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Product Guide Specification

Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) 3-Part Format, based on *MasterFormat 2004* and *The Project Resource Manual—CSI Manual of Practice*. *The Manufacturer is responsible for technical accuracy.*

The section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project and local building code. Words and sentences within brackets [] are choices to include or exclude a particular item or statement. Coordinate this section with other specification sections and the Drawings. Delete all "Specifier Notes" after editing this section.

**SECTION 28 23 29
VIDEO SURVEILLANCE REMOTE DEVICES AND SENSORS
BOSCH AUTODOME IP starlight 7000 HD**

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. HD standards
 - 1. Complies with the 296M-2001 Standard in:
 - a. Resolution: 1280x720
 - b. Scan: Progressive
 - c. Color representation: complies with ITU-R BT.709
 - d. Aspect ratio: 16:9
 - e. Frame rate: 25, 30, 50 and 60 frames/s
 - f. Interference-Causing Equipment Standards
- E. Complies with ICES-003 regulations.
- F. International Electrotechnical Commission (IEC)
 - 1. Complies with IEC Product Safety standards
- G. 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 HD PTZ camera shall be a full-featured HD PTZ unit designed for discrete video surveillance applications in indoor and outdoor environments.
2. The HD PTZ camera shall be a high performance 1/3-in. progressive scan day/night Exmor CMOS sensor with 720p60 resolution.
3. The HD PTZ camera shall offer enhanced system flexibility with dual recording (iSCSI and SD card) options.
4. The HD 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 HD PTZ camera shall default to use power from the 24 VAC power supply, if connected.
 - d. The HD PTZ camera shall switch to the High PoE or PoE+ power supply if power from the 24 VAC power supply is lost with no interruption to camera operation.
5. The HD PTZ camera shall provide Intelligent Tracking to continuously track objects in motion.
6. The HD PTZ camera shall offer a Wide Dynamic Range of 90 dB for clear images in extreme high-contrast environments.
7. The HD PTZ camera shall provide direct network connection using H.264 and JPEG compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
8. The HD PTZ camera shall offer embedded Intelligent Video Analysis (IVA) that eliminates dedicated PCs and associated software maintenance.
9. The HD PTZ camera shall conform to the ONVIF standard to provide interoperability with other conformant systems.
10. The HD PTZ camera shall offer configurable quad streaming with individually configurable HD streams.
11. The HD PTZ camera shall have an autofocus lens with 360x zoom (30x optical/12x digital).
12. The HD PTZ camera shall have variable pan and tilt speeds, and autopivot capability for optimal camera control and viewing at all zoom levels.
13. The HD PTZ camera shall offer bi-directional audio.
14. The HD PTZ camera shall support 256 user-defined presets.
15. The HD 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.]
16. The HD PTZ camera housing shall be a durable, rugged design with an acrylic 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.
130 Perinton Parkway
Fairport, New York, 1450, USA
Phone: + 1 800 289 0096
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emea.securitysystems@bosch.com
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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 HD SERIES CAMERA [VG5-7130-CPT4] [VG5-7130-EPC4]

A. General Characteristics:

1. The HD PTZ camera shall provide a 1/3-in. type Exmor CMOS day/night camera with the following:
 - a. 1305 x 1049 (1.37 MP) effective picture elements.
 - b. Sensitivity to below 1.0 lux.
2. The HD PTZ camera shall offer a 720p/60 resolution for capturing fast motion.
3. The HD 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.
4. The HD 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 HD PTZ camera shall default to use power from the 24 VAC power supply, if connected.
 - d. The HD PTZ camera shall switch to the High PoE or PoE+ power supply if power from the 24 VAC power supply is lost with no interruption to camera operation.
5. The HD PTZ camera shall offer a dynamic range of 90 dB for clear images in extreme high-contrast environments.
6. The HD PTZ camera shall offer 256 user-defined pre-positions with 20-character titles.
7. The HD PTZ camera shall offer five configurable, pre-programmed user modes.
8. The HD PTZ camera shall offer bi-directional audio.
9. The HD PTZ camera shall offer Intelligent Tracking that controls the pan, tilt, and zoom movements of the camera to continuously follow an object or individual.
10. The HD PTZ camera shall offer an optional fiber optic media converter kit.
11. The HD 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.
12. The HD 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.]
- 13. The HD 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

1. The HD PTZ camera shall offer a 1/3-inch type Exmor CMOS imager.
2. The HD PTZ camera shall offer an effective number of pixels of 1305 x 1049 (1.37 megapixels).
3. The HD PTZ camera shall offer a 16:9 aspect ratio.
4. The HD PTZ camera shall offer a 30x optical zoom lens (4.3 to 129 mm).
5. The HD PTZ camera shall have 2.1° to 59° field of view.
6. The HD PTZ camera shall produce a color image with a minimum scene illumination of 0.052 lux and a monochrome image, when in the night mode, with a minimum illumination of 0.0103 lux at 30 IRE.
7. The HD PTZ camera shall offer automatic focus and iris control with manual override.
8. The HD PTZ camera shall offer a dynamic range of 90 dB.
9. The HD PTZ camera shall offer a Sodium Vapor White Balance mode that automatically compensate for light from a sodium vapor lamp to restore objects to their true color.
10. The HD PTZ camera shall offer an anti-fog image feature that assists the camera in registering a usable image through the heaviest fog.

C. Image Processing

1. The HD 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.
2. The HD 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.

D. System Features

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

E. PTZ Features

1. The HD 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 HD 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 HD PTZ camera shall provide a pan range of 360° continuous.
4. The HD 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 HD PTZ camera shall provide pan and tilt preset repeatability accurate to within ± 0.1 degrees.
6. The HD 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 HD 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 HD 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 HD PTZ camera shall store up to 256 preset scenes with each preset programmable for 20 character titles.
10. The HD 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 HD 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.

F. Pre-programmed Modes

1. The HD 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 HD PTZ camera shall allow users to customize these modes for the specific requirements of the camera site.

G. Recording and Storage Management

1. The HD PTZ camera shall support iSCSI devices to allow video stream to be recorded directly to an iSCSI RAID array.
2. The HD PTZ camera shall support iSCSI storage targets.
3. The HD 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 HD PTZ camera shall be compatible with the Bosch Video Recording Manager (VRM) to control and manage video recording.

H. HD Characteristics

1. The HD PTZ camera shall generate full HD 720p50/60 resolution using H.264 compression (ISO/IEC 14496-10).
2. The HD PTZ camera shall generate multiple simultaneous configurable HD video streams.
3. The HD PTZ camera shall allow simultaneous streaming of individual HD streams, and allow a choice of HD resolution in combination with SD resolutions.

I. IP Connectivity

1. The HD PTZ camera shall allow full camera control and configuration capabilities via a TCP/IP network.
2. The HD 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 HD PTZ camera shall default to use power from the 24 VAC power supply, if connected.
 - d. The HD 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.
3. The HD PTZ camera shall be capable of capturing and storing images using H.264 compression at HD 720p resolution.
4. The HD PTZ camera shall deliver 720p video, at rates up to 60 images per second via TCP/IP over Cat5/Cat6 UTP cable.
5. The HD PTZ camera shall support iSCSI devices to allow the network-enabled camera to stream video directly to an iSCSI RAID array.
6. The HD PTZ camera shall conform to the ONVIF standard.
7. The HD PTZ camera shall offer Quality of Service (QoS) configuration options.
8. The HD PTZ camera shall support the IPv6 internet-layer protocol for packet switched internetworking across multiple IP networks.
9. The HD PTZ camera shall offer embedded Intelligent Video Analysis (IVA) that eliminates dedicated PCs and associated software maintenance.

J. Intelligent Video Analysis

1. The HD PTZ camera shall be capable of processing and analyzing video within the camera itself, with no extra hardware required.
2. The HD PTZ camera shall be capable of detecting and sending alarms for abnormal events.
3. The HD 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 HD 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 HD PTZ camera shall support scene tours that automatically reposition the camera to each scene for a specified duration.
6. The HD PTZ camera shall support Bird's Eye View (BEV) people counting.

7. The HD 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 HD PTZ camera shall offer Intelligent Tracking to continuously track an object using pan, tilt, and zoom actions.
2. The HD PTZ camera shall provide automatic motion tracking using intelligent video analytics.
3. The HD PTZ camera shall have the ability to follow an object continually when passing behind a privacy mask.
4. The HD 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 HD PTZ camera shall offer the following control options for the Intelligent Tracking feature:
 - a. Off – the HD PTZ camera does not track moving object.
 - b. Auto – the HD PTZ camera actively analyzes the video to detect moving objects.
 - c. One Click – the HD PTZ camera allows a user to click a moving object in the live video image to activate Intelligent Tracking.
 - d. IVA-triggered – the HD 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 HD 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 HD PTZ camera shall allow an operator to select an object to track in the live image view.
8. The HD PTZ camera shall automatically start tracking a target that violates an IVA rule or triggers an IVA alarm.

L. Access Security

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

M. Installation Requirements

1. The HD 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 HD PTZ camera shall accept power, transmit video, and accept control via TCP/IP connection.
3. The HD 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 HD PTZ camera shall default to use power from the 24 VAC power supply, if connected.
 - d. The HD 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 HD PTZ camera shall provide a multi-language on-screen display.

N. Housing Options

1. The HD PTZ camera shall be offered in
 - a. [An indoor/outdoor Pendant housing.]
 - b. [An in-ceiling housing.]
2. The HD PTZ camera housings shall come standard with recessed setscrews and a recessed bubble latch for increased tamper resistance.
3. The HD PTZ camera shall provide built-in surge protection for power, data, and video and alarm inputs.
4. The HD PTZ camera dome bubble shall:
 - a. Be a high-resolution acrylic bubble.
 - b. Offer a clear or tinted version.
5. [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. Conform to the IP66 standard for a weather-resistant package.
 - 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, except impact test, with use of an acrylic bubble.

- g. Be made of cast aluminum for corrosion resistance, and supplied with a built-in heater/blower to provide an operating temperature range of -40°C to 55°C (-40°F to 131°F).
 - h. Be powder coated with a sand finish in white (RAL 9003).]
6. [The in-ceiling housing shall:
- a. Allow the camera to view 1° above the horizon.
 - b. Conform to IP54 and Plenum-rating standards.
 - c. Provide an operating temperature of -10°C to 40°C (14°F to 104°F).
 - d. Use a low-impact, high-resolution acrylic tinted bubble.]

O. Camera:

1. Imager: 1/3-inch type Exmor CMOS sensor
2. Effective Picture Elements (Pixels): 1305 x 1049 (1.37 MP)
3. Lens:
 - a. 30x optical zoom, 4.3 to 129 mm
 - b. 12x digital zoom
 - c. Field of View: 2.1° to 59°
4. Focus: Automatic with manual override
5. Iris: Automatic with manual override
6. Gain Control: Auto/Manual/Max
7. Aperture Correction: Horizontal and vertical
8. Electronic Shutter Speed (AES): 1/1 sec to 1/0000 sec (22 steps)
9. Wide Dynamic Range (WDR) / High Dynamic Range (HDR): 90 dB (720p/30 = 120 dB)
10. Signal-to-Noise Ration (SNR): >50 dB
11. Backlight Compensation: On/Off
12. White Balance: 2000 K to 10,000 K; ATW, Indoor, Outdoor, AWB Hold, Extended ATW, Manual, Outdoor Auto, Sodium Lamp Auto, Sodium Lamp
13. Day/Night: Monochrome, Color, Auto
14. Anti-fog Image Feature: Allows the camera to “see” and register a usable image through the heaviest fog

P. 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: $400^{\circ}/\text{s}$
 - b. Tilt: $300^{\circ}/\text{s}$
4. Pan/Tilt Modes:
 - a. Turbo Mode:
 - 1) Pan: $0.1^{\circ}/\text{s}$ to $400^{\circ}/\text{s}$
 - 2) Tilt: $0.1^{\circ}/\text{s}$ to $300^{\circ}/\text{s}$
 - b. Normal Mode:
 - 1) Pan: $0.1^{\circ}/\text{s}$ to $120^{\circ}/\text{s}$
 - 2) Tilt: $0.1^{\circ}/\text{s}$ to $120^{\circ}/\text{s}$
5. Preset Accuracy: $\pm 0.1^{\circ}$ typical

Q. 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]

R. 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, versions 4.5.5 or later), Bosch Video Client (BVC)
2. Software Update: Network firmware upload

S. Network

1. Communications Protocols: Standard Bosch IP protocol, including ONVIF and SNMP v1
2. Video Compression: H.264 (ISO/IEC 14496-10), M-JPEG, JPEG
3. Streaming: Two (2) individually configurable streams:
 - a. Stream 1
 - 1) [H.264 MP 720p50/60 fixed]
 - 2) [H.264 MP SD]
 - b. Stream 2:
 - 1) [Options with H.264 MP 720p25/30 fixed selected for Stream 1:
 - a) H.264 MP SD
 - b) H.264 MP 720p6/7 fixed
 - c) H.264 MP upright (cropped)
 - d) H.264 MP D1 4:3 (cropped)]
 - 2) [Option with H.264 MP SD selected for Stream 1:
 - a) H.264 MP SD]
 4. Resolution (H x V):
 - a. 720p HD: 1280 x 720
 - b. 432p SD: 768 x 432
 - c. 288p SD: 512 x 288
 - d. 144p SD: 256 x 144
 5. Protocols: IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP/RTCP, IGMP V2/V3, ICMP, ICMPv6, RTSP, FTP, Telnet, ARP, DHCP, 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
 6. Ethernet: 10-Base T/100 Base-TX, auto-sensing, half/full duplex, RJ45
 7. Encryption: TLS 1.0, SSL, DES, 3DES, AES
 8. GOP Structure: IP, IBP, IBBP
 9. Data Rate: 9.6 kbps to 6 Mbps (per stream)

10. Overall IP Delay: 240 ms
 11. 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)
- T. Local Storage
1. Memory Card Slot: SD/SDHC/SDXC memory card (maximum 2TB – SDXC)
 2. Recording: Continuous recording of video and audio, alarm/events/schedule recording
- U. 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 of 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
- V. 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)
 - 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

W. Environmental

1. Ingress Protection Rating/Standard (with acrylic bubble):
 - 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, 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]

X. Construction

1. Product 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, tinted]
 - 2) [Pendant: High-resolution acrylic, clear]
4. Standard Color: White (RAL9003)
5. Standard Finish: Powder coated, sand finish

2.3 ACCESSORIES

A. Bubbles

1. In-ceiling
 - a. VGA-BUBHD-CCLA Clear HD high-resolution acrylic bubble
 - b. VGA-BUBHD-CTIA Tinted HD high-resolution acrylic bubble
2. Pendant
 - a. VGA-BUBBLE-PCLA Clear high-resolution acrylic bubble
 - b. VGA-BUBBLE-PITA Tinted high-resolution acrylic bubble

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-SFPSCKT 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