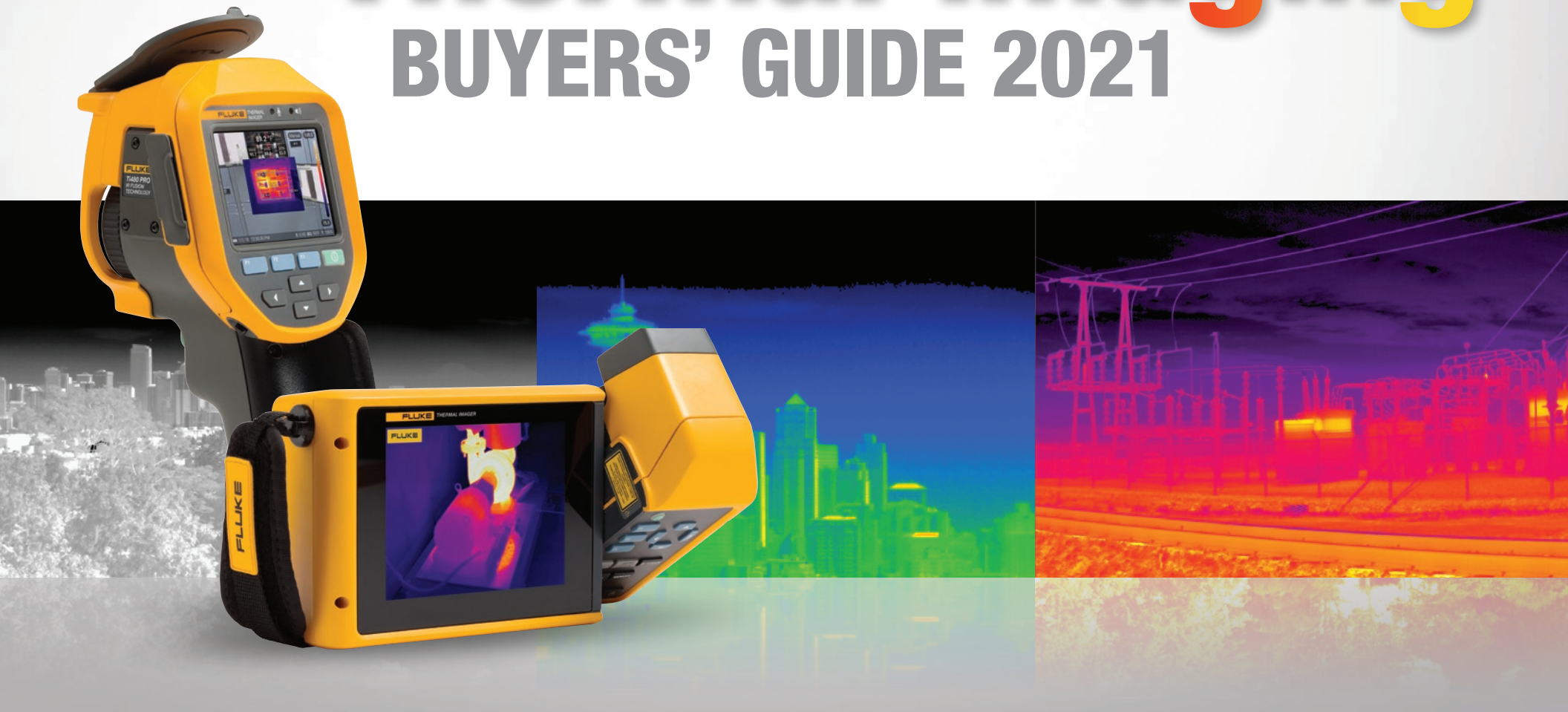
FLUKE®

ADVANCED Thermal imaging BUYERS' GUIDE 2021



Fluke thermal imaging

From our digital multimeters to our award winning thermal imagers; for the past 70 years, Fluke's design team has been on the job and in the field for countless hours with our customers to deliver solutions around how they work and their applications. Understanding our customer pain points and developing unique solutions that address these pain points is what makes us stand out.

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At Fluke, we focus on four areas that make thermal imaging a success.

Image quality

An in-focus image is needed to see details and accurately measure temperatures—both of which are critical in identifying problems.

Work environment

Fluke makes difficult inspections safer and easier with unique features like a full 240 degree rotating lens, tablet-like screen and clear crystal IR Windows that have passed the 63 kA arc blast test.

Managing data

Having the ability to capture multiple measurements at one time, having instant access to historical data and being able to easily analyze and manage your images helps you work faster and easier.

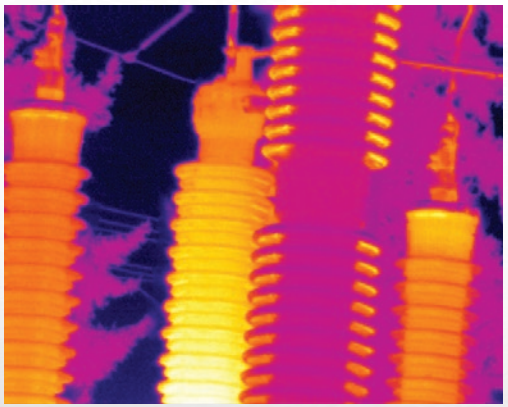
ROI and thermal imaging

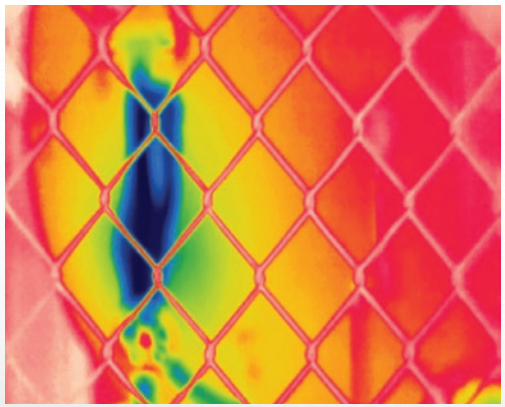
Eliminating downtime, improving efficiency, productivity and customer satisfaction can only add to your overall bottom line.

Image quality

- Do you spend more than 5 seconds trying to focus an image?
- Are there physical objects such as a chain link fence blocking equipment?
- Are you required to inspect multiple complex targets or targets from varying distances making inspections difficult?

When conducting infrared inspections, high quality images that allow for better analysis, presentation and professionalism are essential.





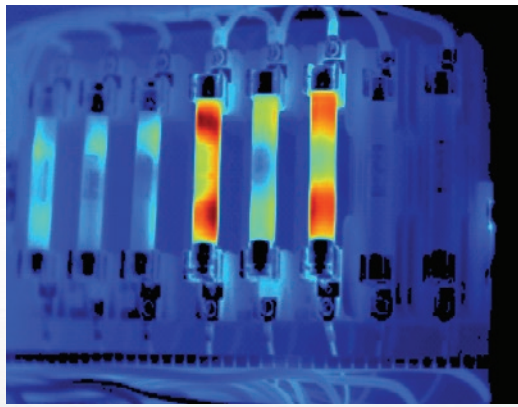
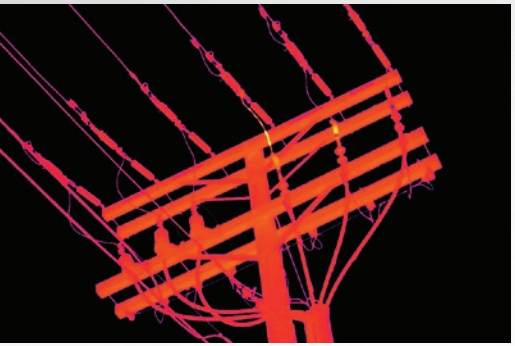
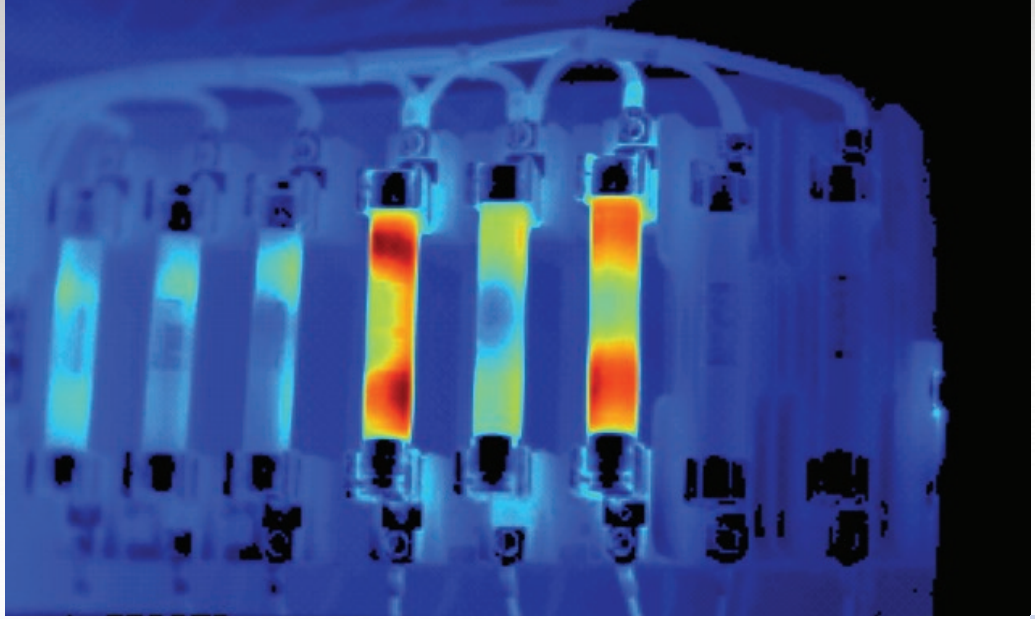
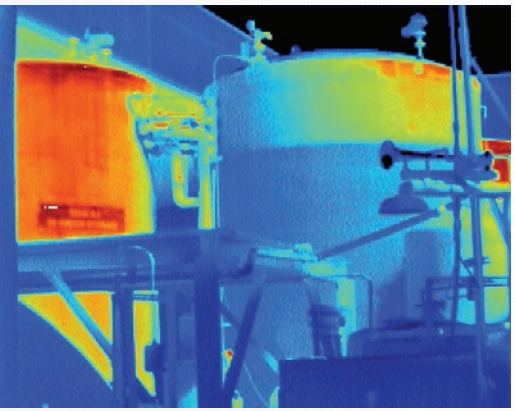
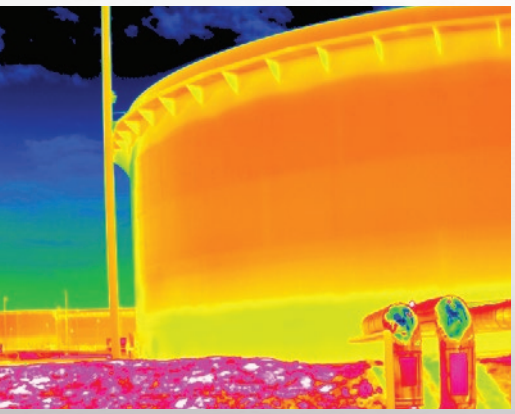


Image quality









An in-focus image is essential

With a sharply focused image, there is a distinct contrast between areas of varying thermal energy on the surface being inspected. This allows the individual detector elements (also known as pixels) to clearly report the intensity of the energy being focused on them.

When the focus is poor, the incoming energy isn't as concentrated on individual detectors, and their response is skewed. This can lead to temperature measurements that are significantly off, resulting in expensive downtime and possible safety hazards. Fluke understands the criticality of image quality and the various environments that make getting quality images difficult. That is why Fluke engineers solutions that make troubleshooting faster, safer and easier.

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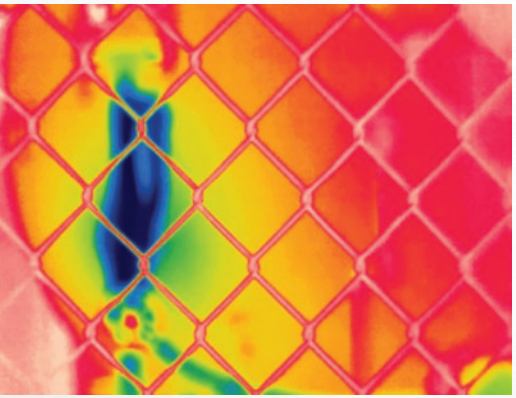
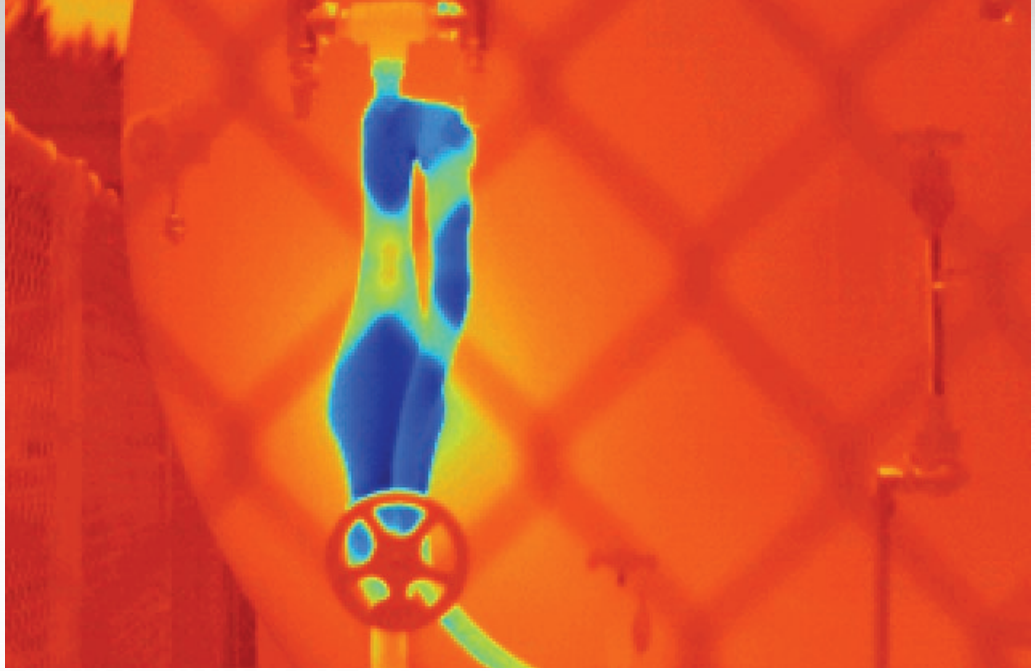
Fluke uses only 100 % diamond-turned germanium lenses covered with a specialty coating, providing premium quality images.

Image quality

Difficult inspection sites



Passive auto focus systems may only capture near-field subject

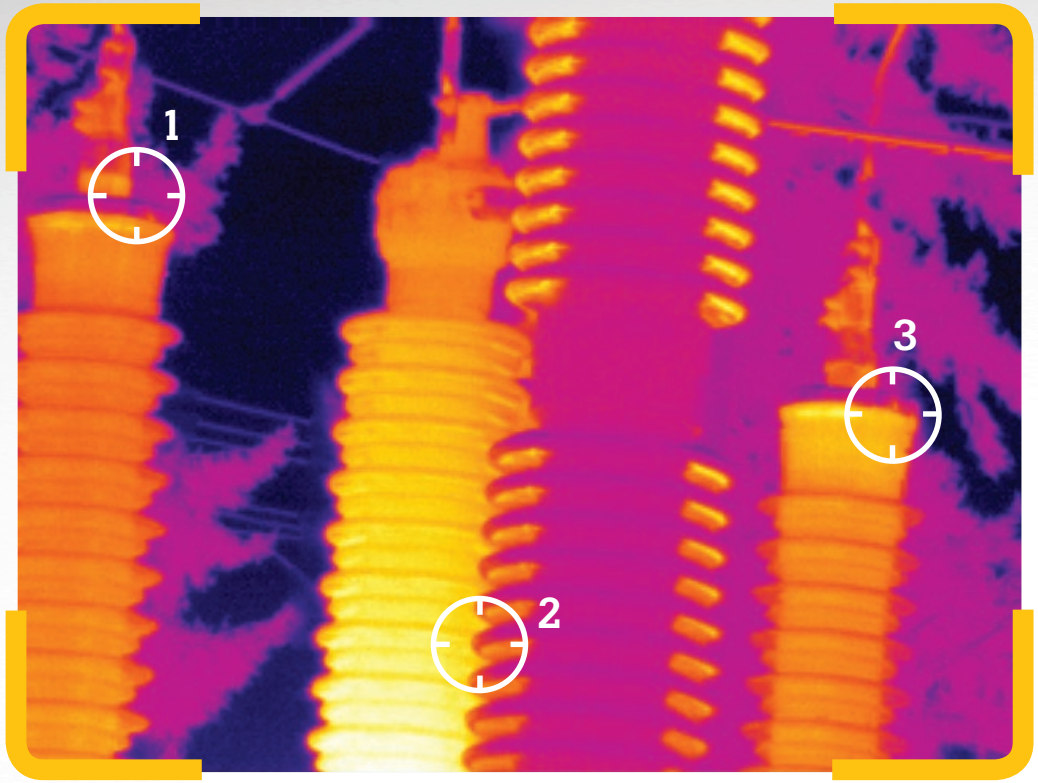


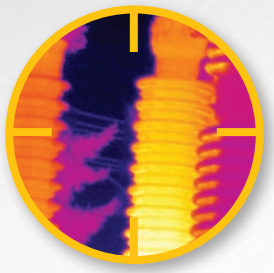
Fluke LaserSharp Auto Focus allows you to select and focus on a specific target

Easily choose and focus on your target

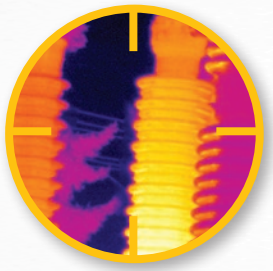
LaserSharp™ Auto Focus uses a built in laser distance meter that provides both speed and precision. The laser-driven target detection pinpoints the target while the camera focuses to capture a precise, high quality image. With LaserSharp Auto Focus, you can:

- Easily capture high-quality, focused images of your desired target with the push of a button
- Take infrared images through common obstacles like chain link fences
- Avoid skewed temperature measurements by precisely choosing your target
- Perform the same inspections multiple times as a part of your preventive maintenance program—the built-in laser distance meter calculates and displays how far you are from your target, making repeatability much easier.

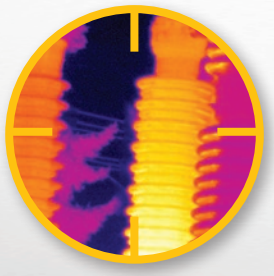




1. Middleground in focus



2. Foreground in focus



3. Background in focus

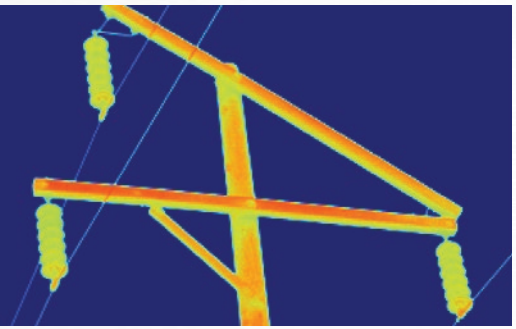
Choose multiple targets at different distances

MultiSharp™ Focus takes multiple images from different focal distances and combines them into one clear image. With a simple point and shoot, you can go from being completely out of focus, to complete focus, throughout the field of view. With MultiSharp:

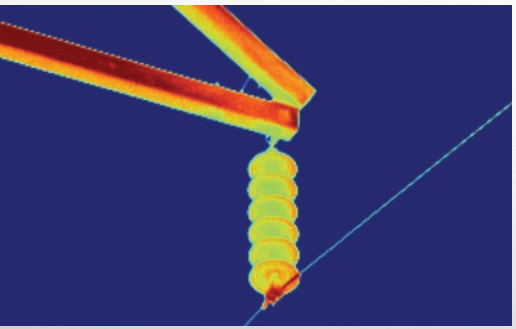
- Reduce the need to take individual images of targets that are in the camera's field of view—focus on one target, and all objects that are in the camera's field of view will be in focus
- Cut down time spent taking multiple images to increase productivity
- Capture quality, in-focus images, even under direct sunlight

Image quality

High voltage power pole, captured with a camera and standard lens



The same power pole captured from the same distance, but with a Fluke 2x telephoto lens



The same power pole captured from the same distance, but with a Fluke 4x telephoto lens

Shoot from a distance

Infrared inspections can take you into multiple types of environments with many types of equipment. Interchangeable lenses that require no calibration give you the versatility and the image quality needed to conduct inspections in almost any environment.

- Reduce the need to enter the danger zone with a 2x telephoto lens
- Identify potential issues as small and distant as a failed splice on a high electrical line from the ground with a 4x telephoto lens
- Save time with roofing and industrial building inspections by viewing a large area at one time with a wide angle lens

Work environment

- Are you required to inspect targets that are hard to reach or difficult to access?
- Do you inspect targets that force you to be in an uncomfortable position for long periods of time?
- Are you at risk for arc flash? Are you NFPA 70E compliant?

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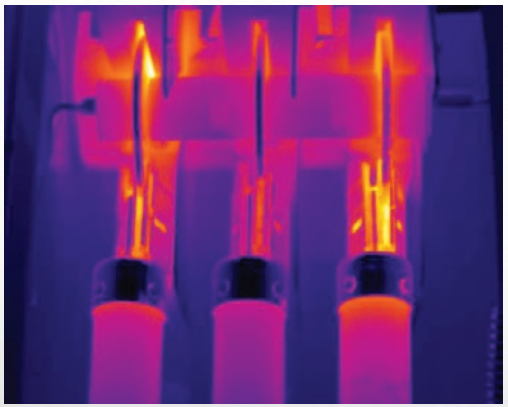
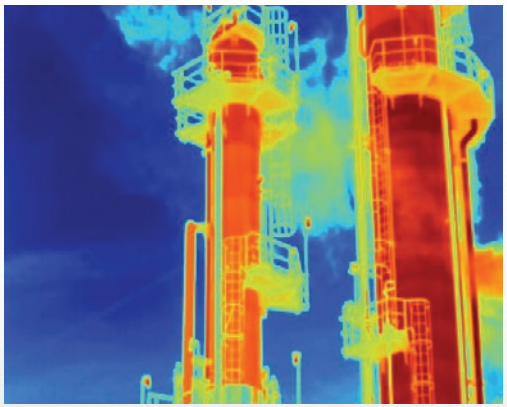
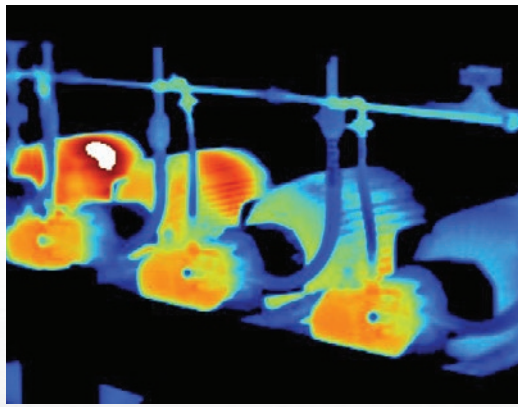
As a thermographer you work in many different conditions, some being more ideal than others. You might be on the factory floor inspecting conveyor belts, or inspecting outdoor substations, or conducting an energy audit in a commercial building. Regardless of where you are, you need to quickly identify potential problems, prevent unplanned downtime and eliminate potential safety hazards.







Work environment

Make tricky inspections easier and more ergonomic

Quickly capture in-focus images around hard-to-reach equipment or at tough angles with a full 240 degree rotating lens.

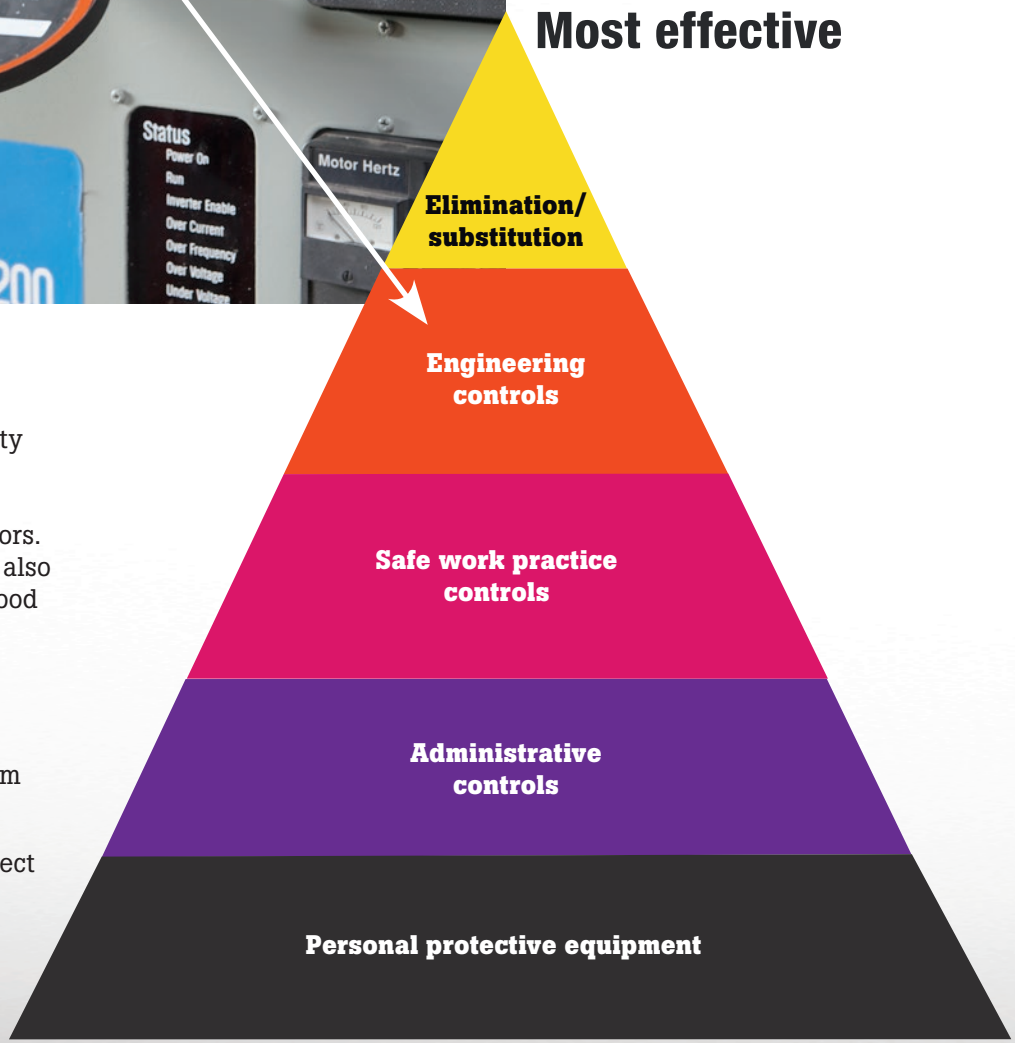
Cramped arms and stiff necks are a thing of the past. Keep the camera at a position that is comfortable for you, while the rotating lens views over, under and around hard-to-reach targets.

A bigger screen results in a clearer picture—view your target and review images on the large 5.7 inch tablet-like screen with up to 640 x 480 resolution.

Work environment

Hierarchy of controls

Occupational Health and Safety Organization (OSHA) and the National Fire Protection Association (NFPA) recommend the Hierarchy of Controls to minimize or eliminate exposure to occupational hazards.



Reduce the risk of arc flash

Arc flash accidents occur every day in the United States and can involve a fatality or serious injury to an employee. Along with infrared cameras, Fluke also offers IR Windows. IR Windows provide a permanently installed “access point” on an enclosure, creating a solid barrier between the thermographer and live conductors. IR Windows make it possible to not only reduce the trigger effects of an arc but also provide the thermographer with a safer working environment. Here are three good reasons to consider IR Windows:

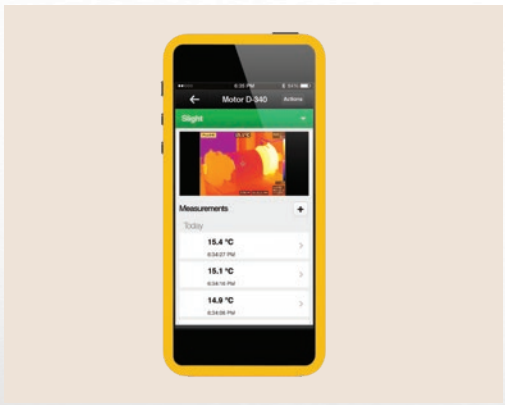
- **Safety**—Infrared inspections can be performed without opening enclosures, virtually eliminating the risk of arc flash
- **Increased productivity**—Eliminate panel removal from the process to perform infrared inspections quicker
- **Save money**—Reduce the need to suit up in full PPE, making it easier to inspect more frequently to ensure maximum uptime

Managing your data

Would you like to:

- **Capture multiple measurements (mechanical, electrical and thermal), organized by piece of equipment?**
- **Access historical data from your phone?**
- **Eliminate the use of pen and paper to take notes after you capture an image?**
- **Eliminate the need to take a visual light image with every infrared image?**

Whether you are troubleshooting or conducting maintenance inspections, having easy access to more information faster is always a big benefit.



Managing your data

FLUKE CONNECT

Looking for a solution to help prevent equipment failures?

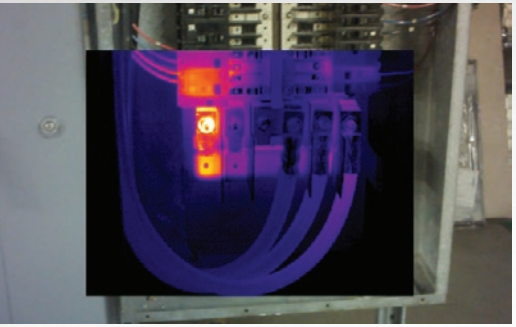
The Fluke Connect™ system is a preventive maintenance software platform that wirelessly links Fluke test tools to smartphones and to the cloud where measurements can be viewed, graphed, shared and stored for trending and further analysis. With Fluke Connect:

- Pinpoint problems faster by pulling other measurements types like electrical and vibration into your thermal image
- Easily access historical data and reports from the field—measurement data is automatically uploaded to the cloud via the Fluke Connect app
- Text or email measurements or images to get approvals or questions answered while in the field

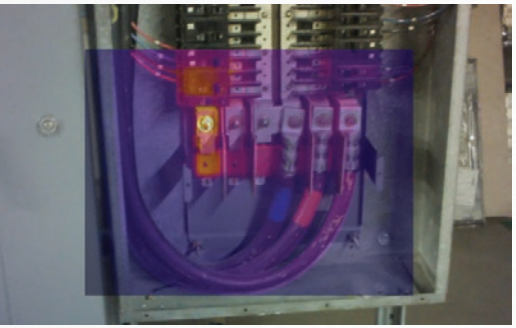
Fluke Connect is not available in all countries.

866.472.8948

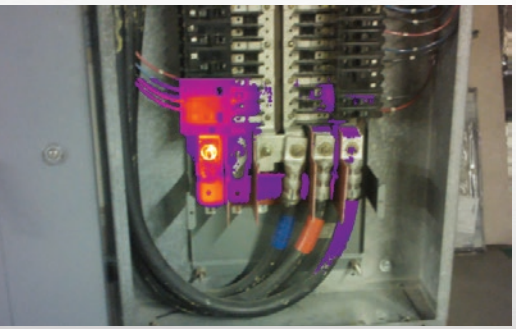
Managing your data



IR Fusion picture-in-picture mode: Ironbow palette



IR Fusion picture-in-picture mode: AutoBlend



IR Fusion color alarm

Capture digital and infrared images at once

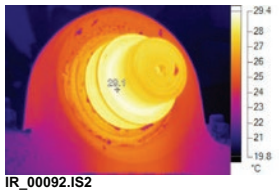
Fluke patented IR Fusion™ technology combines a visible light and an infrared image into one, giving you better clarity.

- Get exact location details in picture-in-picture mode, which provides the center part of the display in IR and the remainder of the image in visible light
- See more details when you adjust the level of infrared and visible light blending in AutoBlend™ mode
- Isolate problem areas with user-defined temperature ranges with IR color alarms

Document information on the equipment you're inspecting

With IR PhotoNotes™, voice or text annotation, you can easily document critical information about each piece of equipment and its location. Each "note" attaches to the image, so you never have to search or match up notes to images.

- Document critical information with your infrared image
- Capture surrounding details like wind conditions and time of day
- Identify asset location



IR_00092.IS2

Visible Light Image

Image Info

IR Sensor Size	320 x 240
Distance to Target	0.69m

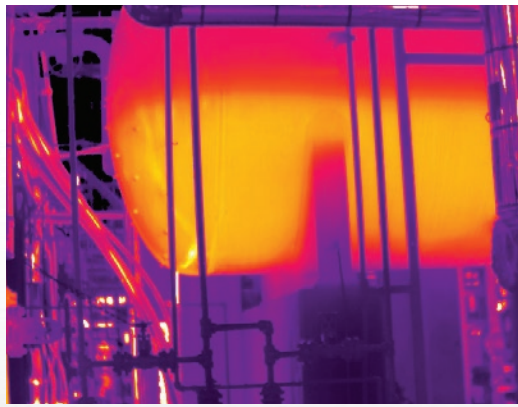
Main Image Markers

Name	Temperature
Centerpoint	29.1°C

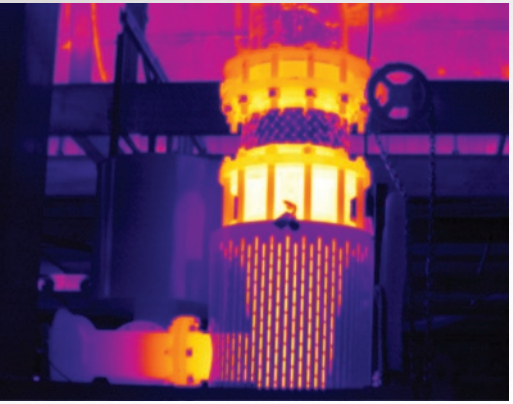
ROI and thermal imaging

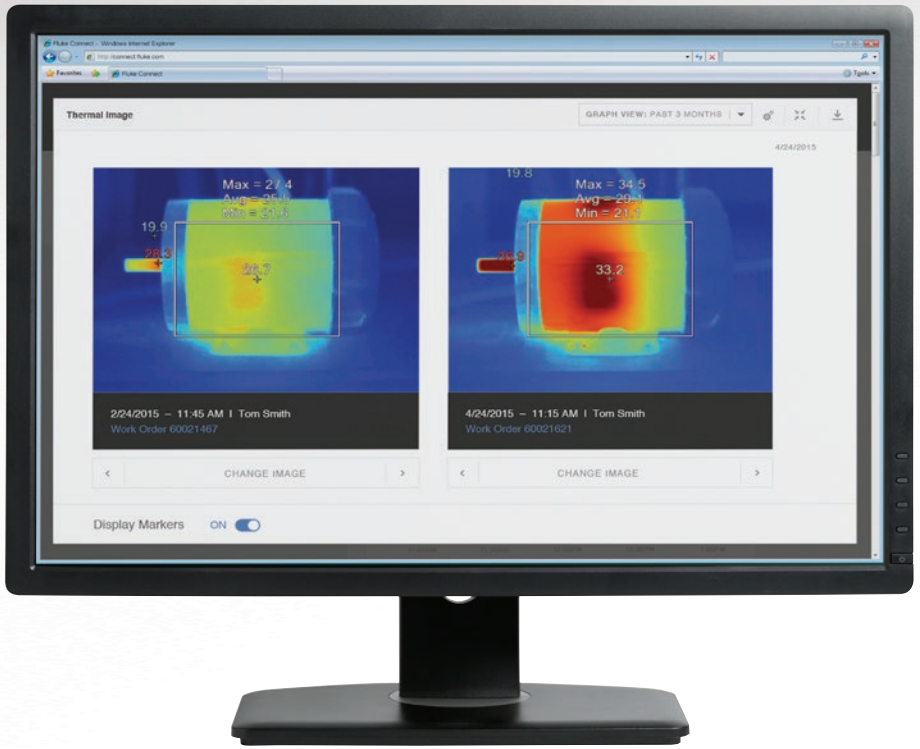
We often get asked how much return on investment can be expected from adding a thermal imager to an inspection tool bag? While there are a couple ways to look at it, it's all positive!

Please look under 'tools and calculators' on Fluke.com for an ROI estimation.



ROI and thermal imaging





Review thermal images side by side, making it easy to compare today's reading with the baseline or other historical images.

7 Benefits of on-site infrared inspections

1. **Reduce downtime.**
   Inspections can be done while equipment is running—no lost production time.

2. **Protect lives while doing more.**
   The non-contact nature of infrared inspections allows technicians to scan large areas quickly, from a safer distance away. That means technicians can inspect more equipment faster.

3. **Improve production efficiency.**
   Subtle problems are found and addressed before they have a major impact on production.

4. **Document before and after.**
   Validate post-maintenance work and capture the results for future review.

5. **Reduce capital expenses.**
   Finding and repairing problems at an early stage can improve the life expectancy of equipment, as a result extending replacement intervals.

6. **Increase productivity.**
   Quickly scan a large area to find air leaks, insulation gaps, moisture and overheated electrical components to complete more work in less time.

7. **Identify work in easy-to-understand terms.**
   See exactly what the problem is on the camera, eliminating guesswork and making it easier for everyone to see what repairs needs to be done.

ROI and thermal imaging

Down to the numbers—read what our customers say

"The Fluke thermal imager has **saved us tremendous amounts of downtime and more than $100,000** by finding problems with bearings, heat exchangers and too many other things to mention. Thanks Fluke."

— Jeffery Massey, Condition Based Maintenance (CBM) analyst

At Adams Columbia Electric Cooperative, Keith Weyh bought a Fluke thermal imager to protect their $15,000 regulators and $19,000 transformers from failing. He also wanted to bring down overtime costs caused by outages—which **had cost the company $900,000** the year before.

Dave Feniak of Weyerhauser, an integrated forest products company, was very glad he had decided to purchase a Fluke thermal imager, especially when he brought it into the plant, used the laser pointer feature, and saw that a motor was about to fail. He **saved his company $30,000** in downtime on that one repair.

Contractors or consultants?

ROI for your customer means more revenue for you. Quality thermography can impact how much more money you can earn. Use your thermal imager to show customers what needs to be done in a single image and leave traditional salesmanship behind.

Need more proof? Listen to what others in your industry had to say.

Greg Ibbotson of Ibbotson Heating Company reports that the use of a Fluke thermal imager gives him a competitive advantage and has increased sales. On one occasion, a homeowner was having a problem with an in-floor heating system. With his thermal imager, Ibbotson identified the floor pipes that were leaking, and the **client did not have to spend thousands of dollars** replacing all the in-floor heating.

Jim Ackles uses his Fluke thermal imager to make images that help his non-technical clients understand why a building problem needs to be repaired, thus making them more willing to approve the repairs he recommends. He **no longer needs to advertise** and always has work.

Mike Bannon of Efficient Home, LLC, says his customers see him as an expert because of the high-tech equipment he uses and often recommend his company. With the help of his Fluke thermal imager, his business is **growing by 50 %**.

Handheld and pocket

Technicians and contractors who need quality images and feature rich affordability for quick scans and/or intermittent inspections.

FLUKE®

Where used

- Electrical inspections
- HVAC/R inspections
- Mechanical
- Residential home inspections
- Light commercial maintenance
- Building diagnostics
  - Building envelope
  - Commercial/industrial facilities





	TiS75+	TiS60+	TiS55+	TiS20+ / TiS20+ MAX	PTi120
Infrared resolution	384 x 288 (110,592 pixels)	320 x 240 (76,800 pixels)	256 x 192 (49,152 pixels)	120 x 90 (10,800 pixels)	
Field of view	42 °H x 30 °V	34.1 °H x 25.6 °V	28 °H x 20 °V	50° H x 38° V	
Thermal sensitivity*	Target temp at or over 0 °C (40 mk)	≤ 0.045 °C at 30 °C target temp (45 mK)	Target temp at or over 0 °C (40 mk)	Target temp at or over 0 °C (60 mK)	
Temperature range	–20 °C to 550 °C (–4 °F to 1022 °F) (not calibrated below –10 °C)	–20 °C to 400 °C (–4 °F to 752 °F)	–20 °C to 550 °C (–4 °F to 1022 °F) (not calibrated below –10 °C)	TiS20+ –20 ° C to 150 ° C (–4 °F to +302 °F) TiS20+ MAX –20 ° C to 400 ° C (–4 °F to +752 °F)	–20 ° C to 150 ° C (–4 °F to +302 °F)
Focus system	Manual focus, plus focus free operation for distances >0.5m via focus marker	Fixed Focus	Manual focus, plus focus free operation for distances >0.5m via focus marker	Fixed Focus	
Touchscreen	Yes	No	Yes		
Wireless connectivity**	Fluke Connect™ app compatible. Wireless connectivity to PC, iPhone® and iPad® (iOS 4s and later), Android™ 4.3 and up, and WiFi to LA				
IR-Fusion®	Continuous Touchscreen IR-Fusion 0–100%	Yes, 4 levels 0%, 25%, 50%, 75%, 100%	Continuous Touchscreen IR-Fusion 0–100%	Continuous Touchscreen IR-Fusion 0–100%	
Software	Full analysis and reporting software with access to Fluke Connect Desktop				
Warranty	2 year warranty				
Asset tagging	Yes, automatically organize and file thermal images by scanning QR codes	–	Yes, automatically organize and file thermal images by scanning QR codes	Yes, automatically organize and file thermal images by scanning QR codes	
Battery life	≥ 3.5 hours continuous without WiFi	4 hours continuous use per battery pack	≥ 3.5 hours continuous without WiFi	≥ 5 hours continuous (without WiFi)	≥ 2 hours continuous (without WiFi)
Voice annotation	Yes, 60 second maximum audio recording via Bluetooth Audio Headset Profile (HSP) connection to external device. (sold separately)	Yes, 60 seconds maximum record-ing time per image; reviewable playback on camera; Bluetooth headset required (sold separately)	Yes, 60 second maximum audio recording via Bluetooth Audio Headset Profile (HSP) connection to external device. (sold separately)	–	
Level and span	Smooth auto and manual scaling				Auto
Color Alarms	High temperature, low temperature, and dew point calculation	High temperature, low temperature, isotherms (within range)	High temperature, low temperature	–	
IR-PhotoNotes	Yes, 3 images		Yes, 1 image	–	

Handheld

Engineers, R&D professionals and advanced thermographers who require premium image quality and an unsurpassed level of detail in every infrared image.

Where used

The most detailed and challenging inspections/targets

- Industrial maintenance
- Generation/transmission
- Oil and gas predictive maintenance
- Research and development (electrical, mechanical, biology/sciences, microelectronics)

	Ti480 PRO	Ti401 PRO	Ti300+
Infrared resolution	640 x 480 (307,200 pixels)	640 x 480 (307,200 pixels)	320 x 240 (76,800 pixels)
Field of view	34° H x 24° V		
Thermal sensitivity*	≤ 0.05 °C at 30 °C target temp (50 mK)	≤ 0.075 °C at 30 °C target temp (75 mK)	
Temperature range	–10 °C to +1,000 °C (–4 °F to +1,832 °F)	–20 °C to +650 °C (–4 °F to +1,202 °F)	
MultiSharp™ Focus	Yes	No	
LaserSharp™ Auto Focus	LaserSharp™ Auto Focus for consistently in-focus images		
Touchscreen	Yes		
Optional lenses	Pre-calibrated smart optional lenses: wide angle, 2x and 4x telephoto, macro–25 micron		
Wireless connectivity**	Fluke Connect™ app compatible. Wireless connectivity to PC, iPhone® and iPad® (iOS 4s and later), Android™ 4.3 and up, and WiFi to LAN		
IR-Fusion®	Five modes of image blending (AutoBlend™ mode, Picture-in- Picture (PIP), IR/Visible alarm, Full IR, Full visible light) add the context of the visible details to your infrared image		
Software	Full analysis and reporting software with access to Fluke Connect Desktop		
Voice annotation	60 seconds maximum recording time per image, reviewable playback on camera; Bluetooth headset optional, but not required		
Video recording	Standard and radiometric	—	
Warranty	Two-years (standard), extended warranties are available		
Alarms	High temperature, low temperature, and isotherms (within range)		

Articulating

Engineers, R&D professionals and advanced thermographers who require premium image quality and an unsurpassed level of detail in every infrared image

Where used

- Industrial maintenance
- Oil and gas predictive maintenance
- Power generation/transmission
- Research and development
  - Electrical
  - Mechanical
  - Sciences
- Quality control
- Plus the industries included under the handheld series

	TiX580	TiX501
Detector resolution	640 x 480 (307,200 pixels) SuperResolution mode: 1280 x 960 (1,228,800 pixels)	640 x 480 (307,200 pixels)
Field of view	34 °H x 24 °V	
Distance to spot	1065:1	
Thermal sensitivity*	≤ 0.05 °C at 30 °C target temp (50 mK)	≤ 0.075 °C at 30 °C target temp (75 mK)
Temperature range	–20 °C to +1,000 °C (–4 °F to +1,832 °F)	–20 °C to +650 °C (–4 °F to +1,202 °F)
Focus systems	MultiSharp™ Focus, LaserSharp™ Auto Focus with built-in laser distance meter and advanced manual focus	LaserSharp™ Auto Focus with built-in laser distance meter and advanced manual focus
Touchscreen		
Optional lenses	Pre-calibrated smart optional lenses: wide angle, 2x and 4x telephoto, macro–25 micron lens	
Wireless connectivity**	Fluke Connect™ app compatible. Wireless connectivity to PC, iPhone® and iPad® (iOS 4s and later), Android™ 4.3 and up, and WiFi to LAN	
IR-Fusion®	Five modes of image blending (AutoBlend™ mode, Picture-in- Picture (PIP), IR/Visible alarm, Full IR, Full visible light) add the context of the visible details to your infrared image	
Software	Full analysis and reporting software with access to Fluke Connect Desktop	
Voice annotation	60 seconds maximum recording time per image, reviewable playback on camera; Bluetooth headset optional, but not required	
Video recording	Standard and radiometric	Standard
Remote control operation	Remote display and control operation through Fluke Connect	Remote display through Fluke Connect
Warranty	Two-years (standard), extended warranties are available	

Mounted and Gas detection

R&D professionals, scientists and engineers who require a mounted infrared camera to continuously stream, measure and analyze data

Applications For RSE

- Research and development
  - Electrical
  - Mechanical
  - Biology/sciences
- Quality control
  - Pre- and post production testing

	RSE600	RSE300
Infrared resolution	640 x 480 (307,200 pixels)	320 x 240 (76,800 pixels)
Field of view	34° H x 25.5° V	
Thermal sensitivity*	≤ 0.040 °C at 30 °C target temp (40 mK)*	≤ 0.030 °C at 30 °C target temp (30 mK)*
Temperature range	–10 °C to +1200 °C (14 °F to +2192 °F)	
Focus systems	Focus is adjusted in Fluke Connect Desktop software (manual or MultiSharp™)	
Touchscreen	No	
Optional lenses	Pre-calibrated smart lenses: wide angle, 2x telephoto, 4x telephoto, macro	
IR-Fusion®	Yes, in Fluke Connect Desktop software. Five modes of image blending (AutoBlend™ mode, Picture-in-Picture (PIP), IR/Visible alarm, Full IR, Full visible light) add the context of the visible details to your infrared image	
Software	Fluke Connect Desktop software—full analysis and reporting software Compatible with MATLAB® and LabVIEW® software	
Gas detection	No	
Video recording	Radiometric, in Fluke Connect Desktop software, with exports to standard non-radiometric formats	
Streaming video	Yes, see the live stream of the camera on your PC, smartphone, or TV monitor. Via USB, WiFi hotspot, or WiFi network to Fluke Connect Desktop software on a PC; via WiFi hotspot to the Fluke Connect™ app	
Remote control operation	Yes, through ethernet or Fluke Connect Desktop software	
Alarms	Yes, in Fluke Connect Desktop software–high temperature low temperature, and isotherms (within range)	
Warranty	Two years (standard), extended warranties are available	

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1.866.472.8948

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