

ENGLISH

TI220

INSTRUCTION MANUAL

Thermal Imager for Android® Devices

- 10,800 PIXELS TO TROUBLESHOOT HOT AND COLD SPOTS
- CAPTURE, STORE, AND SHARE IMAGES, VIDEO, AND TIME-LAPSE VIDEO
- DIFFERENTIAL AND TOUCH SCREEN TEMPERATURE
- HIGH AND LOW TEMPERATURE ALARMS
- SELECTABLE COLOR PALETTES
- COMPATIBLE WITH MOST ANDROID®* DEVICES



*Android® version 6.0 or higher



-4° – 752°F
-20° – 400°C



2m

**KLEIN
TOOLS®** 

CE
UK
CA

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GENERAL SPECIFICATIONS

Klein Tools TI220 Thermal Imager allows easy capture, storage, and sharing of images and video, including time-lapse video, for instant troubleshooting on your Android® device. Excellent resolution of over 10,800 pixels, with your choice of color palettes. The meter features differential temperature, touch-point temperature, and high and low temperature alarms.

TI220 has USB-C and micro-USB connections for most Android® smart phones and devices. The camera output is displayed on the Android® device using the Klein Tools Thermal Imager App, available for free from Google Play™ store.

- **Environment:** Indoor or outdoor
- **Operating Altitude:** 6562 ft. (2000 m)
- **Relative Humidity:** <95% non-condensing
- **Operating Temp:** 32° to 122°F (0° to 50°C)
- **Storage Temp:** 14° to 140°F (-10° to 60°C)
- **Sensor Resolution:** 10800 pixels
- **Pixel size:** 17µm
- **Spectral Response:** 8 to 14µm
- **Field of View (FOV):** 50°
- **Frame Rate:** 9 Hz
- **Sensitivity:** <60 mK at 25°C
- **Temperature Range:** -4° to 752° F (-20° to 400° C)
- **Temperature Resolution:** 0.1°F, 0.1°C
- **Temperature Accuracy:** +/-2° or 2% (whichever is greater)
NOTE: Not calibrated below 14°F (-10°C)
- **Temperature Display:** Differential temperature, high, center, and low cross hairs, and user-selectable temperature
- **Temperature Settings:** °F / °C
- **Emissivity:** 0.1 to 0.99 adjustable (0.95 default)
- **Color Palettes:** Ironbow, Rainbow, Grayscale
- **Mobile Device:** Android® 6.0 or higher
- **Mobile App:** Google Play supported
- **Image Format:** JPG
- **Video Format:** MP4
- **Dimensions:** 1.07" × 2.13" × 0.73" (27.2 × 54.0 × 18.5 mm)
- **Weight:** 1.08 oz. (30.7 grams)
- **Pollution degree:** 2
- **Drop Protection:** 6.6 ft. (2m)

Specifications subject to change.

Android® is a registered trademark of Google LLC.
Google Play™ store is a trademark of Google LLC.

⚠ WARNINGS

To ensure safe operation and service, follow these instructions.

- Read the instructions to ensure safe operation.
- Always wear approved eye protection.
- Do not use if the housing is damaged in any way.
- DO NOT use if the USB-C connector, micro-USB connector/adaptor is damaged in any way.
- There are no user-serviceable parts inside. DO NOT open or attempt to repair.

NOTE: Do not point the camera at the sun or any other strong energy source. This can affect the accuracy of the camera or cause damage to the sensor.

⚠ CAUTION

- Burn Hazard. Reflective materials may have a higher actual temperature than the measured temperature. Set emissivity to match the object being measured (see Emissivity section).

SYMBOLS ON TESTER



Warning or Caution



Read Instructions



Conformité Européenne: Conforms with European Economic Area directives



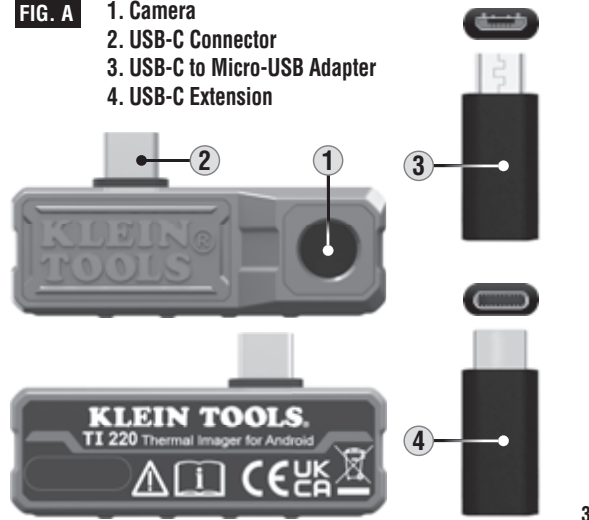
UKCA - United Kingdom Conformity Assessment



Do not place equipment and its accessories in the trash

FEATURE DETAILS

- FIG. A**
1. Camera
 2. USB-C Connector
 3. USB-C to Micro-USB Adapter
 4. USB-C Extension



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DISPLAY DETAILS

FIG. B LIVE MODE SCREEN

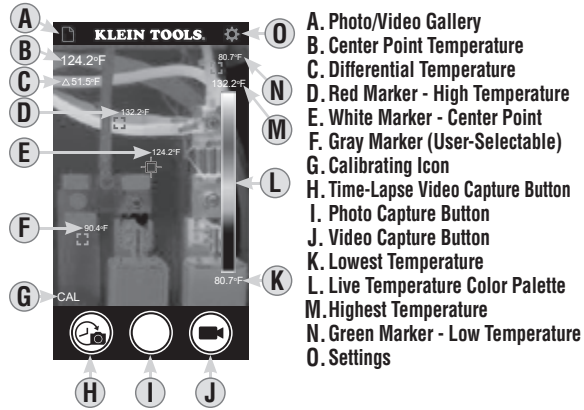
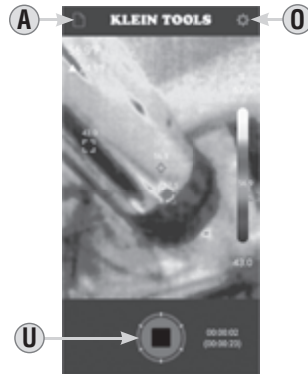


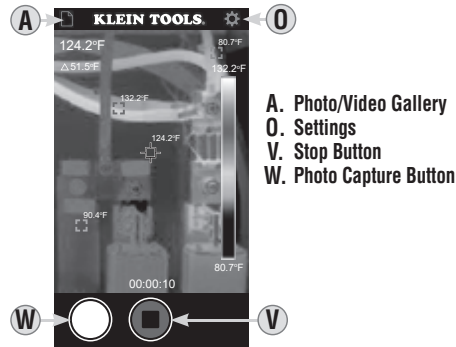
FIG. C TIME-LAPSE MODE SCREEN



- A. Photo/Video Gallery
- O. Settings
- U. Stop Button

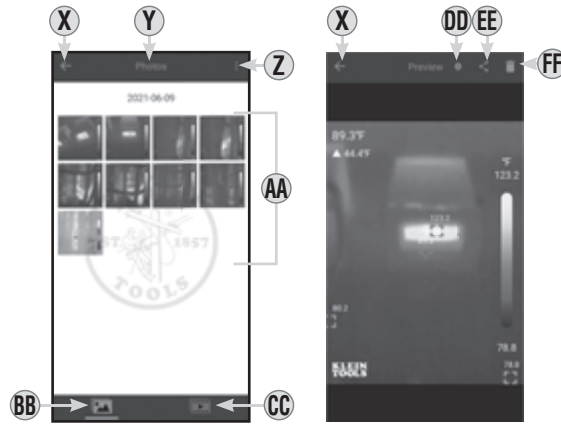
DISPLAY DETAILS

FIG. D VIDEO MODE SCREEN



- A. Photo/Video Gallery
- O. Settings
- V. Stop Button
- W. Photo Capture Button

FIG. E GALLERY MODE SCREENS



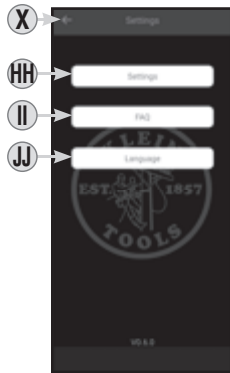
- X. Previous Screen Icon
- Y. Active Menu (Photo or Video Gallery)
- Z. More Selection Options
- AA. Files
- BB. Photo Gallery
- CC. Video Gallery
- DD. File Information
- EE. Copy/Share Selected File(s)
- FF. Delete Selected File(s)

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DISPLAY DETAILS

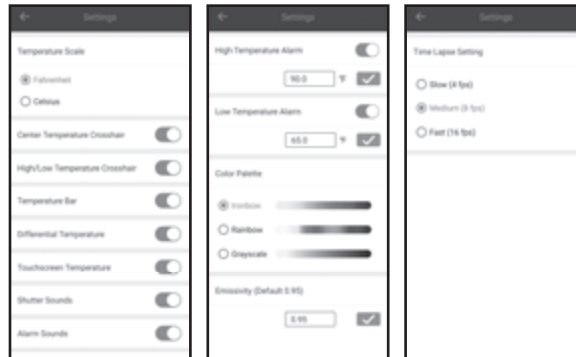
FIG. F

SETTINGS SCREEN



- X. Previous Screen Icon
- HH. Camera Settings Button
- II. Frequently Asked Questions Button
- JJ. Language Button

CAMERA SETTINGS SCREENS **HH**



OPERATING INSTRUCTIONS

DOWNLOADING THE APP

The Klein Tools Thermal Imager app is required for functionality. The app is available for free from the Google Play™ store, or by scanning the QR code below.

CONNECTING YOUR DEVICE

1. Turn on your Android® device.
2. Connect the Thermal Imager to your device:
 - If your device uses a USB-C connector, insert the USB-C connector ② directly into your device (FIG. G). If a phone case interferes with the connection, attach the USB-C Extension ④ to the USB-C connector ②, making sure it is fully seated, then insert into your device.
 - If your device uses a micro-USB connector, make sure the USB-C to micro-USB Adapter ③ is fully seated over the USB-C connector ②, then insert into your device (FIG. H).
3. Connecting your device will automatically open the app, and a popup will ask for confirmation: "Open Klein Thermal to handle Klein Tools T1220?" Tap "OK" or "CANCEL". Optionally, check the box to select "Always open Klein Thermal when Klein Tools T1220 is connected."

Scan QR code for free download of the Klein Tools T1220 app



FIG. G



FIG. H



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OPERATING INSTRUCTIONS

PHOTO CAPTURE

While in Live View mode (see FIG. B), aim the Camera ① at the subject to be photographed and tap the Photo Capture button ① to take a photo. **NOTE:** When the first photo is captured, the app will ask permission, "Allow Klein Thermal to access photos and media on your device?" "Allow" "Deny". Tap "Allow" to store images to your device.

TIME-LAPSE VIDEO CAPTURE (FIG. C)

1. While in live view mode (see FIG. B), aim the Camera ① at the subject to be recorded.
2. Tap the Time Lapse Video Button ⑨ to begin recording time-lapse video capture.
3. To stop recording and exit Time Lapse Video mode, tap the Stop button ⑩.

VIDEO CAPTURE (FIG. D)

1. While in Live View mode (see FIG. B), aim the Camera ① at the subject to be recorded and tap the Video Capture button ⑪. **NOTE:** When the first video is captured, the app will ask permission, "Allow Klein Thermal to access photos and media on your device?" "Allow" "Deny". Tap "Allow" to store video to your device. A popup will ask, "Allow Klein Thermal to record audio?" Responses are: "While using the app", "Only this time", or "Deny". Tap to make selection. To update this selection later, change the setting in your device's Settings menu.
2. Tap the Photo Capture Button ① while recording is active to capture still images of the subject.
3. To stop recording and Exit Video Capture mode, tap the Stop button ⑩.

VIEWING AND MANAGING PHOTOS AND VIDEO FILES

To access the photo and/or video galleries, tap the Photo/ Video Gallery icon ⑫, then select the Photo Gallery ⑬ or Video Gallery ⑭. To select multiple files or all files at once, tap the "More Selection Options" button ⑮.

Tap on a file ⑯ to view. Once a file is selected, you can tap the "File Information" icon ⑰ to show additional information about the file, the "Share" icon ⑱ to view your device's options for file sharing, or the "Delete" button ⑲ to delete the file. Touch and hold a file ⑯ to enable multiple selections. To exit the Photo/Video mode, tap the "Previous" icon ⑳ to return to Live View mode.

ADJUSTING SETTINGS (FIG. F)

While in Live View mode (see FIG. B), tap the Settings icon ㉑ and tap one of the buttons to view/adjust the following settings:

Camera Settings ㉒:

- **Temperature Scale:** Select °F or °C (default is °F)
- **High/Low Temperature Crosshairs:** On/Off (default is On)
- **Center Temperature Crosshairs:** On/Off (default is On)
- **Temperature Bar:** On/Off (default is On)
- **Differential Temperature:** On/Off (default is On)
- **Touchscreen Temperature:** On/Off (default is On)
- **Shutter Sounds:** On/Off (default is On)
- **Alarm Sounds:** On/Off (default is On)
- **High/Low Temperature Alarm:** Select Temperature, On/Off, enter temperature from -4 to 752°F (-20 to 400°C)
- **Color Palette:** Select Ironbow, Rainbow, or Grayscale (default is Ironbow)
- **Emissivity:** Enter emissivity from 0.01 to 0.99 (default is 0.95)
- **Time Lapse:** Change capture interval by selecting either slow (4 fps), medium (8 fps), or fast (16 fps) (default is medium (8 fps)).

OPERATING INSTRUCTIONS

Frequently Asked Questions (FAQ) ⓘ:

- Helpful tips for using the Thermal Imager

Language ⓘ:

- Select English, Spanish, or French

EMISSIVITY

Emissivity is a measure of the ability of a surface to emit thermal energy by radiation. Different types of surfaces (metals, masonry, wood, etc.) emit thermal energy through radiation at different efficiencies. Accordingly, these materials have different emissivity coefficients which must be considered in order to make accurate measurements with an infrared thermometer.

Emissivity on the TI220 may be adjusted from 0.01 to 0.99 to enable accurate measurement of the temperature of most types of materials. Generally speaking, shiny bright surfaces such as chrome, white boards, etc. exhibit lower emissivity than flat black materials.

For guidance only, the chart below may be used to estimate emissivity for many different types of materials. However, the emissivity of surfaces is dependent upon many parameters such as surface finish, temperature, shape of the object, etc.

This chart should be used for guidance only.

Material	Emissivity
Asphalt	0.93
Red brick	0.93
Gray brick	0.75
Porcelain ceramic	0.92
Fired clay	0.91
Rough concrete	0.94
Cotton cloth	0.77
Smooth glass	0.92 - 0.94
Granite	0.45
Gravel	0.28
Smooth ice	0.97
Smooth white marble	0.56
Black paint	0.96
Hard rubber	0.94
Wood	0.80 - 0.90
Matte copper	0.22
Commercial sheet aluminum	0.09
Cold rolled steel	0.75 - 0.85

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CLEANING

Be sure unit is not connected to a device and wipe with a clean, dry lint-free cloth. **Do not use abrasive cleaners or solvents.**

STORAGE

Do not expose to high temperatures or humidity. After a period of storage in extreme conditions exceeding the limits mentioned in the General Specifications section, allow unit to return to normal operating conditions before using.

FCC & IC COMPLIANCE

Canada ICES-003 (B) / NMB-003 (B)

WARRANTY

DISPOSAL / RECYCLE



Do not place equipment and its accessories in the trash. Items must be properly disposed of in accordance with local regulations. Please see www.epa.gov/recycle for additional information.