Intelligent Awareness
Any Moment, Any Condition
Hikvision Thermal Products
BASIC PRINCIPLES OF THERMAL CAMERAS

Each type of radiation has a unique wavelength. Any object with a temperature above absolute zero can emit a detectable amount of infrared radiation. The higher an object’s temperature, the more infrared radiation is emitted.

An infrared camera’s effective range is what is meant by “seeing an object”. Defined thresholds, known as Johnson’s Criteria, refer to the minimum number of pixels necessary to either detect, recognize, or identify targets captured by scene imagers. The lower limits of detection, recognition, and identification (DRI), according to Johnson criteria are:

- **Detection**: In order to distinguish an object from the background, the image must be covered by 1.5 or more pixels.
- **Recognition**: In order to classify the object (animal, human, vehicle, boat, etc.), the image must have at least 6 pixels across its critical dimension.
- **Identification**: In order to identify the object and describe it in details, the critical dimension must have be least 12 pixels across.

While invisible to human eyes, thermal cameras detect this kind of radiation (from wavelength 8 to 14 μm, or 8,000 – 14,000 nm) and produce images using temperature differences, making it possible to see the environment without visible light.

### Detection Distance

<table>
<thead>
<tr>
<th>Distance</th>
<th>Human</th>
<th>Car</th>
<th>25 m</th>
<th>50 m</th>
<th>100 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 m</td>
<td>20 m</td>
<td>10 m</td>
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<td>25 m</td>
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<td>100 m</td>
<td>2 m</td>
<td>1 m</td>
<td>500 m</td>
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<td>1000 m</td>
</tr>
</tbody>
</table>

**Notice**: This distance is based on a 17-μm sensor.

### VCA Distance

VCA takes line crossing, intrusion, region entrance, and region exit into account, and must have at least 5 pixels across.

<table>
<thead>
<tr>
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<td>500 m</td>
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</tr>
</tbody>
</table>

**Notice**: This distance is based on a 21-μm sensor.
Based on the experience of AGC 2.0 development, AGC 4.0 improves detail of object with low temperature differences, and the abrupt change of image brightness when there comes a high temperature object. DDE is an advanced technology based on enhanced algorithms. This feature renders details more sharply in low contrast in any given region of interest.

ADVANTAGES

1. Clear Imaging

With advanced features such as automatic gain control, digital detail enhancement, and 3D digital noise reduction, Hikvision thermal cameras offer crystal clear thermal imaging unparalleled in the industry.

Auto Gain Control (AGC)

Based on the experience of AGC 2.0 development, AGC 4.0 improves detail of object with low temperature differences, and the abrupt change of image brightness when there comes a high temperature object.

Digital Detail Enhancement (DDE)

DDE is an advanced technology based on enhanced algorithms. This feature renders details more sharply in low contrast in any given region of interest.

OVERVIEW

Security Group Products

Integrating technology from Hikvision’s image processing and intelligent applications, the security group’s thermal products meet the rigorous demands of sophisticated security. These cameras provide superb solutions for fire protection and perimeter defence by combining the advantages of thermal imaging and visible image processing.

Thermography Group Products

Hikvision is devoted to providing easy-to-use, high-quality products to the public security market. These temperature measurement products offer the world’s leading imaging technology and intelligent analysis algorithms to create efficient thermometric solutions – solutions that improve industry safety and efficiency.

Commercial Vision Group Products

Hikvision is devoted to bringing advanced thermal technology to more people – both professional and personal users. With the commercial vision products, we help you see clearer and to build better.
Based on deep learning algorithms, Hikvision’s thermal products deliver powerful and accurate behavior analyses, including detections such as line crossing, intrusion, region entrance and exit, and more. The intelligent human/vehicle detection feature helps reduce false alarms caused by animals, camera shake, falling leaves, or other irrelevant objects, significantly improving alarm accuracy.

Deep-learning-based dynamic fire source detection takes advantage of Hikvision’s security big data, containing over 100,000 samples of global climate information to provide the highest possible detection accuracy. This front-end device can detect fire based on raw, frame-by-frame data, ensuring firsthand image analysis and rapid alarm triggering.

Through strict calibration and standardized testing procedures, Hikvision has established a temperature measurement model that offers great stability and high accuracy – up to ±2°C or ±2% (whichever is greater).

In addition, Hikvision’s thermal products support multiple temperature measurement rules including point, line, and frame measurements. Users can select rules for various scenarios to reach maximum accuracy.
Robust Design

Self-protection mechanism for harsh environments:
- Proven capability to work under extreme environments (-40°C to 60°C); self-protective temperature control with intelligent heating/cooling adjustment to prevent freezing and fog.
- Non-stop year-round operation.

Stable long-distance transmission:
- Normal cameras can only withstand ±10% voltage fluctuation. Hikvision thermal products are specially designed to adapt to as much as ±20% voltage fluctuation and 5% packet loss.

Easy positioning for visible-light module:
- For most bi-spectrum products, the visible-light module cannot be accurately positioned, requiring constant manual adjustment. Hikvision's optical & thermal PTZ products are equipped with an auto-adjustment technology that ensures both thermal and visible imaging maintain a precise view. When the thermal module detects anomalies, the visible module can automatically locate and track relevant details.

Stable imaging:
- The integrated design improves device stability and reduces false alarms caused by shaking.

APPLICATION SCENARIOS

Perimeter Defense

Advantages
- Superior environmental adaptability: Thermal products are capable of capturing images all day and all night, regardless of environmental factors such as darkness, bright light, backlight, fog, and haze.
- More accurate alarms: Powerful behavior analysis, including crossing, intrusion, region entrance, and exit, combined with a deep learning algorithm, provides higher alarm accuracy and reduces false alarms.
- Extended distances: Compared to optical cameras, thermal detection can cover much longer distances and requires fewer devices to install.
- Better visuals: With thermal cameras, you can easily detect objects and potential risks otherwise invisible to normal cameras. In addition to thermal images, the built-in visible-light module can provide supplementary recorded evidence – lowering costs for installation.

Recommended product models:
- Short range (20-70 m): DS-2TD2117/V1, DS-2TD2617/V1,
- Medium range (70-350 m): DS-2TD2137/V1, DS-2TD2166/V1, DS-2TD8166/V1, DS-2TD8366/V1
- Long range (over 350 m): DS-2TD2366, DS-2TD6266/V2, DS-2TD8166/V2

Recommended product models (for more than 200 thermal cameras):
- DS-2TD1217/V1, DS-2TD1237/V1

More Success Stories...

Success stories
- The end user used Hikvision thermal cameras to detect and analyze suspicious activities. These cameras can detect heat over long distances, providing high-accuracy detection and 24/7 perimeter defense.
- The end user used Hikvision thermal cameras to protect the entire area of the solar plant to prevent valuable equipment and prevent theft.

More successful projects...
Fire Prevention

Recommended product models:
- DS-2TD2117/V1
- DS-2TD1217/V1

Indoor Fire Prevention

Success stories

Gas Station in France
The end user used Hikvision thermal cameras to detect temperature exceptions of gas tanks in the gas station.

Outdoor Fire Prevention

Recommended product models:
- DS-2TD2117/V1
- DS-2TD1217/V1
- DS-2TD6236

Warehouses
Data Centers
Museums

Refuse Areas
Gas Stations
Metallurgy

Advantages

Temperature anomaly detection:
Detects and reports abnormal temperature in key areas of prevention sites.

Dynamic fire detection:
For sensitive areas where temperature is undetectable, the dynamic fire detection function can detect fire at early stages.

Outdoors Fire Prevention

Recommended product models:
- DS-2TD2136
- DS-2TD4136
- DS-2TD6236

Refuse Areas
Gas Stations
Metallurgy

Advantages

Temperature exception alarm:
Vigilant smoking detection
Video Content Analytics
Picture-in-picture preview

Temperature Measurement

Recommended product model:
- DS-2TF2166T
- DS-2TF31

Temperature Measurement

Recommended product models:
- DS-2TF2166T, DS-2TF31

Accurate temperature measurement:
Wide measurement range (-20 to 550° C or -4 to 1,022° F) with high accuracy (up to ± 2° C or ± 2%, whichever is greater).

Easy to operate:
Online, 24-hour, real-time alarm.

Charging Stations
Chemical Plants
Industrial Laundries

Success stories

Substation in Eastern Europe
The end user used Hikvision thermal PTZ cameras to detect the temperature of equipment in the substation with high accuracy to ensure secure daily operations.

Advantages

Rapid Location Detection
Ergonomic and Compact
Long Measurement Distance
Extremely Cost-efficient
Commercial Vision

Handheld Products

Advantages
- High quality: IP66 protection, 30 to 127°F or -22 to 12°C working temperature range, extreme heat and cold resistance, suitable for harsh environments.
- Advanced detection: All products adopt advanced detector which can detect objects above 40 mK.
- Target tracking: Quick detection and tracking of targets automatically.
- Great user experience: High resolution OLED display and ocular design provides larger field of view, fine images, and better user experience.

Thermal Modules

Advantages
- Great image effects: Hikvision has 16 years accumulation in imaging technologies. Self-developed AGC, DDE, 3D DNR bring great advantages on image effects.
- Shutter-less technology: DS-2TM13/16 Series adopts shutter-less technology, which avoids the risks of losing targets and revealing user’s position.
- Low power consumption: DS-2TM03/06 Series power consumption < 1.3 / 1.8 W; DS-2TM13/16 Series power consumption < 0.8 / 1 W.

Integrations

Open Standard – ONVIF
ONVIF is a leading international standardization initiative for IP-based physical security products. Hikvision closely works with all the ONVIF members across the physical security industry to develop an open standard System that works effortlessly with third party products. Hikvision offers fully integrated solutions that propel you forward.

Hikvision Open Standard – ISAPI
The ISAPI is an Application Layer Protocol designed by Hikvision. It uses standard format—Http + XML—to allow easy access and control to Hikvision devices. It’s an open protocol that suits all Hikvision Partners and offers strong capabilities for developers with various software architecture. ISAPI protocols are sending Smart Events metadata, and allows metadata extraction using standard RTSP.

Hikvision SDK
Hikvision is dedicated to encouraging third-party integration with existing products. We are continually developing third-party collaboration by offering a range of integrations and choosing multiple options for customers and delivering quality integrated service to our partners and customers.

A full-featured member of ONVIF®. Hikvision not only fully supports open standard protocols, but also created a dedicated team to focus on building the integration protocol and related development tools. With Hikvision Private SDK, we provide comprehensive programming resources to help customers developing their own. Third party solutions.

Additionally, we have released the ISAPI, an open standard protocol that suits any Hikvision Partner, providing powerful possibilities for customers.

Hikvision Device

ONVIF ISAPI Hikvision SDK

Network

Third Party Integration Framework

Open Standard – ONVIF

Integration

Thrid Partner Integration Framework

Hikvision Device

3rd Party VMS/Application

In the future, Hikvision will work with different partners and provide various applications. The ISAPI protocol contains Hikvision Smart Events metadata, and allows metadata extraction using standard RTSP.
**Hikvision Thermal Products**

**DS-2TD2466**
- Multi-camera Thermal Network Bullet Camera
- **Temperature accuracy:** ±8° C
- **Temperature measurement range:** -20 to 150° C

**DS-2TD4166**
- Bullet Camera
- **Temperature accuracy:** ±8° C
- **Temperature measurement range:** -20 to 150° C

**DS-2TD3136**
- Volcano VCA: Line crossing / Intrusion detection / Region entrance / Region exit
- **Thermal:** 25 / 50 mm; **Optical:** 5.7–205.2 mm
- **Resolution:** 1920 × 1080

**DS-2TD3166**
- Volcano VCA: Line crossing / Intrusion detection / Region entrance / Region exit
- **Thermal:** 50 / 75 mm; **Optical:** H (5.6–208 mm) / C (6.7–330 mm)
- **Resolution:** 1920 × 1080

**DS-2TD3166V**
- Volcano VCA: Line crossing / Intrusion detection / Region entrance / Region exit
- **Thermal:** 25 / 50 mm; **Optical:** 5.7–205.2 mm
- **Resolution:** 1920 × 1080

**DS-2TD3166H**
- Volcano VCA: Line crossing / Intrusion detection / Region entrance / Region exit
- **Thermal:** 25 / 50 mm; **Optical:** H (5.6–208 mm) / C (6.7–330 mm)
- **Resolution:** 1920 × 1080

**DS-2TD4166**
- Volcano VCA: Line crossing / Intrusion detection / Region entrance / Region exit
- **Thermal:** 25 / 50 mm; **Optical:** 5.7–205.2 mm
- **Resolution:** 1920 × 1080

**DS-2TD4166T**
- Volcano VCA: Line crossing / Intrusion detection / Region entrance / Region exit
- **Thermal:** 25 / 50 mm; **Optical:** 5.7–205.2 mm
- **Resolution:** 1920 × 1080

**DS-2TD3737**
- Volcano VCA: Line crossing / Intrusion detection / Region entrance / Region exit
- **Thermal:** 25 / 50 mm; **Optical:** H (5.6–208 mm) / C (6.7–330 mm)
- **Resolution:** 1920 × 1080

**DS-2TD18**
- Smart Tracking Linkage (Thermal + Optical)
- **Thermal:** 640 × 512
- **Optical:** 1920 × 1080

**DS-2TD4136**
- Smart Tracking Linkage (Thermal + Optical)
- **Thermal:** 384 × 288
- **Optical:** 1920 × 1080

**DS-2TD5166**
- Smart Tracking Linkage (Thermal + Optical)
- **Thermal:** 384 × 288
- **Optical:** 1920 × 1080

**DS-2TD3166**
- Smart Tracking Linkage (Thermal + Optical)
- **Thermal:** 50 / 75 mm; **Optical:** 1920 × 1080

**DS-2TD3166**
- Smart Tracking Linkage (Thermal + Optical)
- **Thermal:** 50 / 75 mm; **Optical:** 1920 × 1080

**DS-2TD3166**
- Smart Tracking Linkage (Thermal + Optical)
- **Thermal:** 50 / 75 mm; **Optical:** 1920 × 1080

**DS-2TD3166**
- Smart Tracking Linkage (Thermal + Optical)
- **Thermal:** 50 / 75 mm; **Optical:** 1920 × 1080
**Commercial Vision**

**Hikvision Thermal Products**

**DS-2TV628F**
- Handheld Thermal Monocular
- IP67
- -30 to 55° C (-22 to 131° F)
- Working temperature: up to 5 hours continuous running
- 16 GB SD card
- 0.39-inch LCOS display @ 720 × 540
- Lens: 15 mm
- 384 × 288, 17 μm

**DS-2TV538F**
- Handheld Thermal Monocular
- IP67
- -30 to 55° C (-22 to 131° F)
- Working temperature: up to 5 hours continuous running
- 16 GB SD card
- Hot track, Wi-Fi, Ranging, GPS
- 0.39-inch OLED display @ 1024 × 768
- Lens: 15 / 25 / 35 mm
- 384 × 288, 17 μm

**DS-2TV560F**
- Handheld Thermal Monocular
- IP67
- -30 to 55° C (-22 to 131° F)
- Working temperature: (with GPS and Wi-Fi hot spot off)
- Up to 5 hours continuous running
- 16 GB SD card
- 0.39-inch OLED display @ 1024 × 768
- Lens: 15 / 25 mm
- 384 × 288, 17 μm

**DS-2TV5805**
- Thermal Scope
- IP67
- -30 to 55° C (-22 to 131° F)
- Working temperature: up to 8 hours continuous running
- 16 GB SD card
- Hot track, Wi-Fi, Ranging, GPS
- 0.39-inch OLED display @ 1024 × 768
- Lens: 35 mm
- 640 × 512, 17 μm

**DS-2TV516**
- Thermal Module
- Commercial Vision
- Support CVBS & BT.656
- Support lens size M34*0.75
- Size: 40 x 41 x 49 mm
- Power consumption: ≤ 1.3 W / 1.6 W (TYP)
- NETD < 35 mk @ F1.0, 30°C
- 384 × 288 / 640 × 512, 17 μm

**DS-2TV551/3/18**
- Thermos Module
- Support CVBS & BT.656
- Support lens size M25*0.5
- Size: 28 x 28 x 34.6 mm
- Power consumption: ≤ 0.8 W / 1.0 W (TYP)
- NETD < 35 mk @ F1.0, 30°C
- 384 × 288, 17 μm

**DS-2TV536**
- Handheld Thermal & Optical Bi-spectrum Binocular
- -40°C to 65°C (-40 °F to 149 °F)
- Working temperature:
- Support CVBS & BT.656
- Support lens size M25*0.5
- Size: 28 x 28 x 34.6 mm
- Power consumption: ≤ 0.8 W / 1.0 W (TYP)
- NETD < 35 mk @ F1.0, 30°C
- 384 × 288 / 640 × 512, 17 μm

**DS-2TV538**
- Handheld Thermal & Optical Bi-spectrum Multi-Function Binocular
- Thermos lens: 35 / 50 mm, Optical lens: 22 mm
- Thermal: 640 × 512, 17 μm; Optical: 1280 × 960
- Multi-function Binocular
- Support CVBS & BT.656
- Support lens size M34*0.75
- Size: 40 x 41 x 49 mm
- Power consumption: ≤ 1.3 W / 1.6 W (TYP)
- NETD < 35 mk @ F1.0, 30°C
- 384 × 288 / 640 × 512, 17 μm

**DS-2TS03UF**
- Handheld Thermal Monocular
- DS-2TS03UF
- -30 to 55° C (-22 to 131° F)
- Up to 7 hours continuous running
- 32 GB SD card
- Wi-Fi, GPS, video recording, picture snapshot, image fusion, object highlight
- 0.39-inch OLED display @ 1024 × 768
- Thermal lens: 35 / 50 mm, Optical lens: 12 mm

**DS-2TS26**
- Handheld Thermal Monocular
- DS-2TS26
- -30 to 55° C (-22 to 131° F)
- Up to 7 hours continuous running
- 32 GB SD card
- Wi-Fi, GPS, Laser rangefinder, video recording, picture
- 0.39-inch OLED display @ 1024 × 768
- Thermal lens: 50 / 75 / 100 mm, Optical lens: 22 mm

**DS-2TS36**
- Handheld Thermal Monocular
- DS-2TS36
- -30 to 55° C (-22 to 131° F)
- Up to 8 hours continuous running
- 16 GB SD card
- Hot track, Wi-Fi, Ranging, GPS
- 0.39-inch OLED display @ 1024 × 768
- Lens: 35 / 50 mm
- 384 × 288, 17 μm

**DS-2TR03**
- Thermal Scope
- DS-2TR03
- -30 to 55° C (-22 to 131° F)
- Up to 8 hours continuous running
- 16 GB SD card
- Hot track, Wi-Fi, Ranging, GPS
- 0.39-inch OLED display @ 1024 × 768
- Lens: 35 mm
- 640 × 512, 17 μm