NBE-4502-AL Bullet 2MP 2.8-12mm auto IP67 IK10

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Invented for life

- Easy to install with auto zoom/focus lens, wizard and pre-configured modes
- Built-in IR illuminator with 60 m (196 ft) viewing distance
- 1080p30 for highly detailed images
- Built-in Essential Video Analytics to trigger relevant alerts and quickly retrieve data
- Fully configurable H.265 multi-streaming

The 1080p infrared bullet from Bosch is a professional surveillance camera that provides high quality HD images for demanding security and surveillance network requirements.
This robust bullet camera is a true day/night camera offering excellent performance day or night. The built-in infrared LEDs provides quality night time monitoring with 60 m (196 ft) viewing distance in darkness.

System overview

Outdoor bullet camera with Automatic Varifocal lens
The robust aluminum housing provides high installation flexibility. The camera resists both water and dust ingress in tough environments and is rated to IP67 standards. The 2.8 to 12 mm AVF (Automatic Varifocal) lens allows you to choose the coverage area remotely.
The automatic zoom/focus lens wizard makes it easy for an installer to accurately zoom and focus the camera for both day and night operation. The wizard is activated from the PC or from the on-board camera push button making it easy to choose the workflow that suits best.

The AVF (Automatic Varifocal) feature means that the zoom can be changed without opening the camera. The automatic motorized zoom/focus adjustment with 1:1 pixel mapping ensures the camera is always accurately focused.

Functions

Essential Video Analytics
The built-in video analysis reinforces the Intelligence-at-the-Edge concept and now delivers even more powerful features. Essential Video Analytics is ideal for use in controlled environments with limited detection ranges.
The system reliably detects, tracks, and analyzes objects, and alerts you when predefined alarms are triggered. A smart set of alarm rules makes complex tasks easy and reduces false alarms to a minimum. Metadata is attached to your video to add sense and structure. This enables you to quickly retrieve the relevant images from hours of stored video. Metadata can also be used to deliver irrefutable forensic evidence or to optimize business processes based on people counting or crowd density information.

Calibration is quick and easy – just enter the height of the camera. The internal gyro/accelerometer sensor provides the rest of the information to precisely calibrate the video analytics.

Intelligent streaming reduces bandwidth and storage requirements
The low-noise image and the efficient H.265 compression technology provide clear images while reducing bandwidth and storage by up to 80% compared to standard H.264 cameras. With this new generation of cameras an extra level of intelligence is added with Intelligent Streaming. The camera provides the most usable image possible by cleverly optimizing the detail-to-bandwidth ratio. The smart encoder continuously scans the complete scene as well as regions of the scene and dynamically adjust compression based on relevant information like movement. Together with Intelligent Dynamic Noise Reduction, which actively analyzes the contents of a scene and reduces noise artifacts accordingly, bitrates are reduced by up to 80%. Because noise is reduced at the source during image capture, the lower bitrate does not compromise image quality. This results in substantially lower storage costs and network strain and still retain a high image quality and smooth motion.

Bitrate optimized profile
The average typical optimized bitrate in kbits/s for various frame rates when in H.265 mode is shown in the table:

fps	1080p	720p
30	600	450
12	438	329
5	284	213
2	122	92

Multiple streams
The innovative multi-streaming feature delivers various H.264 or H.265 streams together with an M-JPEG stream. These streams facilitate bandwidth-efficient viewing and recording as well as integration with third-party video management systems.
The camera can run multiple independent streams that allows to set a different resolution and frame rate on the first and second stream. The user can also choose to use a copy of the first stream.
The third stream uses the I-frames of the first stream for recording; the fourth stream shows a JPEG image at a maximum of 10 Mbit/s.

Regions of interest and E-PTZ
Regions of Interest (ROI) can be user defined. The remote E-PTZ (Electronic Pan, Tilt and Zoom) controls allow you to select specific areas of the parent image. These regions produce separate streams for remote viewing and recording. These streams, together with the main stream, allow the operator to separately monitor the most interesting part of a scene while still retaining situational awareness.

Two-way audio and audio alarm
Two-way audio allows the operator to communicate with visitors or intruders via an external audio line input and output. Audio detection can be used to generate an alarm if needed.

Tamper and motion detection
A wide range of configuration options is available for alarms signaling camera tampering. A built-in algorithm for detecting movement in the video can also be used for alarm signaling.

Storage management
Recording management can be controlled by the Bosch Video Recording Manager
(Video Recording Manager) or the camera can use iSCSI targets directly without any recording software.

Edge recording
The MicroSD card slot supports up to 2 TB of storage capacity. A microSD card can be used for local alarm recording. Pre-alarm recording in RAM reduces recording bandwidth on the network, or — if microSD card recording is used — extends the effective life of the storage medium.

Cloud-based services
The camera supports time-based or alarm-based JPEG posting to four different accounts. These accounts can address FTP servers or cloud-based storage facilities (for example, Dropbox). Video clips or JPEG images can also be exported to these accounts.
Alarms can be set up to trigger an e-mail or SMS notification so you are always aware of abnormal events.

Easy installation
Power for the camera can be supplied via a Power-over-Ethernet compliant network cable connection. With this configuration, only a single cable connection is required to view, power, and control the camera. Using PoE makes installation easier and more cost-effective, as cameras do not require a local power source.
The camera can also be supplied with power from 24 VAC or +12 VDC SELV class 2 power supplies.
For trouble-free network cabling, the camera supports Auto-MDIX which allows the use of straight or cross-over cables.

True day/night switching
The camera incorporates mechanical filter technology for vivid daytime color and exceptional night-time imaging while maintaining sharp focus under all lighting conditions.

Hybrid mode
An analog video output enables the camera to operate in hybrid mode. This mode provides simultaneous high resolution HD video streaming and an analog video

output via a BNC connector. The hybrid functionality offers an easy migration path from legacy CCTV to a modern IP-based system.

DORI coverage
DORI (Detect, Observe, Recognize, Identify) is a standard system (EN-62676-4) for defining the ability of a camera to distinguish persons or objects within a covered area. The maximum distance at which a camera/lens combination can meet these criteria is shown below:

2MP Camera with 2.8 mm - 12 mm lens

DORI	DORI definition	Distance 2.8 mm / 12 mm	Horizontal width
Detect	25 px/m 8 px/ft	33 m / 130 m 105 ft / 427 ft	79 m 249 ft
Observe	63 px/m 19 px/ft	13 m / 51 m 43 ft / 167 ft	31 m 102 ft
Recognize	125 px/m 38 px/ft	6 m / 26 m 20 ft / 85 ft	14 m 46 ft
Identify	250 px/m 76 px/ft	3 m / 13 m 9 ft / 43 ft	7 m 23 ft

Data security
Special measures have been put in place to ensure the highest level of security for device access and data transport. The three-level password protection with security recommendations allows users to customize device access. Web browser access can be protected using HTTPS and firmware updates can also be protected with authenticated secure uploads.
The on-board Trusted Platform Module (TPM) and Public Key Infrastructure (PKI) support, guarantee superior protection from malicious attacks. The 802.1x network authentication with EAP/TLS, supports TLS 1.2 with updated cipher suites including AES 256 encryption.
The advanced certificate handling offers:
- Self-signed unique certificates automatically created when required
- Client and server certificates for authentication
- Client certificates for proof of authenticity
- Certificates with encrypted private keys

Complete viewing software
There are many ways to access the camera's features: using a web browser, with the Bosch Video Management System, with the free-of-charge Bosch Video Client or Video Security Client, with the video security mobile app, or via third-party software.

Video security app
The Bosch video security mobile app has been developed to enable Anywhere access to HD surveillance images allowing you to view live images from any location. The app is designed to give you complete control of all your cameras, from panning and tilting to zoom and focus functions. It's like taking your control room with you.
This app, together with the integrated Bosch Dynamic Transcoding on the DIVAR IP recorders, will allow you to fully utilize our dynamic transcoding features so you can play back images even over low-bandwidth connections.

System integration
The camera conforms to the ONVIF Profile S and Profile G specifications. This guarantees interoperability between network video products regardless of manufacturer.
Third-party integrators can easily access the internal feature set of the camera for integration into large projects. Visit the Bosch Integration Partner Program (IPP) website (ipp.boschsecurity.com) for more information.

Certifications and approvals

HD standards
Complies with the SMPTE 274M-2008 Standard in:
- Resolution: 1920x1080
- Scan: Progressive
- Color representation: complies with ITU-R BT.709
- Aspect ratio: 16:9
- Frame rate: 25 and 30 frames/s

Complies with the SMPTE 296M-2001 Standard in:
- Resolution: 1280x720
- Scan: Progressive
- Color representation: complies with ITU-R BT.709
- Aspect ratio: 16:9
- Frame rate: 25 and 30 frames/s

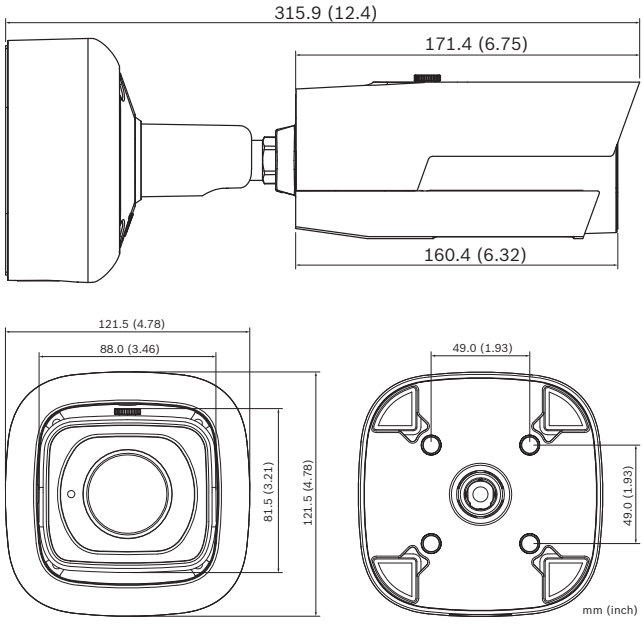
Standards	IEC 62471 (IR version)
	EN 60950-1
	cUL 60950-1
	EN 60950-22
	cUL 60950-22
	CAN/CSA-C22.2 NO. 60950-1-07
	EN 50130-4
	EN 50130-5, Class IV (outdoor in general)
	FCC Part15 Subpart B, Class B
	EN 55032
	EN 61000-3-2
	EN 61000-3-3
	EN 55024
	AS/NZS CISPR 32
	ICES-003 Class B
	VCCI J55022 V2/V3

	EN 50121-4
ONVIF compliance	EN 50132-5-2; IEC 62676-2-3
Product certifications	CE, FCC, UL, cUL, C-tick, CB, VCCI, EAC

Ingress protection	IP67
Impact protection	IK10, including the front glass of the camera

Region	Regulatory compliance/quality marks	
Europe	CE	DINION IP 4/5/6000i
USA	UL	DINION IP 4/5/6000i

Installation/configuration notes



Parts included

Quantity	Component
1	Camera
1	Quick installation guide
1	Safety instructions
1	Camera screw kit

Technical specifications

Power	
Input voltage	Power-over-Ethernet (48 VDC nominal); or 24 VAC ±10% / +12 VDC ±10%
PoE IEEE standard	IEEE 802.3af (802.3at Type 1) Power level: Class 3
Power consumption	950 mA (12 VDC) 750 mA (24 VAC) 260 mA (PoE)

Sensor	
Sensor type	1/2.8-inch CMOS
Active pixels	1937 (H) x 1097 (V); approximately 2.12MP

Video performance - Sensitivity	
Sensitivity - (3200K, reflectivity 89%, F1.4, 30IRE)	
Color	0.052 lux
Mono	0.008 lux
With IR	0.0 lx

Video performance - Dynamic range	
Wide Dynamic Range	92 dB WDR
Measured according to IEC 62676 Part 5	85 dB WDR

Video streaming	
Video compression	H.265; H.264; M- JPEG
Streaming	Multiple configurable streams in H.264 or H. 265 and M-JPEG, configurable frame rate and bandwidth. Regions of Interest (ROI)
Camera processing latency	<55 ms (max. average at 1080p30)
GOP structure	IP, IBP, IBBP
Encoding interval	1 to 25 [30] fps
Encoding regions	Up to 8 areas with encoder quality settings per area

Video resolution (H x V)	
1080p HD	1920 x 1080
Upright mode 1080p	1080 x 1920
1.3 MP (5:4) (cropped)	1280 x 1024
Upright mode 1.3 MP (5:4) (cropped)	1024 x 1280

Video resolution (H x V)	
720p HD	1280 x 720
Upright mode 720p	720 x 1280
D1 4:3 (cropped)	704 x 480
432p SD	768 x 432
288p SD	512 x 288
144p SD	256 x 144

Camera installation	
Base frame rate	25/30 fps (PAL/NTSC for analog output)
Mirror image	On / Off
Rotate	0° / 90° / 180° / 270°
Camera LED	Enable/disable
Analog output	Off, 4:3 letterbox, 4:3 crop, 16:9
Positioning	Coordinate / Mounting
Lens wizard	Zoom, Autofocus

Video functions - color	
Adjustable picture settings	Contrast, Saturation, Brightness
White Balance	2500 to 10000K, 4 automatic modes (Basic, Standard, Sodium lamp, Dominant color), Manual mode and Hold mode

Video functions - ALC	
Day/Night	Auto (adjustable), Color, Monochrome
Shutter	Automatic Electronic Shutter (AES); Fixed shutter (1/25[30] to 1/15000) selectable; Default shutter
IR intensity	Adjustable

Video functions - enhance	
Sharpness	Sharpness enhancement level selectable
Backlight compensation	On/off
Contrast enhancement	On/off
Noise reduction	Intelligent Dynamic Noise Reduction with separate temporal and spatial adjustments
Intelligent defog	Intelligent Defog automatically adjusts parameters for best picture in foggy or misty scenes (switchable)
Signal to Noise Ratio (SNR)	>55dB

Video content analysis	
Analysis type	Essential Video Analytics
Features	Rule based alarms and tracking Line crossing Enter /leave field Follow route Loitering Idle / removed object People counting Crowd density estimation 3D tracking

Additional functions	
Scene modes	Nine default modes, Scheduler
Privacy Masking	Eight independent areas, fully programmable
Video authentication	Off / Watermark / MD5 / SHA-1 / SHA-256
Display stamping	Name; Logo; Time; Alarm message
Pixel counter	Selectable area

Local storage	
Internal RAM	60 s pre-alarm recording
Memory card slot	Supports up to 32 GB microSDHC / 2 TB microSDXC card. (A memory card of Class 6 or higher is recommended for HD recording)
Recording	Continuous recording, ring recording. alarm/ events/schedule recording

Night vision	
Distance	60 m (196 ft)
LED	4 LED high efficiency array, 850 nm

Lens	
Lens type	Automatic Varifocal 2.8 to 12 mm, DC Iris F1.4 – 360
Lens mount	Board mounted
Horizontal field of view	33° - 100°
Vertical field of view	19° - 52°

Input/output connections	
Analog video output	CVBS, 1 Vpp, BNC connector, 75 Ohm, approx. 500 TVL Selectable standard
Alarm input	Short or DC 5V activation
Alarm out	Input rating Maximum 0.5 A, 30 VAC / 40 VDC
Audio input	Wires; 10 kOhm typ. 0.707 Vrms

Input/output connections	
Audio output	Wires; 16 Ohm typ. 0.707 Vrms
Network connector	RJ45

Audio streaming	
Standard	G.711, 8 kHz sampling rate L16, 16 kHz sampling rate AAC-LC, 48 kbps at 16 kHz sampling rate AAC-LC, 80 kbps at 16 kHz sampling rate
Signal-to-Noise Ratio	>50 dB
Audio Streaming	Full-duplex / half duplex

Software	
Unit discovery	IP Helper
Unit configuration	Via web browser or Configuration Manager
Firmware update	Remotely programmable
Software viewing	Web browser; Video Security Client; Video Security App; Bosch Video Management System; Bosch Video Client; or third party software
Latest firmware and software	http://downloadstore.boschsecurity.com/

Network	
Protocols	IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP/RTCP, IGMP V2/V3, ICMP, ICMPv6, RTSP, FTP, ARP, DHCP, APIPA (Auto-IP, link local address), NTP (SNTP), SNMP (V1, V3, MIB-II), 802.1x, DNS, DNSv6, DDNS (DynDNS.org, selfHOST.de, no-ip.com), SMTP, iSCSI, UPnP (SSDP), DiffServ (QoS), LLDP, SOAP, Dropbox™, CHAP, digest authentication
Encryption	TLS1.0/1.2, AES128, AES256
Ethernet	10/100 Base-T, auto-sensing, half/full duplex
Connectivity	Auto-MDIX
Interoperability	ONVIF Profile S; ONVIF Profile G; GB/T 28181

Mechanical	
3-axis adjustment (pan/tilt/rotation)	360º / 90º / 360º
Dimensions (H x W x D)	271 x 90 x 90 mm (10.7 x 3.5 x 3.5 in) without SMB
Weight of the camera without SMB	1.3 kg (2.9 lb)
Weight of the SMB	0.67 kg (1.48 lb)
Color	RAL 9006

Environmental	
Operating temperature	-40 ºC to +60 ºC (-40 ºF to +140 ºF) for continuous operation; -34 ºC to +74 ºC (-30 ºF to +165 ºF) according to NEMA TS 2-2003 (R2008), para 2.1.5.1 using fig. 2.1 test profile
Storage temperature	-40 ºC to +70 ºC (-40 ºF to +158 ºF)
Operating humidity	5% to 100% relative humidity (condensing) 5% to 93% relative humidity (non condensing)
Storage humidity	0% to 93% relative humidity (non condensing)

Ordering information

NBE-4502-AL Bullet 2MP 2.8-12mm auto IP67 IK10
Robust IP bullet camera with infrared illumination for outdoor HD surveillance with H.265 and Essential Video Analytics.
Order number **NBE-4502-AL**

Accessories

LTC 9213/01 Pole mount adapter for LTC9210,9212,9215
Flexible pole mount adapter for camera mounts (use together with the appropriate wall mount bracket). Max. 9 kg (20 lb); 3 to 15 inch diameter pole; stainless steel straps
Order number **LTC 9213/01**

NPD-5001-POE Power over ethernet , 15.4W, 1-port
Power-over-Ethernet midspan injector for use with PoE enabled cameras; 15.4 W, 1-port
Weight: 200 g (0.44 lb)
Order number **NPD-5001-POE**

NPD-5004-POE Power over ethernet, 15.4W, 4-port
Power-over-Ethernet midspan injectors for use with PoE enabled cameras; 15.4 W, 4-ports
Weight: 620 g (1.4 lb)
Order number **NPD-5004-POE**

VDA-CMT-PTZDOME Corner mount adapter

Corner (270°) mount adapter for use with the appropriate wall mount
Order number **VDA-CMT-PTZDOME**

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24011639435 | en, V12, 28. Mar 2018