

# FLIR ETS320™

## Thermal Imaging Solution for Electronics Testing



The FLIR ETS320 is an affordable solution for reducing test times and improving product design for electronic board and device evaluation. Whether the goal is R&D or product testing, heat can be an important indicator of how a system is functioning. The ETS320 helps engineers and test technicians collect accurate, reliable data in seconds and analyze it quickly.

### Reduce Test Times

*The FLIR ETS320 takes the guesswork out of thermal testing, for fast discovery of hot spots and potential points of failure.*

- Sensitive enough to detect temperature shifts smaller than 0.06°C
- Wide temperature range, from -20°C to 250°C, for quantifying heat generation and thermal dissipation
- Measures small components down to 170 µm per pixel spot size

### Improve Product Design

*The FLIR ETS320 promotes design improvements and shortens product development time by detecting design flaws that materialize as heat.*

- 320 x 240 IR sensor offers 76,800 points of non-contact temperature measurement
- True 45° field of view for broad initial scans to identify potential problems
- Measurement accuracy of ±3°C promotes quality assurance and factory acceptance of PCBs

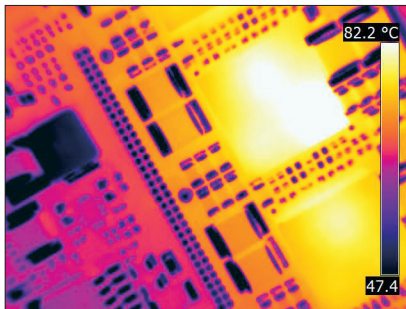
### Designed for Laboratory Work

*The ETS320 is designed for hands-free laboratory testing, with simplified features that allow users to focus on their work instead of on the camera controls.*

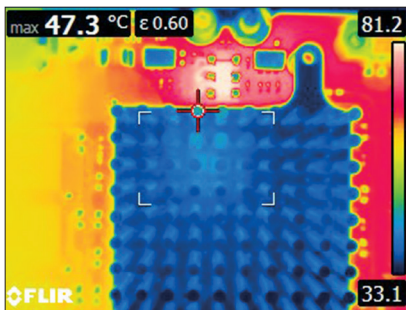
- Pole mount included for fast and easy setup
- Crisp 3" LCD display provides immediate thermal feedback
- FLIR Tools+ software for instant analysis, including Time vs. Temperature measurement

### Key Features:

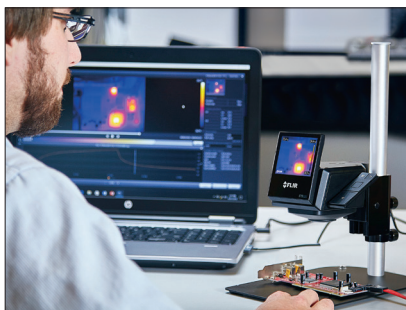
- 320 x 240 IR resolution (76,800 pixels)
- Vibrant 3" LCD display
- 45° field of view
- ±3% measurement accuracy
- Records standard radiometric JPEGs
- FLIR Tools+ software provided



Measure small components down to 170 µm per pixel spot size



Determine where to add or remove thermal management devices



Connect over USB a computer to analyze data in FLIR Tools+

## Specifications

System Overview	ETS320
IR Resolution	320 x 240 (76,800 pixels)
Detector Type	Uncooled microbolometer
Spectral Range	7.5 - 13.0 $\mu\text{m}$
Thermal Sensitivity/NETD	< 0.06°C
Field of View (FOV)	45° x 34°
Fixed Focus Distance	70 mm $\pm$ 10 mm
F-number	1.5
Spot Size @ Min. Focus	170 $\mu\text{m}$
Image Frequency	9 Hz
Measurement and Analysis	
Object Temperature Range	-20°C to 250°C (-4°F to 482°F)
Accuracy	$\pm 3^\circ\text{C}$ or $\pm 3\%$ of reading for ambient temperature 10°C to 35°C (50°F to 95°F)
Spotmeter	Center spot
Area	Box with max/min
Emissivity Correction	Variable from 0.1 to 1.0
Emissivity Table	Table of pre-defined materials
Reflected Apparent Temperature Correction	Automatic, based on input of reflected temperature
Storage of Images	
Image File Formats	Standard radiometric JPEG, 14-bit measurement data included
Video Streaming	
Radiometric IR Video Streaming	Full dynamic to PC (FLIR Tools/Tools+) using USB
Non-Radiometric IR Video Streaming	Uncompressed colorized video using USB
Data Communication Interfaces	
Interfaces	USB Micro: data transfer to and from PC and Mac devices
Power System	
Battery Type	Li-ion battery, charged in camera
Battery Operating Time	Approx. 4 hours at 25°C (77°F) ambient temperature and typical use
Charging Time	2.5 hrs to 90% capacity
Additional Data	
Display	3 in, 320 x 240 pixel color LCD
Operating Temperature Range	10°C to 40°C (50°F to 104°F)
Storage Temperature Range	-40°C to 70°C (-40°F to 158°F)
Directives and Regulations	<ul style="list-style-type: none"> <li>• Battery Directive 2006/66/EC</li> <li>• EMI/EMC Directive 2014/30/EU</li> <li>• WEEE Directive 2012/19/EC</li> <li>• RoHS2 Directive 2011/65/EC</li> <li>• FCC 47 CFR Part 15 Class B</li> <li>• REACH Regulation EC 1907/2006</li> </ul>
Encapsulation, Shock, Vibration	<ul style="list-style-type: none"> <li>• IP 40 (IEC 60529)</li> </ul>
Camera Weight, Incl. Battery	0.575 kg (1.27 lbs)
Camera Size (L x W x H)	22 x 15 x 30 cm (8.7 x 5.9 x 11.8 in)
FLIR ETS320 Includes:	
List of Contents	Camera, mount, stand, power supply, USB cable, FLIR Tools+ software

For the most up-to-date specifications, go to [www.flir.com](http://www.flir.com)

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## INDUSTRIAL TRMS MULTIMETERS

# FLIR DM90/91™

The FLIR DM90 and DM91 are affordable, safe, and reliable digital multimeters for a wide range of electrical and electronic system applications. With durable design, intuitive user interfaces, and comprehensive features covering high and low voltage applications, the DM90 and DM91 are uniquely positioned to help you troubleshoot electrical, electronic and HVAC/R systems. The DM91 is also enhanced with Bluetooth® technology, so you can connect via METERLiNK® to FLIR infrared cameras, or to mobile devices running FLIR Tools™ or the FLIR InSite™ workflow management system.

[www.flir.com/test](http://www.flir.com/test)



### FAST & EFFECTIVE TROUBLESHOOTING

Rich feature set ensures safe and accurate operations

- Diagnose complex systems with high and low voltage measurement capabilities
- Measure True RMS, LoZ, and VFD, as well as microamp and milliamp current
- Assess temperatures up to 400°C (752°F) with Type-K thermocouple
- Work safely with built-in, non-contact AC voltage



### WORK EFFICIENTLY

Designed and built to make your job easier

- User-friendly design with an intuitive interface and enhanced ergonomics
- Work longer with flexible battery options, powerful LED worklights, and rugged, drop-tested design
- Detect and document intermittent trends using the datalogging mode with on-board storage of 40k measurements\*
- Rely on the protection of CAT IV-600V, CAT III-1000V safety ratings



### DOCUMENT & SHARE RESULTS

View and share wirelessly for improved workflow

- Send readings via METERLiNK to compatible FLIR infrared cameras to embed data into live or saved thermal images\*
- Wirelessly connect to FLIR Tools or the FLIR InSite workflow management application, for efficient troubleshooting and streamlined inspections\*

\* FLIR DM91 model only.

## SPECIFICATIONS

Features by Meter	DM90	DM91
Connectivity	–	Bluetooth®
Data Logging & Storage	–	1 file of 40k scalar measurements
Measurements-Both Models		
True RMS	Yes	Yes
	Range	Basic Accuracy
AC / DC Volts	1000 V	±1.0% / 0.09%
AC / DC mV	600.0 mV	±1.0% / 0.5%
VFD AC Volts	1000 V	±1.0%
AC / DC LoZ V	1000 V	±2.0%
AC / DC Amps	10.00 A	±1.5% / 1.0%
AC / DC mAmps	400.0 mA	±1.5% / 1.0%
AC / DC μAmps	4,000 μA	±1.0%
Resistance	6.000 MΩ 50.00 MΩ	±0.9% ±3.0%
Capacitance	10.00 mF	±1.9%
Diode Test	1.500 V	±0.9%
Frequency Counter	100.00 kHz	±0.1%
Temperature, Type-K Thermocouple	-40°F to 752.0°F -40°C to 400°C	±1.0% + 5.4°F ±1.0% + 3°C

Additional Measurements	DM90	DM91
Continuity Check	600 Ω	20 Ω and 200 Ω
Measuring Rate	3 samples per second	3 samples per second
General Information		
Auto Power Off	Yes	Yes
Worklights	Yes	Yes
Battery	4 AAA batteries; optional TA04 Li-Poly rechargeable battery	3 AA batteries; optional TA04 Li-Poly rechargeable battery
Drop Test	3 m	3 m
IP Rating	IP54	IP40
Safety Category Rating	CAT IV-600V, CAT III-1000V	CAT IV-600V, CAT III-1000V
Size (L x W x H)	200 × 95 × 49 mm (7.9 × 3.7 × 1.9 in)	200 × 95 × 49 mm (7.9 × 3.7 × 1.9 in)
Weight	536 g (18.9 oz)	535 g (18.8 oz)
Warranty	Limited lifetime warranty	Limited lifetime warranty

Box Contents
FLIR digital multimeter, batteries, silicone test leads, alligator clips, test lead storage/holder attachment, Type-K thermocouple, soft carrying case

Ordering Information	Order #
FLIR DM90 True RMS Industrial Multimeter	793950370841
FLIR DM91 Industrial TRMS Multimeter with Datalogging, Connectivity	793950370919

For a complete list of available accessories, go to: [flir.com/store/instruments/testaccessories](http://flir.com/store/instruments/testaccessories)

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