NDE-4512-A Fixed dome 2MP HDR 3-9mm IP66

FLEXIDOME IP 4000i



- Easy to install with auto zoom/focus lens, wizard and pre-configured modes
- Built-in Essential Video Analytics to trigger relevant alerts and quickly retrieve data
- Fully configurable H.265 multi-streaming
- High Dynamic Range to see every detail in both bright and dark areas of the scene
- Starlight camera technology with excellent low-light performance

The 1080p dome cameras from Bosch are professional surveillance cameras that provide high quality HD images for demanding security and surveillance network requirements. These domes are true day/night cameras offering excellent performance day or night.

System overview

Vandal resistant outdoor dome with varifocal lens
Ideal for outdoor use, the IK10-rated design is suitable for installations where a vandal resistance is important. The camera is protected against water and dust to IP66 standards. The varifocal lens allows you to choose the coverage area to best suit your application. Mounting options are numerous, including surface, wall, and suspended-ceiling mounting.
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.

Fast performance
The 60 frames per second mode provides for optimum performance in fast action scenes that ensures no critical data is lost.

Starlight performance
The latest sensor technology combined with the sophisticated image processing and noise suppression results in an exceptional sensitivity in

color. The low-light performance is so good that the camera continues to provide excellent color performance even with a minimum of ambient light.

High Dynamic Range
The camera has High Dynamic Range. This is based on a multiple-exposure process that captures more details in the highlights and in the shadows even in the same scene. The result is that you can easily distinguish objects and features, for example, faces with bright backlight.
The actual dynamic range of the camera is measured using Opto-Electronic Conversion Function (OECF) analysis according to IEC 62676 Part 5. This method is used to provide standardized measurements, which can be used to compare different cameras.

Content Based Imaging Technology
Content Based Imaging Technology (CBIT) is used to radically improve image quality in all lighting conditions and to identify areas for enhanced processing. The camera examines the scene using Essential Video Analytics and provides feedback to re-tune the image processing. This provides better detail in the areas that matter and better all-round performance. Intelligent Auto Exposure technology, for example, allows you to view moving objects in bright and dark areas of a scene.

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.

Area-based encoding
Area-based encoding is another feature which reduces bandwidth. Compression parameters for up to eight user-definable regions can be set. This allows uninteresting regions to be highly compressed, leaving more bandwidth for important parts of the scene.

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
60	712	525
30	600	450
12	438	329
5	284	213
2	122	92

Multiple streams
The 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.

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 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. 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 +12 VDC/24 VAC power supplies. To increase system reliability, the camera can be simultaneously connected to both PoE and +12 VDC/24 VAC supplies. Additionally, uninterruptible power supplies (UPS) can be used, which will allow continuous operation, even during a power failure.
For trouble-free network cabling, the camera supports Auto-MDIX which allows the use of straight or cross-over cables.

Automatic image rotation
The integrated gyro/accelerometer sensor automatically corrects the image orientation in steps of 90° if the camera is mounted at right angles or upside down. The sensor image can also be rotated manually through steps of 90°.
To efficiently capture details in long hallways without loss of resolution, mount the camera at right angles. The image is displayed upright at full resolution on your monitor.

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 an SMB 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 person viewing the video 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:

1080p camera with 3-9 mm lens

DORI	DORI definition	Distance 3 mm / 9 mm	Horizontal width
Detect	25 px/m 8 px/ft	32 m / 126 m 104 ft / 412 ft	77 m 252 ft
Observe	63 px/m 19 px/ft	13 m / 50 m 41 ft / 164 ft	30 m 100 ft
Recognize	125 px/m 38 px/ft	6 m / 25 m 21 ft / 82 ft	15 m 50 ft
Identify	250 px/m 76 px/ft	3 m / 13 m 10 ft / 41 ft	8 m 25 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 BVMS, with the free-of-charge Bosch Video Client or Video Security Client, with the video security mobile app, or via third-party software.

System integration
The camera conforms to the ONVIF Profile G, ONVIF Profile M, ONVIF Profile S, and ONVIF Profile T 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.

Regulatory information

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

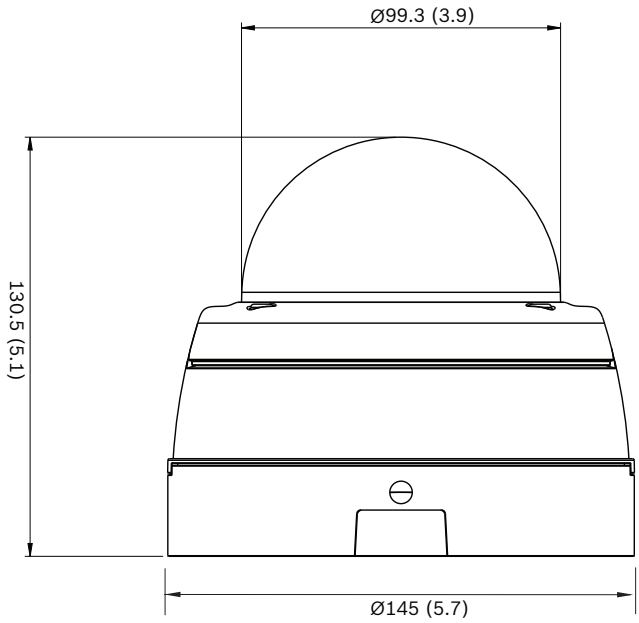
Complies with the SMPTE 296M-2001 Standard in:

- Resolution: 1280x720
- Scan: Progressive
- Color representation: complies with ITU-R BT.709
- Aspect ratio: 16:9
- Frame rate: 25 and 30 frames/s

Type	Standard
	EN 60950-1
	UL 60950-1
	UL 60950-22
	CAN/CSA-C22.2 NO. 60950-1-03
	CAN/CSA-C22.2 NO. 60950-22
	EN 50130-4
	EN 50130-5
	FCC Part15 Subpart B, Class B
	EMC directive 2014/30/EU
	EN 55032 class B
	EN 55024
	AS/NZS CISPR 32 (equal to CISPR 32)
	ICES-003 Class B
	VCCI J55022 V2/V3
	EN 50121-4:2016
	EN 60950-22
ONVIF compliance	EN 50132-5-2; IEC 62676-2-3
Product certifications	CE, FCC, UL, cUL

Region	Regulatory compliance/quality marks	
Europe	CE	EU_DoC_F.01U.403.295
USA	UL CAP	Cybersecurity Assurance Program
Great Britain	UKCA	

Installation/configuration notes



Dimensions in mm (inch)

Parts included

Quantity	Component
1	Camera
1	Quick installation guide
1	Safety instructions
1	Camera screw kit
1	Conduit adapter kit
1	Desiccant

Technical specifications

Electrical

Input voltage (AC)	24 VAC ± 10%
Input voltage (DC)	12 VDC ± 5%
PoE input	PoE IEEE 802.3af / 802.3at Type 1, Class 3
PoE nominal voltage (VDC)	48 VDC
Power consumption VDC (W) (typical – maximum)	7.15 W
Power consumption VAC (W) (typical – maximum)	6.15 W

Power consumption PoE (W) (typical – maximum)	7 W

Sensor

Sensor type	1/2.8 inch CMOS
Effective pixels (H x V)	1,920 x 1,080
Total sensor pixels	2 MP approx.

Optical

Lens type	3 mm to 9 mm
Lens mount	Board mounted
F-stop	1.3 - 360
Iris control	Automatic; DC-iris
IR corrected	Yes
Day / Night	Switched mechanical IR filter
Zoom/focus control	Motorized
Horizontal field of view (°)	106° – 37°
Vertical field of view (°)	55° – 21°

Video functions

Day/night modes	Auto (adjustable switch points); Color; Monochrome
Camera functionality	Mirror image; Rotation 90°; Rotation 180°; Flip image; Geolocation; Back-light compensation (BLC); Intelligent dynamic noise reduction; Contrast enhancement; Sharpness enhance-ment; Intelligent defog; Pixel counter; Saturation; Brightness; Video watermarking; Display stamp-ing; Location; Rotation 0°; Rotation 270°
White balance (K)	2,000 K – 10,000 K
White balance modes	Basic; Standard; Sodium vapor; Dominant color; Manual mode; Hold mode; 4 automatic modes
Shutter modes	Automatic Electronic Shutter (AES); Default shutter; Fixed (1/25[30] to 1/15000) selectable
Number of privacy masks	8 independent areas, fully program-mable
Scene modes	Standard; Sodium lighting; Vibrant; Sports & gaming; Retail; License plate recognition; Fast movement; Sensitivity boost; Dynamic back-light; Color only
Color (lx)	0.0225 lx (3100K, reflectivity 89%, 1/25, F1.3, 30IRE)
Monochrome (lx)	0.0051 lx (3100K, reflectivity 89%, 1/25, F1.3, 30IRE)
Wide Dynamic Range (WDR) (dB)	146 dB
Measured according to IEC 62676 Part 5 (dB)	107 dB

Video streaming

Video compression	H.264 (ISO/IEC 14496-10); M-JPEG; H.265/HEVC
Streaming	Multiple configurable streams in H.265; Configurable framerate and bandwidth; Region of Interest (ROI); Multiple configurable streams in H.264; Multiple configurable streams in M-JPEG
Camera processing latency	<120ms (maximum average at 1080p60)
GOP structure	IP; IBP; IBBP
Encoding interval	1 to 50 [60] fps
Encoding regions	Up to 8 areas with encoder quality settings per area
Video signal-to-noise ratio (dB)	>55 dB
Noise reduction	Intelligent Dynamic Noise Reduction with separate temporal and spatial adjustments
Resolution	1920 x 1080; 1280 x 720; 768 x 432; 640 x 480; 1536 x 864; 720 x 480

Video content analysis

Analysis type	Essential Video Analytics
Alarm triggers	Line crossing; Enter / leave field; Loitering; Follow route; Idle / re-moved object; Counting; Crowd density estimation; 3D tracking; Rule based alarms and tracking; Audio de-tection

Calibration	Automatic based on gyro / accelero-meter data and camera height
Tamper detection	Maskable
Audio detection	Detection of audio to generate an alarm

Inputs and outputs

Analog video out	SMB connector, CVBS (PAL/NTSC), 1 Vpp, 75 Ohm, approx. 500 TVL
Audio input	1 Line-in
Audio line in	0.707 Vrms max, 10 kOhm typical
Audio output	1 Line-out
Audio line out	0.707 Vrms at 16 Ohm typical
Alarm input activation	Short or DC 5V activation
Alarm output voltage	30 VDC, max. load 0.5 A
Ethernet	RJ45

Capacity

Alarm inputs	1
Alarm outputs	1
Number of RJ45 connections	1

Audio

Audio input	Line-in
Audio output	Line-out
Compression and sampling rate	G.711 8 kHz; L16 16 kHz; AAC-LC 80kbps 16 kHz; AAC-LC 48kbps 16 kHz
Minimum signal-to-noise ratio (dB)	50 dB
Audio streaming	Full duplex; Half duplex

Storage

Internal storage	5-s-pre-alarm-recording
Memory card slot	Micro SDHC; Micro SDXC (Supports up to 32 GB microSDHC / 2 TB microSDXC card. A memory card of Class 6 or higher is recommended for HD recording.)
Recording mode	Continuous (ring); Scheduled; Alarm; Event

Data security

Encryption	TLS 1.2; TLS 1.0; AES 256; AES 128

Firmware

Common Product Platform	CPP7.3

Network

Ethernet type	10/100BASE-T; Auto-sensing; Full / half duplex

System integration

Protocols / standards	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, MIBII); SNMP (V3, MIBII); 802.1x, EAP/TLS; DNS; DNSv6; DDNS (DynDNS.org, selfHOST.de, no-ip.com); SMTP; iSCSI; UPnP (SSDP); DiffServ (QoS); LLDP; SOAP; CHAP; Digest authentication; IGMP; RTSPS; SRTP
Conformity	ONVIF Profile S; ONVIF Profile G; ONVIF Profile T; Auto-MDIX; ONVIF Profile M

Mechanical

3-axis adjustment (pan / tilt / rotation)	350º / 130º / 350º
Dimensions (Ø x H) (mm)	145 mm x 131 mm
Dimensions (Ø x H) (in)	5.71 in x 5.14 in
Weight (g)	1,102 g
Weight (lb)	2.43 lb
Color	White; Traffic black
Color (RAL)	RAL 9003 Signal white; RAL 9017
Material	Aluminum
Bubble material	Clear polycarbonate
Coating type	Clear with anti-scratch coating

Environmental

Operating temperature (°C)	-40 °C – 50 °C for continuous operation; -34 ºC - 74 ºC according to NEMA TS 2-2003 (R2008), para 2.1.5.1 using fig. 2.1 test profile
Operating temperature (°F)	-40 °F – 122 °F for continuous operation; -30 ºF - 165 ºF according to NEMA TS 2-2003 (R2008), para 2.1.5.1 using fig. 2.1 test profile
Storage temperature (°C)	-40 °C – 70 °C
Storage temperature (°F)	-40 °F – 158 °F
Operating relative humidity, non-condensing (%)	5% – 93%
Operating relative humidity, condensing (%)	5% – 100%
Impact protection	IK10
IP rating	IP66
Degree of protection	NEMA type 4X
Country of origin	Portugal

Ordering information

NDE-4512-A Fixed dome 2MP HDR 3-9mm IP66
Vandal resistant IP dome camera for outdoor HD 60 fps surveillance with H.265 and Essential Video Analytics. NDAA compliant
Order number **NDE-4512-A**

Accessories

BUB-CLR-FDO Bubble, clear, outdoor
Clear polycarbonate bubble for dome camera
Outdoor
Order number **BUB-CLR-FDO**

BUB-TIN-FDO Bubble, tinted, outdoor
Tinted polycarbonate bubble for dome camera.
Outdoor
Order number **BUB-TIN-FDO**

NBN-MCSMB-03M Cable, SMB to BNC, camera-cable, 0.3m
0.3 m (1 ft) analog cable, SMB (female) to BNC (female) to connect camera to coaxial cable
Order number **NBN-MCSMB-03M**

NBN-MCSMB-30M Cable, SMB to BNC, camera-monitor/DVR
3 m (9 ft) analog cable, SMB (female) to BNC (male) to connect camera to monitor or DVR
Order number **NBN-MCSMB-30M**

NDA-5030-PIP Pendant interface plate NDE-4/5000
Pendant interface plate for outdoor FLEXIDOME 4000i / 5000i.
Order number **NDA-5030-PIP**

NDA-ADT4S-MINDOME Surface mount box for dome camera
Surface mount box (Ø145 mm / Ø5.71 in) for dome cameras (for indoor camera variant, use together with NDA-ADTVEZ-DOME).
Order number **NDA-ADT4S-MINDOME**

NDA-FMT-DOME Inceiling flush mount for dome camera
In-ceiling flush mounting kit for dome cameras (Ø157 mm)
Order number **NDA-FMT-DOME**

NDA-SMB-MINISMB Surface mount box for dome camera 5.87"
Surface mount box (Ø149 mm / Ø5.87 in)
Order number **NDA-SMB-MINISMB**

NDA-U-CMT Corner mount adapter
Universal corner mount, white
Order number **NDA-U-CMT**

NDA-U-PMAL Pole mount adapter large
Universal pole mount adapter, white; large
Order number **NDA-U-PMAL**

NDA-U-PMAS Pole mount adapter small
Pole mount adapter small
Universal pole mount adapter, white; small.
Order number **NDA-U-PMAS**

NDA-U-PMT Pendant pipe mount, 12" (31cm)
Universal pipe mount for dome cameras, 31 cm, white
Order number **NDA-U-PMT**

NDA-U-PMTE Pendant pipe extension, 20" (50cm)
Extension for universal pipe mount, 50 cm, white
Order number **NDA-U-PMTE**

NDA-U-PSMB Pendant wall/ceiling mount SMB
Surface mount box (SMB) for wall mount or pipe mount.
Order number **NDA-U-PSMB**

NDA-U-RMT Pendant parapet mount
Universal roof mount for dome cameras, white, for outdoor usage
Order number **NDA-U-RMT**

NDA-U-WMT Pendant wall mount
Universal wall mount for dome cameras, white
Order number **NDA-U-WMT**

NDN-IOC-30M Cable, IP66 certified, waterproof
An IP66 certified cable for easy waterproof installation, for outdoor usage
Order number **NDN-IOC-30M**

NPD-5001-POE Midspan, 15W, single port, AC in
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 Midspan, 4 port x 15W, AC in
Power-over-Ethernet midspan injector for use with PoE enabled cameras; 15.4 W, 4-ports
Weight: 620 g (1.4 lb)
Order number **NPD-5004-POE**

UPA-1220-60 Power supply, 120VAC 60Hz,12VDC 1A out
Power supply for camera. 100-240 VAC, 50/60 Hz In; 12 VDC, 1 A Out; regulated.
Input connector: 2-prong, North American standard (non-polarized).
Order number **UPA-1220-60**

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