

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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**4K BOX TYPE AI NETWORK 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

**4K BOX TYPE AI NETWORK CAMERA**

1. **GENERAL**
   1. **SUMMARY**
      1. Section includes a 4K IP video camera
      2. Product - A 4K IP video 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. AI Artificial Intelligence
        4. API Application Programming Interface
        5. ARP Address Resolution Protocol
        6. AWB Auto White Balance
        7. BLC Back light compensation
        8. CBR Constant Bit Rate
        9. CVBS Composite Video Blanking and Sync
        10. DHCP Dynamic Host Configuration Protocol
        11. DNR Digital Noise Reduction
        12. DNS Domain Name Server
        13. DDNS Dynamic Domain Name Server
        14. DSCP Differentiated Services Code Point
        15. FPS Frames Per Second
        16. FTP File Transfer Protocol
        17. GOV Group of Video
        18. GUI Graphical User Interface
        19. HD High Definition
        20. HTTP Hypertext Transfer Protocol
        21. HTTPS Secure HTTP
        22. ICMP Internet Control Message Protocol
        23. IGMP Internet Group Management Protocol
        24. IP Internet Protocol
        25. IR Infrared
        26. JPEG Joint Photographic Experts Group
        27. LAN Local Area Network
        28. LED Light Emitting Diode
        29. LDC Lens Distortion Correction
        30. LLDP Link Layer Discovery Protocol
        31. LPR License Plate Recognition
        32. MJPEG Motion JPEG
        33. MP Megapixel
        34. MPEG Moving Pictures Experts Group
        35. NAS Network Attached Storage
        36. NTP Network Time Protocol
        37. NVR Network Video Recorder
        38. PIM-SM Protocol Independent Multicast-Sparse Mode
        39. PoE Power over Ethernet
        40. PPPoE Point to Point Protocol over Ethernet
        41. QoS Quality of Service
        42. RTP Real-Time Transport Protocol
        43. RTCP Real-Time Control Protocol
        44. RTSP Real-Time Streaming Protocol
        45. SDK Software Development Kit
        46. SFP Small Form factor Pluggable
        47. SMTP Simple Mail Transfer Protocol
        48. SNMP Simple Network Management Protocol
        49. SSDR Super Smart Dynamic Range
        50. SSNR Super Smart Noise Reduction
        51. SSL Secure Sockets Layer
        52. TCP Transmission Control Protocol
        53. UDP User Datagram Protocol
        54. UPnP Universal Plug and Play
        55. VBR Variable Bit Rate
        56. VMS Video Management System
        57. 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 / T
        3. EMC & Safety
           1. FCC 47 CFR Part 15 Subpart B

ANSI C63.4-2017 Class A

* + - * 1. IC Regulation ICES-003: Issue 7

CAN/CSA CISPR 32:17 Class A

* + - * 1. CE EMC-Directive 2014/30/EU

EN 55032:2015/A11:2020 Class A

EN 50130-4:2011

EN 61000-3-2:2014

EN 61000-3-3:2013

* + - * 1. VCCI-CISPR 32:2016 Class A
        2. AS/NZS CISPR32:2015 Class A
      1. RoHS
         1. EN 50581:2012
      2. Safety
         1. UL listed
         2. CE EN 50581:2012 (hazardous substances)
    1. 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 – 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.
       6. WiseStream – Technology 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.
       7. WiseStream III – 3rd generation of WiseStream that intelligently separates the objects from the background, and keeps the compression ratio low for classifying humans and vehicles.
       8. WiseNR II **–** 2nd generation of Noise Reduction that intelligently suppresses the image noise and blurring to get clearer image when there are movements of detected objects such as humans or vehicles.
       9. AI Prefer shutter – Technology that intelligently controls the shutter speed to obtain clearer image and suppresses image blurring when there are movements of detected objects such as humans or vehicles.
       10. LDC – Lens Distortion Correction corrects image distortion at the edge of a wide angle lens. Since Fill mode maintains the screen’s top and bottom angular fields of view, the left and right end of the video could be cropped. Since Stretch mode maintains the screen’s top/bottom/left/right angular fields of view, none of the areas in the original video recording is lost, but the aspect ratio of the video is not maintained.
       11. 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
  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.
  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 environment specified in section 2.04 Detailed Specification, protected from mechanical and environmental conditions as designated by the manufacturer.
  4. **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

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

* + 1. Model XNB-9003
    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 – maximum of 30/25FPS(60Hz/50Hz) at all resolution
           2. MJPEG – maximum of 15fps/12fps(60Hz/50Hz)
        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. 16:9 aspect ratio : 3840x2160, 3328x1872, 3072x1728, 2688x1520, 1920x1080, 1280x720,

800x448, 640x360

* + - * 1. 4:3 aspect ratio : 2592x1944, 1600x1200, 1280x960, 1024x768, 800x600, 640x480,

320x240

* + - * 1. 5:4 aspect ratio : 1280x1024, 720x576
        2. 3:2 aspect ratio : 720x480
      1. The camera shall support unicast video streaming up to 20 users.
      2. The camera shall support multicast video streaming.
      3. The camera shall support multiple video streaming up to 10 profiles.
      4. The camera shall support 3 virtual channel support.
      5. The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
      6. The camera shall provide WiseStream Ⅱ/Ⅲ, Dynamic GOV and Dynamic FPS to efficiently manage bit rate of the video stream and reduce storage.
      7. The camera shall provide WiseNRⅡ that working based on AI engine for reduce noise and blur on image.
    1. Camera – The camera device shall have the following physical and performance properties:
       1. True day/night operation with scheduling and options for external devices.
          1. Low light level operation to 0.03 lux at F1.2 in color mode, 0.003 lux at F1.2 in black and white mode.
       2. The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120dB.
       3. The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range.
       4. The camera shall be able to configure 32 privacy masking areas with quadrangle zones.
       5. The camera shall have the defog feature to remove fogginess of scene which can be triggered automatically from the fog detection event.
       6. 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 intelligent analytic functions.
       1. Analytics events based on AI engine : Object detection

(Person/Face/Vehicle(car/truck/bus/bicycle/motorcycle)/License plate), IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion)

* + - 1. Analytics events : Defocus detection, Motion detection, Tampering, Fog detection, Audio detection, Sound classification, Shock detection, Appear/Disappear
         1. Motion detection with 8 definable detection areas with 8 point polygonal zones, and minimum/maximum object size.
         2. Detection and classification of the following sound.

Scream

Gunshot

Explosion

Crashing glass

* + - 1. Business Intelligence : People counting, Queue management, Heatmap (based on AI engine)
    1. Interoperability – The camera shall be ONVIF Profile S / G and T compliant.
    2. The camera shall possess the following further characteristics:
       1. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
       2. NAS recording option with configurable pre-alarm and post-alarm recording intervals
       3. Alarms and notifications
          1. alarm notification triggers:

Analytics

Network disconnect

Alarm input

App event

Time schedule

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

File upload(image) : e-mail/FTP

Notification : e-mail

Recording : SD/SDHC/SDXC or NAS recording at event triggers

Alarm output

Handover(PTZ preset, Send message by HTTP/HTTPS/TCP)

Audio clip playback

* + - 1. Pixel Counter available in the web viewer.
      2. 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.
     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
     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 playback speed
        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, authentication
        3. Date and time
        4. Network settings and IP version
           1. DDNS
           2. IP filtering
           3. SSL/TLS, including certificate management
           4. 802.1x authentication
           5. Quality of Service settings
           6. SNMP to include version selection and settings
           7. Auto IP configuration
        5. Video setup
           1. Flip / mirror mode
           2. Video output type
           3. Privacy zone
        6. Audio setup to include source, audio codec type, gain and bit rate.
        7. Camera settings to configure 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.
        8. Event detection setup to configure notification parameters, recording rules, time schedule, tamper protection, motion detection and event triggers
        9. System function to control reboot, upgrade, check system and event logs and application (SDK) management
        10. View profile information
  2. **DETAILED SPECIFICATIONS**
     1. Video
        1. Imaging device 1/1.8" CMOS
        2. Scanning Progressive
        3. Minimum Illumination Color: 0.03 Lux (F1.2, 1/30sec),

B/W: 0.003 Lux (F1.2, 1/30sec)

* + - 1. Video out CVBS : 1.0 Vpp/75Ω composite, 720x480(N), 720x576(P)

for installation

USB : Micro USB Type B, 1280x720 for installation

* + 1. Lens
       1. Focus Control Simple focus
       2. Lens Type P-iris(IR corrected)
       3. Mount Type C mount, CS mount
    2. Operational Functions
       1. Camera Title Off / On (Displayed up to 85 characters)
       2. Day/Night Setting Auto (ICR)
       3. Backlight Compensation Off / BLC / HLC / extremeWDR(120dB)
       4. Contrast Enhancement SSDR
       5. Digital Noise Reduction (DNR) WiseNRⅡ(Based on AI engine), SSNRⅤ
       6. Digital Image Stabilization (DIS) Support (built-in gyro sensor)
       7. Defog Support
       8. Motion Detection Off / On (8ea, 8-point polygonal)
       9. Privacy Masking Off / On (32ea, Quadrangle zones)

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

- Mosaic

* + - 1. Gain Control Off / Manual / Max Gain
      2. White Balance ATW / Narrow ATW / AWC / Manual / Indoor / Outdoor
      3. LDC Support (Fill/stretch mode)
      4. Electronic Shutter Speed Min / Max / Anti-flicker (2 ~ 1/12,000sec)

Prefer shutter control(Based on AI engine)

* + - 1. Image Rotation Flip: Off / On

Mirror: Off / On

Hallway view(90°/270°)

* + - 1. Digital PTZ Support
      2. Alarm I/O 2 configurable I/O ports, DC 12V output(Max. 50mA)
      3. Alarm Triggers Analytics, Network disconnect, Alarm input, App event,

Time schedule

* + - 1. Alarm Events File upload(image) : e-mail/FTP

Notification : e-mail

Recording : SD/SDHC/SDXC or NAS recording at event triggers

Alarm output

Handover(PTZ preset, Send message by HTTP/HTTPS/TCP)

Audio clip playback

* + - 1. Pixel Counter Support
      2. Storage Micro SD/SDHC/SDXC 2slot Max. 1TB (512GB \* 2)
      3. Analytics Analytics events based on AI engine : Object detection

(Person/Face/Vehicle(car/truck/bus/bicycle/motorcycle)/

License plate),

IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion)

* + - 1. Business Intelligence Based on AI engine : People counting, Queue management,

Heatmap

* + - 1. Analytics events Defocus detection, Motion detection, Tampering, Fog detection,

Audio detection, Sound classification, Shock detection,

Appear/Disappear

* + - 1. Memory 4GB RAM, 512MB Flash
    1. Video Streams
       1. Video compression H.265, H.264, MJPEG
       2. Resolution 3840x2160, 3328x1872, 3072x1728, 2592x1944, 2688x1520,

1920x1080, 1600x1200, 1280x1024,1280x960, 1280x720,

1024x768, 800x600, 800x448, 720x576, 720x480, 640x480,

640x360, 320x240

* + - 1. Maximum Framerate
         1. H.265 / H.264 Max. 30FPS/25FPS(60Hz/50Hz)
         2. MJPEG Max. 15fps/12fps(60Hz/50Hz)
      2. Smart Codec Manual(5ea area),

WiseStream

WiseStream Ⅲ (Based on AI engine support)

* + - 1. Bitrate Control Method H.265 / H.264: CBR or VBR

MJPEG: VBR

* + - 1. Streaming Capability Unicast(20 users) / Multicast

Multiple streaming(Up to 10 profiles, 3 virtual channel support)

* + - 1. Streaming method Unicast / Multicast
      2. Simultaneous Users 20 maximum (Unicast)
      3. Profile set Max. 10 ea
      4. Interoperability ONVIF Profile S / G / T, SUNAPI(HTTP API),

Wisenet Open Platform

* + 1. Audio
       1. Audio In Selectable(mic in/line in/built-in MIC)

Supply voltage: 2.5V DC(4mA), Input impedance: 2K Ohm

* + - 1. Audio Out Line out, Max. output level 1Vrms
      2. 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. Network
       1. Connectivity Metal shielded RJ-45(10/100/1000BASE-T)
       2. Protocol
          1. IP v4 / v6, TCP, UDP
          2. Configuration: DHCP, LLDP
          3. Web service: HTTP, HTTPS
          4. Network Service: ARP, Bonjour, DNS, ICMP, NTP, PIM-SM, SNMPv1/v2c/v3(MIB-2), UPnP
          5. Media: RTP, RTCP, RTSP
          6. Unicast: SRTP
          7. Multicast: IGMP, PIM-SM
          8. Notifications: FTP, SMTP
       3. DDNS – The camera shall support DDNS services offered by the manufacturer and others publicly available service offerings
       4. QoS – Layer 3 DSCP
       5. 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/TLS) login authentication
          8. HTTPS(SSL/TLS) secured communication
          9. Digest login authentication
          10. User access log
          11. 802.1X Authentication(EAP-TLS, EAP-LEAP, EAP-PEAP MSCHAPv2)
          12. TPM 2.0 (FIPS 140-2 level 2)
          13. Device Certificate(Hanwha Techwin Root CA, pre-installed)
          14. Secure by default certificate
          15. Secure OS/Boot/Storage, Verify firmware forgery
       6. Discovery – The manufacturer shall offer a discovery program to identify all devices of them on the network.
       7. Configuration – The manufacturer shall offer a configuration program that remotely allows users to change settings on multiple cameras simultaneously.
       8. Firmware upgrade – The manufacturer shall offer a program capable of upgrading multiple cameras at the same time (not requiring access to individual cameras).
       9. 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.
       10. 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.
    2. Electrical
       1. Power
          1. Input Voltage PoE(IEEE802.3af, Class3), 12VDC
          2. Power Consumption PoE: Max 12.95W, typical 9.8W

12VDC: Max 19W, typical 9.5W

* + 1. Mechanical And Environmental
       1. Color/Material Black / Aluminum
       2. Dimensions (W x H) 81(W)x67(H)x165(D)mm(3.19x2.64x6.48"),
       3. Weight 880g(1.94 lb)
       4. Temperature
          1. Operating -10 °C ~ 55 °C(-14°F ~ +131°F)
          2. Storage -50°C ~ +60°C(-58°F ~ +140°F)
       5. Humidity
          1. Operating Less than 95% RH (non-condensing)
          2. Storage Less than 90% RH (non-condensing)

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