

October 2013

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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 7000 IP SERIES CAMERA**

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes

1. Security Lighting

B. 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.

1.2 REFERENCES

- A. Canadian Standards Association (CSA)
 - 1. Complies with CSA product safety standards.

- B. European Norm
 - 1. Complies with CE Product Safety regulations
 - 2. Complies with EN Product Safety standards
 - 3. EN 50121-4 Railway Applications - Electromagnetic Compatibility - Part 4: Emission and Immunity of the Signaling and Telecommunications Apparatus.
 - 4. Complies with EN 50130-4:1995 + A1:1998 + A2:2003 - Alarm Systems - Electromagnetic Compatibility - Product Family Standard: Immunity Requirements for Components Of Fire, Intruder And Social Alarm Systems. (Conformity to EN 50130-4 requires the use of the following power supplies: VG4-A-PSU0, VG4-A-PSU1, VG4-A-PSU2, VG4-A-PA0, VG4-A-PA1, or VG4-A-PA2.)
 - 5. EN 55022 Class A - Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement
 - 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 61000-6-1 - Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light-industrial environments
 - 8. EN 61000-6-2 - Electromagnetic compatibility (EMC). Generic standards. Immunity standard for industrial environments
 - 9. EN 60950-1 - Information technology equipment. Safety. General requirements

- C. Federal Communications Commission (FCC) (www.fcc.gov)
 - 1. Complies with FCC Part 15.

- D. Complies with ICES-003 regulations.

- E. International Electrotechnical Commission (IEC)
 - 1. Complies with IEC Product Safety standards

- F. Underwriters Laboratories, Inc. (UL) (www.ul.com)
 - 1. Complies with UL standards.

1.3 SYSTEM DESCRIPTION

A. Section Includes

1. Video Surveillance Remote Devices

B. Performance Requirements

1. The day/night IP PTZ camera shall be a full-featured IP PTZ unit designed for discrete video surveillance applications in indoor and outdoor environments.
2. The day/night IP PTZ camera shall offer a 28x or 36x optical zoom, high performance 1/4-in. Exview HAD CCD progressive scan imager.
3. The day/night IP PTZ camera shall have sensitivity to below 1.0 lux.
4. The day/night IP PTZ camera shall offer 12x digital zoom.
5. The day/night IP PTZ camera shall offer enhanced system flexibility with dual recording (iSCSI and SD card) options.
6. The day/night IP PTZ camera shall support the following dual, redundant power options:
 - a. [Outdoor Pendant Models using the Heater:
 - 1) 24 VAC
 - 2) High PoE (using the Bosch NPD-6001A Midspan)]
 - b. [Indoor Pendant Models (not using the heater) and In-ceiling Models:
 - 1) 24 VAC
 - 2) PoE+ (IEEE 802.3at, class 4) or High PoE (using the Bosch NPD-6001A Midspan)]
 - c. The day/night IP PTZ camera shall default to use power from the 24 VAC power supply, if connected.
 - d. The day/night IP 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.
 7. The day/night IP PTZ camera shall provide Intelligent Tracking to continuously track objects in motion.
 8. The day/night IP PTZ camera shall offer a Wide Dynamic Range of 92 dB for clear images in extreme high-contrast environments.
 9. The day/night IP PTZ camera shall provide direct network connection using H.264 and M-JPEG compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
 10. The day/night IP PTZ camera shall offer configurable quad streaming with individually configurable 4CIF@30 ips streams.
 11. The day/night IP PTZ camera shall offer embedded Intelligent Video Analysis (IVA) that eliminates dedicated PCs and associated software maintenance.
 12. The day/night IP PTZ camera shall conform to the ONVIF standard to provide interoperability with other conformant systems.

13. The day/night IP PTZ camera shall have variable pan and tilt speeds, and autopivot capability for optimal camera control and viewing at all zoom levels.
14. The day/night IP PTZ camera shall offer bi-directional audio.
15. The day/night IP PTZ camera shall support 256 user-defined presets.
16. The day/night IP PTZ camera shall:
 - a. [for Pendant Housings]
 - 1) Offer IP66 environmental protection]
 - 2) Conform to the NEMA 4X standard for the following:
 - a) Access to Hazardous parts
 - b) Ingress of solid foreign objects (falling dirt, circulating dust, settling dust)
 - c) Ingress of water (dripping and light splashing, hosedown and splashing)
 - d) Corrosive agents
 - 3) Meet the requirements for NEMA 4X certification with use of a polycarbonate bubble.
 - 4) Meet the requirements for NEMA 4X certification, except impact test, with use of an acrylic bubble.]
 - b. [for In-ceiling Housings:
 - 1) IP54 environmental protection.
 - 2) Plenum rating.
 - 3) IK8 rating when using an optional polycarbonate bubble.]

1.4 SUBMITTALS

- A. Submit under provisions of Section [01 33 00.]
- B. 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.
- C. Shop Drawings; include
 - 1. System device locations on architectural floor plans.
 - 2. Full Schematic of system, including wiring information for all devices.
- D. Closeout Submittals
 - 1. User manual.
 - 2. Parts list.
 - 3. System device locations on architectural floor plans.
 - 4. Wiring and connection diagram.
 - 5. Maintenance requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer:
 - 1. Minimum of [10] years experience in manufacture and design Video Surveillance Devices.
- B. 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.
- C. Installer:
 - 1. Minimum of [5] years experience installing Video Surveillance System.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Comply with requirements of Section 01 60 00.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers; and unharmed original identification labels.
- C. Protect store materials from environmental and temperature conditions following manufacturer's instructions.
- D. Handle and operate products and systems according to manufacturer's instructions.
- E. Bosch provides off-the-shelf availability for our top selling products and same-day or 24-hour shipping.

1.7 WARRANTY

- A. Provide manufacturer's warranty covering 3 years for replacement and repair of defective equipment.

1.8 MAINTENANCE

- A. Make ordering of new equipment for expansions, replacements, and spare parts available to dealers and end users.
- B. Provide factory direct technical support from 8:00 a.m. to 8:00 p.m. via phone and e-mail.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:

[Bosch Security Systems, Inc.
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B. 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.]

2.2 BOSCH AUTODOME 7000 IP SERIES CAMERA [VG5-7028-C1PC4]
 [VG5-7028-C2PT4] [VG5-7028-E1PC4] [VG5-7028-E2PC4] [VG5-7036-E1PC4]
 [VG5-7036-E2PC4]

A. General Characteristics:

1. The day/night IP PTZ camera shall offer a 28x or 36x 1/4-in. Exview HAD CCD camera with 12x digital zoom.
2. The day/night IP PTZ camera shall offer progressive scan technology that allows for the capture of clear images from a moving camera.
3. The day/night IP PTZ camera shall offer a Wide Dynamic Range of 92 dB for clear images in extreme high-contrast environments.
4. The day/night IP PTZ camera shall feature a Sodium Vapor White Balance mode for taking images under a street lamp or tunnel lamp.
5. The day/night IP PTZ camera shall provide direct network connection using H.264 and M-JPEG compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
6. The day/night IP PTZ camera shall support the following dual, redundant power options:
 - a. [Outdoor Pendant Models using the Heater:
 - 1) 24 VAC
 - 2) High PoE (using the Bosch NPD-6001A Midspan)]
 - b. [Indoor Pendant Models (not using the heater) and In-ceiling Models:
 - 1) 24 VAC
 - 2) PoE+ (IEEE 802.3at, class 4) or High PoE (using the Bosch NPD-6001A Midspan)]
 - c. The day/night IP PTZ camera shall default to use power from the 24 VAC power supply, if connected.
 - d. The day/night IP 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.
7. The day/night IP PTZ camera shall offer 256 user-defined pre-position settings with 20-character titles.
8. The day/night IP PTZ camera shall offer five configurable, pre-programmed user modes.
9. The day/night IP PTZ camera shall offer bi-directional audio.
10. The day/night IP PTZ camera shall offer Intelligent Tracking that controls the pan, tilt, and zoom movements of the camera to continuously follow an object or individual.
11. The day/night IP PTZ camera shall offer an optional fiber optic media converter kit.
12. The day/night IP PTZ camera shall be able to be mounted to a wall, mounted to a surface, mounted to a pipe, or recessed into an indoor ceiling.

13. The day/night IP PTZ camera shall offer:
14. The day/night IP PTZ camera shall:
 - a. [for Pendant Housings
 - 1) Offer IP66 environmental protection]
 - 2) Conform to the NEMA 4X standard for the following:
 - a) Access to Hazardous parts
 - b) Ingress of solid foreign objects (falling dirt, circulating dust, settling dust)
 - c) Ingress of water (dripping and light splashing, hosedown and splashing)
 - d) Corrosive agents
 - 3) Meet the requirements for NEMA 4X certification with use of a polycarbonate bubble.
 - 4) Meet the requirements for NEMA 4X certification, except impact test, with use of an acrylic bubble.]
 - b. [for In-ceiling Housings:
 - 1) IP54 environmental protection.
 - 2) Plenum rating.
 - 3) IK8 rating when using an optional polycarbonate bubble.]
15. The day/night IP PTZ camera shall support the following languages:
 - a. Dutch
 - b. English
 - c. French
 - d. German
 - e. Italian
 - f. Japanese
 - g. Polish
 - h. Portuguese
 - i. Spanish

B. [Imaging – 36x Camera

1. The 36x day/night camera shall consist of an integrated high resolution Exview HAD CCD camera using a 1/4-inch imager.
2. The 36x day/night camera shall offer the following effective picture elements:
 - a. PAL: Approx. 440,000; 752(H) x 582(V)
 - b. NTSC: Approx. 380,000; 768 (H) x 494 (V)
3. The 36x day/night camera shall offer a 36x (3.4 – 122.4 mm, F1.6 to F4.5) auto-iris, auto-focus optical zoom lens with manual override.
4. The 36x day/night camera shall offer a Wide Dynamic Range of 92 dB for clear images in extreme high-contrast environments.
5. The 36x day/night camera shall offer sensitivity down to 0.04 lux in day mode, and 0.0052 lux in night mode at 30 IRE.
6. The 36x day/night camera shall switch automatically from daylight color operation to a higher sensitivity nighttime monochrome mode when light levels fall below an adjustable threshold level. Day/night operation may also be manually switched on or off from the system switcher/controller keyboard.
7. The 36x day/night camera shall possess a full 12x digital zoom that is functional once the maximum 36x optical zoom limit has been reached. The 12x digital zoom lens is on/off selectable from the system controller keyboard.
8. The 36x day/night camera shall have a Freeze Frame feature that holds a preposition shot while moving to another preposition.

9. The 36x day/night 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.]

C. [Imaging – 28x Camera

1. The 28x day/night camera shall consist of an integrated high resolution Exview HAD CCD camera using a 1/4-inch imager.
2. The 28x day/night camera shall offer the following effective picture elements:
 - a. PAL: Approx. 440,000; 752(H) x 582(V)
 - b. NTSC: Approx. 380,000; 768 (H) x 494 (V)
3. The 28x day/night camera shall offer a 28x (3.5 – 98.0 mm, F1.35 to F3.7) auto-iris, auto-focus optical zoom lens.
4. The 28x day/night camera shall offer a Wide Dynamic Range of 92 dB for clear images in extreme high-contrast environments.
5. The 28x day/night camera shall offer sensitivity down to 0.02 lux in day mode, and 0.0026 lux in night mode at 30 IRE.
6. The 28x day/night camera shall switch automatically from daylight color operation to a higher sensitivity nighttime monochrome mode when light levels fall below an adjustable threshold level. Day/night operation may also be manually switched on or off from the system switcher/controller keyboard.
7. The 28x day/night camera shall possess a full 12x digital zoom that is functional once the maximum 28x optical zoom limit has been reached. The 12x digital zoom lens is on/off selectable from the system controller keyboard.
8. The 28x day/night camera shall have a Freeze Frame feature that holds a preposition shot while moving to another preposition.
9. The 28x day/night 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.]

D. Image Processing

1. The day/night IP PTZ camera shall provide image stabilization using a dedicated digital signal processor (DSP) to minimize camera shake on both the horizontal and vertical axes while maintaining a clear image as the zoom range increases. The image stabilization algorithms do not reduce camera sensitivity.
2. The day/night IP PTZ camera shall provide an AutoPivot feature to automatically rotate and flip the camera as it tilts through the vertical position to maintain the correct orientation of the image.
3. The day/night IP PTZ camera shall provide an AutoScaling feature that reduces the pan/tilt speed as the camera zooms in on an object, so that the relative speed on the screen remains constant.

E. System Features

1. The day/night IP PTZ camera shall allow 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 day/night IP PTZ camera shall be compatible with the Bosch Video Client and the Bosch Video Management System.
3. The day/night IP PTZ camera shall provide one (1) audio mono line in and one (1) audio mono line out.

F. PTZ Features

1. The day/night IP PTZ camera shall provide the following modes for variable pan/tilt speeds:
 - a. Turbo Mode (manual control):
 - 1) Pan: 0.1°/s to 400°/s
 - 2) Tilt: 0.1°/s to 300°/s
 - b. Normal Mode:
 - 1) Pan: 0.1°/s to 120°/s
 - 2) Tilt: 0.1°/s to 120°/s
2. The day/night IP PTZ camera shall provide a preposition speed of:
 - a. Pan: 0.1°/s to 400°/s
 - b. Tilt: 0.1°/s to 300°/s
3. The day/night IP PTZ camera shall provide a pan range of 360° continuous.
4. The day/night IP PTZ camera shall provide a tilt angle of
 - a. [18° above the horizon for pendant housings.]
 - b. [1° above the horizon for in-ceiling housings.]
5. The day/night IP PTZ camera shall provide pan and tilt preset repeatability accurate to within ± 0.1 degrees.
6. The day/night IP PTZ camera shall provide a feature that automatically rotates, or pivots, the camera to simplify tracking of a person walking directly under the camera.
7. The day/night IP PTZ camera shall divide the camera's 360° 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.
8. The day/night IP PTZ 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.
9. The day/night IP PTZ camera shall store up to 256 preset scenes with each preset programmable for 20 character titles.
10. The day/night IP PTZ camera shall support the following tour modes:
 - a. One (1) preset tour capable of 256 sequential pre-positions and a configurable dwell time between positions.
 - b. 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.
 - c. One (1) 360° AutoPan mode.
 - d. One (1) AutoPan mode between limits.
11. The day/night IP PTZ 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.

G. Pre-programmed Modes

1. The day/night IP PTZ camera shall offer five (5) pre-programmed but configurable user modes.
2. The pre-programmed modes shall be optimized with the best settings for the following environments:
 - a. Outdoor
 - b. Indoor
 - c. Low Light
 - d. Motion
 - e. Vibrant
3. The day/night IP PTZ camera shall allow users to customize these modes for the specific requirements of the camera site.

H. Recording and Storage Management

1. The day/night IP PTZ camera shall support iSCSI devices to allow video stream to be recorded directly to an iSCSI RAID array.
2. The day/night IP PTZ camera shall support iSCSI storage targets.
3. The day/night IP PTZ camera shall have an SD card slot that uses a 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).
4. The day/night IP PTZ camera shall be compatible with the Bosch Video Recording Manager (VRM) to control and manage video recording.

I. IP Connectivity

1. The day/night IP PTZ camera shall allow full camera control and configuration capabilities via a TCP/IP network.
2. The day/night IP PTZ camera shall support the following dual, redundant power options:
 - a. [Outdoor Pendant Models using the Heater:
 - 1) 24 VAC
 - 2) High PoE (using the Bosch NPD-6001A Midspan)]
 - b. [Indoor Pendant Models (not using the heater) and In-ceiling Models:
 - 1) 24 VAC
 - 2) PoE+ (IEEE 802.3at, class 4) or High PoE (using the Bosch NPD-6001A Midspan)]
 - c. The day/night IP camera shall default to use power from the 24 VAC power supply, if connected.
 - d. The day/night IP 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.
3. The day/night IP PTZ camera shall be capable of capturing and storing images using H.264 compression at 4CIF 30 resolutions.
4. The day/night IP PTZ camera shall deliver 4CIF video, at rates up to 30 images per second via TCP/IP over Cat5/Cat6 UTP cable.
5. The day/night IP PTZ camera shall support iSCSI devices to allow the network-enabled camera to stream video directly to an iSCSI RAID array.
6. The day/night IP PTZ camera shall conform to the ONVIF standard.
7. The day/night IP PTZ camera shall offer Quality of Service (QoS) configuration options.
8. The day/night IP PTZ camera shall support the IPv6 internet-layer protocol for packet switched internetworking across multiple IP networks.

9. The day/night IP PTZ camera shall offer embedded Intelligent Video Analysis (IVA) that eliminates dedicated PCs and associated software maintenance.
- J. Intelligent Video Analysis
1. The day/night IP PTZ camera shall be capable of processing and analyzing video within the camera itself, with no extra hardware required.
 2. The day/night IP PTZ camera shall be capable of detecting and sending alarms for abnormal events.
 3. The day/night IP PTZ camera shall be configurable to analyze up to 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 day/night IP PTZ camera shall allow users to set up to 10 separate profiles and switch profiles based on a day/night or holiday schedules.
 5. The day/night IP PTZ camera shall support scene tours that automatically reposition the camera to each scene for a specified duration.
 6. The day/night IP PTZ camera shall support Bird's Eye View (BEV) people counting.
 7. The day/night IP 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:
 - a. Trigger a relay connected to an alarm siren and/or strobe
 - b. Trigger a visual alert to be displayed on the operator's screen
 - c. Go to a specified scene (preset position)
- K. Motion Tracking
1. The day/night IP PTZ camera shall offer Intelligent Tracking to continuously track an object using pan, tilt, and zoom actions.
 2. The day/night IP PTZ camera shall provide automatic motion tracking using intelligent video analytics.
 3. The day/night IP PTZ camera shall have the ability to follow an object continually when passing behind a privacy mask.
 4. The day/night IP PTZ camera shall allow a user to define virtual masks for a scene so certain objects are not considered for flow analysis and will not trigger Intelligent Tracking.
 5. The day/night IP PTZ camera shall offer the following control options for the Intelligent Tracking feature:
 - a. Off – the day/night IP PTZ camera does not track moving object.
 - b. Auto – the day/night IP PTZ camera actively analyzes the video to detect moving objects.
 - c. One Click – the day/night IP PTZ camera allows a user to click a moving object in the live video image to activate Intelligent Tracking.
 - d. IVA-triggered – the day/night IP PTZ camera continuously analyzes the scene for IVA alarms or an IVA rule violation. If an alarm or rule violation is detected, the camera activates Intelligent Tracking to track the object that triggered the alarm or rule violation.
 6. The day/night IP PTZ camera shall have the ability to restart tracking if a target starts moving in the same area where the initial target stopped moving or if the camera detects an object moving along the last known trajectory.
 7. The day/night IP PTZ camera shall allow an operator to select an object to track in the live image view.
 8. The day/night IP PTZ camera shall automatically start tracking a target that violates an IVA rule or triggers an IVA alarm.

L. Access Security

1. The day/night IP PTZ camera shall offer three levels of password protection.
2. The day/night IP PTZ camera shall support 802.1x authentication using a RADIUS (Remote Authentication Dial In User Service) server.
3. The day/night IP PTZ camera shall store a SSL certificate for use with HTTPS.
4. [The day/night IP PTZ camera shall be capable of being independently AES encrypted with 128-bit keys.]

M. Installation Requirements

1. The day/night IP PTZ camera shall be capable of operating in an outdoor environment within the following temperature range:
 - a. [Outdoor Pendant: -40°C to $+55^{\circ}\text{C}$ (-40°F to 131°F).]
 - b. [Indoor Pendant: -10°C to $+55^{\circ}\text{C}$ (14°F to 131°F).]
 - c. [In-ceiling: -10°C to $+40^{\circ}\text{C}$ (14°F to 104°F).]
2. The day/night IP PTZ camera shall accept power, transmit video, and accept control via TCP/IP connection.
3. The day/night IP PTZ camera shall support the following dual, redundant power options:
 - a. [Outdoor Pendant Models using the Heater:
 - 1) 24 VAC
 - 2) High PoE (using the Bosch NPD-6001A Midspan)]
 - b. [Indoor Pendant Models (not using the heater) and In-ceiling Models:
 - 1) 24 VAC
 - 2) PoE+ (IEEE 802.3at, class 4) or High PoE (using the Bosch NPD-6001A Midspan)]
 - c. The day/night IP PTZ camera shall default to use power from the 24 VAC power supply, if connected.
 - d. The day/night IP 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.
4. The day/night IP PTZ camera shall provide a multi-language on-screen display.

N. Housing Options

1. The day/night IP PTZ camera shall be offered in
 - a. [An indoor/outdoor Pendant housing.]
 - b. [An in-ceiling housing.]
2. The day/night IP PTZ camera housings shall come standard with recessed setscrews and a recessed bubble latch for increased tamper resistance.
3. The day/night IP PTZ camera shall provide built-in surge protection for power, data, and video and alarm inputs.
4. [The indoor/outdoor pendant housing shall:
 - a. Use a hinge, in-place of a tether, to make installation easier and safer.
 - b. Come with an attached sunshield that can be removed by the installer for indoor camera applications.
 - c. Allow the camera to view 18° above the horizon.
 - d. Offer IP66 environmental protection
 - e. Conform to the NEMA 4X standard for the following:
 - 1) Access to Hazardous parts
 - 2) Ingress of solid foreign objects (falling dirt, circulating dust, settling dust)
 - 3) Ingress of water (dripping and light splashing, hosedown and splashing)
 - 4) Corrosive agents
 - f. Meet the requirements for NEMA 4X certification with use of a polycarbonate bubble.
 - g. Meet the requirements for NEMA 4X certification, except impact test, with use of an acrylic bubble.]
 - h. Be made of cast aluminum for corrosion resistance, and supplied with a built-in heater/blower to provide an operating temperature range down to -40°C to 55°C (-40°F to 131°F).
 - i. Use a high-resolution acrylic clear bubble or a rugged polycarbonate bubble.
 - j. Be powder coated with a sand finish in white (RAL 9003).]
5. [The in-ceiling housing shall:
 - a. Allow the camera to view 1° above the horizon.
 - b. Conform to IP54 and Plenum-rating standards.
 - c. Offer IK8 rating when using an optional polycarbonate bubble
 - d. Provide an operating temperature of -10°C to 40°C (14°F to 104°F).
 - e. Use one of the following bubbles:
 - 1) A high-resolution acrylic bubble.
 - 2) A rugged polycarbonate bubble.
 - 3) A rugged high-resolution acrylic bubble]

- O. Camera – 36x Day/Night:
 1. Imager: 1/4 in.-type Exview HAD CCD (progressive scan)
 2. Effective Picture Elements:
 - a. [PAL: Approx. 440,000; 752(H) x 582(V)]
 - b. [NTSC: Approx. 380,000; 768 (H) x 494 (V)]
 3. Lens: 36x Zoom (3.4–122.4 mm) F1.6 to F4.5
 4. Focus: One-push, Autofocus, Manual
 5. Iris: Automatic with manual override
 6. Zoom Movement Speed:
 - a. NTSC:
 - 1) Optical WIDE / Optical TELE – Focus Tracking ON: 4.0 sec
 - 2) Optical WIDE / Optical TELE – Focus Tracking OFF: 2.7 sec
 - 3) Optical WIDE / Digital TELE: 6.0 sec
 - 4) Digital WIDE / Digital TELE: 2.1 sec
 - b. PAL:
 - 1) Optical WIDE / Optical TELE – Focus Tracking ON: 4.0 sec
 - 2) Optical WIDE / Optical TELE – Focus Tracking OFF: 2.7 sec
 - 3) Optical WIDE / Digital TELE: 6.2 sec
 - 4) Digital WIDE / Digital TELE: 2.3 sec
 7. Optical Zoom Field of View: 1.7° to 57.8°
 8. Gain Control: AGC or Fixed (–3 dB to 28 dB, 2 dB steps)
 9. Max Gain Level: Normal, Medium, High
 10. Gain Settings: Red Gain, Blue Gain; user selectable
 11. Synchronization: Line-Lock (–120° to 120° vertical phase adjust) or internal crystal
 12. Aperture Correction: Horizontal and vertical
 13. Digital Zoom: 12x

14. Sensitivity (F1.6, shutter: NTSC 1/60, PAL 1/50, maximum AGC. Normal light source – Halogen lamp)
 - a. 30 IRE (Tinted bubble adds 0.8 f-stop loss)
 - 1) Day Mode
 - a) SensUP Off: 0.66 lx (0.061 fc)
 - b) SensUP On (NTSC: 1/4s, 15X; PAK: 1/3s, 16.7X): 0.04 lx (0.0037 fc)
 - 2) Night Mode
 - a) SensUP Off: 0.104 lx (0.0097 fc)
 - b) SensUP On (NTSC: 1/4s, 15X; PAK: 1/3s, 16.7X): 0.0052 lx (0.0005 fc)
 - b. 50 IRE (Tinted bubble adds 0.8 f-stop loss)
 - 1) Day Mode
 - a) SensUP Off: 1.4 lx (0.13 fc)
 - b) SensUP On (NTSC: 1/4s, 15X; PAK: 1/3s, 16.7X): 0.1 lx (0.0092 fc)
 - 2) Night Mode
 - a) SensUP Off: 0.209 lx (0.0194 fc)
 - b) SensUP On (NTSC: 1/4s, 15X; PAK: 1/3s, 16.7X): 0.0103 lx (0.001 fc)
15. Electronic Shutter Speed (AES): 1/1 to 1/10,000 sec, 22 steps
16. Wide Dynamic Range: 92 dB (50 dB with WDR off)
17. Signal-to-Noise Ratio: > 50 dB (AGC off)
18. White Balance: ATW, Indoor, Outdoor, AWB Hold, Extended ATW, Manual, Outdoor Auto, Sodium Lamp Auto, Sodium Lamp

P. Camera – 28x Day/Night:

1. Imager: 1/4 in.-type Exview HAD CCD (progressive scan)
2. Effective Picture Elements:
 - a. [PAL: Approx. 440,000; 752(H) x 582(V)]
 - b. [NTSC: Approx. 380,000; 768 (H) x 494 (V)]
3. Lens: 28x Zoom (3.5–98.0 mm) F1.35 to F3.7
4. Focus: One-push, Autofocus, Manual
5. Iris: Automatic with manual override
6. Zoom Movement Speed:
 - a. NTSC:
 - 1) Optical WIDE / Optical TELE – Focus Tracking ON: 2.5 sec
 - 2) Optical WIDE / Optical TELE – Focus Tracking OFF: 1.7 sec
 - 3) Optical WIDE / Digital TELE – Focus Tracking ON: 4.5 sec
 - 4) Optical WIDE / Digital TELE – Focus Tracking OFF: 1.7 sec
 - 5) Digital WIDE / Digital TELE: 2.0 sec
 - b. PAL:
 - 1) Optical WIDE / Optical TELE – Focus Tracking ON: 2.5 sec
 - 2) Optical WIDE / Optical TELE – Focus Tracking OFF: 1.7 sec
 - 3) Optical WIDE / Digital TELE – Focus Tracking ON: 4.9 sec
 - 4) Optical WIDE / Digital TELE – Focus Tracking OFF: 1.7 sec
 - 5) Digital WIDE / Digital TELE: 2.5 sec
7. Optical Zoom Field of View: 2.1° to 55.8°
8. Gain Control: AGC or Fixed (–3 dB to 28 dB, 2 dB steps)
9. Max Gain Level: Normal, Medium, High
10. Gain Settings: Red Gain, Blue Gain; user selectable

11. Synchronization: Line-Lock (-120° to 120° vertical phase adjust) or internal crystal
12. Aperture Correction: Horizontal and vertical
13. Digital Zoom: 12x
14. Sensitivity (F1.6, shutter: NTSC 1/60, PAL 1/50, maximum AGC. Normal light source – Halogen lamp)
 - a. 30 IRE (Tinted bubble adds 0.8 f-stop loss)
 - 1) Day Mode
 - a) SensUP Off: 0.33 lx (0.031 fc)
 - b) SensUP On (NTSC: 1/4s, 15X; PAK: 1/3s, 16.7X): 0.02 lx (0.002 fc)
 - 2) Night Mode
 - a) SensUP Off: 0.066 lx (0.006 fc)
 - b) SensUP On (NTSC: 1/4s, 15X; PAK: 1/3s, 16.7X): 0.0026 lx (0.0002 fc)
 - b. 50 IRE (Tinted bubble adds 0.8 f-stop loss)
 - 1) Day Mode
 - a) SensUP Off: 0.66 lx (0.061 fc)
 - b) SensUP On (NTSC: 1/4s, 15X; PAK: 1/3s, 16.7X): 0.04 lx (0.004 fc)
 - 2) Night Mode
 - a) SensUP Off: 0.166 lx (0.015 fc)
 - b) SensUP On (NTSC: 1/4s, 15X; PAK: 1/3s, 16.7X): 0.0082 lx (0.0008 fc)
15. Electronic Shutter Speed (AES): 1/1 to 1/10,000 sec., 22 steps
16. Wide Dynamic Range: 92 dB (50 dB with WDR off)
17. Signal-to-Noise Ratio: > 50 dB (AGC off)
18. White Balance: ATW, Indoor, Outdoor, AWB Hold, Extended ATW, Manual, Outdoor Auto, Sodium Lamp Auto, Sodium Lamp

Q. Mechanical

1. Pan Range: 0 to 360° continuous
2. Tilt Angle:
 - a. [In-ceiling: 1° above horizon]
 - b. [Pendant: 18° above horizon]
3. Pre-position Speed:
 - a. Pan: $400^{\circ}/s$
 - b. Tilt: $300^{\circ}/s$
4. Pan/Tilt Modes:
 - a. Turbo Mode:
 - 1) Pan: $0.1^{\circ}/s$ to $400^{\circ}/s$
 - 2) Tilt: $0.1^{\circ}/s$ to $300^{\circ}/s$
 - b. Normal Mode:
 - 1) Pan: $0.1^{\circ}/s$ to $120^{\circ}/s$
 - 2) Tilt: $0.1^{\circ}/s$ to $120^{\circ}/s$
5. Preset Accuracy: $\pm 0.1^{\circ}$ typical

R. Electrical

1. Input Voltage:
 - a. [In-ceiling:
 - 1) 21-30 VAC, 50/60 Hz (class 2)
 - 2) High PoE
 - 3) PoE+ (IEEE 802.3at, class 4)]
 - b. [Pendant:
 - 1) 21-30 VAC, 50/60 Hz (class 2)
 - 2) High PoE]
2. Power Consumption (typical):
 - a. [In-ceiling: 24 W / 44 VA]
 - b. [Pendant:
 - 1) with heater connected: 60 W / 69 VA
 - 2) without heater: 24 W / 44 VA]

S. Software Control

1. Camera Setup/Control: Via Internet Explorer Web browser version 7.0 or later, Bosch Configuration Manager or Bosch Video Management System (BVMS 4.5.5 or later), Bosch Video Client (BVC)
2. Software Update: Network firmware upload

T. Network

1. Video Compression: H.264 (ISO/IEC 14496-10), M-JPEG, JPEG
2. Encoding and Streaming:
 - a. Scenario 1:
 - 1) Stream 1: 4CIF@30ips
 - 2) Stream 2: 4CIF@30ips
 - 3) Stream 3: I-frame only, stream 1
 - 4) Stream 4: 4CIF@30ips
 - b. Scenario 2:
 - 1) Stream 1: 4CIF@30ips
 - 2) Stream 2: Copy of stream 1
 - 3) Stream 3: I-frame only, stream 1
 - 4) Stream 4: 4CIF@30ips
 - c. Scenario 3:
 - 1) Stream 1: Downscaled stream
 - 2) Stream 2: Downscaled stream
 - 3) Stream 3: I-frame only, stream 1
 - 4) Stream 4: Downscaled stream from Stream 1
3. GOP Structure: IP, IBP, IBBP
4. Data Rate: 9.6 kbps to 10 Mbps
5. Overall IP delay: 240 ms
6. Resolution:
 - a. 4CIF/D1: 704 x 576/480 (25/30 ips, or 50/60 fields/s for interlaced fields)
 - b. CIF: 352 x 288/240 (25/30 ips, or 50/60 fields/s for interlaced fields)

U. Network

1. Ethernet: 10-Base T/100 Base-TX, auto-sensing, half/full duplex, RJ45
2. Protocols: IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP/RTCP, IGMP V2/V3, ICMP, ICMPv6, RTSP, FTP, Telnet, ARP, DHCP, SNMP, SNMP (V1, MIB II), 802.1x, DNS, DNSv6, DDNS (DynDNS.org, selfHOST.de, no-ip.com), SMTP, iSCSI, UPnP (SSDP), DiffServ (QoS), LLDP, SOAP, Dropbox, CHAP, digest authentication
3. Advanced Networking: IPv6, QoS
4. Audio
 - a. Standard:
 - 1) G.711, 8 kHz sampling rate,
 - 2) L16, 16 kHz sampling rate
 - 3) AAC, 16 kHz sampling rate
 - b. Signal-to-Noise Ratio: >50 dB
 - c. Audio Streaming: Bidirectional (full-duplex)

V. Local Storage

1. Memory Card Slot: SD/SDHC/SDXC memory card (maximum 2TB – SDXC)
2. Continuous recording of video and audio

W. 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:
 - a. Recorded tours – two (2), total duration 30 minutes
 - b. Preset tour – one (1), consisting of up to 256 scenes, consecutively
5. Supported Languages: Chinese, Dutch, English, German, French, Italian, Japanese, Portuguese, Polish, Russian, and Spanish

X. User Connections:

1. Power
 - a. Camera:
 - 1) RJ-45 100 Base-TX Ethernet (High Power over Ethernet) or PoE+ (IEEE 802.3at, class 4 standard)
 - 2) 21-30 VAC, 50/60 Hz
 - b. Heater:
 - 1) RJ-45 100 Base-TX Ethernet (High Power over Ethernet) or 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 (7): 2 supervised; 5 non-supervised; programmable for “normally open” or “normally closed”
4. Alarm Outputs (4): 1 dry contact relay; 3 open collector/transistor outputs 32 VDC @ 150 mA, maximum
5. Audio:
 - a. Signal Line In: 12 kOhm typical, 1 Vrms max
 - b. Signal Line Out: 1 Vrms at 1.5 kOhm, typical

Y. Environmental

1. Design Rating:
 - a. [In-ceiling: IP54, Plenum rated]
 - b. [Pendant: IP66]
 - c. [Pendant: NEMA 4X for:
 - 1) Access to Hazardous parts
 - 2) Ingress of solid foreign objects (falling dirt, circulating dust, settling dust)
 - 3) Ingress of water (dripping and light splashing, hosedown and splashing)
 - 4) Corrosive agents]
 - d. [Pendant: Meet the requirements for NEMA 4X certification with use of a polycarbonate bubble.]
 - e. [Pendant: Meet the requirements for NEMA 4X certification, except impact test, with use of an acrylic bubble.]
2. Operating Temperature:
 - a. [In-ceiling: -10°C to $+40^{\circ}\text{C}$ (14°F to 104°F)]
 - b. [Outdoor Pendant: -40°C to $+55^{\circ}\text{C}$ (-40°F to 131°F)]
 - c. [Indoor Pendant: -10°C to $+55^{\circ}\text{C}$ (14°F to 131°F), without heater connected in power supply box for indoor applications]
3. Storage Temperature:
 - a. [In-ceiling: -40°C to $+60^{\circ}\text{C}$ (-40°F to 140°F)]
 - b. [Pendant: -40°C to $+60^{\circ}\text{C}$ (-40°F to 140°F)]
4. Humidity:
 - a. [In-ceiling: 0% to 90% relative, non-condensing]
 - b. [Indoor Pendant/Outdoor Pendant with Heater: 0% to 100% relative, non-condensing]

Z. Construction

1. Weight:
 - a. [In-ceiling: 2.58 kg (5.69 lb)]
 - b. [Indoor/Outdoor Pendant: 3.06 kg (6.75 lb)]
2. Bubble Size: 153.1 mm (6.03 in.)
3. Construction Material:
 - a. Housing
 - 1) [In-ceiling: Magnesium]
 - 2) [Pendant: Cast aluminum]
 - b. Bubble:
 - 1) [In-ceiling: High-resolution acrylic, rugged polycarbonate, or rugged high-resolution acrylic]
 - 2) [Pendant: High-resolution acrylic or rugged polycarbonate]
4. Standard Color: White (RAL9003)
5. Standard Finish: Powder coated, sand finish

2.3 ACCESSORIES

A. Bubbles

1. In-ceiling
 - a. VGA-BUBBLE-CCLA Clear high-resolution acrylic
 - b. VGA-BUBBLE-CTIA Tinted high-resolution acrylic
 - c. VGA-BUBBLE-CCLR Clear rugged polycarbonate
 - d. VGA-BUBBLE-CTIR Tinted rugged polycarbonate
 - e. VGA-BUBHD-CCLA Clear HD high-resolution acrylic
 - f. VGA-BUBHD-CTIA Tinted rugged high resolution acrylic
2. Pendant
 - a. VGA-BUBBLE-PCLA Clear high-resolution acrylic
 - b. VGA-BUBBLE-PTIA Tinted high-resolution acrylic
 - c. VGA-BUBBLE-PCLR Clear rugged polycarbonate
 - d. VGA-BUBBLE-PTIR Tinted rugged polycarbonate

B. Mounts

1. VG4-A-PA0 Pendant arm mount 24 VAC, white
2. VG4-A-PA1 Pendant arm mount with 120 VAC transformer, white
3. VG4-A-PA2 Pendant arm mount with 230 VAC transformer, white
4. VGA-PEND-ARM Pendant arm without power supply box, white
5. VGA-PEND-WPLATE Pendant arm mounting plate for use with VGA-PEND-ARM, white
6. VG4-A-TSKIRT Trim skirt for AutoDome power supply box, white
7. Optional Mounting Accessories
 - a. For Roof Mounts
 - 1) LTC 9230/01 Flat Roof Adapter for Parapet Mount
 - b. For Arm Mounts
 - 1) VG4-A-9542 Corner Mounting Plate
 - 2) VG4-A-9541 Mast (Pole) Mounting Plate
8. VG4-A-9543 Pipe mount, white
9. VGA-ROOF-MOUNT Roof mount, white
10. VGA-IC-SP In-ceiling Support Kit

C. Power Supplies

1. NPD-6001A High PoE Midspan 60W, Single Port, AC in
2. VG4-A-PSU0 24 VAC Power Supply Unit
3. VG4-A-PSU1 120 VAC Power Supply Unit
4. VG4-A-PSU2 230 VAC Power Supply Unit

D. VG4-SFP SCKT Fiber Optic Ethernet Media Converter Kit

PART 3 – EXECUTION**3.1 EXAMINATION**

- A. Examine areas to receive devices and notify adverse conditions affecting installation or subsequent operation.
- B. Do not begin installation until unacceptable conditions are corrected.

3.2 PREPARATION

- A. Protect devices from damage during construction.

3.3 INSTALLATION

- A. Install devices in accordance with manufacturer's instruction at locations indicated on the floor drawings plans.
- B. Perform installation with qualified service personnel.
- C. Install devices in accordance with the National Electrical Code or applicable local codes.
- D. Ensure selected location is secure and offers protection from accidental damage.
- E. Location must provide reasonable temperature and humidity conditions, free from sources of electrical and electromagnetic interference.

3.4 FIELD QUALITY CONTROL

- A. Test snugness of mounting screws of all installed equipment.
- B. Test proper operation of all video system devices.
- C. Determine and report all problems to the manufacturer's customer service department.

3.5 ADJUSTING

- A. Make proper adjustment to video system devices for correct operation in accordance with manufacturer's instructions.
- B. Make any adjustment of camera settings to comply with specific customer's need.

3.6 DEMONSTRATION

- A. Demonstrate at final inspection that video management system and devices functions properly.

END OF SECTION