AXIS M4328-P Panoramic Camera
12 MP indoor fisheye with deep learning

AXIS M4328-P can deliver 360° or 180° panoramic views at up to 30 fps with no blind spots. The camera can stream up to four individual view areas simultaneously, with support for digital PTZ. Built on ARTPEC-8, it offers powerful artificial intelligence and deep learning analytics on the edge. Plus, thanks to AXIS Object Analytics, it can accurately detect and classify moving objects for more effective monitoring. The camera is delivered factory-focused and features digital roll functionality for easy installation. Furthermore, it's compact, discreet, and repaintable to blend in with any surroundings.

> 180°/360° view up to 30 fps

> 12 MP with stereographic lens

> Support for digital PTZ views

> Digital roll for easy installation

> Support for advanced analytics

AXIS M4328-P Panoramic Camera

Camera

Image sensor	1/2.3" progressive scan RGB CMOS
Lens	1.2 mm, F2.2 Horizontal field of view: 182° Vertical field of view: 182° Fixed iris, fixed focus, IR corrected
Day and night	Automatic IR-cut filter
Minimum illumination	**Color:** 0.19 lux at 50 IRE, F2.2 **B/W:** 0.04 lux at 50 IRE, F2.2
Shutter speed	1/8100 s to 1/2 s
Camera angle adjustment	Digital roll: ±180°

System on chip (SoC)

Model	ARTPEC-8
Memory	2048 MB RAM, 8192 MB Flash
Compute capabilities	Deep learning processing unit (DLPU)

Video

Video compression	H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles H.265 (MPEG-H Part 2/HEVC) Main Profile Motion JPEG
Resolution	Overview: 2992x2992 to 160x160 (1:1) Panorama: 3840x2160 to 192x72 (8:3, 16:9 or 32:9) Double panorama: 3584x2688 to 384x288 (4:3 or 16:9) Quad view: 3584x2688 to 384x288 (4:3 or 16:9) View area 1-4: 2048x1536 to 256x144 (4:3 or 16:9) Corner left/right: 3200x1600 to 192x72 (2:1 or 8:3) Double corner: 2880x2880 to 384x288 (1:1 or 4:3) Corridor: 2560x1920 to 256x144 (4:3 or 16:9)
Frame rate	360° overview only up to max resolution without WDR: 25/30 fps @ 50/60 Hz 360° overview and 4 dewarped views up to max resolution with WDR: up to 25/20 fps @ 50/60 Hz
Video streaming	Multiple, individually configurable streams in H.264, H.265, and Motion JPEG Axis Zipstream technology in H.264 and H.265 Controllable frame rate and bandwidth VBR/ABR/MBR H.264/H.265 Video streaming indicator
WDR	Forensic WDR: Up to 120 dB depending on scene
Noise reduction	Spatial filter (2D noise reduction) Temporal filter (3D noise reduction)
Image settings	Saturation, contrast, brightness, sharpness, local contrast, tone mapping, white balance, day/night threshold, exposure mode, exposure zones, compression, mirroring, dynamic text and image overlay, and polygon privacy mask
Image processing	Axis Zipstream, Forensic WDR
Pan/Tilt/Zoom	Digital PTZ of view areas, digital PT of panorama, corner, corridor and quad views, preset positions, guard tours

Audio

Audio features	Network speaker pairing
Audio input/output	Audio features through portcast technology: two-way audio connectivity, voice enhancer

Network

Network protocols	IPv4, IPv6 USGv6, ICMPv4/ICMPv6, HTTP, HTTPS[a], HTTP/2, TLS[a], QoS Layer 3 DiffServ, FTP, SFTP, CIFS/SMB, SMTP, mDNS (Bonjour), UPnP®, SNMP v1/v2c/v3 (MIB-II), DNS/DNSv6, DDNS, NTP, NTS, RTSP, RTP, SRTP, TCP, UDP, IGMPv1/v2/v3, RTCP, DHCPv4/v6, SSH, LLDP, CDP, MQTT v3.1.1, Syslog, Link-Local address (ZeroConf), IEEE 802.1X (EAP-TLS), IEEE 802.1AR

System integration

Application Programming Interface	Open API for software integration, including VAPIX®, metadata and AXIS Camera Application Platform (ACAP); specifications at *axis.com/developer-community*. ACAP includes Native SDK and Computer Vision SDK. One-click cloud connection

ONVIF® Profile G, ONVIF® Profile M, ONVIF® Profile S, and ONVIF® Profile T, specifications at *onvif.org*
Support for Session Initiation Protocol (SIP) for integration with Voice over IP (VoIP) systems, peer to peer or integrated with SIP/PBX.
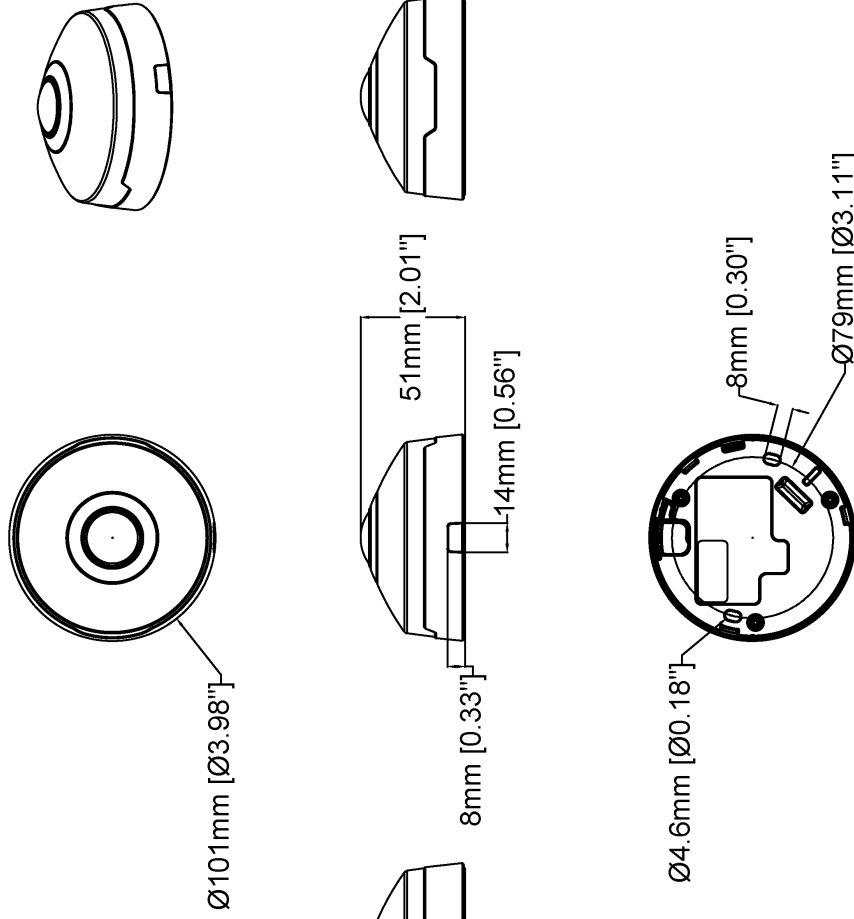
Video management systems	Compatible with AXIS Companion, AXIS Camera Station, video management software from Axis' Application Development Partners available at *axis.com/vms*
Onscreen controls	Privacy masks Media clip
Event conditions	Device status: above operating temperature, above or below operating temperature, below operating temperature, within operating temperature, IP address removed, new IP address, network lost, system ready, live stream active Edge storage: recording ongoing, storage disruption, storage health issues detected I/O: manual trigger, virtual input MQTT: subscribe Scheduled and recurring: schedule Video: average bitrate degradation, day-night mode, tampering
Event actions	Day-night mode MQTT: publish Notification: HTTP, HTTPS, TCP and email Overlay text Recordings: SD card and network share SNMP traps: send, send while the rule is active Status LED Upload of images or video clips: FTP, SFTP, HTTP, HTTPS, network share and email WDR mode
Built-in installation aids	Pixel counter, digital roll, level grid

Analytics

AXIS Object Analytics	**Object classes**: humans, vehicles (types: cars, buses, trucks, bikes) **Features**: line crossing, object in area Up to 10 scenarios Metadata visualized with trajectories, color-coded bounding boxes and tables Polygon include/exclude areas ONVIF Motion Alarm event
Metadata	**Object data**: Classes: humans, faces, vehicles (types: cars, buses, trucks, bikes), license plates Confidence, position **Event data**: Producer reference, scenarios, trigger conditions
Applications	**Included** AXIS Object Analytics, AXIS Video Motion Detection, active tampering alarm **Supported** Support for AXIS Camera Application Platform enabling installation of third-party applications, see *axis.com/acap*

Approvals

Product markings	CSA, UL/cUL, BIS, UKCA, CE, KC
Supply chain	TAA compliant
EMC	EN 55032 Class A, EN 55035, EN 61000-6-1, EN 61000-6-2 **Australia/New Zealand:** RCM AS/NZS CISPR 32 Class A **Canada:** ICES-3(A)/NMB-3(A) **Japan:** VCCI Class A **Korea:** KS C 9835, KS C 9832 Class A **USA:** FCC Part 15 Subpart B Class A
Safety	IEC/EN/UL 62368-1 ed. 3, CAN/CSA C22.2 No. 62368-1 ed. 3, IS 13252
Environment	IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-6, IEC 60068-2-14, IEC 60068-2-27, IEC 60068-2-78
Network	NIST SP500-267

Cybersecurity

Edge security	**Software:** Signed firmware, brute force delay protection, digest authentication, password protection, AES-XTS-Plain64 256bit SD card encryption **Hardware:** Axis Edge Vault cybersecurity platform

	Secure element (CC EAL 6+), system-on-chip security (TEE), Axis device ID, secure keystore, signed video, secure boot, encrypted filesystem (AES-XTS-Plain64 256bit)
Network security	IEEE 802.1X (EAP-TLS)[a], IEEE 802.1AR, HTTPS/HSTS[a], TLS v1.2/v1.3[a], Network Time Security (NTS), X.509 Certificate PKI, IP address filtering
Documentation	*AXIS OS Hardening Guide* *Axis Vulnerability Management Policy* *Axis Security Development Model* To download documents, go to *axis.com/support/cybersecurity/resources* To read more about Axis cybersecurity support, go to *axis.com/cybersecurity*

General

Casing	Plastic casing, encapsulated electronics Color: white NCS S 1002-B For repainting instructions, go to the product's support page. For information about the impact on warranty, go to *axis.com/warranty-implication-when-repainting.*
Mounting	Mounting bracket with junction box holes (double-gang, single-gang, and 4" octagon) ¼"-20 UNC tripod screw thread
Power	Power over Ethernet (PoE) IEEE 802.3af/802.3at Type 1 Class 3 Typical 3.5 W, max 5.1 W
Connectors	Network: Shielded RJ45 10BASE-T/100BASE-TX PoE Audio: Audio and I/O connectivity via portcast technology
Storage	Support for microSD/microSDHC/microSDXC card Recording to network-attached storage (NAS) For SD card and NAS recommendations, see *axis.com*
Operating conditions	0 °C to 40 °C (32 °F to 104 °F) Humidity 10–85% RH (non-condensing)
Storage conditions	-40 °C to 65 °C (-40 °F to 149 °F) Humidity 5–95% RH (non-condensing)
Dimensions	Height: 51 mm (2.0 in) ø 101 mm (4.0 in)
Weight	300 g (0.66 lb)

Box content	Camera, installation guide, owner authentication key
Optional accessories	AXIS TM3820 Vandal Casing (IK08, IP42 with cover hatch, IP41 without cover hatch) AXIS TM3210 Recessed Mount AXIS TM3211 Recessed Mount AXIS T94 mounting accessories AXIS T91 mounting accessories AXIS Surveillance Cards For more accessories, go to *axis.com/products/axis-m4328-p#accessories*
System tools	AXIS Site Designer, AXIS Device Manager, product selector, accessory selector, lens calculator Available at *axis.com*
Languages	English, German, French, Spanish, Italian, Russian, Simplified Chinese, Japanese, Korean, Portuguese, Polish, Traditional Chinese, Dutch, Czech, Swedish, Finnish, Turkish, Thai, Vietnamese
Warranty	5-year warranty, see *axis.com/warranty*
Part numbers	Available at *axis.com/products/axis-m4328-p#part-numbers*

Sustainability

Substance control	PVC free, BFR/CFR free in accordance with JEDEC/ECA Standard JS709 RoHS in accordance with EU RoHS Directive 2011/65/EU/ and EN 63000:2018 REACH in accordance with (EC) No 1907/2006. For SCIP UUID, see *axis.com/partner.*
Materials	Renewable carbon-based plastic content: 73% (recycled) Screened for conflict minerals in accordance with OECD guidelines To read more about sustainability at Axis, go to *axis.com/about-axis/sustainability*
Environmental responsibility	*axis.com/environmental-responsibility* Axis Communications is a signatory of the UN Global Compact, read more at *unglobalcompact.org*

a. *This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (openssl.org), and cryptographic software written by Eric Young (eay@cryptsoft.com).*

Dimension drawing

Ø101mm [Ø3.98"]

51mm [2.01"]

14mm [0.56"]

8mm [0.33"]

8mm [0.30"]

Ø79mm [Ø3.11"]

Ø4.6mm [Ø0.18"]

AXIS M4328-P Panoramic Camera

Revision	v.01	Revision date	2023-02-17
Paper size	A4	Release date	2023-02-17
Created by	MS	Scale	1:3

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Key features and technologies

AXIS Object Analytics

AXIS Object Analytics is a preinstalled, multifeatured video analytics that detects and classifies humans, vehicles, and types of vehicles. Thanks to AI-based algorithms and behavioral conditions, it analyzes the scene and their spatial behavior within – all tailored to your specific needs. Scalable and edge-based, it requires minimum effort to set up and supports various scenarios running simultaneously.

Axis Edge Vault

Axis Edge Vault is the hardware-based cybersecurity platform that safeguards the Axis device. It forms the foundation that all secure operations depend on and offers features to protect the device's identity, safeguard its integrity from factory and protect sensitive information from unauthorized access.

Establishing the root of trust starts at the device's boot process. In Axis devices, the hardware-based mechanism **secure boot** verifies the operating system (AXIS OS) that the device is booting from. AXIS OS, in turn, is cryptographically signed (**signed firmware**) during the build process. Secure boot and signed firmware tie into each other and ensure that the firmware has not been tampered with during the lifecycle of the device and that the device only boots from authorized firmware. This creates an unbroken chain of cryptographically validated software for the chain of trust that all secure operations depend on.

From a security aspect, the **secure keystore** is the critical building-block for protecting cryptographic information used for secure communication (IEEE 802.1X, HTTPS, Axis device ID, access control keys etc..) against malicious extraction in the event of a security breach. The secure keystore is provided through a Common Criteria and/or FIPS 140 certified hardware-based cryptographic computing module. Depending on security requirements, an Axis device can have either one or multiple such modules, like a TPM 2.0 (Trusted Platform Module) or a secure element, and/or a system-on-chip (SoC) embedded Trusted Execution Environment (TEE).

Signed video ensures that video evidence can be verified as untampered without proving the chain of custody of the video file. Each camera uses its unique video signing key, which is securely stored in the secure keystore, to add a signature into the video stream. This allows video to be traced back to the Axis camera from where it originated, so it's possible to verify that the footage has not been tampered with after it left the camera.

To read more about Axis Edge Vault, go to *axis.com/solutions/edge-vault*.

Forensic WDR

Axis cameras with wide dynamic range (WDR) technology make the difference between seeing important forensic details clearly and seeing nothing but a blur in challenging light conditions. The difference between the darkest and the brightest spots can spell trouble for image usability and clarity. Forensic WDR effectively reduces visible noise and artifacts to deliver video tuned for maximal forensic usability.

Zipstream

The Axis Zipstream technology preserves all the important forensic in the video stream while lowering bandwidth and storage requirements by an average of 50%. Zipstream also includes three intelligent algorithms, which ensure that relevant forensic information is identified, recorded, and sent in full resolution and frame rate.

For more information, see *axis.com/glossary*