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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 AUTODOME IP starlight 5100i IR**

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. Safety
        1. EN 62368-1 Audio/video, information and communication technology equipment - Part 1: Safety requirements
        2. EN 60950-1 - Information technology equipment. Safety. General requirements
        3. EN 60950-22 Information technology equipment. Safety. Part 22: Equipment to be installed outdoors
        4. Underwriters Laboratories standard UL 60950-1 Ed.2.
        5. Underwriters Laboratories standard UL 62368-1.
        6. CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12 (Audio/video, Information and Communication Technology Equipment - Part 1: Safety Requirements)
        7. CSA C22.2 No. 60950-22-07 Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors
     2. EMC

International Electrotechnical Commission (IEC) compliance:

* + - 1. FCC 47 CFR Part 15 Subpart B: 2020 Conducted + Radiated Emission based on VERIFICATION procedure, Class A
      2. EN 50130-4:2011- Alarm Systems - Electromagnetic Compatibility - Product Family Standard: Immunity Requirements for Components Of Fire, Intruder And Social Alarm Systems.
      3. EN 55032:2015+AC: 2016 - Electromagnetic compatibility of multimedia equipment , Class A
      4. EN 50121-4 Railway Applications - Electromagnetic Compatibility - Part 4: Emission and Immunity of the Signaling and Telecommunications Apparatus
      5. EN/ IEC 61000-4-2 ESD Susceptibility
      6. EN/ IEC 61000-4-3 Radiated electromagnetic fields
      7. EN/ IEC 61000-4-4 Electrical Fast Transient (EFT) Burst
      8. EN/ IEC 61000-4-6 Conducted Immunity
      9. ICES-003 Issue 6: 2016-01 Updated 2019-04 Information Technology Equipment (including Digital Apparatus)
      10. VCCI-CISPR 32:2016 Voluntary Control Council for Interference. Electromagnetic compatibility of multimedia equipment - Emission requirements.
    1. Environmental
       1. EN 50130-5 Alarm systems Part 5 Environmental test methods
       2. EN 60068-2-1 Environmental testing - Part 2-1: Tests - Test A: Cold
       3. EN 60068-2-2 Environmental testing - Part 2-2: Tests - Test B: Dry heat
       4. EN 60068-2-6 Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)
       5. EN 60068-2-27 Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock
       6. EN 60068-2-30 Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)
       7. EN 60068-2-78 Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state
    2. Impact protection
       1. EN 62262 (IK10) Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code); Excluding camera window and wiper.
    3. Water/Dust protection
       1. EN 60529 (IP66) Degrees of protection provided by enclosures (IP Code)
    4. Environment
       1. EN 50581 (RoHS) Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
    5. HD standards
       1. Complies with the SMPTE 274M-2008 Standard in:
          1. Resolution: 1920x1080
          2. Scan: Progressive
          3. Color representation: complies with ITU-R BT.709
          4. Aspect ratio: 16:9
          5. Frame rate: 25 and 30 frames/s
       2. Complies with the 296M-2001 Standard in:
          1. Resolution: 1280x720
          2. Scan: Progressive
          3. Color representation: complies with ITU-R BT.709
          4. Aspect ratio: 16:9
          5. Frame rate: 25, 30, 50 and 60 frames/s
          6. Interference-Causing Equipment Standards
    6. Image performance
       1. IEC 62676-5 Video surveillance systems for use in security applications - Part 5: Data specifications and image quality performance for camera devices
    7. Color representation
       1. ITU-R BT.709-6 Parameter values for the HDTV standards for production and international programme exchange
    8. ONVIF conformance
       1. EN 50132-5-2 Alarm systems - CCTV surveillance systems for use in security applications - Part 5-2: IP Video Transmission Protocols
       2. EN 62676-2 Video surveillance systems for use in security applications
    9. International Organization for Standardization (ISO)
       1. ISO 9001 – Quality System.
    10. Marks
        1. CE, CMIM, EAC, RCM, China RoHS, VCCI, WEEE, BIS, cULus

Note: Some marks are available for specified models only.

* 1. SYSTEM DESCRIPTION
     1. Section Includes
        1. Video Surveillance Remote Devices
           1. NDP-5523-Z30L PTZ dome 4MP 30x clear IP66 pendant with IR
           2. NDP-5523-Z30L-P PTZ dome 4MP 30x clear IP66 pendant with IR (Made in Portugal)
     2. Performance Requirements
        1. The camera shall offer a high performance 1/1.8-inch progressive scan day/night CMOS sensor with a maximum of 2688 x 1520 pixels (4MP).
        2. The camera shall generate full 2560x 1440p 50/60 and 1080p50/60 resolution.
        3. The camera shall be a full-featured, robust designed for discrete video surveillance in outdoor applications including traffic monitoring (highways), perimeter protection, city surveillance, and commercial buildings.
        4. The camera shall has an integrated autofocus 30x optical zoom with 16x digital zoom capability.
        5. The camera shall support following dual, redundant power options:

24 VAC

PoE, IEEE 802.3bt, type 3

* + - * 1. The camera shall default to use power from the PoE, if connected.
        2. The camera shall switch to 24VAC power supply without interruption to camera operation if PoE is lost.
      1. The camera shall offer a high dynamic range of 133 dB (HDR X) for clear images in extreme high-contrast environments.
      2. The camera shall integrate with a dual-mode illumination including infrared illuminator and white light LEDs for covertness and specially tuned for application where surveillance in scenes with changing light levels is necessary.
      3. The camera shall start the IR illuminator automatically to provide a monochrome image to detect objects 320 m away in complete darkness.
      4. The camera illuminator shall offer a white light function to use as a deterrent effect.
      5. The camera shall produce a color image with a minimum scene illumination of 0.0101 lux without turning on the illuminator.
      6. The camera shall offer a rain-sensing wiper to wipe water from the camera window when the camera detects rain on the window.
      7. The camera shall offer Essential Video Analytics.
      8. The camera shall provide a 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.
      9. The camera shall conform to the specifications of ONVIF Profiles S, G, T, and M to provide interoperability with other conformant systems.
      10. The camera shall offer four (4) streams with two (2) configurable streams in H.264 or H.265.
      11. The camera shall offer variable pan and tilt speeds, and AutoPivot capability for optimal camera control and viewing at all zoom levels.
      12. The camera shall offer bi-directional audio.
      13. The camera shall support 256 user-defined pre-positions (presets).
      14. The camera shall offer IP66 environmental protection.
      15. The camera shall meet an IK rating of IK10.
      16. The camera window shall be of optical glass.
  1. 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.
  1. QUALITY ASSURANCE
     1. Manufacturer:
        1. Minimum of [10] years of experience in manufacture and design Video Surveillance Devices.
     2. Video Surveillance System:
        1. Listed by CSA.
        2. Certified compliant to FCC and CE for the required loads. Test methods are in accordance with Industry Canada and the IEC. Provide evidence of compliance upon request.
     3. Installer:
        1. Minimum of [5] years of experience installing Video Surveillance System.
  2. 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.
  3. WARRANTY
     1. The Bosch AUTODOME family of products is covered by a limited hardware warranty for a period of 3 years 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. Pan/Tilt drive and belts
        2. Electrical slip-ring contacts
  4. 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.]
  1. BOSCH AUTODOME IP starlight 5100i IR CAMERA [NDP-5523-Z30L], [NDP-5523-Z30L-P]  
     1. General Characteristics:
        1. The camera shall generate full 2560 x 1440p 50/60 and 1080p50/60 resolution.
        2. The camera shall be specially designed for covertness, and tuned for applications where surveillance in scenes with changing light levels is necessary.
        3. The camera shall offer an integrated 30X optical zoom to identify people at a distance of more than 280 m (919 ft).
        4. The camera shall offer a motion-optimized HDR X (133 dB) imaging feature, which operators can use in scenes with extreme high-contrast light levels without seeing blur when the camera is moving.
        5. The camera shall offer 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.
        6. The camera is with integrate a rain-sensing wiper automatically wipes water from the camera window to ensure outstanding image quality in bad weather.
        7. The camera shall integrate with a dual-mode illumination including infrared illuminator and white light LEDs for covertness and specially tuned for application where surveillance in scenes with changing light levels is necessary.
        8. The camera shall offer 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.
        9. The camera shall provide a multi-language on-screen display. (Supported languages: Chinese, Czech, Dutch, English, French, German, Italian, Japanese, Portuguese, Polish, Russian, and Spanish)
     2. Imaging
        1. The camera shall offer a 1/1.8-in. type progressive scan CMOS sensor.
        2. The camera shall offer an effective number of pixels of 2688 x 1520 (4 MP).
        3. The camera shall offer a 16:9 aspect ratio.
        4. The camera shall offer a 30x optical zoom lens (6.6 mm to 198 mm).
        5. The camera shall offer a 16x digital zoom.
        6. The camera shall offer a field of view from 2.1° to 58.5°.
        7. The camera shall offer automatic focus control with manual override.
        8. The camera shall offer automatic iris control with manual override.
        9. The camera shall produce a color image with a minimum scene illumination of 0.0101 lux and a monochrome image, when in the night mode, with a minimum illumination of 0.0016 lux at 30 IRE.
        10. The camera shall offer a theoretical dynamic range of 133 dB.
        11. The camera shall offer a Signal-to-noise ratio (SNR) of >55 dB.
        12. The camera shall offer the following day/night modes: Mechanical switchable IR filter (Auto/On/off) and Monochrome.
        13. The HD PTZ shall offer Bosch Intelligent Dynamic Noise Reduction.
        14. The HD PTZ camera shall produce a clear image for with DORI (Detect, Observe, Recognize, Identify) performance (per EN 62676-4 standard):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | DORI definition | Distance (WIDE 1x) | Distance  (TELE 30x) | Scene Width |
| Detect | 25 pixel/m  (8 pixel/ft) | 91 m(300 ft) | 2794 m (9167ft) | 102 m(336 ft) |
| Observe | 63 pixel/m  (19 pixel/ft) | 36 m(119 ft) | 1109 m (3638ft) | 41 m(133 ft) |
| Recognize | 125 pixel/m  (38 pixel/ft) | 18 m(60 ft) | 559 m (1834 ft) | 20 m(67.2 ft) |
| Identify | 250 pixel/m  (76 pixel/ft) | 9 m(30 ft) | 280 m (919 ft) | 10 m(33.6 ft) |

* + - 1. The camera shall offer Backlight Compensation.
      2. The camera shall offer the following White Balance modes: Basic auto, Standard auto, Sodium lamp auto, Dominant color auto, Manual.
      3. The camera shall offer an intelligent defog image feature that assists the camera in registering a usable image through the heaviest fog.
    1. System Features
       1. The camera shall be compatible with the Bosch Configuration Manager, the Bosch Video Management System (BVMS), Video Security Client, and Project Assistant.
    2. PTZ Features
       1. The camera shall provide the following modes for variable pan/tilt speeds:
          1. Turbo Mode (manual control):

Pan: 0.1°/s to 240°/s

Tilt: 0.1°/s to 100°/s

* + - * 1. Normal Mode:

Pan: 0.1°/s to 120°/s

Tilt: 0.1°/s to 100°/s

* + - 1. The camera shall provide a pre-position speed of:
         1. Pan: 1°/s to 240°/s
         2. Tilt: 1°/s to 100°/s
      2. The camera shall provide a pan range of 360° continuous.
      3. The camera shall provide pan and tilt preset accurate to within +/-0.1°.
      4. The camera shall provide a tilt angle of -90° to 5° above the horizon for pendant housings.
      5. The camera shall divide the camera’s 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.
      6. The camera shall offer the ability to define 32 privacy masks with up to 8 masks per scene that prohibit areas of the field of view from being seen even if the camera is panned, tilted, or zoomed. Selectable colors shall be Black, White, Grey or Auto (average background color).
      7. The camera shall offer 24 virtual masks.
      8. The camera shall store up to 256 preset scenes with each preset programmable for 20 character titles.
      9. The camera shall support the following tour modes:
         1. Recorded tours - two (2), maximum total duration 30 minutes (depending on amount of commands sent during recording).
         2. Preset tour - one (1), consisting of up to 256 scenes consecutively, and (1) customized up to 64 scenes.
         3. One (1) 360° AutoPan mode.
         4. One (1) AutoPan mode between limits.
    1. Pre-programmed Modes
       1. The camera shall offer three (4) pre-programmed but configurable user modes.
       2. The camera shall be optimized with the best settings for the following environments:
          1. Standard: For indoor fluorescent lighting.
          2. Sodium-lighting: For scenarios where the video is captured under sunlight in the day or under sodium vapor lamp at night.
          3. Vibrant: For enhanced contrast, sharpness, and saturation.
          4. LPR: For applications to capture the refection of license plates in combination of IR lighting.
       3. The camera shall allow users to customize these modes for the specific requirements of the camera site.

* + 1. Essential Video Analytics

1. The camera shall be capable of processing and analyzing video within the camera itself, with no extra hardware required.
2. The camera shall be capable of detecting moving objects.
3. The camera shall identify objects up to 280 m (916 ft).
4. The camera shall be capable of separating moving people in scenes where no other moving objects occur.
5. The camera shall be able to detect the following object properties and states:
   * + - 1. Object class (upright person, bike, car, truck)
         2. Object size
         3. Object aspect ratio
         4. Object speed
         5. Object motion direction
         6. Object color
         7. Duration of object in scene
6. The camera shall be able to detect the following object events:
   * + - 1. Object entering a user-defined field
         2. Object within a user-defined field
         3. Object leaving a user-defined field
         4. Object crossing a user-defined line
         5. Object crossing a line
         6. Object following a route
         7. Object loitering
         8. Idle objects, both for moving objects that stopped and objects that were carried and placed in the scene
         9. Removed objects, both for object that started moving by themselves or were carried away
         10. Object condition change based on size, speed, aspect ratio, direction, or color of the object
         11. Number of moving objects in a user-defined field above a user-defined threshold
7. The camera shall be capable of counting moving objects that are currently within a user-defined area.
8. The camera shall be capable of counting objects that are moving in a user-defined direction.
9. The camera shall be able to estimate crowd density.
10. The camera shall be able to combine object events and states for user-defined events.
11. The camera shall be capable of detecting and sending alarms for user-defined events.
12. The camera shall incorporate an Alarm Rule Engine, enabling video analytics events prompting the camera to take one or more actions such as:
    1. Trigger a relay connected to an alarm siren and/or strobe
    2. Send an e-mail with a snapshot of the video analytics event
    3. Trigger a visual alert to be displayed on the operator’s screen
13. The camera shall allow users to set up to 16 separate video analytics profiles and assign each video analytics profile to a different pre-position. The video analytics profile will become active once the corresponding pre-position is reached, and become inactive once the corresponding pre-position is left.
    * 1. Recording and Storage Management
         1. The camera shall support iSCSI devices to allow the video stream to be recorded directly to an iSCSI RAID array.
         2. The camera shall support iSCSI storage targets.
         3. The camera shall offer an SD card slot that uses a microSDHC or microSDXC card for local storage (up to 2 TB).
         4. The camera shall be compatible with the Bosch Video Recording Manager (VRM) to control and manage video recording.
      2. HD Characteristics
         1. The camera shall support H.265, H.264 video compression.
         2. The camera shall generate the following streaming resolutions: 2560 x 1440p50/60 / 1920 x 1440p50/60 / 1280 x 720p50/60.
         3. The camera shall generate multiple simultaneous configurable HD video streams.
         4. The camera shall allow simultaneous streaming of individual HD streams, and allow a choice of HD resolution in combination with SD resolutions.
      3. IP Connectivity
         1. The camera shall allow full camera control and configuration capabilities via a TCP/IP network.
         2. The camera shall be capable of capturing and storing images using H.265 or H.264 compression at 2560x 1440p50/60 resolution.
         3. The camera shall deliver 2560x 1440 video at rates up to 50/60 images per second via TCP/IP over Cat5e (or better) UTP cable.
         4. The camera shall support iSCSI devices to allow the network-enabled camera to stream video directly to an iSCSI RAID array.
         5. The camera shall conform to the specifications of ONVIF Profiles S, G, T, and M.
         6. The camera shall conform to the SNMP (V1, V3, MIB-II) standard.
         7. The camera shall offer Quality of Service (QoS) configuration options.
         8. The camera shall support the IPv6 internet-layer protocol for packet switched internetworking across multiple IP networks.
      4. Access Security
         1. The camera shall offer three levels of password protection.
         2. The camera shall support 802.1x authentication using a RADIUS (Remote Authentication Dial-In User Service) server.
         3. The camera shall store an SSL certificate for use with HTTPS.
         4. The camera shall be capable of being independently AES encrypted with 256-bit keys.
      5. Installation Requirements
         1. The camera shall be capable of operating in an outdoor environment within the temperature range of -40 °C to +60 °C (-40 °F to +140 °F).
         2. The camera shall offer a cold start-up temperature of -40 °C (-40 °F).
         3. The camera shall accept power, transmit video, and accept control via TCP/IP connection.
         4. The camera shall be able to be mounted to a wall, the corner of a wall, and to a pole using optional mounting hardware.
         5. The camera shall provide an IP66-rated weatherproofing kit for the camera’s RJ45 interface.
      6. Housing Specifications and Options
         1. The camera shall be offered in an outdoor pendant aluminum housing.
         2. The camera shall provide built-in surge protection for power, data, and video and alarm inputs.
         3. The camera housing shall:
            1. Use a hook, in place of a tether, to make installation easier and safer.
            2. Allow the camera to view 5º above the horizon.
            3. Conform to the IP66 standard.
            4. Include a sunshield of aluminum.
         4. The camera shall conform to the IK10 rating for external mechanical impact (excluding wiper/ glasses window).
         5. The camera shall provide a corrosion protection surface treatment with powder coat paint, sand finish.
      7. Electrical
         1. Input Voltage:

The camera shall support the following dual, redundant power options:

* + - * 1. Options:

24 VAC

PoE, IEEE 802.3bt, type 3

* + - * 1. The camera shall default to use power from the PoE power supply, if connected.
        2. The camera shall switch to 24VAC power supply if power from the PoE power supply is lost, with no interruption to camera operation.
      1. The camera shall offer advanced PoE type diagnostics that display PoE source type on the camera’s on-screen display, including insufficient power-PoE, PoE+ and PoE++ (represent IEEE 802.3bt).
      2. Power Consumption (typical):
         1. When using 24VAC

29.5VAC (Heater OFF, Illumination OFF)

55.2VAC (Heater ON, Illumination ON)

* + - * 1. When using IEEE802.3bt

21.2W (Heater OFF, Illumination OFF)

39.4W (Heater ON, Illumination ON)

* + 1. Illumination
       1. The camera shall integrate a dual-mode illuminator with infrared illuminator and white light LEDs.
       2. The infrared illuminator shall enable detection of objects at a maximum distance of 320 m (1050 ft) with infrared LEDs (850 nm).
       3. The white light illuminator shall enable detection of objects at a maximum distance of 60 m (197 ft) with White light.
       4. The infrared illuminator shall offer Constant Light technology to automatically control and adjust output to deliver a consistent level of illumination.
       5. The infrared illuminator shall offer both close-range IR LEDs and Long-range IR LEDs with different beam angles (ranging from 10° to 54°).
       6. The infrared illuminator shall offer an AUTO mode that can steer the IR beam dynamically to match the illumination coverage and intensity with the camera’s field of view.
       7. The infrared illuminator shall offer a Spotlight mode to allow the IR illuminator to brighten the center of the camera’s field of view.
       8. The infrared illuminator shall be a ruggedized unit designed for discrete video surveillance in outdoor applications including perimeter protection, city surveillance, and mining.
    2. Software Control
       1. Camera Setup/Control: Via web browser, Bosch Configuration Manager, or Bosch Video Management System (BVMS, versions 7.5 or later)
       2. Software Update: Network firmware upload
    3. Mechanical
       1. Pan speed: Normal: 0.1°/s - 120°/s (pan) │ Turbo mode: 0.1°/s - 240°/s (pan)
       2. Tilt Speed: Normal: 0.1°/s - 100°/s (tilt)
       3. Pre-position speed: Pan: 240°/s │ Tilt: 100°/s
       4. Pan range: 360° continuous
       5. Tilt range: -90° to 5° (Auto-flip 190°)
       6. Pre-position Accuracy: ± 0.1°.
       7. Pre-positions: 256
       8. 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
       9. Manual Pan Tilt Control Delay: Acceleration: 200ms (From stop to max speed)
       10. Manual Pan Tilt Control Delay: De-acceleration: 200ms (From 5°/s to stop), 900ms (From 100°/s to stop)
    4. Network
       1. Interoperability/Conformity: ONVIF Profile S, Profile G, Profile T, Profile M
       2. Communications Protocols: Standard Bosch IP protocol, including SNMP v1, v3, MIB-II
       3. Video Compression: H.265, H.264 (ISO/IEC 14496‑10), M‑JPEG, JPEG
       4. Streaming:
          1. Four (4) streams: Two (2) configurable streams in H.264 or H.265
          2. One (1) I-frame-only stream based on the first stream
          3. One (1) M-JPEG Stream
       5. 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, selftHOST.de, no-ip.com), SMTP, iSCSI, UPnP (SSDP), DiffServ (QoS), LLDP, SOAP, Dropbox™, CHAP, digest authentication
       6. Ethernet port: 10/100 Base-TX, auto-sensing, half/full duplex, RJ45
       7. Encryption: TLS 1.2, SSL, DES, 3DES, AES
       8. GOP Structure: IP, IBP, IBBP
       9. Frame rate: up to 60fps at all resolutions
       10. IP Delay: 166ms (at 60 fps) (typical) | 233ms (at 30fps) (typical)
       11. Audio
           1. Standard:

G.711, 8 kHz sampling rate

L16, 16 kHz sampling rate

AAC, 16 kHz sampling rate

* + - * 1. Signal-to-Noise Ratio: >55 dB
        2. Audio Streaming: Bi-directional (full-duplex)
    1. User Connections:
       1. Ethernet: RJ-45 100 Base-T
       2. Alarm Inputs: 2
       3. Alarm Outputs: 1 relay output 5 VDC, 150 mA maximum
       4. Audio: 1x mono line in, 1x mono line out
          1. Signal Line In: 94 kOhm typical, 1 Vrms maximum
          2. Signal Line Out: 1 kOhm typical, 1 Vrms maximum
    2. Environmental
       1. Ingress Protection Rating/Standard (with bubble): IP66
       2. External Mechanical Impact (IK Code or Impact rating): IK10
       3. The camera shall be capable of operating in an outdoor environment within -40 °C to +60 °C (-40 °F to +140 °F)
       4. Storage Temperature:

-40 °C to +60 °C (-40 °F to +140 °F)

* + - 1. Humidity:

0% to 90% RH non-condensing

* + 1. Construction
       1. Product Weight: 9.9 kg (21.8 lb)
       2. Construction Material:
          1. Housing: Aluminum
          2. Sunshield: Aluminum
          3. Window: Optical glass
       3. Standard Color: White (RAL 9003)
       4. Standard Finish: Corrosion-resistant, powder coat paint
       5. Wiper: White, integrated, long-life silicone wiper
  1. ACCESSORIES
     1. Mounts
        1. NDA-U-WMT Pendant wall mount, white
        2. NDA-U-PMT Pendant pipe mount ,31 cm (12 in.), white
        3. NDA-U-PMTS Pendant pipe mount, 11 cm (4 in.), white
        4. NDA-U-CMT Corner mount adapter, white
        5. NDA-U-PMAL Pole mount adapter large, white
        6. NDA-U-WMP Wall mount plate for universal wall mount, corner mount and pole mount, white
        7. NDA-U-RMT Pendant parapet mount
        8. NDA-U-PSMB Pendant wall/ceiling mount
     2. Power Supplies
        1. UPA-2450-50 Power Supply, 220 V, 50 Hz, white
        2. UPA-2450-60 Power Supply, 120 V, 60 Hz, white
        3. NDA-U-PA0 24 VAC Power Supply Box
        4. NDA-U-PA1 110 VAC Power Supply Box
        5. NDA-U-PA2 230 VAC Power Supply Box

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. Perform installation with qualified service personnel.
      3. Install devices in accordance with the National Electrical Code or applicable local codes.
      4. Ensure selected location is secure and offers protection from accidental damage.
      5. 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 functions properly.

END OF SECTION

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