

# AXIS Q2101-TE Thermal Camera

## Large-scale remote temperature monitoring

Ideal for large-scale temperature monitoring, this dependable camera lets you remotely monitor temperatures from  $-40^{\circ}\text{C}$  to  $350^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $660^{\circ}\text{F}$ ). You'll know if your equipment is close to overheating and can act to avoid unwanted downtime. With the camera mounted on a positioning unit (sold separately) you can enable thermometric guard tour with up to 256 presets and 10 polygonal detection areas per preset. Robust and impact-resistant, it includes built-in cybersecurity features to help safeguard your system. Additionally, edge-to-edge technology lets you connect network speakers to enable audio alarms.

- > [Thermometric guard tour capabilities](#)
- > [Early fire detection analytics](#)
- > [Spot temperature reading](#)
- > [Built-in cybersecurity features](#)
- > [Support for edge-to-edge technology](#)



# AXIS Q2101-TE Thermal Camera

## Camera

<b>Image sensor</b>	Uncooled microbolometer 384x288 pixels, pixel size 17 µm. Spectral range: 8-14 µm
<b>Lens</b>	Athermalized 7 mm Horizontal field of view: 55°, F1.18 Minimum focus distance: 1.3 m (4.3 ft) 13 mm Horizontal field of view: 28°, F1.0 Minimum focus distance: 4 m (13 ft) 19 mm Horizontal field of view: 19.4°, F1.23 Minimum focus distance: 8.5 m (27.9 ft)
<b>Sensitivity</b>	NETD 40 mK @25C, F1.0
<b>Pan/Tilt</b>	Thermometric guard tour with up to 256 preset positions (positioning unit sold separately)

## Thermometry

<b>Object temperature range</b>	-40 °C to 350 °C (-40 °F to 662 °F)
<b>Temperature accuracy</b>	Below 120 °C (248 °F): ±5 °C (±9 °F) accuracy Above 120 °C (248 °F): ±15% accuracy
<b>Detection range</b>	We recommend the size of a monitored object to cover at least 10x10 pixels in 384x288.
<b>General</b>	Spot temperature meter Up to 10 polygonal temperature detection areas per preset (positioning unit sold separately)

## System on chip (SoC)

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

## Video

<b>Video compression</b>	H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles H.265 (MPEG-H Part 2/HEVC) Main Profile Motion JPEG
<b>Resolution</b>	Sensor is 384x288. Image can be scaled up to 768x576.
<b>Frame rate</b>	Up to 8.3 fps or 30 fps depending on model
<b>Video streaming</b>	Up to 20 unique and configurable video streams <sup>a</sup> Axis Zipstream technology in H.264 and H.265 Controllable frame rate and bandwidth VBR/ABR/MBR H.264/H.265 Video streaming indicator
<b>Image settings</b>	Contrast, brightness, sharpness, local contrast, exposure zones, compression, rotation: 0°, 90°, 180°, 270° including corridor format, mirroring, text and image overlay, polygon privacy mask, electronic image stabilization, multiple color palettes

**Image processing** Axis Zipstream

## Audio

<b>Audio features</b>	AGC automatic gain control Network speaker pairing Spectrum visualizer <sup>b</sup>
<b>Audio streaming</b>	Configurable duplex: Two-way (half duplex, full duplex)
<b>Audio input</b>	10-band graphic equalizer Input for external unbalanced microphone, optional 5 V microphone power Digital input, optional 12 V ring power Unbalanced line input
<b>Audio output</b>	Output via network speaker pairing Line output
<b>Audio encoding</b>	24bit LPCM, AAC-LC 8/16/32/44.1/48 kHz, G.711 PCM 8 kHz, G.726 ADPCM 8 kHz, Opus 8/16/48 kHz Configurable bit rate

## Network

<b>Network protocols</b>	IPv4, IPv6 USGv6, ICMPv4/ICMPv6, HTTP, HTTPS <sup>c</sup> , HTTP/2, TLS <sup>c</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, NTS, RTSP, RTP, SRTP, TCP, UDP, IGMPv1/v2/v3, RTCP, ICMP, DHCPv4/v6, SSH, LLDP, CDP, MQTT v3.1.1, Secure syslog (RFC 3164/5424, UDP/TCP/TLS), Link-Local address (ZeroConf)
--------------------------	--

## System integration

<b>Application Programming Interface</b>	Open API for software integration, including VAPIX <sup>®</sup> and AXIS Camera Application Platform (ACAP); specifications at <a href="https://axis.com/developer-community">axis.com/developer-community</a> . ACAP includes Native SDK and Computer Vision SDK. 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 <a href="https://onvif.org">onvif.org</a>
--	---

<b>Video management systems</b>	Compatible with AXIS Companion, AXIS Camera Station, video management software from Axis' Application Development Partners available at <a href="https://axis.com/vms">axis.com/vms</a>
---------------------------------	---

<b>Onscreen controls</b>	Electronic image stabilization Video streaming indicator Privacy masks Media clip Heater
--------------------------	--

<b>Event conditions</b>	Application: early fire detection Audio: audio detection, audio clip playing 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, ring power overcurrent protection, live stream active, casing open Digital audio input status Edge storage: recording ongoing, storage disruption, storage health issues detected I/O: digital input, manual trigger, virtual input MQTT: subscribe Scheduled and recurring: schedule Video: average bitrate degradation, tampering, temperature detection
-------------------------	--

<b>Event actions</b>	Audio clips: play, stop I/O: toggle I/O once, toggle I/O while the rule is active MQTT: publish Notification: HTTP, HTTPS, TCP, and email Overlay text Pre- and post-alarm video or image buffering for recording or upload Recordings: SD card and network share SNMP traps: send, send while the rule is active Status LED: flash Upload of images or video clips: FTP, SFTP, HTTP, HTTPS, network share, and email
----------------------	--

<b>Built-in installation aids</b>	Pixel counter, level grid
-----------------------------------	---------------------------

## Analytics

<b>Applications</b>	<b>Included</b> AXIS Video Motion Detection, AXIS Motion Guard, AXIS Fence Guard, AXIS Loitering Guard, early fire detection, active tampering alarm, audio detection <b>Supported</b> AXIS Perimeter Defender Support for AXIS Camera Application Platform enabling installation of third-party applications, see <a href="https://axis.com/acap">axis.com/acap</a>
---------------------	--

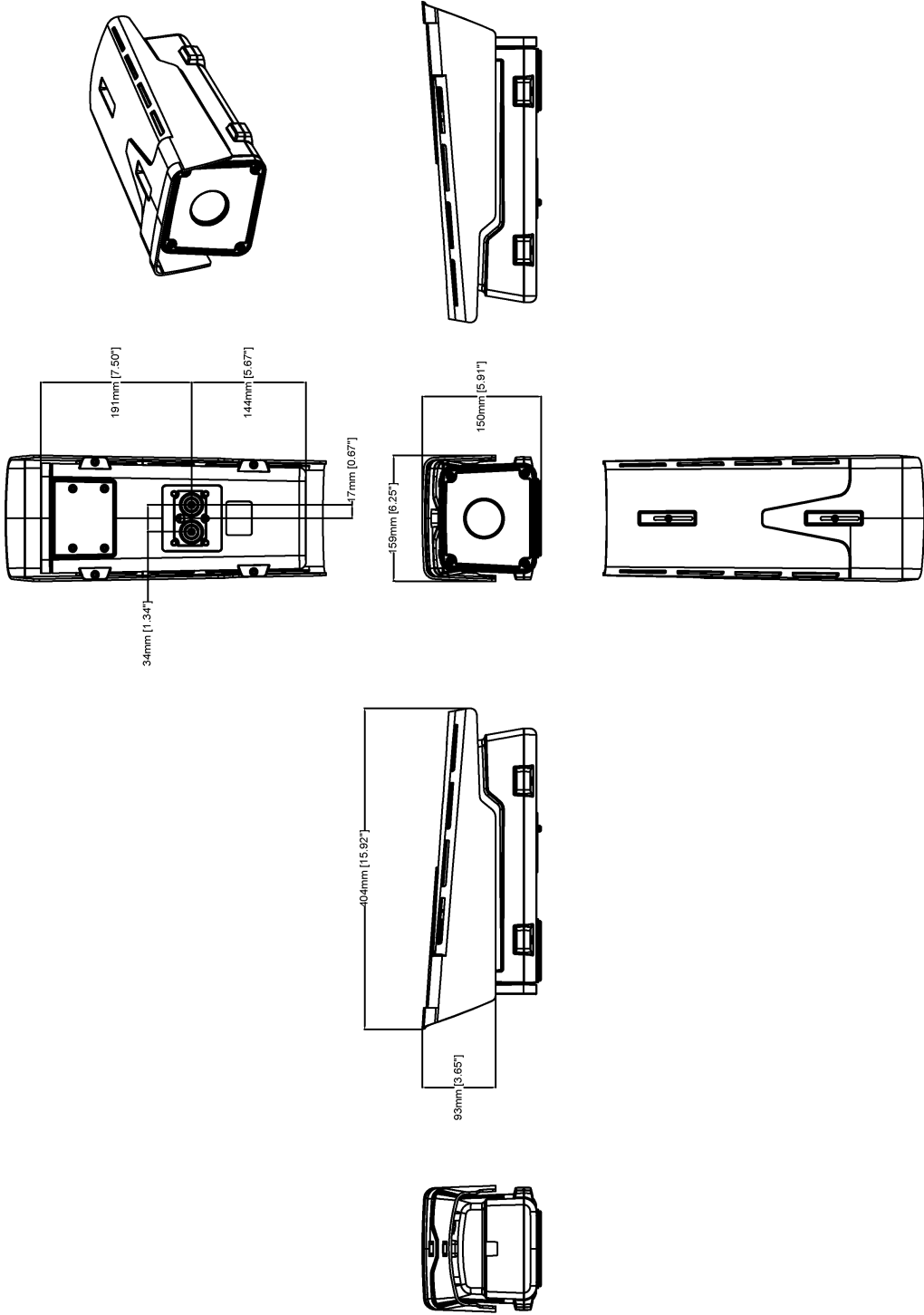
## Approvals

<b>Product markings</b>	CSA, UL/cUL, UKCA, CE, KC, VCCI, RCM
<b>Supply chain</b>	TAA compliant
<b>EMC</b>	CISPR 35, CISPR 32 Class A, EN 50121-4, EN 55032 Class A, EN 55035, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, EN 61000-6-2, IEC 62236-4 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

	Railway: IEC 62236-4
<b>Safety</b>	CAN/CSA C22.2 No. 62368-1 ed. 3, IEC/EN/UL 62368-1 ed. 3, IS 13252
<b>Environment</b>	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/IP67, IEC/EN 62262 IK10 <sup>d</sup> , ISO 21207 Method B, MIL-STD-810H (Method 501.7, 502.7, 505.7, 506.6, 507.6, 509.7, 510.7, 512.6, 514.8, 516.8, 521.4), NEMA 250 Type 4X, NEMA TS 2 (2.2.7-2.2.9)
<b>Network</b>	NIST SP500-267
<b>Cybersecurity</b>	ETSI EN 303 645, FIPS 140
<b>Cybersecurity</b>	
<b>Edge security</b>	<b>Software:</b> Signed firmware, brute force delay protection, digest authentication and OAuth 2.0 RFC6749 OpenID Authorization Code Flow for centralized ADFS account management, password protection, AES-XTS-Plain64 256bit SD card encryption <b>Hardware:</b> Secure boot, Axis Edge Vault with Axis device ID, signed video, secure keystore (CC EAL4+, FIPS 140-2 level 2 certified hardware protection of cryptographic operations and keys)
<b>Network security</b>	IEEE 802.1X (EAP-TLS, PEAP-MSCHAPv2) <sup>c</sup> , IEEE 802.1AE (MACsec PSK/EAP-TLS), IEEE 802.1AR, HTTPS/HSTS <sup>c</sup> , TLS v1.2/v1.3 <sup>c</sup> , Network Time Security (NTS), X.509 Certificate PKI, host-based firewall
<b>Documentation</b>	<i>AXIS OS Hardening Guide</i> <i>Axis Vulnerability Management Policy</i> <i>Axis Security Development Model</i> AXIS OS Software Bill of Material (SBOM) To download documents, go to <a href="https://axis.com/support/cybersecurity/resources">axis.com/support/cybersecurity/resources</a> To read more about Axis cybersecurity support, go to <a href="https://axis.com/cybersecurity">axis.com/cybersecurity</a>
<b>General</b>	
<b>Casing</b>	IP66/IP67-, NEMA 4X-, and IK10-rated <sup>d</sup> Aluminum 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 <a href="https://axis.com/warranty-implication-when-repainting">axis.com/warranty-implication-when-repainting</a> .
<b>Power</b>	Power over Ethernet (PoE) IEEE 802.3af/802.3at Type 2 Class 4 Typical 4.6 W, max 25.5 W 8–28 V DC, typical 4.1 W, max 25.5 W
<b>Connectors</b>	Network: RJ45 10BASE-T/100BASE-TX/1000BASE-T PoE I/O: Terminal block for two supervised and two unsupervised configurable inputs / digital outputs (12 V DC output, max. load 50 mA) Audio: 3.5 mm mic/line in, 3.5 mm line out Serial communication: RS485/RS422, 2 pcs, 2 pos, full duplex, terminal block Power: DC input, terminal block
<b>Storage</b>	Support for microSD/microSDHC/microSDXC card

	Recording to network-attached storage (NAS) For SD card and NAS recommendations see <a href="https://axis.com">axis.com</a>
<b>Operating conditions</b>	Temperature monitoring -40 °C to 50 °C (-40 °F to 122 °F) Maximum temperature according to NEMA TS 2 (2.2.7): 74 °C (165 °F) Humidity 10–100% RH (condensing)
<b>Storage conditions</b>	-40 °C to 65 °C (-40 °F to 149 °F) Humidity 5-95% RH (non-condensing)
<b>Dimensions</b>	404 x 159 x 150 mm (15.9 x 6.3 x 5.9 in) Effective Projected Area (EPA): 0.05 m <sup>2</sup> (0.48 ft <sup>2</sup> )
<b>Weight</b>	3.3 kg (7.3 lb)
<b>Box content</b>	Camera, installation guide, TORX® T30 bit, TORX® T20 screwdriver, terminal block connectors, connector guard, cable gaskets, owner authentication key
<b>Optional accessories</b>	AXIS T99A12 Positioning Unit, AXIS TQ1003-E Wall Mount For more accessories, go to <a href="https://axis.com/products/axis-q2101-te#accessories">axis.com/products/axis-q2101-te#accessories</a>
<b>System tools</b>	AXIS Site Designer, AXIS Device Manager, product selector, accessory selector, lens calculator Available at <a href="https://axis.com">axis.com</a>
<b>Languages</b>	English, German, French, Spanish, Italian, Russian, Simplified Chinese, Japanese, Korean, Portuguese, Polish, Traditional Chinese
<b>Warranty</b>	5-year warranty, see <a href="https://axis.com/warranty">axis.com/warranty</a>
<b>Export control</b>	This product is subject to export control regulations, and you should always comply with all applicable national and international export or re-export control regulations.
<b>Part numbers</b>	Available at <a href="https://axis.com/products/axis-q2101-te#part-numbers">axis.com/products/axis-q2101-te#part-numbers</a>
<b>Sustainability</b>	
<b>Substance control</b>	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.
<b>Materials</b>	Renewable carbon-based plastic content: 18% (recycled: 5%, bio-based: 13%) Screened for conflict minerals in accordance with OECD guidelines To read more about sustainability at Axis, go to <a href="https://axis.com/about-axis/sustainability">axis.com/about-axis/sustainability</a>
<b>Environmental responsibility</b>	<a href="https://axis.com/environmental-responsibility">axis.com/environmental-responsibility</a> Axis Communications is a signatory of the UN Global Compact, read more at <a href="https://unglobalcompact.org">unglobalcompact.org</a>
	<p>a. <i>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.</i></p> <p>b. <i>Feature available with ACAP</i></p> <p>c. <i>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).</i></p> <p>d. <i>Excluding front window</i></p>

# Dimension drawing



Revision	v.01	Revision date	2023-03-08
Paper size	A4	Release date	2023-03-08
Created by	MS	Scale	1:1

© 2023 Axis Communications

**AXIS** COMMUNICATIONS **AXIS Q2101-TE Thermal Camera**

www.axis.com

## Highlighted capabilities

### Thermometry

Thermal cameras detect objects using the infrared radiation (heat) emitted by all objects. Temperature-calibrated thermal cameras, called thermometric cameras, can measure absolute temperatures, while surveillance-optimized thermal cameras show relative temperatures. All types of thermal cameras have excellent object detection capabilities regardless of light conditions – even in total darkness.

### Isothermal palette

A mode that allows the user to select a color range to represent different temperatures in a scene. Each color in an isotherm palette corresponds to a specific temperature value. The user can choose between black-and-white ranges, color ranges, or a mix between the two. The same input (measured thermal radiation) can result in different visual appearance depending on how each pixel value is mapped to a color range.

### Thermometric guard tour

When using thermometric guard tour the camera needs to be installed on a positioning unit to be able to move between preset positions. It then measures temperatures in predefined polygonal detection areas. It's possible to add up to 256 presets with 10 detection areas per preset for large-scale temperature monitoring.

With thermometric guard tour, you also don't have to control the camera manually every time you want to do a video tour of the premises. Instead, you can play the guard tour. You can play the guard tour on command and at scheduled times.

### 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 mecha-

nism **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](https://www.axis.com/solutions/edge-vault).

### Electronic image stabilization

Electronic image stabilization (EIS) provides smooth video in situations where a camera is subject to vibrations. Built-in gyroscopic sensors continuously detect the camera's movements and vibrations, and they automatically adjust the frame to ensure you always capture the details you need. Electronic image stabilization relies on different algorithms for modeling camera motion, which are used to correct the images.

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