TECHNICAL DATA

Fluke FS100 Thermal Body Screener
Thermal Imaging Kit

Keeping your world up and running®

70 years of test and measurement experience

For over 70 years Fluke has been a leader in test and measurement tools and over the past 20 years has become a leader in thermal imaging tools. When our customers started asking for a thermal imaging device to measure human body temperature, we were up for the challenge. Introducing the FS100 Thermal Body Screener*, a non-contact, thermal imaging system, engineered to detect elevated body temperature.

Manufactured in the United States

The Fluke FS100 is engineered and produced right here in the United states, from our headquarters in Everett Washington. Fluke controls the entire process from production to calibration to maintain the high-quality tools that the world has come to expect from us. All Fluke tools, including the FS100, go through a rigorous testing and validation process, ensuring the accuracy, durability and overall quality of the tool.

The System

The FS100 Thermal Body Screener Kit is a hardware and software solution for human temperature screening. Defined as a Telether-mographic System, the product determines human surface skin temperature based on a thermal image that is calibrated by an External Temperature Reference Source (ETRS).

Elevated body temperatures based on FS100 output need to be confirmed by a secondary method, such as a non-contact infrared thermometer or clinical grade contact thermometer.

It is important to use a calibrated temperature source to ensure accurate measurements. The Infrared Thermal Imaging Camera (IR Camera) and ETRS provide data to the Software. The Software interprets this data, and within 1 second or less, the operator sees if a test subject's temperature exceeds pre-determined limits.

Product usage includes temperature assessment for high-throughput areas such as building entrances, airports, factories, and more.

Accuracy is what matters

When engineering the FS100 Thermal Body Screener, Fluke made sure to consider several different factors to achieve our system level accuracy of +/ 0.5C. Please see the following for a list of the relevant factors:

- **Resolution**
  The FS100 uses the Ti480 PRO camera as its thermal imaging base. At a resolution of 640 x 480, we are capturing the most pixels on the human face as possible with highest resolution camera that Fluke produces.

KEY FEATURES AND MEASUREMENTS

- Human body temperature in ≤ 1 second
- Temperature range: 34 °C to 39 °C (93.2 °F to 102.2 °F)
- FS100 PC software included

- **External Temperature Reference Source (ETRS)**
  The Fluke 4180ETRS is an external temperature reference source, allowing for traceability and accuracy of infrared body temperature measurements by continuously benchmarking against a known, stable temperature surface in the camera's field of view. This allows for the system to continually reference a known temperature and to adjust accordingly for accuracy.

- **Ambient temperature**
  Included in the system is the Amprobe TR300. This tool is a temperature monitor that is plugged directly into the system so that it can measure and communicate the ambient temperature of the screening area to the FS100 system.

- **Relative humidity**
  The Amprobe TR300 also measures and communicates the relative humidity of the screening area to the FS100 system which further contributes to achieving accuracy by allowing the operator to confirm the humidity in the screening area is at an acceptable level.

- **Facial detection**
  Utilizing facial detection, the FS100 measures the hottest point on the human face.

Quick Results

With a measurement time of approximately one second, the FS100 system minimizes the productivity impact of a temperature screening process. The system is portable and assembles rather simply, enabling the ability for users to carefully select the optimal screening area. Note that to maximize accuracy of the system and adhere to FDA guidance, the FS100 conducts temperature screening on an individual basis (e.g., one person at a time).

Accuracy and resolution

When it comes to measuring human body temperature, accuracy is one of the most important attributes, which is why Fluke focused on maximizing accuracy when engineering the Fluke FS100 Thermal Body Screener. Fluke's +/- 0.25 C accuracy is defined as the difference between actual and expected readings using a secondary blackbody calibration source. When combined with other system uncertainties including stability, long-term drift, uniformity, and uncertainty in the accuracy of the temperature reference source, the combined accuracy of the Fluke FS100 system is +/- 0.5C. The FS100 utilizes a 640 x 480 infrared resolution camera, inferring [not inferring, but rather providing] 307,200 pixels of temperature measurements. For context, this

means that when someone is standing at the specified distance from the camera each pixel is measuring a 1mm area on each human face. The FS100 is for initial human temperature measurement only. Any elevated or suspected elevated body temperature measurement must be confirmed with a secondary evaluation method (e.g., non-contact infrared thermometer (NCIT) or clinical grade contact thermometer).

Facial Detection

The FS100 utilizes facial detection technology to ensure that the subject is properly positioned and has enough measurement points on the face to accurately measure the body temperature. The device can operate effectively within a range of 1.0 to 1.5M (4.9ft) from the subject to the camera and by doing so, the 640 x 480 resolution can be optimized, generating a reading in which each pixel that is measured is approximately 1 mm square of the human face. Consequently, providing measurement and assessment performance in accordance with IEC 80601-2-59. Facial detection technology enables the ability to ensure that temperature measurements of the facial region are actually captured, rather than unrelated items (e.g., a tumbler filled with hot liquid, etc.) that happen to be in the field of view of the thermal camera.

Social Distance

In order to limit person-to-person contact, the CDC has recommended social distancing of 6-feet between all people. The Fluke FS100 enables social distancing by having each person move into the measurement area while maintaining 6-feet of distance between people. Additionally, the system can be set up so that the operator is also able to safely practice social distancing as well (e.g., with an operator of the FS100 6 feet from the subject, behind a barrier or in another room if desired).

Data Privacy

As a world class and trusted provider of Test & Measurement tools and software, Fluke naturally operates in environments with sensitive data that must be protected. To that end, Fluke strongly recognizes the significance of data privacy and has equipped the FS100 with data capture features applicable to a range of customer preferences. By default, unidentifiable data (i.e., date, time and temperature) is recorded when a subject with an elevated body temperature is identified. If preferred, settings can be adjusted in the software to capture thermal or visible light images at the moment when elevated temperature is identified.
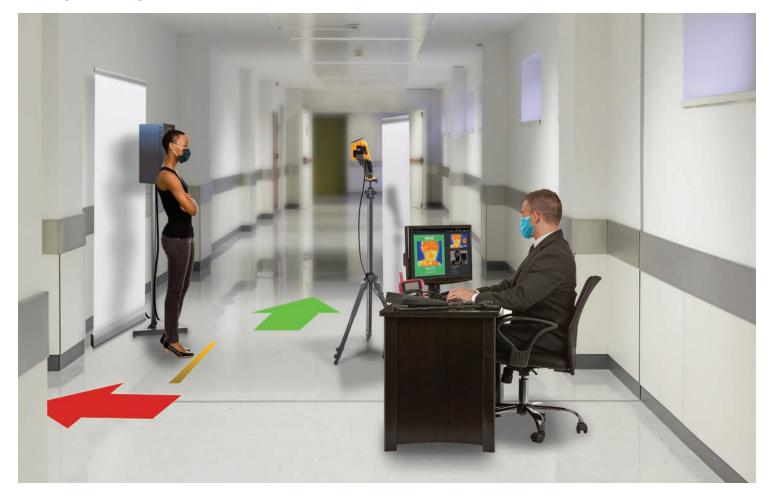
Specifications

Key features	FS100
Typical scan measurement time	≤ 1 second
Temperature range	34 °C to 39 °C (93.2 °F to 102.2 °F)
Software Included	FS100 PC Software
PC and display requirements	
Resolution	1920 x 1080
OS Requirements	Windows 10
Processor Requirements	i7, 3 GHz or better
RAM Requirements	16 GB or more
Hard Drive Requirements	200 MB for application, more for scanning records (100KB each)
Secondary display requirements (optional for operation)	1920 x 1080
Export file formats with Fluke Connect software	JPEG
System specifications	
Accuracy*	± 0.25 °C (0.45 °F)
Communication and Cables	All needed cables are included
Languages	EN
Warranty	1 year
Environment	
Ambient Temp Range (per FDA guidance and IEC specs)	18 °C to 24 °C (64 °F to 75 °F)
Operating Humidity	≤ 75%, non-condensing
Camera + external shutter accessory	
Size	27.7 x 12.2 x 21.6 cm (10.9 x 4.8 x 8.5 in)
Weight	2.5 kg (5 lbs)
IR resolution	640 x 480
Horizontal / vertical field of view (FOV)	34 x 24 degrees
Stand	1/4"-20 standard camera tripod mount
Visible light camera resolution	5 megapixel
Spectral Range	8-14 microns
External Temperature Reference Source (ETRS)	
Size	356 x 241 x 216 mm (14 x 9.5 x 8.5 in)
Weight	9.1 kg (20 lbs)
Stand Height	Adjustable
External Power	120 volts
Stand	ETRS tripod with adapter
Software	
Face area detection	Automatic
Temperature correction	Automatic
Alert	On equipment status changes
Image file format	Jpeg

* Accuracy is defined here as the difference between actual and expected readings using a second black-body calibration source. When combined with other system uncertainties including stability, long-term drift, uniformity, and uncertainty in the accuracy of the calibration source and ETRS, the combined accuracy including all system uncertainties is +/- 0.5C.

1. The FS100 should not be solely or primarily relied upon to diagnose or exclude a diagnosis of COVID-19, or any other disease.
   a. Elevated body temperature should be confirmed with secondary evaluation methods (e.g., clinical thermometer);
   b. Public health officials, through their experience with the device in the particular environment of use, should determine the significance of any fever or elevated temperature based on the skin telethermographic temperature measurement;
   c. The technology should be used to measure only one subject's temperature at a time; and
   d. Visible thermal patterns are only intended for locating the points from which to extract the thermal measurement.

Example set up

Steps

1. Install camera shutter onto the camera.

2. Physically mount the camera on the tripod and move the tripod to desired location, then connect power and communication cables to the camera.

3. Physically mount the ETRS on the provided shelf and tripod and move it to desired location, then connect power and communication cables to the ETRS.

4. Connect the power and USB cable to the TR300 to the PC.

5. Physically position screens if necessary to prevent reflections onto the camera and ETRS.

6. Connect communication cables to PC.

7. Turn on camera, ETRS, and PC.

8. Launch the PC software to take temperature measurements.

PC Software

The FS100 PC software allows the operator to view the test subject's temperature.

With a green "PASS" or a red "WARNING," as indicators of a temperature that is below or above the threshold, the operator is able to quickly let the test subject know of the next step.

The FS100 utilizes the latest in facial detection technology to ensure that the subject is properly positioned and has enough measurement points on the face to accurately measure the body temperature. By ensuring the subject is 1 meter away from the sensor each pixel that is measured is <1 mm square of the human face.

Ordering information

FLK-FS100 60Hz Thermal Body Screener

Included
4180 ETRS
FLK-Ti480 PRO 60 Hz
2x Non–reflective screens
ETRS stand
FLK–Ti480 PRO tripod
TR300 + AC adapters
2x Power strips
Tripod–camera adapter
USB hub
USB cables
USB extension cables
RS232–USB adapter for ETRS

Computer not included
Subject facing monitor (optional for full function—not included)

Reference Links

Fluke Ti480 PRO datasheet

Fluke 4180 web page