



INDUSTRIAL PRODUCT INTRODUCTION & TRAINING



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Agenda



- Hikmicro Introduction
- IR in HVAC & Electrical
- IR Fundamentals
- Camera Operations
- Questions

COMPANY PROFILE



SEE THE WORLD IN A NEW WAY

About HIKMICRO

HIKMICRO is a leading provider of thermal imaging equipment and solutions. Specializing in thermal technology innovation, the company offers thermal cores, modules, cameras, total solutions and also night vision products, which can be used in outdoor, industrial and security industry globally, serving customers in over 100 countries and regions.

Employees



1300+

Masters & PhDs



396

Patents



115

OUR MISSION: Take thermal products from niche to mass market “one in every tool bag”



Thermal imaging can drive efficiencies in maintenance and reliability programs across all levels



Safety and screening tools- Thermal is first line of defense



Camera costs should no longer limit adoption or performance expectations



HIKMICRO ADVANTAGES



Solid Foundation and One of the Few that **MANUFACTURES** FPAs

- ◆ Continuous innovation
- ◆ Aggressive product roadmap
- ◆ Products for all applications and customer types



Advanced Technology

- ◆ HIKMICRO IR VOx detector technology
- ◆ Athermalized lens design
- ◆ Blainview sunlight readable screens



Fast Image Frequency

- ◆ 25Hz or higher IR detector across all products
- ◆ Not export-controlled



Quality Guarantee



- ◆ Warranty, 3 years on electronics, 10 years on detector, 2 years on battery
- ◆ Warranty based on **END USER** purchase date
- ◆ Camera registration not required



Pre & Post Sale Service & Support

- ◆ Call centers in **4** districts cover **22** countries/regions
- ◆ Products are serviced locally without the need to return to factory
- ◆ 11 international subsidiaries providing localized marketing and technical support



Enabling Thermal for work or play

- ◆ Exceptional value and performance
- ◆ Products for every user and application

QUALITY & MANUFACTURING



LARGE-SCALE PRODUCTION MANAGEMENT

- **10,000 m² manufacturing factory**
- **1,500,000 cameras annual production capacity**
- Stocked product- Flexible and constantly optimized production strategy to meet delivery expectations
- Fully Automated (Core Components)

QUALITY and COMPLIANCE

- **ISO 9001:2015 Certified**
- Products produced to meet FCC Class B and EU Standards
- Anti-Electromagnetic: Meets Level 3 for industrial use
- Anti-static Interference: Meets 8 kV Contact / 15 kV Air of Electrostatic Discharge test



SERVICE & CALIBRATION



HIKMICRO is pleased to offer service and camera calibration services through one of our global sites. Contact your local office for details.

North America: infoNAM@hikmicrotech.com



INDUSTRIAL PRODUCTS THERMAL OVERVIEW



E

- 160 x 120 IR
- 2.4" LCD
- 8 Hour Battery Life
- Laser Pointer



B

- 3 Models
- *B1L 160 x 120
- *B10/**B20** 256 x 192 IR
- 3.2" LCD
- Visible Camera (B10/B20)
- Wifi (B20)



Pocket

- 2 Models available
- *Pocket1 194 x 144 IR
- Pocket2 256 x 192 IR
- 3.5" LCD Touchscreen
- Visible Camera
- Wifi



M

- 3 Models available
- M11W 192 x 144
- M20W 256 x 192
- M30 384 x 288
- 3.5" LCD Touchscreen
- Focus type- Fixed "W" or Manual
- Visible Camera, Wifi, Laser pointer



G

- 2 Models
- G31 384x288 IR
- G61H 640x480 IR 2000°C
- 4.3" LCD Touchscreen
- Motorized Focus
- 4 Interchangeable Lenses Available
- Inspection Route
- Laser Distance Meter for Distance and Area Measurement
- Visible Camera, Wifi, Laser pointer

SP

- 4 Models
- SP40 480x360 IR
- SP40H 480x360 IR 2200°C
- SP60 640x480 IR
- SP60H 640x480 IR 2200°C
- 5" LCD & Flexible Rotating Lens and Screen
- Electronic Viewfinder (SP60)
- Motorized Focus
- 6 Interchangeable Lenses
- Laser Distance Meter for Distance and Area Measurement
- 8MP Visible Camera, GPS, Compass, Wifi

Full Thermography Inspection / Reporting

Field Inspection & Documentation- Technician Tools

Troubleshooting tools- Field Service

* Not all cameras are available in all regions or to all market segments

WHERE IS THERMOGRAPHY UTILIZED?

PM

Predictive Maintenance

- ◆ Electrical
- ◆ Mechanical and Machinery
- ◆ Facility
- ◆ Process Equipment

BI

Building Inspection

- ◆ Restoration (water)
- ◆ Energy Loss
- ◆ Home Inspection
- ◆ Commercial Building & Facility Maintenance

HV

HVAC/R Inspection

- ◆ Residential
- ◆ Commercial
- ◆ Refrigeration

UT

Utility

- ◆ Transmission Systems
- ◆ Distribution Systems
- ◆ Solar Inspection

TP

Transportation Gas, Diesel, EV

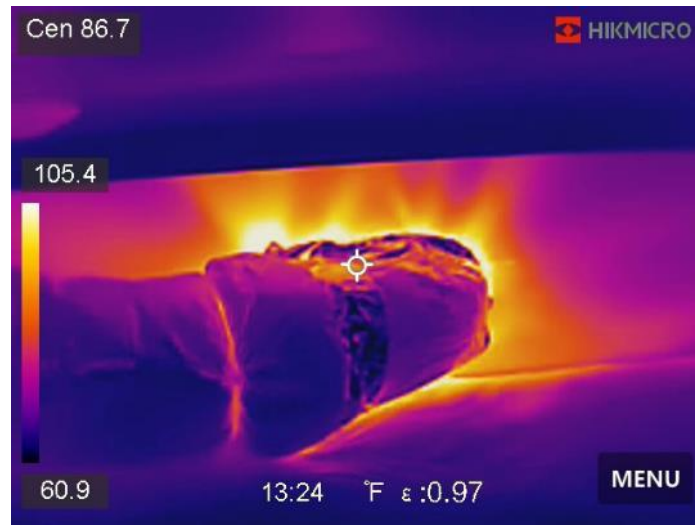
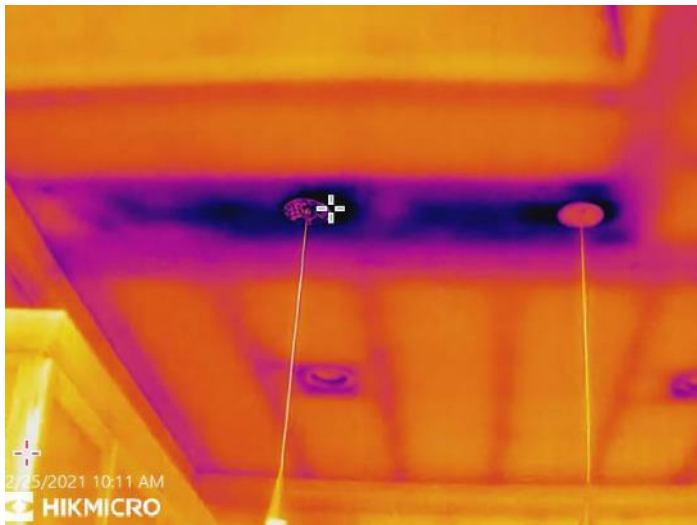
- ◆ Engine Systems
- ◆ Electrical, Battery, Charging
- ◆ Passenger Comfort

DIY

DIY

- ◆ Home Inspection
- ◆ Outdoors and Hobbies

What can we learn from Infrared?



Building Applications: Moisture, HVAC, Insulation/Air Infiltration

What can we learn from Infrared? Electrical

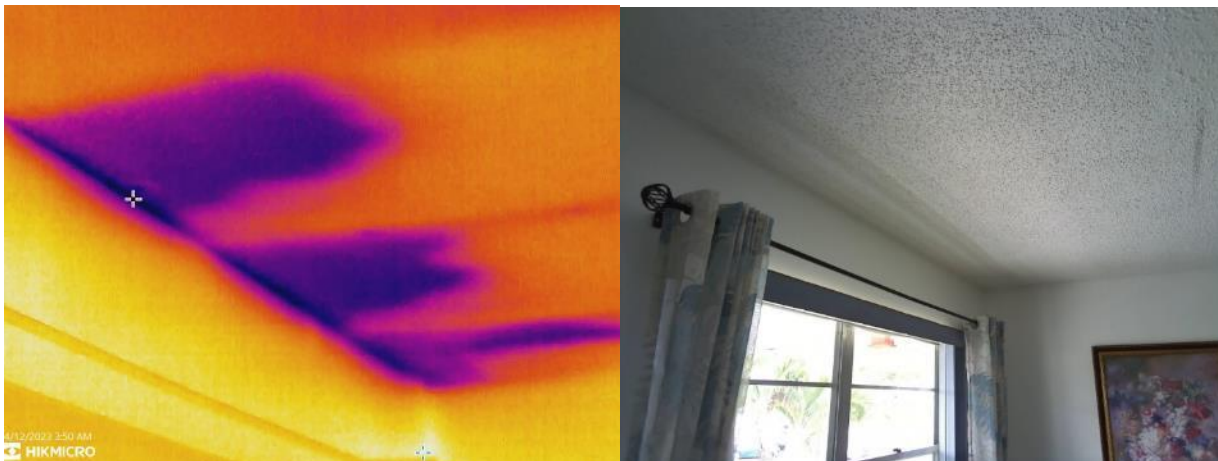
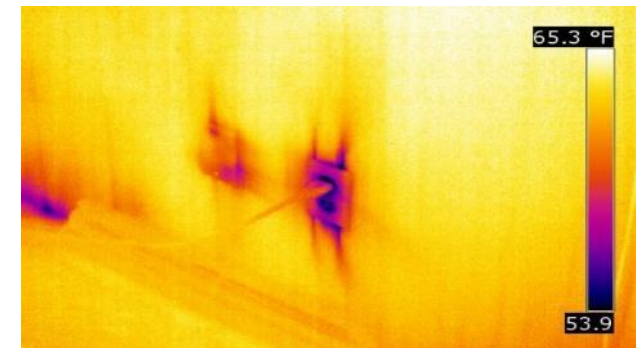
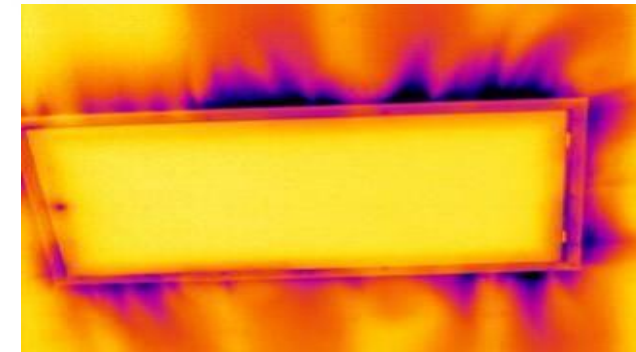
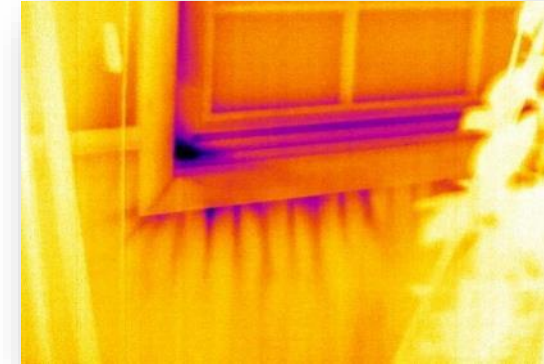


Temperature anomalies can indicate potential problem areas or confirm items are operating under normal conditions

Is this the fault of a bad HVAC system?

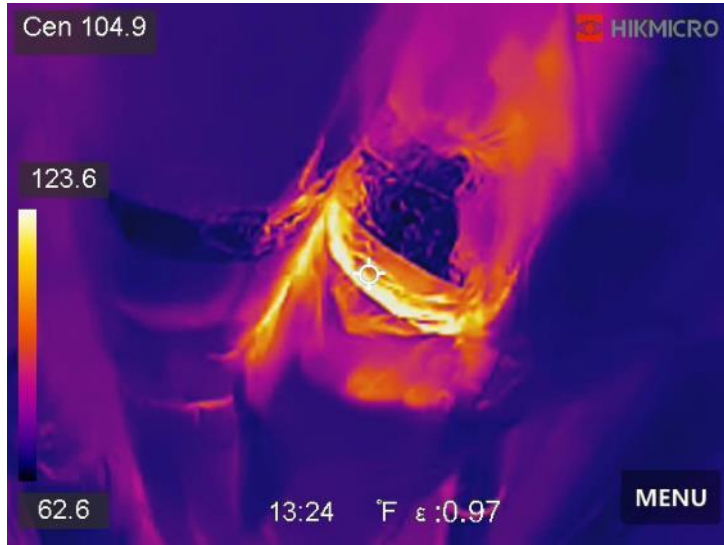
HVAC Technicians are called out to many sites with customers believing the HVAC system is not operating properly. They “blame” the HVAC company for bad equipment or poor workmanship if it’s a call back.

An HVAC Technician can utilize thermal imaging to visually demonstrate to the customer problems outside the HVAC system that impact comfort levels and the ability of the HVAC system to manage interior temperatures.

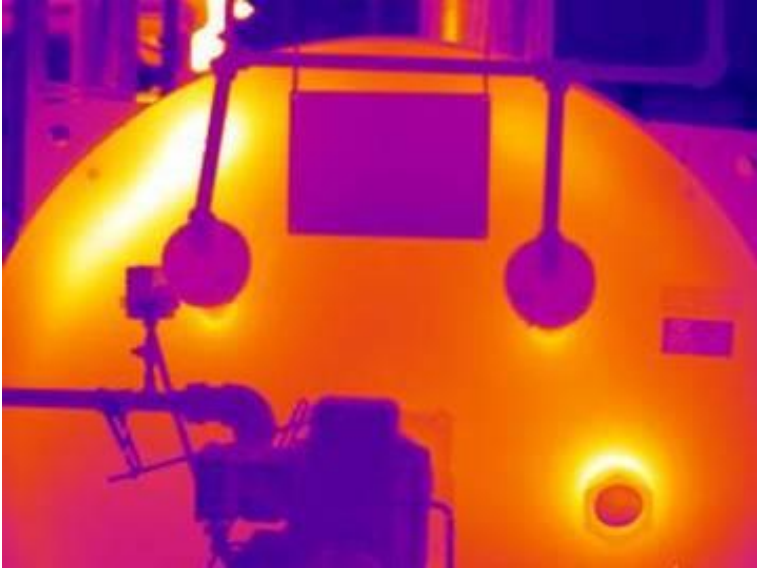


HVAC Components

HVAC Thermal Examples-Air Duct Leaks

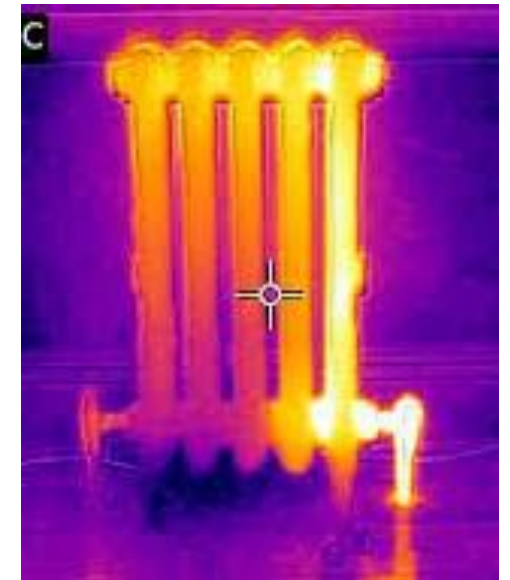
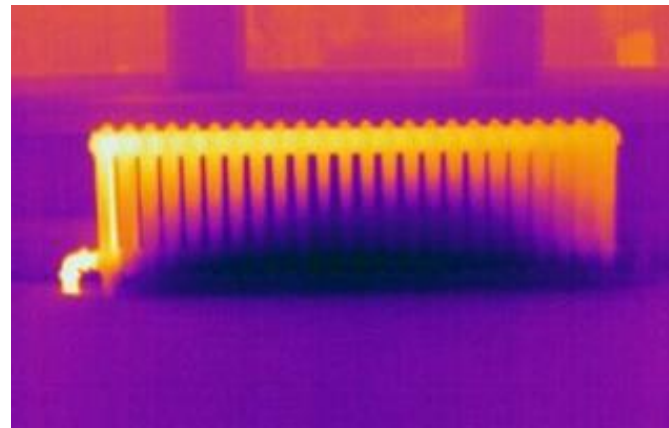
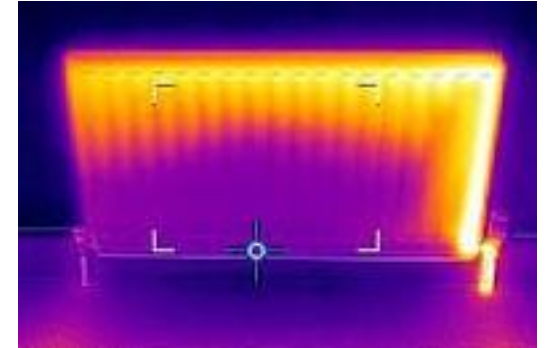


Boilers\Radiators



- Boiler & Furnace Inspections
 - Burner motor temp
 - Hot spots may indicate bad flame pattern or internal refractory breakdown
- Flu temperatures
- Circulation pumps and bearings

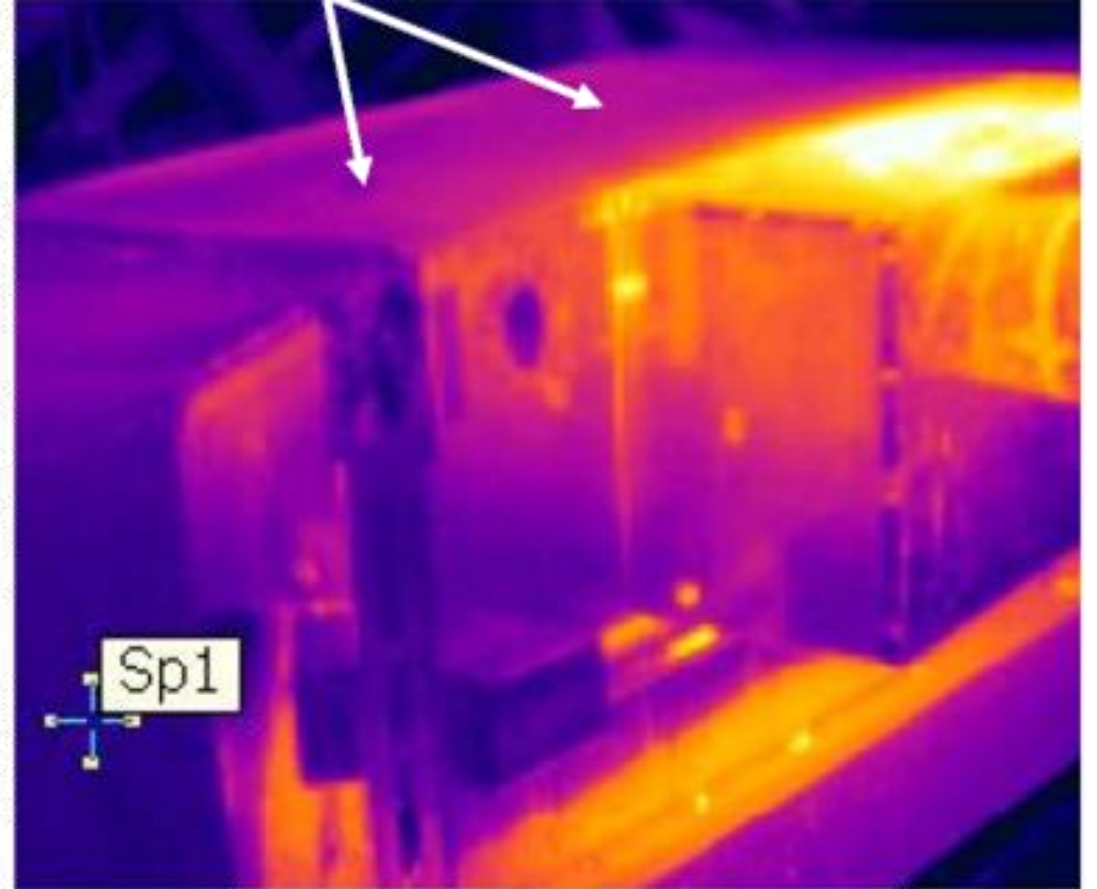
- Water & Steam radiators can be clogged with rust or water deposits impacting their performance
- Valves can be stuck open or closed
- Thermal imaging allows a technician to examine these systems and identify issues



Furnace- Proper Operation



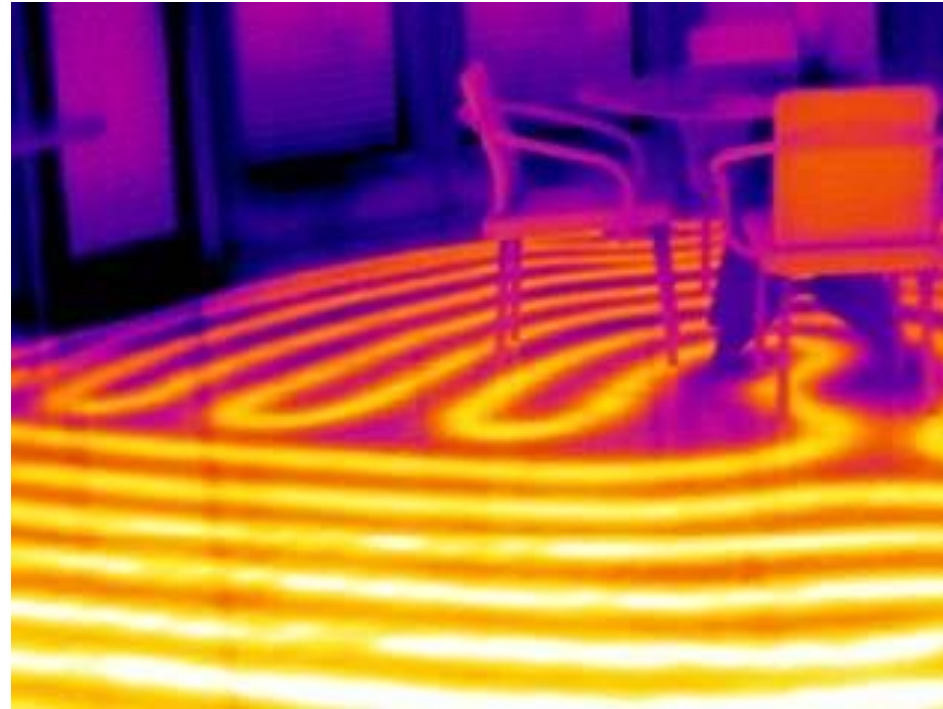
Normal heat pattern



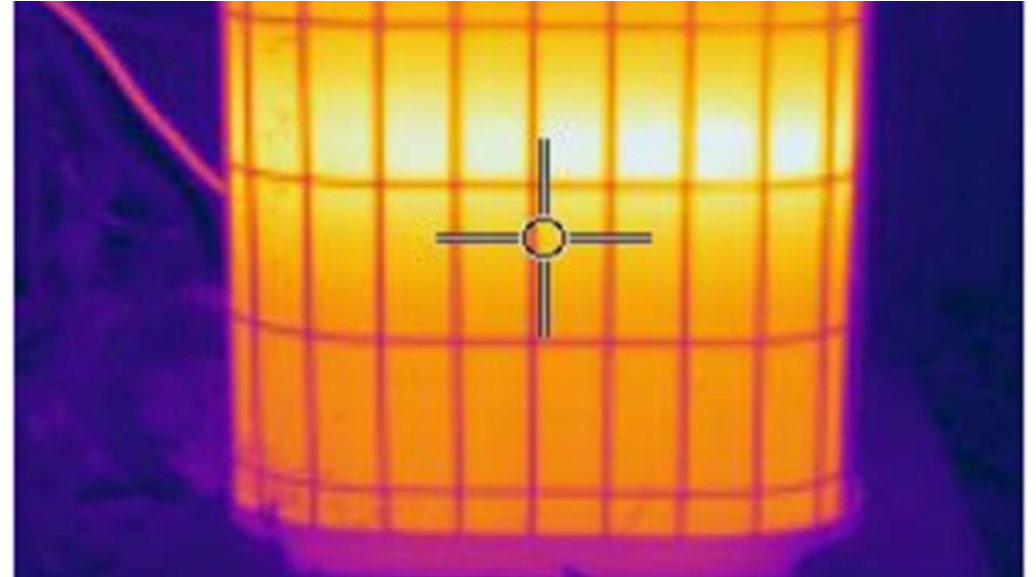
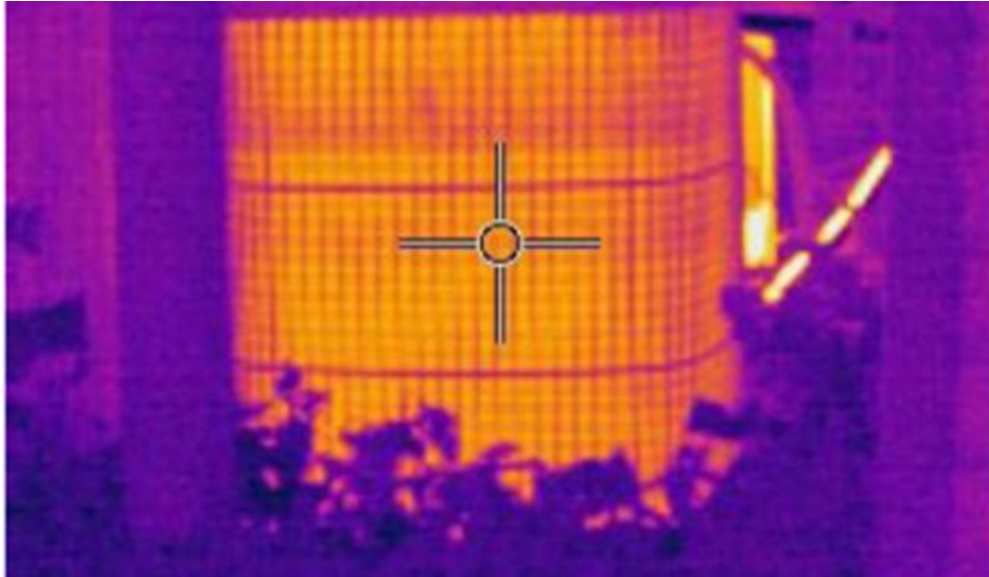
Radiant Floor

Operation:

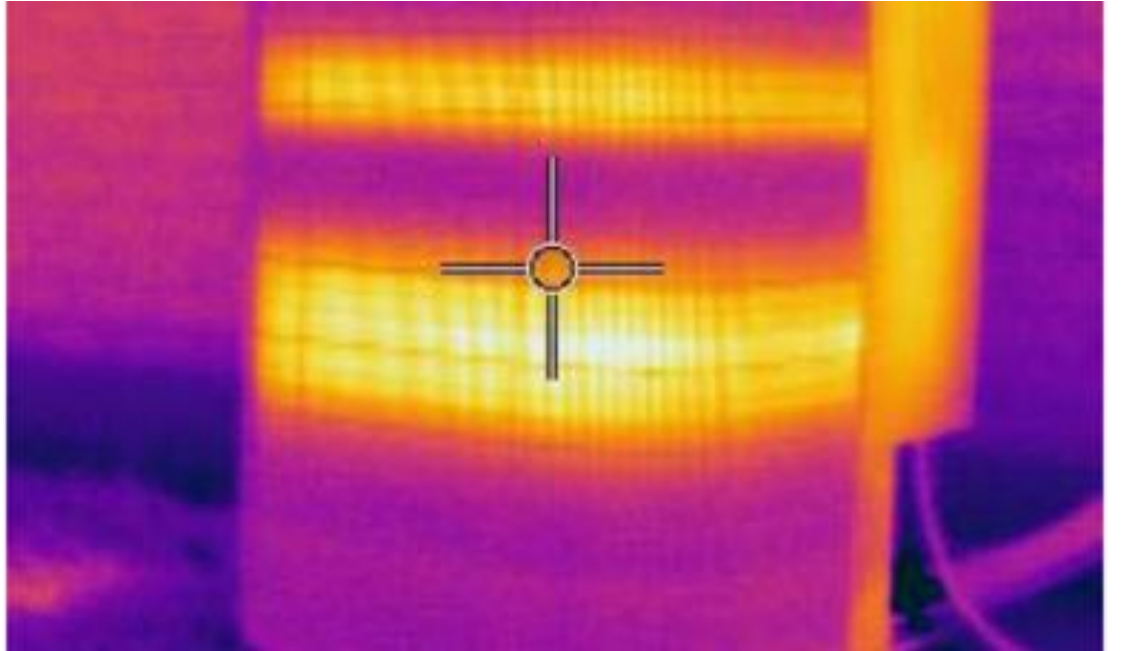
- Efficient heating pattern
- Identify dead zones
- Can help find leaks in water systems or faulty electrical connections



Condensing Units



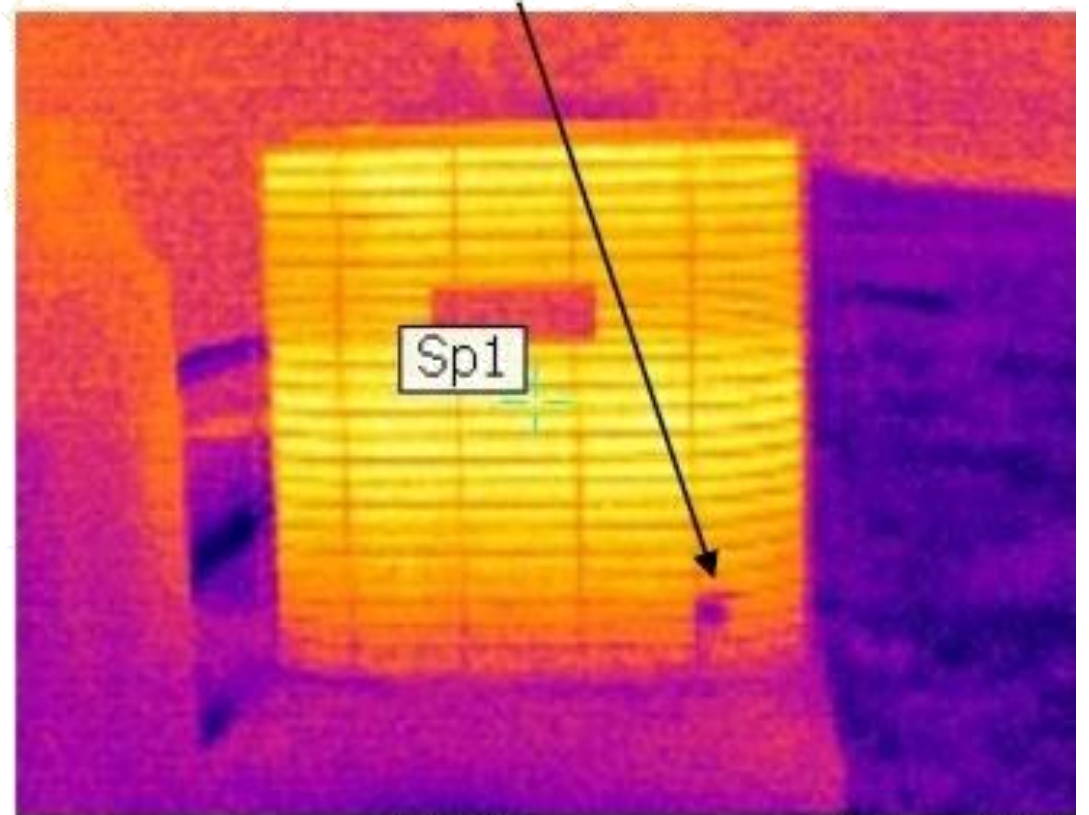
Flow Restriction



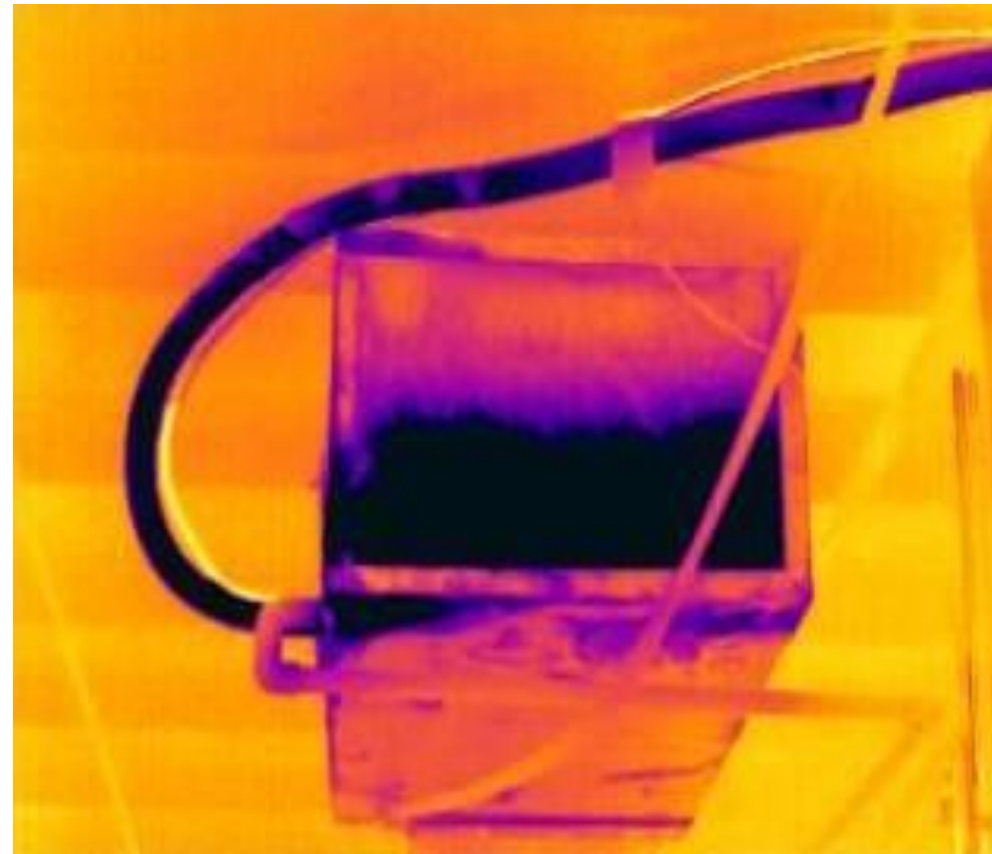
Refrigerant Leaks



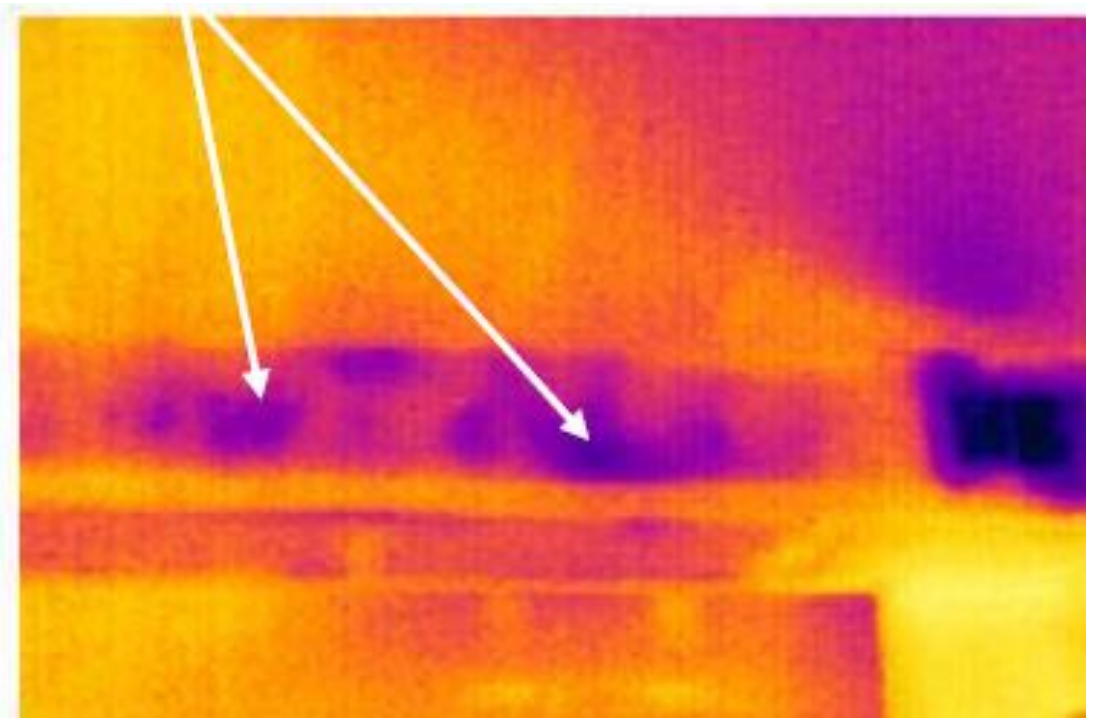
Leak



**Frozen coil and suction line-
Blower motor not functioning properly**



Cold Air Duct Leaks or Condensation?



Cold air sometimes creates moisture issues with condensation. Technicians must test and validate with a moisture meter to determine if a thermal cold spot is wet or cold.

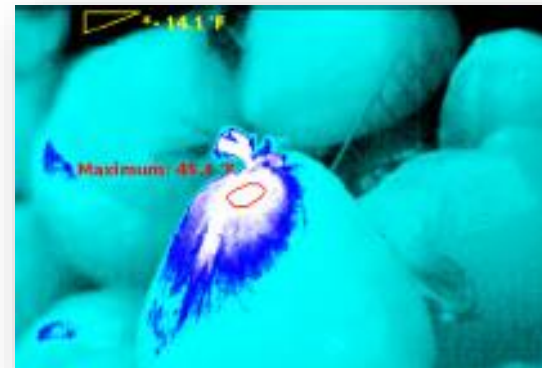
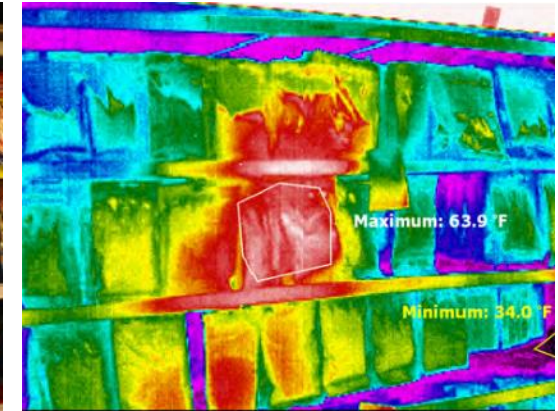
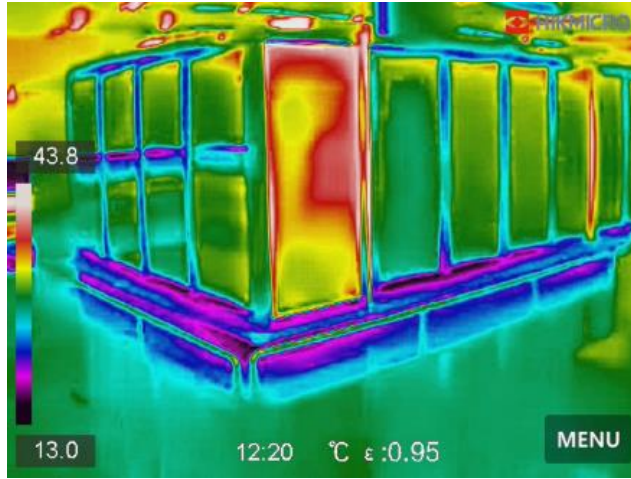
AC Drip Pan Leak

- Second floor interior ceiling water leak.
- Found within 15 seconds
- The sheetrock was (from the IR photo) soaked, yet to the naked eye it looked fine.



AC condensation leak and clogged drain line caused the drain pan to overflow

Refrigeration

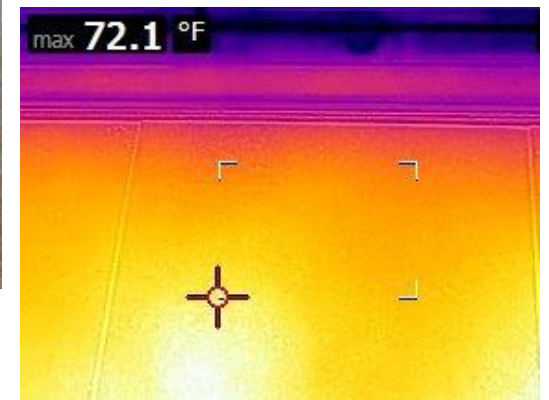
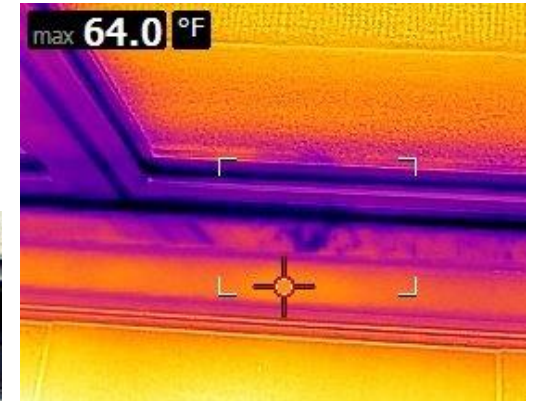


Case Study Example

Problem: Customer complained that it was cold by the doorway and the radiant heat was either not working or not properly installed.

Diagnosis: The images show the radiant is working fine and installed correctly, as close to the door as possible.

Fix: There is no fix, you can see the radiant manifold working correctly.



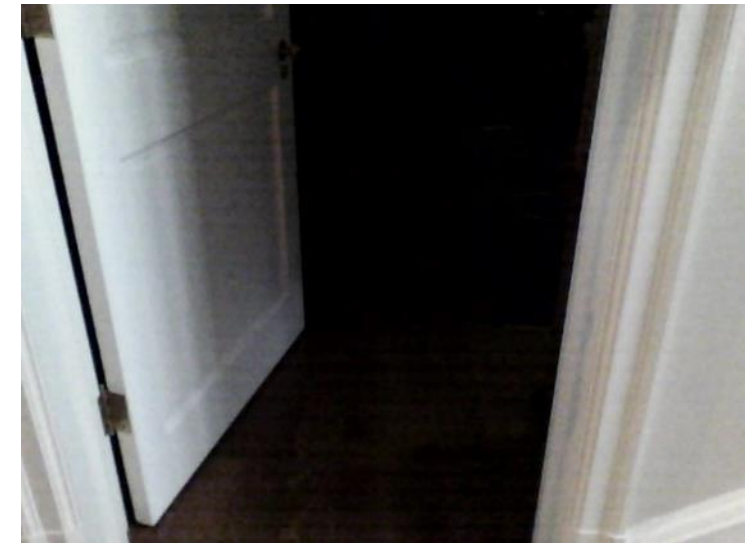
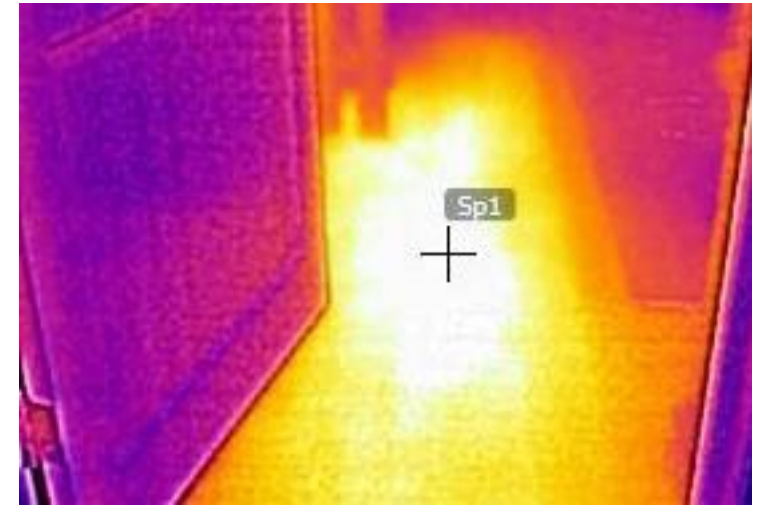
Case Study Example

Problem: Customer complained of very warm and overheating area of the room, and that it was the radiant zone causing it.

With the radiant flooring turned off, a thermal inspection indicated heat. Upon investigation, the heat is from un-insulated hot water lines.

Fix: To have the plumber insulate his lines.

Before, the customer was upset and blaming a faulty radiant zoning system, and after, he was relieved and shocked to see it wasn't the radiant, and it was some un-insulated hot water lines. Like they say "a picture is worth a thousand words".



Case Study Example



Problem: Customer complained that the garage was excessively hot in the warmer months and blame the radiant system.

Diagnosis: It was not the radiant system but two co-generation inverters blowing out 120 air into the garage.



Fix: A electrician will relocate the inverters to a place with proper ventilation.

Thermal imaging quickly diagnosed the problem visually



Case Study Example

Problem: Customer complained that the thermostat was out of calibration because the room felt colder than what the thermostat said.

Diagnosis: The thermostat was reading correct temperature radiated by a light switch below.

Fix: Relocation of the thermostat, problem solved.

Thermal Imaging provided clear and instant diagnosis to the problem



Why is Adoption of Thermal Slow in HVAC/R?

T
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Essential Tool for the Industry- HVAC/R is all about heat and cold management

L
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- FIND the PROBLEM quickly
- ILLUSTRATE the issue to the customer
- INCREASE revenue/call

T
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- Very traditional business & lack of understanding
- Asked to carry a LARGE variety of tools
- HVAC Technicians are price sensitive
- Easier to replace components than diagnose

Thermography Concepts



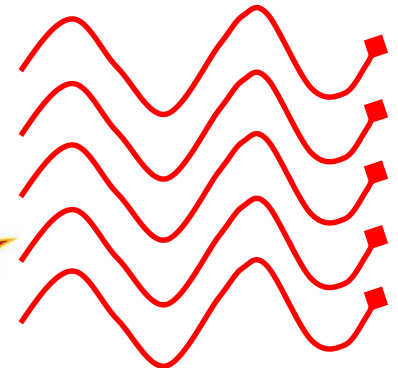
What is a Thermal Imager?

“A thermal imaging camera captures and creates an image of an object using infrared radiation emitted from the object”

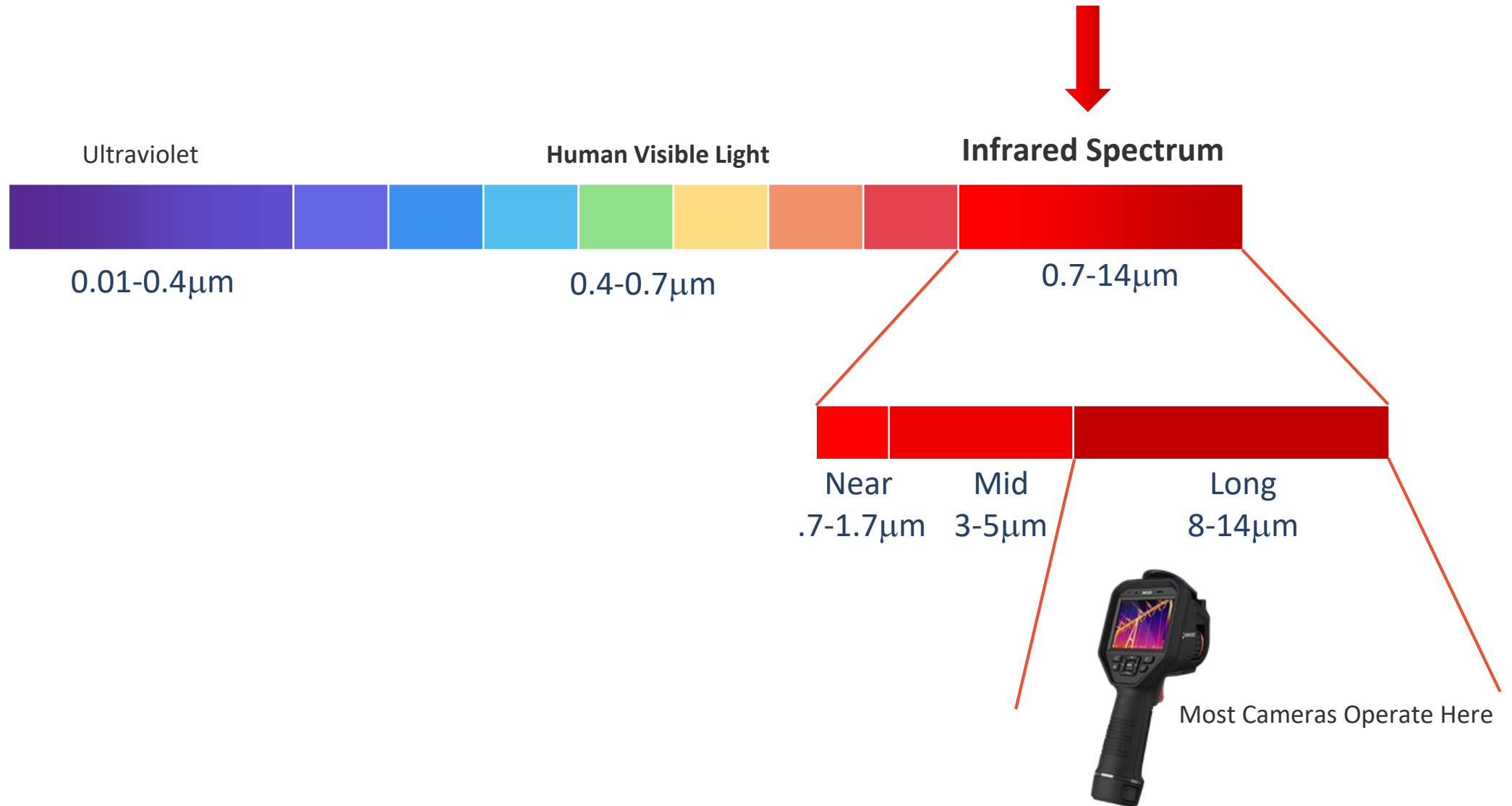


Infrared Radiation

- IR is emitted by all objects
- IR increases with temperature

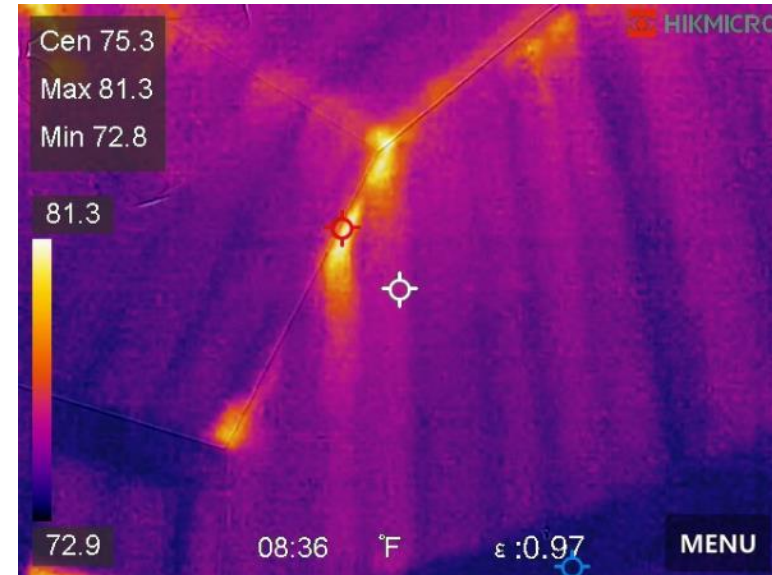
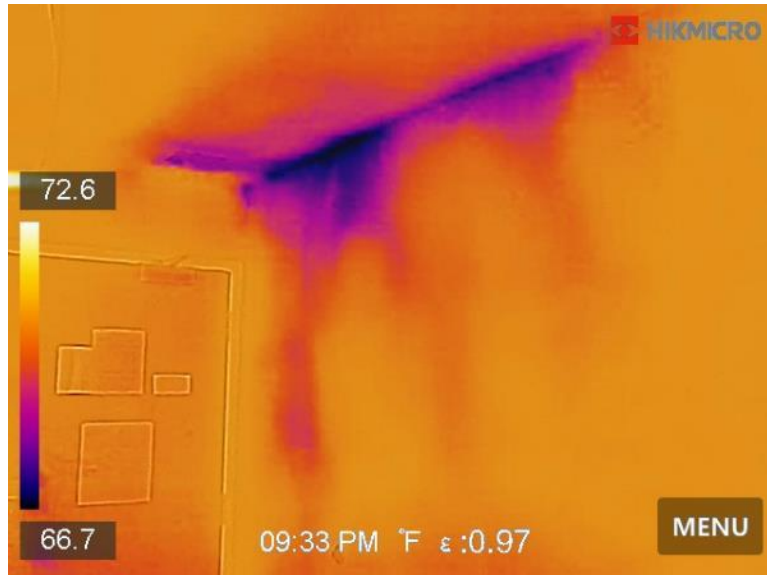


IR Cameras Operate in the Infrared Spectrum

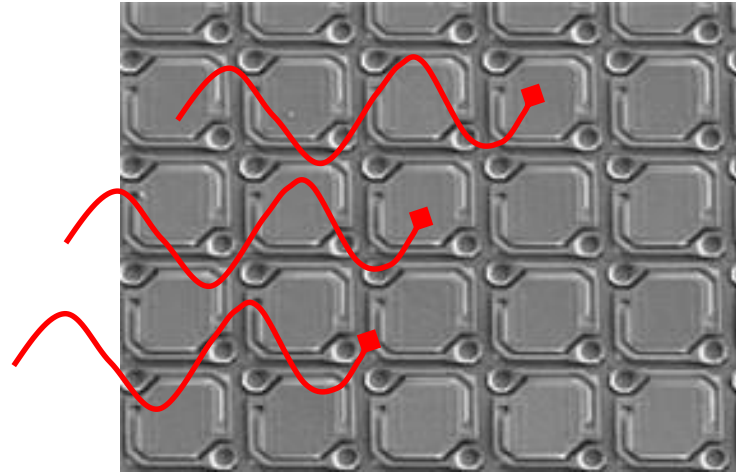


Most Important IR Concept

Infrared cameras see surface hot and cold



How do IR Cameras Work



Photons (heat energy) impact the individual sensors/pixels and heat the elements



99.1	99.1	98.8	99.1
98.8	98.4	98.8	99
99.3	102	103	105
98.8	102.1	103.5	105
98.8	102	103	104.9
95	95	99	98.6
88.0	88.8	99.3	98.6
79.0	80.0	99.1	99.3

The camera performs some advanced calculations based on the Stefan-Boltzmann law to calculate temperature of each pixel



The numerical values are then converted to colors and an image is created

What Am I Seeing Onscreen?



- Optional Hot, Cold, Center Temp
- Hot and cold are continuously auto tracking based on the entire viewable area



Temperature range based on the scene temp range and color pallet applied from the coldest to warmest items

Optional Time/Date

Emissivity Setting

- Color Palettes
- Resolution
- Spot Size
- Transparency, Conduction and Reflection

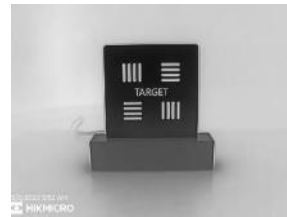
Color Palettes

- Largely based on user preference, cameras have multiple color palettes to choose from. Additional palettes may be available in reporting software.
- Additional “Alarm” or Isotherm options can be configured to specifically highlight temperature above or below specific ranges as a visual call out to the user



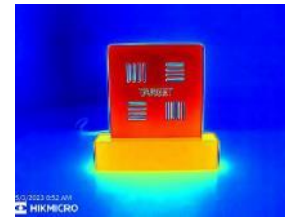
Ironbow

- Industry favorite
- Bright colors warm, dark colors cold



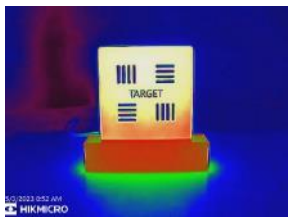
Black Hot

- Favorite for hunting and law enforcement
- Displays body heat in lifelike image



Blue Red

- Red warm and blue cold
- Quickly identifier for heat versus cold



Rainbow

- Warm and cold colors
- Good for minimal heat differences



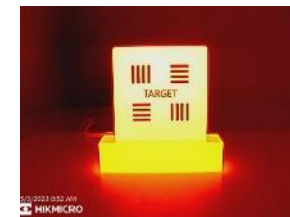
White Hot

- Industry favorite
- Grayscale with realistic details, wide temperature ranges



Red Hot

- Shades of red
- Sometimes with Isotherm alarm

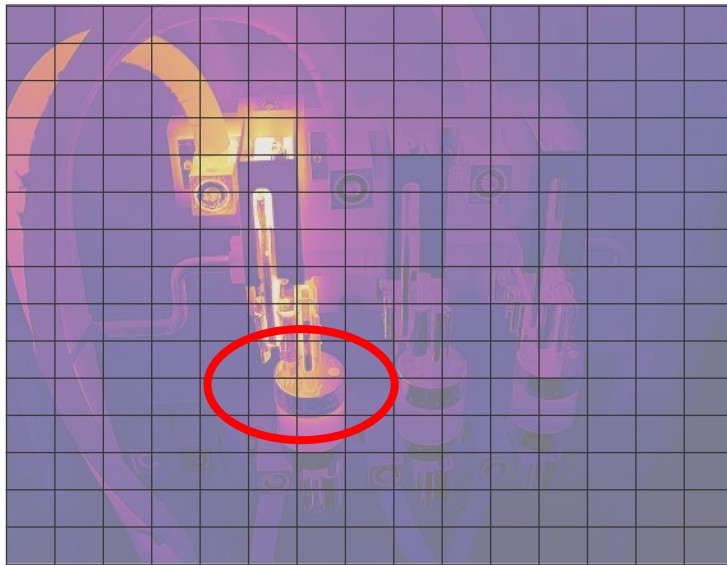


Fusion

- Yellow warm, red cooler

Resolution & Accuracy

More Pixels equals higher measurement density
and more accurate temperature calculations



~1.5 pixels on the fuse



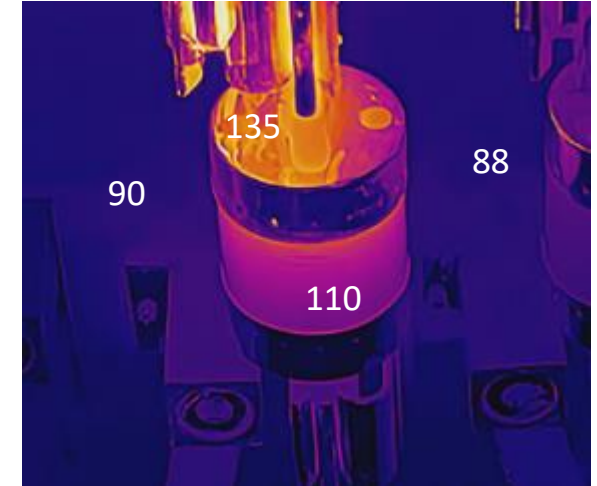
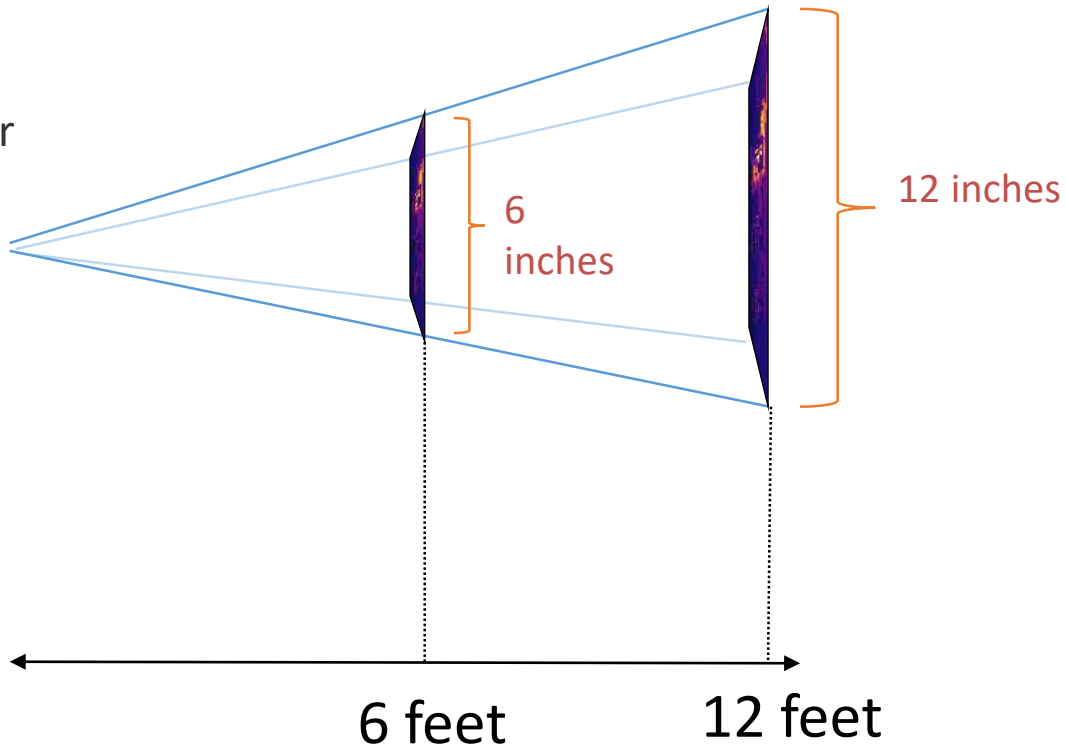
~6 pixels on the fuse

Spot Size Ratio

Typical Spot Temp
Tool has 1 IR Receptor



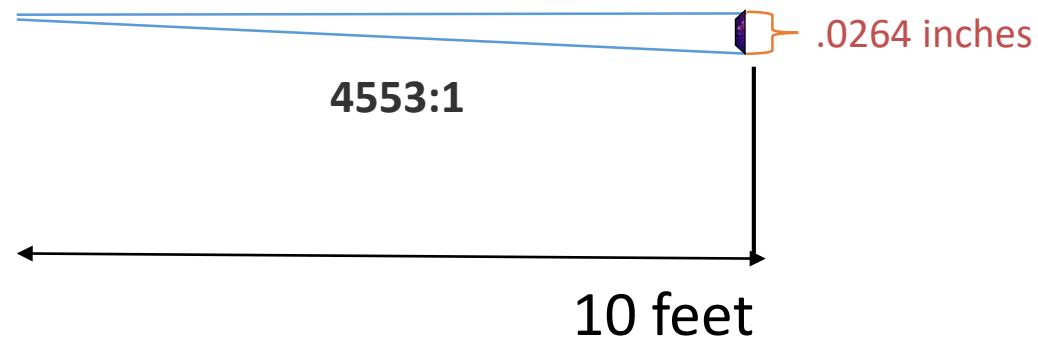
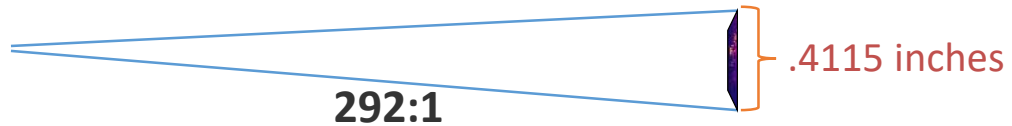
**12:1 Spot
Size Ratio**



With a single spot, the unit calculates the average temperature of the entire area. NOT ACCURATE

Spot Size Ratio & Accuracy

An IR Camera lens focuses the image onto thousands of pixels, and tight spot size ratios providing much higher temperature accuracy readings

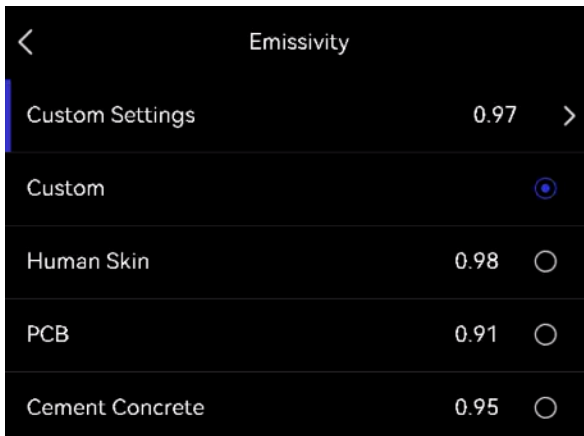


81.9	80.8	80.8	80.8	79.7	79	77.5	76.3	77.2	77.7	78.6	79.3	79.2
80.4	79.5	79.3	79.3	79.2	79.3	78.4	77.9	78.1	77.4	77.5	78.6	78.6
79.9	78.3	77.9	77.4	77.5	78.3	80.2	81.7	81.9	80.6	79	78.3	78.6
82.8	80.8	81.7	83.7	84	83.8	84.9	86.7	88.9	88.2	84.2	77.7	77
82.4	84	87.1	92.3	99	100.4	96.4	94.3	93.4	92.3	88.5	81	76.6
91.2	94.1	97.5	100.4	106.3	110.8	111	103.8	100.4	96.4	91.2	81.7	76.5
99.3	102	104.7	107.2	110.3	113.9	116.1	108.9	103.6	99.9	94.5	82.9	77
105.1	108.9	112.3	114.3	116.1	118.4	114.3	105.1	99.9	97.5	93	83.1	76.5
107.6	111.4	114.8	117.7	119.7	118.2	113.5	106.2	100.9	98.6	95.5	87.3	78.3
107.2	110.3	112.5	111	111.2	112.8	111.7	109	106.2	102	97.7	90.5	81.3
105.4	110.8	112.5	112.8	112.1	111.9	113.2	113.2	111.4	106.9	100	92.3	86.9
91.4	105.1	112.1	113.5	113.7	113.9	114.3	113.5	111.7	109.4	102.7	91.2	81.5
83.5	90.7	102.4	110.1	111.6	111.7	112.8	111.6	111	109	104	93.4	81.7
81.3	85.6	93.9	106.5	111.2	110.3	110.1	110.1	109.4	106.9	102.4	97.5	88.5
79.9	81.1	87.6	100.4	108	108.5	109.4	107.4	107.4	106.9	104.5	99.3	92.1
79.7	80.2	82.6	88.5	98.6	104.5	107.2	107.2	105.6	102.9	102.7	99.9	93.2
79.5	80.1	80.6	83.1	89.1	99.7	104.9	105.6	105.3	103.8	101.7	98.1	93.7

Instead of 1 pixel on a large area, you have hundreds or thousands resulting in much improved accuracy

Understanding Emissivity

- Emissivity is a measure of how well a material radiates heat
- Your camera sees the total radiation
 - Emitted
 - Reflected
 - Transmitted (usually zero)
- It's represented as a number between 0 and 1
 - Dark, matte, or rough surfaces have values closer to 1
 - Reflective and polished surfaces have values on the lower end of the scale and are closer to zero
 - **The number represents the ratio of the heat emitted by a material and a perfect emitter (black body)**

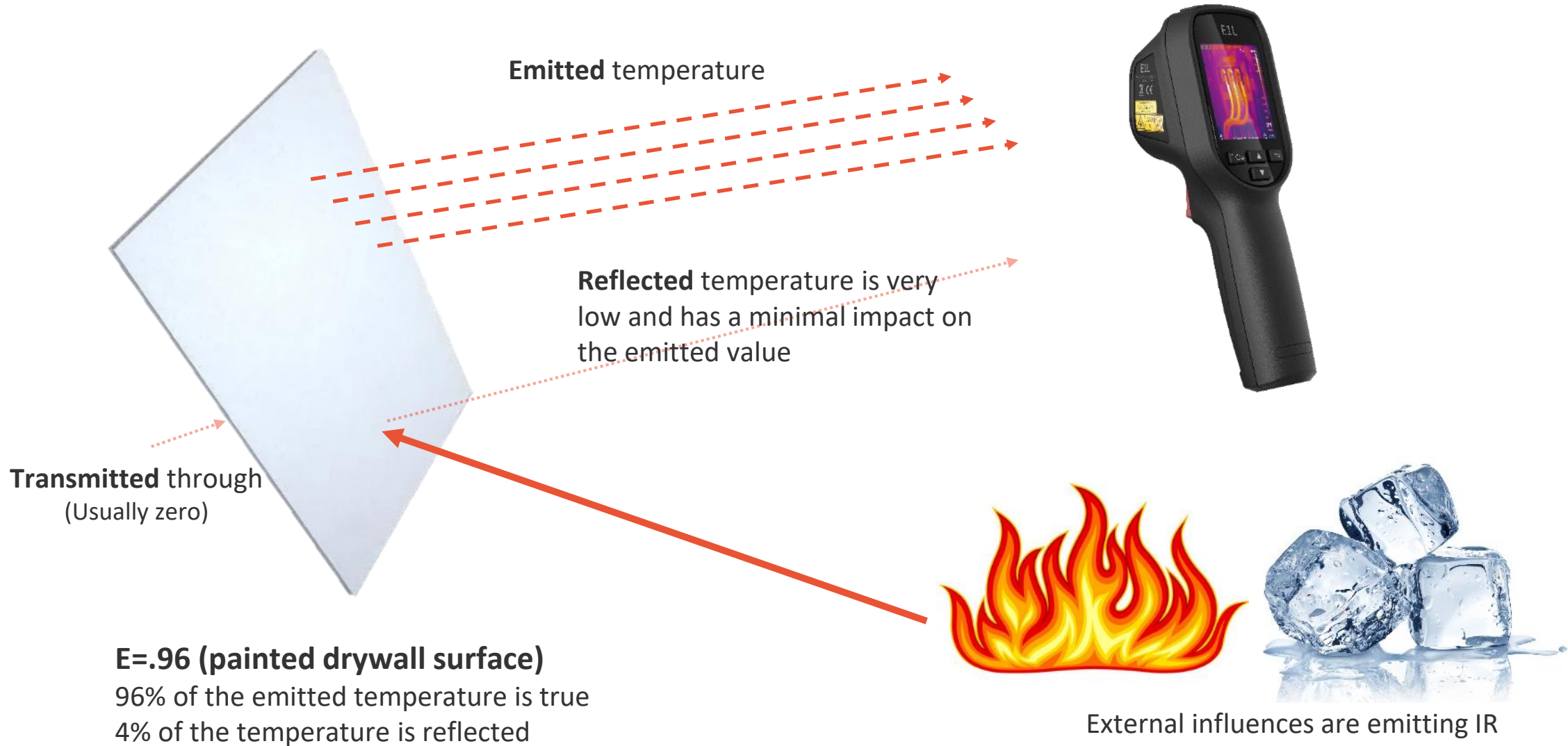


Material	Emissivity
Custom Settings	0.97
Custom	<input checked="" type="radio"/>
Human Skin	0.98
PCB	0.91
Cement Concrete	0.95

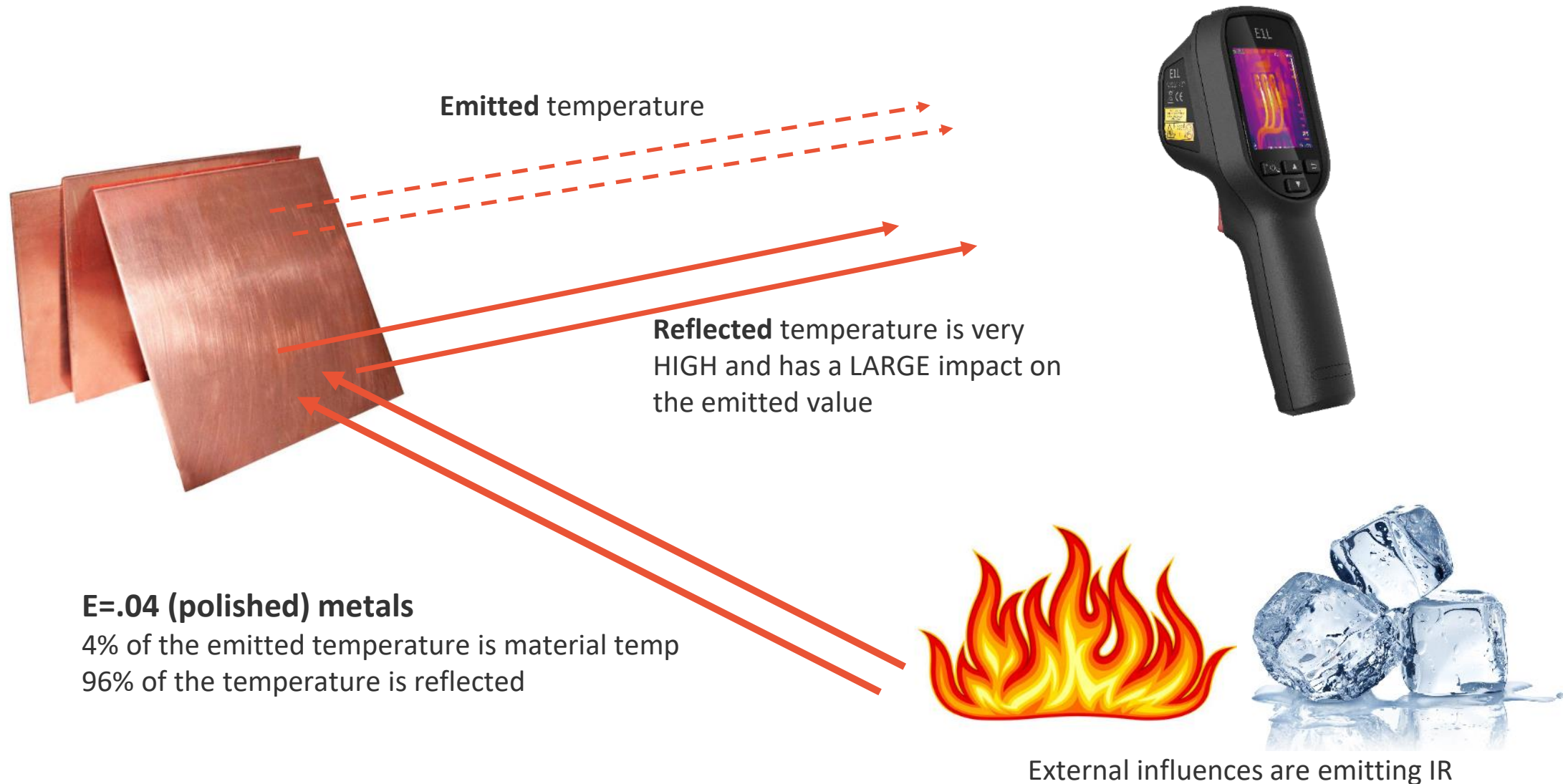
(Typical camera menu)

Material	Emissivity
Aluminum foil	0.03
Aluminum, anodized	0.9
Asphalt	0.88
Brick	0.90
Concrete, rough	0.91
Copper, oxidized	0.87
Copper, polished	0.04
Glass, smooth (uncoated)	0.95
Ice	0.97
Limestone	0.92
Marble (polished)	0.89 to 0.92
Paint (including white)	0.9
Paper, roofing or white	0.88 to 0.86
Plaster, rough	0.89
Silver, oxidized	0.04
Silver, polished	0.02
Skin, Human	0.97 to 0.999
Snow	0.8 to 0.9
Transition metal diselenides (e.g. MoSi ₂ or WSi ₂)	0.86 to 0.93
Water, pure	0.96

Calculating Temperature, High E Materials



Calculating Temperature- Low E Materials



Emitted temperature

Reflected temperature is very HIGH and has a LARGE impact on the emitted value

$E = .04$ (polished) metals

4% of the emitted temperature is material temp
96% of the temperature is reflected

External influences are emitting IR

Importance of Temperature- Quantitative vs Qualitative



Understanding absolute temperature values may be very important in electrical, HVAC & mechanical applications. If exact temperature is critical, it's referred to as **quantitative** data



In building applications, simply seeing differences in temperature is the critical factor. This example is **qualitative** thermography

Thermal Camera Sensitivity- NETD

“Noise Equivalent Temperature Difference”. It is a measure for how well a thermal imaging detector is able to distinguish between very small differences in thermal radiation in the image. NETD is typically being expressed in milli-Kelvin (mK)

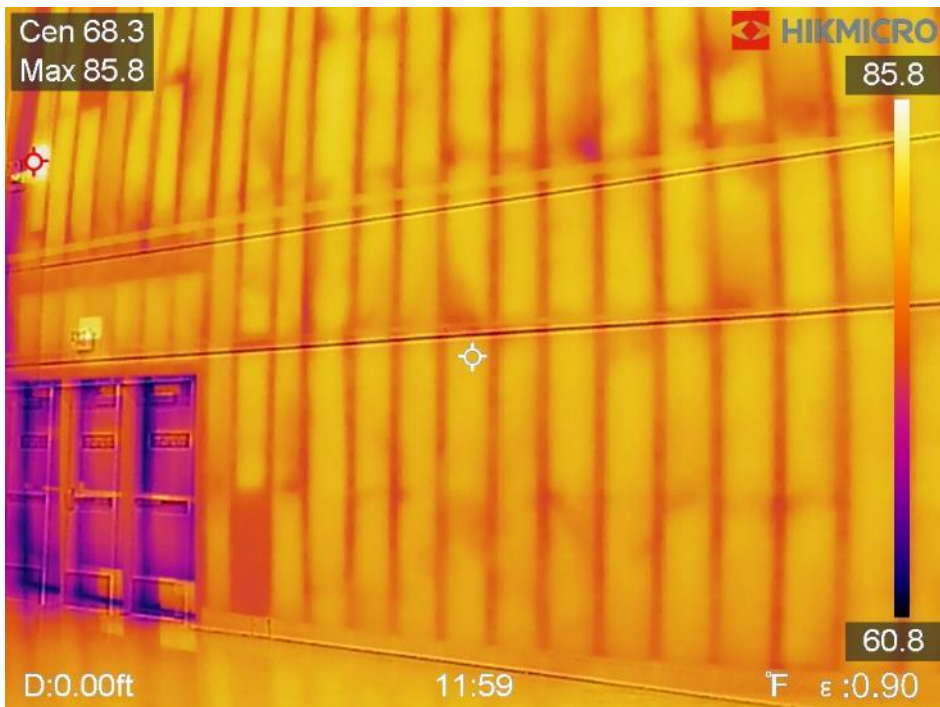
- For example, a camera with 40mK sensitivity can see differences of 0.04 Centigrade.
- High sensitivity enables the camera to visualize and represent very small differences to the user and image items that are very close in temperature.



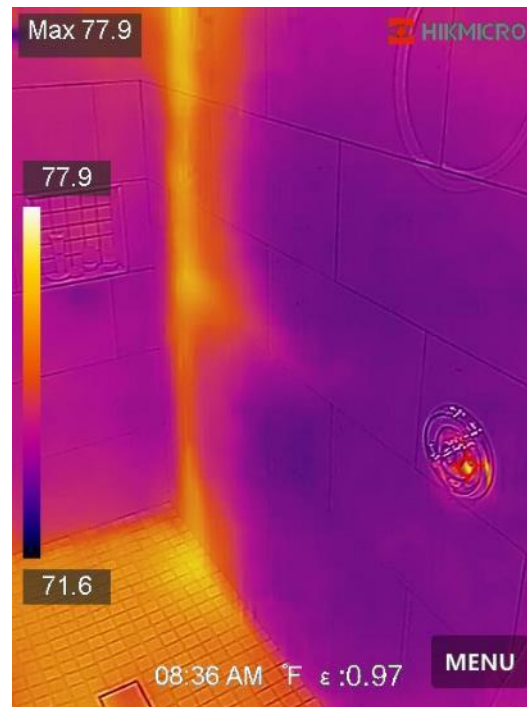
FAQ's

Q: Can I see through walls or concrete to find pipes, wires, water leaks?

A: NO. Thermal cameras only see surface temperature, however, underlying items may conduct heat to the adjoining material making it “visible”



Cold wall studs conducting through the wall surface



Warm water leak or pipe behind tile



Warm electrical cord conducting heat to the carpet

Q: How far can I see with a thermal camera

A: That depends.

- Based on resolution, lens & spot size ratio, and temperature conditions you can see a few feet or across the galaxy
- Based on the nature of your work and desired result, you'll select the proper camera for the job based on resolution, spot size, and accuracy



Detection



Recognition



Identification

E SERIES - OVERVIEW

Compact thermal imaging camera for troubleshooting



\$299 MSRP/MAP

Camera Highlights

IR Resolution	160 x 120 (19,200 pixels)
Object Temperature Range	-20°C ~550°C (-4 °F to 1022 °F)
Accuracy	Max (±2°C, ±2%)
Temperature Spots	Center, Hot, Cold
FOV	37.2°x 50°
Display	2.4" LCD Screen
Weight	350g
Battery Life	8 hours

Warranty



E1L - APPLICATIONS



In Floor Heating

HVAC



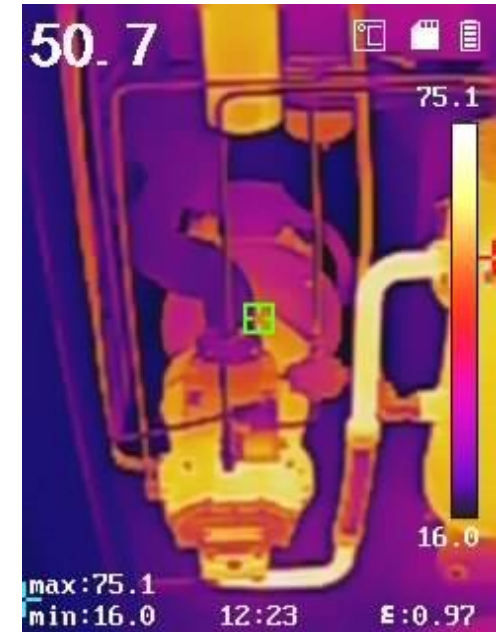
Moisture

HVAC/Building



Electrical Cabinet

Electricians



Machinery

First Level
Maintenance

E1L – PRODUCT FEATURES



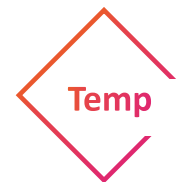
High Image Quality

HIKMICRO VOx detector (NETD < 40 mK) for a distinct thermal vision of the target.



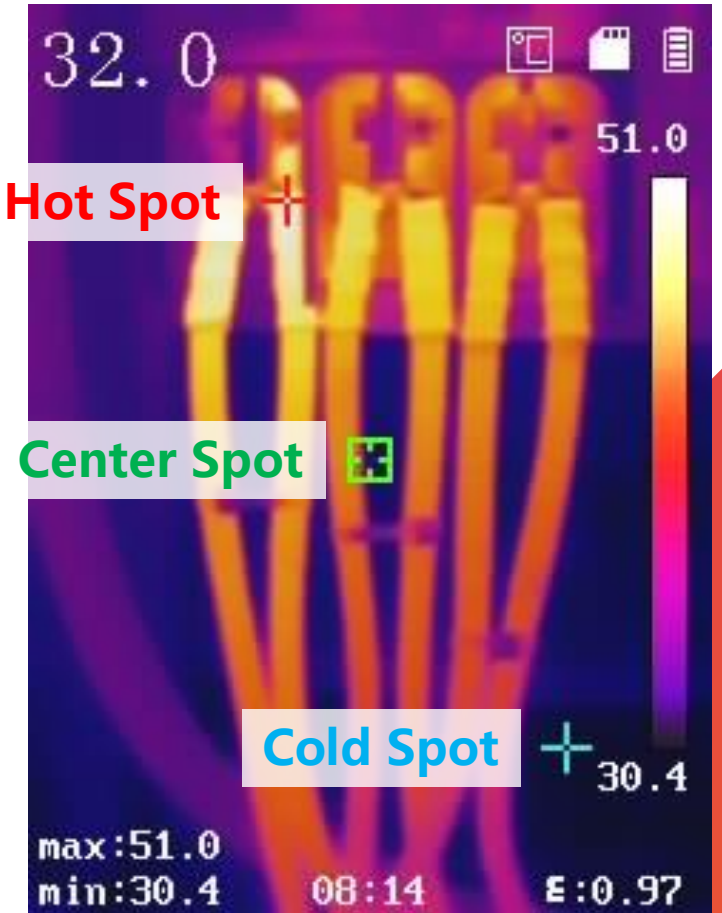
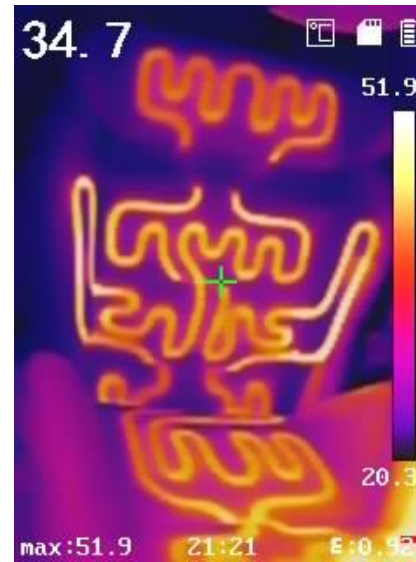
Fast Image Frequency

25 Hz delivers smooth video while panning across scenes or viewing moving targets.



Efficient Temperature Measurement

Track the temperature of the Center Spot, Hot Spot, Cold spot automatically.



E1L – PRODUCT FEATURES



Laser Pointer

Laser Pointer helps show the position of the center point on actual object



Light Weight

350g compact design, easy to carry or fit in your toolbox



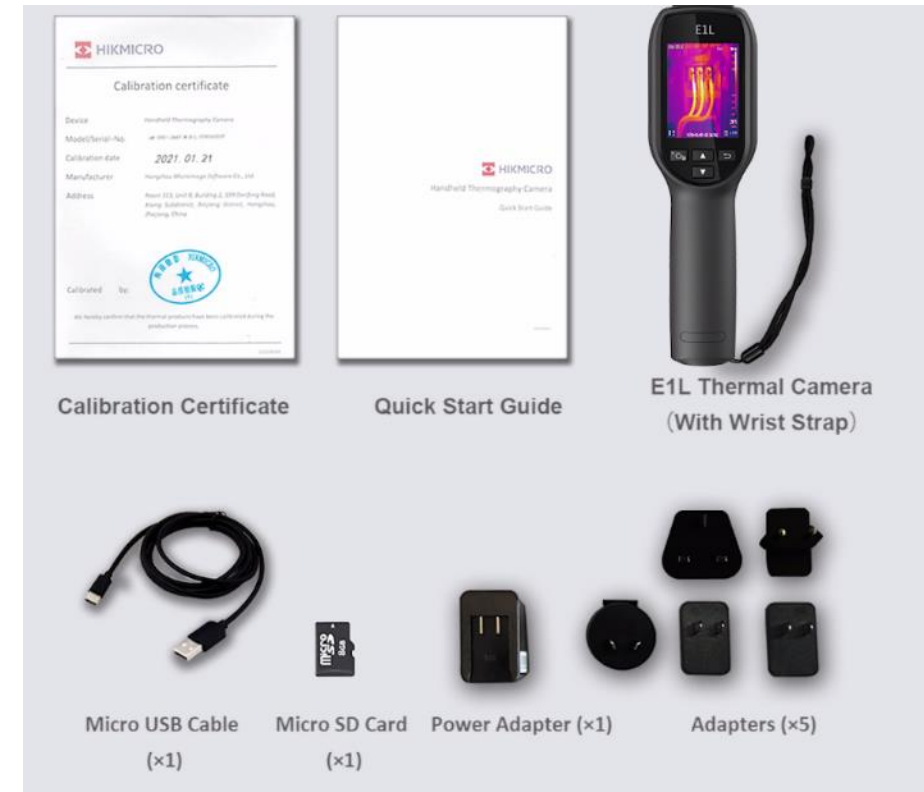
Long Battery Life

Reliable 8 hours continuous running



E1L – SCOPE OF DELIVERY

- ◆ Thermal Imager
- ◆ Wrist Strap
- ◆ Power Supply
- ◆ International Use Plugs (US/EU/UK/AU/CN) for Power Supply
- ◆ USB 2.0 A to Micro USB Cable
- ◆ Color Box Packaging
- ◆ Calibration Certificate
- ◆ Quick Start Guide
- ◆ 8GB Micro SD card



Pocket2 OVERVIEW

High performance compact thermal imaging camera



\$599 MSRP/MAP

Camera Highlights

IR Resolution	256 x 192 (49,152 pixels)
Object Temperature Range	-20°C ~400°C (-4 °F to 752 °F)
Accuracy	Max ($\pm 2^{\circ}\text{C}$, $\pm 2\%$)
Temperature Spots	Center, Hot, Cold
Visual Camera	8MP
FOV	50 °H x 37.2 °V
Display	3.5" LCD Screen
Battery Life	Approx. 4 Hours

Warranty



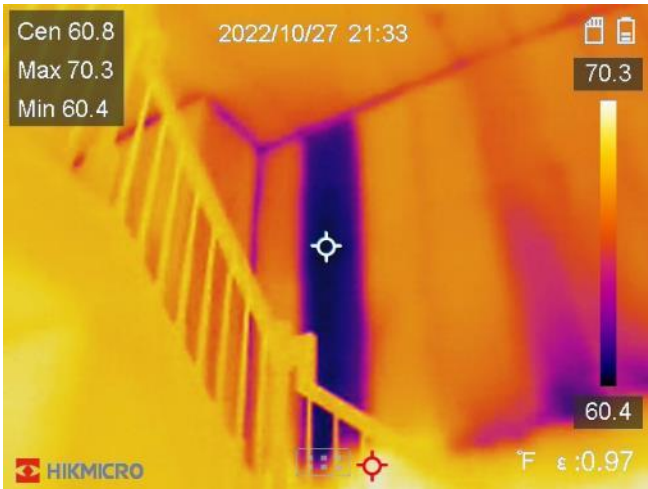
Pocket2 – APPLICATIONS



Electrical
Electricians



Equipment
First Level
Maintenance



Building Envelope
Building Inspection



HVAC Inspection
HVAC Contractors

POCKET SERIES – PRODUCT FEATURES



Portable pocket-sized design and fits in any pocket

3.5"

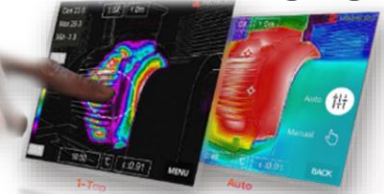
Intuitive 3.5" LCD Touch Screen



3 Modes

Multiple Level & Span Modes

3 modes (manual, automatic, and 1-Tap) help you instantly improve image contrast and highlight potential problems



Wi-Fi

Download on-device images

Connect (Wi-Fi or Hotspot) to HIKMICRO Viewer App for transmitting pictures from camera to mobile phone.



16 GB

On-camera Recording

Up to 60,000 images or 15 hours of video



25_{Hz}

Fast Image Frequency

25 Hz delivers smooth video while panning across scenes or viewing moving targets



Exceptional Image Quality

HIKMICRO VOx 256×192 detector (NETD < 40 mK) for a distinct thermal image of the target in a pocket sized solution

Pocket2 – PHYSICAL TRAITS



Faster Troubleshooting

Built-in speaker and flash light give the operator audio and visual alerts to high temperatures



Portable Pocket-sized Design

Easy to carry and hold and fits perfectly in your pocket or tool bag

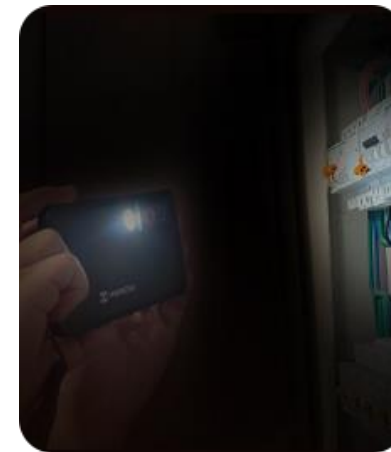


Rugged & Durable Design

IP54 rated for protection against water and dust and a 2-meter (6.6ft) drop tested, making it suitable for industrial use



2-meter
Drop Protection



LED Flashlight



IP54

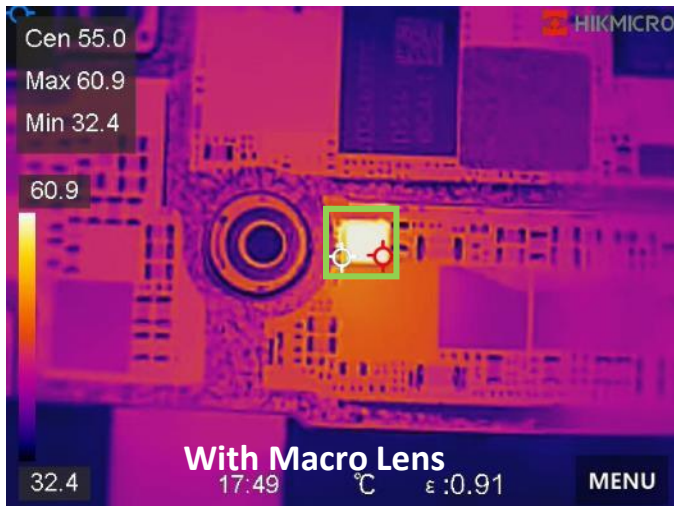
POCKET SERIES – OPTIONAL ACCESSORIES



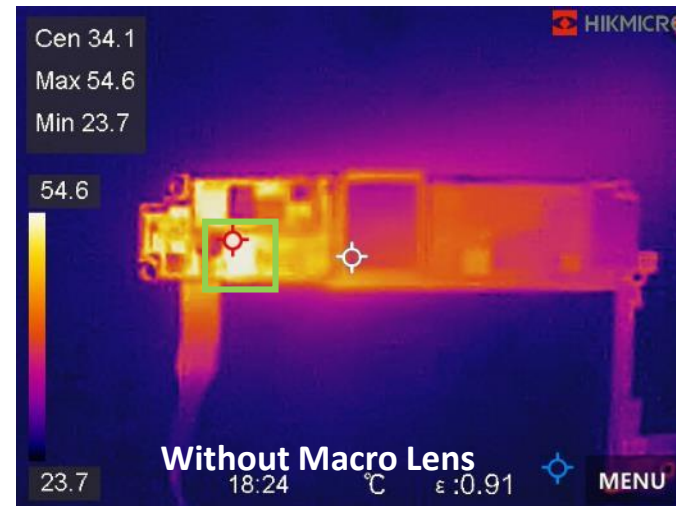
Macro Lenses Solution for Imaging Small Targets

Item	Model Name	Key Features	Picture
Macro Clip-on Lens	HM-P201-MACRO	<ul style="list-style-type: none">Compatible with Pocket2, Pocket1Magnification: 0.12XFocus Distance: 30 mmMinimum Target Size: 100 μmAccurate Temperature Range: -20~150 $^{\circ}$C(-4~302$^{\circ}$F), Max(\pm3$^{\circ}$C, \pm3%)	

With Macro Lens



Without Macro Lens



Pocket2 – SCOPE OF DELIVERY

- ◆ Thermal Imager
- ◆ Wrist Strap
- ◆ Power Supply
- ◆ USB 2.0 A to USB Type-C Cable
- ◆ Soft Carrying Pouch
- ◆ Color Box Packaging
- ◆ Calibration Certificate
- ◆ Quick Start Guide



Thermal Imager with Wrist Strap



Pouch



Power Supply



USB Cable



Quick Start Guide



Calibration Certificate

Pocket2 Camera Operations



Pocket2 Camera



Power Button

Camera/Video Button
Quick press/release for image
Longer press/release for video. Press/release to stop recording

USBC Charging/
Download Port

Folder/Image Library

Camera Settings

640x480 Touchscreen

Menu Button

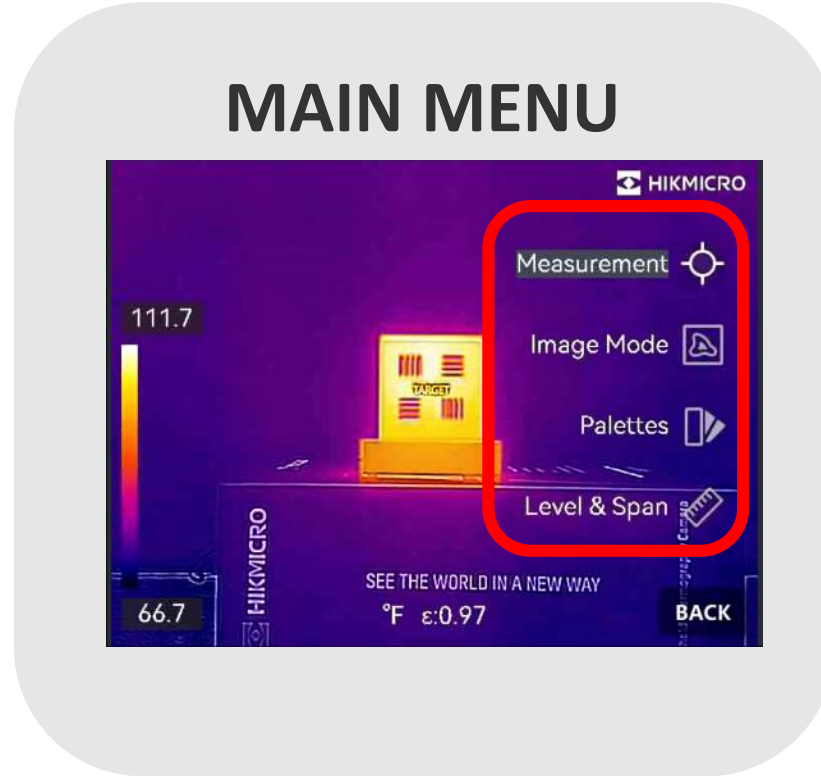


Pocket2 Main Menu



MEASUREMENT

Toggle on/off Center, Cold, Hot Spot



MAIN MENU



IMAGE MODE

Thermal, Fusion, PIP, Visual



PALETTES

Select your preferred color



LEVEL AND SPAN

Auto or Manual + 1-Tap

MEASUREMENT MENU

Activate or deactivate live temp values



Toggle On/Off Center, Max, Min by touching the screen.



These are live values and MIN/MAX constantly tracking the entire screen.

Most people keep at least the center point active and toggle on/off Min/Max based on their preferences.

Image Mode

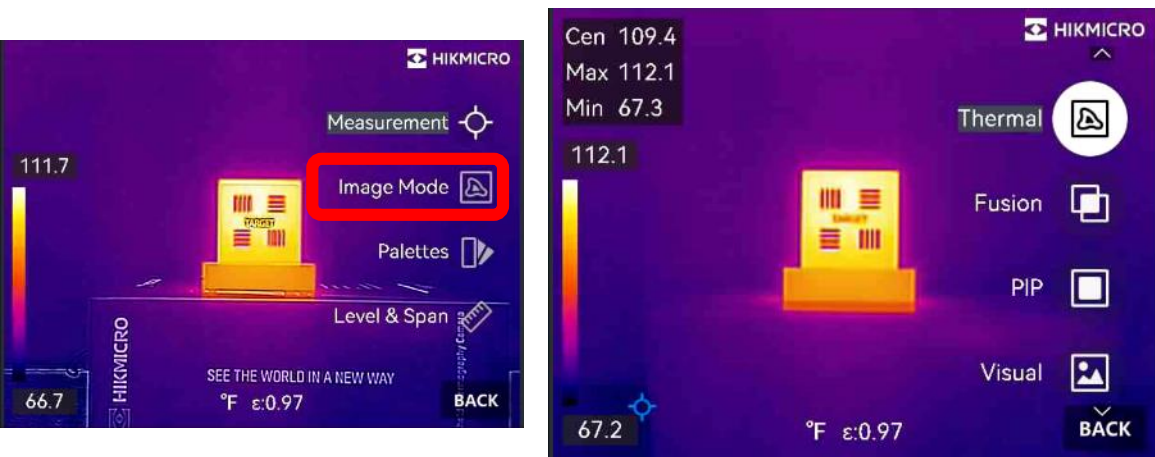


IMAGE MODE
Thermal, Fusion, PIP, Visual



Thermal only



Fusion- Combines visual and thermal for definition and text
Recommended Mode



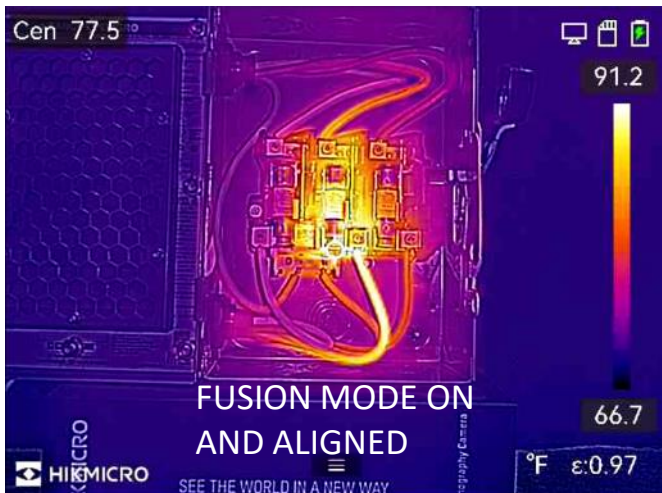
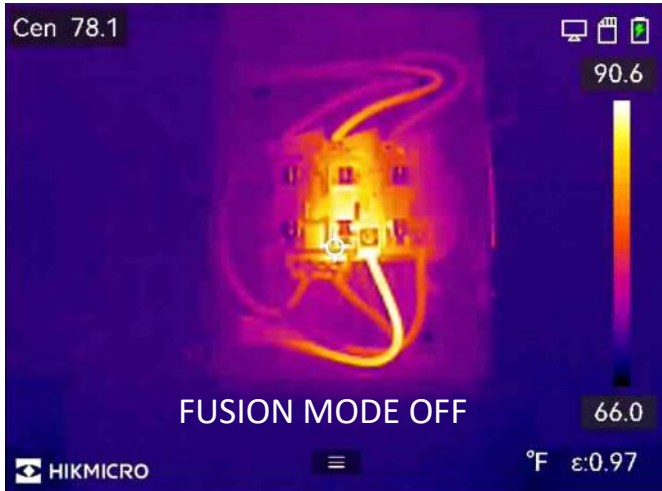
Picture in Picture-
Can adjust how large



Visual only

Appendix- Fusion Mode and Alignment

Fusion mode combines the thermal and visual image to add edge definition and detail to your images including the ability to read text. You may need to adjust Parallax Correction to align the two images at close ranges.



Pocket Series, touch top of screen, select right value, and scroll to approximate distance.

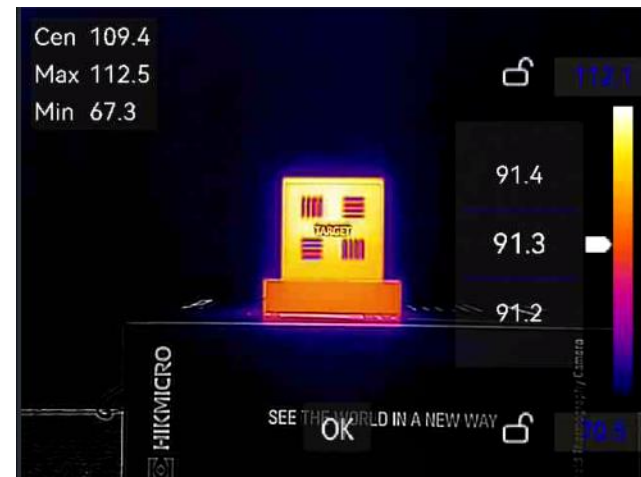
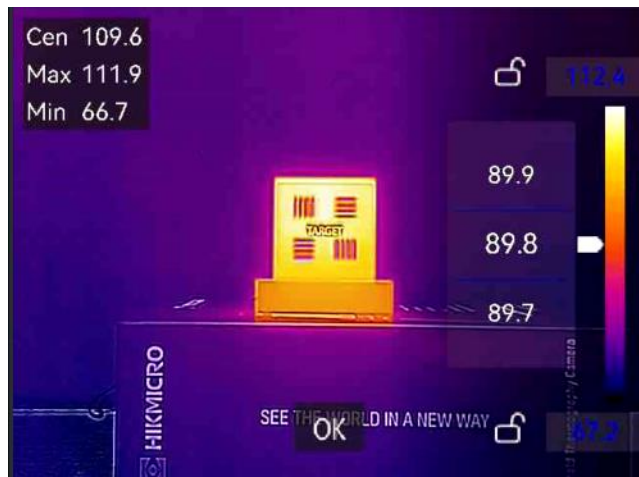
Level and Span



Auto: Camera is always adjusting to the hottest and coldest item in the entire scene. “Set it and forget it”
Recommended mode as you learn thermography

Manual: You can lock in min/max temperature span or manually touch an item of interest to focus the temp range on that specific item. This is ideal for finding anomalies of specific temperature ranges and screening out background items with temperatures you are not concerned with.

Manual- lock in the upper and lower limit

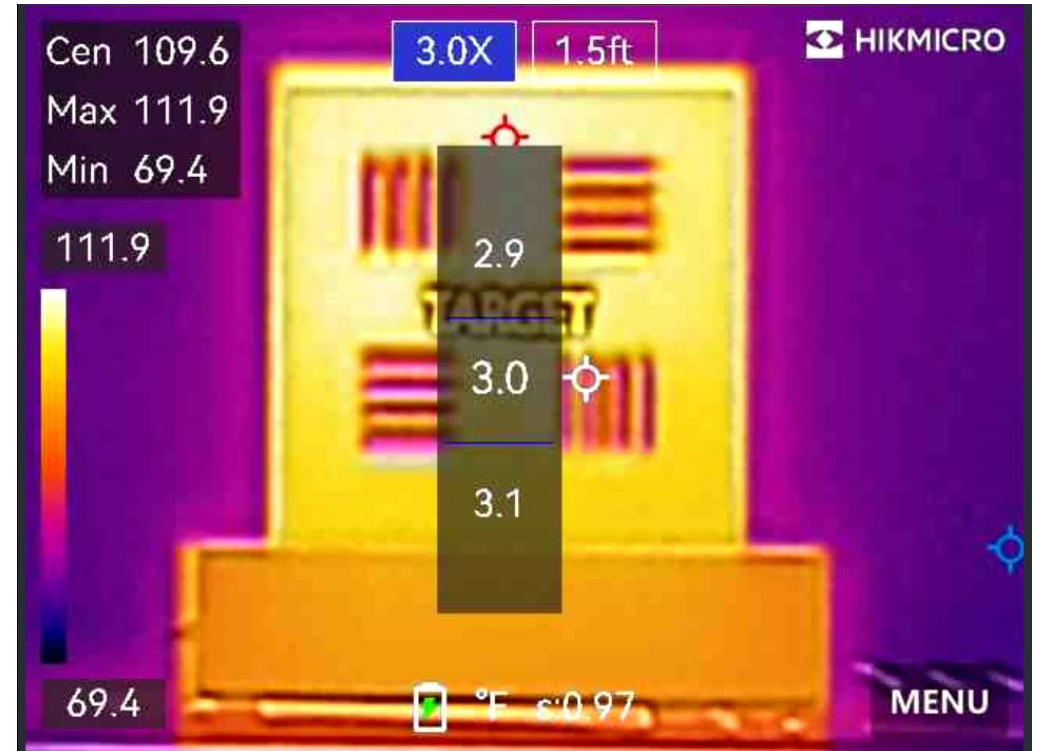


“One Tap” mode- A touch of the warm target onscreen tightens the temp range to focus on just that item. Everything else is ignored.

Pocket2 Digital Zoom

A quick tap on the top section of the screen launches the zoom and parallax correction mode. Zoom is left button. Scroll to zoom in or out. Tap to exit

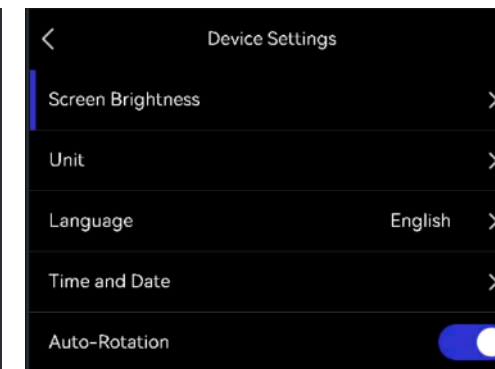
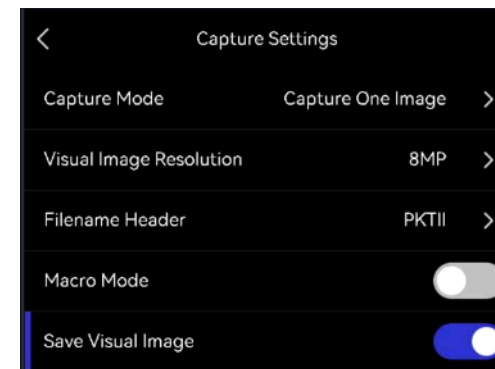
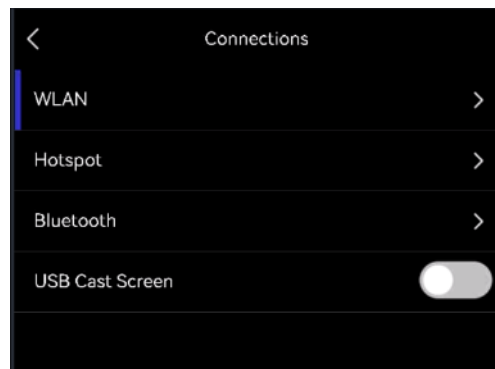
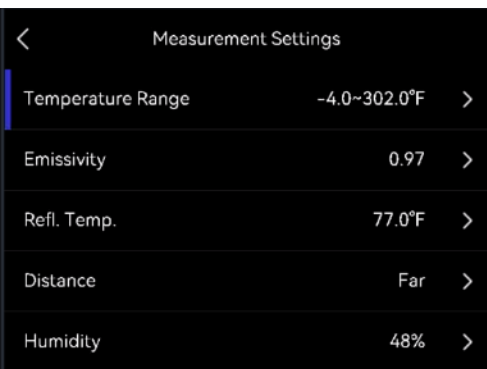
Digital Zoom



Camera Settings



Settings Button
Tap Button



Measurement Settings:
Leave these at defaults
Option: If you are measuring over 302F, then change temp range

Connections:
WLAN: WIFI Password settings
Bluetooth-Leave OFF
USB Cast Screen- Leave OFF

Display Settings:
Enable/Disable home screen overlays. These are saved to the thermal image when enabled

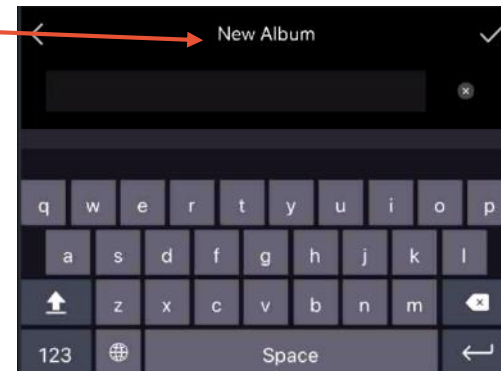
Capture Settings:
Change Visible to 8MP for best visual images
Turn on Save Visual Image to have separate JPG visual from the thermal in the file

Device Settings:
Unit: Select metric, imperial, F or C for Temp
Date/Time: Set these
Auto-Rotation: Turn on for auto screen rotation (portrait or landscape when turning camera)

Camera Settings

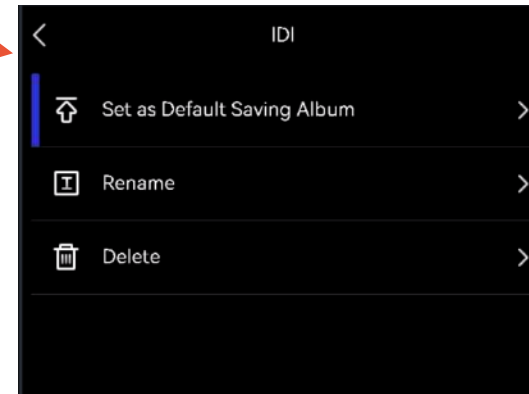


File Menu/Storage Tap Button



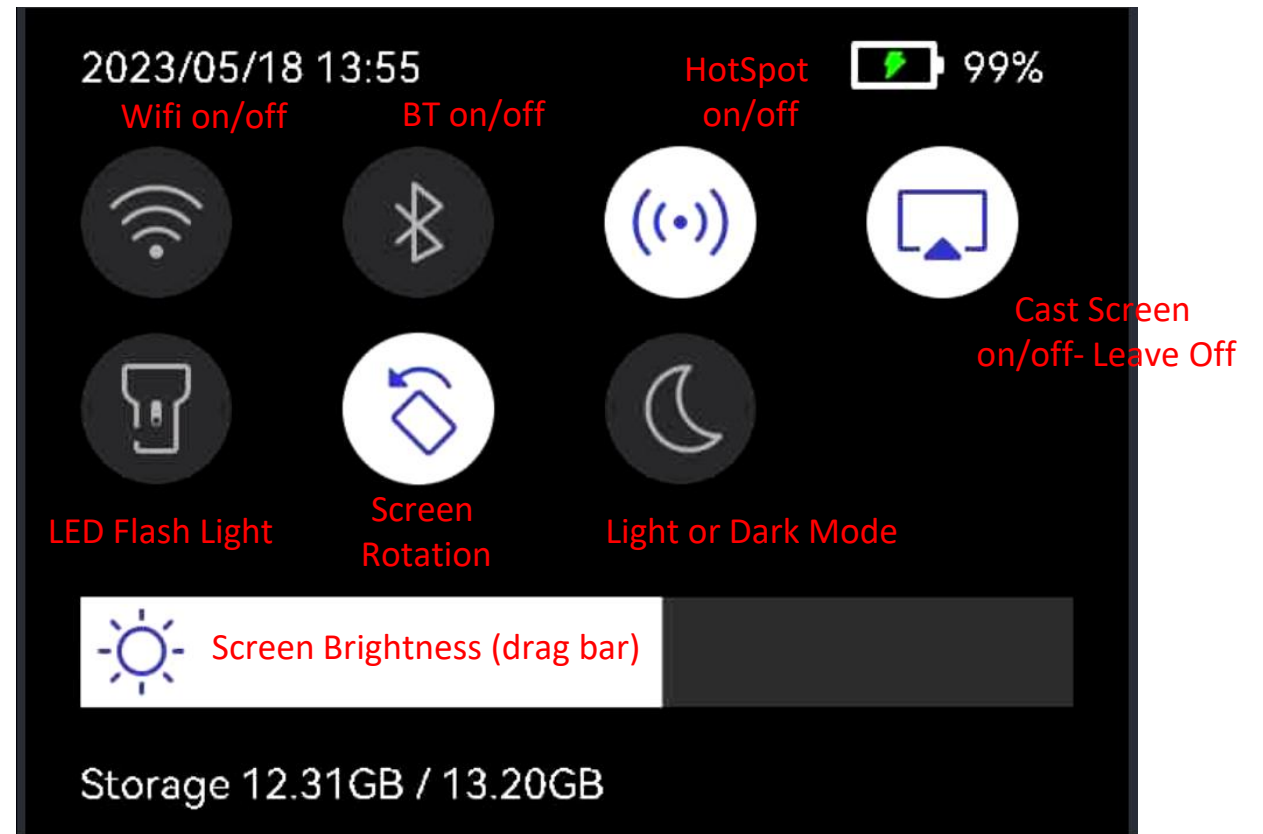
Tap check mark to save new folder name

Tap Folder to open/view files
Blue folder is default storage location



Camera Settings- Shortcut and Added Settings

Finger Swipe Down from top to enable and swipe up to close



Reading the Display

Center Temp- White target
Max Temp- Red target
Min Tem- Blue target

Temperature span/values from coldest to warmest item in the scene with associated temperature color. Blue/purple (cold) to yellow white (hot)



Min/Max targets will constantly move all over the screen tracking the hottest and coldest items in real time

Camera parameters based on your selection in settings

What is the Screen Telling Me?

This is the same wall section with missing insulation on a summer day and a winter day

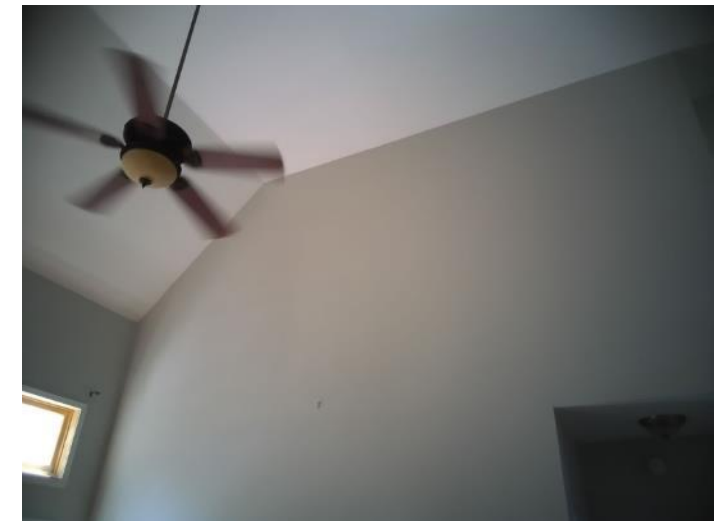
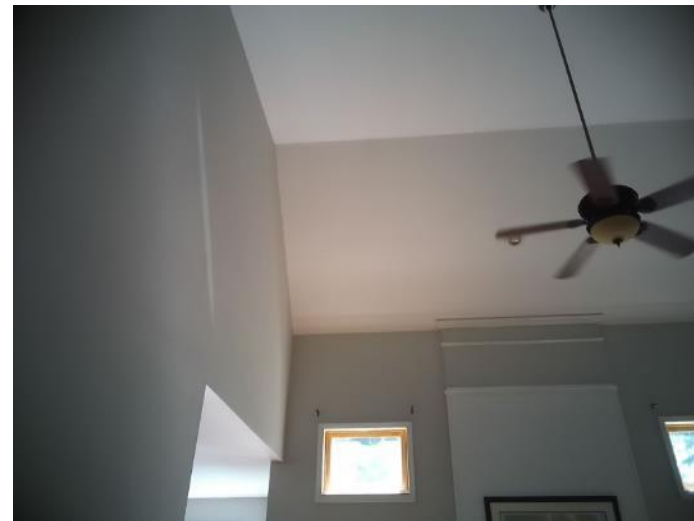
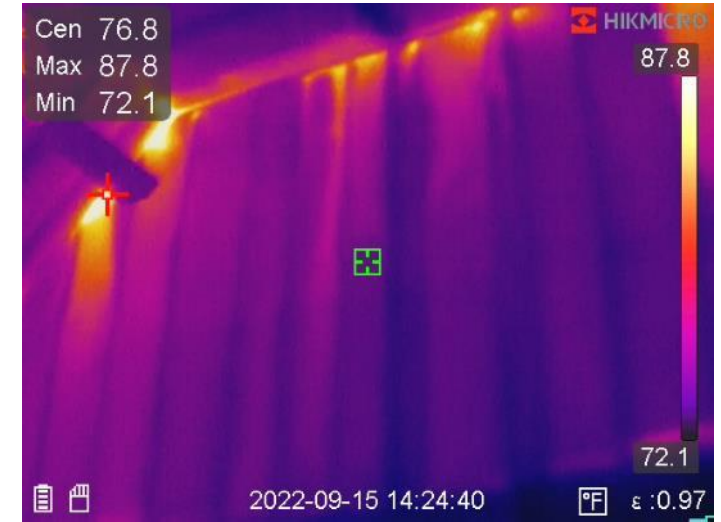


Hot attic air is heating the drywall and it appears there is an insulation problem in some areas. Wall surface is almost 78 degrees versus 70-72. HVAC has to work harder



Cold attic air is cooling the drywall. Investigation found that insulation fell out of one stud cavity and is not and is not properly pushed into stud cavity other two showing cold at the bottom. Cold section is ~55-60 versus the heated house at 70. Prime area to get condensation if not corrected

Why is this Great Room Always Hot in the Summer?



What's Behind the Wall...



Questions

