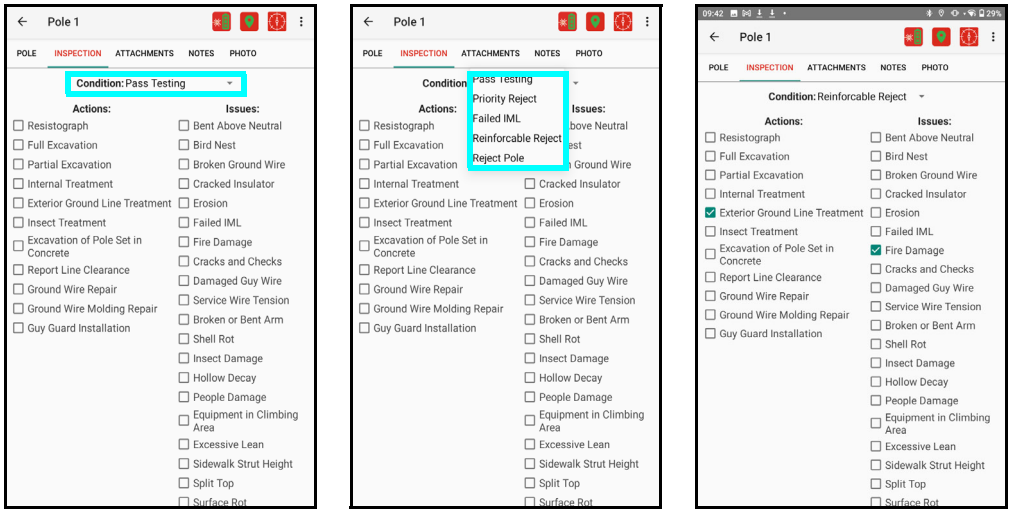
Figure 26

INSPECTION Tab

Tap on the Inspection tab (Figure 27A) and complete the information required for your project.

- **Condition**: choose the status from the pull-down list.
- **Actions**: select any actions necessary for this site (Figure 27B).
- **Issues**: check any issues found on site (Figure 27C).

NOTE All the lists on this tab can be customized to your specifications. See editing the List Values (Page 9).

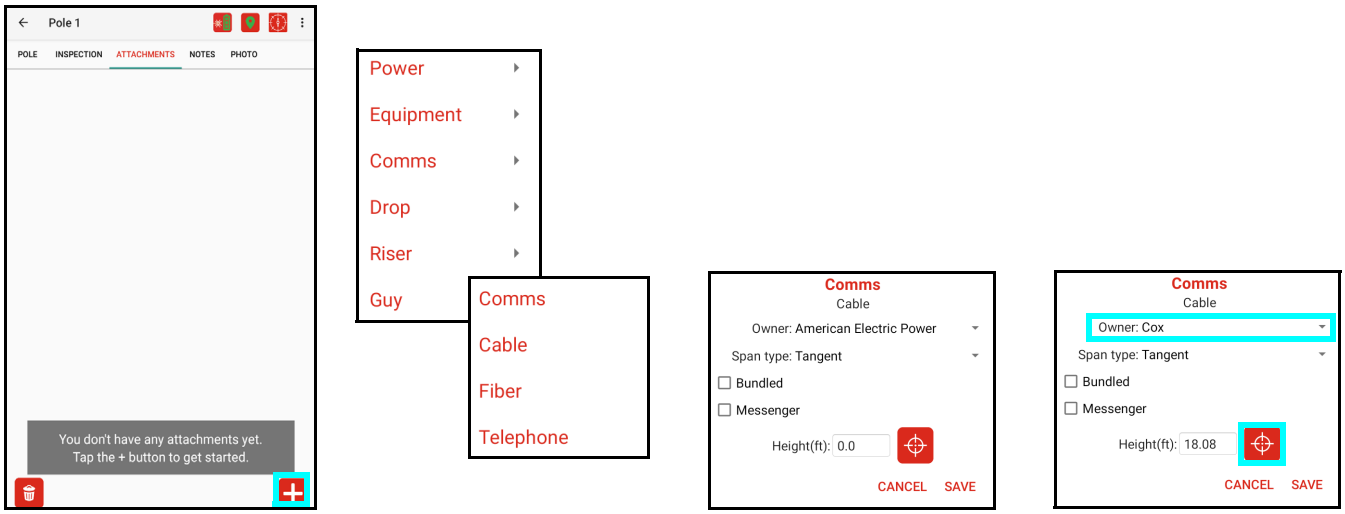


(A) (B) (C)

Figure 27

ATTACHMENTS Tab

1. Tap the  button to add an Attachment (Figure 28A).
2. Choose the type from the sub-menus (Figure 28B).
3. A pop-up window will appear (Figure 28C) where you can:
    - Specify parameters for the Attachment. If it is a Power type, the window will show lists for Owner and Construction. These can be edited in List Values (Page 9).
    - Tap the  button to measure the height or enter it manually.
    - If the attachment is a Comms type (Figure 28D), the window will show a list for Telco owner, which can be edited in the List Values (Page 9).



(A) (B) (C) (D)

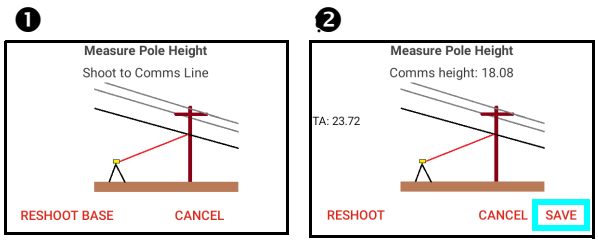
Figure 28

Measure Attachment Height with the Laser

Tap the  button and follow the prompts. This data will be saved to the tab.

NOTE If you are standing in the same location you measured the Height on the Pole tab, you do not have to repeat the Base angle and HD to pole shots. Simply aim at the Attachment point and collect the top angle for the Height.

If you have moved, tap the 'Reshoot Base' button to restart the sequence.



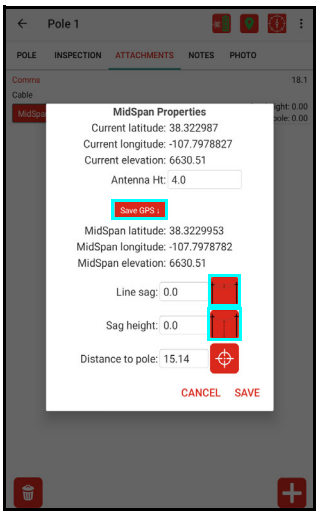
- **ADD**: Tap the  button to add another Attachment type.
- **DELETE**: Highlight an Attachment and tap the  button to remove it.
- **CHANGE**: Tap an Attachment to highlight it and tap it again to re-open it.

Figure 29

Measure the Mid Span Line Sag and Sag Height

Tap the MidSpan button and collect the needed data (Figure 30).

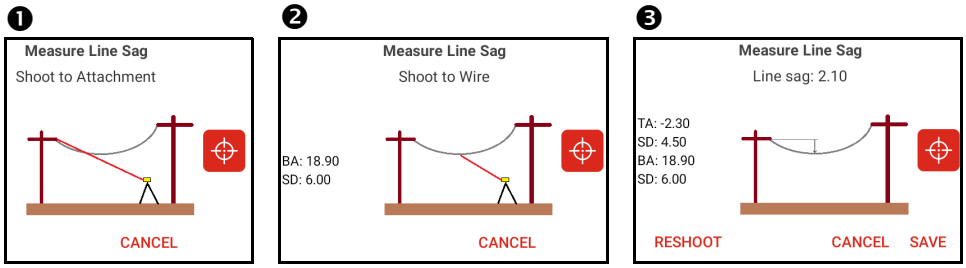
Tap the Save GPS ↓ button to update your position (Figure 30A).
Note that the distance to the last pole field is updated.
This can also be measured with the laser.



A

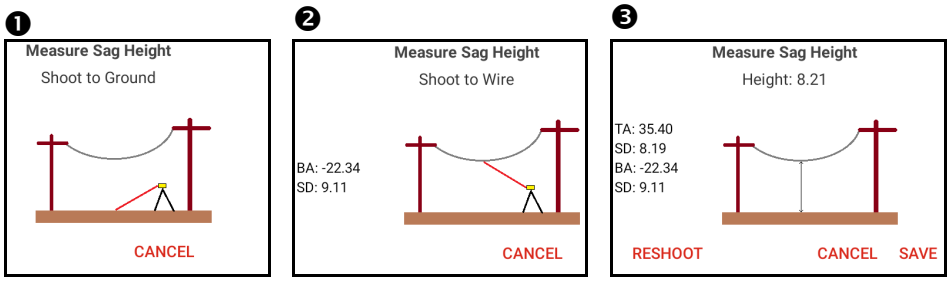
Mid Span Line Sag:

Tap the button and follow the prompts to measure sag from the attachment to the low point.

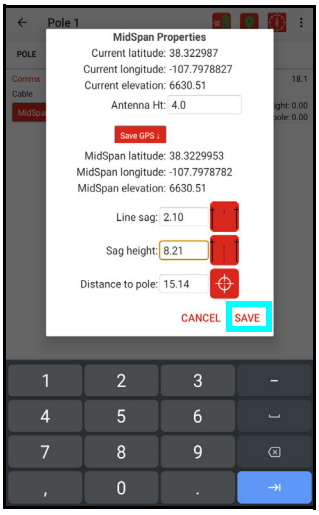


Sag Height:

Tap the button and follow the prompts to measure sag from the attachment to the low point.



Tap SAVE to store these measurements in the pole record (Figure 30B).



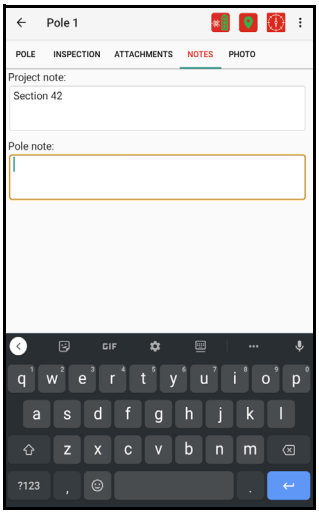
(B)

Figure 30

NOTES Tab

Tap on the Notes tab (Figure 31) and complete the information required for your project.

- **Project note**: Update this note if required.
- **Pole note**: Enter a note specific to this site.



(A) (B)

Figure 31

PHOTO Tab

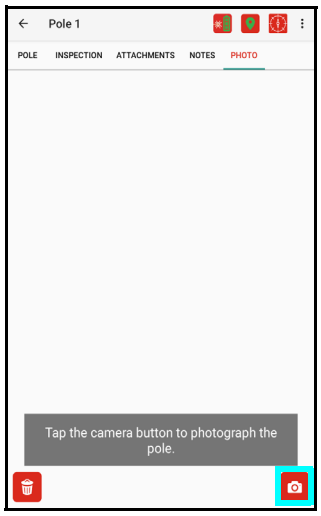


Figure 32

- Tap the button to add a Photo (Figure 32).
- Follow the prompts to take and accept the image.
- Tap the button to delete the image (Figure 33).
- Tap the button to re-take the image.

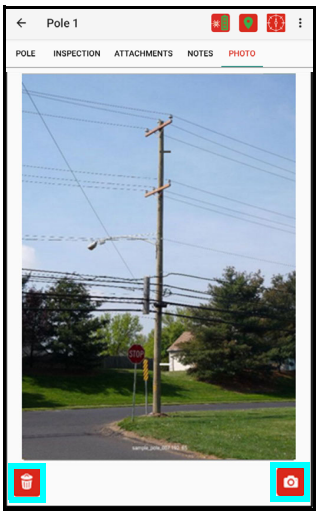
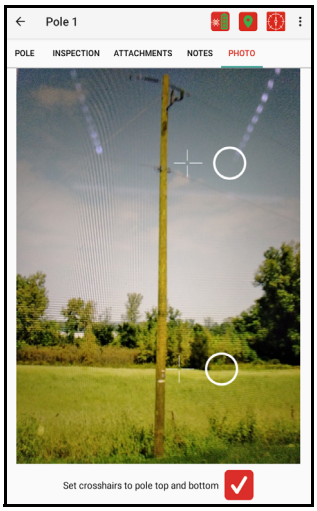


Figure 33

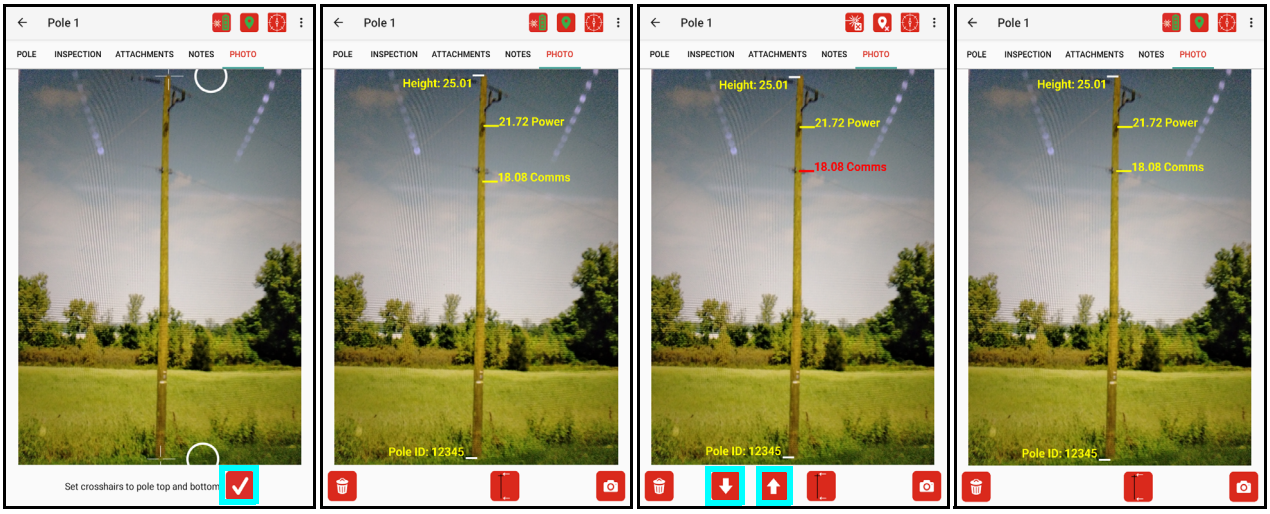
Plot Attachment Labels

For this feature to work, this option needs to be checked in the Settings screen (Page 8) and the screen calibration performed (Page 9).

1. After taking the photo, you will see markers for the top and bottom of the pole appear (Figure 34A).
2. Tap and hold in the circle next to the bottom crosshair and slide it to the base of the pole in the photo. Do the same thing for the top of the pole with the upper crosshair. Tap the checkmark when they look good (Figure 34B). You can always tap the button to reset the top and bottom crosshairs.
3. The Attachment labels and heights will now appear. Note the Pole ID at the base and the total height at the top. Due to the camera angle, some attachment points may not line up (Figure 34C).
4. Tap on the attachment so the text turns red. Up and Down arrows will appear at the bottom of the page and can be used to nudge the label to the correct position. Do this as many times as necessary. This action does not affect the good height value from the laser, it only makes the image look correct (Figure 34D).
5. Review the image and make sure it looks good (Figure 34E). Tap another tab and continue collecting information or tap the back arrow (←) to return to the Pole record list.



(A)



(B) (C) (D) (E)

Figure 34

Pole Record List

When leaving the tabs from your first pole record, or when opening a Saved Project, you will enter the Pole record list (Figure 35). Use this screen to Open, Delete, or Add a new Pole.

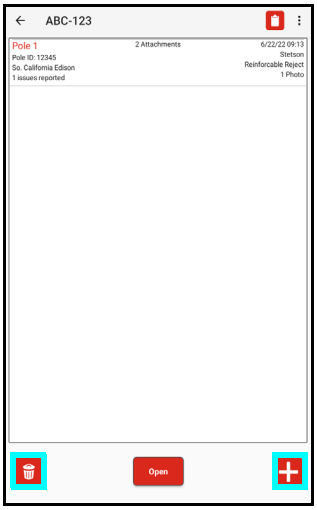


Figure 35

Open a Pole

1. Tap on a Pole record to highlight it on the list.
2. Tap the Open button to reopen the pole for viewing or editing.

Delete a Pole

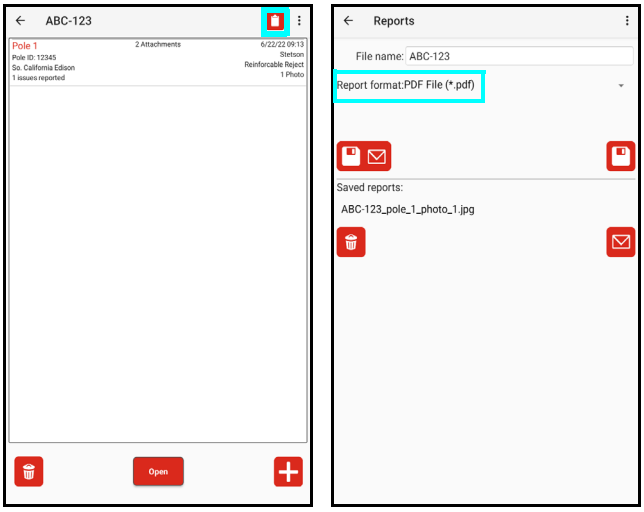
1. Tap on a Pole record to highlight it on the list.
2. Tap the button to remove it. There will be a prompt to continue or cancel and the Pole record will be removed from the project.

Add a Pole

1. Tap the icon and the Pole tabs will display.
2. Fill out all the information on the tabs and take the measurements needed with the laser.

Generate a Report

When a Project has been completed and all the Pole records have been checked for quality in the field, reports of several different types can be generated from the app. They will contain Project and Pole information, any images taken and all laser measurements results.



(A) (B)

Figure 36

1. At the Pole record list, tap the icon in the upper right portion of the screen (Figure 36A). The Report Menu will display (Figure 36B).

   NOTE all photos taken (*.jpg) are in the list of Saved reports.

2. Pull down the list next to the Report format and select a type.
   - **PDF:** creates a PDF.
   - **GPX**: creates a geo-referenced output file with descriptions that will open in GIS software such as ArcGIS - GPS ONLY.
   - **KML**: creates a geo-referenced output file with descriptions that will open in Google Earth - GPS ONLY.
   - **TXT**: produces a tab delimited text file with no images.
   - **CSV**: generates a comma delimited text file (no images) that will open directly in Excel.
   - **All Above Formats**: will create a copy of the report in each of the formats listed.

   NOTE The GPX and KML output files are only available on this list when GPS has been used to set Pole locations (Page 7).

3. Select one of the Save buttons:
   - will open the email client and create a message with the reports attached. If you have entered an address to send reports to in the Settings screen (Page 8) this will automatically be used. Otherwise, enter an address and send the message.
   - will save a copy of the selected file(s) and make them available for transfer later.

   Once Reports have been generated, they will be listed at the bottom of the Report menu (Figure 37). All images that were taken for the project will be listed here also. Any of these files may be selected by tapping on them to highlight, and they can be either deleted or sent via email.

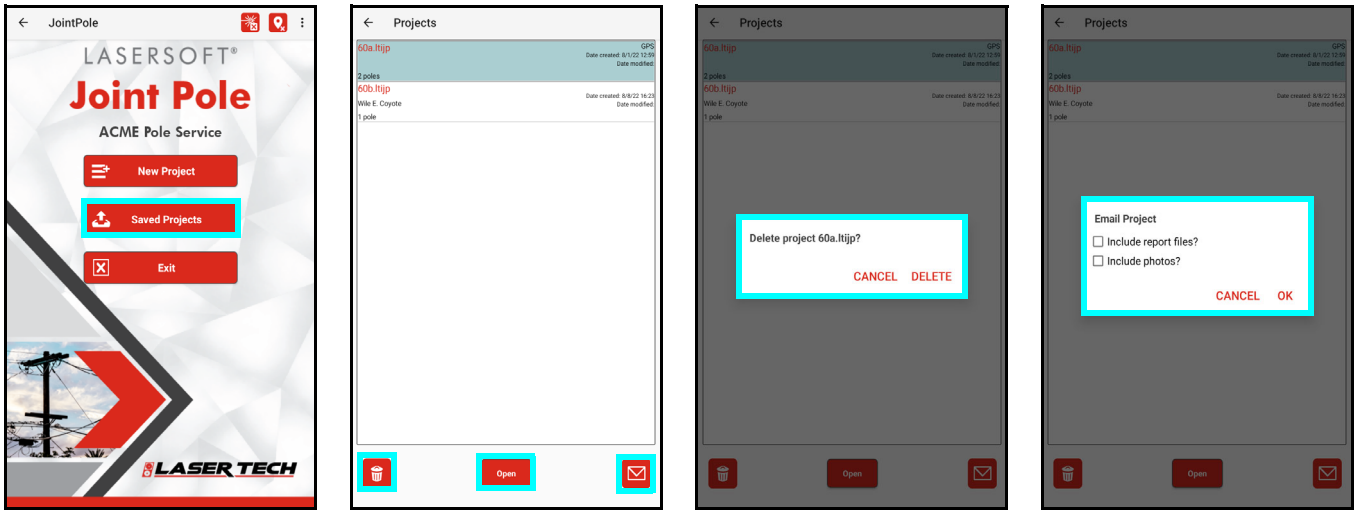
Figure 37

4. Tap the back arrow (←) to return to the Pole record list. Continue to add poles to this project or tap the back arrow to return to the Main menu.

Saved Projects Screen

Manage your projects from within the app. At the Main menu, tap the [Saved Projects] button (Figure 38A).
Tap on a Project (Figure 38B) to highlight it and then tap:

- Open to re-open the project.
- to remove the project and all report files from the device (Figure 38C).
- to send and choose to include reports and/or photos with the *.ltijp data file, tap OK (Figure 38D).



(A) (B) (C) (D)

Figure 38

Transfer Reports/Data to a PC

In addition to email, saved reports can also be transferred to a PC via the USB cable that accompanies the Android device. When Joint Pole is installed, it creates a folder for storing program settings, reports, and *.ltijp format project files. The location is Android/data/com.lasertech.jointpole/files/. The *.ltijp project files can only be opened within Joint Pole and are located in a sub-folder named "Data". In addition to transferring project reports to a PC, it is also a good idea to copy *.ltijp files over as well once all edits and changes to the project are complete. An *.ltijp file can always be copied back over to the Android device if it becomes necessary to add more data to a project or make any other changes - and then reports can be re-created based on the updated file.

1. Connect the Android device to a PC with the USB cable that accompanies the device. Android devices typically connect as if they are a "Removable Disk" or external hard drive. Please refer to the manual that shipped with your device to understand how it connects to a PC.
2. Swipe down from the top of the Android device screen, select Settings, and tap Connected devices (Figure 39A).
3. Tap "USB" from the Currently Connected list (Figure 39B).
4. Select the File Transfer option (Figure 39C).
5. On the PC, open File Explorer and then navigate to and select the Android device. In this example, it is "CT8X2". When the device is selected, its contents display on the right side of the File Explorer screen (Figure 39D).

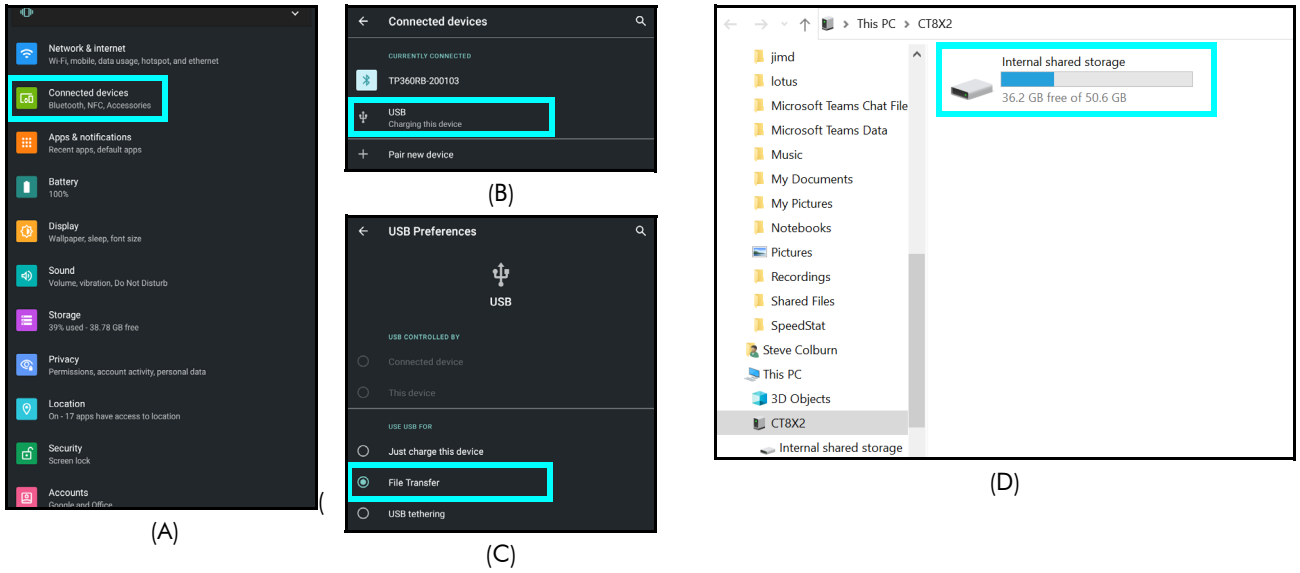


Figure 39

6. Navigate to the Android/data/com.lasertech.jointpole/files folder (Figure 40A).
7. Double-click the folder that coincides with the project name and the saved reports will display (Figure 40B). Copy any of the individual reports or copy the entire folder to transfer all the reports for the project by highlighting them and then right-click/copy with your mouse.
8. Create a folder on your PC for storing your Joint Pole reports and *.ltijp files. Double-click the folder, and then right-click/paste with your mouse.

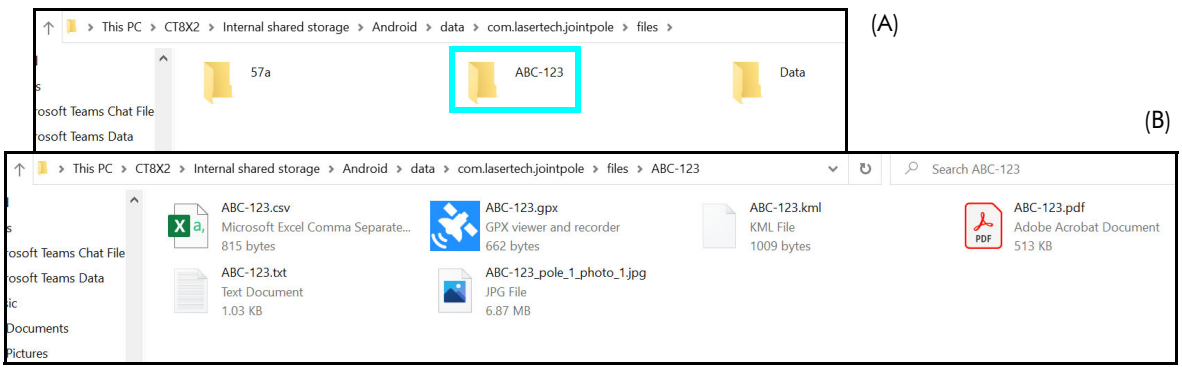


Figure 40

Appendix A - Joint Pole for Android Quick Start Guide

This quick reference guide is divided up by specific LTI lasers used with a ruggedized Android tablet. If using an Android device not purchased from LTI, the steps referencing tablet set up will be similar but may have some variances. Refer to the Android device's manual for information on setting up Wi-Fi, email accounts, and connecting Bluetooth devices if necessary.

Step 1 for All Lasers - Install Joint Pole and Get Licensed

1. Turn on tablet, tap Settings, tap Display to set SLEEP to NEVER.
2. Tap Settings, then tap + Add account to add a Google account or get assistance from IT to set up a dedicated email account for your reports.
3. Tap Play Store, then Search for: "LaserSoft Joint Pole" Joint Pole and INSTALL the app.
4. From the Main screen, tap , then tap Joint Pole to open app.
5. Tap and hold Machine ID: 748DDB3C to copy or notate Machine ID on paper.
6. Tap License Manager website link, then log in with your Email and temporary password sent from LTI.
7. Paste or type the Machine ID into * Machine ID: .
8. From the Purchases Table, copy and paste or type in your purchase ID into * Purchase ID: .
9. Tap Submit, then copy or notate the License Key.
10. Tap Joint Pole, then paste or type in the License Key and then tap START.
11. Charge the tablet.
12. Go to Step 2 for TruPulse 360R/B for laser setup (below), or to Step 2 for TruPulse 200X + TruAngle (Page 30).

TruPulse 360B/R

Step 2 - Toggle On Bluetooth

1. Press FIRE to power the unit on.
2. Long press ▲ until Units .
3. Press ▲ until bt .
4. Press FIRE then press ▲ until bt on .
5. Press FIRE to confirm.

Step 3 - Change Units of Measure to Feet (if necessary)

1. Long press ▲ until  .
2. Press FIRE then press ▲ until  .
3. Press FIRE and then press FIRE again to accept feet/degrees as units of measurement.

Step 4 - Connect TruPulse 360B/R with Android Device via Bluetooth

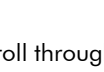
1. Tap ⚙, then tap Connected devices Bluetooth, NFC, Accessories.
2. Turn on tablet's Bluetooth.
3. Tap the laser model/serial number under AVAILABLE DEVICES.
4. Enter PIN number: 1111 or accept any passkey.
5. Exit to the Main screen.

TruPulse 200X + TruAngle

Step 2 - Toggle On Bluetooth

1. Press FIRE to power the unit on.
2. Press MODE until  .
3. Press ▲ until  .
4. Press FIRE to accept.

Step 3 - Change Units of Measure to Feet

1. Press MODE until  .
2. Press ▲ to scroll through unit options  ,  .
3. Press FIRE to accept the units of measurement .

Step 4 - Sync Android Device with TruPulse 200X via Bluetooth

1. Tap ⚙, then tap Connected devices Bluetooth, NFC, Accessories.
2. Turn on the tablet's Bluetooth.
3. Tap the laser model/serial number under AVAILABLE DEVICES.
4. Enter the PIN number: 1234 or accept any passkey.
5. Exit to the Main screen.

Final Steps for All Lasers - Start a Project & Store a Result

*For standard projects without GPS.

1. Power ON all components.
2. Tap 

and then tap 

.
3. Connect to a Laser and GPS (if needed) by tapping the connection icons at the top of the Main menu.
4. Enter the filename for the Project, select whether GPS will be used and enter an Inspector.
5. Choose your Configuration file from the pull-down list.
6. Choose the Load case to use for this project.
7. Enter a Project note and then tap 

.
8. From the Pole record list, tap  to add a new Pole record.
9. Fill out the tabs of information for the pole and make measurements with the laser.
10. Complete the information for the pole and tap the Back arrow (←) to return to the Pole record list.

Appendix B - Conversion Table (Inches to Decimal Feet)

The chart below converts fractions of inches into decimal equivalents. Conversions are also available in Joint Pole 's built-in Help (Page 8).

Inches	Feet	Inches	Feet	Inches	Feet	Inches	Feet
1/8″	0.0104	3 1/8″	0.2604	6 1/8″	0.5104	9 1/8″	0.7604
1/4″	0.0208	3 1/4″	0.2708	6 1/4″	0.5208	9 1/4″	0.7708
3/8″	0.0313	3 3/8″	0.2813	6 3/8″	0.5313	9 3/8″	0.7813
1/2″	0.0417	3 1/2″	0.2917	6 1/2″	0.5417	9 1/2″	0.7917
5/8″	0.0521	3 5/8″	0.3021	6 5/8″	0.5521	9 5/8″	0.8021
3/4″	0.0625	3 3/4″	0.3125	6 3/4″	0.5625	9 3/4″	0.8125
7/8″	0.0729	3 7/8″	0.3230	6 7/8″	0.5729	9 7/8″	0.8229
1″	0.0833	4″	0.3333	7″	0.5833	10″	0.8333
1 1/8″	0.0938	4 1/8″	0.3438	7 1/8″	0.5938	10 1/8″	0.8438
1 1/4″	0.1042	4 1/4″	0.3542	7 1/4″	0.6042	10 1/4″	0.8542
1 3/8″	0.1146	4 3/8″	0.3646	7 3/8″	0.6146	10 3/8″	0.8646
1 1/2″	0.1250	4 1/2″	0.3750	7 1/2″	0.6250	10 1/2″	0.8750
1 5/8″	0.1354	4 5/8″	0.3854	7 5/8″	0.6354	10 5/8″	0.8854
1 3/4″	0.1458	4 3/4″	0.3958	7 3/4″	0.6458	10 3/4″	0.8958
1 7/8″	0.1563	4 7/8″	0.4063	7 7/8″	0.6563	10 7/8″	0.9063
2″	0.1667	5″	0.4167	8″	0.6667	11″	0.9167
2 1/8″	0.1771	5 1/8″	0.4271	8 1/8″	0.6771	11 1/8″	0.9271
2 1/4″	0.1875	5 1/4″	0.4375	8 1/4″	0.6875	11 1/4″	0.9375
2 3/8″	0.1979	5 3/8″	0.4479	8 3/8″	0.6979	11 3/8″	0.9479
2 1/2″	0.2083	5 1/2″	0.4583	8 1/2″	0.7083	11 1/2″	0.9583
2 5/8″	0.2188	5 5/8″	0.4688	8 5/8″	0.7188	11 5/8″	0.9688
2 3/4″	0.2292	5 3/4″	0.4792	8 3/4″	0.7292	11 3/4″	0.9792
2 7/8″	0.2396	5 7/8″	0.4896	8 7/8″	0.7396	11 7/8″	0.9896
3″	0.2500	6″	0.5000	9″	0.7500	12″	1.000

Appendix C - Troubleshooting Tips

NOTE Joint Pole for Android does not support Android devices running Android operating systems older than 10.0. To check the version of the operating system of the Android device, navigate to "Settings" and then "About." Remedy steps may vary slightly depending on the specific device used.

Problem	Remedy
No communication between laser and the Android device.	• Ensure all system components have adequate power levels. Replace laser batteries and/or re-charge the device if they are low. • Tap the Laser Connection Indicator icon at the top of the Main screen and try to take another measurement. • Verify that the Bluetooth feature in the laser is set to BT_Enc (when using a TruAngle) or BT_On (without a TruAngle). • Ensure that the laser is paired to the Android device via Bluetooth (Page 4). Lasers can only be paired to one device at a time. • If using a TruAngle: ensure that the 4pin to 4pin cable connecting the laser to the TruAngle laser connector is securely in place. Also verify that the TruAngle firmware is version 1.17 or better. Refer to the TruAngle manual for more information.
Joint Pole Height measurements do not look right.	Tap the RESHOOT button to return to the shot sequence screens and retake any suspect measurements. They can be repeated until the operator is satisfied.
The Android device locked up or doesn't seem to be working properly.	Power the Android device off and back on again. Press and hold the power button to see the options for resetting the device. No matter what, each measurement is saved as it is taken, and no data will be lost.
An error message was displayed while working in Joint Pole.	Error messages are often self-explanatory. Clear the message and correct the error before proceeding. If the error continues, restart Joint Pole. If the error persists, reset the Android device (see above). Go to Joint Pole Help and select Email Tech Support to send a diagnostic file to support@lasertech.com
Cannot see the Android device when connected to a PC with the USB cable.	When the Android device is connected with the USB cable, swipe down from the top of the Android device screen, select Settings and check the USB Connection. Ensure that you are allowing file transfer and not just charging or image transfer only.
Cannot save reports when trying to transfer them to a PC using a cable.	The Android device cannot be connected to the computer when reports are being saved. Unplug the cable, save the reports, and then plug the cable back in to access saved reports.

Appendix D - TruPulse 360 Magnetic Interference Guidelines

Minimum 6"

- Metal Rim Eyeglasses
- Pen/Pencil
- Metal Watch Ban
- Pocket Knife
- Metal Zipper/Buttons
- Belt Buckle
- Batteries
- Binoculars
- Cell Phone
- Keys
- Camera
- Camcorder
- Survey Nails
- Metal Tape Measure

Minimum 18"

- Clipboard
- Data Collector
- Computer
- GPS Antenna
- 2-Way Radio
- Hand Gun
- Hatchet
- Cell Phone Case w/ Magnetic Closure

Minimum 6'

- Bicycle
- Fire Hydrant
- Road Sign
- Sewer Cap or Drain
- Steel Pole
- ATV
- Guy Wire
- Magnets
- Chain-Link Fence
- Barb-Wire Fence
- Trimble Nomad w/ Stylus Magnet

Minimum 15'

- Electrical Box
- Small Car/Truck
- Powerline
- Building Concrete & Steel

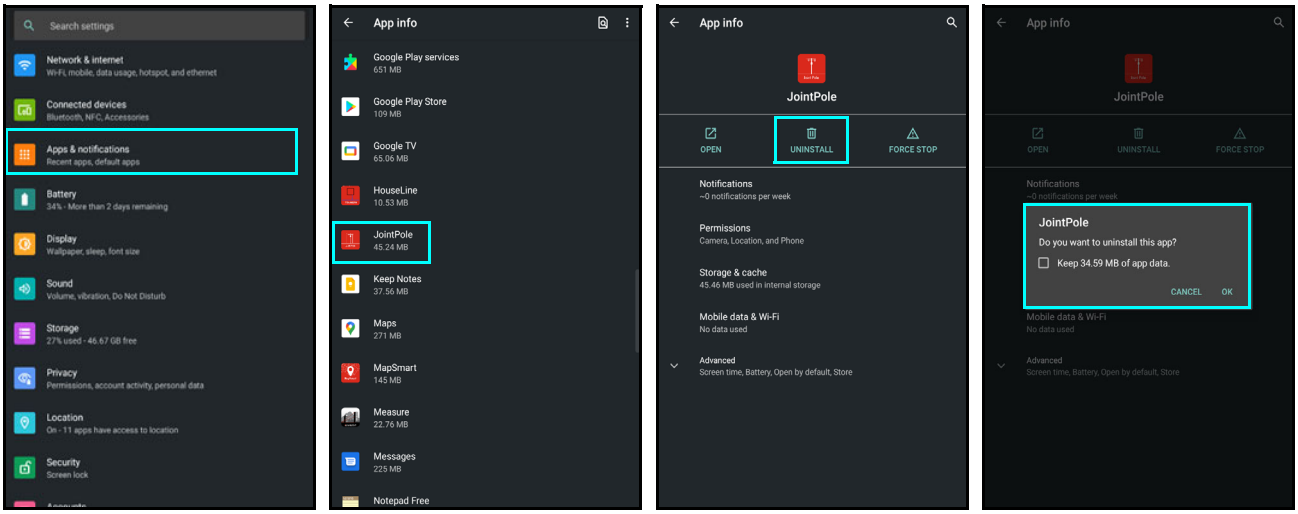
Minimum 30'

- Large Truck
- Metal Building
- Heavy Machinery

Appendix E - Uninstall Joint Pole

This example is based on Android tablet OS version 10. Other Android devices may be very similar. Refer to the manual for the specific Android device used to find the process for uninstalling apps.

1. Transfer any needed project files or reports to a computer (Page 28).
2. Go to Settings, scroll down and select [Apps & Notifications] from the Settings list (Figure 41A)
3. Scroll down and select Joint Pole from the list of apps (Figure 41B).
4. Tap [Uninstall] to remove the program (Figure 41C).
5. Leave the "Keep app data" box unchecked and all remaining app files will be deleted. Tap OK to uninstall and delete app data. (Figure 41D).



(A) (B) (C) (D)

Figure 41