# Thermal Network Bullet Camera with Thermometry

## 400 x 300 VOx Uncooled Thermal Sensor Technology

- 400 x 300 VOx Uncooled Thermal Sensor Technology
- Athermalized Lens, Focus-free
- H.265 Video Compression
- 7.5 mm, 13 mm, or 25 mm Fixed Thermal Lens Options
- ≤ 40 mK Thermal Sensitivity
- Designed for Remote Temperature Measurement (not suitable for human temperature monitoring)
- Enhanced Power and Data Transmission Distances (ePoE)
- Two (2) Alarm Inputs, Two (2) Alarm Outputs
- Support for PoE and Micro SD Memory Storage
- ArcticPro Series Camera – Operational down to –40° C (–40° F)
- IP67 Ingress Protection
- Five-year Warranty*

Pro Series | 40mK | Fire Detection | Analysis | PoE | IP67

### System Overview

The Dahua Thermal Network Bullet camera combines an uncooled VOx Microbolometer sensor with an athermalized lens to produce long-range thermal images. The camera produces clear images in total darkness, and delivers usable images in fog, rain, and snow, offering truly covert surveillance without the need for external light. The camera offers a rapid temperature detection and alarm functionality that identifies an abnormal rise in temperature and sends an alert to warn of a potential fire. Dahua thermal cameras are ideal for forestry, border security, and industrial applications.

### Functions

**Uncooled Vanadium Oxide (VOx) Technology**

Dahua thermal cameras use an uncooled Vanadium Oxide (VOx) sensor that delivers higher thermal sensitivity in a more compact and cost-effective package. Vanadium Oxide cameras are also more reliable, as compared to other thermal imaging technologies, due to less moving parts.

**Athermalized Lens**

The athermalized lens used in Dahua thermal cameras maintains the focus position passively and without power over a wide temperature range.

**High Thermal Sensitivity**

The VOx detector offers high thermal sensitivity (< 40 mK) that allows Dahua thermal cameras to distinguish objects in a scene with minimal temperature differences. The camera captures detailed images where thermal contrast between object and background is minimal.

**Temperature Monitoring**

The thermal camera provides remote temperature monitoring that has the ability to trigger an alarm for a temperature that exceeds a set threshold. This feature is ideal for industrial applications where it is dangerous for humans and where maintaining a consistent temperature is vital.

**Thermal Color Palettes**

Dahua thermal cameras provide a choice of color palettes onboard the camera that help to distinguish thermal variations and patterns in an image. The color tones correspond to the apparent surface temperatures of the target.

**Rapid Temperature Rise and Alarm**

The camera can detect a rapid rise in temperature over a short time and issue an alarm for a potential fire event even at long distances. Because thermal cameras are sensitive to temperature, they provide higher fire detection accuracy than standard cameras, making them particularly fit for applications such as forest fire prevention.

**Enhanced Power over Ethernet (ePoE) Technology**

Dahua's innovative ePoE technology offers a plug-and-play solution to transmit power and data over long distances via Ethernet or coaxial cables, reducing installation time and saving money. ePoE technology is a viable, cost-effective solution for extending transmission distances and for converting existing, coax-based analog systems into IP systems. For video security and surveillance installers, ePoE technology saves time and money by reducing overall cabling requirements, allowing for existing coax cable to be used, and minimizing the number of peripheral devices needed. For new installations, ePoE offers the ability to design long-distance applications without the need for additional repeaters.

**Intelligent Video System (IVS)**

IVS is a built-in video analytic algorithm that delivers intelligent functions to monitor a scene for Tripwire violations, intrusion detection, and human/vehicle classification. A camera with IVS quickly and accurately responds to monitoring events in a specific area.

**Environmental**

With a temperature range of –40 °C to +70 °C (–40 °F to +158 °F), the camera is designed for extreme temperature environments. The camera complies with the IP67 rating makes it suitable for demanding outdoor applications.



*Warranty applies to products sold through an authorized Dahua Dealer.

## Technical Specification

### Thermal Camera

| | |
|---|---|
| Image Sensor | Uncooled VOx Focal Plane Detector |
| Effective Pixels | 400 (H) x 300 (V) |
| Pixel Size | 17 μm |
| Thermal Sensitivity (NETD) | < 40 mK |
| Spectral Range | 8 μm to 14 μm |
| Image Setting | Brightness, Sharpness, ROI, AGC, FFC, 3D DNR |
| Color Palettes | 18, including:<br>Whitehot, Blackhot, Icefire, Fusion, Rainbow, Globow, Ironbow1, and Sepia |

### Thermal Lens

| | | | | |
|---|---|---|---|---|
| Lens Type | | Fixed | | |
| Focus Control | | Athermalized, Focus-free | | |
| Focal Length | | 7.5 mm | 13 mm | 25 mm |
| Angle of View | | H: 53.7°<br>V: 39.7° | H: 30.2°<br>V: 22.6° | H: 15.5°<br>V: 11.6° |
| Effective Distance, human (1.80 m x 0.50 m)[1] | Detection | 221 m (725 ft) | 382 m (1253 ft) | 735 m (2411 ft) |
| | Recognition | 57 m (187 ft) | 98 m (322 ft) | 189 m (620 ft) |
| | Identification | 28 m (92 ft) | 49 m (161 ft) | 95 m (312 ft) |
| Effective Distance, vehicle (4.0 m x 1.40 m)[1] | Detection | 558 m (1608 ft) | 1020 m (3346 ft) | 1961 m (6434 ft) |
| | Recognition | 147 m (482 ft) | 255 m (837 ft) | 490 m (1608 ft) |
| | Identification | 74 m (243 ft) | 127 m (417 ft) | 245 m (804 ft) |

### Temperature Measurement

| | | | | |
|---|---|---|---|---|
| Range | Low | –20° C to 150° C (–4° F to 302° F) | | |
| | High | 0° C to 550° C (32° F to 1022° F) | | |
| Accuracy | | ±2.0° C (±3.6° F),<br>when operating temperature is between –20° C to 60° C (–4° F to 140° F) | | |
| Mode | | Spot, Line, Area | | |
| Rule | | Supports 12 Rules Simultaneously:<br>• Spot: 12<br>• Line: 12<br>• Area: 12 | | |
| | | 7.5 mm | 13 mm | 25 mm |
| Temperature Measurement Distance | | | | |
| Target Size: 0.1 m x 0.1 m, Recommended Distance | | 4.10 m (13.45 ft) | 7.60 m (24.93 ft) | 14.70 m (46.26 ft) |
| Target Size: 0.3 m x 0.3 m, Maximum Distance | | 12.40 (40.68 ft) | 22.90 m (75.13 ft) | 44.10 m (144.69 ft) |
| Rapid Temperature Rise Detection Distance | | | | |
| Target Size: 0.2 m x 0.2 m, Recommended Distance | | 22.0 m (72.18 ft) | 39.0 m (127.95 ft) | 75.0 m (246.06 ft) |
| Target Size: 0.2 m x 0.2 m, Maximum Distance | | 46.40 m (152.23 ft) | 80.50 m (264.10 ft) | 154.80 m (507.87 ft) |
| Target Size: 2.0 m x 2.0 m, Recommended Distance | | 220.0 m (721.78 ft) | 390.0 m (1279.53 ft) | 750.0 m (2460.63 ft) |
| Target Size: 2.0 m x 2.0 m, Maximum Distance | | 464.0 m (1522.31 ft) | 805.0 m (2641.08 ft) | 1548.0 m (5078.74 ft) |

### Video

| | | |
|---|---|---|
| Compression | | H.265, H.264, H.264H, H.264B, MJPEG |
| Frame Rate | Main Stream | 1280 x 1024, 1280 x 960, 720p, or 400 x 300 at 30 fps |
| | Sub Stream | 640 x 512, 640 x 480, or 400 x 300 at 30 fps |
| Bit Rate Control | | CBR/VBR |
| Bit Rate | | H.264: 640 Kbps to 8192 Kbps |
| Noise Reduction | | 2D, 3D |
| Gain Control | | Auto, Manual |
| Advanced Features | | Electronic Thermal Image Stabilization, Digital Detail Enhancement |
| Motion Detection | | Off, On (4 zones, Rectangle) |
| Region of Interest | | Off, On (4 zones) |
| Digital Zoom | | 4x |
| Flip | | 90°, 180°, 270° |
| Mirror | | Off, On |
| Privacy Masking | | Off, On (4 areas, Rectangle) |

### Audio

| | |
|---|---|
| Compression | G.711a, G.711Mu, AAC, PCM |

### Network

| | |
|---|---|
| Ethernet | RJ-45 (10/100 Base-T) |
| Protocol | HTTP; TCP; ARP; RTSP; RTP; UDP; RTCP; SMTP; FTP; DHCP; DNS; DDNS; PPPOE; IPv4/v6; SNMP; QoS; UPnP; NTP |
| Interoperability | ONVIF, CGI, Dahua SDK |
| Streaming Method | Unicast / Multicast |
| Maximum User Access | 20 Users (64 Mbps) |
| Edge Storage | FTP<br>Micro SD Card Slot, maximum 256 GB |
| Web Browser | IE 8 or later |
| Management Software | DSS |
| Mobile Operating System | Android, IOS |

1. The Detection, Recognition, and Identification values shown are nominal values and should be used as estimates only. Exact value calculations depend on a wide variety of conditions.

## Certifications

| | |
|---|---|
| Safety | UL 60950-1<br>CAN/CSA C22.2 No. 60950-1-07<br>EN 60950:2000 |
| Electromagnetic Compatibility (EMC) | 47 CFR FCC Part 15 Subpart B<br>ANSI C63.4 - 2009<br>Canada ICES-003 Issue 5<br>CISPR Pub. 22 |

## Interface

| | |
|---|---|
| Video | One (1) Port BNC (CVBS) use for camera installation |
| Audio | Input: One (1) Channel, 3.5 mm Jack<br>Output: One (1) Channel, 3.5 mm Jack |
| RS485 | One (1) Port |
| Alarm | Input: Two (2) Channels<br>Output: Two (2) Channel |

## Electrical

| | |
|---|---|
| Power Supply | 12 VDC ±20%, 1.2 A; or PoE (IEEE 802.3af), ePoE |
| Power Consumption | Basic: 5.0 W<br>Maximum 13 W |

## Environmental

| | |
|---|---|
| Operating Condition | –40° C to +70° C (–40° F to +158° F)<br>Less than 95% RH |
| Storage Conditions | –50° C to +80° C (–58° F to +176° F) |
| Ingress Protection | IP67 |
| Surge Protection | Surge: 6 KV<br>Electrostatic, contact: 8 KV<br>Electrostatic, air: 15 KV |

## Construction

| | | |
|---|---|---|
| Casing | | Metal |
| Dimensions | Camera | 291.0 mm x 103.80 mm x 97.20 mm<br>(11.46 in. x 4.09 in. x 3.83 in.) |
| | Packaging | 365.0 mm x 175.0 mm x 176.0 mm<br>(14.37 in. x 6.89 in. x 6.93 in.) |
| Net Weight | | 1.40 kg (3.09 lb) |
| Gross Weight | | 1.90 kg (4.19 lb) |

## Intelligence

IVS triggers an alarm and takes a defined action for the following events:

| | |
|---|---|
| Standard Features | • Tampering with the camera.<br>• Camera loses or changes focus drastically.<br>• Error writing to an onboard Micro SD card.<br>• Error sending or receiving data over the network.<br>• Unauthorized access to the camera. |
| Premium Features | |
| Tripwire | A target crosses a user-defined line. |
| Intrusion | A target enters or exits a defined perimeter. |
| Advanced Features | |
| Rapid Temperature Rise Detection | Detects a rapid rise in temperature over a short time and issues an alarm for a potential fire. |
| Cold/Hot Spot Trace | Indicates the coldest and the hottest spot of the scene. |
| Human/Vehicle Classification | Detects human or vehicle violations using Tripwire or Intrusion detection methods. |

### Via CAT5E/CAT6 Ethernet Cable

ePoE supply voltage 48 V
Maximum DC resistance < 10 Ω/100 m

| Cable Length, m (ft) | Bandwidth, Mbps | PoE Load Capacity, W | Hi-PoE Load Capacity, W | Working Mode |
|---|---|---|---|---|
| 100 (328) | 100 | 25.5 | 53 | IEEE/E100 |
| 200 (656) | 100 | 25.5 | 33 | E100 |
| 300 (984) | 100 | 19 | 19 | E100 |
| 400 (1312) | 10 | 17 | 17 | E10 |
| 500 (1640) | 10 | 13 | 13 | E10 |
| 800 (2625) | 10 | 7 | 7 | E10 |

### Via CAT5E/CAT6 Ethernet Cable

ePoE supply voltage 53 V
Maximum DC resistance < 10 Ω/100 m

| Cable Length, m (ft) | Bandwidth, Mbps | PoE Load Capacity, W | Hi-PoE Load Capacity, W | Working Mode |
|---|---|---|---|---|
| 100 (328) | 100 | 25.5 | 53 | IEEE/E100 |
| 200 (656) | 100 | 25.5 | 47 | E100 |
| 300 (984) | 100 | 25.5 | 32 | E100 |
| 400 (1312) | 10 | 23 | 26 | E10 |
| 500 (1640) | 10 | 20 | 20 | E10 |
| 800 (2625) | 10 | 13 | 13 | E10 |

### Via RG-59 Coaxial Cable

ePoE supply voltage 48 V
Maximum DC resistance < 5 Ω/100 m

| Cable Length, m (ft) | Bandwidth, Mbps | PoE Load Capacity, W | Hi-PoE Load Capacity, W | Working Mode |
|---|---|---|---|---|
| 100 (328) | 100 | 25.5 | 50 | IEEE/E100 |
| 200 (656) | 100 | 25.5 | 30 | E100 |
| 300 (984) | 100 | 18 | 18 | E100 |
| 400 (1312) | 100 | 15 | 15 | E100 |
| 500 (1640) | 10 | 12 | 12 | E10 |
| 800 (2625) | 10 | 6 | 6 | E10 |
| 1000 (3281) | 10 | 5 | 5 | E10 |

### Via RG-59 Coaxial Cable

ePoE supply voltage 53 V
Maximum DC resistance < 5 Ω/100 m

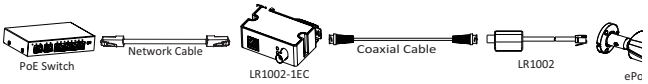
| Cable Length, m (ft) | Bandwidth, Mbps | PoE Load Capacity, W | Hi-PoE Load Capacity, W | Working Mode |
|---|---|---|---|---|
| 100 (328) | 100 | 25.5 | 52 | IEEE/E100 |
| 200 (656) | 100 | 25.5 | 48 | E100 |
| 300 (984) | 100 | 25.5 | 30 | E100 |
| 400 (1312) | 100 | 20 | 23 | E100 |
| 500 (1640) | 10 | 16 | 16 | E10 |
| 800 (2625) | 10 | 10 | 10 | E10 |
| 1000 (3281) | 10 | 8 | 8 | E10 |

## ePoE Applications

### Pure Ethernet

### Passive EoC

### EoC with Single-port EoC Receiver



## Ordering Information

| Type | Part Number | Description |
|---|---|---|
| Thermal Network Camera | DH-TPC-BF5401N-TB7 | Thermal Network Bullet Camera, 400 x 300, 7.5 mm lens, IVS |
| | DH-TPC-BF5401N-TB13 | Thermal Network Bullet Camera, 400 x 300, 13 mm lens, IVS |
| | DH-TPC-BF5401N-TB25 | Thermal Network Bullet Camera, 400 x 300, 25 mm lens, IVS |
| Mounting Accessories, optional | PFA121 | Junction Box |
| | PFA151 | Corner Mount |
| | PFA152-E | Pole Mount |
| | DH-PFM321D-US | 12 VDC, 1 A Power Adapter |
| ePoE Accessories, optional | LR1002 | EoC Passive Converter |
| | LR1002-1EC | Single-port EoC Receiver |

## Accessories

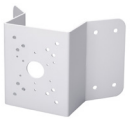
Optional:

PFA121
Junction Box

DH-PFB120C
Ceiling Mount Bracket

DH-PFB129W
Wall/Ceiling Mount Bracket

DH-PFM321D-US
12 VDC, 1 A Power Adapter

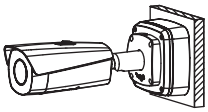
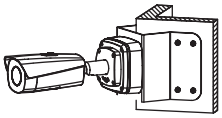
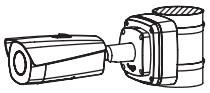


PFA151
Corner Mount

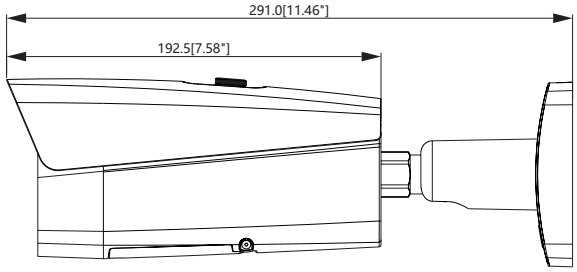
PFA152-E
Pole Mount

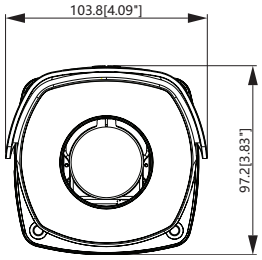
LR1002
EoC Passive Converter

LR1002-1EC
Single-port EoC Receiver

| Wall Mount | Corner Mount | Pole Mount |
|---|---|---|
| PFA121 | PFA121+PFA151 | PFA121+PFA150 |
|  |  |  |

## Dimensions (mm/in.)

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