DHI-TPC-BF5441-V1

Thermal Network Hybrid Bullet Camera





- Vanadium oxide uncooled focal plane detector.
- 1/1.8" 4Megapixel progressive scan CMOS.
- AI functions: heat (fire) detection, tripwire, human/vehicle classification, and smoke detection.
- Junction box optional.
- Illumination distance is up to 80 m.
- Wide input voltage 12–24 VDC (± 10%), and PoE power supply.
- Smart linkage of white light and audio.
- Built-in TPM2.0 encryption module for cybersecurity.
- IP67 rated and IK10-rated housing.
- Ultra low false alarm with Xinghan Large-Scale AI Model.

Featuring thermal and visible channels, Thermal Network Hybrid Bullet Camera offers various AI functions such as heat (fire) detection, tripwire, intrusion, and human/vehicle classification, and supports sound and light alarm. The camera is widely applied in outdoor scenes of the medium-distance perimeter protection and heat (fire) detection.

Technical Specification

Thermal

Detector Type	Vanadium oxide uncooled focal plane detector
Effective Pixels	400 (H) × 300 (V)
Pixel Pitch	12 μm
Spectral Range	8 μm–14 μm
Sensitivity (NETD)	≤20 mK (@f/1.0)
Field of View	7.5 mm: H: 51.8°; V: 38.8° 13 mm: H: 21.0°; V: 16.0° 19 mm: H: 14.5°; V: 10.9° 25 mm: H: 10.9°; V: 8.2° 35 mm: H: 7.8°; V: 5.8° 50 mm: H: 5.5°; V: 4.1°
Thermal Focus Control	Fixed-focal
Close Focus Distance	7.5 mm: 1.2 m (3.94 ft) 13 mm: 4 m (13.12 ft) 19 mm: 8 m (26.25 ft) 25 mm: 15 m (49.21 ft) 35 mm: 28 m (91.86 ft) 50 mm: 55 m (180.45 ft)
Digital Detail Enhancement (DDE)	Yes
Digital Zoom	24 levels
Thermal AGC	Auto/Manual
Thermal Noise Reduction	2D NR/3D NR
Image Flip	180°; Mirror
Color Palettes	18 (white hot/black hot/fusion/rainbow/golden autumn/midday/iron red/amber/jade/sunset/icefire/ painting/pomegranate/emerald /spring/summer/ autumn/winter)

Visible

Image Sensor	1/1.8" CMOS
Max. Resolution	2688 (H) × 1520 (V)
Pixel	4 MP
Horizontal Definition	Center ≥ 1200 TVL Edge ≥ 900 TVL
Min. Illumination	Color: 0.01 lux Black & white: 0.001 lux 0 lux (IR on)
Visible AGC	Auto/Manual
Visible Noise Reduction	2D NR/3D NR
S/N Ratio	>55 dB
White Balance	Auto; manual; indoor; outdoor; tracking; sodium lamp; street lamp; natural
Defog	Electronic defog
Electronic Shutter Speed	1 s–1/30,000 s (auto/manual)
BLC	Yes
WDR	DWDR
HLC	Yes
Day/Night	Auto (ICR); Color; B/W
Iris Control	Manual/Auto
Image Flip	180°; Mirror
Field of View	4 mm: H: 87.0°; V: 47.3° 6 mm: H: 55.3°; V: 30.0° 12 mm: H:37.3°; V: 21.4° 10 mm-30 mm: H: 42°–15°;V: 22.8°–8.4°

Close Focus Distance	4 mm: 1.2 m (3.94 ft) 6 mm: 2.5 m (8.20 ft) 12 mm: 7.4 m (24.28 ft) 10 mm-30 mm: 9 m (29.53 ft)
Aperture	4 mm: F1.6 6 mm: F1.6 12 mm: F1.7 10 mm-30 mm: F1.7
Illuminator On/Off Control	Auto; manual
Illumination Distance	80 m (262.47 ft)

Audio and Video

Video Compression	H.265; H.264M; H.264H; H.264B
Resolution	Thermal: Main stream: 1280 × 1024; 1280 × 960; 1280 × 720; 640 × 512; 1280 × 960 (default); Sub stream: 640 × 512; 640 × 480; 400 × 300; 400 × 300 (default) Visible: Main stream: 2688 × 1520; 1920 × 1080; 1280 × 720; 704 × 576; 2688 × 1520 (default); Sub stream: 704 × 576; 352 × 288; 704 × 576 (default)
Video Frame Rate	Thermal (50 Hz): Main stream: 1 fps–25 fps, 25 fps by default Sub stream: 1 fps–25 fps, 15 fps by default Visible (50 Hz): Main stream: 1 fps–25 fps, 25 fps by default Sub stream: 1 fps–25 fps, 15 fps by default Thermal (60 Hz): Main stream: 1 fps–30 fps, 30 fps by default Sub stream: 1 fps–30 fps, 15 fps by default Visible (60 Hz): Main stream: 1 fps–30 fps, 30 fps by default Sub stream: 1 fps–30 fps, 15 fps by default
Audio Compression	G.711a; G.711mu; PCM; AAC
Image Encoding Format	JPEG

Function

Two-way Audio	Yes
Sound and Light Alarm	Yes
Network Protocol	HTTP; HTTPS; TCP; ARP; RTSP; RTP; UDP; RTCP; SMTP; FTP; DHCP; DNS; DDNS; PPPOE; IPv4/v6; SNMP; QoS; UPnP; NTP; Multicast; SFTP; 802.1x
Region of Interest (RoI)	Yes
Storage	FTP; Micro SD card (optional)
Interoperability	ONVIF; CGI; DaHua SDK
Browser	IE: IE8 and later (including the browsers with IE kernel, such as 360 Explorer, Sougou Explorer); Chrome: 42 and earlier; Firefox: 42 and earlier
User/Host	Up to 12 (total bandwidth: 64 MB)
Security	Authorized username and password; attached MAC address; HTTPS; IEEE 802.1x; controlled network access
User Management	Up to 20 users; supports multi-level user permissions (2 levels): management group and user group
Malfunction Detection	Network disconnection detection; IP conflict detection; memory card state detection; memory space detection
Fusion Mode	Yes
PIP	Yes
Micro SD Card (Max.)	512 GB

Intelligence

Heat (Fire) Detection	Yes
Cold/Hot Spot Trace	Yes
IVS (Perimeter Protection)	Yes. Supports tripwire and intrusion.
Target Distinction	Human/Vehicle Classification
Target Filtering	Yes (by pixel)

Port

Analog Output	1 × CVBS output; BNC port
Network Port	1 × RJ-45 (10/100 Base-T)
Alarm Input	2
Alarm Output	2
Alarm Linkage	Recordings on SD card; digital output; email; snapshot
Alarm Event	No SD card; low SD card space; SD card error; network disconnection; IP conflict; motion detection; video tampering; intrusion; tripwire; audio detection
Audio Input	1
Audio Output	1
RS-485	1

Power

Power Supply	12-24 VDC (±10%), PoE (802.3af)
Power Consumption	Basic: 5.2 W (illuminator off, heater off, speaker off); Max: 16.2 W (illuminator on, heater on, speaker on)
ePoE	Yes

Environment

Operating Temperature	–40 °C to +70 °C (–40 °F to +158 °F)
Operating Humidity	≤95%
Storage Temperature	–40 °C to +70 °C (–40 °F to +158 °F)

Physical Characteristics

Protection	IP67
Product Dimensions	300.9 mm × 130.2 mm × 120.1 mm (11.85" × 5.13" × 4.73") (L × W × H)
Packaging Dimensions	423 mm × 180 mm × 178 mm (16.65" × 7.09" × 7.01") (L × W × H)
Net Weight	≤2.35 kg (5.18 lb)
Gross Weight	≤2.7 kg (5.95 lb)
Lens	Included
Reliability	Surge protection: 6 kV Contact discharge: 8 kV Air discharge: 15 kV
Vandal-proof Rating	Enclosure: IK10
Anti-corrosion Level	Basic Protection *The products are designed for general use and are applicable even in areas with no specific requirements for anti-corrosion protection.

Certification

Certifications	CE

Heat (Fire) Detection Distance

Focal Length	Max. Distance
7.5 mm	92 m (301.84 ft)
13 mm	156 m (511.81 ft)
19 mm	230 m (754.59 ft)
25 mm	300 m (984.25 ft)
35 mm	420 m (1,377.95 ft)
50 mm	600 m (1,968.50 ft)

Note:
The table displays the measured distances obtained from using the target size 0.2 m × 0.2 m for testing in an environment where the temperature is 23 °C and the relative humidity is below 60%.
The table is for reference only. The distances within it are subject to actual conditions including atmospheric conditions, target size, the installation site, and more.
Supports up to 16 fire points detectable.

Perimeter Protection Distance (IVS Distance)

Focal Length	Distance (Human)	
	General	Large-Scale AI Models
7.5 mm	75 m (246.06 ft)	97.5 m (319.88 ft)
13 mm	130 m (426.51 ft)	169 m (554.46 ft)
19 mm	190 m (623.36 ft)	247 m (810.37 ft)
25 mm	250 m (820.21 ft)	325 m (1,066.27 ft)
35 mm	350 m (1,148.29 ft)	455 m (1,492.78 ft)
50 mm	500 m (1,640.42 ft)	650 m (2,132.55 ft)
	Distance (Vehicle)	
	General	Large-Scale AI Models
7.5 mm	225 m(738.19 ft)	—
13 mm	390 m (1,279.53 ft)	—
19 mm	570 m (1,870.08 ft)	—
25 mm	750 m (2,460.63 ft)	—
35 mm	1,050 m (3,444.88 ft)	—
50 mm	1,500 m (4,921.26 ft)	—

Note:
The table displays the optimal distance obtained from using the target sizes 1.8 m × 0.5 m (human) and 4 m × 1.4 m (vehicle) for testing in an environment where the temperature is 23 °C and the relative humidity is below 60%.
The table is for reference only. The distances within it are subject to actual conditions including atmospheric conditions, target size, the installation site, and more.
General: For the short range scene, select general mode, which is better for the classification of human, vehicles, and small targets.
High Sensitivity: In scene of perimeter detection, when the scene needs to be detected at a distance of 10 times, select the high sensitivity mode.

DRI Distance

Focal Length	Detection Distance①	Recognition Distance②	Identification Distance③
7.5 mm	Vehicle: 958 m (3,143.04 ft); Human: 313 m (1,026.90 ft)	Vehicle: 240 m (787.40 ft); Human: 78 m (255.91 ft)	Vehicle: 120 m (393.70 ft); Human: 39 m (127.95 ft)
13 mm	Vehicle: 1,661 m (5,449.48 ft); Human: 542 m (1,778.22 ft)	Vehicle: 415 m (1,361.55 ft); Human: 135 m (442.91 ft)	Vehicle: 208 m (682.41 ft); Human: 68 m (223.10 ft)
19 mm	Vehicle: 2,428 m (7,965.88 ft); Human: 792 m (2,598.43 ft)	Vehicle: 607 m (1,991.47 ft); Human: 198 m (649.61 ft)	Vehicle: 303 m (994.09 ft); Human: 99 m (324.80 ft)
25 mm	Vehicle: 3,194 m (10,479.00 ft); Human: 1,042 m (3,418.64 ft)	Vehicle: 799 m (2,578.74 ft); Human: 260 m (857.98 ft)	Vehicle: 392 m (1,286.60 ft); Human: 132 m (433.06 ft)
35 mm	Vehicle: 4,472 m (14,671.92 ft); Human: 1,458 m (4,783.46 ft)	Vehicle: 1,118 m (3,667.98 ft); Human: 365 m (1,197.51 ft)	Vehicle: 559 m (1,833.99 ft); Human: 182 m (597.11 ft)
50 mm	Vehicle: 6,389 m (20,961.29 ft); Human: 2,083 m (6,833.99 ft)	Vehicle: 1,597 m (5,239.50 ft); Human: 521 m (1,709.32 ft)	Vehicle: 799 m (2,621.39 ft); Human: 260 m (853.02 ft)

① Detection Distance: Detects objects, but cannot recognize their characteristics (objects must cover more than 1.5 pixels of the image).
② Recognition Distance: Classifies objects into general categories, such as human, vehicle (the object must cover more than 6 pixels of the image).
③ Identification Distance: Classifies objects into specific categories based on their characteristics, such as engineering truck, car (the object must cover more than 12 pixels of the image).

Note:
The table is the standard theoretical calculation and is for reference only. The distances within it are subject to actual conditions including atmospheric conditions, target size, the installation site, and more. For the intelligent detection distance, refer to the table of Perimeter Protection Distance (IVS Distance) above.

Ordering Information

Type	Model	Description
Thermal Camera	DHI-TPC-BF5441-B7F4-DC-S5-V1 DHI-TPC-BF5441-B7F4-DC-J-S5-V1	Thermal: 7.5 mm; Visible: 4 mm
	DHI-TPC-BF5441-B13F6-DC-S5-V1 DHI-TPC-BF5441-B13F6-DC-J-S5-V1	Thermal: 13 mm; Visible: 6 mm
	DHI-TPC-BF5441-B19F12-DC-S5-V1 DHI-TPC-BF5441-B19F12-DC-J-S5-V1	Thermal: 19 mm; Visible: 12 mm
	DHI-TPC-BF5441-B25F12-DC-S5-V1 DHI-TPC-BF5441-B25F12-DC-J-S5-V1	Thermal: 25 mm; Visible: 12 mm
	DHI-TPC-BF5441-B35Z3-DC-S5-V1 DHI-TPC-BF5441-B35Z3-DC-J-S5-V1	Thermal: 35 mm; Visible: 10 mm-30 mm
	DHI-TPC-BF5441-B50Z3-DC-S5-V1 DHI-TPC-BF5441-B50Z3-DC-J-S5-V1	Thermal: 50 mm; Visible: 10 mm-30 mm

Accessories (Optional)	PFA151 + PFA121	Corner Mount Bracket
	PFA121	Junction Mount
	PFA156+PFA121	Vertical Pole Mount Bracket
	PFM320D	Power Adapter
Accessories (Optional for -J model)	—	Junction Mount
	PFA154	Vertical Pole Mount Bracket

Accessories

Optional:



PFA151 + PFA121
Corner Mount Bracket



PFA121
Junction Mount



PFA156 + PFA121
Vertical Pole Mount Bracket

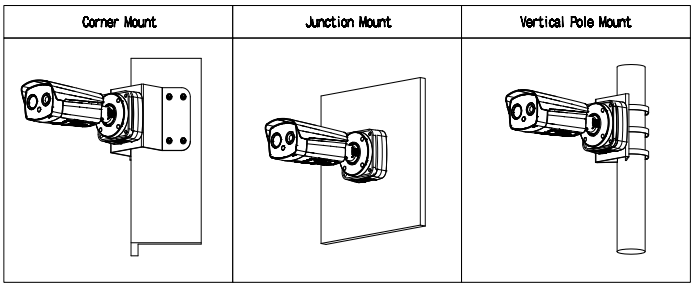


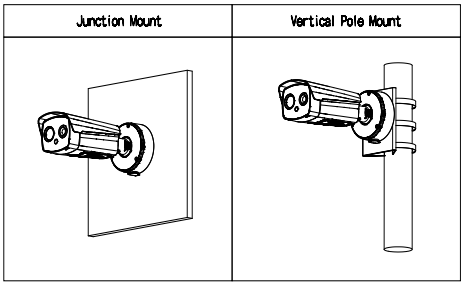
PFM320D
Power Adapter

For Junction box model (-J):

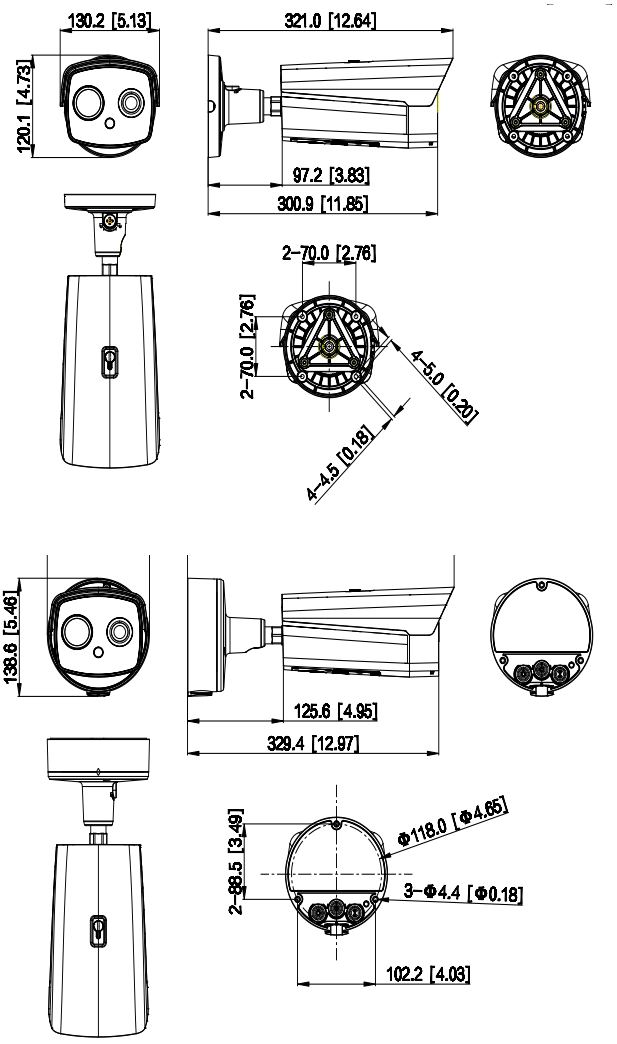


PFA154
Vertical Pole Mount Bracket





Dimensions (mm[inch])



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