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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 MIC IP inteox 7100i – 2MP**

1. **– GENERAL**
   1. SUMMARY
      1. 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. Product Safety compliance
        1. Underwriters Laboratories standard UL 60950-1 Ed.2.
        2. Underwriters Laboratories standard UL 62368-1.
        3. AS/NZS CISPR 32 Radiated & Conducted Emissions (RMC)
     2. International Electrotechnical Commission (IEC) compliance:
        1. IEC 60529, edition 2.2 – Ingress, meets IP68 when installed on MIC Hinged DCA or MIC Wall Mount accessories
        2. IEC 60529, edition 2.2 – Ingress, meets IP67 when not installed on MIC Deep Conduit Adapter (DCA) or MIC Wall Mount accessories, but with MIC-IP67-5PK kit
        3. IEC 60950-1, Ed.2. – General safety requirements
        4. IEC 60950-22 – Safety, equipment to be installed outdoors
        5. IEC 60068-2-1, edition 6.0 – Cold operational and Cold Endurance/Storage
        6. IEC 60068-2-2, edition 5.0 – Dry Heat operational and Dry Heat Endurance/Storage
        7. IEC 60068-2-27, edition 4.0 – Shock
        8. IEC 60068-2-30 – Humidity
        9. IEC 60068-2-6, edition 7.0 -- Sinusoidal Vibration
        10. IEC 62262, edition 1.0 – Impact rating of IK10
        11. IEC 62368-1 – Safety
     3. European Norm compliance
        1. Complies with CE Product Safety regulations
        2. Complies with EN Product Safety standards
        3. Complies with Low Voltage Directive (LVD) 2014/35/EU
        4. EN 50581 – Complies with Restriction of Hazardous Substances (RoHS) directive, Compliant to 2011/863/EU
        5. Complies with EMC directive 2014/30/EU
        6. EN 50121-4 – Railway Applications, Electromagnetic Compatibility: Emission and Immunity of the Signaling and Telecommunications Apparatus.
        7. EN 50130-4 – Alarm Systems - Electromagnetic Compatibility
        8. EN 50132-7, scope A – DORI detection/observation/recondition/identification distances for visible video images
        9. EN 55032 – Radiated and Conducted Emissions
        10. EN 60950-1 – ITE Product Safety
        11. EN 60950-22 – Outdoor rating
        12. EN 61000-3-2 – Mains Harmonic Current Emissions
        13. EN 61000-3-3 – Mains Voltage fluctuations and flicker
        14. EN 61000-4-2 – ESD Susceptibility
        15. EN 61000-4-3 – Radiated electromagnetic fields
        16. EN 61000-4-4 – Electrical Fast Transient (EFT) Burst
        17. EN 61000-4-5 – Surge
        18. EN 61000-4-6 – Conducted Immunity
        19. EN 61000-4-11 – Voltage Dip and Short Interruption
        20. EN 62368-1 – Audio/Video safety
     4. Canadian Standards Association (CSA) compliance
        1. CSA product safety standards CAN/CSA-C22.2 No. E60950-1B-07
     5. Complies with Canada ICES-003 regulations.
     6. Federal Communications Commission (FCC) Compliance
        1. Complies with FCC 47 CFR Part 15, Subpart B, Class A.
     7. MIL-STD compliance
        1. MIL-STD-167-1A – Sinusoidal Vibration
        2. MIL-STD-810-G, 510.5 – Sand and Dust
        3. MIL-STD-810-G, 506.5 – Rain
        4. MIL-STD-810-G, 505.5 – Solar Radiation
        5. MIL-STD-810-G, 501.5 – High Temperature
        6. MIL-STD-810-G, 502.5 – Low Temperature
        7. MIL-STD-810-G, 503.5 – Temperature Shock
        8. MIL-STD-810-G, 509.5 – Salt Fog
        9. MIL-STD-810-G, 521.3 – Ice/Freezing Rain
     8. Other Environmental compliance ratings
        1. UL standard UL50E – Ingress, Type 6P
        2. Cold Start: Able to start-up from -40 °C (-40 °F) after 2 hours of warm-up
        3. Corrosion resistance/Salt mist spray

ISO 12944-6: C5-M (High); Aluminum Housing Components

* + - 1. Wind loading rating:
         1. 161 km/h (100 mph) (sustained)
         2. Gusts to a maximum of 241 km/h (150 mph) for a camera in upright or inverted orientation with an attached illuminator
         3. Gusts to a maximum of 257 km/h (160 mph) for a camera in canted orientation with an attached illuminator)
         4. Effective Projected Area: Camera + DCA: 0.0725 m² (0.78 ft²); Camera + DCA + illuminator: 0.0854 m² (0.92 ft²)
      2. ASTM D 3359 – Paint Adhesion, method B, Cross-hatch
      3. Audible Noise – Meets <65dB average noise during pan/tilt operations
    1. 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, 30, 50 and 60 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
    2. International Organization for Standardization (ISO)
       1. ISO 9001 – Quality System.
    3. Other
       1. 24VAC power source – Able to be powered using nominal 24VAC power source
       2. High PoE power source – Able to be powered using 95 W High PoE power source when connected to network cable (CAT5/6) having <=100m length
       3. Redundant power source – Able to be powered using both 24VAC and High PoE providing a redundant power source operating mode
       4. Video latency – Meet <200 ms video latency limit (end-to-end video signal)
       5. Control latency – Meet <50 ms control latency limit (command received to motor start)
       6. NEMA TS2, Section 2.2.7.2 – Transients, Temperature, Voltage, and Humidity
       7. NEMA TS2, Section 2.2.8 – Vibration
       8. NEMA TS2, Section 2.2.9 – Shock (Impact)
       9. NEMA TS2, Section 2.2.10 – Power Interruption
       10. China environmental import requirements -- Compliant
       11. International Safe Transit Association (ISTA) procedure – Drop test per ISTA-1A
       12. Highly Accelerated Life Testing (HALT) -- Voltage, Temperature, and Vibration conditions, per Bosch guidelines
       13. Open Network Video Interface Forum (ONVIF) Profile S, Profile G, Profile T
       14. Wiper Blade – Meets >200,000 wipe cycles
       15. Thermal IC temperature rating – At +65 °C (+149 °F), with airflow
       16. Window Condensation – Room temperature down to -40 °C (-40 °F) at rate of 5 °C (9 °F) per hour
  1. SYSTEM DESCRIPTION
     1. Section Includes
        1. Video Surveillance Remote Devices
     2. Performance Requirements
        1. The PTZ camera shall be a full-featured, ruggedized unit designed for discrete video surveillance in outdoor applications including traffic monitoring (bridge, tunnel, or highways), perimeter protection, city surveillance, and mining.
        2. The PTZ camera shall be a high performance 1/2-in. CMOS sensor with a maximum 1937 x 1097 (2.12 MP) resolution.
        3. The PTZ camera shall produce a color image with a minimum scene illumination of 0.047 lux and a monochrome image, when in the night mode, with a minimum illumination of 0.0013 lux at 30 IRE.
        4. The PTZ camera shall comply with the IK10 impact rating and with the IP68 and TYPE 6P environmental protection rating.
        5. The PTZ camera shall comply with the ISO 12944-6: C5-M (High); Aluminum Housing Components salt spray standard.
        6. The PTZ camera shall be engineered to withstand high-impact or continuous low-frequency vibration.
        7. The PTZ camera shall support the following dual, redundant power options:
           1. Without illuminator:

24 VAC

Bosch 60 W Midspan (NPD-6001B)

* + - * 1. With illuminator:

24 VAC

Bosch 95 W indoor midspan (NPD-9501A) or 95 W outdoor midspan (NPD-9501-E)

* + - * 1. The PTZ camera shall default to use power from the midspan power supply, if connected.
        2. The PTZ camera shall switch to the 24 VAC power supply if power from midspan is lost, with no interruption to camera operation.
      1. The PTZ camera shall offer High Dynamic Range (120 dB) for images with simultaneous bright and dark areas.
      2. The PTZ camera shall provide direct network connection using H.264, H.265, and JPEG compression and bandwidth throttling to manage bandwidth and storage requirements while delivering outstanding image quality.
      3. The PTZ camera shall offer embedded Intelligent Video Analysis (IVA) that eliminates dedicated PCs and associated software maintenance.
      4. The PTZ camera shall conform to the ONVIF standard to provide interoperability with other conformant systems.
      5. The PTZ camera shall offer 3 fully configurable streams with stream prioritization.
      6. The PTZ camera shall have an autofocus lens with 30x optical and 12x digital zoom.
      7. The PTZ camera shall have variable pan and tilt speeds, and auto pivot capability for optimal camera control and viewing at all zoom levels.
      8. The PTZ camera shall offer a defog image feature that assists the camera in registering a usable image when viewing foggy or other low-contract scenes.
      9. The PTZ camera shall be compatible with an optional, field-installable MIC illuminator.
      10. The PTZ camera shall be able to control the optional illuminator to produce white light to capture full scene details in color.
      11. The PTZ camera shall be able to control the optional illuminator to produce 940m IR array to make invisible illumination.
      12. The PTZ camera shall be able to control the optional illuminator to produce 850 nm IR array to allow detection of objects at a maximum distance of 300 m (984 ft).
      13. The PTZ camera shall be capable of operating in an outdoor environment within the following temperature range: -40 °C to +65 °C (-40 °F to +149 °F)
  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’ experience in manufacture and design Video Surveillance Devices.
     2. Video Surveillance System:
        1. Listed by CSA and UL.
        2. Certified compliant to FCC, CE, and UL 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’ 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. Provide manufacturer’s warranty covering 3 years for replacement and repair of defective equipment.
  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 MIC inteox 7100i - 2MP [MIC-7602-Z30B] [MIC-7602-Z30W] [MIC-7602-Z30G] [MIC-7602-Z30BR] [MIC-7602-Z30WR] [MIC-7602-Z30GR]
     1. General Characteristics:
        1. The PTZ camera shall allow users to set up a global video analytics profile independent of prepositions. In this global profile, the event object in field and the masking of areas to ignore objects there shall be supported. Moving objects shall be detected and tracked even if The PTZ camera is panning, tilting or zooming with low speed.
        2. The PTZ camera shall be engineered to withstand high-impact or continuous low-frequency vibration. The PTZ camera shall be compatible with a full set of accessories that support upright/inverted/canted mounting configurations on flat surfaces, walls, ceilings, poles, and building corners.
     2. Imaging
        1. The PTZ camera shall offer a 1/2-in. type CMOS imager.
        2. The PTZ camera shall offer an effective number of pixels of 5544 x 3694 (20.47 MP).
        3. The PTZ camera shall offer a 16:9 aspect ratio.
        4. The PTZ camera shall offer a 12x optical zoom lens (9.3 mm to 111.6 mm).
        5. The PTZ camera shall offer a 12x digital zoom.
        6. The PTZ camera shall have 6.1° to 64.6° field of view.
        7. The PTZ camera shall produce a color image with a minimum scene illumination of 0.292 lux and a monochrome image, when in the night mode, with a minimum illumination of 0.0110 lux at 30 IRE.
        8. The PTZ camera shall produce a clear image for with DORI (Detect, Observe, Recognize, Identify) performance (per EN 62676-4 standard):

|  |  |  |  |
| --- | --- | --- | --- |
| DORI | Distance (WIDE 1x) | Distancence (TELE 12x) | Scene Width |
| Detection  25 pixel/m (8 pixel/ft) | 69 m  (226 ft) | 2095 m  (6873 ft) | 77 m  (253 ft) |
| Observation  63 pixel/m (19 pixel/ft) | 27 m  (89 ft) | 831 m  (2726 ft) | 31 m  (102 ft) |
| Recognition  125 pixel/m (38 pixel/ft) | 14 m  (46 ft) | 419 m  (1375 ft) | 15 m  (49 ft) |
| Identification  250 pixel/m (76 pixel/ft) | 7 m  (23 ft) | 210 m  (689 ft) | 8 m  (26 ft) |

* + - 1. The PTZ camera shall offer automatic focus and iris control with manual override.
      2. The HD PTZ shall offer Bosch Intelligent Dynamic Noise Reduction.
      3. The PTZ camera shall offer a High Dynamic Range of 120 dB.
      4. The PTZ camera shall offer a Sodium Vapor White Balance mode that automatically compensate for light from a sodium vapor lamp to restore objects to their true color.
      5. The PTZ camera shall offer a defog image feature that assists the camera in registering a usable image when viewing foggy or other low-contract scenes.
      6. The camera shall have an average typical optimized bandwidth in kbits/s for various image rates as shown in the following table:

|  |  |  |
| --- | --- | --- |
| **FPS** | **H.264** | **H.265** |
| 30 | 2740 | 2060 |
| 15 | 1690 | 1260 |
| 2 | 420 | 310 |
| 1 | 260 | 190 |

Note: The actual bit rate table will be variant depends on the scene, picture settings and encoder profile settings.

* + 1. System Features
       1. The PTZ camera PTZ camera shall be compatible with the Configuration Manager and the Bosch Video Management System.
       2. The PTZ camera shall have several built-in sensors and offer advanced diagnostics that display warnings on the cameras on-screen display, including high and low temperature, low voltage, high humidity, high vibration, total hours of operation for camera and for illuminator.
    2. PTZ Features
       1. The PTZ camera shall provide a brushless, integral pan/tilt motor drive unit.
       2. The PTZ camera shall provide a pan range of 360° continuous.
       3. The PTZ camera shall provide a tilt angle, with or without illuminator, of 290°.
       4. The PTZ camera shall offer the following tilt ranges, with or without illuminators:
          1. Upright unit: -55° to +90°
          2. Inverted unit: -95° to +55°
          3. Canted unit: -80° to +65°
       5. The PTZ camera shall provide pan and tilt preset accurate to within +/-0.05° with or without illuminator.
       6. The PTZ camera shall offer variable pan speeds of 0.2°/second to 120°/second.
       7. The PTZ camera shall offer a variable tilt speed of 0.2°/second to 90°/second.
       8. The PTZ camera shall offer a pre-position speed of 120°/second.
       9. The PTZ camera shall divide the cameras 360º rotation into 4, 6, 8, 9, 12, or 16 independent sectors with 20-character titles per sector. Any or all of the sectors can be blanked from the operator's view.
       10. The PTZ camera shall offer the ability to define 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. Selectable colors shall be Black, White, Grey, or Mosaic, or an Auto option (average background color).
       11. The PTZ camera shall offer 24 virtual masks.
       12. The PTZ camera shall store a maximum of 256 preset scenes with each preset programmable for 20-character titles.
       13. The PTZ 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. Pre-position tour - one (1), consisting of a maximum of 256 scenes consecutively, and (1) customized with a maximum of 256 scenes.
    3. Pre-programmed Modes
       1. The PTZ camera shall offer multiple pre-programmed but configurable user modes.
       2. The pre-programmed modes shall be optimized with the best settings for the following environments:
          1. Standard (default mode)
          2. Sensitivity Boost
          3. Fast movement
          4. Vibrant
          5. Color Only
          6. Illuminator (only for MIC cameras with installed illuminators)
          7. 2 custom modes
       3. The PTZ camera shall allow users to customize these modes for the specific requirements of the camera site.
    4. Recording and Storage Management
       1. The PTZ camera shall support iSCSI devices to allow video stream to be recorded directly to an iSCSI RAID array.
       2. The PTZ camera shall support iSCSI storage targets.
       3. The PTZ camera shall be compatible with the Bosch Video Recording Manager (VRM) to control and manage video recording.
    5. HD Characteristics
       1. The PTZ camera shall generate HD resolution using H.264 compression (ISO/IEC 14496-10).
       2. The PTZ camera shall generate HD resolution using H.265 compression.
       3. The PTZ camera shall generate multiple simultaneous configurable HD video streams.
       4. The PTZ camera shall allow simultaneous streaming of individual HD streams, and allow a choice of HD resolution in combination with SD resolutions.
    6. IP Connectivity
       1. The PTZ camera shall allow full camera control and configuration capabilities via a TCP/IP network.
       2. The PTZ camera shall support the following dual, redundant power options:
          1. 24 VAC
          2. High PoE (using the 60 W midspan (for models without illuminator) or the 95 W midspan (for models with illuminator))
       3. The PTZ camera shall default to use power from the 24 VAC power supply, if connected.
       4. The PTZ camera shall switch to the High PoE or PoE+ power supply if power from the 24 VAC power supply is lost with no interruption to camera operation.
       5. The PTZ camera shall be capable of capturing and storing images using 4K HD, HD 1080p, and HD 720p resolutions.
       6. The PTZ camera shall deliver video, at rates of maximum 30 images per second, via TCP/IP over Cat5e/Cat6 UTP cable.
       7. The PTZ camera shall support operation with Internet Explorer web browser version 11.0 or later, Bosch Configuration Manager, Bosch Video Management System (BVMS), Video Security Client (VSC), Project Assistant, or other third party software.
       8. The PTZ camera shall conform to the ONVIF S, G, and T standards.
       9. The PTZ camera shall offer Quality of Service (QoS) configuration options.
       10. The PTZ camera shall support the IPv6 internet-layer protocol for packet switched internetworking across multiple IP networks.
       11. The PTZ camera shall offer embedded Intelligent Video Analysis (IVA) that eliminates dedicated PCs and associated software maintenance.
    7. Intelligent Video Analysis
       1. The PTZ camera shall be able to process and analyze video within the camera itself, with no extra hardware required.
       2. The PTZ camera shall be able to detect and send alarms for abnormal events.
       3. The PTZ camera shall be configurable to analyze a maximum of 10 different scenes for one or more of the following events: Line Crossing, Loitering, Idle Object, Removed Object, Conditional Change, Trajectory Tracking, and filters.
       4. The PTZ camera shall allow users to set a maximum of 10 separate profiles and switch profiles based on a day/night or holiday schedules.
       5. The PTZ camera shall support scene tours that automatically reposition the camera to each scene for a specified duration.
       6. The PTZ camera shall be able to count moving objects that are currently within a user-defined area.
       7. The PTZ camera shall be able to count objects that are moving in a user defined direction.
       8. The PTZ camera shall be able to estimate crowd density.
       9. The PTZ camera shall be able to combine object events and states for user defined events.
       10. The PTZ camera shall be able to detect and send alarms for user defined events.
       11. The PTZ camera shall incorporate an Alarm Rule Engine, enabling abnormal events that IVA detects to prompt the camera to take one or more actions such as:
           1. Trigger a relay connected to an alarm siren and/or strobe.
           2. Trigger a visual alert to be displayed on the operator’s screen.
           3. Go to a specified scene (preset position).
    8. Access Security
       1. The PTZ camera shall offer three levels of password protection.
       2. The PTZ camera shall incorporate Trusted Platform Module (TPM) functionality provided by “Secure Element” (dedicated AES/DES/PKI crypto co-processor):for storage of encryption keys.
       3. The PTZ camera shall have cryptography with a maximum of 4096 bit RSA keys for TLS (maximum version 1.3) and device identity.
       4. The PTZ camera shall have advanced certificate handling with unique certificates and encrypted private keys.
       5. The PTZ camera shall support secured connections.
       6. The PTZ camera shall require a service-level password at initial setup to access camera functions.
       7. The PTZ camera shall disable all unsecure ports.
       8. The PTZ camera shall disable all unsecure remote communication.
       9. The PTZ camera shall prevent uploading of untrusted, unauthenticated third party software.
       10. The PTZ camera shall support only authenticated firmware and third-party apps.
       11. The HTD PTZ camera shall include a sandbox environment for the secure execution of trusted third-party software.
       12. The PTZ camera shall incorporate an embedded login firewall.
       13. The PTZ camera shall have software protection that seals the camera configuration (“software sealing”) and detects changes to camera configuration.
    9. Installation Requirements
       1. The PTZ camera shall be capable of operating in an outdoor environment within the following temperature range: -40 °C to +65 °C (-40 °F to +149 °F)
       2. The PTZ camera shall offer a cold start-up temperature of: -40 °C (-40 °F)

(Requires 60-minute warm-up prior to PTZ operations.)

* + - 1. The PTZ camera shall accept power, transmit video, and accept control via TCP/IP connection.
      2. The PTZ camera shall support the following dual, redundant power options:
         1. Without illuminator:

24 VAC

Bosch 60 W Midspan (NPD-6001B)

* + - * 1. With illuminator:

24 VAC

Bosch 95 W indoor midspan (NPD-9501A) or 95 W outdoor midspan (NPD-9501-E)

* + - 1. The PTZ camera shall switch to the High PoE or PoE+ power supply if power from the 24 VAC power supply is lost, with no interruption to camera operation.
      2. The PTZ camera shall be able to be mounted in an upright, inverted, or canted position.
      3. The PTZ camera shall be able to be mounted to a wall, the corner of a wall, and to a pole using optional mounting hardware.
      4. The PTZ camera shall offer an optional sunshield.
      5. The PTZ camera shall provide an optional IP67-rated weatherproofing kit for the camera’s electrical interface pigtail.

The PTZ camera shall provide an optional hinged deep conduit adapter to facilitate connecting cables to the camera before the final bolts are installed.

* + - 1. The PTZ camera shall provide a multi-language on-screen display with custom-sized fonts (1-1000).
    1. Housing Options
       1. The PTZ camera shall be made of anodized cast solid aluminum with a flat glass viewing window.
       2. The PTZ camera shall provide built-in surge protection for power, data, and network inputs.
       3. The PTZ camera shall conform to the IP68 standard for a weather-resistant package.
       4. The PTZ camera shall conform to the IP67 standard for a weather resistant package when using the MIC-IP67-5PK connector kit.
       5. The PTZ camera shall conform to the Type 6P standard for ingress protection (when using installed MIC-DCA-H or MIC-WMB).
       6. The PTZ camera shall provide an integrated silicone wiper.
       7. The PTZ camera shall conform to the IK10 rating for external mechanical impact.
       8. The PTZ camera shall conform to the following wind loads:
          1. 161 km/h (100 mph) (sustained)
          2. Gusts to a maximum of 241 km/h (150 mph)) for a camera in upright or inverted orientation with an attached illuminator
          3. Gusts to a maximum of 257 km/h (160 mph) for a camera in canted orientation with an attached illuminator
          4. Effective Projected Area: Camera + DCA: 0.0725 m² (0.78 ft²); Camera + DCA + illuminator: 0.0854 m² (0.92 ft²)
       9. The PTZ camera shall conform to the IEC 60068-2-6, Test Fc: Vibration (sinusoidal), 10m/s² (1.0g) and the Sinusoidal vibration test IAW MIL-STD-167-1A vibration tests.
       10. The PTZ camera shall be available in the following colors:
           1. Black (RAL 9005)
           2. White (RAL 9010)
           3. Grey (RAL 7001)
       11. The PTZ camera shall provide a corrosion protection surface treatment with powder coat paint, sand finish.
    2. Illumination
       1. The PTZ camera shall offer an optional, field-installable illuminator.
       2. The field-installable illuminator shall enable detection of objects at a maximum distance of 300 m (984 ft) with infrared (850 nm).
       3. The field-installable illuminator shall enable detection of objects at a maximum distance of 250 m (820 ft) with White light.
       4. The field-installable illuminator shall offer Constant Light technology to automatically control and adjust output to deliver a consistent level of illumination.
       5. The field-installable illuminator shall offer both IR (940 nm and 850 nm) and White Light LEDs and shall allow operators to switch between the three sources.
       6. The field-installable illuminator shall offer IR arrays with multiple beam angles (ranging from 16° to 47°) to provide illumination of a wide area of view.
       7. The MIC camera shall steer the IR beam dynamically to match the illumination intensity with the camera’s field of view according to the zoom level.
       8. The field-installable illuminator shall be a ruggedized unit designed for discrete video surveillance in outdoor applications including perimeter protection, city surveillance, and mining.
    3. Camera
       1. Imager: 1/2-in. type CMOS sensor
       2. Effective Picture Elements (Pixels): 1937 x 1097 (2.12 MP)
       3. Lens:
          1. 30x optical zoom, 6.6 to 198 mm
          2. F1.5 to F4.8
          3. 12x digital zoom
          4. Field of View: 2.1° to 58.3°
       4. Focus: Automatic with manual override
       5. Iris: Automatic with manual override
       6. Gain Control: Auto/Manual
       7. Aperture Correction: Horizontal and vertical
       8. Electronic Shutter Speed (AES): 1/1 sec to 1/10,000 sec (22 steps)
       9. High Dynamic Range (HDR): 120 dB
       10. Signal-to-Noise Ratio (SNR): >55 dB
       11. Backlight Compensation: On/Off
       12. White Balance: 2000 K to 10,000 K; ATW, AWB Hold, Extended ATW, Manual, Sodium Lamp Auto, Sodium Lamp
       13. Day/Night: Monochrome, Color, Auto
       14. Defog Image Feature: Allows the camera to “see” and register a usable image when viewing foggy or other low-contract scenes.
    4. Mechanical
       1. Drive Unit: Brushless, integral pan/tilt motor drive
       2. Pan Range: 360° continuous rotation
       3. Tilt Angle (with or without illuminators): 290°
       4. Tilt Range (with or without illuminators):
          1. Upright unit: -55° to +90°
          2. Inverted unit: -95° to +55°
          3. Canted unit: -80° to +65°
       5. Variable Pan Speed: 0.2°/second to 120°/second
       6. Variable Tilt Speed: 0.2°/second to 90°/second
       7. Pre-position Speed: 120°/second
       8. Preset Accuracy: +/-0.05° (with or without illuminator)
       9. Proportional Pan/Tilt to Zoom: Yes
       10. Zoom Movement Speed:
           1. <5 seconds (optical Wide to optical TELE)
           2. <7.5 seconds (optical Wide to digital TELE)
       11. Audible Noise: <65 dB
    5. Electrical
       1. Input Voltage: 21-30 VAC, 50/60 Hz and/or High Power over Ethernet (56 VDC nominal)
       2. Power Consumption:
          1. Without illuminator: 40 W maximum
          2. With illuminator: 70 W maximum
       3. Current Consumption:
          1. 24 VAC: ~3.15A
          2. High PoE: ~1.5A
       4. Built-in Surge Suppression:
          1. Protection on Audio in, out Peak forward current 150A (8/20us)
          2. Protection on Power Input Peak forward current 8.3ms single half wave sine 100 A, peak pulse power dissipation 600 W (10/1000 μ)
          3. Protection on Ethernet Peak current 24A, 300 Watts Peak Pulse Power per Line (tp = 8/20µs)
    6. Software Control
       1. Via web browser, Bosch Configuration Manager, Bosch Video Management System (BVMS), Video Security Client (VSC), or support for third party software
       2. Software Update: Network firmware upload
    7. Network
       1. Communications Protocols: Standard Bosch IP protocol, including ONVIF S, G and T
       2. Video Compression: H.265, H.264 (ISO/IEC 14496‑10), M‑JPEG, JPEG
       3. Streaming: 3 fully configurable streams, with the option to activate or deactivate VCA overlays on each stream.
       4. Resolution (H x V):
          1. 1080p HD: 1920 x 1080
          2. 720p HD: 1280 x 720
          3. 432p SD: 768 x 432
          4. 288p SD: 512 x 288
       5. Protocols: IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP/RTCP, IGMP V2/V3, ICMP, ICMPv6, RTSP, FTP, ARP, DHCP, NTP (SNTP), 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: 10-Base T/100 Base-TX, auto-sensing, half/full duplex, Auto-MDI-X
       7. Encryption: TLS 1.0/1.2, AES128, AES256
       8. GOP Structure: IP, IBP, IBBP
       9. Camera internal delay: 30 fps: 247 ms (typical)
    8. Data Security
       1. Three-level password protection
       2. Web browser access protected with HTTPS
       3. Firmware updates protected with authenticated secure uploads
       4. Trusted Platform Module (TPM)
       5. Public Key Infrastructure (PKI)
       6. 802.1x network authentication with EAP/TLS, supports TLS 1.2 with updated cipher suites including AES 256 encryption
    9. Miscellaneous
       1. Sectors/Titling: 4, 6, 8, 9, 12, or 16 independent sectors with 20-character titles/sector
       2. Privacy Masking: 32, individually configurable, with a "Mosaic" option, where the movements behind a Privacy Mask remain visible.
       3. Virtual Masking: 24 individually configurable masks to hide parts of the scene (background motion such as moving trees, pulsating lights, busy roads, etc.).
       4. Pre-positions: 256, each with 20-character titles
       5. Camera Setup/Control: 100 Base-Tx Ethernet
       6. Guard Tours: Two (2) types of tours:
          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 a maximum of 256 scenes consecutively, and (1) customized, with a maximum of 64 scenes
       7. Supported Languages: English, Czech, Dutch, French, German, Italian, Polish, Portuguese, Russian, Spanish
       8. Embedded logo with resolution of 1024x1024 and color depth of 16M colors.
    10. User Connections:
        1. Power
           1. Network:

Without illuminator: RJ-45 100 Base-TX Ethernet PoH (60 W midspan; NPD-6001B), or HPoE 95 W midspan (NPD-9501A or NPD-9501-E) 24 VAC, 50/60 Hz

With illuminator: HPoE 95 W midspan (NPD-9501A or NPD-9501-E)

* + - * 1. Camera: 24 VAC (power supply)
      1. Video and Control: RJ-45 100 Base-TX Ethernet
    1. Environmental
       1. Ingress Protection Rating/Standard:
          1. IP68
          2. Type 6P, when using installed MIC-DCA-H or MIC-WMB
          3. IP67 (dust and moisture) rating on pigtail connections
       2. External Mechanical Impact (IK Code or Impact rating): IK10 (excluding glass window)
       3. Operating Temperature: -40 °C to +65 °C (-40 °F to +149 °F)
       4. Cold Start-up Temperature: -40 °C (-40 °F)

(Requires 60-minute warm-up prior to PTZ operations)

* + - 1. Storage Temperature: -45 °C to +70 °C (-49 °F to +158 °F)
      2. Humidity: 0% to 100%
      3. Wind Load:
         1. 161 km/h (100 mph) (sustained)
         2. Gusts to a maximum of 241 km/h (150 mph)) for a camera in upright orientation with an attached illuminator
         3. Gusts to a maximum of 257 km/h (160 mph) for a camera in canted orientation with an attached illuminator
         4. Effective Projected Area: Camera + DCA: 0.0725 m² (0.78 ft²); Camera + DCA + illuminator: 0.0854 m² (0.92 ft²)
      4. Vibration: IEC 60068-2-6, Test Fc: Vibration (sinusoidal), 10 m/s² (1.0 G), (0.5 G on canted units); Sinusoidal vibration test IAW MIL-STD-167-1A
      5. Shock: IEC 60068-2-27, Test Ea: Shock, half sine impulse, 11 ms, 45 G, (20 G on canted units); Impact: Test half sine wave 11 ms, 10 G
    1. Construction
       1. Dimensions: Refer to product datasheet
       2. Product Weight: 8.7 kg (19.2 lb)
       3. Viewing Window: Flat glass
       4. Construction Material: Anodized cast solid aluminum
       5. Standard Colors: Black (RAL 9005); White (RAL 9010); Grey (RAL 7001)
       6. Standard Finish: Corrosion-resistant, powder coat paint, sand finish
       7. Window Wiper: Long-life silicone wiper
       8. Sunshield: Optional; sold separately
       9. Canting: On-site canting functionality
  1. ACCESSORIES
     1. Mounts
        1. MIC Hinged DCA, Black (MIC-DCA-HB)
        2. MIC Hinged DCA, White (MIC-DCA-HW)
        3. MIC Hinged DCA, Grey (MIC-DCA-HG)
        4. MIC Hinged DCA, Black (MIC-DCA-HBA), with adapter (available in specific regions only)
        5. MIC Hinged DCA, White (MIC-DCA-HWA), with adapter (available in specific regions only)
        6. MIC Hinged DCA, Grey (MIC-DCA-HGA), with adapter (available in specific regions only)
        7. Wall Mount Bracket, Black (MIC-WMB-BD)
        8. Wall Mount Bracket, White (MIC-WMB-WD)
        9. Wall Mount Bracket, Grey (MIC-WMB-MG)
        10. Pole Mount Bracket (MIC-PMB)
        11. Corner Mount Bracket, Black (MIC-CMB-BD)
        12. Corner Mount Bracket, White (MIC-CMB-WD)
        13. Corner Mount Bracket, Grey (MIC-CMB-MG)
        14. Spreader Plate, Black (MIC-SPR-BD)
        15. Spreader Plate, White (MIC-SPR-WD)
        16. Spreader Plate, Grey (MIC-SPR-MG)
        17. Shallow Conduit Adapter, Black (MIC-SCA-BD)
        18. Shallow Conduit Adapter, White (MIC-SCA-WD)
        19. Shallow Conduit Adapter, Grey (MIC-SCA-MG)
        20. Sunshield (MIC-7100i-SNSHLD-W)
     2. Illuminators
        1. Illuminator white-IR light 450m black (MIC-ILB-400)
        2. Illuminator white-IR light 450m white (MIC-ILW-400)
        3. Illuminator white-IR light 450m gray (MIC-ILG-400)
     3. Power Supplies/Alarm Interface
        1. PoH indoor midspan, 95 W (NPD-9501A)
        2. PoH outdoor midspan, 95 W (NPD-9501-E)
        3. High PoE Midspan, 60W (NPD-6001B)
        4. VG4-A-PSU1
        5. VG4-A-PSU2

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