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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 FLEXIDOME IP starlight 8000i**

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. EMC – Emissions
        1. ETSI EN 301 489-1 Electro-Magnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU
        2. EN 50121-4 Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus
        3. 47CFR15, class B (STP) and 47CFR15, class A (UTP) Code of Federal Title 47 – Telecommunication Chapter I - FEDERAL COMMUNICATIONS COMMISSION, Subchapter A – GENERAL, Part 15 - RADIO FREQUENCY DEVICES
        4. AS/NZS CISPR 32 Electromagnetic compatibility of multimedia equipment - Emission requirements
     2. EMC – Immunity
        1. EN 50130-4\* Alarm systems - Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems
        2. EN 50121-4 Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus
     3. Environmental
        1. EN 50130-5 (Class IV) 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 60068-2-18 Environmental testing - Part 2-18: Tests – Test R and guidance: Water
        6. EN 60068-2-27 Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock
        7. EN 60068-2-30 Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)
        8. EN 60068-2-52 Environmental testing - Part 2: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)
        9. EN 60068-2-75 Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests
        10. EN 60068-2-78 Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state
        11. UL 2043 Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces
            1. combined with NDA-8000-PLEN
        12. NEMA TS2 Environmental testing – chapter 2.1: Tests Temperature, humidity, shock, vibration
     4. Safety
        1. EN 62368-1 Audio/video, information and communication technology equipment - Part 1: Safety requirements
        2. EN 60950-22 Information technology equipment - Safety - Part 22: Equipment to be installed outdoors
        3. UL 62368-1, 2nd Edition, 2014-12-01 (Audio/video, Information and Communication Technology Equipment - Part 1: Safety Requirements)
        4. UL 60950-22 1st Ed Issued 2007-04-23 Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors
        5. CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12 (Audio/video, Information and Communication Technology Equipment - Part 1: Safety Requirements)
        6. CSA C22.2 No. 60950-22-07 Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors
     5. 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
     6. HD
        1. HD SMPTE 296M-2001 (Resolution: 1280x720) 1280 x 720 Progressive Image Sample Structure – Analogue and Digital Representation and Analogue Interface
        2. SMPTE 274M-2008 (Resolution:1920x1080) 1920 x 1080 Image Sample Structure, Digital Representation and Digital Timing Reference Sequences for Multiple Picture Rates
     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. Impact protection
        1. EN 62262 (IK10+) Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
     10. Water/Dust protection
         1. EN 60529 (IP66) Degrees of protection provided by enclosures (IP Code)
         2. UL50E (Type 4X) Enclosures for Electrical Equipment, Environmental Considerations 1st edition
     11. Environment
         1. EN 50581 (RoHS) Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
     12. Marks
         1. CE, cULus, WEEE, RCM, EAC and China RoHS

\* Chapters 7 and 8 (mains voltage supply requirement) are not applicable to the camera.

However, if the system in which this camera is used needs to comply with this standard,

then any power supplies used must comply with this standard.

* 1. SYSTEM DESCRIPTION
     1. Section Includes
        1. Video Surveillance Remote Devices
     2. Performance Requirements
        1. The fixed network camera shall be a full-featured fixed dome designed for discrete video surveillance applications in indoor and outdoor environments.
        2. The fixed network camera shall have motorized Pan/Tilt/Roll/Zoom (PTRZ) for (re-)commissioning.
        3. The fixed network camera shall be a high performance 1/2.8 inch CMOS sensor type with up to 2.1MP resolution.
        4. The fixed network camera shall offer enhanced system flexibility with dual recording (iSCSI and SD card) options.
        5. The fixed network camera shall support the following dual, redundant power options:
           1. Input options:

PoE (IEEE 802.3at, class 3)

24 VAC

12-26 VDC

* + - * 1. The fixed network camera shall default to use PoE power.
        2. The fixed network camera shall switch with no interruption on camera operation to the 24 VAC / 12-26VDC power supply if power from the PoE power supply is lost.
      1. The fixed network camera shall provide Intelligent Tracking to continuously track objects in motion.
      2. The fixed network camera shall offer a High Dynamic Range of 134 dB for clear images in extreme high-contrast environments.
      3. The fixed network camera shall provide direct network connection using H.265, H.264 and JPEG compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
      4. The fixed network camera shall offer embedded Intelligent Video Analytics (IVA) that eliminates dedicated PCs and associated software maintenance.
      5. The fixed network camera shall conform to the ONVIF standard to provide interoperability with other conformant systems.
      6. The fixed network camera shall offer configurable multi streaming with individually configurable HD 1080p streams.
      7. The fixed network camera shall have support for both 16:9 - wide screen and 9:16 - upright aspect ratios.
      8. The fixed network camera shall offer bi-directional audio.
      9. The fixed network camera shall:
         1. Offer IP66 environmental protection.
         2. Offer IK10+ impact resistance housing and bubble.
         3. Conform to the UL50E type 4X standard.
         4. Support a temperature range of -50 ºC to +60 ºC (-58 ºF to +140 ºF) for continuous operation.
      10. The fixed network camera housing shall be an aluminum, rugged design.
  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 [20] years experience in manufacture and design Video Surveillance Devices.
     2. Video Surveillance System:
        1. Listed by cULus.
        2. Complies to FCC, CE and UL product specific requirements Test methods are in accordance to international standards. 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 NDE-8502-R(T), FLEXIDOME IP starlight 8000i camera or comparable  
     1. General Characteristics:
        1. The fixed network camera shall provide motorized Pan/Tilt/Roll/Zoom (PTRZ) for remote (re-)commissioning.
        2. The fixed network camera shall provide remote (re-)commissioning via the wired network and via integrated wireless capability.
        3. The fixed network camera shall provide a 1/2.8-inch CMOS image sensor with the following minimum capabilities:
           1. 1920x1080 (2.1 MP) effective picture elements.
           2. Sensitivity down to 0.0011 lux (3-9 mm lens) and 0.0031 lux (10-23 mm lens)
           3. High Dynamic Range (HDR) multi-exposure at HD 1080p resolution
        4. The fixed network camera shall offer an Automatic Varifocal (AVF) lens with P-iris control and a focal length of 3 to 9 mm.
        5. The fixed network camera shall offer an Automatic Varifocal (AVF) lens with P-iris control and a focal length of 10 to 23 mm
        6. The fixed network camera shall provide direct network connection using H.265, H.264 and –M-JPEG compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
        7. The fixed network camera shall offer a High Dynamic Range of 134 dB for clear images in extreme high-contrast environments.
        8. The fixed network camera shall have support for both 16:9 - wide screen and 9:16 - upright aspect ratios.
        9. The fixed network camera shall offer advanced Intelligent Video Analysis (IVA) with automated calibration by use of an gyro-sensor.
        10. The fixed network camera shall offer bi-directional audio input/output.
        11. The fixed network camera shall offer intelligent tracking that digitally zooms & tracks movement to continuously follow objects or individuals.
        12. The fixed network camera shall offer the ability to define 8 irregular polygon masks that will automatically recolor to match the scene color and prohibit areas of the field of view from being seen.
        13. The fixed network camera shall directly integrate into mounting accessories that supports an optional fiber optic media converter module.
        14. The fixed network camera shall support the following redundant power options:
            1. Input options:

PoE (IEEE 802.3at, class 3)

24 VAC

12-26 VDC

* + - * 1. The fixed network camera shall default to use PoE power.
        2. The fixed network camera shall switch with no interruption on camera operation to the 24 VAC / 12-26VDC power supply if power from the PoE power supply is lost.
      1. The fixed network camera shall be able to be direct surface mounted to a wall or ceiling.
      2. The fixed network camera shall be capable of operating in an indoor and outdoor environment.
      3. The fixed network camera shall:
         1. Offer IP66 environmental protection
         2. Offer IK10+ impact resistance
         3. Conform to the UL50E type 4X standard for the following:

Access to Hazardous parts

Ingress of solid foreign objects (falling dirt, circulating dust, settling dust)

Ingress of water (dripping and light splashing, hose down and splashing)

Corrosive agents

* + - * 1. Support a temperature range of -50 ºC to +60 ºC (-58 ºF to +140 ºF) for continuous operation.
      1. The fixed network camera housing shall be an aluminum, rugged design.
      2. The fixed network camera shall support the following languages:
         1. English
         2. Czech
         3. Dutch
         4. French
         5. German
         6. Italian
         7. Polish
         8. Portuguese
         9. Russian
         10. Spanish
         11. Japanese
         12. Chinese
    1. Imaging
       1. The fixed network camera shall offer a 1/2.8-inch CMOS image sensor.
       2. The fixed network camera shall offer a minimum effective number of pixels of 1920x1080 (2.1MP).
       3. The fixed network camera shall offer a 16:9 aspect ratio.
       4. The fixed network camera shall produce a color image with a minimum scene illumination of 0.007 lux and a monochrome image, when in the night mode, with a minimum illumination of 0.0011 lux at 30 IRE (3-9 mm lens), measured according to IEC 62676 Part 5 (1/25, F1.2).
       5. The fixed network camera shall produce a color image with a minimum scene illumination of 0.013 lux and a monochrome image, when in the night mode, with a minimum illumination of 0.0031 lux at 30 IRE (10-23 mm lens), measured according to IEC 62676 Part 5 (1/25, F1.6).
       6. The fixed network camera shall offer automatic focus and P-iris control with manual override.
       7. The fixed network camera shall offer a High Dynamic Range (HDR) of 134 dB.
       8. The fixed network 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.
       9. The fixed network camera shall offer an anti-fog image feature that assists the camera in registering a usable image through the heavy fog.
    2. Image Processing
       1. The fixed network camera shall support dynamic noise reduction to reduce bandwidth and storage requirements by optimizing the detail-to-bandwidth ratio via temporal and spatial noise filtering.
       2. The fixed network camera shall include intelligent streaming functionality to reduce bandwidth and storage requirements by optimizing the camera encoder on to camera noise level
       3. The fixed network camera shall be capable of capturing and storing images using H.265 and H.264 compression at HD 1080p resolution.
       4. The fixed network camera shall deliver HD 1080p video, at rates up to 30 images per second.
       5. The fixed network camera shall deliver HD 1080p video with High Dynamic Range (HDR) multi-exposure enabled, at rates up to 30 images per second.
       6. The 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.
    3. System Features
       1. The fixed network camera shall directly integrate into mounting accessories that supports an optional fiber optic media converter module designed to accept a wide-range of 10/100 Mbps SFP modules for use with Multimode or Singlemode optical fiber with LC or SC connectors.
       2. The fixed network camera shall be compatible with the Bosch Video Client, Video Security client and the Bosch Video Management System.
       3. The fixed network camera shall provide one (1) audio mono line in and one (1) audio mono line out.
       4. The fixed network camera shall provide a 12VDC 50mA power output.
       5. The fixed network camera shall provide two (2) alarm inputs and one (1) alarm output
    4. PTRZ Features
       1. The fixed network camera shall provide motorized Pan/Tilt/Roll/Zoom (PTRZ) for remote (re-)commissioning only with service level login.
       2. The fixed network camera shall provide a minimum capability of 400 motorized Pan/Tilt/Roll/Zoom (PTRZ) cycles for remote (re-)commissioning.
       3. The fixed network camera shall provide remote (re-)commissioning via the wired network and via integrated wireless capability.
       4. The fixed network camera shall offer an Automatic Varifocal (AVF) lens with P-iris control and a focal length of 3 to 9 mm.
       5. The fixed network camera shall offer an Automatic Varifocal (AVF) lens with P-iris control and a focal length of 10 to 23 mm.
       6. The fixed network camera shall have 117° to 37° field of view.
       7. The fixed network camera shall provide a pan range of 0º to 361º.
       8. The fixed network camera shall provide a roll angle of -95º to +95º.
    5. Pre-programmed Modes
       1. The fixed network camera shall offer nine (9) pre-programmed configurable user modes for optimized settings for key applications.
       2. The fixed network camera shall allow users to customize these modes for the specific requirements of the camera site.
    6. Recording and Storage Management
       1. The fixed network camera shall have dual (2) SD card slots that use standard, off-the-shelf SD (Secure Digital), SDHC (Standard Digital High Capacity) or a SDXC (Secure Digital eXtended Capacity) card for local storage (up to 2 TB).
       2. The fixed network camera shall support Sony Industrial SD cards with integrated heath monitor.
       3. The fixed network camera shall offer the following configuration modes when dual (2) SD cards are used:
          1. Extend – use all available storage.
          2. Redundant – record to both SD cards to enhance data security.
          3. Fail-over – 2nd SD card takes over if 1st fails
       4. The local storage feature shall be capable of storage for Automatic Network Replenishment (ANR).
       5. The fixed network camera shall offer enhanced system flexibility with dual recording (iSCSI and SD card) options.
       6. The fixed network camera shall support iSCSI devices to allow video stream to be recorded directly to an iSCSI RAID array.
       7. The fixed network camera shall support iSCSI storage targets.
       8. The fixed network camera shall be compatible with the Bosch Video Recording Manager (VRM) to control and manage video recording.
    7. Resolution Characteristics
       1. The fixed network camera shall generate HD 1080p50/60 resolution using H.265 compression (ISO/IEC 14496-10).
       2. The fixed network camera shall generate multiple simultaneous configurable HD 1080p video streams.
       3. The fixed network camera shall allow simultaneous streaming of individual configurable HD 1080p50/60 streams.
    8. IP Connectivity
       1. The fixed network camera shall support iSCSI devices to allow the network-enabled camera to stream video directly to an iSCSI RAID array.
       2. The fixed network camera shall conform to the ONVIF Profile S, G and T standard.
       3. The fixed network camera shall offer Quality of Service (QoS) configuration options.
       4. The fixed network camera shall support the IPv6 internet-layer protocol for packet switched internetworking across multiple IP networks.
    9. Intelligent Video Analysis (IVA)
       1. The fixed network camera shall offer advanced embedded Intelligent Video Analytics (IVA) that eliminates dedicated PCs and associated software maintenance.
       2. The fixed dome camera shall offer advanced Intelligent Video Analysis (IVA) with automated calibration by use of an integrated gyro-sensor so only camera height needs to be set for a full calibration.
       3. The fixed network camera shall offer advanced embedded Intelligent Video Analytics (IVA) with the following functionality:
          1. Triggers: any object, object in field, line crossing, enter field, leave field, loitering, follow route, idle object, removed object, counting, occupancy, crowd density, condition change, similarity search, flow, counter flow, conditional change
          2. Filters: duration, size, aspect ratio, speed, direction, color, object classes
          3. Tracking modes: 3D, 3D people, ship, museum
          4. Tamper detection: global change, scene too bright, scene too dark, reference check
          5. Face detection
       4. The fixed network camera shall allow users to set up to 10 separate profiles and switch profiles based on a day/night or holiday schedules.
       5. The fixed network camera shall support people counting.
       6. The fixed network camera shall incorporate an IVA alarm rule engine that support programming of up-to 8 independent alarm tasks which are individually reported to the video management software.
    10. Motion Tracking
        1. The fixed network camera shall offer intelligent tracking that digitally zooms & tracks movement to continuously follow objects or individuals.
        2. The fixed network camera shall provide intelligent tracking using intelligent video analytics.
        3. The fixed network camera shall offer the following control options for the intelligent tracking feature:
           1. Off – the fixed network camera does not track moving object.
           2. Auto – the fixed network camera actively analyzes the video to detect moving objects and starts tracking.
           3. One Click – the fixed network camera allows a user to click a moving object in the live video image to activate intelligent tracking.
    11. Access Security
        1. The fixed network camera shall offer three levels of password protection.
        2. The fixed network camera shall support 802.1x authentication using a RADIUS (Remote Authentication Dial In User Service) server.
        3. The fixed network camera shall store a SSL certificate for use with HTTPS.
        4. [The fixed network camera shall be capable of being independently AES encrypted with 128-bit keys.]
    12. Installation Requirements
        1. The fixed network camera shall provide motorized Pan/Tilt/Roll/Zoom (PTRZ) for remote (re-)commissioning.
        2. The fixed network camera shall provide remote (re-)commissioning via the wired network and via integrated wireless capability.
        3. The fixed network camera shall support the following redundant power options:
           1. Input options:

PoE (IEEE 802.3at, class 3)

24 VAC

12-26 VDC

* + - * 1. The fixed network camera shall default to use PoE power.
        2. The fixed network camera shall switch with no interruption on camera operation to the 24 VAC / 12-26VDC power supply if power from the PoE power supply is lost.
      1. The fixed network camera shall be able to be direct surface mounted to a wall or ceiling.
      2. The fixed network camera shall be capable of operating in an indoor and outdoor environment.
      3. The fixed network camera shall:
         1. Offer IP66 environmental protection
         2. Offer IK10+ impact resistance
         3. Conform to the UL50E type 4X standard for the following:

Access to Hazardous parts

Ingress of solid foreign objects (falling dirt, circulating dust, settling dust)

Ingress of water (dripping and light splashing, hose down and splashing)

Corrosive agents

* + - * 1. Support a temperature range of -50 ºC to +60 ºC (-58 ºF to +140 ºF) for continuous operation.
      1. The fixed network camera housing shall be an aluminum, rugged design.
      2. The fixed network camera shall directly integrate into mounting accessories that supports an optional fiber optic media converter module.
      3. The fixed network camera shall provide a multi-language on-screen display.
  1. ACCESSORIES
     1. Bubbles
        1. NDA-8000-TBL Tinted Bubble
     2. Mounts & accessories
        1. NDA-8000-WP On-Camera Weather Protector
        2. NDA-8000-PC Paintable Cover (4 pcs)
        3. NDA-8000-IC In-Ceiling Mount Kit
        4. NDA-8000-PLEN Plenum-Rated In-Ceiling Mount kit
        5. NDA-8000-SP Soft Ceiling support for In-Ceiling Mount Kit
        6. NDA-8000-PIP Pendant Interface Plate
        7. NDA-8000-PIPW Pendant Interface Plate including Weather Protector
        8. NDA-U-WMT Pendant Wall Mount
        9. NDA-U-WMT G Pendant Wall Mount, dual gang mount
        10. NDA-U-PMT Pendant Ceiling Mount, 30cm / 12”
        11. NDA-U-PMTG Pendant Ceiling Mount, 30cm / 12”, dual gang mount
        12. NDA-U-PMTE Pendant Ceiling Extension Pipe 50cm / 20”
        13. NDA-U-PSMB Pendant Wall/Ceiling Mount SMB
        14. NDA-U-PMAS Pole Mount Adapter Small
        15. NDA-U-WMP Wall Mount Plate
        16. NDA-U-PAx Surveillance Cabinet
            1. NDA-U-PA0 Surveillance Cabinet 24VAC
            2. NDA-U-PA1 Surveillance Cabinet 110VAC
            3. NDA-U-PA2 Surveillance Cabinet 230VAC
            4. VG5-SFPSCKT Optional fiber optic media converter kit
        17. NDA-U-PMAL Pole Mount Adapter Large
        18. NDA-U-CMT Corner Mount Adapter
        19. NDA-U-RMT Pendant Parapet Mount
        20. LTC 9230/01 Flat Roof Mount Adapter

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