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**360o 12 MEGAPIXEL STAINLESS STEEL VIDEO CAMERA**

**DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

**Notes to Specifier**

1. Where several alternative parameters or specifications exist, or where the specifier has the option of inserting text, such choices are presented in **<bold text>. The normal default is presented in [bracketed bold text].**

2. Explanatory notes and comments are presented in **colored** text.

**Important Note to Security Systems Specifiers**

CSI MasterFormat 2016 incorporates numerous significant changes affecting electronic safety and security since MasterFormat 2014. This document is written to provide flexibility in using either format, although adoption of MasterFormat 2016 is encouraged. The following is a guide to the MasterFormat numbers relevant to the product referenced in this specification.

**Primary Specification Area**

MasterFormat 2014:

28 20 00 Electronic Surveillance

28 23 00 Video Surveillance

28 23 29 Video Surveillance Remote Devices and Sensors

MasterFormat 2016:

28 20 00 Video Surveillance

28 21 00 Surveillance Cameras

28 21 13 IP Cameras

28 21 13.11 Panoramic IP Cameras

**Related Requirements**

MasterFormat 2014:

27 20 00 Data Communications

28 23 13 Video Surveillance Control and Management Systems

28 23 16 Video Surveillance Monitoring and Supervisory Interfaces

28 23 19 Digital Video Recorders and Analog Recording Devices

28 23 23 Video Surveillance Systems Infrastructure

MasterFormat 2016

27 15 01.13 Video Surveillance Communications Conductors and Cables

27 20 00 Data Communications

28 05 07.21 PoE Power Sources for Electronic Safety and Security

28 05 11 Cyber Requirements for Electronic Safety and Security

28 05 19 Storage Appliances for Electronic Safety and Security

28 05 19.15 Network Video Recorders

28 05 33 Safety and Security Network Communications Equipment

28 23 00 Video Management System

**360o 12 MEGAPIXEL OUTDOOR VIDEO CAMERA**

1. **GENERAL**
   1. **SUMMARY**
      1. Section includes a 12 megapixel (MP) IP stainless steel video camera providing 360 degree surveillance.
      2. Product – Designed for demanding industrial environments, 12 MP electropolished marine grade 316 stainless steel, IP69K rated video camera, employing one 4072H x 3046V image sensor, capable of providing 360 degree surveillance with no moving parts and seven independent video streams.

## Related Requirements

**Refer to MasterFormat notes at the beginning of this document to select requirements specific to the MasterFormat version being used in the specification.**

* 1. **REFERENCES**
     1. Abbreviations
        1. API – Application Programming Interface
        2. ARP – Address Resolution Protocol
        3. AWB - Automatic White Balance
        4. DHCP - Dynamic Host Configuration Protocol
        5. DNS - Domain Name Server
        6. fps - frames per second
        7. FTP - File Transfer Protocol
        8. GOP – Group of Pictures
        9. GUI – Graphical User Interface
        10. HTTP - Hypertext Transfer Protocol
        11. HTTPS – Secure Hypertext Transfer Protocol
        12. ICMP – Internet Control Message Protocol
        13. IGMP - Internet Group Management Protocol
        14. IP - Internet Protocol
        15. JPEG - Joint Photographic Experts Group
        16. MJPEG - Motion JPEG
        17. MP - Megapixel
        18. MPEG - Moving Pictures Experts Group
        19. NTP - Network Time Protocol
        20. PoE - Power over Ethernet
        21. RTP - Real-Time Transport Protocol
        22. RTSP - Real-Time Streaming Protocol
        23. SDK - Software Development Kit
        24. SMTP - Simple Mail Transfer Protocol
        25. TCP - Transmission Control Protocol
        26. UDP - User Datagram Protocol
        27. UPnP – Universal Plug and Play
        28. VCam – Virtual Camera
        29. VMS - Video Management System
        30. WDR – Wide Dynamic Range
     2. Reference Standards
        1. Network
           1. IEEE 802.3 Ethernet Standards
           2. IEEE 802.1x – Port-based authentication
        2. Video
           1. ISO / IEC 14496 –10, MPEG-4 Part 10 ( ITU H.264)
           2. ISO / IEC 10918 – JPEG
           3. ONVIF – Profile S
        3. Emissions
           1. FCC-47 CFR Part 15, Class A
           2. ANSI C63.4-2009
           3. CE

EN 55022: 2010/AC:2011, Class A Conducted and Radiated Power

EN 61000-3-2:2006, A1:2009, A2:2010 Harmonic Current Emissions

EN 61000-3-3:2013 Voltage Fluctuations and Flicker

* + - * 1. ICES-003, Issue 5-20121
        2. IEC CISPR:2010, Class A Conducted and Radiated Power
      1. Environmental
         1. ANSI / IEC 60529 – Degrees of Protection Provided by Enclosures – IP69K
         2. National Electrical Manufacturers Association, NEMA 250-2003, 4X Enclosure Definition
         3. IEC 62262 Impact Rating - IK10
      2. Safety
         1. Underwriters Laboratories (UL) and cUL 60950 – Information Technology Equipment
    1. Definitions
       1. Dewarping – A process in which an image or set of images is rendered in a flat plane with spatial distortions corrected by a curvilinear type algorithm to create a normal appearance.
       2. Virtual Camera (VCam) – An image stream which is the result of taking a selected portion of a camera’s field of view and presenting it as if it were a single camera dedicated to that view.
  1. **SUBMITTALS**
     1. Product Data
        1. Manufacturer’s printed or electronic data sheets
        2. Manufacturer’s installation and operation manuals
        3. Warranty documentation
  2. **QUALIFICATIONS**
     1. Manufacturer shall have a minimum of five years’ experience in producing IP video equipment.
     2. Installers shall be trained and authorized by the Manufacturer to install, integrate, test, and commission the system.
  3. **DELIVERY, STORAGE AND HANDLING**
     1. Deliver the camera in the manufacturer’s original, unopened, undamaged container with identification labels intact.
     2. Store the camera in a temperature controlled environment protected from mechanical and environmental conditions as designated by the manufacturer.
  4. **WARRANTY AND SUPPORT**
     1. Manufacturer shall provide a limited 3 year warranty for the product to be free of defects in material and workmanship.

END OF SECTION

1. **PRODUCTS**
   1. **EQUIPMENT**
      1. Manufacturer: Pelco

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* + 1. Model EVO-12-SSK (Surface Mount); EVO-12-PSK (Pendant Mount)
    2. Alternates: None
  1. **GENERAL DESCRIPTION**
     1. The 360o 12 MP stainless steel video camera (“360degreecamera”) shall have no moving parts and be capable of providing 360 degree surveillance with no blind spots
     2. The 360 degree camera shall possess the following primary characteristics:
        1. employ a single image sensor capable of providing 4072H x 3046V resolution
        2. provide dewarping software to convert the spherical video image into a continuous flat view
        3. H.264 and MJPEG compression
        4. 12 fps for maximum resolution, 30 fps for 2MP resolution and below
        5. unicast support for up to 20 simultaneous users depending on the resolution settings
        6. multicast supported for the H.264 main camera stream
        7. 0.1 lux minimum illumination, providing clarity in low light
        8. local 3D dewarping providing 4x VCams at max 1MP each
        9. 10x zoom with Oncam 3D client-side dewarping software
        10. 10 configurable privacy regions
        11. 8 polygonal Video Motion Detection regions
        12. local alarm digital input and output
        13. audio microphone input
        14. built-in SD Card slot. Supports cards up to 128 GB capacity. Speed class 10 or higher required
        15. image snapshot transferred by email
        16. operate on an embedded Linux platform
        17. include a built-in web server
        18. PoE (IEEE standard 802.af) or 12VDC powered
        19. IP69K and IK10 rated
  2. **VIDEO**
     1. Imager
        1. Sensor: 12.4 MP (approximately) 1/2.3" Sony EXMOR R CMOS Sensor
        2. Minimum illumination: 0.10 lux (50 IRE, F/2.0)
        3. Scanning: Progressive
     2. Image Control Settings
        1. Automatic white balance (AWB): 2,500K to 8,000K (approximately)
        2. Privacy zone definition: 10 configurable zones
        3. Wide Dynamic Range (WDR): Electronic WDR 60 dB
        4. Brightness
        5. Sharpness
        6. Contrast
        7. Saturation
        8. Exposure compensation
        9. Compression – image quality Multi-levels of compression and frame rate adjustment
     3. Lens: 185o fixed, F/2.0
        1. Angle of view: 180o horizontal, 180o vertical(hemispherical)
     4. Video Streams
        1. The 360 degree camera shall support the transmission of seven configurable video streams, whose properties are detailed in Attachment A.
        2. Available compression types:
           1. H.264, available in 6 streams
           2. MJPEG, available in 1 stream
           3. Available resolutions:

H.264 compression

3200 x 3000 (9.6 MP)

2528 x 2376 (6 MP)

2080 x 1960 (4 MP)

1472 x 1384 (2 MP)

1056 x 992 (1 MP)

544 x 512 (1/4 MP)

MJPEG compression

2080 x 1960 (4 MP)

1472 x 1384 (2 MP)

1056 x 992 (1 MP)

544 x 512 (1/4 MP)

* + - 1. Bit rate
         1. Range: 0.8 Mbps – 10 Mbps (Constant Bit Rate)
         2. H.264 options:

Constant Bit Rate

Fixed Quality

GOP length

Maximum frames per second

* + - * 1. MJPEG options:

maximum frames per second

quality

* + - 1. Frame rate: 0-30 fps
      2. Presentation: Video views shall be available in both fisheye and dewarped (flat) views as follows:
         1. Fisheye views: 3 streams, one of which shall be MJPEG
         2. Dewarped views: 4 streams of independent VCams
      3. Video streams shall support ONVIF profile S.
    1. Video Viewing
       1. Video and snapshots shall be capable of being accessed through the following means:
          1. JPEG images accessible through a web browser
          2. Video streaming through an available media player
          3. ONVIF driver
          4. PSIA driver
    2. Storage and Recording
       1. The 360 degree camera shall have the facility for onboard SD card storage.
    3. Video Motion
       1. Video motion analytics shall be pre-loaded in the 360 degree camera.
       2. The 360 degree camera shall have the ability to detect motion within up to 8 user defined areas of the video image.
    4. Pan Tilt Zoom (PTZ) Functionality - The 360 degree camera shall support 10x digital zoom with Oncam 3D client side dewarping software.
  1. **ADDITIONAL FEATURES**
     1. Alarm – The 360 degree camera shall have a contact input and contact output for alarm or control.
     2. Event management – The 360 degree camera shall perform selected response actions when triggered by selected inputs as follows:
        1. Response actions:
           1. contact output
           2. e-mail via SMTP
           3. local recording
        2. Trigger inputs:
           1. motion in a pre-defined area
           2. contact input
           3. HTTP event
           4. network connection lost
     3. Audio – The 360 degree camera shall have audio capability.
        1. Input options:
           1. Line level/external microphone input (3.5 mm jack), 600-ohm differential, 1 V p-p maximum
           2. via RTSP using G.711 codec
           3. via ONVIF Profile S
     4. Integrations – The 360 degree camera shall have available an API and an SDK to support integrations with third party manufacturers, including VMS and network storage providers.
  2. **NETWORK**
     1. Connectivity: 1000BASE-TX Ethernet with RJ-45 connector
     2. Protocols supported
        1. Transmission Control Protocol (TCP), Internet Protocol (IP) v4, User Datagram Protocol (UDP)
        2. Configuration: Dynamic Host Configuration Protocol (DHCP)
        3. Web services: Hypertext Transfer Protocol (HTTP)
        4. Network services: Domain Name System (DNS), Network Time Protocol (NTP), Internet Control Message Protocol (ICMP), Universal Plug and Play (UPnP)
        5. Media: Real-Time Transport Protocol (RTP), Real-Time Streaming Protocol (RTSP)
        6. Multicast: Internet Group Management Protocol (IGMP)
        7. Simple Mail Transfer Protocol (SMTP)
     3. Unicast - The 360 degree camera shall support 20 simultaneous users of independent streams.
     4. Multicast - The 360 degree camera shall support multicast for an H.264 main camera stream.
     5. Security
        1. The 360 degree camera shall have a user configurable password feature.
  3. **CAMERA SOFTWARE**
     1. Web Server - The 360 degree camera shall have a built in web server which supports browser-based configuration of the camera.
        1. The camera’s web server shall allow access to camera information and all primary software functions to include:
           1. Image settings
           2. Network settings
           3. Alarm settings, triggers, and actions

Triggers:

motion

network connection lost

contact input

Actions:

Email (SMTP)

Record to SD card

* + - * 1. Camera settings

Frames per second

Quality

Bit rate control

Compression settings

* + - * 1. Clock settings
        2. Video stream settings

Resolution

Compression

* + - * 1. SD card recording settings
        2. Factory reset
        3. Image regions

Privacy zones

Motion detection zones

* + - 1. The camera’s web server shall support up to 20 clients simultaneously over the network.
    1. Setup and Maintenance - The Manufacturer shall offer a setup and a maintenance software tool to implement the following actions:
       1. Scan local network to discover compatible cameras
       2. Remotely change and configure camera settings, including network settings
       3. Remotely import or export network settings
       4. Upgrade camera firmware
       5. Remotely send commands to camera
    2. Diagnostics
       1. The 360 degree camera shall have a self-monitoring function which automatically resets the camera in the event of malfunction.
       2. The 360 degree camera shall have a diagnostics tool to test hardware functionality, accumulate statistics, and diagnose hardware faults.
       3. The 360 degree camera’s SD card shall allow the creation and storage of a boot-up function for diagnostics and fault finding.
  1. **ELECTRICAL**
     1. Power
        1. Source Options
           1. 12 VDC
           2. PoE (IEEE standard 802.3af) – 48 VDC nominal
        2. Power Consumption (maximum):
           1. 12 VDC: 7.32 W
           2. POE: 8.4 W
     2. Connectors:
        1. Ethernet: RJ-45 connector
        2. External power (12 VDC): 2.1 mm input jack
        3. External input/output: 6-pin 1.5 mm Phoenix style connector
        4. Analog video: BNC test port for production, not available for normal operation
  2. **MECHANICAL AND ENVIRONMENTAL**
     1. Housing Material: Electropolished marine grade 316 stainless steel with polymer dome cover
     2. Dimensions:
        1. Surface 7.2” L x 6.3” W x 4.8” H (183 mm x 161 mm x 122 mm)
        2. Pendant 7.7” L x 7.7” W x 5.7” H (195 mm x 195 mm x 146 mm)
     3. Temperature
        1. Operating: -40° C to 55° C (-40° F to 131° F)
     4. Environmental Rating: IP69K
     5. Impact Rating: IK10
  3. **ACCESSORIES**
     1. The Manufacturer shall include accessories to enable the following types of mounting dependent on model type:
        1. Pendant
        2. Wall

END OF SECTION

1. **EXECUTION**
   1. **INSTALLERS**
      1. Contractor personnel shall comply with all applicable state and local licensing requirements.
   2. **PREPARATION**
      1. The network design and configuration shall be verified for compatibility and performance with the camera(s).
      2. Network configuration shall be tested and qualified by the Contractor prior to camera installation.
      3. Before permanent installation of the system, the Contractor shall test the system in conditions simulating the final installed environment
         1. A report indicating successful test results shall be produced.
   3. **INSTALLATION**
      1. Contractor personnel shall follow all Manufacturer published installation instructions and guidelines.
      2. The 360 degree camera shall not be deployed in air handling spaces.
      3. Contractor shall insure that the installed cameras contain the latest revision of Manufacturer’s firmware.
   4. **STORAGE**
      1. The 360 degree camera hardware shall be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.
   5. **ATTACHMENTS**
      1. Video Stream Properties

END OF SECTION

**Attachment A**

**Video Stream Properties**

