

# AXIS M4228-LVE Dome Camera

Compact 8 MP AI-powered dome with audio analytics

This compact varifocal dome camera offers great image quality in 8 MP. With Lightfinder 2.0, Forensic WDR, and OptimizedIR, it provides detailed images regardless of light conditions. It comes preinstalled with AXIS Object Analytics to detect, classify, track, and count objects such as humans and vehicles. With AXIS Audio Analytics it can detect and classify specific sounds as well as sudden changes in sound volume. Axis Edge Vault, a hardware-based cybersecurity platform, safeguards the device and protects sensitive information from unauthorized access. Furthermore, this IP66- and IK10-rated camera has an operating temperature range from -30 °C to 50 °C (-22 °F to 122 °F).

- > **Great image quality in 4K**
- > **Varifocal lens with remote zoom and focus**
- > **Lightfinder 2.0, Forensic WDR, and OptimizedIR**
- > **AI-based audio and video analytics**
- > **Built-in cybersecurity with Axis Edge Vault**



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## Camera

### Image sensor

1/2.8" progressive scan RGB CMOS  
Pixel size 1.45 µm

### Lens

Varifocal, 3.2–7.2 mm, F1.6–2.7  
Horizontal field of view: 100–38°  
Vertical field of view: 52°–20°  
Minimum focus distance: 1.0 m (3.2 ft)  
Fixed iris, IR corrected, remote zoom and focus

### Day and night

Automatic IR-cut filter

### Minimum illumination

Color: 0.14 lux at 50 IRE, F1.6  
B/W: 0.03 lux at 50 IRE, F1.6  
0 lux with IR illumination on

### Shutter speed

1/16000 s to 2

### Camera adjustment

Pan ±180°, tilt -10 to +65°, rotation ±180°

## System on chip (SoC)

### Model

ARTPEC-8

### Memory

2 GB RAM, 8 GB 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

16:9: 3840x2160 to 640x360  
4:3: 2592x1944 to 320x240

### Frame rate

Up to 25/30 fps (50/60 Hz) in all resolutions

### Video streaming

Up to 20 unique and configurable video streams<sup>1</sup>  
Axis Zipstream technology in H.264 and H.265  
Controllable frame rate and bandwidth  
VBR/ABR/MBR H.264/H.265  
Low latency mode  
Video streaming indicator

### Signal-to-noise ratio

>55 dB

### WDR

Forensic WDR: Up to 120 dB depending on scene

### Image settings

Saturation, contrast, brightness, sharpness, white balance, day/night threshold, exposure mode, exposure zones, compression, rotation: 0°, 90°, 180°, 270° including corridor format, mirroring, dynamic text and image overlay, privacy masks

### Image processing

Axis Zipstream, Forensic WDR, Lightfinder 2.0, OptimizedIR

### Pan/Tilt/Zoom

Digital PTZ, optical zoom, preset positions  
Limited guard tour, control queue, on-screen directional indicator  
Tour recording (max 10, max duration 16 minutes each), guard tour (max 100), adjustable zoom speed

1. We recommend a maximum of 3 unique video streams per camera or channel, for optimized user experience, network bandwidth, and storage utilization. A unique video stream can be served to many video clients in the network using multicast or unicast transport method via built-in stream reuse functionality.

## Network

### Network protocols

IPv4, IPv6 USGv6, ICMPv4/ICMPv6, HTTP, HTTPS<sup>2</sup>, HTTP/2, TLS<sup>2</sup>, QoS Layer 3 DiffServ, FTP, SFTP, CIFS/SMB, SMTP, mDNS (Bonjour), UPnP<sup>®</sup>, SNMP v1/v2c/v3 (MIB-II), DNS/DNSv6, DDNS, NTP, PTP, NTS, RTSP, RTP, SRTP/RTSPS, TCP, UDP, IGMPv1/v2/v3, RTCP, ICMP, DHCPv4/v6, ARP, SSH, LLDP, CDP, MQTT v3.1.1, Secure syslog (RFC 3164/5424, UDP/TCP/TLS), Link-Local address (ZeroConf)

## System integration

### Application Programming Interface

Open API for software integration, including VAPIX<sup>®</sup>, metadata and AXIS Camera Application Platform (ACAP); specifications at [axis.com/developer-community](http://axis.com/developer-community).

One-click cloud connection

ONVIF<sup>®</sup> Profile G, ONVIF<sup>®</sup> Profile M, ONVIF<sup>®</sup> Profile S, and ONVIF<sup>®</sup> Profile T, specifications at [onvif.org](http://onvif.org)

### Video management systems

Compatible with AXIS Camera Station Edge, AXIS Camera Station Pro, AXIS Camera Station 5, and video management software from Axis' partners available at [axis.com/vms](http://axis.com/vms).

### Onscreen controls

Autofocus

Day/night shift

Wide dynamic range

Video streaming indicator

IR illumination

Privacy masks

Heater

### Edge-to-edge

Siren and light pairing

### Event conditions

Application

Device status: above/below/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: stateless

Scheduled and recurring: schedule

Video: average bitrate degradation, day-night mode, tampering

### Event actions

Day-night mode

Illumination: use lights, use lights while the rule is active

Images: FTP, HTTP, HTTPS, SFTP, network share and email

LEDs: flash status LED, flash status LED while the rule is active

MQTT: publish

Notifications: HTTP, HTTPS, TCP and email

Overlay text

Recordings: record video, record video while the rule is active

Security: erase configuration

SNMP trap messages: send, send while the rule is active

Video clips: FTP, HTTP, HTTPS, SFTP, network share and email

WDR mode

### Built-in installation aids

Pixel counter, remote zoom and focus, level grid

## Analytics

### Applications

Included

AXIS Object Analytics, AXIS Image Health Analytics, AXIS Audio Analytics, AXIS Scene Metadata, AXIS Live Privacy Shield<sup>3</sup>, AXIS Video Motion Detection

Supported

Support for AXIS Camera Application Platform enabling installation of third-party applications, see [axis.com/acap](http://axis.com/acap)

### AXIS Object Analytics

Object classes: humans, vehicles (types: cars, buses, trucks, bikes, other)

Scenarios: line crossing, object in area, time in area, crossline counting, occupancy in area, tailgating detection, PPE monitoring<sup>BETA</sup>, motion in area, motion line crossing

Up to 10 scenarios

Other features: triggered objects visualized with trajectories, color-coded bounding boxes and tables

Polygon include/exclude areas

Perspective configuration

ONVIF Motion Alarm event

### AXIS Image Health Analytics

Detection settings:

Tampering: blocked image, redirected image

Image degradation: blurred image, underexposed image

Other features: sensitivity, validation period

2. This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. ([openssl.org](http://openssl.org)), and cryptographic software written by Eric Young ([eay@cryptsoft.com](mailto:eay@cryptsoft.com)).

3. Available for download

## AXIS Audio Analytics

**Features:** sound pressure level, adaptive audio detection, audio classification

**Audio classes:** scream, shout, glass break, speech, coughing fit

**Event metadata:** audio detections, classifications, sound pressure level

## AXIS Scene Metadata

**Object classes:** humans, faces, vehicles (types: cars, buses, trucks, bikes), license plates

**Object attributes:** vehicle color, upper/lower clothing color, confidence, position

## Approvals

### Product markings

UL/cUL, UKCA, CE, EAC, VCCI, RCM, BSMI

### Supply chain

TAA compliant

### EMC

CISPR 35, CISPR 32 Class A, EN 55035, EN 55032 Class A, EN 61000-6-1, EN 61000-6-2

**Australia/New Zealand:** RCM AS/NZS CISPR 32 Class A

**Canada:** ICES(A)/NMB(A)

**Japan:** VCCI Class A

**USA:** FCC Part 15 Subpart B Class A

### Safety

CAN/CSA C22.2 No. 62368-1 ed. 3,

IEC/EN/UL 62368-1 ed. 3, IEC/EN 62471 risk group exempt, 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, IEC/EN 60529 IP66, IEC/EN 62262 IK10, NEMA 250 Type 4X

### Network

NIST SP500-267

### Cybersecurity

ETSI EN 303 645, BSI IT Security Label, FIPS 140

## Cybersecurity

### Edge security

**Software:** Signed OS, brute force delay protection, digest authentication and OAuth 2.0 RFC6749 Client Credential Flow/OpenID Authorization Code Flow for centralized ADFS account management, password protection, Axis Cryptographic Module (FIPS 140-2 level 1)

**Hardware:** Axis Edge Vault cybersecurity platform

Secure keystore: secure element (CC EAL 6+, FIPS 140-3 Level 3), system-on-chip security (TEE)

Axis device ID, signed video, secure boot, encrypted filesystem (AES-XTS-Plain64 256bit)

### Network security

IEEE 802.1X (EAP-TLS, PEAP-MSCHAPv2)<sup>4</sup>, IEEE 802.1AR, HTTPS/HSTS<sup>4</sup>, TLS v1.2/v1.3<sup>4</sup>, Network Time Security (NTS), X.509 Certificate PKI, host-based firewall

### Documentation

*AXIS OS Hardening Guide*

*Axis Vulnerability Management Policy*

*Axis Security Development Model*

**AXIS OS Software Bill of Material (SBOM)**

To download documents, go to [axis.com/support/cybersecurity/resources](http://axis.com/support/cybersecurity/resources)

To read more about Axis cybersecurity support, go to [axis.com/cybersecurity](http://axis.com/cybersecurity)

## General

### Casing

IP66-, NEMA 4X- and IK10-rated

Polycarbonate hard-coated dome

Plastic casing, polycarbonate (PC) dome, weathershield (PC/ASA)

**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](http://axis.com/warranty-implication-when-repainting). This product can be repainted.

### Power

Power over Ethernet (PoE) IEEE 802.3af/802.3at/802.3bt

Type 1 Class 3, max 12.9 W, typical (heater off, IR off)

3.6 W

Features: power meter

### Connectors

Network: Shielded RJ45 10BASE-T/100BASE-TX

4. This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. ([openssl.org](http://openssl.org)), and cryptographic software written by Eric Young ([eay@cryptsoft.com](mailto:eay@cryptsoft.com)).

## Sensor

Acoustic sensor

## IR illumination

OptimizedIR with power-efficient, long-life 850 nm IR LEDs  
Range of reach 20 m (66 ft) or more depending on the scene

## Storage

Support for microSD/microSDHC/microSDXC card  
Support for SD card encryption (AES-XTS-Plain64 256bit)  
Recording to network-attached storage (NAS)  
For SD card and NAS recommendations see [axis.com](http://axis.com)

## Operating conditions

Temperature: -30 °C to 50 °C (-22 °F to 122 °F)  
Maximum temperature according to NEMA TS 2 (2.2.7): 74 °C (165 °F)  
Start-up temperature: -20 °C (-4 °F)  
Humidity: 10–100% RH (condensing)

## Storage conditions

Temperature: -40 °C to 65 °C (-40 °F to 149 °F)  
Humidity: 5–95% RH (non-condensing)

## Dimensions

For the overall product dimensions, see the dimension drawing in this datasheet.  
Effective Projected Area (EPA): 0.007 m<sup>2</sup> (0.08 ft<sup>2</sup>)

## Weight

540 g (1.2 lb)

## Box content

Camera, weathershield, installation guide, connector guard, cable gaskets, owner authentication key

## System tools

AXIS Site Designer, AXIS Device Manager, product selector, accessory selector, lens calculator  
Available at [axis.com](http://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](http://axis.com/warranty)

## Part numbers

Available at [axis.com/products/axis-m4228-lve#part-numbers](http://axis.com/products/axis-m4228-lve#part-numbers)

## Optional accessories

### Installation

AXIS T8415 Wireless Installation Tool

### Mounting

AXIS TM3601-E Counduit Back Box, AXIS TM4101 Pendant Kit

### Storage

AXIS Surveillance Cards

For more accessories, go to [axis.com/products/axis-m4228-lve#accessories](http://axis.com/products/axis-m4228-lve#accessories)

## 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 [echa.europa.eu](http://echa.europa.eu)

### Materials

Renewable carbon-based plastic content: 44% (bio-based: 43%, carbon capture based: 1%)  
Screened for conflict minerals in accordance with OECD guidelines  
To read more about sustainability at Axis, go to [axis.com/about-axis/sustainability](http://axis.com/about-axis/sustainability)

### Environmental responsibility

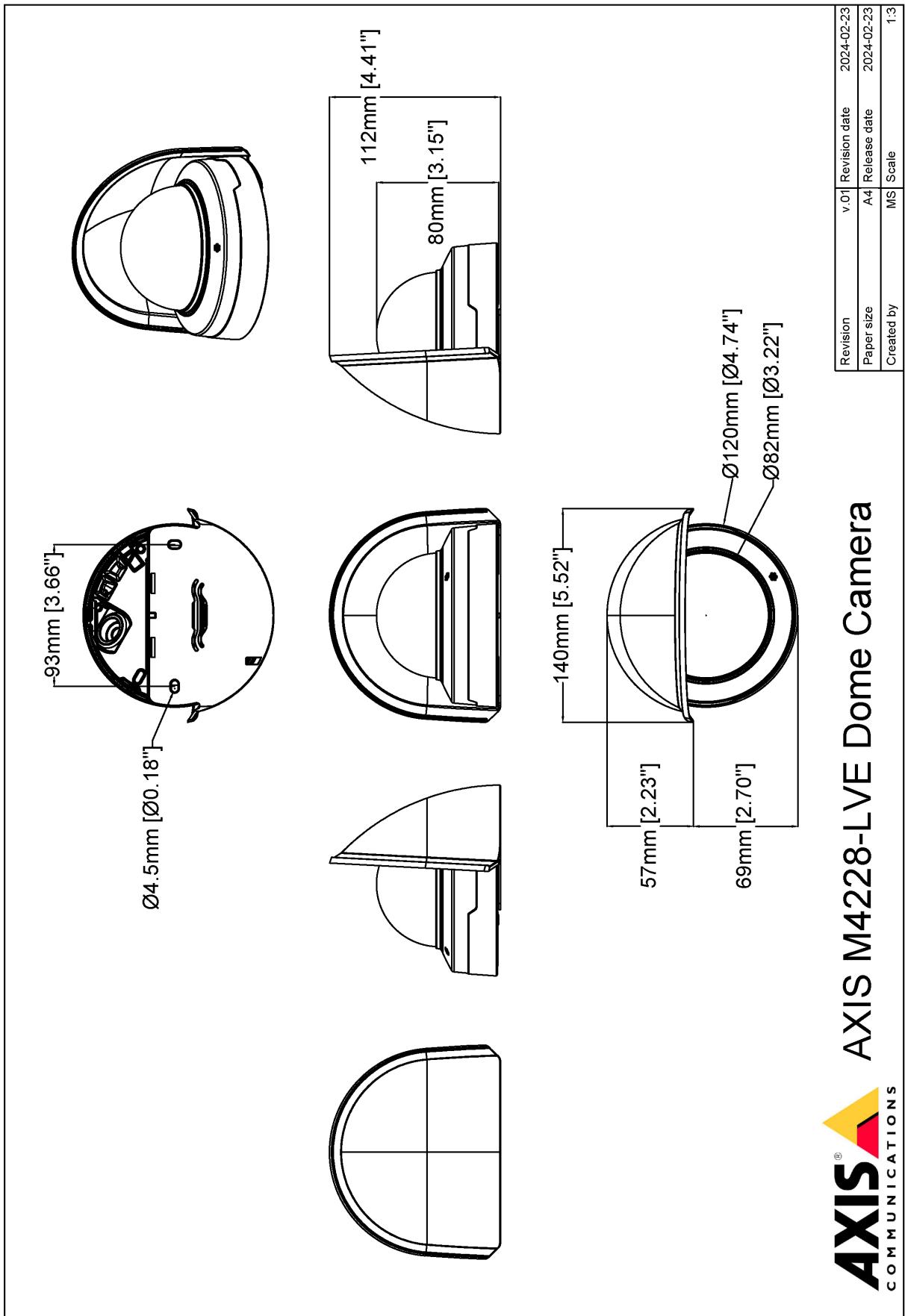
[axis.com/environmental-responsibility](http://axis.com/environmental-responsibility)  
Axis Communications is a signatory of the UN Global Compact, read more at [unglobalcompact.org](http://unglobalcompact.org)

## Detect, Observe, Recognize, Identify (DORI)

	DORI definition	Distance (wide)	Distance (tele)
Detect	25 px/m (8 px/ft)	87.5 m (287.0 ft)	203.6 m (667.8 ft)
Observe	63 px/m (19 px/ft)	34.7 m (113.8 ft)	80.8 m (265.0 ft)
Recognize	125 px/m (38 px/ft)	17.5 m (57.4 ft)	40.7 m (113.5 ft)
Identify	250 px/m (76 px/ft)	8.8 m (28.9 ft)	20.4 m (66.9 ft)

The DORI values are calculated using pixel densities for different use cases as recommended by the EN-62676-4 standard. The calculations use the center of the image as the reference point and consider lens distortion. The possibility to recognize or identify a person or object depends on factors such as object motion, video compression, lighting conditions, and camera focus. Use margins when planning. The pixel density varies across the image, and the calculated values can differ from the distances in the real world.

## Dimension drawing



## Highlighted capabilities

### 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 Audio Analytics

AXIS Audio Analytics uses adaptive audio detection to generate alarms on sudden increases in sound volume. With AI-based classifiers, it can detect screaming and shouting. You can also get extra confirmation by combining AXIS Audio Analytics with video analytics. This smart application only transmits metadata, ensuring privacy is safeguarded. A core feature of AXIS OS, AXIS Audio Analytics comes preinstalled at no extra cost.

### 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 offer features to protect the device's identity, safeguard its integrity and protect sensitive information from unauthorized access. For instance, **secure boot** ensures that a device can boot only with **signed OS**, which prevents physical supply chain tampering. With signed OS, the device is also able to validate new device software before accepting to install it. And 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 and secure connections are provided through a Common Criteria or FIPS 140 certified hardware-based cryptographic computing module.

Furthermore, **signed video** ensures that video evidence can be verified as untampered. Each camera uses its unique video signing key, which is securely stored in the secure keystore, to add a signature into the video stream allowing video to be traced back to the Axis camera from where it originated.

To read more about Axis Edge Vault, go to [axis.com/solutions/edge-vault](http://axis.com/solutions/edge-vault).

### Lightfinder

The Axis Lightfinder technology delivers high-resolution, full-color video with a minimum of motion blur even in near darkness. Because it strips away noise, Lightfinder makes dark areas in a scene visible and captures details in very low light. Cameras with Lightfinder discern color

in low light better than the human eye. In surveillance, color may be the critical factor to identify a person, an object, or a vehicle.

### OptimizedIR

Axis OptimizedIR provides a unique and powerful combination of camera intelligence and sophisticated LED technology, resulting in our most advanced camera-integrated IR solutions for complete darkness. In our pan-tilt-zoom (PTZ) cameras with OptimizedIR, the IR beam automatically adapts and becomes wider or narrower as the camera zooms in and out to make sure that the entire field of view is always evenly illuminated.

For more information, see [axis.com/glossary](http://axis.com/glossary)