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**2 MP FULL HD NETWORK IR BULLET 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>.**

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

**2 MP FULL HD NETWORK IR BULLET CAMERA**

1. **GENERAL**
   1. **SUMMARY**
      1. Section includes a full HD IP video camera.
      2. Product - A 2 MP IP video camera, with multi-streaming (H.265, H.264 and MJPEG) capability in a IP67/IK10 rated bullet type body with integral IR illuminator.

## 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 - Automatic Gain Control
        2. ARP – Address Resolution Protocol
        3. AWB - Automatic White Balance
        4. BLC – Back light compression
        5. CBR – Constant Bit Rate
        6. CVBS – Color, Video, Blanking, Sync
        7. DHCP - Dynamic Host Configuration Protocol
        8. DNR – Digital Noise Reduction
        9. DNS - Domain Name Server
        10. DDNS – Dynamic Domain Name Server
        11. DSCP – Differentiated Services Code Point
        12. fps - frames per second
        13. FTP - File Transfer Protocol
        14. GOV – Group of Video
        15. GUI – Graphical User Interface
        16. HD – High Definition
        17. HTTP - HyperText Transfer Protocol
        18. ICMP – Internet Control Message Protocol
        19. IGMP - Internet Group Management Protocol
        20. IP - Internet Protocol
        21. JPEG - Joint Photographic Experts Group
        22. MJPEG - Motion JPEG
        23. MP - MegaPixel
        24. MPEG - Moving Pictures Experts Group
        25. NAS – Network Attached Storage
        26. NTP - Network Time Protocol
        27. PIM-SM - Protocol Independent Multicast-Sparse Mode
        28. PoE - Power over Ethernet
        29. PPPoE – Point to Point Protocol over Ethernet
        30. RTP - Real-time Transport Protocol
        31. RTCP – Real-Time Control Protocol
        32. RTSP - Real-Time Streaming Protocol
        33. SDK – Software Development Kit
        34. SMTP - Simple Mail Transfer Protocol
        35. SNMP – Simple Network Management Protocol
        36. SSL – Secure Sockets Layer
        37. TCP - Transmission Control Protocol
        38. UDP - User Datagram Protocol
        39. UPnP – Universal Plug and Play
        40. VBR – Variable Bit Rate
        41. VMS - Video Management System
        42. WDR – Wide Dynamic Range
        43. LDC – Lens Distortion Correction
     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 – Profiles S and G
        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. 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.
        3. 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 dark areas and a short exposure is used in light areas.
        4. 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.
        5. Smart Codec – Smart Codec that controls quantization parameter and dynamic fps in H.265 and H.264 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 specified 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 at least 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

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* + 1. Model XNO-6020R
    2. Alternates: None
  1. **GENERAL DESCRIPTION**
     1. Video Compression and Transmission – The 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 – frame rates to maximum 60 fps at all resolution
           2. MJPEG – frame rates to maximum 30 fps at all resolution

**Maximum frame rates are available at selected resolutions:**

**H.265 and H.264: 60 fps is available at all resolutions.**

**MJPEG: 30 fps is available at all resolution.**

* + - 1. The camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
      2. The camera shall be able to configure various resolution selections
         1. 16:9 aspect ratio : 1920 x 1080, 1280 x 720, 800 x 448, 640 x 360
         2. 4:3 aspect ratio : 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, 320 x 240,
         3. 5:4 aspect ratio : 1280 x 1024, 720 x 576,
         4. 3:2 aspect ratio : 720 x 480,
      3. The camera shall be able to stream at least 10 independent video stream type using unicast protocol
      4. The camera shall support multicast and unicast video streaming
      5. The camera shall be able to configure Dynamic DNS (DDNS).
      6. Smart Codec, Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
    1. Camera – The camera device shall have the following physical and performance properties:
       1. Dustproof, waterproof, and IP67 rated.
       2. IK10 rated for protection against impacts.
       3. True day/night operation with removable IR cut filter
          1. Low light level operation to 0.015 lux at F1.4 in color mode and 0 lux in black and white mode with IR LED on
       4. The camera shall support digital noise reduction using both 2D and 3D noise reduction technology.
       5. Integral IR illumination, providing effective visibility of 30m (98.43ft) at 0 Lux when activated in Black & White mode.
       6. Configurable a privacy masking regions utilizing a 4 point polygon
       7. The camera shall provide video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
    2. Intelligence and Analytics – The camera shall have a suite of integral intelligent operations and analytic functions to include:
       1. Motion detection with eight definable detection areas with 8 point polygonal zones, minimum / maximum object size.
       2. Detection of logical events of specified conditions from the camera’s video input
          1. camera tamper (scene change)
          2. defocus detection
          3. fog detection
          4. motion detection with metadata
          5. face detection
          6. virtual area based event (intrusion, enter/exit, appear/disappear, loitering)
          7. virtual line based event (directional detection, crossing)
       3. Detection of logical events of specified conditions from the camera’s audio input
          1. sound classification (scream, gunshot, explosion, crashing glass)
    3. Interoperability – The camera shall be ONVIF Profile S and G compliant.
    4. The camera shall possess the following further characteristics:
       1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome & Safari
       2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
       3. NAS recording option with configurable pre-alarm and post-alarm recording intervals
       4. bi-directional audio
       5. Alarms and notifications
          1. alarm notification triggers:

motion detection

tampering detection

alarm input

defocus detection

fog detection

face detection

audio detection

video & audio analytics

network disconnection

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

file upload via FTP and e-mail

notification via e-mail

record to local storage (SD card) or NAS storage

external output

move to DPTZ preset

* + - 1. Pixel Counter available in the web viewer.
      2. PoE capable including heater by PoE
  1. **CAMERA SOFTWARE**
     1. The camera shall have a built in web server which supports browser-based configuration using Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari 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 or NAS
        5. Audio/microphone control
        6. Access recorded data playback and camera configuration menus
        7. Digital PTZ
     3. The web viewer shall provide a playback screen which provides access to the following functions:
        1. Recorded data search using date and time range
        2. Recorded data search using event type
        3. Play a recorded video by event triggering
        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, crop encoding area
        2. User profile to include password, access level, 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, hallway view mode, video type, 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, color level, lens distortion correction.
        8. Event detection setup to include notification parameters, recording rules, time schedule, tamper protection, motion detection, event triggers
        9. System function to include reboot, upgrade, check system and event logs, application (SDK) management
        10. View profile information
     5. Client requirements
        1. Acceptable Operating Systems: Windows 7 / 8.1 / 10, MAC OS X 10.10, 10.11, 10.12
        2. Acceptable browsers: Microsoft Internet Explorer and Edge, Mozilla Firefox, Google Chrome,

Apple Safari

* 1. **DETAILED SPECIFICATIONS**
     1. Video
        1. Imager
           1. Sensor: 1/2.8" 2.16MP CMOS

pixels per sensor: 1945 (H) x 1109(V) total; 1945 (H) x 1097 (V) effective

scanning : progressive

* + - * 1. Minimum illumination

Color mode: 0.015Lux (F1.4, 30IRE)

Black & white mode:0Lux (IR LED on)

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

Camera Title Off / On (Displayed 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: True Day & Night

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

WDR 150dB

Digital Noise Reduction (DNR): Off / On (Samsung Super Noise Reduction V)

Motion Detection Off / On (8ea, 8point polygonal zones)

Privacy Masking Off / On (32ea 4point polygonal zones)

Gain Control Off / Low / Middle / High

White Balance ATW / AWC / Manual / Indoor / Outdoor

LDC Off / On (5 levels with min / max)

Electronic shutter speed:

settings: min, max, anti-flicker (2 ~ 1/12,000sec)

Image flip: Off / On

Image mirror: Off / On

Hallway view: 0°/90°/270°

Alarm I/O Input 1 / Output 1

Alarm Triggers Motion detection, Tampering detection,

Alarm input, Fog detection, Defocus Detection,

Face detection, Audio detection,

Sound classification, Network disconnection,

Intelligent video analytics, SD card error,

NAS error

Alarm Events File upload via FTP and E-mail,

Local storage recording at event,

Notification via E-mail, External output,

DPTZ preset

Pixel Counter Available in the plug-in viewer.

* + - * 1. Lens: 4 mm fixed lens

Max. Aperture Ratio F1.4

Angle of view: H: 88.6° / V: 47.5° / D: 104.8°

Focus Control Manual

Lens Type Fixed lens

Mount Type Board-in Type

* + - 1. IR Viewable Length: 30 m (98.43ft)
      2. Video Streams
         1. The camera shall be able to produce 10 video profiles, each of which may have the following properties:

Encoding type:

H.265

H.264

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

Maximum frame rate:

H.265 and H.264: Maximum 60 fps at all resolutions

MJPEG: Maximum 30 fps at all resolution

Smart Codec WiseStreamⅡ, Dynamic GOV, Dynamic fps

Bit rate control method:

H.265 and H.264

target bitrate level control

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

MJPEG

target bitrate 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 camera shall have onboard SD card storage (2 slots)

Card type: Micro SD/SDHC/SDXC

Capacity: Up to 512 GB

Image content on the card shall have the ability to be downloaded to a selected destination.

* + - * 1. NAS
      1. Interoperability - Video streams shall be capable of supporting ONVIF protocol, profiles S and G.
      2. Single Images - The camera shall support png file image screenshot and export.
    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 (RTCP), 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 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. IP address filtering - list of allowed or blocked IP addresses
          3. HTTPS(SSL) login authentication
          4. HTTPS(SSL) secured communications
          5. Digest login authentication
          6. User access log
          7. 802.1x authentication
       6. Discovery - Manufacturer shall offer a discovery program to identify all devices of his manufacture on the network.
    2. Audio
       1. Direction: bi-directional (2-way)
       2. I/O Mic-in / Line-in selectable, Line-out
       3. Compression:
          1. G.711 u-law/G.726/AAC-LC selectable

G.726 (ADPCM) 8KHz, G.711 8KHz

G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps

AAC-LC: 48Kbpx at 8/16/32/48KHz

* + 1. Electrical
       1. Power
          1. Input Voltage / Current PoE (IEEE802.3af, Class3), 12V DC
          2. Power Consumption: <9.7 W (PoE), <8.8W (12V DC)
    2. Mechanical And Environmental
       1. Material:
          1. Housing: Metal (Aluminum), vandal resistant
       2. Dimensions (W x H): 70.0 x 296.0mm (2.76 x 11.65 in.) without sunshield
       3. Weight 1.22Kg (2.96 lb.)
       4. Temperature:
          1. Operating: -30° C to 55° C (-22° F to 131° F)
          2. Storage: -50° C to 60° C (-58° F to 140° F)
       5. Humidity: 0 ~ 90%, non-condensing
       6. Environmental Rating:
          1. Ingress Protection IP67, NEMA 4x
          2. Mechanical (Vandal) Protection IK10

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 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) or Network Video Recorder (NVR).
      4. 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. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.
      3. 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.

END OF SECTION