

MS9390-HV Multi-Sensor Dome Network Camera

8MP • 180° Panoramic View • 20M IR • WDR Pro • SNV • Smart Stream III • IP66 • IK10 • -20°C~50°C

Architectural and Engineering Specification

2.01 Manufacturer

- A. VIVOTEK Inc.
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 - Phone +8868245-5282
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 - Email sales@vivotek.com
- B. Manufacturer shall warrant the camera to be free from defects in material and workmanship for three years from the purchase date.

2.02 General Network Camera Descriptions

- A. VIVOTEK's MS9390-HV is the latest and most efficient panoramic network camera offered in surveillance. Through the use of two wide angle lenses, electronic image stitching*, and high-resolution sensors, the 8MP 180° MS9390-HV is in a new class all by itself. With its unique dual-sensor design, the MS9390-HV is able to maintain a higher vertical FOV than most traditional multi-sensor panoramic cameras using 4 sensors. This higher vertical FOV enables users to have more video coverage, thereby enabling them to capture more evidence below the point of camera installation. The MS9390-HV goes even further with WDR Pro image technology for high contrast environments, 30fps at full resolution, and 180° IR illuminators up to 20 meters, ensuring users with 24/7 comprehensive panoramic video surveillance.
*Electronic image stitching is best at 3~20m distances. Seamless stitching is improbable below 3m.
- B. In addition to its panoramic image qualities, the MS9390-HV is also simple to install. It has been designed to be directly wall mounted, including 20° of internal tilt adjustment on the lenses to get the exact angle desired. With an IP66 weather proof and IK10 vandal proof housing, the MS9390-HV can be installed in both indoors and outdoors and handle most of what mother nature has to offer. The only accessory available for MS9390-HV is a sunshield, which is included with the camera.
- C. To top it all off, the MS9390-HV utilizes H.265 compression and Smart Stream III technology. This combination enables users to greatly save on storage and bandwidth consumption usually associated with high resolution surveillance.

2.03 General Camera Requirements

- A. The camera shall incorporate multiple progressive scan CMOS imagers with 1/2.7-inch optical format, no less than 7,796,736 pixels.
- B. The image resolution shall be no less than 4512(H) x 1728(V) pixels. Users can specify resolutions smaller than default for a specific

- purpose and supports ePTZ for data efficiency.
- C. The camera shall have performance list below:
 - Frame rates:
H.265/H.264/MJPEG:
Up to 30 fps at 4512x1728
 - D. The camera shall provide board lenses, fixed-focal, f=2.8mm, F1.2, fixed-iris.
 - E. The camera shall provide wide angle of view:
 - A. Horizontal: 180°
 - B. Vertical: 68°
 - F. The minimum illumination required to produce an image shall be approximately 0.05 lux @ F1.2 (Color) 30 IRE, and 0.01 lux @ F1.2 (B/W) 30 IRE.
 - G. The camera shall have at least 1GB of RAM and 128MB of flash memory.
 - H. The camera shall provide the possibility to sync the frequency with the power line frequency to eliminate a flickering image.
 - I. The camera shall provide on-screen text and timestamp display on video, the text size and location could be changeable by user.
 - J. To ensure that the text on video works with the specific language of the country, the camera shall be able to allow the user to upload fonts to solve it.
 - K. The camera shall support flip and mirror to allow flexibility in the installation.
 - L. The camera shall have built-in IR LED illuminators to help illuminate the environment. The effective illumination distance is up to 20 meters.
 - M. The camera shall be able to avoid overexposure caused by the IR LED when an object/person moves towards the camera.
 - N. The camera shall have a removable IR-cut filter for Day & Night function.
 - O. At least 3 levels of users shall be provided in case there are different persons that have access to the camera. To increase the security, the administrator shall have the possibility configure his own password, select the permissions for the other user levels and configure the usernames and passwords for each account. Excluding the administrator user level, multiple accounts for the user levels must be available.
 - P. The user shall be able to configure motion detection windows (5 configurable windows). The user shall be able to set up different sensibilities and percentages for each window. It shall also offer 2 sets of 5 motion detection windows: one set for day environments

and one set for night environments.

- Q. The camera shall provide 4 kinds of camera tampering detections:
 - I. Normal tampering detection
 - II. Tampering when the image is too dark
 - III. Tampering when the image is too bright
 - IV. Tampering when the image is too blurry
- R. The camera shall be able to detect the signal level of audio-in (microphone) and trigger events accordingly.
- S. The camera shall support Micro SD/SDHC/SDXC card for on-board storage, so that the camera could be a standalone recorder. When the network connection is lost, the camera will continue to record on the Micro SD/SDHC/SDXC card.
- T. The camera shall support Micro SD/SDHC/SDXC Cards with a size of at least 64GB for recording video over extended period of time.
- U. The camera shall be offer the user to choose Ext4 or FAT32 as the filesystem used to format the MicroSD card.
- V. When recording the video in the MicroSD card, the camera shall offer the option of automatically recycling the old video and automatically erase video after a certain period of time.
- W. To ensure a perfect recording in the recording server, the camera shall be able to detect when the connection with recording server is lost and start to record in the Micro SD card. When the connection is restored, the camera shall be able to synchronize with the recording server to stream the video and events that the recording server couldn't record. This function shall be available only if the recording server supports this functionality.
- X. The user shall be able to configure at least 5 privacy masks.
- Y. A mechanical reset button shall be provided to return the camera to factory default settings.

2.04 Camera Networking Requirements

- A. The camera shall incorporate a built-in web server.
- B. Camera functionality shall be available to users running versions of Internet Explorer™ 7, 8, 9, 10, 11 or Mozilla™ Firefox 7~10 (Streaming only).
- C. The camera shall provide integrated support for IPv4, IPv6, TCP/IP, HTTP, HTTPS, UPnP, RTSP/RTP/RTCP, IGMP, SMTP, FTP, DHCP, NTP, DNS, DDNS, PPPoE, CoS, QoS, SNMP v1/v2c/v3 (MIB-II), 802.1X, ARP, SSL, TLS, CIFS/SMB.
- D. The camera shall provide integrated support Multicast RTSP streaming (following the standard RFC 2326).

- E. No unique or proprietary client software shall be required for viewing or controlling the camera.
- F. The camera shall be configurable and users may modify the camera's web pages according to a specific purpose.
- G. The camera shall be ONVIF compliant.
- H. The camera shall provide a RTSP/RTP/RTCP protocol video output via a RJ-45 10/100 Mbps Ethernet connection.
- I. The camera shall be able to transmit H.265/H.264 streaming over HTTP to pass the firewall protection (RTSP over HTTP).
- J. The camera shall be able to transmit H.265/H.264 streaming over UDP for time-sensitive applications to achieve a better real-time Streaming.
- K. The camera shall be able to transmit H.265/H.264 streaming over TCP for applications where the video quality is a top-priority, preventing packet losses.
- L. The camera shall support encrypted data transmission (HTTPS) to increase the overall security.
- M. The camera shall allow the live viewing for up to 10 clients simultaneously.

2.05 Camera Audio/Video Requirements

- A. The camera shall offer at least 4 simultaneous streams offering multiple simultaneous streaming for multiple purposes. All these streams shall support H.265, H.264 and MJPEG. All these streams shall support resolutions from 4512x1728 to 640x256:
 - a. 1st streaming: configurable codec / FPS / Resolution / Quality / Region of interest to be used for the recording.
 - b. 2nd streaming: configurable codec / FPS / Resolution / Quality / Region of Interest to be used for live viewing.
 - c. 3rd streaming: configurable codec / FPS / Resolution / Quality / Region of Interest to be used for mobile phone viewing which usually require low fps and low resolution.
 - d. 4th streaming: configurable codec / FPS / Resolution / Quality to be used as a backup stream for multiple uses (snapshot, etc.).
- B. The camera shall be able to control the video quality using variable bit rate (VBR) and constant bit rate (CBR).
- C. The camera shall be able to control the maximum bit rate consumed when using variable bit rate (VBR).
- D. The camera shall support H.264 Main Profile, H.264 Baseline Profile and H.264 High Profile.

- E. The camera shall support H.265 HEVC (high efficiency video coding) codec to reduce bitrate compared to H.264.
- F. The camera shall support MJPEG codec.
- G. The camera shall provide 28~80000 Kbps H.265 video bit rate.
- H. The camera shall provide 20~80000 Kbps H.264 video bit rate.
- I. The camera shall provide 20~80000 Kbps MJPEG video bit rate.
- J. In order to optimize bandwidth consumption by using high quality only in the important objects/areas (foreground areas) and using low quality for the unimportant objects/areas (background areas), the camera shall let the user configure the quality for the areas. The camera shall let the user choose from the following usage scenarios:
 - 1. Under the same stream, the camera shall be able to detect moving objects, assigned them as foreground areas and give high quality only to those moving objects, while maintaining the rest of the image in a low quality.
 - 2. Under the same stream, the camera shall be able to let the user define multiple regions of interest and only give those regions high quality while maintaining the rest of the image in a low quality.
 - 3. Under the same stream, the camera shall be able to detect moving objects, assigned them as foreground areas and give high quality to those moving objects. In addition, the camera shall also let the user define multiple regions of interest and give those regions high quality. The rest of the image will be assigned as background and have low quality.
- K. Based on the content of the video the camera shall be able to adjust dynamically the compression ratio for different regions of the image.
- L. The camera shall be able to have independent compression values for the I-frame and the P-frames.
- M. The camera shall provide 13 levels of exposure compensation.
- N. The camera shall support exposure time from 1/32000 sec. to 1/5 sec.
- O. The camera shall be able to provide the audio codec G.711 which is most widely supported.
- P. The camera shall provide pcmu and pcma for G.711.
- Q. The camera shall be able to provide the audio codec G.726 to obtain high quality audio.
- R. The camera shall provide 4 audio quality levels for G.726.
- S. The camera shall provide automatic white balance. The camera shall also provide manual white balance to fit different light conditions. The camera shall have configurable brightness, contrast, saturation and sharpness.

- T. The camera shall provide defog functionality in order to provide a clearer image in environments with fog/rain.
- U. The camera shall have implemented 3D Noise Reduction technology in order to improve the image quality.
- V. The camera shall have auto exposure (AE), but the camera shall allow the user to select manual mode if necessary.
- W. The camera shall have Automatic Gain Control (AGC).
- X. The camera shall support backlight compensation (BLC).
- Y. The camera shall provide dynamic range of 91 dB.
- Z. The camera shall support digital WDR (WDR Enhanced) capability for unparalleled visibility in extremely bright and dark environments.
- AA. The camera shall provide WDR (wide dynamic range) by using 2 shutter capture method to obtain visibility in extremely dark & light environments.
- BB. The camera shall provide SNR higher than 46 dB.
- CC. The camera shall feature streaming of the full field of view (FOV) and simultaneous multiple region of interest (ROI) for forensic zooming.
- DD. The camera shall provide ePTZ function of 48x digital zoom (4x on IE plug-in, 12x built-in)

2.06 Connectors

- A. RJ-45 cable connector for Network/PoE 10 Base-T / 100 BaseTX Ethernet connection (IEEE 802.3at, Class 4 POE compliant)

2.07 Electrical Specifications

- A. Power Consumption:
 - a. Maximum 15.2 watts (PoE).
- B. Power requirement:
 - a. PoE IEEE 802.3at on CAT-5 cable

2.10 Mechanical Specifications

- A. Net weight: 1.207kg
- B. Dimensions:
 - a. Ø 165 mm x 112 mm x 97 mm (w/o sunshield)
 - b. Ø 165 mm x 100 mm x 119 mm (w/ sunshield)

2.11 Environmental Specifications

- A. Starting Temperature:
 - a. -10°C ~ 50°C (14°F ~ 122°F) for PoE

- B. Working Temperature:
 - a. $-20^{\circ}\text{C} \sim 50^{\circ}\text{C}$ ($-4^{\circ}\text{F} \sim 122^{\circ}\text{F}$) for PoE
- C. The camera shall support up to 90% Humidity.
- D. The camera shall have IP66 rating to protect against ingress of dust and water.
- E. The camera shall come with an IK10-rated vandal-proof housing.

2.12 Certifications and Approvals

A. Electromagnetic Compatibility

Emissions:

- FCC Class A
- CE
- LVD
- VCCI
- C-Tick
- UL

B. RoHS

All material and/or components used in the manufacture of the product shall be in compliance with the EU Directive 2002/95/EC Restriction of Hazardous Substance (RoHS).