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**8M to 20M MULTI-DIRECTIONAL CAMERA with 4ea LENSES (2MP / 5MP)**

**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>.**

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

**Important: See further notes on the following page.Important Note to Security Systems Specifiers**

CSI MasterFormat 2016 incorporates numerous significant changes affecting electronic safety and security. 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 2x xx Surveillance Cameras

28 2x xx 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.xx Video Surveillance Communications Conductors and Cables

27 20 00 Data Communications

28 05 xx.xx PoE Power Sources for Electronic Safety and Security

28 05 xx Storage Appliances for Electronic Safety and Security

28 05 xx.xx Network Video Recorders

28 05 xx Cyber Requirements for Electronic Safety and Security

28 05 xx Safety and Security Network Communications Equipment

28 2x 00 Video Management System

**8M to 20M MULTI-DIRECTIONAL CAMERA with 4ea lenses(2MP / 5MP)**

1. **GENERAL**
   1. **SUMMARY**
      1. Section includes an multi-directional camera with 4ea lenses(2MP / 5MP).
      2. Product - IP video camera with 4ea lenses of multi-streaming (H.265, H.264 and MJPEG) capability and ability to produce videos in various view

## 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. AGC Auto Gain Control
        2. AES Advanced Encryption Standard
        3. API Application Programming Interface
        4. ARP Address Resolution Protocol
        5. AWB Auto White Balance
        6. BLC Back light compensation
        7. CBR Constant Bit Rate
        8. CVBS Composite Video Blanking Sync
        9. DHCP Dynamic Host Configuration Protocol
        10. DNR Digital Noise Reduction
        11. DNS Domain Name Server
        12. DDNS Dynamic Domain Name Server
        13. DSCP Differentiated Services Code Point
        14. fps frames per second
        15. FTP File Transfer Protocol
        16. GOV Group of Video
        17. GUI Graphical User Interface
        18. HD High Definition
        19. HTTP Hypertext Transfer Protocol
        20. ICMP Internet Control Message Protocol
        21. IGMP Internet Group Management Protocol
        22. IP Internet Protocol
        23. IR Infrared
        24. JPEG Joint Photographic Experts Group
        25. LAN Local Area Network
        26. LED Light Emitting Diode
        27. LDC Lens Distortion Correction
        28. LPR License Plate Recognition
        29. MJPEG Motion JPEG
        30. MP Megapixel
        31. MPEG Moving Pictures Experts Group
        32. NAS Network Attached Storage
        33. NTP Network Time Protocol
        34. PIM-SM Protocol Independent Multicast-Sparse Mode
        35. PoE Power over Ethernet
        36. PPPoE Point to Point Protocol over Ethernet
        37. QoS Quality of Service
        38. RTP Real-Time Transport Protocol
        39. RTCP Real-Time Control Protocol
        40. RTSP Real-Time Streaming Protocol
        41. SDK Software Development Kit
        42. SMTP Simple Mail Transfer Protocol
        43. SNMP Simple Network Management Protocol
        44. SSDR Super Smart Dynamic Range
        45. SSNR Super Smart Noise Reduction
        46. SSL Secure Sockets Layer
        47. TCP Transmission Control Protocol
        48. UDP User Datagram Protocol
        49. UPnP Universal Plug and Play
        50. VBR Variable Bit Rate
        51. VMS Video Management System
        52. WDR Wide Dynamic Range
     2. Reference Standards
        1. Network - IEEE
           1. 802.3 Ethernet Standards
           2. 802.1x Port-based Network Access Control
        2. Video
           1. ISO / IEC 23008-2:2013, MPEG-H Part2 (ITU H.265, HEVC)
           2. ISO / IEC 14496–10, MPEG-4 Part 10 ( ITU H.264)
           3. ISO / IEC 10918 – JPEG
           4. ONVIF – Profile S
        3. Emissions
           1. FCC-47 CFR Part 15 Subpart B Class B
           2. CE EN 55022:2010
        4. Immunity - CE
           1. EN 50130-4:2011
           2. EN 61000-3-3:2014
           3. EN 61000-4-2:2009
           4. EN 61000-4-3:2006+A2:2010
           5. EN 61000-4-4:2012
           6. EN 61000-4-5:2014
           7. EN 61000-4-6:2009
        5. Safety
           1. UL listed
           2. CE EN 50581:2012 (hazardous substances)
        6. Ingress Protection and Vandal Resistance
           1. ANSI / IEC60529 – Degrees of protection Provided by Enclosures : IP67
           2. IEC EN 62262 - Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts : IK10
           3. IEC 60068-2-75 : IK10
     3. Definitions
        1. GOV (Group of Video object planes) - A set of video frames for H.264 and H.265 compression, indicating a collection of frames from the initial I-Frame (key frame) to the next I-Frame. GOV consists of 2 kinds of frames: I-Frame and P-Frame.
        2. WiseStream – Smart Codec that controls quantization parameter in H.265 and H.264 to efficiently manage bitrate of the video stream and reduce the storage required.
        3. Dynamic GOV – Dynamic assignment of GOV length based on the complexity of the scene to efficiently manage bitrate of the video stream and reduce the storage required.
        4. Multi-exposure wide dynamic range - Operation which automatically adjusts shutter speed to provide a wide range between dark and light areas visible at the same time, preventing backlighting issues. Long exposure is used for bright areas and a short exposure is used in dark areas.
        5. Dynamic fps – Dynamic assignment of fps (frames per seconds) based on the movement of object(s) in the scene to efficiently manage bitrate of the video stream and reduce the storage required.
  2. **SUBMITTALS**
     1. Product Data
        1. Manufacturer’s printed or electronic data sheets
        2. Manufacturer’s installation and operation manuals
        3. Warranty documentation
  3. **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.
  4. **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 environment indicated in 2.04 Detailed Specification, protected from mechanical and environmental conditions as designated by the manufacturer.
  5. **WARRANTY, LICENSING AND SUPPORT**
     1. Manufacturer shall provide a limited 3 year warranty for the product to be free of defects in material and workmanship.
     2. Manufacturer shall provide embedded camera video analytics free of license charges.

END OF SECTION

1. **PRODUCTS**
   1. **EQUIPMENT**
      1. Manufacturer: Hanwha Techwin

http://www.hanwha-security.com/

* + 1. Model PNM-9000VQ
    2. Alternates: None
  1. **GENERAL DESCRIPTION**
     1. The camera shall provide multi directional view and produce video in various view mode.
     2. The lenses(2M/5M) shall be selectable depending on customer’s requirement at site.
     3. Hallway view is available on CH1/2/3/4
     4. Each Channels support SD Card
     5. It provides one single power supply for all of multi-channels
     6. Video Compression and Transmission – The multi-directional camera shall have the following properties relating to the video signals it produces.
        1. H.265, H.264 and MJPEG compression, each derived from a dedicated encoder and capable of being streamed independently and simultaneously
           1. H.265 and H.264 – Maximum of 60 fps at all resolutions
           2. MJPEG – Maximum of 30 fps
        2. The multi-directional camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, bit rate, and other video settings.
        3. The multi-directional camera shall have four lenses, and one PTZ and each lens shall provide the following resolutions.
           1. [2MP] : 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
           2. [5MP] : 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, 720 x 576, 720 x 480, 640 x 480, 320 x 240

* + - 1. Simultaneous unicast access by up to 20 users
      2. Multicast or unicast capable
      3. Dynamic DNS (DDNS) support.
      4. The multi-directional camera shall provide smart codec (WiseStream, Dynamic GOV, and Dynamic fps) to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
    1. Camera – The multi-directional camera device shall have the following physical and performance properties:
       1. IK10 rated for protection against impacts.
       2. IP66 for protection against dust and water.
       3. 2D and 3D digital noise reduction
       4. 32 privacy masking regions utilizing polygons
       5. The multi-directional camera shall be able to capture high contrast scenes with 150 dB for 2MP and 120dB for 5MP multi-exposure wide dynamic range.
       6. Supporting digital image stabilization the camera shall be able to measure movements in three axes and accurately enhance images from distortions caused by instability.
    2. Intelligence and Analytics – The multi-directional camera shall have a suite of integral intelligent operations and analytic functions to include:
       1. Motion detection with eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water. The camera shall also be able to send meta-data to NVR or VMS to allow users to search for motion events and generate video summary.
       2. Detection of logical events of specified conditions from the camera’s video input
          1. Tampering
          2. Loitering
          3. Directional detection
          4. Defocus detection
          5. Fog detection
          6. Virtual line
          7. Enter/Exit
          8. Appear/Disappear
          9. Face detection
          10. Motion detection
    3. Interoperability – The multi-directional camera shall be ONVIF Profile S compliant.
    4. The multi-directional camera shall possess the following further characteristics:
       1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome & Safari
       2. Micro SD/SDHC/SDXC memory card options, with configurable pre-alarm and post-alarm recording intervals
       3. Alarms and notifications
          1. Alarm notification triggers:

Motion detection

Video analytics

Network disconnect

* + - * 1. Available notification means upon trigger:

File upload via FTP and e-mail

Notification via e-mail

Record to local storage (SD/SDHC/SDXC card)

NAS recording at event triggers

* + - 1. Pixel Counter available in the plug-in web viewer.
  1. **CAMERA SOFTWARE**
     1. The multi-directional camera shall have a built in web server which supports browser-based configuration using Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari, for which web viewer plug-ins are available, from a PC or Mac.
     2. The web viewer shall provide a monitoring screen which displays live camera video and simultaneously provides same-screen access to the following functions:
        1. Live view window size
        2. Resolution setting
        3. Image (snapshot) capture
        4. Manual recording to SD
        5. Audio/microphone control
        6. Access Playback and Setup menus
     3. The web viewer shall provide a playback screen which provides access to the following functions:
        1. Search date and time range
        2. Search event type
        3. Play an event video
        4. Set resolution
        5. Play audio if present
        6. Generate a backup copy of saved video data
     4. The web viewer shall provide a setup screen which provides access to the following configuration settings and functions in the camera:
        1. Digital video profile to include compression type, maximum or target bit rate, frame rate, multicast parameters and crop encoding area
        2. User profile to include password, access level and authentication
        3. Date and time
        4. Network settings and IP version
           1. DDNS
           2. SSL, including certificate management
           3. 802.1x authentication
           4. Quality of Service settings
           5. SNMP to include version selection and settings
           6. Auto configuration
        5. Video setup to include flip and mirror mode, video type and privacy zone
        6. Audio setup to include source, audio codec type, gain and bit rate
        7. Camera settings to include image preset, sensor frame capture, dynamic range, white balance, back light, exposure, day/night operation, on-screen display, IR illumination, sharpness, contrast, and color level.
        8. Event detection setup to include notification parameters, recording rules, time schedule, tamper protection, motion detection and event triggers
        9. System function to include reboot, upgrade, check system and event logs and application (SDK) management
        10. View profile information
     5. Client requirements
        1. Acceptable Operating Systems: Windows 7 / 8 / 10, MAC OS X 10.10~10.12
        2. Acceptable browsers
           1. Non-plugin Webviewer : Google Chrome 54, MS Edge 38, Mozilla Firefox 49

(Windows 64bit only), Apple Safari 9 (Mac OS X only)

* 1. **DETAILED SPECIFICATIONS**
     1. Video
        + 1. Lens Model

SLA-2M2400Q(2.4mm Zoom Ratio)

SLA-2M2800Q(2.8mm Zoom Ratio)

SLA-2M3600Q(3.6mm Zoom Ratio)

SLA-2M6000Q(6.0mm Zoom Ratio)

SLA-5M3700Q(3.7mm Zoom Ratio)

SLA-5M4600Q(4.6mm Zoom Ratio)

SLA-5M7000Q(7.0mm Zoom Ratio)

* + - 1. Operational
         1. The following features with control settings shall be available:

Camera Title Off / On (Up to 85 characters per line)

- 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 setting: Auto (Electrical) / Color / B/W /Schedule

Backlight compensation (BLC): Off / BLC / WDR / HLC

Contrast Enhancement Off / On (SSDR)

Digital Noise Reduction Off / On (SSNR5 : 2D+3D noise filter)

Digital Image Stabilization On/Off

Defog Off / Auto / Manual

Motion Detection Off / On (8ea polygonal zones)

Privacy Masking Off / On (32ea polygonal zones)

Color: Gray / Green / Red / Blue / Black / White

Mosaic

Gain Control Off / Low / Middle / High

White Balance ATW / AWC / Manual / Indoor / Outdoor

(included Mercury and Sodium)

Electronic shutter speed:

Settings: Minimum / Maximum / Anti flicker

(2 ~ 1/12,000 sec)

Digital Zoom 24x

Image flip: Off / On

Image mirror: Off / On

Hallway view : 90˚/270˚

Intelligent video analytics Tampering, Loitering, Directional Detection,

Defocus Detection, Fog Detection, Virtual Line, Enter/Exit, (Dis) Appear, Motion Detection, Face Detection

Alarm Triggers Motion detection, Video analytics,

Network disconnect

Alarm Events File upload via FTP and E-mail, Notification via

E-mail, Local storage (SD/SDHC/SDXC) recording at event triggers, External output

Pixel Counter Support

* + - 1. Video Streams
         1. The multi-directional camera shall be able to produce 10 independent video profiles, each of which may have the following properties:

Encoding type:

H.265

H.264

MJPEG

Resolution:

[2MP] : 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240

[5MP] : 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, 720 x 576, 720 x 480, 640 x 480, 320 x 240

Maximum frame rate:

H.265 and H.264: 2M Max. 60fps, 5M 30fps at all resolutions

MJPEG: Max. 30fps

Smart Codec Manual mode (Area-based : 5ea),

Bit rate control method:

H.265 and H.264

Target bitrate level control

Constant bit rate (CBR) or variable bit rate (VBR)

MJPEG

Quality level control

Variable bit rate (VBR)

* + - 1. Number of multi-streaming profiles: 10 maximum
      2. Simultaneous users (total): 20 maximum (Unicast)
      3. Storage and Recording
         1. The multi-directional camera shall have onboard SD card storage for each sensor.

Card type: Micro SD/SDHC/SDXC

SD/SDHC/SDXC 4slot (Each CH) - Motion Images recorded in the SD/SDHC/SDXC memory card can be downloaded.

Local PC for Instant Recording

* + - 1. Interoperability - Video streams shall be capable of supporting ONVIF profile S.
      2. Single Images - The multi-directional camera shall support screenshot and export in jpg format.
    1. Network
       1. Connectivity: 10/100 Base-T Ethernet via RJ-45 connector
       2. Protocols supported:
          1. Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP)
          2. Configuration: Dynamic Host Configuration Protocol (DHCP)
          3. Web services: Hypertext Transfer Protocol (HTTP), Secure HTTP (HTTPS)
          4. Network services: Address Resolution Protocol (ARP), Bonjour, Domain Name System (DNS), Internet Control Message Protocol (ICMP), Network Time Protocol (NTP), Protocol Independent Multicast-Sparse Mode (PIM-SM), Simple Network Management Protocol (SNMP v1/2c/3 – MIB-2), Universal Plug and Play (UPnP)
          5. Media: Real-Time Transport Protocol (RTP), Real-Time Control Protocol, Real-Time Streaming Protocol (RTSP)
          6. Multicast: Internet Group Management Protocol (IGMP)
          7. Notifications: File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP)
          8. Remote Access: Point-to-Point Protocol over Ethernet) (PPPoE)
       3. DDNS – The multi-directional camera shall support DDNS services offered by the Manufacturer and other publicly available service offerings.
       4. Quality of Service (QoS) – Layer 3 DSCP
       5. Security features:
          1. User password protection
          2. The device shall not provide a manufacture default password. Default password change shall be required to access the camera.
          3. A minimal level of password complexity shall be required by the camera.
          4. The camera shall not have a manufacture back-door password.
          5. The manufacturer shall provide a tool that provides the ability to make password changes to multiple cameras at the same time.
          6. IP address filtering - list of allowed or blocked IP addresses
          7. HTTPS(SSL) login authentication
          8. HTTPS(SSL) secured communications
          9. Digest login authentication
          10. User access log
          11. 802.1x authentication
       6. Discovery - Manufacturer shall offer a discovery program to identify all devices of his manufacture on the network and enable device configuration remotely and simultaneously for multiple devices to reduce time required for installation and setup.
    2. Electrical
       1. Power
          1. Input Voltage / Current PoE+(IEEE802.3at)
          2. Power Consumption:

PoE+ 25.5W

* + 1. Mechanical And Environmental
       1. Material:
          1. Housing: Ivory / Metal
       2. Dimensions (W x H): Ø253 x 130mm(9.96” x 5.12”)
       3. Weight 3.0Kg(6.7 lb)
       4. Temperature:
          1. Operating: -40° C to 55° C
          2. Storage: -50° C to 60° C
       5. Humidity: 0 - 90%, non-condensing
       6. Environmental Rating:
          1. Mechanical (Vandal) Protection IK10
          2. Ingress Protection IP66

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. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.
      4. All firmware found in products shall be the latest and most up-to-date provided by the manufacturer, or of a version as specified by the provider of the Video Management Application (VMA).
      5. All equipment requiring users to log on using a password shall be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.
   3. **INSTALLATION**
      1. The contractor shall carefully follow instructions in documentation provided by the manufacturer to insure all steps have been taken to provide a reliable, easy-to-operate system.
      2. Before permanent installation of the system, the contractor shall test the system in conditions simulating the final installed environment.
   4. **STORAGE**
      1. The hardware shall be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.

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END OF SECTION