

Hanwha Techwin is a global leading supplier of solutions for IP and analog video surveillance. Building on the company's history of innovation, Hanwha Techwin is dedicated to providing systems solutions with the highest levels of performance, reliability and cost-effectiveness. Hanwha Techwin is committed to the continued development of innovative systems products for professional security applications.

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**8K NETWORK BOX 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

**8K NETWORK BOX CAMERA**

1. **GENERAL**
   1. **SUMMARY**
      1. Section includes a 8K IP box camera
      2. Product - A 8K resolution box type IP camera with multi-streaming (H.265, H.264 and MJPEG) capability

## 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. HTTPS Secure HTTP
        21. ICMP Internet Control Message Protocol
        22. IGMP Internet Group Management Protocol
        23. IP Internet Protocol
        24. IR Infrared
        25. JPEG Joint Photographic Experts Group
        26. LAN Local Area Network
        27. LED Light Emitting Diode
        28. LDC Lens Distortion Correction
        29. LPR License Plate Recognition
        30. MJPEG Motion JPEG
        31. MP Megapixel
        32. MPEG Moving Pictures Experts Group
        33. NAS Network Attached Storage
        34. NTP Network Time Protocol
        35. NVR Network Video Recorder
        36. PIM-SM Protocol Independent Multicast-Sparse Mode
        37. PoE Power over Ethernet
        38. PPPoE Point to Point Protocol over Ethernet
        39. QoS Quality of Service
        40. RTP Real-Time Transport Protocol
        41. RTCP Real-Time Control Protocol
        42. RTSP Real-Time Streaming Protocol
        43. SDK Software Development Kit
        44. SMTP Simple Mail Transfer Protocol
        45. SNMP Simple Network Management Protocol
        46. SSDR Super Smart Dynamic Range
        47. SSNR Super Smart Noise Reduction
        48. SSL Secure Sockets Layer
        49. TCP Transmission Control Protocol
        50. UDP User Datagram Protocol
        51. UPnP Universal Plug and Play
        52. VBR Variable Bit Rate
        53. VMS Video Management System
        54. WDR Wide Dynamic Range
     2. Reference Standards
        1. Network - IEEE
           1. 802.3 Ethernet Standards
           2. 802.1x Port-based Network Access Control
           3. IPv4 IP addressing version 4
           4. IPv6 IP addressing version 6
           5. QoS Quality of Service
        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 / G
        3. Emission
           1. FCC Part 15 Subpart B Class A
           2. CE EN 55032:2015[Class A]
           3. CE EN 61000-3-2:2014
           4. CE EN 61000-3-3:2013
        4. Immunity - CE
           1. EN 50130-4:2011+A1:2014
           2. EN 61000-4-2:2009
           3. EN 61000-4-3:2006/A2:2010
           4. EN 61000-4-4:2012
           5. EN 61000-4-5:2014
           6. EN 61000-4-6:2014
           7. EN 61000-4-11:2004
        5. Safety
           1. UL listed
           2. CE EN 50581:2012 (hazardous substances)
     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 two kinds of frames in video surveillance setup: 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 bright 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 – Codec that controls quantization parameter, fps, and GOV length in H.265 and H.264 to efficiently manage bitrate of the video stream and reduce the storage required. Smart Codec may be referred to as WiseStream in this document.
        6. DORI (Detect, Observe, Recognize, Identify) – A standard system (EN-62676-4) for defining the ability of a camera to distinguish persons or objects within a covered area.
           1. Detect : 25PPM / 8PPF
           2. Observe : 63PPM / 19PPF
           3. Recognize : 125PPM / 38PPF
           4. Identify : 250PPM / 76PPF
  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 section 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 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 TNB-9000
    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 – Max.15fps@8K, 20fps@24MP, 30fps@15MP, 60fps@4K
        2. 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.
        3. The camera shall be able to configure various resolution selections.
           1. 7680x4320, 7360x4128, 6016x3384, 6016x4008, 5472x3648, 4768x3184,

4608x2592, 3840x2160, 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768,

800x600, 800x448, 720x576, 720x480, 640x480, 640x360

* + - 1. The camera shall support multicast and unicast video streaming up to 10 users.
      2. The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
      3. The camera shall provide smart codec (WiseStream Ⅱ, 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 camera device shall have the following physical and performance properties:
       1. Automatic, manual, scheduled day and night operation with infrared cut filter. Images are available in color or black and white.
          1. Low light level operation to 0.015Lux (F1.4) in color mode and 0.0015Lux (F1.4) in black and white mode.
       2. The camera shall support digital noise reduction using both 2D and 3D noise reduction technology.
       3. Configurable 6 privacy masking regions utilizing rectangle
    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 eight point polygonal zones, and minimum/maximum object size.
       2. Motion detection hand-over to PTZ cameras. The camera shall be able to call a preset of PTZ camera when motion event is triggered.
       3. Detection of logical events of specified conditions from the camera’s video
          1. Tampering
          2. Loitering
          3. Directional detection
          4. Defocus detection
          5. (Dis)Appear,
          6. Audio detection
          7. Motion detection
          8. Classified object type : person/face/vehicle/license plate with attributes, Best shot per object
          9. Analytics events based on AI engine : object detection, directional detection, Enter/Exit, loitering, virtual line
       4. Detection and classification of the following sound.
          1. Scream
          2. Gunshot
          3. Explosion
          4. Crashing glass
    3. Interoperability – The camera shall be ONVIF Profile S,G and T compliant.
    4. The camera shall possess the following further characteristics:
       1. Built-in web server, accessed via standard HTML5 browsers including Internet Explorer, Firefox, Chrome & Safari
       2. The camera shall provide streaming to multiple smart phones with DDNS provided freely from the manufacturer. In addition, the application shall be available for both iOS and Android, free of charge with search keyword, ‘Wisenet Mobile’.
       3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
       4. NAS recording option with configurable pre-alarm and post-alarm recording intervals
       5. Alarms and notifications
          1. alarm notification triggers:

Alarm input

Analytics

Network disconnect

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

File Upload via FTP and E-mail

Notification via E-mail

Local storage (SD / SDHC / SDXC) or NAS recording at event triggers

Alarm output

Handover

* + - 1. Pixel Counter available in the web viewer.
      2. HPoE capable
      3. This device has been verified using STP cable. The use of appropriate GND grounding and STP cable is recommended to effectively protect your product and property from transient voltage, thunderstroke, communication interruption.
  1. **CAMERA SOFTWARE**
     1. The camera shall have a built in web server which supports HTML5 browser-based configuration using Internet Explorer, MS Edge, 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. Access recorded data playback and camera configuration menus
     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. 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, 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. Camera settings to include image preset, sensor frame capture, dynamic range, white balance, back light, exposure, day/night operation, on-screen display, sharpness, contrast, color level and lens distortion correction.
        7. Event detection setup to include notification parameters, recording rules, time schedule, tamper protection, motion detection and event triggers
        8. System function to include reboot, upgrade, check system and event logs and application (SDK) management
        9. View profile information
     5. Client requirements
        1. Recommend Browser : Chrome
        2. Acceptable Browser : Chrome, Safari, Firefox, MS Edge(chromium based)
        3. Acceptable Operating Systems: Windows, MAC, Android, iOS, Chrome
        4. Verified Environment:
           1. Windows 10 : Google chrome version 80 above, Firefox version 72 above,   
               MS Edge version 83 above
           2. Mac 10.13/14 : Safari version 11.0.1 above
* Decoding performance in web viewer depends on CPU/GPU performance of user
  1. **DETAILED SPECIFICATIONS**
     1. Video
        1. Imager
           1. Sensor 43.3mm Full-frame CMOS

Effective Pixels 7680(H) x 4320(V)

* + - * 1. Minimum Illumination

Color Mode 0.015Lux (1/30sec, F1.4)

Black & White Mode0.0015Lux (1/30sec, F1.4)

* + - * 1. Video Out (Installation) HDMI: 1080p@30fps
        2. The following features with control settings shall be available

Camera Title Off / On (Displayed up to 75 characters)

Day/Night Setting Auto (ICR)

Backlight Compensation (BLC) BLC / DWDR

Digital Noise Reduction (DNR) SSNR5

Motion Detection Off / On (8ea, 8 points polygonal zones in 8k

resolution only)

Privacy Masking Off / On (6ea zones of rectangle)

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

Gain Control Low / Middle / High

White Balance ATW / AWC / Manual / Indoor / Outdoor

Electronic Shutter Speed

Settings Min / Max / Anti-flicker (1/5 ~ 1/12,000sec)

Analytics

Classified object type Person/Face/Vehicle/License plate with

attributes, BestShot per object

Analytics events based on AI object detection, Directional detection, Enter/Exit,

Loitering, Virtual line

Analytics events Defocus detection, Motion detection,

Appear/Disappear, Tampering, Audio detection, Sound classification(\*AI function will be upgraded later)

Serial Interface RS-485(Samsung-T, Pelco-D/P)

Alarm I/O Input 1ea / Output 1ea

Alarm Triggers Alarm Input

Video & Audio Analytics,

Network Disconnection

Alarm Events File Upload via FTP and E-mail,

Notification via E-mail,

Local storage (SD / SDHC / SDXC) or

NAS recording at event triggers,

Alarm output

Handover

Audio In Mic in/Line in

(2.5VDC(4mA), Input impedance: 2K Ohm)

Audio Out Line out(Max. output level 1Vrms)

* + - * 1. Lens

Field of View Canon 24mm f1.4L, Auto-Iris (EF 24mm f/1.4L II USM) :

Horizontal field of view : 8K 62.1°

* DORI Distance

Detect 255.3m (837.7ft)

Observe 102.1m (335.1ft)

Recognize 51.1m (167.5ft)

Identify 25.5m (83.8ft)

Canon 35mm f1.4L, Auto-Iris (EF 35mm f/1.4L II USM) : Horizontal field of view:8K 44.5°

* DORI Distance

Detect 372.3m (1221.6ft)

Observe 148.9m (488.6ft)

Recognize 74.5m (244.3ft)

Identify 37.2m (122.2ft)

Canon 50mm f1.4, Auto-Iris (EF 50mm f/1.4 USM) :

Horizontal field of view: 8K 31.6°

* DORI Distance

Detect 531.9m (1745.1ft)

Observe 212.8m (698.1ft)

Recognize 106.4m (349.0ft)

Identify 53.2m (174.5ft)

Canon 85mm f1.2L, Auto-Iris (EF 85mm f/1.2L II USM) : Horizontal field of view: 8K 19.2°

* DORI Distance

Detect 904.3m (2966.7ft)

Observe 361.7m (1186.7ft)

Recognize 180.9m (593.3ft)

Identify 90.4m (296.7ft)

Canon 100mm f2.0, Auto-Iris (EF 100mm f/2 USM) :

Horizontal field of view: 8K 16.1°

* DORI Distance

Detect 1063.8m (3490.3ft)

Observe 425.5m (1396.1ft)

Recognize 212.8m (698.1ft)

Identify 106.4m (349.0ft)

Canon 70-200mm f2.8L, Auto-Iris, Vari Focal (EF 70?200mm f/2.8L USM) : Horizontal field of view: 8K 23.2° ~ 8.3°

\* When using Canon 70-200mm f2.8L, Auto-Iris, Vari Focal (EF 70?200mm f/2.8L USM) mount lens, housing accessory components must be used.

* DORI Distance

Detect 744.7m-2127.7m (2443.2ft – 6980.5ft)

Observe 297.9m-851.1m (977.3ft – 2792.2ft)

Recognize 148.9m-425.5m (488.6ft – 1396.1ft)

Identify 74.5m-212.8m (244.3ft – 698.1ft)

Focus Control Auto focus

Lens Type Canon EF mount Lens

Mount Type Canon EF mount

Optional Lens Canon 24mm f1.4L, Auto-Iris (EF 24mm f/1.4L II USM)

Canon 35mm f1.4L, Auto-Iris (EF 35mm f/1.4L II USM)

Canon 50mm f1.4, Auto-Iris (EF 50mm f/1.4 USM)

Canon 85mm f1.2L, Auto-Iris (EF 85mm f/1.2L II USM)

Canon 100mm f2.0, Auto-Iris (EF 100mm f/2 USM)

Canon 70-200mm f2.8L, Auto-Iris, Vari Focal (EF 70?200mm f/2.8L USM)

* + - 1. 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 7680x4320, 7360x4128, 6016x3384, 6016x4008, 5472x3648,

4768x3184, 4608x2592, 3840x2160, 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360

Maximum Framerate

H.265/H.264: 8K @ Max. 15fps (Mode 0) : Available in Dec. 2019

H.265/H.264: 24MP @ Max. 20fps (Mode 1) : Available in Mar. 2020

H.265/H.264: 15MP @ Max. 30fps (Mode 2) : Available in Mar. 2020

H.265/H.264: 4K @ Max. 60fps (Mode 3) : Available in Mar. 2020

Smart Codec WiseStreamⅡ, Dynamic GOV, Dynamic fps

Bitrate Control Method H.265 / H.264: CBR or VBR

MJPEG: VBR

* + - 1. Number of Multi-Streaming Profiles 3 maximum
      2. Simultaneous Users (Total) 10 maximum (Unicast)
      3. Storage and Recording
         1. The camera shall have an onboard SD card storage

Card Type Micro SD/SDHC/SDXC

Capacity 256GB (1slot)

Video or images content on the card shall have the ability to be downloaded to a selected destination

* + - 1. Audio Compression G.711 u-law /G.726 Selectable

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

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

AAC-LC: 48Kbps at 16KHz

* + - 1. Interoperability – Video streams shall be capable of supporting ONVIF Profile S / G / T
      2. Still Image – The camera shall support image screenshot and export
    1. Network
       1. Connectivity – Metal Shielded RJ-45(10/100/1000 BASE-T), SFP slot(100/1000Mbps)
       2. Protocol

IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS,

SSL/TLS, DHCP, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS,

DDNS, QoS, UPnP, Bonjour, LLDP

* + - 1. DDNS – The camera shall support DDNS services offered by the manufacturer and others publicly available service offerings
      2. QoS – Layer 3 DSCP
      3. Security Feature
         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 communication
         9. Digest login authentication
         10. User access log
         11. 802.1x authentication
      4. Discovery – The manufacturer shall offer a discovery program to identify all devices of them on the network.
      5. Configuration – The manufacturer shall offer a configuration program that remotely allows users to change settings on multiple cameras simultaneously.
      6. Firmware upgrade – The manufacturer shall offer a program capable of upgrading multiple cameras at the same time (not requiring access to individual cameras).
      7. Camera backup setting – The manufacturer shall provide a program that provides the ability to save multiple camera settings to a file and restore these camera settings if needed.
      8. Reporting – The manufacturer shall provide a tool that can generate a report including thumbnail view, MAC address, IP address, serial number and other camera settings.
    1. Electrical
       1. Power
          1. Input Voltage / Current HPoE(IEEE802.3bt, Class5), 12VDC
          2. Power Consumption PoE: Max 30W, typical 20W, 12VDC: Max 26W, typical 18W
    2. Mechanical And Environmental
       1. Material Black, Aluminum
       2. Dimensions (W x H x D) 120(W)x118.1(H)x179(D)mm
       3. Weight 2.1Kg(4.55 lb)
       4. Temperature
          1. Operating 0°C ~ +45°C(32°F ~ +122°F) / Less than 90% RH
          2. Storage / Humidity -40°C ~ +65°C(-40°F ~ +149°F) / Less than 90% RH
       5. Certification EMC

EN 50130-4, EN 55032 Class A, EN 61000-6-3, EN 61000-3-2,

EN 61000-3-3, EN 61000-6-1, FCC Part 15 Subpart B Class A, IC ICES-003 Class A, IC ICES-003 Class A,

Safety

UL 60950-1

END OF SECTION

1. **EXECUTION**
   1. **INSTALLERS**

Contractor personnel shall comply with all applicable state and local licensing requirements.

* 1. **PREPARATION**

The network design and configuration shall be verified for compatibility and performance with the camera(s).

Network configuration shall be tested and qualified by the Contractor prior to camera installation.

All firmware found in products shall be the latest and the most up-to-date provided by the manufacturer, or of a version as specified by the provider of the VMS or NVR.

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.

* 1. **INSTALLATION**

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.

All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.

Before permanent installation of the system, the contractor shall test the system in conditions simulating the final installed environment.

* 1. **STORAGE**

The hardware shall be stored in an environment where temperature and humidity are in the range specified by the manufacturer.

END OF SECTION