Bosch Security Systems is a leading global supplier of security, safety, and communications products and systems. Protecting lives, buildings, and assets is the major aim. The product portfolio includes video security, intrusion detection, and fire detection as well as access control and management systems.

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BOSCH AUTODOME IP starlight 5000i (2MP outdoor PTZ dome camera)

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 20 00 Video Surveillance

28 21 00 Surveillance Cameras

28 21 13 IP Cameras

Notes to Specifier:

1. Where several alternative parameters or specifications exist, or where, the specifier has the option of inserting text, such choices are presented in **<bold bracketed text>.**

2. Explanatory notes and comments are presented in *italicized colored* text.

BOSCH AUTODOME IP starlight 5000i (NDP-5522-Z30 2MP outdoor PTZ dome camera)

PART 1 GENERAL

1.1 SUMMARY

1.A Section includes a 2MP IP66-rated outdoor PTZ dome camera with H.264 and H.265 encoding, 120 dB dynamic range, and starlight camera technology with excellent low-light performance.

1.B Related Requirements

1.B.1. 27 15 00 Communications Horizontal Cabling
1.B.2. 27 20 00 Data Communications
1.B.3. 28 05 00 Common Work Results for Electronic Safety and Security
1.B.4. 28 06 20 Schedules for Video Surveillance
1.B.5. 28 16 15 Access Control Interfaces to Video Surveillance
1.B.6. 28 23 00 Video Management System
1.B.7. 28 31 31.15 Intrusion Detection Interfaces to Video Surveillance
1.B.8. 28 51 15.13 Information Interfaces to Video Surveillance Systems

1.2 REFERENCES

2.A Abbreviations

2.A.1. AI – Artificial Intelligence
2.A.2. ARP – Address Resolution Protocol
2.A.3. DHCP - Dynamic Host Configuration Protocol
2.A.4. DNS - Domain Name Server
2.A.5. DDNS – Dynamic DNS
2.A.6. DORI - Detect, Observe, Recognize, Identify
2.A.7. fps - frames per second
2.A.8. HEVC – High Efficiency Video Coding
2.A.9. HTTPS – Secure Hypertext Transfer Protocol
2.A.10. ICMP - Internet Control Message Protocol
2.A.11. IP - Internet Protocol
2.A.12. IR – InfraRed
2.A.13. JPEG - Joint Photographic Experts Group
2.A.14. mDNS – Multicast DNS
2.A.15. MP - Megapixel
2.A.16. MJPEG - Motion JPEG
2.A.17. NTP - Network Time Protocol
2.A.18. PKI - Public Key Infrastructure
2.A.19. PoE - Power over Ethernet
2.A.20. RTCP – Real-Time Control Protocol
2.A.21. RTP - Real-Time Transport Protocol
2.A.22. RTSP - Real-Time Streaming Protocol
2.A.23. TCP - Transmission Control Protocol
2.A.24. TPM - Trusted Platform Module
2.A.25. TLS – Transport Layer Security
2.A.26. UDP - User Datagram Protocol

2.B Reference Standards

2.B.1. Network

2.B.1.a. IEEE 802.3 Ethernet Standards

2.B.2. Video

2.B.2.a. ITU H.264

2.B.2.b. H.265/HEVC

2.B.2.c. MJPEG

2.B.3. ONVIF

2.B.3.a. EN 50132-5-2

2.B.4. Emissions

2.B.4.a. FCC CFR 47 part 15 (Class A)

2.B.4.b. EN 55032 - Electromagnetic compatibility of multimedia equipment. Emission Requirements – Class A

2.B.4.c. EN 50130-4

2.B.4.d. EN 50121-4 (Railway applications)

2.B.5. Safety

2.B.5.a. EN 62368-1

2.B.5.b. IEC 62368-1

2.B.5.c. UL 62368-1

2.B.5.d. IEC 62471:2006

2.B.5.e. CAN/CSA-C22.2 No. 62368-1-19

2.B.6. Environmental

2.B.6.a. IEC

2.B.6.a.1) EN 60529 – Degrees of protection provided by enclosures – IP66

2.B.6.a.2) IEC 62262 - Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts – IK10

2.B.7. Other

2.B.7.a. BIS

2.B.7.b. RCM

2.B.7.c. China RoHS

2.B.7.d. WEEE

1.3 SUBMITTALS

3.A Informational Submittals

3.A.1. Product Data

3.A.1.a. Manufacturer’s printed or electronic data sheets

3.A.1.b. Manufacturer’s installation and operation manuals

3.A.1.c. Warranty documentation

3.A.2. Shop Drawings

3.A.3. Cyber hardening guidance

3.B Closeout Submittals

3.B.1. Final listing of devices and settings

3.B.2. System test results

3.B.3. Statement of compliance with Manufacturer Cyber Hardening Guidelines

1.4 QUALIFICATIONS

4.A Installers shall be certified, trained and authorized by the Manufacturer to install, integrate, test, and commission the system.

1.5 DELIVERY, STORAGE, AND HANDLING

5.A Deliver the camera in the manufacturer’s original, unopened, undamaged container with identification labels intact.

5.B Store the camera in a temperature environment protected from mechanical and environmental conditions as designated by the manufacturer.

1.6 WARRANTY AND SUPPORT

6.A The AUTODOME family of products is covered by a limited hardware warranty period of 3 years for moving parts and 5 years for non-moving parts, from the date of shipment, against any proved defect in materials or workmanship.

This warranty will be limited to a period of one year from the date of original purchase for moving parts such as, but not limited to:

1..1. Pan/Tilt drive and belts

1..2. Electrical slip-ring contacts

1.7 MAINTENANCE

7.A. Make ordering of new equipment for expansions, replacements, and spare parts available to dealers and end users.

7.B. Provide factory direct technical support from 8:00 A.M. to 8:00 P.M. via phone and e-mail.

END OF SECTION

PART 2 PRODUCTS

2.1 EQUIPMENT

1.A Manufacturer:

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1.B Product Model: NDP-5522-Z30

2.2 GENERAL DESCRIPTION

2.A The camera (“PTZ dome camera”) shall be a 2MP, IP66-rated, outdoor, PTZ dome camera with H.264 and H.265 encoding, 120 dB dynamic range, and starlight camera technology with excellent low-light performance.

2.B The PTZ dome camera shall possess the following primary characteristics:

2.B.1. H.264, H.265, and MJPEG compression

2.B.2. Resolution up to 1,945 x 1,097 pixels

2.B.3. Frame rate up to 60 fps

2.B.4. Bi-directional audio

2.B.5. DORI technology to facilitate distinguishing of persons or objects

2.B.6. Multiple data security elements including Trusted Platform Module (TPM), PKI, and full end-to-end encryption.

2.B.7. Pre- programmed, optimized scene modes

2.B.8. Mobile device camera setup and configuration

2.B.9. IP66 and IK10 environmental ratings

2.B.10. Power: 24 VAC or PoE+

2.C The PTZ dome camera shall be NDAA and TAA compliant.

2.3 ADDITIONAL VIDEO/CAMERA SPECIFICATIONS

3.A Imaging Device:

3.A.1. The PTZ dome camera shall offer a 1/2.8-inch image sensor.

3.A.2. The PTZ dome camera shall offer a maximum effective number of pixels (resolution) of 1,945 x 1,097 (approximately 2.13 MP).

3.B Lens:

3.B.1. The PTZ dome camera shall have a focal length of 4.5 – 135 mm.

3.B.2. The PTZ dome camera shall have a lens aperture of F/1.6 – F/4.4.

3.B.3. The PTZ dome camera shall have a horizontal field of view of 2.4° x 60.9°.

3.B.4. The PTZ dome camera shall have an autofocus lens with 30x optical zoom and 16x digital zoom.

3.C Video Streaming:

3.C.1. The PTZ dome camera shall provide direct network connection using H.265, H.264, and M-JPEG compression and bandwidth throttling to manage bandwidth and storage requirements efficiently while delivering outstanding image quality.

3.C.2. The PTZ dome camera shall support the following video resolutions:

3.C.2.a. 1920 x 1080

3.C.2.b. 1280 x 1024

3.C.2.c. 1280 x 720

3.C.2.d. 768 x 432

3.C.2.e. 704 x 576

3.C.2.f. 640 x 480

3.C.2.g. 512 x 288

3.C.3. The PTZ dome camera shall have 1080p resolution with frame rates of maximum 60 frames per second (fps).

3.C.4. The PTZ dome camera shall have a dynamic range of 120 dB for clear images in extreme high-contrast environments.

3.D Additional Video Functions:

3.D.1. The PTZ dome camera shall support day/night modes with automatic adjustable switch points, allowing it to operate in both color and monochrome settings.

3.D.2. The PTZ dome camera shall have backlight compensation.

3.D.3. The PTZ dome camera shall offer video watermarking capabilities.

3.D.4. The PTZ dome camera shall offer display stamping.

3.D.5. The PTZ dome camera shall be capable of displaying its location information.

3.D.6. The PTZ dome camera shall offer pre-programmed scene modes that users can configure for the specific requirements of the camera site.

3.D.7. The pre-programmed modes shall be optimized with the best settings for the following environments:

3.D.7.a. Standard: For indoor fluorescent lighting.

3.D.7.b. Sodium-lighting: For scenarios where the video is captured under sunlight in the day or under sodium vapor lamp at night.

3.D.7.c. Vibrant: For enhanced contrast, sharpness, and saturation.

3.D.8. The PTZ dome camera shall offer the ability to define a maximum of 32 privacy masks with a maximum of 8 masks per scene that prohibit areas of the field of view from being seen even if the camera is panned, tilted, or zoomed.

3.D.9. The PTZ dome camera shall offer multiple user-defined privacy masks patterns, including:

3.D.9.a. Black

3.D.9.b. White

3.D.9.c. Gray

3.D.9.d. Auto color

3.D.10. The PTZ dome camera shall offer an intelligent defog image feature that assists the camera in registering a usable image through the heaviest fog.

3.D.11. The PTZ dome camera shall offer automatic focus and iris control with manual override.

3.D.12. The PTZ dome camera shall produce a monochrome image with a minimum scene illumination of 0.0186 lux.

3.D.13. The PTZ dome camera shall produce a color image with a minimum scene illumination of 0.0040 lux.

3.D.14. The PTZ dome camera shall offer starlight technology to deliver superior image performance in low-light environments.

3.D.15. The PTZ dome camera shall offer Essential Video Analytics.

3.D.16. The PTZ dome camera shall offer comprehensive video content analysis capabilities, including detection and classification of persons and vehicles (bike, car, truck).

3.D.17. The PTZ dome camera shall offer a wide range of video analytics rule configuration, including:

3.D.17.a. Any object

3.D.17.b. Object in field

3.D.17.c. Line crossing

3.D.17.d. Enter / leave field

3.D.17.e. Loitering

3.D.17.f. Follow route

3.D.17.g. Idle / Removed object

3.D.17.h. Counting

3.D.17.i. Occupancy

3.D.17.j. Crowd density estimation

3.D.17.k. Condition change

3.D.17.l. Similarity search

3.D.17.m. Tampering

3.E PTZ features

3.E.1. The PTZ dome camera shall provide the following modes for variable pan/tilt speeds:

3.E.1.a. Pan: 1°/s to 300°/s

3.E.1.b. Tilt: 1°/s to 200°/s

3.E.2. The PTZ dome camera shall provide a pan range of 360° continuous.

3.E.3. The PTZ dome camera shall divide the cameras 360º rotation into 16 independent sectors with 20-character titles per sector. Any or all of the 16 sectors can be blanked from the operator's view.

3.E.4. The PTZ dome camera shall store a maximum of 256 pre-positions with each pre-position programmable for 20 character titles.

3.E.5. The PTZ dome camera shall have a pre-position accuracy of ±0.1°.

3.E.6. The PTZ dome camera shall support the following tour modes:

3.E.6.a. One (1) pre-position tour capable of 64 sequential pre-positions and a configurable dwell time between positions.

3.E.6.b. Two (2) separate tours of an operator's keyboard movements consisting of pan, tilt and zoom activities. The recorded tours can be continuously played back.

3.E.6.c. One (1) 360° AutoPan mode.

3.E.6.d. One (1) AutoPan mode between limits.

3.E.7. The camera shall execute one of the following programmable options when an operator stops manual control of the camera, and a programmed period of time is allowed to expire: return to a stored pre-position, return to the automated tour previously executed, and do nothing.

3.F Storage and recording:

3.F.1.	Local SD storage:	Micro SDHC or SDXC memory card (maximum 2 TB)
3.F.2.	Recording:	Continuous recording of video and audio, alarm/events/schedule

3.G Inputs and outputs

3.G.1.	Alarm inputs:	2
3.G.2.	Alarm outputs:	1 relay output 5 VDC, 150 mA maximum

3.H Audio

3.H.1. The PTZ dome camera shall provide one (1) audio line in.

3.H.2. The PTZ dome camera shall provide one (1) audio line out.

3.H.3. The PTZ dome camera shall offer the following compression rates:

3.H.3.a. G.711 8 kHz

3.H.3.b. L16 16 kHz

3.H.3.c. AAC-LC

3.H.4. The PTZ dome camera shall provide full duplex streaming.

3.I ONVIF Conformity

3.I.1. The PTZ dome camera shall conform to the following ONVIF profiles:

3.I.1.a. Profile S

3.I.1.b. Profile G

3.I.1.c. Profile T

2.4 NETWORK

4.A Connectivity: 10BASE-TX/100BASE-T Ethernet

4.B Protocols supported

4.B.1. Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP)

4.B.2. Configuration: Dynamic Host Configuration Protocol (DHCP)

4.B.3. Web services: Internet Control Message Protocol (ICMP and ICMP v6), Hypertext Transfer Protocol (HTTP), Secure Hypertext Transfer Protocol (HTTPS)

4.B.4. Network services: Domain Name System (DNS), Dynamic DNS (DDNS), File Transfer Protocol (FTP), System Network Management Protocol (SNMP) v1, v3, MIBII

4.B.5. Media: Real-Time Control Protocol (RTCP), Real-Time Transport Protocol (RTP), Real-Time Streaming Protocol (RTSP); Internet Group Messaging Protocol (IGMP) v2/v3, DiffServ (QoS)

4.C Data Security

4.C.1. Crypto coprocessor: AES/CBC 256 bit

4.C.2. Advanced handling certificates

4.C.2.a.1) Manufacturer origin device certificate pre-installed

4.C.2.a.2) Self-signed unique certificates automatically generated when required

4.C.2.a.3) Client and server certificates for authentication.

4.C.2.a.4) Client certificates for proof of authenticity.

4.C.2.a.5) Certificates with encrypted private keys.

4.C.3. End-to-end encryption: Full end-to-end with supported VMS

4.C.4. Encryption TLS 1.1; TLS 1.2; TLS 1.3; AES 256; AES 128

4.C.5. Video Authentication: MD5; SHA-1; SHA-256

4.C.6. Local storage encryption: XTS-AES

4.C.7. Firmware protection: Signed firmware, secure boot

2.5 ELECTRICAL

5.A Power Input:

5.A.1. 24 VAC

5.A.2. PoE: PoE+

5.B Power Consumption, 24 VAC (typical – maximum): 14 W (heater off) – 24 W (heater on)

2.6 MECHANICAL AND ENVIRONMENTAL

6.A Construction Material: Aluminum (camera housing); Outdoor grade plastic (sunshield)

6.B Finish options: White

6.C Impact Resistance: IK10

6.D Dimensions (Ø x H): 207 mm x 303.6 mm (8.2 in. x 12 in.)

6.E Temperature:

6.E.1. Operating: -40 °C to 60 °C (-40 °F to 140 °F)

6.E.2. Storage: -40 °C to 60 ºC (-40 °F to 140 ºF)

6.F Operating Relative Humidity: 0 to 100% (condensing)

6.G Ingress Protection: IP66

6.H Mounting:

6.H.1. Pendant arm mount

6.H.2. Pipe mount

6.H.3. Pole mount

6.H.4. Pendant wall/ceiling mount

6.H.5. Roof mount

2.7 ACCESSORIES

7.A The Manufacturer shall offer accessories to enable the mounting of the dome camera in the following circumstances:

7.A.1. Pendant – wall, pipe, pole, roof, or ceiling

7.B Other Accessories

7.B.1. Mid-span injectors

7.B.2. 24 V power supplies

END OF SECTION

PART 3 EXECUTION

3.1 INSTALLERS

1.A Contractor personnel shall comply with all applicable state and local licensing requirements.

3.2 PREPARATION

2.A The network design and configuration shall be verified for compatibility and performance with the camera(s).

2.B Network configuration shall be tested and qualified by the Contractor prior to camera installation.

2.C Before permanent installation of the system, the Contractor shall test the system in conditions simulating the final installed environment.

3.3 INSTALLATION

3.A The contractor shall follow all Manufacturer-published guidance on proper installation and configuration of the installed cameras.

3.B The Contractor shall test the system in conditions simulating the final installed environment

3.C Reports:

3.C.1. System test results

3.C.2. System network addressing and device settings

3.4 STORAGE

4.A Products shall be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.

END OF SECTION

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