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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 4000i**

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. Canadian Standards Association (CSA)
        1. Complies with CSA product safety standards.
     2. European Norm
        1. Complies with CE Product Safety regulations
        2. Complies with EN Product Safety standards
        3. Complies with EN 50130-4:2011/A1:2014 - Alarm Systems - Electromagnetic Compatibility - Product Family Standard: Immunity Requirements for Components of Fire, Intruder and Social Alarm Systems.
        4. EN 55032 - Electromagnetic compatibility of multimedia equipment
        5. EN 61000-3-2 - Electromagnetic compatibility (EMC). Limits. Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
        6. EN 61000-3-3 - Electromagnetic compatibility (EMC). Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection
        7. EN 60950-1 - Information technology equipment. Safety. General requirements

* + 1. Federal Communications Commission (FCC) ([www.fcc.gov](http://www.fcc.gov))
       1. Complies with FCC Part 15 Class B
    2. HD standards
       1. Models comply 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: 60 frames/s
    3. Complies with ICES-003 regulations.
    4. International Electrotechnical Commission (IEC)
       1. Complies with IEC Product Safety standards
    5. Underwriters Laboratories, Inc. (UL) (www.ul.com)
       1. Complies with UL standards.
  1. SYSTEM DESCRIPTION
     1. Section Includes
        1. Video Surveillance Remote Devices
           1. NDP-4502-Z12 PTZ dome 2MP 12x clear indoor surface
           2. NDP-4502-Z12C PTZ dome 2MP 12x clear indoor in-ceiling
           3. NDP-4502-Z12-P PTZ dome 2MP 12x clear indoor surface (Made in Portugal)
           4. NDP-4502-Z12C-P PTZ dome 2MP 12x clear indoor in-ceiling (Made in Portugal)
     2. Performance Requirements
        1. The camera shall be an HD PTZ unit designed for discrete video surveillance applications in indoor environments.
        2. The camera shall be a high performance 1/2.8-in. progressive scan CMOS sensor with 1080p resolution
        3. The camera shall offer enhanced system flexibility with dual recording (iSCSI and microSDHC / microSDXC card) options.
        4. The camera shall support the following dual, redundant power options:
           1. Options:

24 VAC

PoE+ (IEEE 802.3at, class 4)

* + - * 1. The camera shall default to use power from the 24 VAC power supply, if connected.
        2. The camera shall switch to PoE+ power supply if power from the 24 VAC power supply is lost with interruption to camera operation.
        3. The camera shall switch to 24 VAC power supply if power from PoE+ power supply is lost with no interruption to camera operation.
      1. The camera shall offer a Wide Dynamic Range 94dB for clear images in extreme high-contrast environments.
      2. The camera shall provide Essential Video Analytics
      3. The 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.
      4. The camera shall conform to the Profile S and Profile G specifications to provide interoperability with other conformant systems.
      5. The camera shall offer configurable quad streaming with individually configurable HD streams.
      6. The camera shall have an autofocus lens with 12x optical zoom.
      7. The camera shall have variable pan and tilt speeds, and autopivot capability for optimal camera control and viewing at all zoom levels.
      8. The camera shall offer bi-directional audio.
      9. The camera shall support 256 user-defined presets (pre-positions).
      10. The camera shall:
          1. for Surface Housings

Offer IP65 environmental protection

* + - * 1. for In-ceiling Housings:

IP51 environmental protection

* + - 1. The surface-housing camera shall meet an IK rating of IK10.
      2. The camera housing shall be a durable, rugged design with a polycarbonate bubble.
  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.
        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 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. Bosch’s 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 4000i CAMERA [NDP-4502-Z12, NDP-4502-Z12C, NDP-4502-Z12-P, NDP-4502-Z12C-P]  
     1. General Characteristics:
        1. The camera shall provide a 1/2.8-in. type progressive scan CMOS sensor with the following:
           1. 1945 x 1097 (2.13 MP) effective picture elements.
           2. Sensitivity to below 0.05 lux.
        2. The camera shall offer 1080p resolution at 60fps for capturing fast motion.
        3. The camera shall provide direct network connection using H.265, H.264 and M-JPEG compression and bandwidth throttling to manage bandwidth and storage requirements efficiently while delivering outstanding image quality.
        4. The camera shall utilize Intelligent Dynamic Noise Reduction (IDNR) technology to reduce the bitrate and storage requirements by removing noise artifacts.
        5. The camera shall offer Essential Video Analytics.
        6. The camera shall support the following dual, redundant power options:

24 VAC

PoE+ (IEEE 802.3at, class 4)

* + - 1. The camera shall offer a dynamic range of 94dB for clear images in extreme high-contrast environments.
      2. The camera shall offer 256 user-defined pre-positions with 20-character titles.
      3. The camera shall offer three configurable, pre-programmed user modes.
      4. The camera shall offer bi-directional audio.
      5. The camera shall be able to be mounted to a wall, mounted to a surface, mounted to a pipe, or recessed into an indoor ceiling.
      6. The camera shall offer:
         1. IP65 environmental protection for surface housings
         2. IP51 environmental protection for in-ceiling housing
    1. Imaging
       1. The camera shall provide a 1/2.8-in. type progressive scan CMOS sensor.
       2. The camera shall offer an effective number of pixels of 1945 x 1097 (2.13 megapixels).
       3. The camera shall offer a 16:9 aspect ratio.
       4. The camera shall offer a 12x optical zoom lens (5.3 to 64 mm).
       5. The camera shall have 4.9° to 58.5° field of view.
       6. The camera shall produce a color image with a minimum scene illumination of 0.05 lux and a monochrome image, when in the night mode, with a minimum illumination of 0.01 lux at 30 IRE.
       7. The camera shall offer automatic focus control with manual override.
       8. The camera shall offer automatic iris control.
       9. The camera shall offer a dynamic range of 94dB.
       10. The camera shall offer the following White Balance modes: Standard Auto, Sodium Lamp Auto, Basic Auto, Manual, Hold, Dominant Color Auto. The mode Sodium Lamp Auto automatically compensates for light from a sodium vapor lamp to restore objects to their true color.
       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 camera shall offer Backlight Compensation.
    2. System Features
       1. The camera shall be compatible with the Bosch Video Client and the Bosch Video Management System.
       2. The camera shall provide one (1) audio mono line in and one (1) audio mono line out.
    3. PTZ Features
       1. The camera shall provide the following modes for variable pan/tilt speeds:
          1. Turbo Mode (manual control):

Pan: 1°/s to 160°/s

Tilt: 1°/s to 120°/s

* + - * 1. Normal Mode:

Pan: 1°/s to 120°/s

Tilt: 1°/s to 120°/s

* + - 1. The camera shall provide a preposition speed of:
         1. Pan: 1°/s to 160°/s
         2. Tilt: 1°/s to 120°/s
      2. The camera shall provide a pan range of 360° continuous.
      3. The camera shall provide a tilt angle of 0° above the horizon.
      4. The camera shall divide the cameras 360º rotation into 16 independent sectors with 20-character titles per sector. Any or all of the 16 sectors can be blanked from the operator's view.
      5. The camera shall offer the ability to define 24 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.
      6. The camera shall store up to 256 preset scenes with each preset programmable for 20 character titles.
      7. The camera shall support the following tour modes:
         1. One (1) preset tour capable of 64 sequential pre-positions and a configurable dwell time between positions.
         2. Two (2) separate tours of an operator's keyboard movements consisting of pan, tilt and zoom activities. The recorded tours can be continuously played back.
         3. One (1) 360° AutoPan mode.
         4. One (1) AutoPan mode between limits.
      8. The camera shall execute one of the following programmable options when an operator stops manual control of the camera, and a programmed period of time is allowed to expire: return to a stored preset number, return to the automated tour previously executed, and do nothing.
    1. Pre-programmed Modes
       1. The camera shall offer three (3) pre-programmed but configurable user modes.
       2. The pre-programmed modes shall be optimized with the best settings for the following environments:
          1. Indoor: For indoor fluorescent lighting
          2. Outdoor: For outdoor scenarios where light varies through the day
          3. Traffic: Monitoring traffic or fast moving objects; motion artifacts are minimized
       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 be capable of separating moving people in scenes where no other moving objects occur
4. The camera shall be able to detect the following object properties and states
5. Object class (upright person, bike, car, truck)
6. Object size
7. Object aspect ratio
8. Object speed
9. Object motion direction
10. Object color
11. The camera shall be able to detect the following object events:
12. Object entering a user defined field
13. Object within a user defined field
14. Object leaving a user defined field
15. Object crossing a user defined line
16. Object crossing up to tree user defined lines in order
17. Object following a route
18. Object loitering
19. Idle objects, both for moving objects that stopped and objects that were carried and placed in the scene
20. Removed objects, both for object that started moving by themselves or were carried away
21. Object condition change based on size, speed, aspect ratio, direction or color of the object
22. Number of moving objects in a user defined field above user defined threshold
23. The camera shall be capable of counting moving objects that are currently within a user defined area
24. The camera shall be capable of counting objects that are moving in a user defined direction
25. The camera shall be able to estimate crowd density
26. The camera shall be able to combine object events and states for user defined events
27. The camera shall be capable of detecting and sending alarms for user defined events
28. 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
29. The camera shall allow users to set up to 16 separate video analytics profiles and assign each video analytics profile to a different preposition. The video analytics profile will become active once the corresponding preposition is reached and inactive once the corresponding preposition is left.
    * 1. Recording and Storage Management
         1. The camera shall support iSCSI devices to allow video stream to be recorded directly to an iSCSI RAID array.
         2. The camera shall support iSCSI storage targets.
         3. The camera shall have an SD card slot that uses a microSDHC or microSDXC card for local storage (up to 2 TB).
         4. The local storage feature shall be capable of storage for Automatic Network Replenishment (ANR).
         5. 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 HD 1080p resolution using H.265/HEVC or H.264 compression.
         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 1080p resolution.
         3. The camera shall deliver 1080p video, at rates up to 60 images per second via TCP/IP over Cat5/Cat6 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 ONVIF Profile S and Profile G specifications.
         6. The camera shall offer Quality of Service (QoS) configuration options.
         7. The camera shall support the IPv6 internet-layer protocol for packet switched internetworking across multiple IP networks.
      4. Motion Detection
         1. The camera shall include an algorithm for detecting movement on presets or for alarm signaling.
         2. The camera shall be able to interface to an external alarm source using the built-in alarm I/O ports.
      5. 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 a SSL certificate for use with HTTPS.
         4. [The camera shall be capable of being independently AES encrypted with 256-bit keys.]
      6. Installation Requirements
         1. The camera shall be capable of operating in an indoor environment within the following temperature range:
            1. –10 °C to +55 °C (+14 °F to 131 °F)
         2. The camera shall accept power, transmit video, and accept control via TCP/IP connection.
         3. The camera shall support the following dual, redundant power options:
            1. Options:

24 VAC

PoE+ (IEEE 802.3at, class 4)

* + - * 1. The camera shall default to use power from the 24 VAC power supply, if connected.
        2. The camera shall switch to PoE+ power supply if power from the 24 VAC power supply is lost with interruption to camera operation.
        3. The camera shall switch to 24 VAC power supply if power from PoE+ power supply is lost with no interruption to camera operation.
      1. The camera shall provide a multi-language on-screen display.
    1. Housing Specifications and Options
       1. The camera shall be offered in
          1. An indoor surface housing
          2. An in-ceiling housing
       2. The camera shall provide built-in surge protection for power, data, and video and alarm inputs.
       3. The camera dome bubble shall:
          1. Be a high-resolution polycarbonate bubble.
          2. Offer a clear or tinted version.
       4. The indoor surface housing shall:
          1. Use a hook, in-place of a tether, to make installation easier and safer.
          2. Allow the camera to view 0º above the horizon.
          3. Conform to the IP65 standard.
          4. Provide an operating temperature of -10 °C to +55 °C (+14 °F to 131 °F).
          5. Be powder coated in white (RAL 9003).
          6. Use a low-impact, high-resolution polycarbonate bubble.
       5. The in-ceiling housing shall:
          1. Allow the camera to view 0º above the horizon.
          2. Conform to the IP51 standard.
          3. Provide an operating temperature of -10 °C to +55 °C (+14 °F to 131 °F).
          4. Use a low-impact, high-resolution polycarbonate bubble.
          5. Be powder coated in white (RAL 9003).
    2. Mechanical
       1. Pan Range: 0 to 360° continuous
       2. Tilt Angle: 0° above horizon
       3. Pre-position Speed:
          1. Pan: 160°/s
          2. Tilt: 120°/s
       4. Pan/Tilt Modes:
          1. Turbo Mode:

Pan: 1°/s to 160°/s

Tilt: 1°/s to 120°/s

* + - * 1. Normal Mode:

Pan: 1°/s to 120°/s

Tilt: 1°/s to 120°/s

* + - 1. Preset Accuracy: ± 0.1° typical
    1. Electrical
       1. Input Voltage:
          1. 24 VAC, 50/60 Hz (class 2)
          2. PoE+ (IEEE 802.3at, class 4)]
       2. Power Consumption (typical):
          1. 24 VAC: 12 W
          2. PoE+: 12 W
    2. Software Control
       1. Camera Setup/Control: Via Internet Explorer Web browser version 11.0 or later, Bosch Configuration Manager or Bosch Video Management System (BVMS, versions 7.5 or later), Bosch Video Client (BVC)
       2. Software Update: Network firmware upload
    3. Network
       1. Communications Protocols: Standard Bosch IP protocol, including ONVIF and SNMP v1
       2. Video Compression: H.265, H.264 (ISO/IEC 14496‑10), M‑JPEG, JPEG
       3. Streaming: Two (2) individually configurable streams:
          1. Stream 1

720P

1080P

* + - * 1. Options with “720P” selected for Stream 1:

SD

720P

D1 4:3 (cropped)

640x480

* + - * 1. Options with “1080P” selected for Stream 1:

SD

720P

1080P\* (This option is valid only if the frame option is 30fps)

D1 4:3 (cropped)

640x480

1280x960 (cropped)

* + - 1. 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, 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
      2. Ethernet: 10-Base T/100 Base-TX, auto-sensing, half/full duplex, RJ45
      3. Encryption: TLS 1.0, SSL, DES, 3DES, AES
      4. GOP Structure: IP, IBP, IBBP
      5. Data Rate: 9.6 kbps to 6 Mbps (per stream)
      6. Overall IP Delay: 240 ms
      7. Audio
         1. Standard:

G.711, 8 kHz sampling rate

L16, 16 kHz sampling rate

AAC, 16 kHz sampling rate

* + - * 1. Signal-to-Noise Ratio: >50 dB
        2. Audio Streaming: Bidirectional (full-duplex)
    1. Local Storage
       1. Memory Card Slot: microSDHC or microSDXC memory card (maximum 2 TB)
       2. Recording: Continuous recording of video and audio, alarm/events/schedule recording
    2. Miscellaneous
       1. Sectors/Titling: 16 independent sectors with 20-character titles/sector
       2. Masking: 24, individually configurable
       3. Pre-positions: 256, each with 20-character titles
       4. Guard Tours: Two (2) types of tours:
          1. Recorded tours – two (2), total duration of 15 minutes
          2. Preset tour – one (1), consisting of up to 256 scenes consecutively, and one (1), customized up to 64 scene
       5. Supported Languages: Chinese, Dutch, English, German, French, Italian, Japanese, Portuguese, Polish, Russian, and Spanish
    3. User Connections:
       1. Power
          1. RJ-45 100 Base-TX Ethernet PoE+ (IEEE 802.3at, class 4 standard)
          2. 21-30 VAC, 50/60 Hz
       2. Video and Control: RJ-45 10/100 Base-TX Ethernet
       3. Alarm Inputs (2): 2 supervised / non-supervised; programmable for “normally open” or “normally closed”
       4. Alarm Outputs (1): 1 dry contact relay
       5. Audio:
          1. Signal Line In: 94 kOhm typical, 1 Vrms max
          2. Signal Line Out: 1 Vrms at 1kOhm, typical
    4. Environmental
       1. Ingress Protection Rating/Standard (with polycarbonate bubble):
          1. Surface: IP65
          2. In-ceiling: IP51
       2. Operating Temperature:
          1. –10 °C to +55 °C (+14 °F to 131 °F)
       3. Storage Temperature:
          1. -40 °C to +60 °C (-40 °F to 140 °F)
       4. Humidity:
          1. Up to 90% RH non-condensing
    5. Construction
       1. Product Weight:
          1. Surface models: 1.88kg (4.14 lb)
          2. In-ceiling model: 1.81kg (3.99 lb)
       2. Bubble Size: 198 mm (7.8 in.)
       3. Construction Material:
          1. Housing: Cast aluminum
          2. Bubble: Polycarbonate
       4. Standard Color: White (RAL 9003)
  1. ACCESSORIES
     1. Bubbles
        1. Surface
           1. NDA-4020-PTBL tinted bubble
        2. In-ceiling
           1. NEZ-A4-BUB-CTIP tinted bubble
     2. Mounts
        1. NDA-4020-PIP Pendant interface plate to mount AUTODOME IP 4000i surface model, white
        2. NDA-U-WMT Pendant wall mount, white
        3. NDA-U-PMT Pendant pipe mount ,31cm (12in), white
        4. NDA-U-PMTE Pendant pipe extension pipe, 50cm (20in), white
        5. NDA-U-CMT Corner mount adapter, white
        6. NDA-U-PMAL Pole mount adapter large, white
        7. NDA-U-PSMB Pendant wall/ceiling mount SMB
        8. NDA-U-WMP Wall mount plate for universal wall mount, corner mount and pole mount, white
        9. NDA-U-RMT Pendant parapet mount
        10. NEZ-A4-SMB Surface mount kit
        11. VGA-IC-SP In-ceiling Support Kit
        12. NDA-4020-PLEN In-ceiling housing for plenum space
     3. 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. High PoE Midspan, 60 W
        4. NDA-U-PA0 24 VAC Power Supply Box
        5. NDA-U-PA1 110 VAC Power Supply Box
        6. 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. DEMOSTRATION
      1. Demonstrate at final inspection that video management system and devices functions properly.

END OF SECTION