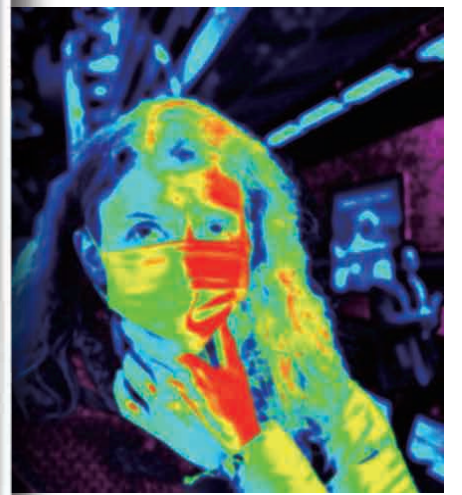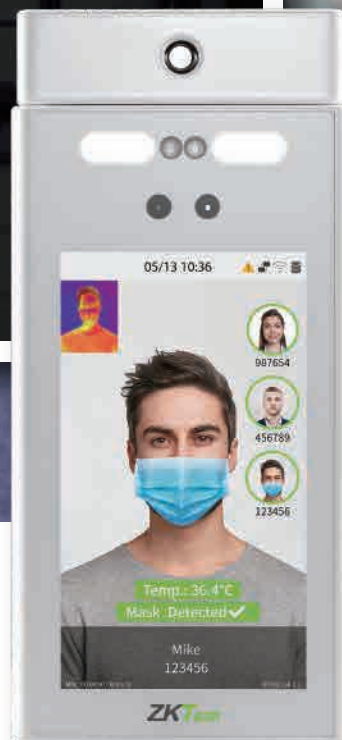# ZKTeco

Principle of Access Control with Thermal Imaging Technology
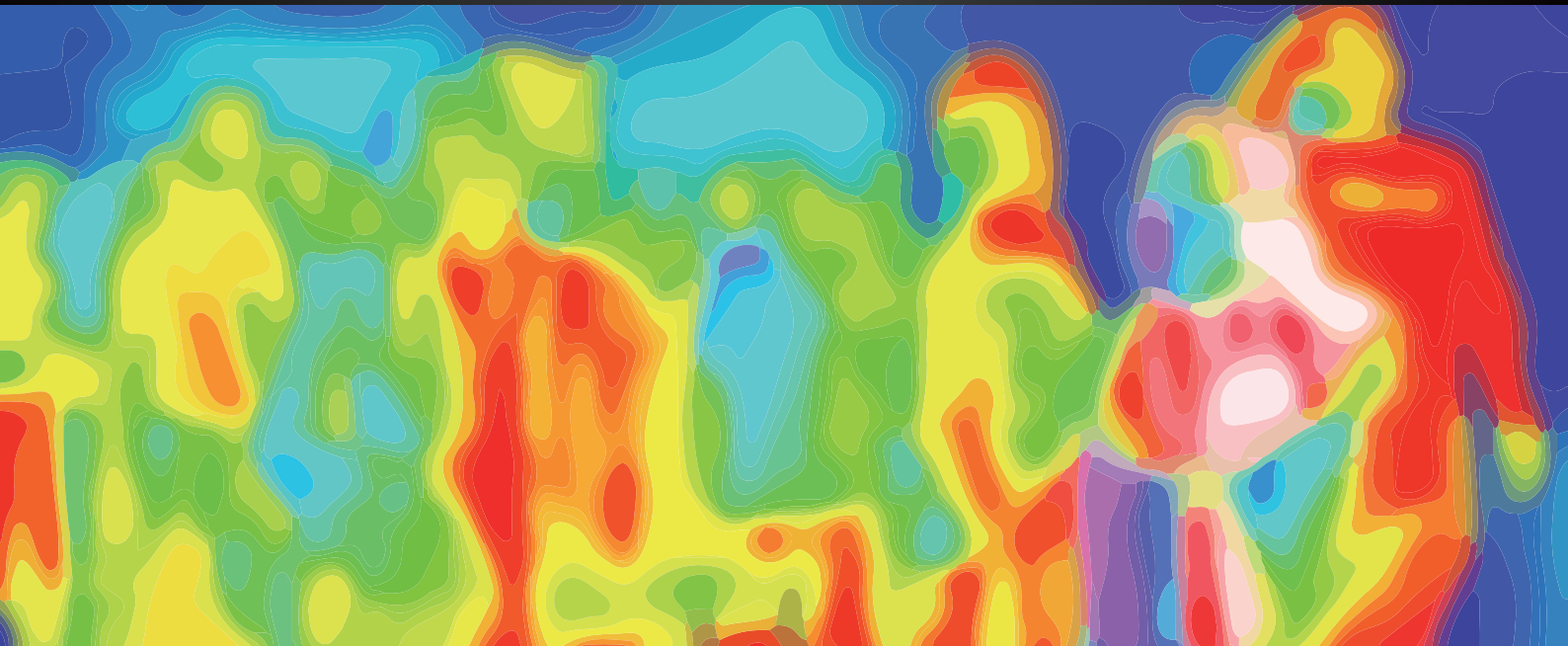
THERMAL IMAGING
TEMPERATURE SENSOR

Business organizations and public sectors are facing a difficult time in response to the recent ongoing public health issue. Not only governments worldwide have taken numerous preventive measures like partial and national lockdown, but employers around the world have also made tremendous efforts to maintain business continuity and secure working environment for their employees.

Understandably, it is not always efficient for guards, staff, or any organization to use manual thermometers to check the body temperature of each visitor or employee at the entrance of almost every commercial building, transport hub, school, restaurant, and other crowded places. Here is a complete access control system that combines facial recognition and thermal imaging technology.

This solution can accurately detect the facial temperatures of each person in a crowd standing or walking around within a long distance of 1.2 meters away from the sensor in 0.1 seconds, which is an astonishingly fast response time. Administrators can also enable the mask detection function to allow only people wearing masks to access the controlled area.

Principle of Access Control with Thermal Imaging Technology

ZKTeco combines thermal imaging and Visible Light recognition technology in both access control terminals and entrance control systems to help various industries detect personnel or suspicious visitors with ultra-fast and accurate temperature screenings during identity recognition at the entrance of each monitoring area.

As employees, users, visitors, and patients walk close to the thermal imaging detection area (approx. 1.2m away from the thermal imaging sensor), the system will acquire biometric data for identification and generate images for the record. After successful verification, the system will measure the body temperature of the user afterward.

If the temperature detected is over the pre-set value, an alarm will be triggered, and notice will be delivered to the guards. ZKTeco believes that this kind of product will help reduce the risk of germs spreading while maintaining an excellent performance of biometric security.

Infrared Temperature Sensor with Thermal Imaging Technology
Accurate temperature measurement
Deviation +/- 0.3°C.

Face Detection
No need to touch the A&C terminal
Auto detection and identification of faces
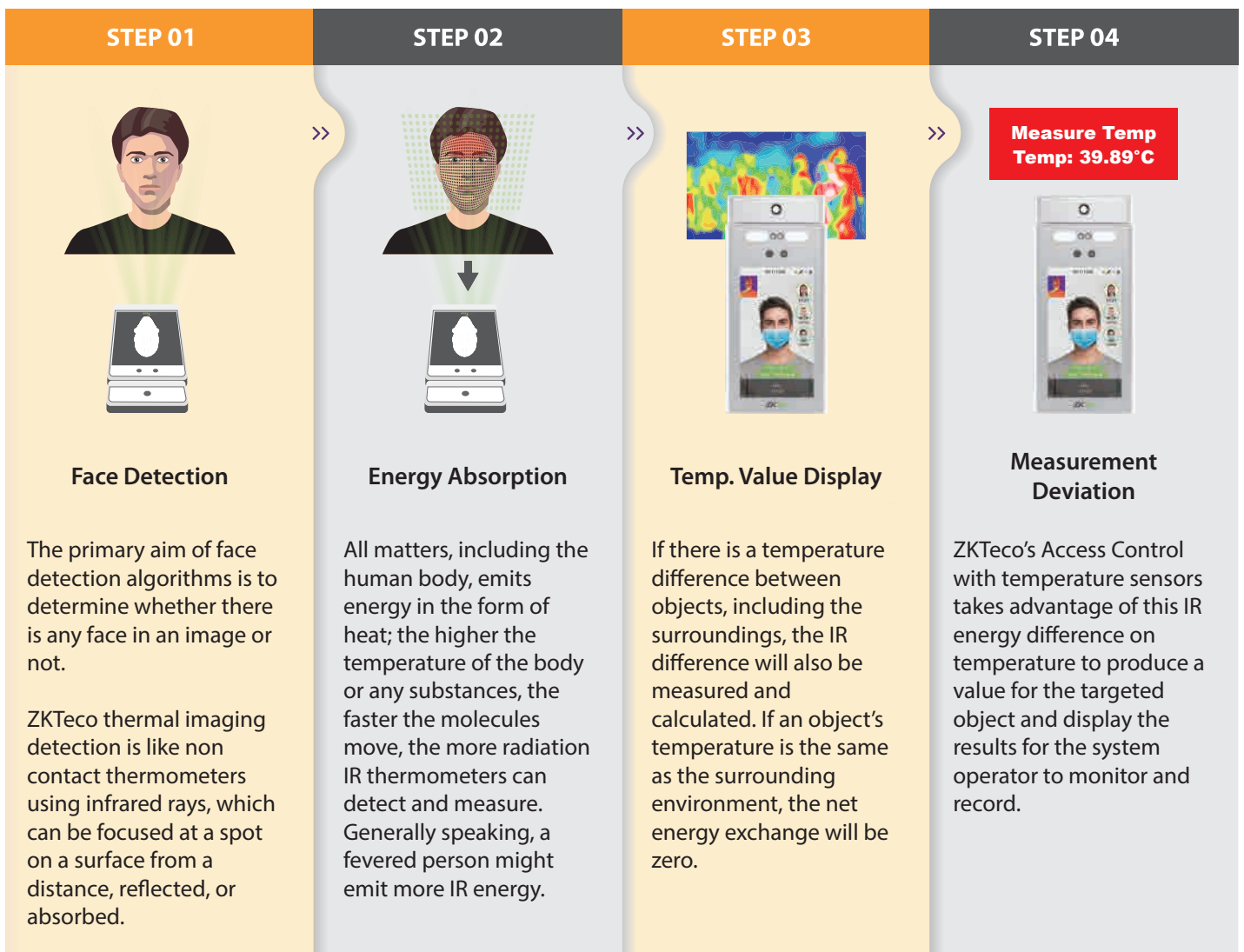
How ZKTeco's Thermal Imaging Technology Works

ZKTeco's thermal imaging technology is a non-contact automatic thermometer that provides a maximum of 10,800 (120 x 90) measuring points and detects temperature differences as small as 0.3°C. Also, the system will immediately auto-select the highest temperature among all results detected on a surface from a distance.

Generally speaking, the human body emits energy in the form of heat; the higher the temperature of the body, the higher the power emitted. Thermal imaging technology captures different levels of infrared light. If the IR radiation intensity is high enough, it can be recognized as heat.

The system detects the body temperature of a target by calculating the temperature difference between the person and the surrounding object. If the object temperature is the same as the surrounding environment, the net energy exchange will be zero.

Moreover, ZKTeco combines the cutting-edge Visible Light technology and thermal imaging technology, so the frame rate is increased to 25/fps, compared with about 4/fps offered by the ordinary IR technology. With this integration, the solution detects a more accurate temperature difference faster.

Thermal imaging technology adopts a wide-angle camera that is adequate to monitor the front porch, entryway, hallway, side of the door, side door, and relatively small areas. Even people who are relatively tall or short can have their authentication recognized and have their body temperature measured at ease.

STEP 01	STEP 02	STEP 03	STEP 04
Face Detection	**Energy Absorption**	**Temp. Value Display**	**Measurement Deviation**
The primary aim of face detection algorithms is to determine whether there is any face in an image or not. ZKTeco thermal imaging detection is like non contact thermometers using infrared rays, which can be focused at a spot on a surface from a distance, reflected, or absorbed.	All matters, including the human body, emits energy in the form of heat; the higher the temperature of the body or any substances, the faster the molecules move, the more radiation IR thermometers can detect and measure. Generally speaking, a fevered person might emit more IR energy.	If there is a temperature difference between objects, including the surroundings, the IR difference will also be measured and calculated. If an object's temperature is the same as the surrounding environment, the net energy exchange will be zero.	ZKTeco's Access Control with temperature sensors takes advantage of this IR energy difference on temperature to produce a value for the targeted object and display the results for the system operator to monitor and record.

Measure Temp
Temp: 39.89°C

ZKTeco Access Control with Thermal Imaging Technology Advantages

Facial Recognition

+/- 30 Wide Pose Angle Acceptance

Masked Face

Temperature Detection

### Multi-point temperature check with auto-forehead detection

While most of the thermal imaging technology in the market only provides 1 focus spot on a surface for temperature measurement, ZKTeco's multi-point temperature sensors can measure the temperature at various spots within the detection distance.

It gives a maximum of 10,800 (120 x 90) points to measure people's body temperature; then, it will pick and display the highest temperature measured among the results. Therefore, the result given by ZKTeco's solution will be more specific.
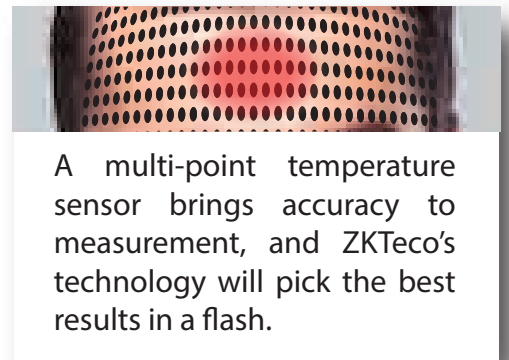
A multi-point temperature sensor brings accuracy to measurement, and ZKTeco's technology will pick the best results in a flash.

10,800
Temperature Measurement Points
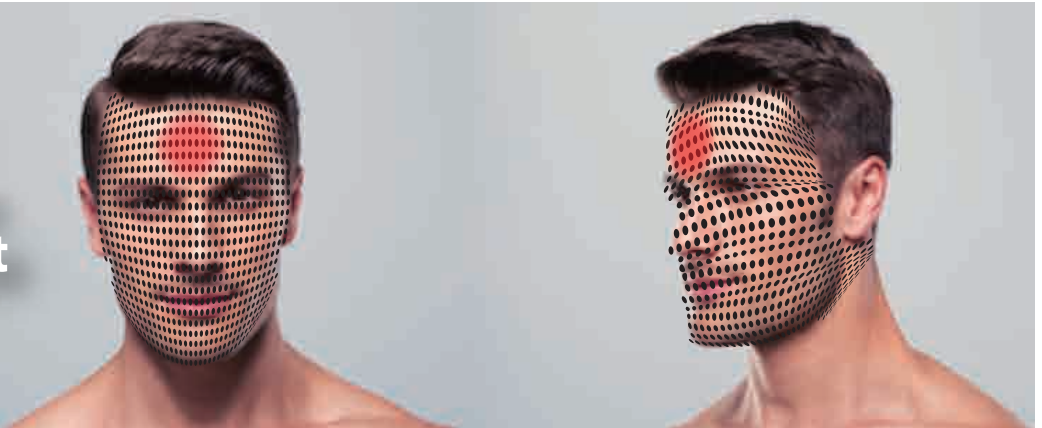
Ultra-Wide-Angle check for various body size

As the camera has an extensively wide view as illustrated on the right, identification and body temperature detection are not a problem regardless of the users' body size. The access control terminal is advised to mount at the height of approximately 150cm above the ground; at this height, the A&C terminal can detect targets within 1.2 meters.

Recommended installation height: 150cm
Temperature Measurement Distance: 30cm~120cm
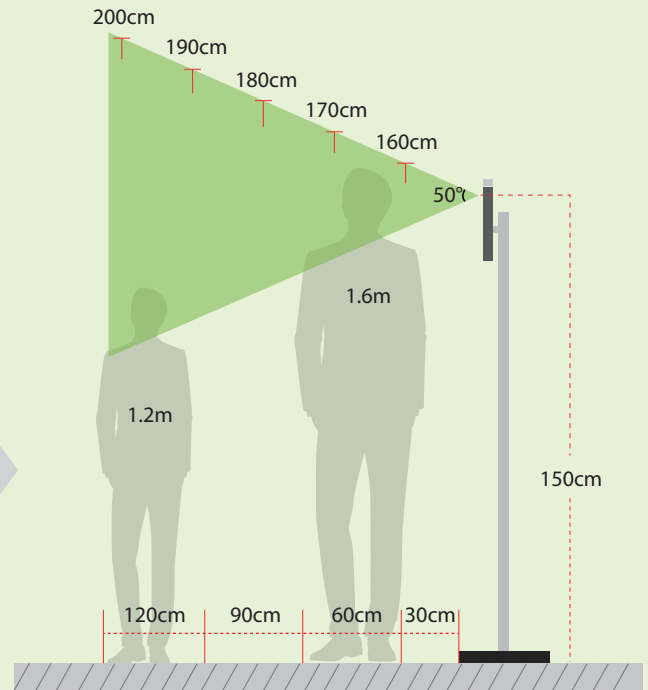
Touchless Sensor

The facial recognition and non-contact features facilitate temperature measurements without touching. It is not only crucial for the safety of workers but also minimization of potential product contamination.

Extra-wide angle recognition (+/- 25 degrees)

While most of the algorithms only support a 15-degree facial recognition tolerance, ZKTeco's thermal imaging technology supports a much wider tolerance angle of 50-degree for facial recognition.
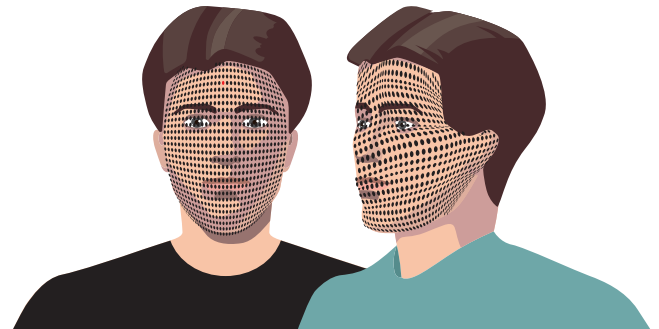
Fast, accurate, and convenient

ZKTeco's thermal imaging technology is fast, precise, and convenient to use — ideal for remote monitoring. The response time (from detection to display) of thermal imaging is typically about a 0.1 second that might assist people in having fast track access to the monitored area.

Proactive long-distance temperature measurement

Because of the combination with the Visible Light facial recognition technology, the recognition distance of ZKTeco's access control greatly extends to up to 120cm, significantly boosting the maximum traffic rate for temperature measurement plus authentication checks.

30-120cm   +/- 25°   +/- 25°

Product Comparison

ZKTeco's Access Control with Thermo Imaging Detection	Other Brands' Access Control with Thermo Imaging Detection
✅ Multi-point temperature sensor with auto-forehead detection, Maximum 10,800 (120 x 90) measuring points, plus auto-selection of the highest temperature results	❌ Single-point temperature sensor Temperature measurement at 1 spot only
✅ Support mask detection	❌ Do not support mask detection
➖ Detection Distance: Up to 120cm	➖ Detection Distance: Up to 120cm
✅ Detection Time: 0.1s	❌ Detection Time: 0.5s
✅ Temperature measuring range: 20°C ~ 50°C (68°F ~ 122°F)	❌ Temperature measuring range: 30°C to 45°C (89.6°F to 113°F)
✅ Temperature Accuracy: +/- 0.3°C	❌ Temperature Accuracy: +/- 0.5°C
✅ Passage Time: 2.2s per user	❌ Passage Time: 8.5s per user

Diverse product offerings

ZKTeco offers a wide range of high-quality products that meet the needs of global customers, from facial recognition terminals, network cameras to metal detectors that all integrate with the infrared temperature detection. With an emphasis on quality, technology, and cost-effectiveness, ZKTeco seeks to offer the best solution in a wide range of dimensions.

Proface X[TI]
Facial Recognition Terminal with Temperature Imaging Detection

SpeedFace V5L[TI]
Facial Recognition Terminal with Temperature Imaging Detection

RevFace
Walk-Through Metal Detector with Temperature Imaging Detection

✅ Temperature Detection

✅ Masked Face Detection

✅ Palm Recognition

+/- 60°
Wide Palm Pose Angle Acceptance (Exclude RevFace)

Proactive Facial Recognition

Speedy Recognition

Touchless for Better Hygiene

NEW
Temperature Detection

NEW
Masked Face

NEW
Proactive Palm Recognition (Exclude RevFace)

ZKTeco Products Applications

ZKTeco's touchless biometric solution is a good fit for this situation that is preventing people or patients from touching the door handle. The solution has been widely used in many practical scenarios, including hospitals, educational institutes, factories, construction sites, shopping malls, IT parks, public transportation, banks, business organizations, small to medium enterprises, government organizations and so on.

Hospitals
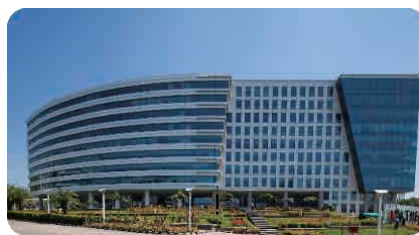

Educational Institutes

Factories

Construction Sites

Shopping Malls

IT Parks

Public Transportation

Business Organizations

Small to Medium Enterprises

Banks

Government Organizations

The Leader Of
Security And Time Management
Solution

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