

# 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
- $\leq 40$  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  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ )
- IP67 Ingress Protection
- Five-year Warranty\*



### 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.

#### Cybersecurity

Dahua network cameras are equipped with a series of key cybersecurity technologies including: security authentication and authorization, access control, trusted protection, encrypted transmission, and encrypted storage. These technologies improve the camera's ability to prevent malicious access and to protect data.

#### Environmental

With a temperature range of  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $+158^{\circ}\text{F}$ ), the camera is designed for extreme temperature environments. The camera complies with the IP67 rating makes it suitable for demanding outdoor applications.

### 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: 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° V: 39.7°	H: 30.2° V: 22.6°	H: 15.5° V: 11.6°

#### DORI Distance<sup>1</sup>

		7.5 mm	13 mm	25 mm
Effective Distance, human (1.80 m x 0.50 m) <sup>1</sup>	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) <sup>1</sup>	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), when operating temperature is between -20° C to 60° C (-4° F to 140° F)			
Mode	Spot, Line, Area			
Rule	Supports 12 Rules Simultaneously: <ul style="list-style-type: none"> <li>• Spot: 12</li> <li>• Line: 12</li> <li>• Area: 12</li> </ul>			
		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, PCM
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### 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 Micro SD Card Slot, maximum 256 GB
Web Browser	IE 8 or later
Management Software	DSS
Mobile Operating System	Android, IOS
Cybersecurity	Video Encryption, Firmware Encryption, Configuration Encryption, Digest, WSSE, Account Lockout, Security Logs, IP/MAC Filtering, Generating and Importing X.509 Certification, Syslog, HTTPS, 802.1x, Trusted Boot, Trusted Execution, Trusted Upgrade

1. The DORI distance is a measure of the general proximity for a specific classification to help pinpoint the right camera for your needs. The DORI distance is calculated based on sensor specifications and lab test results according to EN 62676-4, the standard that defines the criteria for the Detect, Observe, Recognize and Identify classifications. 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, EN 60950:2000 CAN/CSA C22.2 No. 60950-1-07
Electromagnetic Compatibility (EMC)	47 CFR FCC Part 15 Subpart B ANSI C63.4 - 2009, Canada ICES-003 Issue 5 CISPR Pub. 22

Interface

Video	One (1) Port BNC (CVBS) use for camera installation
Audio	Input: One (1) Channel, 3.5 mm Jack Output: One (1) Channel, 3.5 mm Jack
RS485	One (1) Port
Alarm	Input: Two (2) Channels 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 Maximum 13 W

Environmental

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

Construction

Casing	Metal	
Dimensions	Camera	291.0 mm x 103.80 mm x 97.20 mm (11.46 in. x 4.09 in. x 3.83 in.)
	Packaging	365.0 mm x 175.0 mm x 176.0 mm (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	<ul style="list-style-type: none"> <li>Tampering with the camera.</li> <li>Camera loses or changes focus drastically.</li> <li>Error writing to an onboard Micro SD card.</li> <li>Error sending or receiving data over the network.</li> <li>Unauthorized access to the camera.</li> </ul>
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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.

Effective IVS Distances – Thernal Lens

	7.5 mm	13 mm	25 mm
Human (1.80 m x 0.50 m)	83.0 m (273.31 ft)	143.0 m (469.16 ft)	275.0 m (902.23 ft)
Vehicle (4.0 m x 1.40 m)	231.0 m (757.87 ft)	400.0 m (1312.34 ft)	771.0 m (2529.53 ft)

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

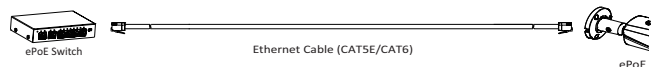
Via RG-59 Coaxial Cable

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

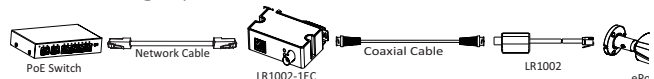
Pure Ethernet



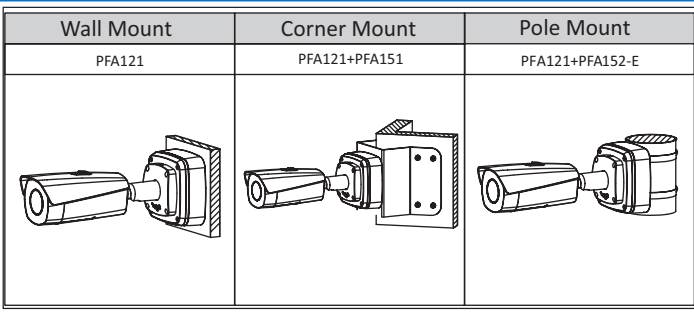
Passive EoC



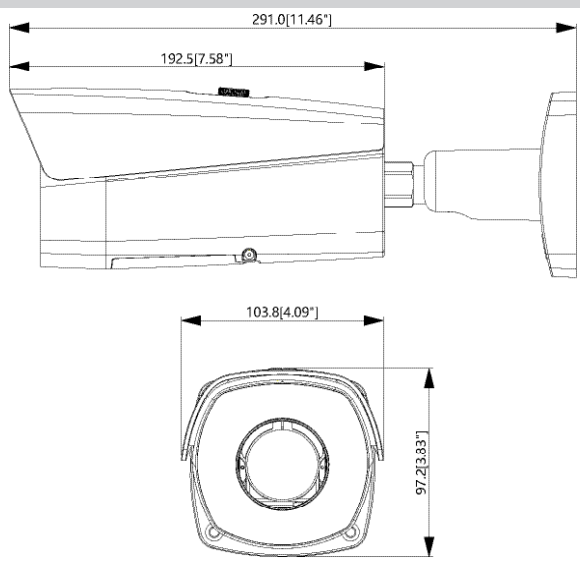
EoC with Single-port EoC Receiver



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



**Dimensions (mm/in.)**



**Accessories**

Optional :

