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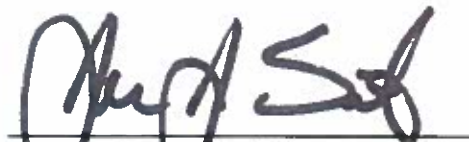
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**BULLETIN
TO
DESIGN AND CONSTRUCTION PROFESSIONALS**

Date: July 1, 2017
Bulletin: 0001 – 2017
Section: 28 23 00 – Web-Based CCTV Security System
Re: APS Design Guidelines and Standard Specifications Update

- Item 1:** This is a clarification, change or addition to the existing Atlanta Public Schools (APS) Design Guidelines and Standard Specifications dated December 1, 2010 and any previous Bulletins.
- Item 2:** This set of requirements and specifications should be implemented IMMEDIATELY on all projects that are in the "Construction Document" phase of the project delivery process. On projects where the "Construction" has begun, these requirements and specifications should be implemented IMMEDIATELY, WHERE PRACTICAL as to not adversely impact the schedule, budget or overall delivery of the project.
- Item 3:** The existing APS Standard Specification Section 28 23 00 Web-Based CCTV Surveillance System (dated October 8, 2015) should be replaced in entirety by the attached updated version (dated May 8, 2017, 17 pages).



Jere J. Smith III, AIA
Director of Capital Improvements



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Facilities and Construction

1631 La France Street NE
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CCTV Specifications

May 8, 2017

Reviewed By:

Charles Johnson, APS Building Systems Programmer

5-8-17

Date

Approved By:

Ralph Velez, Director of Security

5/8/2017

Date

CCTV Specification Changes:

- Updated Samsung cameras to current models: XNV-6080R (Exterior) and XNV-6010 (Interior)
- Removed Parking 360 camera and replace with - XNO-8020r
- Added grounding and lightening rod to parking lot poles
- Clarify server and licenses purchase process
- Clarify cable color requirement
- Updated Rack space to show security equipment is to be located in rack #2
- Updated server specifications
- Clarified camera placement is determined by Office of Safety & Security

WEB-BASED CCTV SECURITY SYSTEM

Part I: General Conditions & Scope of Work

1. **Current Environment:** The Atlanta Public Schools has 96 schools/centers serving approximately 48,000 students and about 6,500 employees. To optimize safety and security, the Department of Safety and Security has facilitated the installation, maintenance and monitoring of one of the most sophisticated camera systems with approximately 5,000 units. With the renovation, modernization and or construction of schools, the department seeks manufacturer-certified Vendors to collaborate with the Security Engineering Manager to acquire, install, configure, and commission a fully integrated web accessible IP system; that is compatible with the District's current BOSCH hardware system.
 - 1.1. The Vendor shall be responsible for IP Cameras and all material, Cat-6 cable installation, testing, mounting and labor from the camera communication outlet (Cat-6 Data drop) to the termination on the patch panel in the closet. This shall further include camera configuration and proper documentation to include; but is not limited to cable labels, camera descriptions, test data, IP address and manufacturer training manuals. Delivery and installation of hardware and material and all such activities required to meet the scope of work, must be performed solely and exclusively by the award recipient who has demonstrated proof of Company and Lead-Tech certification by the manufacturer. No part shall be subcontracted to a third-party Vendor without prior approval by Atlanta Public Schools Department of Safety and Security
 - 1.2. The APS Department of Safety & Security shall facilitate the purchase and installation of Servers and Video devices for monitoring.

2. Scope of Work

The SOW includes the provisioning and installation and final commissioning of an IP based closed circuit television (CCTV) System that is fully compatible with the current Atlanta Public School's CCTV System. This shall encompass compatibility in operation, design, functionality, and manufacturer specification.

- 2.1. **Multi-School Environment:** The layout and design shall accommodate multiple schools in a single facility or a campus-like setting. The positioning of the cameras and therefore the routing of the cable MUST allow for each "school" to operate independent of the others; and still meet the requirements of a single integrated system.
- 2.2. Most schools shall be designed to meet the requirements for a single intra-building system and integrated into the APS network; and requires that the CCTV Vendor provide all material, labor, installation, hardware, equipment, etc. to meet the following:
 - 2.2.1. Cat-6 Cable: Patch Panels, Patch Cables
 - 2.2.2. IP Cameras (Analog cameras are not accepted)
 - 2.2.3. HP Desktop Workstations
 - 2.2.4. Documentation
 - 2.2.5. Training

Note that the UPS equipment (1 unit per closet with NVR Server) is no longer required. Effective this bulletin, APS Security has determined that the UPS is not required; but reserves the right to reinstate it if so warranted based on special conditions of the school.

2.3. The vendor is responsible for the purchase of all hardware, software, and licensing. The APS Department of Safety & Security shall facilitate the purchase, acquisition, configuration and integration of the following, and shall work with the Vendor for final commission of the system:

2.3.1. NVR Servers

2.3.2. License & Software

Part II: Vendor General Requirements

3. Purchase & Install

The Vendor shall purchase and install all hardware as outlined herein for the CCTV system and must ensure proper operation for a period of two years from the final acceptance of the system by the Owner. Individual pieces of equipment may carry a longer warranty than two years; and should be so designated at final acceptance. All Hardware shall include material, mounting, peripherals and installation for the following:

3.1. IP Cameras

3.2. Cat-6 Cabling

3.3. Patch Panels

3.4. Patch Cables

3.5. Desktop Workstation

4. Camera Placement

The Vendor shall refer to the security drawings for the exact camera location, Server placement, UPS, and the conduit location from each individual IP camera to a dedicated CCTV Patch Panel. The system shall be designed for maximum building coverage to include the following key areas:

4.1. Building Entrance & Exits with badge readers

4.2. Adequate coverage for all Hallways

4.3. Front Office & Administrative Area

4.4. Adequate coverage for Stairwell Entrances and Exits

4.5. Adequate coverage for Parking Lots

4.6. Adequate coverage for multi-story building

4.7. Bus Pickup & Drop-off

4.8. Cafeteria & Loading Dock

4.9. Gym and all "Commons" areas

4.10. Media Centers

4.11. Breezeways

4.12. Portables

4.13. Courtyards

4.14. Playgrounds

4.15. Safe Room Interior and Exterior

- 4.16. Computer Labs
- 4.17. MDF/IDF Closets

5. Shop Drawings

Within 14 days of contract award, Vendor must provide shop drawings to reflect cable routing to each MDF/IDF and closet-specific breakdown of the number of ports required for each.

- 5.1. Shop Drawings will be validated by an APS designated Representative
- 5.2. Camera Schedule & Drawings must be approved prior to Kick-off meeting with APS Safety & Security that shall be held within 30 days of contract award.
- 5.3. Errors & Omissions must be identified and approved during Kick-off meeting

6. Cable

The Vendor shall utilize a minimum standard of **RED** CAT-6 cable routed between the camera locations and the MDF/IDF room housing the video system components; and shall meet the distance limitations as required for Cat-6 cable; and shall include 3-foot slack per drop. The cable is to be terminated to a CCTV specific Patch Panel and labeled with individual camera identifiers. Each patch port and patch cable shall be labeled with "Security" and the last octet of the camera. Cables routed between the CCTV patch panel and the network switch should **RED** as designated and accepted by the APS Technology Department.

- 6.1. Vendor is liable for camera failures that are caused by inferior cable practices up to twenty-four months on installation; and is responsible to provide authenticated cable test before warranty starts.
- 6.2. This standard shall have a NEMA 3 approved junction box for mounting the converters, transformers, and other electrical gear where mounted in an exterior or high humidity (such as a gymnasium) setting.

7. Cameras

The Vendor shall install the camera and housing units as per the manufacturer recommendations to accommodate housings in a secure, vandal resistant manner; and all exposed cabling must be protected in metallic or liquid tight conduit.

- 7.1. The digital camera signal shall be carried through CAT-6 wiring terminating at a designated patch panel in the nearest MDF/IDF.
 - 7.1.1. Each cable shall be labeled within one foot of the terminating connection with the identifier and location.
 - 7.1.2. The patch panel shall be labeled with the camera identifier. This label must be printed clearly and not handwritten. Label must include "Security" and the last octet of the camera's IP address.
- 7.2. The IP cameras will receive power from the nearest PoE switch provided by APS Department of Technology and placement shall be validated by an APS designated representative.

8. Rack Mounted Equipment

The Vendor shall install new rack mounted patch panels and UPS in the designated CCTV rack or equipment cabinet in the Owner's MDF/IDF room. Note: The racks and cabinets are not in the Vendor's Scope of Work.

8.1 MDF: Patch Panels must be mounted in Rack #2

8.2 IDF: Patch Panels must be mounted in Rack #2

9. Desktop Workstation

The Vendor must provide at least one work station for up to 32 cameras. Any addition of cameras in any denomination over 32 requires an additional work station (1 per 32 cameras). If the building calls for multiple schools or academies, the Vendor must provide at least one workstation for each location; and shall also comply with the 1:32 camera allowance. The monitor shall be a 22" LED monitor.

10. Documentation

The Vendor shall configure the cameras and provide documentation in Excel format that incorporates the following guidelines

10.1. Configure IP Cameras with IP Addresses

10.2. IP Addresses shall be coordinated through the Department of Safety & Security

10.3. See camera schedule sample form attachment "B" included within this specification. The schedule shall include but is not limited to the following

10.3.1. Camera Model

10.3.2. IP Address

10.3.3. Description (describe physical placement location to include nearest room number)

10.3.4. Patch Port Position Number

10.3.5. Network Switch & Network Switch Port Number

10.3.6. Network Switch MAC Address

10.3.7. Numbering scheme

10.3.8. Floor Number

10.3.9. Building Number

10.3.10. IDF number & IDF room number

10.3.11. Interior or Exterior

11. Vendor Deliverables

The Vendor is responsible for installation and demonstrated operability of all IP Cameras, Cat-6 Cable, HP Desktop Workstations, UPS Devices and final coordination with the APS Building System Engineer for final commissioning. The final coordination for placement of cameras shall be coordinated with a designated APS representative.

11.1. The Vendor is responsible for providing descriptions to uniquely identify the cameras and the delivery of a copy of the final closeout documentation to the APS Project Manager; in addition to any requirements made by the GC or Electrical contractor; and shall include the following:

11.2. Placement of camera icons with descriptions and/or identifiers on CAD drawings.

11.3. Correlate camera identifiers to a legend that describes location of camera MDF/IDF location with camera identifiers and IP Addresses

11.4. Detailed summary of IP Addresses correlated to camera identifier submitted in an electronic format

11.5. Cat-6 Test Data "Pass"

Part III: Technical Requirements

The CCTV Surveillance system must be designed to insure full compliance with current conditions throughout the district and to afford consistency and manufacturer compatibility for hardware and software; meets current end-user functionality and monitoring guidelines; and insures ongoing support from the Vendor and Manufacturer during the warranty period. All costs associated with provisioning for an alternative system, will be borne by the Designer and/or Vendor.

The technical requirements specified herein shall provide for PoE IP cameras, sending video signals via appropriately specified cabling to a network switch; that assures adequate coverage throughout the school. Adequate camera coverage can be determined by APS Safety and Security. The system must be designed for recording servers to provide for access to files, storage of files; and allow for remote access.

12. IP CAMERA

12.1. Building Mounted Interior/Exterior: Network IP Dome Camera, mounted on Main Building, Cat-6: weather and vandal-resistant enclosure, color CCTV camera and varifocal lens with the following minimum features:

- 12.1.1. Resolution: 2M (1920 x 1080) resolution
- 12.1.2. 3 ~ 8.5mm (2.8x) motorized varifocal lens
- 12.1.3. ONVIF compliant
- 12.1.4. Manufacturer: Samsung XNV-6080(Exterior) XNV-6010 (Interior)

12.2. Pole Mounted Parking Lot/Exterior: Pole mounted parking lot coverage with Fiber. Pole must be grounded with lightning rod affixed to the top of the pole. Cameras and cable must be weather and vandal-resistant enclosures and lens with the following minimum features:

- 12.2.1. Resolution: Max. 5M (2560 x 1920) resolution
- 12.2.2. 3.7mm motorized varifocal lens
- 12.2.3. ONVIF compliant
- 12.2.4. Manufacturer: Samsung XNO-8020R

12.3. Alternative cameras must be submitted to APS Security for review at least 1 month before install. A sample of each camera to be considered shall be delivered to APS Safety & Security along with proposed mounting hardware and configuration software. Alternative cameras must meet all specs of above listed cameras.

13. CABLE

- 13.1. Cat-6 cable (RED in color) is the system standard unless the cable will be exposed to exterior conditions or conditions which are electronically "noisy" or to other environmental failures. Outdoor cables must be routed through conduit with compression connectors and weather resistant pull boxes. Absolutely no indoor rated 4 square boxes will be allowed outdoors. Vendor shall be liable for all equipment and system malfunctions due to their failure to use the proper cable where warranted; and must provide test data to authenticate cable prior to start of warranty.
- 13.2. Category 6 4-Pair Plenum Cable: The cable must be rated for plenum return ceilings. The cable shall be paired, 4 pairs, 24 AWG, Solid BC - bare copper conductors, FEP Fluorinated Ethylene Propylene insulation, unshielded, flexible Flam arrest jacket with nylon ripcord. The jacket should be sequentially marked at two-foot intervals. The cable shall be red in color. The cable shall have a flame rating and test: UL CMP, JL910, C (UL) CMP, DSAFT6. This cable will be used, only, in those instances where a video server/station is located away from an IDF/MDF and with written permission of APS and for patch cables.
- 13.3. All cables shall be terminated per EIA/TIA 568b Standard.
- 13.4. All Cables, Conduit, Raceways, and fixtures are to be installed as per the National Electrical Code (NEC)

14. FIBER OPTIC TRANSMISSION EQUIPMENT

- 14.1. All fiber optic transmission equipment shall be as manufactured by Fiber Options, Inc. or International Fiber Systems, Inc.
- 14.2. All fiber optic cable shall be 62.5 micron, multi-mode type fiber, using "ST" type connectors. Fiber jacketing shall be selected dependent upon application: aerial, burial, armored, plenum. Provide the type recommended by manufacturer for specific installation and environmental condition.
- 14.3. Provide Category 6 4-Pair Plenum Cable red in color with crimped RJ-45 connectors between the camera and the fiber optic video transmitter where applicable.
- 14.4. The Vendor shall provide media converters. Media converters shall provide POE power. Coordination of the exact specification should be done with the APS designated representative.
- 14.5. When a unit is mounted outdoors, a NEMA 3 box or Hoffman type box must be supplied.
- 14.6. All power cable is provided in the Electrical Contractor Scope of Work.

15. CONTROL CABLES

Multi-conductor, color-coded type, minimum #22 AWG, stranded tinned-copper for energy limited control circuits conforming to NFPA 70-1999, and minimum #14 AWG size, stranded tinned-copper for others. Insulation and jacket may be vinyl, pvc, cross-linked polyethylene. Voltage rating shall be 200, ac or dc, minimum except where cable is pulled in same raceway with non-energy limited systems, insulations shall be rated 600V minimum. Any control cable, if utilized, must be approved by the APS building systems programmer.

16. HARDWARE & SOFTWARE

16.1. Recording Server (NVR): Each unit will be configured to accommodate a maximum camera capacity of 32 units per server. Minimum features are as follows:

- 16.1.1. Processor/s - Intel® Core™ i7 or better or Intel® Xeon®, (Dual Core or better recommended with at least 2 GHz)
- 16.1.2. Memory - 16GB Ram
- 16.1.3. Hard Drive space – (1) 120GB-OS (1) 4TB Drives or (2) 2TB Drives-Video
- 16.1.4. DVD Drive
- 16.1.5. OS – Windows Server 2012 R2

16.2. HP Desktop Workstation for Clients running Dibos Receiver Software : The Vendor shall be responsible for the purchase, delivery, installation and coordination of final commissioning for the HP Desktop Workstations. The placement of each shall be coordinated with the site Principal and APS Security Engineer.

16.2.1. The vendor must purchase the entire configuration of equipment based on a ratio of one (1) workstation per 32-max cameras. The equipment must meet the following minimum specifications.

- 16.2.1.1. Processor – Intel Core i7
- 16.2.1.2. Memory – 4GB (8 GB if using 64-bit OS)
- 16.2.1.3. Graphics card – PCI-Express, minimum 256 MB RAM, Direct 3D supported.
- 16.2.1.4. DVD Drive
- 16.2.1.5. Windows 7
- 16.2.1.6. 22" Flat Panel Color Monitor

16.2.2. The Vendor shall purchase and deliver Workstations to the APS Building Systems Engineer for programming and final commissioning. The BSE will configure each unit and coordinate pick-up and installation with the Vendor.

16.2.3. Install, CAT6 cable, or VGA cable based on whichever is appropriate for the installed CCTV system; accessibility to the nearest MDF/IDF ; and in respect to locations designated by the Principals and APS Field Engineers.

16.3. Software and License: Vendor shall purchase licenses using APS's SLC number and provide documentation to support proof of purchase

17. SUBMITTALS

The Vendor must submit data information sheets for all items listed below:

- 17.1. Provide three copies of the Operations manual for all equipment, modified as necessary for this particular system, for the Owner's use; and which contains operation, proper maintenance, and possible purchases that may be required for replacement parts beyond the two-year warranty.
- 17.2. Provide a site specific electronic schematic design of building with camera placement.
- 17.3. Electronic As-built deliverables are as follows and must be available at time of final walkthrough and acceptance.
 - 17.3.1. Cameras must be labeled with location and descriptions
 - 17.3.2. Placements must be identified by building, hall, corridor, and/or room # to include the direction the camera is facing.
 - 17.3.3. Vendor must identify cable routing from camera to MDF/IDF

18. WARRANTY:

The warranty shall not commence until the system has been demonstrated; the positioning of cameras is validated and all documentation has been delivered in the format required.

- 18.1. The warranty period for the operational system shall commence after the acceptance of the entire building warranty or the acceptance of the CCTV system warranty, whichever is later; and shall be enforced up to two years. However, in the event of a continuous failure in any area of the hardware, APS has the right to defer the warranty until the Vendor has completely eliminated the problem and restored the system to optimum performance; at which time the warranty period shall resume.

PART IV - INSTALLATION

19. PATHWAYS & CONDUIT

- 19.1. The General Contractor is responsible for all conduits, cable trays, J-hooks and other pathways in accordance with drawings and shall insure a neat workmanlike appearance.
- 19.2. APS Field Representative will work with the Vendor and GC to coordinate pathway issues and requirements that may arise during construction. Conduits shall be tight to corners and plumb.
- 19.3. Conduit and/or pathway requirements that may arise as a result of Moves, Adds or Changes shall be the responsibility of the CCTV Vendor. All work must be completed according to code and will be inspected and approved by APS Safety and Security.

20. CAMERA MOUNTS

Vendor must insure that the correct camera mounts are selected based on surface requirements, and care must be taken to neatly provide penetrations for conduit, and to locate electrical service in a logical and orderly manner.

- 20.1. Exterior Cameras shall be mounted using camera manufacturer approved wall mount/arm plate and must be installed per manufacturer's specifications.
- 20.2. All cameras are to be mounted on horizontal surfaces. In the absence of a readily available horizontal surface Cameras shall be mounted using camera manufacturer approved wall mount/arm plate and must be installed per manufacturer's specifications.
- 20.3. Exterior Cameras shall be sealed with waterproof sealant.

21. SERVER INSTALLATION

APS Building System Engineer is responsible for programming and final installation of Servers and Software; and shall coordinate system test and verification with the CCTV Vendor.

- 21.1. The rack-mounted Server will be installed in the MDF or IDF Closet, at the discretion of the Building System Engineer; and work shall not commence until the closets are certified to be complete; the LEC circuit complete; and the APS Network Servers and Switches are installed and fully operational.
- 21.2. Servers shall be installed in client-provided Rack #5 in the MDF or Rack #3 in either IDF and approved by the APS Security Field Engineer.

22. SYSTEM TEST & VERIFICATION

An APS Field Engineer will be assigned to inspect and insure quality conditions during installation; will perform preliminary walk-thru and create punch list prior to system completion. After satisfactory completion of punch list the Field Engineer and Vendor shall conduct final test to verify proper operation of all equipment. Final Verification shall include:

- 22.1 Camera Schedule (Attachment "B") hand-off to Field Engineer
- 22.2 Test Data with "Pass" for all Cat-6 Cable
- 22.3 IP Addresses & Camera Descriptions hand-off to Field Engineer
- 22.4 Coordination with BSE to facilitate install of Servers
- 22.5 Installation of Desktop Workstations & 22" Monitors
- 22.6 As-Built Drawings & Electronic AutoCAD
- 22.7 Cameras focused on viewable online

23. TRAINING

Vendor shall demonstrate to Owner the proper operation of the entire CCTV system from the MDF/IDF Closet. The contractor shall demonstrate operation of the system and provide two 4-hour training sessions for the Building Administrator and designees.

- 23.1. The Vendor is responsible for providing 8 hours per school of system administrator/maintenance training to consist of features, function, and operation. Sessions can be held in 2 hour increments and will not exceed two sessions in one day.
- 23.2. Operation training shall be at a level that allows the administrator to access, monitor, maintain, diagnose, and trouble shoot day-to-day issues and occurrences. Training should cover these features using both the NVR and the software.

- 23.3. Cost associated with training shall be included in base bid
- 23.4. Training sessions shall be scheduled by the Vendor directly with each school and approved by APS DSS. Vendor shall inform the principal that one training session will be provided and that it should be scheduled such that all desired attendees may be present. Attendance shall be documented by name, date, and signature as a Training Sign-In Sheet for each training session and shall be completed and delivered to APS DSS as a final deliverable to this project. All training sessions are to be completed prior to the substantial completion deadline.
- 23.5. Vendor shall record training sessions and provide DVDs for use by the Principals and APS DSS. Audio and video recording shall both be of professional quality.
- 23.6. APS DSS will deem audio and video quality acceptable at the time of acceptance. Poor quality may result in duplicate sessions at cost to contractor.

24. SYSTEM COMMISSIONING & CLOSEOUT

Throughout the entire life-cycle of each project, an APS representative will be assigned to work with the vendor for review and coordination of tasks associated with the final commissioning and successful closeout of the project. This person will coordinate and validate the following tasks

- 24.1. Vendor Kick-Off Meeting:
- 24.2. Drawing Review and Sign-off
- 24.3. MDF/IDF Closet Readiness
- 24.4. Coordination of Pathways
- 24.5. Coordination of Hardware Delivery & Installation
- 24.6. Port Assignment for connectivity to APS Switch
- 24.7. Camera Focusing
- 24.8. System Testing & Verification
- 24.9. Field Engineer Quality Control
 - 24.9.1. Validation of appropriate housing & mounting
 - 24.9.2. Lens Selection
 - 24.9.3. Cable Routing
 - 24.9.4. Correct use and specification of cabling and connectors.
 - 24.9.5. Correct grouping and specification of video server/station.
 - 24.9.6. System backup power specification
 - 24.9.7. Testing and commissioning of the operational system from cameras
 - 24.9.8. Verification of adequate lighting for cameras field of view.
 - 24.9.9. Coordinate (with Principal) placement of Workstation Monitors
 - 24.9.10. Vendor Punch-list
- 24.10. Vendor Completion & Closeout
 - 24.10.1. Satisfactory completion of Punch-list items
 - 24.10.2. Closeout Documentation
 - 24.10.3. Satisfactory focusing of Cameras
 - 24.10.4. Coordination & Installation of Workstations & Monitors
 - 24.10.5. Coordination & Installation of UPS(if required)
 - 24.10.6. Availability to BSE for Final System Test & Verification

- 24.10.7. Training
- 24.11. Building System Engineer Quality Control
 - 24.11.1. Specification & Configuration of HP DL380 Server
 - 24.11.2. Insure proper quantities & placement of UPS by Vendor(if required)
 - 24.11.3. Review and Signoff of Closeout Documentation
 - 24.11.4. Facilitate System Testing & Final Launch
 - 24.11.5. Other special requirements deemed by the APS project
 - 24.11.6. Review and approval of proposed Change Requests
 - 24.11.7. Coordination of the entire system with the APS Project Manager and the General Contractor.

XNV-6010

2M Vandal-Resistant Network Dome Camera

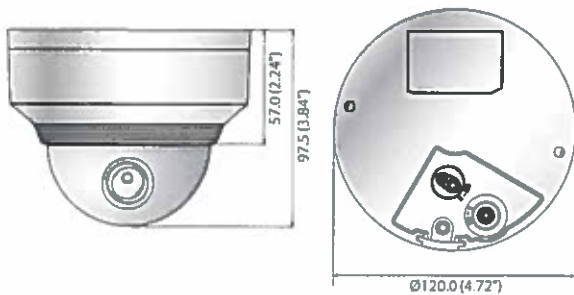


Key Features

- Max. 2 megapixel (1920 x 1080) resolution
- Built-in 2.4mm fixed lens
- Max. 60fps@all resolutions (H.265/H.264)
- H.265, H.264, MJPEG codec supported, Multiple streaming
- Day & Night (ICR), WDR (150dB), Defog
- Loitering, Directional detection, Fog detection, Audio detection, Digital auto tracking, Sound classification, Heatmap, People counting, Queue management, Tampering
- Motion detection, Handover
- SD/SDHC/SDXC memory slot (Max. 512GB), PoE / 12V DC
- Hallway view, WiseStream II support, IP67/IP66, IK10
- LDC support (Lens Distortion Correction)

Dimensions

Unit: mm (inch)



Accessories (Optional)



XNV-6010

VIDEO	
Imaging Device	1/2.8" 2M CMOS
Total Pixels	1,945(H) x 1,109(V) 2.16M
Effective Pixels	1,945(H) x 1,097(V) 2.13M
Scanning System	Progressive Scan
Min. Illumination	Color: 0.055Lux (F2.0, 1/30sec), B/W: 0.0055Lux (F2.0, 1/30sec)
S/N Ratio	50dB
Video Out	CVBS: 1.0Vpp / 75Ω composite, 720 x 480(N), 720 x 576(P), for installation USB: microUSB type B, 1280 x 720 for installation
LENS	
Focal Length (Zoom Ratio)	2.4mm fixed
Max. Aperture Ratio	F2.0
Angular Field of View	H: 139.0° / V: 73.0° / D: 167.0°
Min. Object Distance	0.4m (1.31ft)
Focus Control	Manual
Lens / Mount Type	Fixed / Board-in type
PAN / TILT / ROTATE	
Pan / Tilt / Rotate Range	0° ~ 354° / 0° ~ 67° / 0° ~ 355°
OPERATIONAL	
Camera Title	Off / On (Displayed up to 85 characters) - WW: English / Numeric / Special characters - China: English / Numeric / Special / Chinese characters - Common: Multi-line (Max. 5), Color (Grey / Green / Red / Blue / Black / White), Transparency, Auto scale by resolution
Day & Night	Auto (ICR) / Color / B/W / External / Schedule
Backlight Compensation	Off / BLC / HLC (Masking / Dimming), WDR
Wide Dynamic Range	150dB
Contrast Enhancement	SSDR (Off / On)
Digital Noise Reduction	SSNRV (2D+3D noise filter) (Off / On)
Digital Image Stabilization	Off / On
Defog	Off / Auto (Input from fog detection) / Manual
Motion Detection	Off / On (8ea, 8point polygonal zones), Handover
Privacy Masking	Off / On (32ea, Polygonal), Color: Grey / Green / Red / Blue / Black / White, Mosaic
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor (included mercury & Sodium)
Contrast	Level adjustment
LDC (Lens Distortion Correction)	Off / On (5 levels with min / max)
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)
Digital PTZ	24x, Digital PTZ (Preset, Group)
Flip / Mirror	Off / On, Halfway view: 90°/270° Tampering, Loitering, Directional detection, Defocus detection, Fog detection, Virtual line, Enter / Exit, (Dis)Appear, Audio detection, Face detection, Motion detection, Digital auto tracking, Sound classification, Heatmap, People counting, Queue management
Video & Audio Analytics	Input 1ea / Output 1ea
Alarm I/O	Alarm input, Motion detection, Video & Audio analytics, Network disconnect
Alarm Triggers	File upload via FTP, E-mail, Notification via E-mail, Local storage (SD/SDHC/SDXC) or NAS recording at event triggers, External output, DPTZ preset
Alarm Events	Support
Pixel Counter	Support
NETWORK	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Format	H.265 / H.264 (MPEG-4 part 10/AVC): Main / Baseline / High, MJPEG
Resolution	1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, 320 x 240
Max. Framerate	H.265 / H.264: Max. 60fps at all resolutions, MJPEG: Max. 30fps
Smart Codec	Manual mode (Area-based: 5ea)
WiseStream II	Support
Video Quality Adjustment	H.265 / H.264: Target bitrate level control, MJPEG: Target bitrate level control
Bitrate Control Method	H.265 / H.264: CBR or VBR, MJPEG: VBR
Streaming Capability	Multiple streaming (Up to 10 profiles)
Audio In	Selectable (Mic in / Line in), Supply voltage: 2.5VDC (4mA), Input impedance: approx. 2KΩ
Audio Out	Line out, Max output level: 1Vrms
Audio Compression Format	G.711 u-law/G.726 selectable, G.726 (ADPCM) 8KHz, G.711 8KHz G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps, AAC-LC: 48Kbps at 8/16/32/48KHz
Audio Communication	Bi-directional (2-way)
IP	IPv4, IPv6
Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTPSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, PPPoE, FTP, SFTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB 2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour, HTTPS(SSL) login authentication, Digest login authentication, IP address filtering, User access log, 802.1X authentication (EAP-TLS, EAP-LEAP)
Security	Unicast / Multicast
Streaming Method	Unicast / Multicast
Max. User Access	20 users at unicast mode
Edge Storage	SD/SDHC/SDXC 2slot (Up to 512GB) - Continuous recording (1st slot to 2nd slot) NAS (Network Attached Storage), Local PC for instant recording
Application Programming Interface	ONVIF profile S/G, SUNAPI (HTTP API), Wisenet Open Platform
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Web Viewer	Supported OS: Windows 7, 8.1, 10, Mac OS X 10.10, 10.11, 10.12 Non-plugin Webviewer - Supported Browser: Google Chrome 54, MS Edge 38, Mozilla Firefox 49 (Window 64bit only), Apple Safari 9 * Mac OS X only Plug-in Webviewer - Supported Browser: MS Explorer 11, Apple Safari 9 * Mac OS X only
Central Management Software	SmartViewer, SSM
ENVIRONMENTAL	
Operating Temperature / Humidity	-30°C ~ +55°C (-22°F ~ +131°F) / Less than 90% RH * Start up should be done at above 20°C (-4°F)
Storage Temperature / Humidity	-50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH
Ingress Protection / Vandal Resistance	IP67, IP66 / IK10
ELECTRICAL	
Input Voltage / Current	12V DC ±10%, PoE (IEEE802.3af)
Power Consumption	Max. 5.5W (12VDC), Max. 6W (PoE)
MECHANICAL	
Color / Material	Ivory / Metal
Dimensions (WxH)	Ø120.0 x 97.5mm (Ø4.72" x 3.84")
Weight	625g (1.38lb)

* Design and specifications are subject to change without notice.

XNV-6080R

2M Vandal-Resistant Network IR Dome Camera

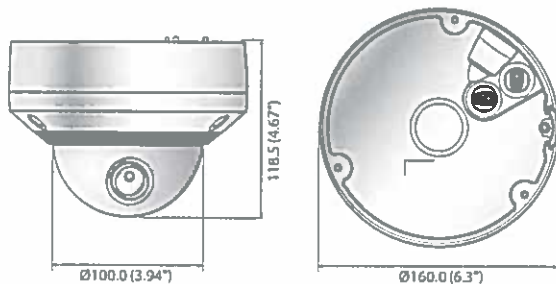


Key Features

- Max. 2 megapixel (1920 x 1080) resolution
- 2.8 ~ 12mm (4.3x) motorized varifocal lens
- Max. 60fps@all resolutions (H.265/H.264)
- H.265, H.264, MJPEG codec supported, Multiple streaming
- Day & Night (ICR), WDR (150dB), Defog
- Loitering, Directional detection, Fog detection, Audio detection, Digital auto tracking, Sound classification, Tampering
- Motion detection, Handover
- SD/SDHC/SDXC memory slot (Max. 512GB)
- Hallway view, WiseStream II support
- IR viewable length 50m, IP67/IP66, NEMA 4X, IK10
- LDC support (Lens Distortion Correction)
- PoE / 24V AC, 12V DC, Bi-directional audio support

Dimensions

Unit : mm (inch)



XNV-6080R

VIDEO	
Imaging Device	1/2.8" 2M CMOS
Total Pixels	1,945(H) x 1,109(V) 2.16M
Effective Pixels	1,945(H) x 1,097(V) 2.13M
Scanning System	Progressive Scan
Min. Illumination	Color: 0.015 Lux (F1.4, 1/30sec), B/W: 0 Lux (IR LED on)
S/N Ratio	50dB
Video Out	CVBS: 1.0Vpp / 75Ω composite 720 x 480(N), 720 x 576(P), for installation USB: micro USB type B, 1280 x 720 for installation
LENS	
Focal Length (Zoom Ratio)	2.8 ~ 12mm (4.3x) motorized varifocal
Max. Aperture Ratio	F1.4(Wide) ~ F3.6(Tele)
Angular Field of View	H: 119.5° ~ 27.9° / V: 62.8° ~ 15.7° / D: 142.1° ~ 32.0°
Min. Object Distance	0.5m (1.64ft)
Focus Control	Simple focus (Motorized V/E) / Manual, Remote control via network (Manual, Simple focus)
Lens / Mount Type	DC auto iris, P-iris / Board-in type
PAN / TILT / ROTATE	
Pan / Tilt / Rotate Range	0° ~ 354° / 0° ~ 67° / 0° ~ 355°
OPERATIONAL	
IR Viewable Length	50m (164.04ft) Off / On (Displayed up to 85 characters) - W/W: English / Numeric / Special characters - China: English / Numeric / Special / Chinese characters - Common: Multi-line (Max. 5), Color (Grey / Green / Red / Blue / Black / White), Transparency, Auto scale by resolution
Camera Title	
Day & Night	Auto (ICR) / Color / B/W / External / Schedule
Backlight Compensation	Off / BLC / HLC (Masking / Dimming), WDR
Wide Dynamic Range	150dB
Contrast Enhancement	SSDR (Off / On)
Digital Noise Reduction	SSNRV (2D+3D noise filter) (Off / On)
Digital Image Stabilization	Off / On
Defog	Off / Auto (input from fog detection) / Manual
Motion Detection	Off / On (Bea, Bpoint polygonal zones), Handover
Privacy Masking	Off / On (32ea, Polygonal) - Color: Grey / Green / Red / Blue / Black / White, Mosaic
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor (included mercury & Sodium)
Contrast	Level adjustment
LDC (Lens Distortion Correction)	Off / On (5 levels with min / max)
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/1,000sec)
Digital PTZ	24x, Digital PTZ (Preset, Group)
Flip / Mirror	Off / On, Hallway view: 90°/270°
Video & Audio Analytics	Tampering, Loitering, Directional detection, Defocus detection, Fog detection, Virtual line, Enter / Exit, (Dis)Appear, Audio detection, Face detection, Motion detection, Digital auto tracking, Sound classification
Alarm I/O	Input 1ea / Output 1ea
Alarm Triggers	Alarm input, Motion detection, Video & Audio analytics, Network disconnect
Alarm Events	File upload via FTP, E-mail, Notification via E-mail, Local storage (SD/SDHC/SDXC) or NAS recording at event triggers, External output, DPTZ preset
Pixel Counter	Support
NETWORK	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Format	H.265 / H.264 (MPEG-4 part 10/AVC), Main / Baseline / High, MJPEG
Resolution	1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, 320 x 240
Max. Framerate	H.265 / H.264: Max. 60fps at all resolutions, MJPEG: Max. 30fps
Smart Codec	Manual mode (Area based: 5ea)...
WiseStream II	Support
Video Quality Adjustment	H.265 / H.264: Target bitrate level control, MJPEG: Target bitrate level control
Bitrate Control Method	H.265 / H.264: CBR or VBR, MJPEG: VBR
Streaming Capability	Multiple streaming (Up to 10 profiles)
Audio In	Selectable (Mic in / Line in), Supply voltage: 2.5V DC (4mA), input impedance: approx. 2K Ohm
Audio Out	Line out, Max output level: 1Vrms
Audio Compression Format	G.711 u-law/G.726 selectable, G.726 (ADPCM) 8KHz, G.711 8KHz, G.726 16Kbps, 24Kbps, 32Kbps, 40Kbps, AAC-LC 48Kbps at 8/16/32/48KHz
Audio Communication	Bi-directional (2-way)
IP	IPv4, IPv6
Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, PPPoE, FTP, SMTp, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour
Security	HTTPS(SSL) login authentication, Digest login authentication, IP address filtering, User access log, 802.1X authentication (EAP-TLS, EAP-LEAP)
Streaming Method	Unicast / Multicast
Max. User Access	20 users at unicast mode
Edge Storage	SD/SDHC/SDXC 2slot (Up to 512GB) - Continuous recording (1st slot to 2nd slot) NAS (Network Attached Storage), Local PC for instant recording
Application Programming Interface	ONVIF profile S/G, SUNAPI (HTTP API), Wisenet Open Platform
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek Supported OS: Windows 7, 8, 10, Mac OS X 10.10, 10.11, 10.12 Non-plugin Webviewer - Supported Browser: Google Chrome 54, MS Edge 38, Mozilla Firefox 49 (Window 64bit only), Apple Safari 9 * Mac OS X only
Web Viewer	Plug-in Webviewer - Supported Browser: MS Explorer 11, Apple Safari 9 * Mac OS X only
Central Management Software	SmartViewer, SSM

ENVIRONMENTAL	
Operating Temperature / Humidity	-40°C ~ +55°C (-40°F ~ +131°F) / Less than 90% RH
Storage Temperature / Humidity	-50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH
Ingress Protection / Vandal Resistance	IP67, IP66, NEMA 4X / IK10
ELECTRICAL	
Input Voltage / Current	24V AC ±10%, 12V DC ±10%, PoE (IEEE802.3af)
Power Consumption	Max. 11.5W (12VDC), Max. 12.95W (PoE), Max. 14W (24VAC)
MECHANICAL	
Color / Material	Ivory / Aluminum
Dimensions (WxH)	101.60 x 118.5mm (Ø6.3" x 4.67")
Weight	995g (2.19 lbs)

* The latest product information / specification can be found at hanwha-security.com
* Design and specifications are subject to change without notice.

Accessories (Optional)



XNO-8020R/8030R/8040R

5M Network IR Bullet Camera

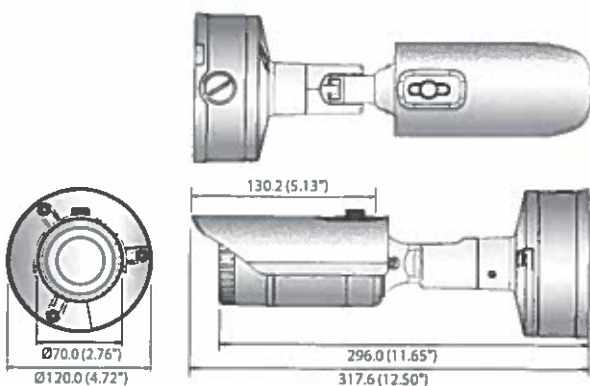


Key Features

- Max. 5 megapixel (2560 x 1920) resolution
- Built-in 3.7mm fixed lens (XNO-8020R)
4.6mm fixed lens (XNO-8030R)
7mm fixed lens (XNO-8040R)
- Max. 30fps@all resolutions (H.265/H.264)
- H.265, H.264, MJPEG codec supported, Multiple streaming
- Day & Night (ICR), WDR (120dB), Defog
- Loitering, Directional detection, Fog detection, Audio detection, Digital auto tracking, Sound classification, Heatmap, People counting, Queue management, Tampering
- Motion detection, Handover
- SD/SDHC/SDXC memory slot (Max. 512GB), PoE / 12V DC
- Hallway view, WiseStream II support
- IR viewable length 30m, IP67/IP66, NEMA 4X, IK10
- LDC support (Lens Distortion Correction)

Dimensions

Unit : mm (inch)



Accessories (Optional)



XNO-8020R/8030R/8040R

VIDEO	
Imaging Device	1/1.8" 6M CMOS
Total Pixels	3,096(H) x 2,094(V)
Effective Pixels	2,616(H) x 1,976(V)
Scanning System	Progressive Scan
Min. Illumination	Color: 0.16Lux (F1.6, 1/30sec), B/W: 0Lux (IR LED on)
S/N Ratio	50dB
Video Out	CVBS: 1.0Vpp / 75Ω composite, 720 x 480(N), 720 x 576(P), for installation USB: micro USB type B, 1280 x 720 for installation
LENS	
Focal Length (Zoom Ratio)	3.7mm fixed (XNO-8020R), 4.6mm fixed (XNO-8030R), 7mm fixed (XNO-8040R)
Max. Aperture Ratio	F1.6
Angular Field of View	H: 97.5° / V: 71.9° / D: 126.2° (XNO-8020R) H: 77.9° / V: 57.9° / D: 98.7° (XNO-8030R) H: 50.7° / V: 37.8° / D: 63.8° (XNO-8040R)
Min. Object Distance	0.4m (1.31ft)
Focus Control	Manual
Lens / Mount Type	Fixed / Board-in type
OPERATIONAL	
IR Viewable Length	30m (98.43ft) Off / On (Displayed up to 85 characters)
Camera Title	- W/W: English / Numeric / Special characters - China: English / Numeric / Special / Chinese characters - Common: Multi-line (Max. 5), Color (Grey / Green / Red / Blue / Black / White), Transparency, Auto scale by resolution
Day & Night	Auto (ICR) / Color / B/W / External / Schedule
Backlight Compensation	Off / BLC / HLC (Masking / Dimming), WDR
Wide Dynamic Range	120dB
Contrast Enhancement	SSDR (Off / On)
Digital Noise Reduction	SSNRV (2D+3D noise filter) (Off / On)
Digital Image Stabilization	Off / On
Defog	Off / Auto (Input from fog detection) / Manual
Motion Detection	Off / On (Bea, Bpoint polygonal zones), Handover
Privacy Masking	Off / On (32ea, Polygonal), Color, Grey / Green / Red / Blue / Black / White, Mosaic
Gain Control	Off / Low / Middle / High
White Balance	ATW / AWC / Manual / Indoor / Outdoor (Included mercury & Sodium)
Contrast	Level adjustment
LDC (Lens Distortion Correction)	Off / On (5 levels with min / max)
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/1,000sec)
Digital PTZ	24x, Digital PTZ (Preset, Group)
Flip / Mirror	Off / On, Hallway view, 90°/270°
Video & Audio Analytics	Tampering, Loitering, Directional detection, Defocus detection, Fog detection, Virtual line, Enter / Exit, (Dis)Appear, Audio detection, Face detection, Motion detection, Digital auto tracking, Sound classification, Heatmap, People counting, Queue management
Alarm I/O	Input 1ea / Output 1ea
Alarm Triggers	Alarm input, Motion detection, Video & Audio analytics, Network disconnect
Alarm Events	File upload via FTP, E-mail, Notification via E-mail, Local storage (SD/SDHC/SDXC) or NAS recording at event triggers, External output, DPTZ preset
Pixel Counter	Support
NETWORK	
Ethernet	RJ-45 (10/100BASE-T)
Video Compression Format	H.265 / H.264 (MPEG-4 part 10/AVC): Main / Baseline / High, MJPEG
Resolution	2560 x 1920, 2560 x 1440, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, 320 x 240
Max. Framerate	H.265 / H.264: Max. 30fps at all resolutions, MJPEG: Max. 30fps
Smart Codec	Manual mode (Area-based, Sea)
WiseStream II	Support
Video Quality Adjustment	H.265 / H.264: Target bitrate level control, MJPEG: Target bitrate level control
Bitrate Control Method	H.265 / H.264: CBR or VBR, MJPEG: VBR
Streaming Capability	Multiple streaming (Up to 10 profiles)
Audio In	Selectable (Mic in / Line in), Supply voltage: 2.5VDC (4mA), Input impedance: approx. 2K Ohm
Audio Out	Line out, Max output level: 1Vrms
Audio Compression Format	G.711 u-law / G.726 selectable, G.726 (ADPCM) 8KHz, G.711 8KHz, G.726 16Kbps, 24Kbps, 32Kbps, 40Kbps, AAC-LC: 48Kbps at 8/16/32/48KHz
Audio Communication	Bi-directional (2-way)
IP	IPv4, IPv6
Protocol	TCP/IP, UDP/IP, RTP (UDP), RTP (TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3 (MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour, HTTPS (SSL) login authentication, Digest login authentication
Security	IP address filtering, User access log, 802.1X authentication (EAP-TLS, EAP-LEAP)
Streaming Method	Unicast / Multicast
Max. User Access	20 users at unicast mode
Edge Storage	SD/SDHC/SDXC 2slot (Up to 512GB) - Continuous recording (1st slot to 2nd slot) NAS (Network Attached Storage), Local PC for instant recording
Application Programming Interface	ONVIF profile S/G, SUNAPI (HTTP, API), Wisenet Open Platform
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Supported OS	Windows 7, 8.1, 10, Mac OS X 10.10, 10.11, 10.12
Non-Plugin Webviewer	- Supported Browser: Google Chrome 54, MS Edge 38, Mozilla Firefox 49 (Window 64bit only), Apple Safari 9 * Mac OS X only
Web Viewer	Plug-in Webviewer - Supported Browser: MS Explorer 11, Apple Safari 9 * Mac OS X only
Central Management Software	SmartViewer, SSM
ENVIRONMENTAL	
Operating Temperature / Humidity	-30°C ~ +55°C (-22°F ~ +131°F) / Less than 90% RH * Start up should be done at above -20°C (-4°F)
Storage Temperature / Humidity	-50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH
Ingress Protection / Vandal Resistance	IP67, IP66, NEMA 4X / IK10
ELECTRICAL	
Input Voltage / Current	12V DC ±10%, PoE (EEE802.3af)
Power Consumption	Max. 9.3W (12VDC), Max. 10.3W (PoE)
MECHANICAL	
Color / Material	Dark gray / Aluminum
Dimensions (WxH)	Ø70.0 x 296.0mm (Ø4.72" x 11.65") (Without sunshield)
Weight	1.22kg (2.69lb)

* Design and specifications are subject to change without notice