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**Product Guide Specification**

Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) 3-Part Format, based on *MasterFormat 2004* and *The Project Resource Manual—CSI Manual of Practice. The Manufacturer is responsible for technical accuracy.*

The section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project and local building code. Words and sentences within brackets [ ] are choices to include or exclude a particular item or statement. Coordinate this section with other specification sections and the Drawings. Delete all “Specifier Notes” after editing this section.

**SECTION 28 23 29**

**VIDEO SURVEILLANCE REMOTE DEVICES AND SENSORS**

**BOSCH NDN-733 FLEXIDOME HD 720p60 DAY/NIGHT IP CAMERA**

1. **– GENERAL**
   1. SUMMARY
      1. Section Includes
         1. Video Surveillance Remote Devices.
      2. Related Sections
         1. Section [28 23 13 – Video Surveillance Control and Management Systems].
         2. Section [28 23 16 – Video Surveillance Monitoring and Supervisory Interfaces].
         3. Section [28 23 19 – Digital Video Recorders and Analog Recording Devices].
         4. Section [28 23 23 – Video Surveillance Systems Infrastructure].

\*\*\*\*\*\*\*\*\*\*Specifier’s note: Include those standards referenced elsewhere in this SECTION.

* 1. REFERENCES
     1. European Norm
        1. CE Declaration of Conformity
        2. EN50121-4 (CE) – Railway applications – Electromagnetic compatibility. Emission and immunity of the signaling and telecommunications apparatus.
        3. EN50130-4 (CE) (PoE, +12 VDC, 24 VAC) Alarm Systems, Part 4 – Electromagnetic Compatibility – Product Family Standard: Immunity Requirements for Components of Fire, Intruder and Social Alarm Systems
        4. EN55022 class B (CE) – Information Technology Equipment – Radio Disturbance Characteristics – Limits and Methods of Measurement for Emission
     2. Federal Communications Commission (FCC) (www.fcc.gov)
        1. FCC CFR 47 part 15 class B – Telecommunications – Radio Frequency Devices – Digital Device Emission.
     3. HD Standards
        1. Complies with the 296M-2001 standard
     4. Immunity
        1. EN61000-3-2 - Electromagnetic compatibility (EMC). Limits. Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)
        2. EN61000-3-3 - Electromagnetic compatibility (EMC). Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $3L 16 A per phase and not subject to conditional connection
     5. International Electrotechnical Commission (IEC)
        1. Camera with 500 g (1.1 lb) lens according to IEC 60068-2-6 Vibration.
     6. International Organization for Standardization (ISO)
        1. 9001 – Quality System.
     7. Safety
        1. EN60950-1 (CE) - Information technology equipment. Safety. General requirements
        2. UL60950-1 Second Edition - Information technology equipment. Safety. General requirements
        3. CAN/CSA 22.2 No 609501-1 - Information technology equipment. Safety. General requirements
     8. Underwriters Laboratories, Inc. (UL) ([www.ul.com](http://www.ul.com))
        1. UL certified
  2. DEFINITIONS
     1. Day/Night (infrared sensitive): A camera that has normal color operation in situations where there is sufficient illumination (day conditions), but where the sensitivity can be increased when there is little light available (night conditions). This is achieved by removing the infrared cut filter required for good color rendition. The sensitivity can be further enhanced by integrating a number of fields to improve the signal-to-noise ratio of the camera (this may introduce motion blur).
     2. Privacy Masking: The ability to mask out a specific area to prevent it from being viewed in order to comply with privacy laws and particular site requirements.
     3. SensUp (sensitivity up): Increases camera sensitivity by increasing the integration time on the CMOS sensor (lowering shutter time from 1/50s to 1/5 s – PAL; 1/60s to 1/6s - NTSC). This is accomplished by integrating the signal from a number of consecutive video fields to reduce signal noise.
     4. Smart BLC (Back Light Compensation): Smart back-light compensation allows the camera to automatically compensate for bright areas of a high contrast scene without having to define a window or area.
  3. SYSTEM DESCRIPTION
     1. Video Surveillance Remote Devices
        1. NDN-733 FLEXIDOME HD 720p60 Day/Night IP Camera
     2. Performance Requirements
        1. 1/3-inch CMOS HD with progressive scan.
        2. High resolution 720p60, HD format.
        3. High sensitivity in color and monochrome modes.
        4. Local storage with microSD card.
        5. Quad-streaming IP video.
        6. Intelligent noise reduction reduces bandwidth and storage requirements by up to 30%.
        7. High-impact, vandal-resistant enclosure.
        8. Add IP66 rating
        9. ONVIF conformant.
  4. SUBMITTALS
     1. Submit under provisions of Section [01 33 00].
     2. Product Data:
        1. Manufacturer’s data, user and installation manuals for all equipment and software programs including computer equipment and other equipment required for complete video management system.
     3. Shop Drawings; include
        1. System device locations on architectural floor plans.
        2. Full Schematic of system, including wiring information for all devices.
     4. Closeout Submittals
        1. User manual.
        2. Parts list.
        3. System device locations on architectural floor plans.
        4. Wiring and connection diagram.
        5. Maintenance requirements.
  5. QUALITY ASSURANCE
     1. Manufacturer:
        1. Minimum of [10] years experience in manufacture and design Video Surveillance Devices.
        2. Manufacturer’s quality system: Registered to ISO 9001 Quality Standard.
     2. Video Surveillance System
        1. Listed by [UL] [EN] [FCC] specifically for the required loads. Provide evidence of compliance upon request.
     3. Installer:
        1. Minimum of [5] years experience installing Video IP Surveillance System.
  6. DELIVERY, STORAGE AND HANDLING
     1. Comply with requirements of Section [01 60 00].
     2. Deliver materials in manufacture’s original, unopened, undamaged containers; and unharmed original identification labels.
     3. Protect store materials from environmental and temperature conditions following manufacturer’s instructions.
     4. Handle and operate products and systems according to manufacturer’s instructions.
     5. Bosch provides off-the-shelf availability for our top selling products and same-day or 24-hour shipping.
  7. WARRANTY
     1. Provide manufacturer’s warranty covering [3] years for replacement and repair of defective equipment.
  8. MAINTENANCE
     1. Make ordering of new equipment for expansions, replacements, and spare parts available to dealers and end users.
     2. Provide factory direct technical support from 8:00 a.m. to 8:00 p.m. via phone and e-mail.

1. **– PRODUCTS**
   1. MANUFACTURERS
      1. Acceptable Manufacturer:

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* + 1. Substitutions: [Not permitted.] [Under provisions of Division 1.]
       1. [All proposed substitutions must be approved by the Architect or Engineer professional.]
       2. [Proposed substitutions must provide a line-by-line compliance documentation.]

\*\*\*\*\*\*\*\*\*\*Specifier’s note: Select Camera System Series based on project requirement.

* 1. BOSCH NDN-733 FLEXIDOME HD 720p60 DAY/NIGHT IP CAMERA   
     [NDN-733V02-P] [NDN-733V03-P] [NDN-733V09-P] [NDN-733V02-IP] [NDN-733V03-IP] [NDN-733V09-IP]
     1. General Characteristics:
        1. The day/night HD camera shall utilize a 1/3-inch CMOS HD image sensor.
        2. The day/night HD camera shall high sensitivity in color (0.017 lx) and monochrome modes (0.0057 lx).
        3. The day/night HD camera shall offer Content-based Imaging Technology (C-BIT).
        4. The day/night HD camera shall utilize Intelligent Dynamic Noise Reduction (iDNR) technology to reduce the bitrate and storage requirements by removing noise artifacts.
        5. The day/night HD camera shall produce a resolution of 1280 x 720 pixels   
           (HD 720p) at 60 ips with a 16:9 image format.
        6. The day/night HD camera shall produce a D1 resolution of 704X480 pixels   
           at 30 ips with a 4:3 image format.
        7. The day/night HD camera shall provide direct network connection using H.264 and JPEG compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
        8. The day/night HD camera shall be capable of operating as an indoor/outdoor camera with an operating temperature range of -50°C to 50°C (-58°F to 122°F) on IVA models and -50°C to 55°C (-58°F to 131°F) on non-IVA models.
        9. The day/night HD camera shall be rated to IP 66 (NEMA 4X) standard against water and dust ingress.
        10. The day/night HD camera shall be rated to IK10 vandal resistance (55 kg [120 lbs] of force).
        11. The day/night HD camera shall work with Power over Ethernet IEEE 802.3af (802.3at Type 1) for indoor applications with a compliant power supply source.
        12. The day/night HD camera shall support AutoMDIX.
        13. The day/night HD camera shall conform to the ONVIF Profile S specification.
        14. A user shall be able to view video on a PC using a Web browser, with the Bosch Video Management System, Bosch Video Client or Bosch Recording Station.
        15. The day/night HD camera shall provide MOTION+ video motion detection analysis system that provides basic video content analysis.
        16. The day/night HD camera shall provide six configurable user modes that provide optimized settings for distinct applications.
        17. The day/night HD camera shall offer Intelligent Video Analysis (IVA).
        18. The day/night HD camera shall provide four independent, fully programmable privacy mask areas.
        19. The day/night HD camera shall provide an on-screen display to simplify the camera/lens back focus and network configuration settings.
        20. The day/night HD camera shall provide enhanced night viewing through the increase of IR sensitivity by automatically switching a motorized IR filter from color to monochrome operation in low-light or IR illuminated applications. Allow the IR filter to be switched manually via the alarm input, preprogrammed in a camera mode or profile.
        21. The day/night HD camera shall utilize pixel-by-pixel analysis to automatically compensate for bright areas of a high contrast scene (Back light) without having to define a window or area.
        22. The day/night HD camera shall provide intelligent Auto Exposure (iAE) to improve visibility of dark objects against a light background and vice versa. Use IVA to detect in which parts of the image local contrast enhancement can improve image usability.
     2. Imaging
        1. The day/night HD camera shall utilize a 1/3-inch CMOS HD image sensor.
        2. The day/night HD camera shall produce a resolution of 1280x 720 pixels (HD 720p) at 60 ips with a 16:9 aspect ratio.
        3. The day/night HD camera shall produce a resolution of 704x 480 pixels (D1) at 30 ips with a 4:3 aspect ratio.
        4. [The day/night HD camera shall utilize a 1.8 to 3 mm optically corrected ultra wide angle lens.]
        5. [The day/night HD camera shall utilize a 3.8 to 13 mm optically corrected wide angle lens.]
        6. [The day/night HD camera shall utilize a 9 to 40 mm optically corrected telephoto lens.]
        7. The day/night HD camera shall offer intelligent Dynamic Noise Reduction to reduce bandwidth and storage requirements by optimizing the detail-to-bandwidth ratio via temporal and spatial noise filtering.
        8. The day/night HD camera shall offer regions of interest to zoom into a specific area of the full image.
        9. The day/night HD camera shall allow regions of interest to be sent in separate streams so it is possible to view both an overview and a detail at the same time.
        10. The day/night HD camera shall offer a Wide Dynamic Range of 84 dB (typical) for clear images in extreme high-contrast environments.
        11. The day/night HD camera shall provide a frame integration mode that can increase the integration time up to 10 times on the CMOS sensor.
        12. The day/night HD camera shall produce a color image with a minimum scene illumination of 0.017 lux (0.0017 fc) and a monochrome image, when in the night mode, with a minimum illumination of 0.0057 lux (0.00057 fc) at 30 IRE.
        13. The day/night HD camera shall provide enhanced night viewing through the increase of IR sensitivity by automatically switching a motorized IR filter from color to monochrome operation in low-light or IR illuminated applications. Allow the IR filter to be switched manually via the alarm input, preprogrammed in a camera mode or profile.
        14. The day/night HD camera shall utilize pixel-by-pixel analysis to automatically compensate for bright areas of a high contrast scene (Back light) without having to define a window or area.
     3. HD Characteristics
        1. The day/night HD camera shall generate HD 720p resolution using H.264 compression.
        2. The camera shall generate multiple simultaneous video streams in H.264 and M-JPEG with configurable frame rates and bandwidth.
        3. The day/night HD camera shall offer the following audio standards:
           1. AAC
           2. G.711, 8 kHz sampling rate
           3. L16, 16 kHz sampling rate
     4. Installation Requirements
        1. The day/night HD camera shall be capable of operating in an outdoor environment within the following temperature range:
           1. [IVA models: -50°C to +50°C (-58°F to 122°F).]
           2. [Non-IVA models: -50°C to +55°C (-58°F to 131°F).]
        2. The day/night HD camera shall offer a cold start temperature of -20°C (-4°F).
        3. The day/night HD camera shall have power and alarm cable connectors which can be removed when the camera is mounted.
        4. The day/night HD camera shall provide power, video, and control via an Ethernet connection.
        5. The day/night IP camera shall be capable of simultaneous connection to both PoE and 12 VDC / 24 VAC power supplies.
        6. The day/night HD camera shall accept CS and C mount type lenses and detect automatically the type of lens used and optimize performance accordingly.
        7. The day/night HD camera shall provide a lens wizard for local or remote control of the motorized lens back focus system to allow focusing at maximum lens opening to ensure that the objects of interest within the field of view always remain in focus.
        8. The day/night HD camera shall provide a multi-language on-screen display.
     5. Storage Management
        1. The day/night HD camera shall support iSCSI devices to allow video stream to be recorded directly to an iSCSI RAID array.
        2. The day/night IP camera shall support iSCSI storage targets to enable the camera to function as a conventional DVR.
        3. The day/night IP camera shall have a microSD card slot that uses standard; off-the-shelf microSD (SDHC and SDXC) cards for local storage (up to 2 TB).
        4. The local storage feature shall be capable of storage for Automatic Network Replenishment (ANR).

* + 1. Alarm Handling Features:
       1. The day/night HD camera shall provide an alarm input that may be triggered by either a normally opened or normally closed contact.
       2. The day/night HD camera shall provide the capability on alarm to display up to a 31 character, programmable alarm message.
       3. The day/night HD camera shall provide a relay output that may be selected for normally opened or normally closed operation. The relay can be activated from an external alarm input to the camera, manual activation from the browser, upon video motion detection, an alarm task script or video loss.
       4. The day/night HD camera shall provide email alarm messaging with optional JPEG posting
    2. IP Connectivity
       1. The day/night HD camera shall allow full camera control and configuration capabilities over the network.
       2. The day/night HD camera shall offer Power over Ethernet (IEEE 802.3at Class 3) for indoor applications.
       3. The day/night HD camera shall offer Pan and Tilt control of PT receiver over the network.
       4. The day/night HD camera shall deliver 720p HD video, at rates up to 60 images per second, via TCP/IP over Shielded Cat5/Cat6 cable.
       5. The day/night HD camera shall conform to the ONVIF Profile S standard.
       6. The day/night HD camera shall offer Embedded Intelligent Video Analytics (IVA).
    3. Embedded Video Content Analysis
       1. The day/night HD camera shall be VCA enabled.
       2. The day/night HD camera shall offer MOTION+ video motion analysis that uses an algorithm based on pixel change.
       3. The day/night HD camera MOTION+ feature shall include object size filtering and tamper-detection capabilities.
    4. [Intelligent Video Analysis
       1. The day/night HD camera shall be capable of processing and analyzing video within the camera itself, with no extra hardware required.
       2. The day/night HD camera shall be capable of detecting and sending alarms for abnormal events.
       3. The day/night HD camera shall allow users to set up to 10 separate profiles and switch profiles based on a day/night or holiday schedules.]
    5. Surveillance Software
       1. The day/night HD camera shall be accessible from a web browser, with the Bosch Video Management System, with the Bosch Recording System, or with the Bosch Video Controller.
       2. The day/night HD camera shall be accessible from the Bosch Security System iPad App. The App shall allow complete camera control and shall display images over low bandwidth connections.
    6. Construction
       1. The day/night HD camera shall be enclosed in a cast-aluminum housing.
       2. The day/night HD camera shall come with a polycarbonate window and a hardened inner liner.
       3. The day/night HD camera shall be able to withstand the equivalent of 55 kg (120 lbs) for force (> IK10).
       4. The day/night HD camera shall be protected against dust and water to the IP 66 (NEMA 4X) standard.
       5. The day/night HD camera shall be capable of being mounted to a surface, wall, corner, or suspended ceiling (specific mounting options may require optional accessories).
    7. Access Security
       1. The day/night HD camera shall offer three levels of password protection.
       2. The day/night HD camera shall support 802.1x authentication using a RADIUS (Remote Authentication Dial In User Service) server.
       3. The day/night HD camera shall store a SSL certificate for use with HTTPS.
       4. [The day/night HD camera shall be capable of being independently AES encrypted with 128-bit keys.]
    8. Image Posting
       1. The day/night HD camera shall offer periodic JPEG image posting to an FTP server or to a Dropbox account.
       2. The day/night HD camera shall offer best face detection and JPEG best face image posting to FTP server or to a Dropbox account.
    9. Specifications
       1. Electrical:
          1. Power Supply:

12 VDC ± 10%

24 VAC ± 10%, 50/60 Hz

PoE 48 VDC nominal

* + - * 1. Current Consumption:

12 VDC: 1 A

24 VAC: 0.8 A

PoE (48 VDC): 0.3 A

* + - * 1. Power Consumption: 12 W
    1. Sensor
       1. Type: 1/3-inch CMOS HD
       2. Active Pixels: 1280 x 720
    2. Video
       1. Video Compression: H.264 (ISO/IEC 14496‑10), M-JPEG, JPEG
       2. Streaming: Multiple configurable streams in H.264 and M-JPEG, configurable frame rate and bandwidth.
       3. Resolution (H x V):
          1. 720p HD: 1280 x 720
          2. 480p SD

Encoding: 704 x 480

Displayed: 854 x 480

* + - * 1. 432p SD: 768 x 432
        2. 288p SD: 512 x 288
        3. 240p SD:

Encoding: 352 x 240

Displayed: 432 x 240

* + - * 1. 144p SD: 256 x 144
        2. Corridor mode: 400 x 720
        3. D1 4:3 cropped: 704 x 480
      1. Overall IP Delay: Min. 120 ms, Max. 240 ms
      2. GOP Structure: I, IP, IBP, IBBP,
      3. Sensitivity ( 3200K, Scene Reflectivity 89%, F1.2)
         1. Minimum Illumination (30 IRE):

Color: 0.017 lx (0.0017 fc)

Monochrome: 0.0057 lx (0.00057 fc)

* + - 1. Day/Night: Color, Monochrome, Auto
      2. White Balance:
         1. ATW (2500 to 10000K)
         2. ATW hold and manual
         3. Indoor and Outdoor ATW
      3. Shutter: Automatic Electronic Shutter (AES) Fixed (1/30 [1/25] to 1/1500000) selectable, default shutter
      4. Backlight Compensation: On, Off, Intelligent AE (BLC)
      5. Noise Reduction: Intelligent Dynamic Noise Reduction (iDNR) with separate temporal and spatial adjustments
      6. Sharpness: Sharpness enhanced level selectable
      7. Wide Dynamic Range: 84 dB
      8. Privacy Masking: Four (4) independent areas, fully programmable
      9. Video Motion Analysis: Intelligent Video Analysis
      10. Dual Region of Interest on second stream. The first two client applications connecting to the second stream get an independent Region Of Interest with Pan Tilt Zoom control.
    1. Audio
       1. Standard:
          1. AAC
          2. G.711, 8 kHz sampling rate
          3. L16, 16 kHz sampling rate
       2. Signal-to-Noise Ratio: >50 dB
       3. Audio Streaming: Full duplex / Half duplex
    2. Input/Output
       1. Audio: 1 x mono line in, 1 x mono line out
          1. Connector: 3.5 mm stereo jack
          2. Signal Line In: 12 kOhm typical, 1 Vrms max.
          3. Signal Line Out: 1 Vrms at 1.5 kOhm, typical
       2. Alarms: 2 inputs
          1. Activation Voltage: +5 VDC to +40 VDC (+3.3 VDC with DC-coupled   
             22 kOhm pull-up resistor)
       3. Relay: 1 output
          1. Voltage: 30 VAC or +40 VDC Max 0.5 A continuous , 10 VA
    3. Local Storage
       1. Memory Card Slot: Supports SDHC and SDXC microSD cards
       2. Recording: Continuous recording, ring recording, alarm/events/schedule recording
    4. Software Control
       1. Unit Configuration: Via Web browser or Configuration Manager
       2. Software Update: Flash ROM, remote programmable
    5. Network
       1. Protocols: IPv4, IPv6, RTP, RTSP, Telnet, UDP, TCP, IP, HTTP, HTTPS, FTP, DHCP, IGMP V2/V3, ICMP, ARP, SMTP, SNTP, SNMP, 802.1x, UPnP (SSDP)
       2. Encryption: TLS 1.0, SSL, AES (optional)
       3. Ethernet: STP, 10/100 Base-T, auto-sensing, half/full duplex, RJ45
       4. PoE Supply: IEEE 802.3at type 1 compliant
       5. Connectivity:
          1. ONVIF Profile S
          2. Auto-MDIX
    6. Optical
       1. Lens: Varifocal SR (Super Resolution)
       2. Focus Control: Automatic
       3. Iris Control: Automatic
       4. Viewing Angle (H x V):
          1. 1.8 to 3 mm

Wide 105° x 74°

Tele 77° x 49°

* + - * 1. 3.8 to 13 mm

Wide 72° x 40°

Tele 21° x 11.9°

* + - * 1. 9 to 40 mm

Wide 30° x 17°

Tele 7.1° x 3.9°

* + 1. Mechanical:
       1. Dimensions (D x H): 208 x 151 mm (8.2 x 5.59 in.)
       2. Weight: 2200 g (4.85 lb)
       3. Color: RAL 9006 Metallic Titanium
    2. Environmental:
       1. Operating Temperature:
          1. IVA Models: -50°C to +50°C (-58°F to 131°F)
          2. Non-IVA Models: 50°C to +55°C (-58°F to 122°F)
       2. Cold Start Temperature: -20°C (-4°F)
       3. Storage Temperature: -30°C to +70°C (-22°F to 158°F)
       4. Operating Humidity: 20% to 100% relative humidity
       5. Storage Humidity: up to 100% relative humidity
       6. Vandal Resistance: IK10
       7. Ingress Resistance: IP66, NEMA 4X
  1. ACCESSORIES
     1. Mounts
        1. VDA-832FHD-WMT Wall mount bracket for HD FlexiDomes
        2. VDA-832FHD-PMT Pendant mount bracket for HD FlexiDomes
     2. Components
        1. S1460 Service/Monitor Cable
     3. Video over IP Accessories
        1. VJT-XTC XF Video Transcoder
     4. Software Options
        1. MVC-FENC-AES BVIP AES 128 bit Encryption License

1. **– EXECUTION**
   1. EXAMINATION
      1. Examine areas to receive devices and notify adverse conditions affecting installation or subsequent operation.
      2. Do not begin installation until unacceptable conditions are corrected.
   2. PREPARATION
      1. Protect devices from damage during construction.
   3. INSTALLATION
      1. Install devices in accordance with manufacturer’s instruction at locations indicated on the floor drawings plans.
      2. Ensure selected location is secure and offers protection from accidental damage.
      3. Location must provide reasonable temperature and humidity conditions, free from sources of electrical and electromagnetic interference.
   4. FIELD QUALITY CONTROL
      1. Test snugness of mounting screws of all installed equipment.
      2. Test proper operation of all video system devices.
      3. Determine and report all problems to the manufacturer’s customer service department.
   5. ADJUSTING
      1. Make proper adjustment to video system devices for correct operation in accordance with manufacturer’s instructions.
      2. Make any adjustment of camera settings to comply with specific customer’s need.
   6. DEMONSTRATION
      1. Demonstrate at final inspection that video management system and devices function properly.

END OF SECTION