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>Object Type</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle</td>
<td>150 m</td>
</tr>
<tr>
<td>Human</td>
<td>250 m</td>
</tr>
</tbody>
</table>

**VCA Distance**

VCA (Video Content Analysis) rules: line crossing, intrusion, region entrance, region exit.

<table>
<thead>
<tr>
<th>Distance</th>
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<tbody>
<tr>
<td>15 m</td>
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Notice: This distance is based on a 27° view angle.
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.

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.

Clear Imaging

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.
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 thermal products support multiple temperature measurement rules including point, line, and frame measurements. Users can select rules for various scenarios to reach maximum accuracy.

Hikvision’s signature thermal technology – bi-spectrum image fusion – combines features from both thermal and optical images, and creates a unique hybrid that provides extra details for more precise detection and decision-making.

Advanced Intelligence

Accurate Temperature Measurement

Bi-Spectrum Image Fusion

Region of Interest (ROI)

3D Digital Noise Reduction (3D DNR)
Robust Design

Self-protection mechanism for harsh environments:
- Power capability to work under extreme conditions (-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 axis adjustment technology that ensures both thermal and visible imagery maintain the same 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.

Perimeter Defense

APPLICATION SCENARIOS

Robust Design

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

Advantages

Superior environmental adaptability:
- Thermal products can capture images all day and night, regardless of environmental factors such as darkness, bright light, backlight, fog, and haze.

More accurate alarms:
- Powerful behavior analysis (line crossing, intrusion, region entrance and exit) based on a deep learning algorithm, which provides highly accurate accuracy and reduces false alarms.

Extended distances:
- Compared to optical cameras, thermal detection covers much longer distances and requires fewer devices to install.

Better visuals:
- With thermal cameras, you can easily discover 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.

Success stories

Farming in South Africa
- The end user used Hikvision thermal cameras to stop rhinoceros poaching. These cameras can detect heat over long distances, allowing them to provide high-accuracy perimeter defense.

BPRM Auto Dealership in Europe
- The end user used Hikvision thermal cameras to protect the entire area of the solar plant to prevent valuable equipment and prevent theft.

Residential Farms
- Borders
- Railways
- Solar Plants in Italy

MORE SUCCESS STORIES...
Fire Prevention

Indoor Fire Prevention
Recommended product models:
- DS-2TD1217/V1
- Warehouses
- Data Centers
- Museums

Outdoor Fire Prevention
Recommended product models:
- DS-2TD2136, DS-2TD4136, DS-2TD6236
- Refuse Areas
- Gas Stations
- Metallurgy

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

Recommended product models:
- DS-2TD2166T, DS-2TD4166T, DS-2TP23, DS-2TP31

Temperature Measurement

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.

Recommended product models:
- DS-2TD2136, DS-2TD4136, DS-2TD6236
- Substations
- Charging Stations
- Chemical Plants
- Industrial Laundries

Temperature Measurement

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

Advantages
- Accurate temperature measurement:
  - Wide measurement range (-20 to 550°C or -4 to 1,022°F) with high accuracy (± 2°C or ± 2%, whichever is greater).
  - Easy to operate:
    - Fast temperature difference comparison, flexible rule settings (point, line, and frame-based), less manual calibration.
    - Fast alarm:
      - Online, 24-hour, real-time alarm.
Hikvision Thermal Products

**Commercial Vision**

**Handheld Products**

- **Advantages**
  - High quality: IP67 protection, -30°C to 55°C or -22°F to 131°F operating temperature, extreme heat and cold resistance, suitable for harsh environments.
  - Advanced detection: All products adopt advanced detectors where NC>0 obtain better than 40m.
  - Target handling: Quick detection and tracking of target/wildlife.
  - Great user experience: High resolution OLED display and focus design provides larger field of view, fine images, and better user experience.

- **Applications**
  - Criminal Seizing
  - Security Patrolling
  - Wildlife Protection
  - Hunting

- **Thermal Modules**

- **Advantages**
  - Great image effect: Hikvision has 16 years accumulation in imaging technologies, self-developed HAC, 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

- **Applications**
  - Criminal Seizing
  - Security Patrolling
  - Thermal scope
  - Shutter-less thermal module
  - Handheld observation
  - Wildlife Protection
  - Hunting

**Integration**

- **Open Standard – ONVIF**
  - ONVIF is a leading international standardization initiative for IP-based physical security products. Hikvision closely works with all ONVIF members across the physical security industry to develop an open standard-based system that varies effortlessly with other ONVIF products.
  - The Hikvision SDK is designed for the remote connection and configuration of embedded DVRs, Encoders, IPCs and the other IP devices, Access Control, Alarm products, Video intercom products, and much more. The SDK Hikvision device features on most Hikvision products with comprehensive programming sources to help customers developing their own uniquely successful solutions.

- **Hikvision Open Standard – ISAPI**
  - 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 is an open protocol that suits all Hikvision Partners and offers strong capabilities for development with various software architectures and third-party systems, and it’s easy to implement. Additionally, the ISAPI protocol contains Hikvision Smart Events metadata, and allows metadata extraction using standard RTSP.

- **Hikvision SDK**
  - The Hikvision SDK is designed for the remote connection and configuration of embedded DVRs, Encoders, IPCs and the other IP devices. It’s easy to implement. Additionally, the SDK protocol contains Hikvision Smart Events metadata, and allows metadata extraction using standard RTSP.

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

A full-sized 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 SDKs, we provide comprehensive programming resources to help customers developing their own uniquely successful solutions.

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

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Hikvision Thermal Products

-40 °C to 65 °C (-40 °F to 149 °F)

Working temperature:

- Temperature accuracy: ±8° C
- Temperature measurement range: -20 to 150° C

Fire detection

Smart Tracking Linkage (Thermal + Optical)
Region entrance / Region exit / VCA: Line crossing / Intrusion detection / Temperature measurement

Optical: H (5.6–208 mm) / C (6.7–330 mm)
Thermal: 50 / 75 mm

Optical: 1920 × 1080
Thermal: 384 × 288, 17 μm

Positioning System
Bi-spectrum
Thermal & Optical

DS-2TD6236V2
Bullet Camera
Thermal Network

DS-2TD2466
316L Stainless Steel material

DS-2TD6266V2
Thermal & Optical Bi-spectrum

DS-2TD6236T / DS-2TD6266T
Thermal & Optical Bi-spectrum

DS-2TD8166V2
Speed Dome
Thermal & Optical Bi-spectrum

DS-2TD4136T / DS-2TD4166T
Thermal & Optical Bi-spectrum

Ingress protection: IP66

-40 °C to 65 °C (-40 °F to 149 °F)

- Temperature accuracy: max (±2° C, ±2%)
- Temperature measurement range: -20 to 550° C

VCA: Line crossing / Intrusion detection / Fire detection

Thermal: 10 / 25 mm; Optical: 5.7–205.2 mm

Optical: 1920 × 1080
Thermal: 384 × 288 / 640 × 512, 17 μm

Positioning System
Bi-spectrum
Thermal & Optical

DS-2TD6236T / DS-2TD6266T
Thermal & Optical Bi-spectrum

DS-2TD4237V2
Speed Dome

-40 °C to 65 °C (-40 °F to 149 °F)

- Temperature accuracy: ±8° C
- Temperature measurement range: -20 to 150° C

Fire detection

Smart Tracking Linkage (Thermal + Optical)
Region entrance / Region exit / VCA: Line crossing / Intrusion detection / Temperature measurement

Optical: 5.6–208 mm
Thermal: 25 / 50 mm

Optical: 1920 × 1080
Thermal: 384 × 288, 17 μm

Positioning System
Bi-spectrum
Thermal & Optical

DS-2TD6236V2
Thermal & Optical Bi-spectrum

DS-2TD2166T
Bullet Camera
Thermal Network

DS-2TD2136T
IP66

-40 °C to 65 °C (-40 °F to 149 °F)

- Temperature accuracy: ±8° C
- Temperature measurement range: -20 to 150° C

Fire detection

VCA: Line crossing / Intrusion detection / Fire detection

Thermal: 640 × 512, 17 μm

Optical: 5.7–205.2 mm

Optical: 1920 × 1080
Thermal: 25 / 50 mm

Positioning System
Bi-spectrum
Thermal & Optical

DS-2TA03 / 06
120 °C to 500 °C

-20 °C to 50 °C (-4 °F to 122°F)

- Temperature accuracy: max (±2° C, ±2%)
- Temperature measurement range: -20 to 550° C

384 × 288 @ 50 fps
Lens: 7 / 15 mm

384 × 288, 17 μm

Thermographic Camera
Handheld

DS-2TP23
IP54

-40 °C to 65 °C (-40 °F to 149 °F)

- Temperature accuracy: ±8° C
- Temperature measurement range: -20 to 150° C

320 × 240 resolution 2.4” LCD display
320 × 160 @ 25 fps
Lens: 3 mm

160 × 120, 17 μm

Thermographic Camera
Handheld

DS-2TP24
IP54

-40 °C to 65 °C (-40 °F to 149 °F)

- Temperature accuracy: ±8° C
- Temperature measurement range: -20 to 150° C

384 × 288 @ 25 fps
Thermal: 10 mm, Optical: 4.9 mm

384 × 288, 17 μm; Optical: 1920 × 1080

Thermographic Camera
Handheld

DS-2TP25
IP54

-40 °C to 65 °C (-40 °F to 149 °F)

- Temperature accuracy: ±8° C
- Temperature measurement range: -20 to 150° C

640 × 480 resolution 3.5” LCD touch display
384 × 288 @ 25 fps
Thermal: 384 × 288, 17 μm; Optical: 1920 × 1080

Thermographic Automation
Thermal Camera

DS-2TG2136
IP66

-40 °C to 65 °C (-40 °F to 149 °F)

- Temperature accuracy: ±8° C
- Temperature measurement range: -20 to 150° C

384 × 288 @ 25 fps
Thermal: 384 × 288, 17 μm; Optical: 1920 × 1080

Thermographic Automation
Thermal Camera

DS-2TG14
IP66

-40 °C to 65 °C (-40 °F to 149 °F)

- Temperature accuracy: ±8° C
- Temperature measurement range: -20 to 150° C

384 × 288 @ 25 fps
Thermal: 384 × 288, 17 μm; Optical: 1920 × 1080

Thermographic Automation
Thermal Camera

DS-2TG28V2
Multi-functional Thermal Network Camera

DS-2TD16V2
Thermal & Optical Bi-spectrum

DS-2TF12V2
Thermal & Optical Bi-spectrum

DS-2TD48V2
Thermal & Optical Bi-spectrum

DS-2TD618V2
Thermal & Optical Bi-spectrum

DS-2TF12V2
Thermal & Optical Bi-spectrum

DS-2TD48V2
Thermal & Optical Bi-spectrum

DS-2TD618V2
Thermal & Optical Bi-spectrum

DS-2TD2166
Thermal & Optical Bi-spectrum

DS-2TD4237
Thermal & Optical Bi-spectrum

DS-2TD6236
Thermal & Optical Bi-spectrum

DS-2TD8166
Thermal & Optical Bi-spectrum

DS-2TD4136
Thermal & Optical Bi-spectrum

DS-2TD2136
Thermal & Optical Bi-spectrum

DS-2TA03 / 06
Thermal Network

DS-2TD2166T
Thermal Network

DS-2TD4237T
Thermal Network

DS-2TD8166T
Thermal Network

DS-2TD4136T / DS-2TD4166T
Thermal Network

DS-2TG28
Thermographic Camera

DS-2TG14
Thermographic Camera

DS-2TG21
Thermographic Camera

DS-2TG28
Thermographic Camera

DS-2TG14
Thermographic Camera

DS-2TG21
Thermographic Camera

DS-2TG28
Thermographic Camera
Handheld Thermal Monocular

**DS-2TS03XF**

- **Working temperature:** -30 to 55°C (-22 to 131°F)
- **SD card capacity:** 16 GB
- **Features:** Hot track, Wi-Fi, Ranging, GPS
- **Display:** 0.39-inch LCOS display @ 720 × 540
- **Lens:** 15 mm
- **NETD:** 384 × 288, 17 μm

**DS-2TS03UF**

- **Working temperature:** -40°C to 65°C (-40 °F to 149 °F)
- **SD card capacity:** 32 GB
- **Features:** Snapshot, image fusion, object highlight, Wi-Fi, GPS, Laser rangefinder, video recording, picture snapshot
- **Display:** 0.39-inch OLED display @ 1024 × 768
- **Lens:** 35 mm
- **NETD:** 640 × 512, 17 μm

**DS-2TS06XF**

- **Working temperature:** -30 to 55°C (-22 to 131°F)
- **SD card capacity:** 32 GB
- **Features:** Video recording, picture snapshot, Wi-Fi, GPS, Laser rangefinder, snapshot, image fusion, object highlight
- **Display:** 0.39-inch OLED display @ 1024 × 768
- **Lens:** 35 / 50 mm
- **NETD:** 640 × 512, 17 μm

**DS-2TS16**

- **Working temperature:** -30 to 55°C (-22 to 131°F)
- **SD card capacity:** 32 GB
- **Features:** Video recording, picture snapshot, Wi-Fi, GPS, Laser rangefinder, snapshot, image fusion, object highlight
- **Display:** 0.39-inch OLED display @ 1024 × 768
- **Lens:** 35 / 50 mm
- **NETD:** 640 × 512, 17 μm

**DS-2TR03**

- **Working temperature:** -30 to 55°C (-22 to 131°F)
- **SD card capacity:** 16 GB
- **Features:** Hot track, Wi-Fi, Ranging, GPS
- **Display:** 0.39-inch OLED display @ 1024 × 768
- **Lens:** 35 mm
- **NETD:** 640 × 512, 17 μm

**DS-2TM03/06**

- **Working temperature:** -40°C to 65°C (-40 °F to 149 °F)
- **SD card capacity:** 16 GB
- **Features:** Support CVBS & BT.656
- **Size:** 40 x 41 x 49 mm
- **Power consumption:** ≤ 1.3 W / 1.6 W (TYP)
- **NETD:** < 35 mk @ F1.0, 30°C
- **Resolution:** 384 × 288 / 640 × 512, 17 μm

**DS-2TM13/16**

- **Working temperature:** -40°C to 65°C (-40 °F to 149 °F)
- **SD card capacity:** 16 GB
- **Features:** Support CVBS & BT.656
- **Size:** 28 x 28 x 34.6 mm
- **Power consumption:** ≤ 0.8 W / 1.0 W (TYP)
- **NETD:** < 35 mk @ F1.0, 30°C
- **Resolution:** 384 × 288 / 640 × 512, 17 μm