

NDP-5523-Z30L-P PTZ 4MP HDR 30x IP66 pendant IR AUTODOME IP starlight 5100i IR



Specially designed for covertness, and tuned for applications where surveillance in scenes with changing light levels is necessary, the camera has an integrated 30X optical zoom to identify people at a distance of more than 280 m (919 ft).

The new HDR technology (HDR X) is ideal for PTZ cameras. With the motion-optimized HDR feature, operators can use HDR imaging in scenes with challenging light levels without seeing blur when the camera is moving.

With a 1/1.8-inch HD sensor and integrated IR and white light illumination, the camera provides superior low-light and no-light performance for outstanding image quality with sharp focus details and excellent color reproduction even under challenging lighting conditions.

The integrated, rain-sensing wiper automatically wipes water from the camera window to ensure outstanding image quality in bad weather.

Functions

Outstanding image quality

The 1/1.8-inch CMOS HD sensor combines outstanding sensitivity and sophisticated noise suppression with High dynamic range of 133dB. The camera provides superior low-light performance as well as outstanding image quality, with sharp focus details and excellent color reproduction even under challenging lighting conditions.

- ▶ 30X, 4MP high detail at fast speeds (60 fps)
- ▶ Starlight technology with 1/1.8 inch HD sensor for excellent low-light performance
- ▶ HDR X technology with up to 133dB dynamic range and fewer motion-related artifacts
- ▶ Combination of 320 m (1050 ft) IR (850 nm) + White light LEDs
- ▶ Rain-sensing wiper for improved images in rain and in dirty urban conditions

Pre-programmed user modes

The camera has several pre-configured scene modes with the best settings for various applications. With one click, users can optimize image settings to match the camera's lighting conditions. Users can also configure individual image settings.

- Standard: For indoor fluorescent lighting.
- Sodium-lighting: For scenarios where the video is captured under sunlight in the day or under sodium vapor lamp at night.
- Vibrant: For enhanced contrast, sharpness, and saturation
- LPR: For applications to capture reflective number plates in combination with IR lighting.

HDR X - High Dynamic Range

HDR X is a new technology that combines unique sensor functionality and advanced algorithms. It is a huge leap forward in capturing high-quality video of moving objects in scenes with a large dynamic range. It also allows HDR imaging at lower light levels in which traditional HDR technologies are non-functional. This is possible because the HDR X - Motion optimized mode takes two different readouts from one exposure to capture details in both the highlights and the shadows of the scene, instead of blending multiple exposures as do standard HDR technologies. Blending multiple exposures reduces sharpness and creates unwanted imaging artifacts on moving objects. HDR-X resolves these issues, providing a crisp image with improved dynamic range.

In case an even larger dynamic range is required, HDR X - Optimized DR or HDR X - Extreme DR will further increase performance to an absolute maximum by

adding another fast exposure. This combines the benefits from HDR X - Motion optimized and traditional HDR.

H.265 high-efficiency video encoding

The camera is designed on the most efficient and powerful H.264 and H.265/HEVC encoding platform. The camera is capable of delivering high-quality and high-resolution video with very low network load. With a doubling of encoding efficiency, H.265 is the new compression standard of choice for IP video surveillance systems.

Intelligent streaming

Smart encoding capabilities, together with Intelligent Dynamic Noise Reduction technology and analytics, make the bandwidth consumption drop to extremely low levels. Only relevant information in the scene, such as motion or objects found with the analytics, are encoded.

Support for H.264 and H.265 with Encoder Regions

Set a region in the field of view and define a specific encoder profile to it. This setting reduces the bitrate of the stream further than intelligent streaming alone.

Recording and storage management

Recording management can be controlled by the Bosch Video Recording Manager application, or the camera can use local storage and iSCSI targets directly without any recording software.

A memory card with a maximum of 32 GB (microSDHC) / 2 TB (microSDXC) can be used for recording *at the edge* or for Automatic Network Replenishment (ANR) technology to improve the overall recording reliability.

Pre-alarm recording in RAM reduces bandwidth consumption on the network and extends the effective life of the memory card.

Essential Video Analytics on the edge

The camera includes the latest release of Essential Video Analytics application from Bosch for use on Pre-positions.

The Essential Video Analytics application provides reliable video analytics for small and medium business, large retail stores, commercial buildings, and warehouses.

Advanced tasks like multiple line crossing, loitering, idle / removed object detection, crowd density estimation, occupancy and people counting are available for live alarming and forensic search. Object filters based on size, speed, direction, aspect ratio, and color can be defined.

A simplified calibration mode reduces installation time significantly, because you only need to enter the installation height once for each camera, independent of pre-positions.

After the camera is calibrated, the analytics engine can automatically classify objects as upright person, car, bike, or truck.

Sophisticated alarm responses

The camera supports advanced alarm control that uses sophisticated rules-based logic to determine how to manage alarms. In its most basic form, a rule could define which input(s) should activate which output(s). In a more complex form, inputs and outputs can be combined with pre-defined or user-specified commands to perform advanced camera functions.

Superior privacy masking

The camera allows for a total of 32 individual privacy masks, with up to eight masks displayed in the same scene. Each mask can be programmed with eight corners. Each mask changes size and shape smoothly and quickly, ensuring that the covered object cannot be seen.

With the AUTO Privacy Mask, the color of the Privacy Mask will adapt to the color of the surroundings.

Dual-mode Illumination

The camera has an integrated, long-life, infrared (IR) Illuminator and White light LEDs.

The illuminator enables viewing of objects even in total darkness, ensuring high-quality images regardless of the lighting conditions.

The illuminator allows Detection of objects at a maximum distance of 320 m (1049 ft) with infrared (850 nm) and 60 m (196 ft) with White light.

The following table identifies the application for each type of LED.

Application	Type of illuminator
Close-range illumination	850 nm wide IR LEDs
Long-range illumination	850 nm narrow IR LEDs
Identification and deterrent	White light LEDs

IR illuminator

As ambient light decreases in the scene, the camera switches to monochrome mode and automatically activates the IR LEDs of the illuminator.

The IR mode AUTO can steer IR beam dynamically to match the illumination coverage and intensity with the camera's field of view.

Beam intensity is controlled automatically or manually, depending on user preference. Decreasing intensity reduces overexposure.

For close-range illumination, the wide angle IR LED will strengthen to cover the whole scene. With the increase of camera lens zoom ratio, the narrow angle of IR LED intensity will be increased.

A spotlight mode is provided to allow IR illuminator to brighten the center of the camera's field of view.

White light illuminator

White light mode allows operators to capture full scene details in color.

Operators can turn the White light LEDs on and off as necessary, especially to use as a deterrent effect.

Operators have the option to set automatic timeout of the White light mode. After this mode times out, the illuminator will operate in IR mode.

Operators can disable the White light functionality permanently or by sector in order to prevent activation in situations where White light might create a hazardous situation such as distracting a driver on a highway.

Snap to zoom

Drawing a box in the image will trigger the camera to zoom to the correct position.

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:

DORI	Distance to object		
	WIDE 1X	TELE 30X	Scene width
Detection 25 px/m (8 px/ft)	91 m (300 ft)	2794 m (9167 ft)	102 m (336 ft)
Observation 63 px/m (19 px/ft)	36 m (119 ft)	1109 m (3638 ft)	41 m (133 ft)
Recognition 125 px/m (38 px/ft)	18 m (60 ft)	559 m (1834 ft)	20 m (67.2 ft)
Identification 250 px/m (76 px/ft)	9 m (30 ft)	280 m (919 ft)	10 m (33.6 ft)

Data security

Special measures are necessary to ensure the highest level of security for device access and data transport. On initial setup, the camera is only accessible over secure channels. You must set a service-level password in order to access camera functions. Web browser and viewing client access can be protected using HTTPS or other secure protocols that support state-of-the-art TLS 1.2 protocol with updated cipher suites, including AES encryption with 256 bit keys. No software can be installed in the camera, and only authenticated firmware can be uploaded. A three-level password protection with security recommendations allows users to customize device access. Network and device access can be protected using 802.1x network authentication with EAP/TLS protocol. Superior protection from malicious attacks is guaranteed by the Embedded Login Firewall, on-board Trusted Platform Module (TPM) and Public Key Infrastructure (PKI) support.

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.

Software sealing

After camera configuration is set it should not be changed, and system administrators can enable software protection to seal the camera configuration. Any change of the sealing status or of the static configuration, accidental or intentional, will break the seal. The camera then sends an alarm message that the video management system can use to start an appropriate alarm scenario. The camera creates a separate log file of all changes that have an effect on the sealing status.

PTZ drive and mechanism

The camera supports 256 pre-positions and two styles of Guard Tours: Pre-position and Record/Playback. The Pre-position tour has capability for up to 256 pre-positions with a configurable dwell time between pre-positions and can be customized as to the order and the frequency that each Pre-position is visited. The camera also provides support for two (2) recorded tours, which have a total duration of 15 minutes of movements. These are recorded macros of an operator's movements, including pan, tilt, and zoom activities, and can be played back in a continuous manner.

Pan and tilt preset repeatability are accurate to within ± 0.1 degrees to ensure that the correct scene is captured every time. The camera delivers maximum pan speed of 240 degrees per second and maximum tilt speed of 100 degrees per second. The camera is capable of manual pan speeds as low as 0.1 degrees per second. The camera provides a pan range of up to 360 degrees continuous rotation.

Ease of installation and servicing

The camera has been designed for quick and easy installation, a key feature from Bosch IP video products. All housings feature recessed screws and latches for increased tamper resistance.

Bosch designed the camera with the knowledge that field cables and mounts are installed before the camera is mounted. The hinge design allows one person to hook the camera to the mount. One person can connect the cables directly to the camera without re-routing cables.

The pendant housing is rated to provide IP66 protection and offers an operating temperature range down to -40°C (-40°F). The pendant camera comes fully assembled with a sunshield and ready for pendant arm or pipe applications with the proper mounting hardware (sold separately).

Bosch offers a full complement of hardware and accessories (sold separately) for wall, corner, mast, roof, pipe mount, and in-ceiling applications for indoor and outdoor environments, which allow the camera to be adapted easily to individual site requirements.

Project Assistant

Project Assistant by Bosch is the market’s most easy-to-use app for initial installation and basic configuration of IP cameras. Off-site and without connection to the camera, basic configurations can be created and then shared with colleagues. On-site, these pre-configurations can be pushed onto the camera, making the installation procedure easier and less time-consuming. Cameras previously configured can be integrated as well. The app allows easy viewing and adjustment of the camera’s field of view. The app automatically generates a comprehensive report of the commissioned cameras.

Regulatory information

For a full list of all related certifications/standards, refer to the Product Tests Report, available on the online catalog, on the Documents tab of the product page for your device. If the document is unavailable on the product page, contact your sales representative.

Electromagnetic Compatibility (EMC)	FCC Part 15, ICES-003 EN 55032:2015/AC:2016 EN 50130-4:2011 EN 50121-4
Product Safety	Complies with UL, CE, CSA, EN, and IEC standards including: UL 62368-1 EN 62368-1 EN 60950-1 CAN/CSA-C22.2 No. 62368-1-14 IEC 62368-1 Ed.2 IEC 60950-1 Ed.2 IEC 60950-22 Ed.2
Marks	UL, CE, WEEE, RCM, EAC, VCCI, FCC, RoHS, CMIM, BIS*

Note: Some marks are available for specified models only.

Region	Regulatory compliance/quality marks	
Europe	CE	Declaration of Conformity (DoC) (AUTODOME IP starlight 5100i, -IR)
USA	UL	UL-US-2013713-0 Certificate of Compliance
	UL	IEC CB Test Certificate

Installation/configuration notes



Fig. 1: Wall mount with surveillance cabinet (IP66)

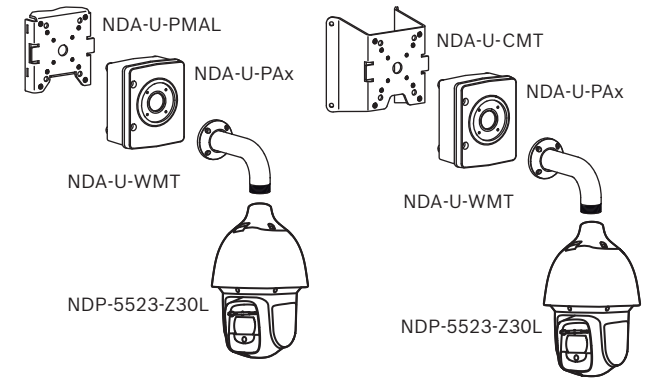


Fig. 2: Pole mount (IP66); corner mount (IP66)

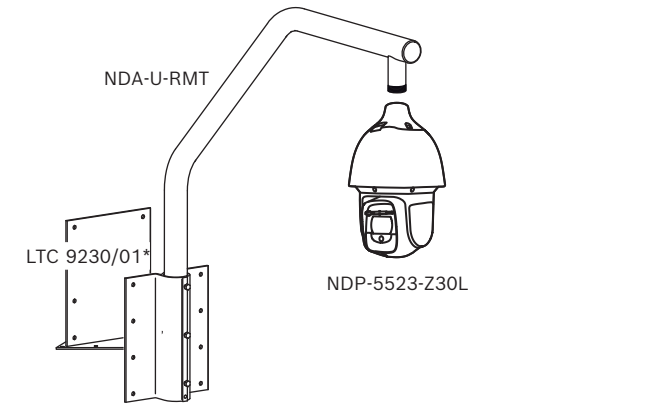
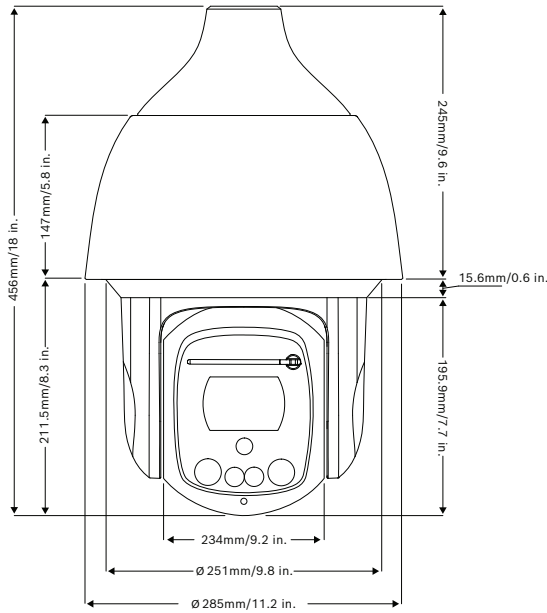


Fig. 3: Roof mount (IP66)
*optional for flat roof mount

For more options, see [Quick Selection Guide: Camera accessories](#).

Dimensional Drawings



Parts included

Quantity	Component
1	AUTODOME IP starlight 5100i IR camera
1	Screwdriver, T15 Torx
4	MAC address labels
1	Pendant interface plate
2	M4 screw
1	IP66 kit
1	PE foam
1	3/16" Allen key (Hex key)
1	Quick Installation Guide
1	Safety instructions

Technical specifications

Sensor type	1/1.8 inch HD CMOS
Sensor resolution	2688 x 1520 (4 MP)
Lens	30x motorized zoom 6.6 mm to 198 mm F1.5 to F4.8
Optical zoom Field of view (FOV)	2.1° to 58.5°
Focus	Automatic with manual override

Iris	Automatic with Iris priority feature
Digital zoom	16x
Video sensitivity	3100K, reflectivity 89%, 1/30, F1.5, 30 IRE
Color	0.0101 lux
Monochrome	0.0016 lux
High dynamic range	133dB
Measured according to IEC 62676 Part 5	108dB
Gain Control	AGC, Variable 6 dB to 78 dB
Electronic Shutter Speed (AES)	0.64 sec to 1/66666 sec
Signal-to-Noise Ratio (SNR)	>55 dB
Day/Night switch	Automatic IR cut filter
Backlight Compensation (BLC)	On / Off / Intelligent Auto Exposure (IAE)
White Balance	Basic auto, Standard auto, Sodium lamp auto, Dominant color auto, Manual
Day/Night (mode)	Monochrome, Color, Auto
Defog mode feature	Improves visibility when viewing foggy or other low-contrast scenes.
Noise reduction	Intelligent Dynamic Noise Reduction
Sector/Titling	16 independent sectors with 20 characters per title
Privacy Masks	32 individually configurable Privacy Masks; maximum 8 per Pre-position; programmable with 3, 4 or 5 corners; selectable color of Black, White, Gray, or Mosaic, as well as an "Auto" option in which the camera selects the most prevalent of the three colors in the background scene as the pattern color.
Supported Languages	English, German, Spanish, French, Italian, Dutch, Polish, Portuguese, Russian, Japanese, Chinese (simplified)
Other functions	Intelligent Streaming, snap to zoom

Video Content Analysis

Analysis type	Essential Video Analytics
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Video Content Analysis	
Configurations	Silent VCA / Profile 1/2 / Scheduled / Event triggered
Alarm rules (combinable)	Any object Object in field Line crossing Enter / leave field Loitering Follow route Idle / removed object Counting Occupancy Crowd density estimation Condition change Similarity search
Object filters	Duration Size Aspect ratio Speed Direction Color Object classes (4)
Calibration / Geolocation	Accelerometer data and camera height
Tamper detection	Maskable
Detection	Audio

Illumination

Number of LEDs, IR array	4
Wavelength	850 nm
Beam angle	10° FWHM (narrow) 54° FWHM (wide)
Performance Range, IR illuminator (based on DCRI criteria)	
Detection	320 m (1050 ft)
Observation	250 m (820 ft)
Recognition	150 m (492 ft)
Identification	100 m (329 ft)
Number of LEDs, White light array	2

Color temperature	5600-6300K
Beam angle	55° FWHM
Light intensity (3m)	90 lux
Performance Range, White light (based on DCRI criteria)	
Detection	60 m (197 ft)
Observation	50 m (164 ft)
Recognition	30 m (98 ft)
Identification	20 m (66 ft)

Mechanical

Pan speed	Normal: 0.1°/s - 120°/s (pan) Turbo mode: 0.1°/s - 240°/s (pan)
Tilt speed	Normal: 0.1°/s - 100°/s (tilt)
Pre-position speed	Pan: 240°/s Tilt: 100°/s Note: When the operating temperature of the camera is below 0 °C, the maximum pre-position speed will be 120°/s to keep pre-position accuracy.
Pan Range	360° continuous
Tilt Angle	-90° to 5° (Auto-flip 190°)
Pre-position Accuracy	± 0.1° typ.
Pre-positions	256
Tours	Custom recorded tours: two (2) Pre-position tours, maximum total duration 30 minutes: one (1), consisting of up to 256 scenes consecutively; one (1), customized up to 256 user-defined scenes

Preposition Pan Tilt Control Delay	60fps: 100 ms
Manual Pan Tilt Control Delay	Acceleration: 200 ms (From stop to max speed) De-acceleration: 200 ms (From 5° to stop), 900ms (From 100° to stop)

Electrical

Power source	24 VAC IEEE802.3bt, Type 3 standard
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Power consumption (24 VAC / IEEE802.3bt, Type 3 standard)	21.2W / 29.5VAC (Heater OFF, Illumination OFF) Maximum 39.4W / 55.2VAC (Heater ON, Illumination ON) When using 24VAC power or IEEE802.3bt, the camera operates with heater and full intensity of IR and White light.
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Network

Video compression	H.265 H.264 M-JPEG
Streaming	Four (4) streams: Two (2) configurable streams in H.264 or H.265 One (1) I-frame-only stream based on first stream One (1) M-JPEG stream
GOP Structure:	IP IBP IBBP
Maximum Frame rate	60fps at all resolutions
IP delay (typical)	60 fps: 166 ms (typical) 30 fps: 233 ms (typical)

Ethernet	10/100BASE-T
Encryption	TLS 1.0, SSL, DES, 3DES, AES
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

Interoperability	ONVIF Profile S, ONVIF Profile G, ONVIF Profile T
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Resolution

1440p	2560 x 1440
1080p HD	1920 x 1080
720p HD	1280 x 720
1.3MP 5:4 (cropped)	1280 x 1024
D1 4:3 (cropped) (4:3)	704 x 576
640x480	640x480
432p SD	768 x 432
288p SD	512 x 288
144p SD	256 x 144

The average typical optimized bitrate in kbits/second for various frame rates is shown in the table below:

Bitrate 2560 x 1440

FPS	H.264	H.265
60	7982	5973
30	4871	3662
25	4284	3218
15	3004	2240
8	1938	1458
4	1191	889
2	747	551
1	462	338

Actual bitrate may vary depending on the scene, picture settings, and encoder profile settings.

Audio

Compression	G.711, 8kHz sampling rate L16, 16kHz sampling rate AAC, 16kHz sampling rate
Interface	1/1 Channel In/Out

Local Storage

Memory card slot	Support a memory card with a maximum of 32 GB (microSDHC) / 2 TB (microSDXC) (user-supplied). (An SD card of Class 6 or higher is recommended for HD recording.)
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User Connections

Ethernet	RJ45 10/100 Base-T
Alarm Inputs	2
Alarm Outputs	1 relay output 5 VDC, 150 mA maximum
Audio	1x mono line in, 1x mono line out
Signal line in	94 kOhm typical, 1 Vrms maximum
Signal line out	1 kOhm typical, 1 Vrms maximum

Environmental

Ingress Protection Rating/ Standard	IP66
External Mechanical Impact (IK Code or Impact rating)	IEC 62262 IK10 (excluding glass window/wiper)

Operating temperature (Input voltage 24 VAC)	-40 °C to +60 °C (-40 °F to +140 °F)
Operating temperature (Input voltage 802.3bt)	-40 °C to +60 °C (-40 °F to +140 °F)
Humidity	Up to 90% relative humidity (RH) (non-condensing)
Storage temperature	-40 °C to +60 °C (-40 °F to +140 °F)

Construction

Dimensions (W x D)	285 mm x 456 mm (11. in. x 18 in.)
Weight	9.9 kg (21.8 lb)
Material, housing	Aluminum
Material, sunshield	Aluminum
Material, window	Optical glass
Standard Color	White (RAL 9003)
Standard Finish	Corrosion-resistant, powder coat paint
Wiper	Integrated, long-life silicone wiper

Ordering information

NDP-5523-Z30L-P PTZ 4MP HDR 30x IP66 pendant IR
PTZ dome camera, 4MP HDR, 30x optical zoom, clear, IP66 pendant, IR
Order number **NDP-5523-Z30L-P | F.01U.385.090**

Accessories

UPA-2450-50 PSU, 220VAC 50Hz, 24VAC 50VA out
Indoor power supply for camera. 220 VAC, 50 Hz in; 24 VAC, 50 VA out
Order number **UPA-2450-50 | F.01U.076.157**

UPA-2450-60 PSU, 120VAC 60Hz, 24VAC 50VA out
Indoor power supply for camera. 120 VAC, 60 Hz In; 24 VAC, 50 VA Out
Order number **UPA-2450-60 | F.01U.076.154**

NDA-U-PA0 Surveillance cabinet 24VAC
Surveillance cabinet, 24 VAC input, 24 VAC output, IP66
Order number **NDA-U-PA0 | F.01U.324.947**

NDA-U-PA1 Surveillance cabinet 120VAC
Surveillance cabinet, 100 - 120 VAC 50/60 Hz input, 24 VAC output, IP66
Order number **NDA-U-PA1 | F.01U.324.948**

NDA-U-PA2 Surveillance cabinet 230VAC
Surveillance cabinet, 230 VAC input, 24 VAC output, IP66
Order number **NDA-U-PA2 | F.01U.324.949**

NDA-U-WMT Pendant wall mount
Universal wall mount for dome cameras, white
Order number **NDA-U-WMT | F.01U.324.939**

NDA-U-PMT Pendant pipe mount, 12" (31cm)
Universal pipe mount for dome cameras, 31 cm, white
Order number **NDA-U-PMT | F.01U.324.940**

NDA-U-PMTS Pendant pipe mount, 4" (11 cm)
Universal pendant pipe mount for dome cameras, 11 cm (4"), white
Order number **NDA-U-PMTS | F.01U.385.046**

NDA-U-PSMB Pendant wall/ceiling mount SMB
Surface mount box (SMB) for wall mount or pipe mount.
Order number **NDA-U-PSMB | F.01U.324.942**

NDA-U-WMP Wall mount plate
Back plate for universal wall mount, corner mount and pole mount, white, IP66
Order number **NDA-U-WMP | F.01U.324.950**

NDA-U-CMT Corner mount adapter
Universal corner mount, white
Order number **NDA-U-CMT | F.01U.324.946**

NDA-U-PMAL Pole mount adapter large
Universal pole mount adapter, white; large
Order number **NDA-U-PMAL | F.01U.324.944**

NDA-U-RMT Pendant parapet mount
Universal roof mount for dome cameras, white
Order number **NDA-U-RMT | F.01U.324.945**

VG4-SFPCKT Ethernet to SFP interface kit
Ethernet media converter video transmitter/data receiver fiber optic kit for AUTODOME cameras, for MIC-IP-PSU for MIC analog cameras and for the Surveillance cabinets (NDA-U-PA0, NDA-U-PA1 and NDA-U-PA2).
Order number **VG4-SFPCKT | F.01U.142.529**

SFP-2 Fiber module, multimode, 1310nm, 2LC
SFP Fiber Optic Module, 2 km (1.2 miles), 2 LC connectors.
Multi-mode
1310 nm
Order number **SFP-2 | F.01U.136.537**

SFP-3 Fiber module, single-mode, 1310nm, 2LC
SFP Fiber Optic Module, 20 km (12.4 miles), 2 LC connectors.
Single-mode
1310 nm
Order number **SFP-3 | F.01U.136.538**

SFP-25 Fiber module, 1310/1550nm, 1SC
SFP Fiber Optic Module, 2 km (1.2 miles), 1 SC connector
Multi-mode
1310/1550 nm
Order number **SFP-25 | F.01U.136.541**

SFP-26 Fiber module, 1550/1310nm, 1SC
SFP Fiber Optic Module, 2 km (1.2 miles), 1 SC connector
Multi-mode
1550/1310 nm
Order number **SFP-26 | F.01U.136.542**

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