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.

For additional information, visit http://www.hanwha-security.com/

1. **PRODUCTS**
	1. **EQUIPMENT**
		1. Manufacturer : Hanwha Techwin(http://www.hanwha-security.com/)
		2. Model : TNM-4960TD
		3. Alternates : None
	2. **GENERAL DESCRIPTION**
		1. Thermal VGA camera shall provide thermographic image so user can recognize object with heat even in dark scene. And the camera shall provide 8MP normal image simultaneously with thermographic image.
		2. 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

Thermal : Max. 30fps

Visible : Max. 30fps/25fps(60Hz/50Hz)

* + - * 1. MJPEG

Thermal : Max. 3fps

Visible : Max. 1fps/1fps(60Hz/50Hz)

* + - 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 for Thermal image.
				1. 16:9 aspect ratio : 1280x720, 800x448, 640x360
				2. 4:3 aspect ratio : 1280x960, 1024x768, 800x600, 640x480
				3. 5:4 aspect ratio : 1280x1024, 720x576
				4. 3:2 aspect ratio : 720x480
			3. The camera shall be able to configure various resolution selections for Visible image.
				1. 16:9 aspect ratio : 3840x2160, 3072x1728, 2688x1520, 2560x1440, 1920x1080, 1280x720, 800x448, 640x360
				2. 4:3 aspect ratio : 2592x1944, 2048x1536, 1600x1200, 1280x960, 1024x768, 800x600, 640x480
				3. 5:4 aspect ratio : 1280x1024, 720x576
				4. 3:2 aspect ratio : 720x480
			4. The camera shall support unicast video streaming up to 6 users.
			5. The camera shall support multicast video streaming.
			6. The camera shall support multiple video streaming up to 3 profiles.
			7. The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
			8. The camera shall provide WiseStream Ⅱ/Ⅲ, Dynamic GOV and Dynamic FPS to efficiently manage bit rate of the video stream and reduce storage.
			9. 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. IK10, NEMA4X rated for protection against impacts.
			2. True day/night operation with scheduling and options for external devices.
				1. Low light level operation to 0.06 lux at F1.3 in color mode, 0.004 lux at F1.3 in black and white mode on visible camera.
			3. The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120dB.
			4. The camera shall be able to configure 6 privacy masking areas with rectangle zones on thermal camera.
			5. 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 on visible camera(WiseAI)
				1. Object detection : Person / Face / Vehicle(car/truck/bus/bicycle/motorcycle) / License plate, Bestshot
				2. IVA : Virtual line/Area, Enter/Exit, Loitering, direction, intrusion
				3. Stopped vehicle, Traffic jam
			2. Analytics events on visible camera : Defocus detection, Motion detection, Tampering, Fog detection, Audio detection, Sound classification, Shock detection, Appear/Disappear
				1. Motion detection with 8 definable detection areas with 4 point polygonal zones, and minimum/maximum object size.
				2. Detection and classification of the following sound.

Scream

Gunshot

Explosion

Crashing glass

* + - 1. Analytics events on thermal camera : Directional detection, Motion detection, Enter/Exit, Virtual line, Temperature Change detection
				1. Motion detection with 8 definable detection areas with 4 point polygonal zones, and minimum/maximum object size.
		1. Interoperability – The camera shall be ONVIF Profile S / 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

* + - * 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. IP66/IP67, IK10, NEMA4X, NEMA TS 2(2.2.8, 2.2.9)
			3. **NDAA Compliant**
	1. **DETAILED SPECIFICATIONS**
		1. Video (Thermal)
			1. Imaging device : Uncooled micro bolometer
			2. NETD : <60mK
			3. Pixel Size : 12㎛
		2. Video (Visible)
			1. Imaging device : 1/1.8" CMOS
			2. Minimum Illumination
			3. Color: 0.06Lux(F1.3, 1/30sec)
			4. BW: 0.004Lux(F1.3, 1/30sec)
			5. Video out for installation (Thermal/Visible)
				1. USB : Micro USB Type B, 1280x720
		3. Lens (Thermal)
			1. Focal length : 25mm fixed focal
			2. Max. Aperture Ratio : F1.0
			3. Field of View
				1. H : 17.4°
				2. V : 13.1°
				3. D : 21.6°
			4. Min. Object Distance : 26m(85.30ft)
			5. Focus Control : Fixed
		4. Lens (Visible)
			1. Focal length : 10.9~29mm(2.6x) motorized varifocal
			2. Max. Aperture Ratio : F1.7(Wide)~F1.73(Tele)
			3. Field of View
				1. H:42.0°(Wide)~15.0°(Tele)
				2. V:22.8°(Wide)~8.4°(Tele)
				3. D:48.7°(Wide)~17.1°(Tele)
			4. Min. Object Distance : Wide: Wide: 2.5m(8.20ft) / Tele: 6m(19.68ft)
			5. Focus Control : Simple focus
		5. Operational Functions
			1. Color Palettes (Thermal) : Whitehot, Blackhot, Rainbow, Rainbow2, Sepia, Red, Iron, Custom
			2. Camera Title
				1. Off / On (Displayed up to 85 characters)
				2. English / Numeric / Special characters
				3. Multi-line (Max. 5lines), Color (Grey / Green / Red / Blue / Black / White), Transparency, Auto scale by resolution
			3. Day/Night Setting (Visible) : Auto (ICR) / Color / B/W / External / Schedule
			4. Backlight Compensation (Visible) : Off / BLC / HLC / WDR(120dB)
			5. Contrast Enhancement (Visible) : SSDR
			6. Digital Noise Reduction (DNR) (Visible) : WiseNRⅡ(Based on AI engine), SSNRⅤ
			7. Digital Image Stabilization (DIS) (Visible) : Support (built-in gyro sensor)
			8. Motion Detection : Off / On (8ea, 4-point polygonal, each camera)
			9. Privacy Masking : Off / On (6ea, Ractangle zones, each camera)
				1. Color : Grey / Black / White
			10. Gain Control (Visible) : Off / Low / Middle / High
			11. White Balance (Visible) : ATW / AWC / Manual / Indoor / Outdoor
			12. LDC (Visible) : Support (Fill/stretch mode)
			13. Electronic Shutter Speed (Visible) : Min / Max / Anti-flicker (1/5 ~ 1/12,000sec)
				1. Auto prefer shutter control(Based on AI engine)
			14. Alarm I/O : 4 configurable I/O ports
			15. Alarm Triggers
				1. Analytics
				2. Network disconnect
				3. Alarm input
			16. Alarm Events
				1. File upload(image) : e-mail/FTP
				2. Notification : e-mail
				3. Recording : SD/SDHC/SDXC or NAS recording at event triggers
				4. Alarm output
				5. Handover(PTZ preset, Send message by HTTP/HTTPS/TCP)
				6. Audio clip playback
			17. Pixel Counter : Support
			18. Storage : Micro SD/SDHC/SDXC 2slot Max. 1TB (512GB \* 2)
			19. Analytics events (Visible) : Analytics events based on AI engine (WiseAI)
				1. Object detection : Person/Face/Vehicle(car/truck/bus/bicycle/motorcycle)/License plate, Bestshot
				2. IVA : Virtual line/Area, Enter/Exit, Loitering, direction, intrusion
				3. Stopped vehicle, Traffic jam
			20. Analytics events (Thermal)
				1. Directional detection, Motion detection, Enter/Exit, Virtual line,Temperature Change detection
			21. Memory : 4GB RAM, 512MB Flash
		6. Video Streams
			1. Video compression : H.265, H.264, MJPEG
			2. Resolution
				1. Visible : 3840x2160, 3072x1728, 2592x1944, 2688x1520, 2560x1440, 2048x1536, 1920x1080, 1600x1200, 1280x1024,1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360
				2. Thermal : 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360
			3. Max. Framerate
				1. Visible :

H.265/H.264: Max. 30fps/25fps(60Hz/50Hz)

MJPEG: Max. 1fps/1fps(60Hz/50Hz)

* + - * 1. Thermal :

H.265/H.264: Max. 30fps

MJPEG: Max. 3fps

* + - 1. Smart Codec
				1. Manual(5ea area, Visible only)
				2. WiseStream
				3. WiseStream Ⅲ(Based on AI engine support, Visible only)
			2. Bitrate Control Method
				1. H.265 / H.264: CBR or VBR
				2. MJPEG: VBR
			3. Streaming Capability : Unicast(6 users) / Multicast, Multiple streaming(Up to 3 profiles)
			4. Streaming method : Unicast / Multicast
			5. Simultaneous Users : 6 maximum (Unicast)
			6. Profile set : Max. 10 ea
			7. Interoperability
				1. ONVIF Profile S / T
				2. SUNAPI(HTTP API)
				3. Wisenet Open Platform
		1. Audio
			1. Audio In
				1. Selectable(mic in/line in)
				2. Supply voltage : 2.5V DC(4mA)
				3. Input impedance : 2K Ohm
			2. Audio Out
				1. Line out
				2. Max. output level 1Vrms
			3. Audio Compression
				1. G.711 u-law /G.726 Selectable
				2. G.726(ADPCM) 8KHz, G.711 8KHz
				3. G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps
				4. AAC-LC : 48Kbps at 16KHz
		2. 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(TCP, UDP)
				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.
		3. Electrical
			1. Power
				1. Input Voltage : PoE+(IEEE802.3at, Class4), 12VDC
				2. Power Consumption

PoE+ : Max 23.5W

12VDC : Max 19.5W

* + 1. Mechanical And Environmental
			1. Color/Material
				1. White / Aluminum
			2. RAL Code : RAL9003
			3. Dimensions : 353.4 \* 287.5 \* 191.2mm (13.92 \* 11.32 \* 7.53in)
			4. Weight : 4.533 kg (9.99 lb)
			5. Temperature
				1. Operating : -40°C to +60°C(-58°F to +140°F)

\* Start up should be done at above -30°C

* + - * 1. Storage : -50°C to +60°C(-58°F to +140°F)
			1. Humidity
				1. Operating : Less than 95% RH(non-condensing)
				2. Storage : Less than 95% RH (non-condensing)
			2. Ingression Protection : IP66/67
			3. Vandal Resistance : IK10
			4. NEMA4X, NEMA TS 2(2.2.8, 2.2.9)
		1. DORI (Visible)
			1. Detect (25PPM/ 8PPF) : Wide: 200.1m(656.40ft) / Tele: 583.4m(1913.89ft)
			2. Observe (63PPM/ 19PPF) : Wide: 80.0m(262.56ft) / Tele: 233.3m(765.56ft)
			3. Recognize (125PPM/ 38PPF) : Wide: 40.0m(131.28ft) / Tele: 116.7m(382.78ft)
			4. Identify (250PPM/ 76PPF) : Wide: 20.0m(65.64ft) / Tele: 58.3m(191.39ft)
		2. EMC & Safety
			1. FCC 47 CFR Part 15 Subpart B
				1. ANSI C63.4a-2017 Class A
			2. IC Regulation ICES-003 Issue7
				1. CAN/CSA CISPR 32-17 Class A
			3. CE EMC-Directive 2014/30/EU and 2011/65/EU
				1. EN 55032:2015/A11:2020
				2. EN 50130-4:2011
				3. EN 610003-2:2014
				4. EN 610003-3:2013
			4. VCCI-CISPR 32:2016 Class A
			5. AS/NZS CISPR32:2015 Class A
			6. UL listed
			7. RoHS CE EN 50581:2012 (hazardous substances)
			8. IP66/67
				1. KS C IEC 60529:2013
			9. IK10
				1. KS C IEC 62262: 2005
			10. NEMA4x(250-2014) / NEMA TS2.2.8/2.2.9

END OF SECTION