MIC IP fusion 9000i

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BOSCH
Invented for life

▶ Ruggedized IP PTZ camera with high performance thermal imager and HD visible imager sitting side-by-side

▶ Designed to provide the highest availability of useable images regardless of lighting conditions in extreme environments (weather, dust/debris/smoke, etc.)

▶ Unique metadata fusion feature provides the ultimate in situation awareness

▶ Exceptional early detection capabilities: Object detection range up to 3550 m (11,600 ft)

▶ Advanced on-board Intelligent Video Analytics

The MIC IP fusion 9000i camera is an advanced PTZ surveillance platform designed to provide early detection in mission-critical applications. With its dual visible/thermal imaging capabilities, the MIC IP fusion 9000i camera is the perfect choice when a robust and high-quality imaging solution is needed.

The MIC camera's distinctive, ruggedized design is well suited for applications having extreme weather conditions of hot/cold temperatures, high winds, rain, fog, ice, and installations associated with shock and vibrations events such as bridges and towers. Precision engineered using Bosch's domain expertise in material and mechanical engineering, this camera offers the most advanced imaging and positioning system solution available on the market.

Functions

Exceptional imaging performance

The MIC IP fusion 9000i camera incorporates a high-performance thermal imaging core and a 1080p starlight-quality day/night visible camera integrated in the same housing. This allows the camera to deliver simultaneous thermal and visible video streams, maximizing the ability to detect and react to long-range threats.

Thermal imager

The thermal imager incorporates the latest un-cooled vanadium oxide microbolometer technology. This high sensitivity thermal imager is equipped with a fixed focal length Athermal lens that balances the field-of-view with maximizing the detection distance.

MIC's thermal core seamlessly and automatically optimizes the image through the use of edge enhancement, dynamic contrast thresholding and adaptive rescaling processes. In addition, its integrated flat field correction feature provides a uniform reference so that scene components are correctly represented.

The combination of these embedded features assure the highest quality image will always be delivered. Depending on model mix, QVGA resolution (320 pixels) and VGA resolution (640 pixels) versions are available, with choice of low (<9Hz) or high (30/60Hz)

frame rates. In addition, a wide variety of user-selectable thermal color modes are available allowing further optimization of the thermal image.

Visible imager

The visible 1080p60-capable starlight camera with a 30x optical/12x digital zoom lens provides high quality visible images, excellent color performance, and unbeatable low-light sensitivity. Its high dynamic range ensures clear image reproduction in the most challenging high-contrast scenes.

Ruggedized design for extreme applications

The MIC IP fusion 9000i camera is designed for surveillance applications beyond the mechanical capabilities of normal PTZ domes or conventional positioning systems.

- **Ingress**

The camera is environmentally sealed and complies with NEMA 6P and IP68 standards, when attached to a MIC-DCA or a MIC-WMB. This level of protection eliminates any risk of dust or water ingress, making the camera a perfect choice for use in extreme environments with rain, dust, snow, flying debris, and other challenging conditions.

In addition, the MIC camera's ingress protection method does not need periodic maintenance, which is required on cameras with pressurized housings.

As part of the factory's final test, every camera is tested for leaks prior to shipping.

- **Wide operating temperature range**

The camera's wide continuous operating temperature range of -40 °C to +65 °C (-40 °F to +149 °F) means that reliable surveillance monitoring is achievable in global locations from very cold northern latitudes to hot equatorial and desert regions.

- **Rugged construction**

The all-metal body has been engineered to withstand IK10-level impacts, and continuous low-frequency vibration. With its symmetrical cross-section designed surfaces, the camera is also well-suited to operating in sites with high wind conditions.

- **Excellent corrosion protection**

The camera benefits from Bosch Automotive domain knowledge in material engineering and coatings. As a result, the superior metallurgy, chromate based pre-coating, and paint finish of the camera provides unprecedented protection against corrosion.

Reliability is ensured by the camera's ability to withstand a 2000 hour salt atmosphere at elevated temperature corrosion resistance test, according to the ASTM B117 test method. In addition, the camera has been tested to meet ISO 12944 C5M rating for use in corrosive environments.

- **Window Wiper and Defroster**

Thanks to its long life integrated wiper and window defroster, the camera is able to capture the highest possible quality image regardless of the weather.

An optional, field-installable wiper brush is available to minimize the chance of window scratches when the camera will be installed in environments with high dust/sand content.

In addition, using available MIC accessory devices, the camera can be integrated into a third-party washer system for the ultimate clean window.

Intelligent Video Analytics for Early Detection

With built-in Intelligent Video Analysis available on both the visible and thermal images, the MIC IP fusion 9000i camera reinforces the concept of Intelligence at the Edge. With Intelligent Video Analytics from Bosch, the camera reliably detects and analyzes moving objects while suppressing unwanted alarms from spurious sources in the image, even under harsh weather conditions.

Many Intelligent Video Analytics rules are available to allow the camera to detect various object behaviors including idle and removed objects, loitering, multiple line crossing, and trajectories. Configurable detection filters improve reliability and reduce operator work load. Bosch's latest Intelligent Video Analytics offers double the detection distances compared to earlier versions, and as an added benefit, the analytics in the camera support the ability to function while an operator is panning or tilting the camera.

Calibration of Intelligent Video Analytics is quick and easy – just enter the height the camera is mounted from the ground. The internal positioning sensors provide the rest of the information to precisely calibrate the video analytics.

Furthermore, metadata is attached to the video streams enabling operators to retrieve relevant images quickly from hours of stored video.

Metadata Fusion imaging

By fusing the Intelligent Video Analytics data captured by both the thermal imager and the visible imager, the MIC IP fusion 9000i camera provides increased situational awareness and ensures early object detection.

When an event is detected, the operator can click inside the alarm overlay box to switch quickly to the other image. The following images illustrate this concept.
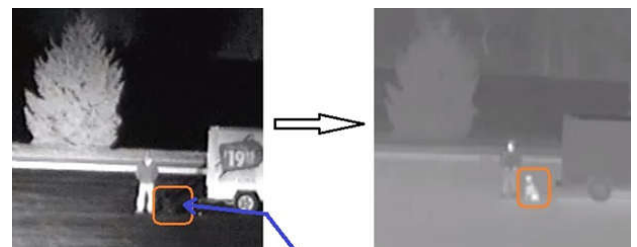
A nighttime visible image shows a metadata alarm near a man by a truck.

Click in the box to switch to the thermal image.

The thermal image easily shows the alarm is being caused by a dog.

Intelligent Tracking

The camera can be programed to activate the Intelligent Tracking feature automatically when its Intelligent Video Analytics detects objects or individuals on either the visible or thermal image. This feature controls the pan/tilt/zoom actions of the camera in order to track the objects and keep them in view. The latest Intelligent Tracking is based on robust flow detection algorithms which can reliably track moving objects even under challenging scenes.

The reliability of tracking and detection with Intelligent Video Analytics can be enhanced further with virtual masking. Virtual masking gives users flexibility to mask parts of the scene which should not be considered for flow analysis to trigger Intelligent Tracking. This means that background motion (moving trees, pulsating lights, and busy roads) in the scene will not interfere with the camera's tracking functions.

The camera supports three modes for Intelligent Tracking:

Auto mode: When configured in this mode, the camera actively analyzes the video to detect any moving object. If it detects movement, it begins to track the object. This mode is most useful for scenarios where normally no motion is expected.

One Click mode: In this mode, users can click an object moving in the live video image to enable the camera to track the movement of the selected object. This mode is most useful for scenarios where normal scene activity is expected.

Triggered mode: In this mode, the camera continuously analyzes the scene for alarms or rule violations. If a rule is violated, it triggers the advanced tracking feature of the camera to start following the object / person that triggered the alarm.

This unique combination of robust Intelligent Video Analytics and Intelligent Tracking allows the camera to track moving objects of interest without getting distracted by other moving objects in the scene.

Advanced encoding features

The camera has an advanced, embedded, high-efficiency encoder capable of providing image streams using either the traditional H.264 or the latest-generation H.265 compression standard. Both compression types provide high-quality image streams. If your head-end video management software supports H.265, you will appreciate the additional 30%-40% savings in network bandwidth by using the H.265 option. This platform supports simultaneous streaming of HD visible, thermal and even an M-JPEG stream. These streams facilitate bandwidth-efficient viewing and recording as well as integration with third-party video management systems.

Access and Data Security

Special measures have been put in place to ensure the highest level of security for device access and data transport. The three-level password protection with security recommendations allows users to customize device access. Web browser access can be protected using HTTPS and firmware updates are always protected with authenticated secure uploads.

The on-board Trusted Platform Module (TPM) and Public Key Infrastructure (PKI) support guarantee superior protection from malicious attacks. The 802.1x network authentication with EAP/TLS, supports TLS 1.2 with updated cipher suites including AES 256 encryption.

The advanced certificate handling offers:

- Self-signed unique certificates automatically created when required
- Client and server certificates for authentication
- Client certificates for proof of authenticity
- Certificates with encrypted private keys

System integration

The camera conforms to the ONVIF (Open Network Video Interface Forum) specification which guarantees interoperability between network video products regardless of manufacturer. The ONVIF Profile S specification allows easy integration with other conformant devices and VMS. ONVIF conformant devices are able to exchange live video, audio, metadata, and control information, and ensure that they are automatically discovered and connected to network applications such as video management systems.

Furthermore, many popular third-party VMS suppliers already support integration with Bosch cameras, including MIC IP fusion 9000i.

Visit the Bosch Integration Partner Program (IPP) website (ipp.boschsecurity.com) for more information.

Superior Features

The camera includes many advanced features that work to maximize performance and satisfy the most demanding system operational requirements.

- **Intelligent Dynamic Noise Reduction reduces bandwidth and storage requirements**

The camera uses Intelligent Dynamic Noise Reduction which actively analyzes the contents of a scene and reduces noise artifacts accordingly.

The low-noise image and the efficient H.264/H.265 compression technology provide clear images while reducing bandwidth and storage by up to 50% compared to typical H.264/H.265 cameras. This results in reduced-bandwidth streams that still retain a high image quality and smooth motion. The camera provides the most usable image possible by cleverly optimizing the detail-to-bandwidth ratio.

- **Superior privacy masking**

Available in both visible and thermal images, the MIC IP fusion 9000i camera has 32 individual privacy masks, with up to eight displayed in the same scene. Unlike conventional privacy masks, these can be programmed with three, four, or even five corners each to cover more complex shapes. Each mask changes size and shape smoothly and quickly, ensuring that the covered object cannot be seen. Each mask can appear in black, white, grey, or red color.

• **Scene modes**

The camera has a very intuitive user interface that allows fast and easy configuration to optimize image quality.

For the thermal camera, many user-selectable thermal mode options are provided, including White Hot, Black Hot, Sepia, Globow, Rainbow, and more.
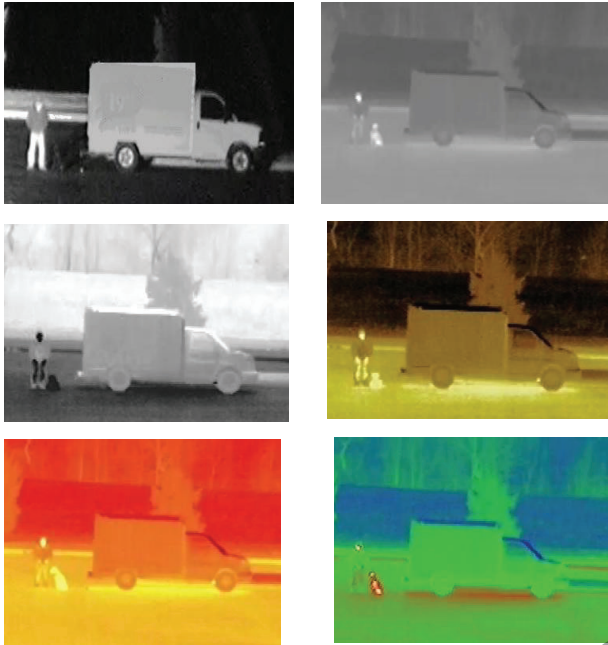
Visible and thermal color mode examples

For the visible camera, user-selectable scene modes are provided with pre-configured settings that optimize the imaging for a variety of applications, such as Motion, Low Light, Vibrant, and more. Different scene modes can be selected for day or night situations.

• **Thermal imaging Range Performance**

The following two tables show the approximate range performance for the thermal imager under ideal conditions.

320 pixel Model:

Performance Range	Human 1.8 x 0.5 m (5.9 x 1.6 ft)	Object 2.3 x 2.3 m (7.5 x 7.5 ft)
Detection	635 m (2080 ft)	1540 m (5050 ft)
Recognition	120 m (390 ft)	310 m (1020 ft)

640 pixel Model:

| Performance Range	Human 1.8 x 0.5 m (5.9 x 1.6 ft)	Object 2.3 x 2.3 m (7.5 x 7.5 ft)
Detection	1500 m (4960 ft)	3550 m (11,600 ft)
Recognition	320 m (1050 ft)	800 m (2630 ft)

• **Visible imaging DORI performance**

DORI (Detect, Observe, Recognize, Identify) is a standard system (EN 62676-4) for defining the ability of a visible camera to distinguish persons or objects

within a covered area. The maximum distance at which a camera/lens combination can meet these criteria is shown below:

DORI	DORI definition	Distance to Object		
		WIDE 1X	TELE 30X	Scene width
Detection	25 px/m (8 px/ft)	62 m (193 ft)	1913 m (5978 ft)	77 m (252 ft)
Observation	63 px/m (19 px/ft)	25 m (81 ft)	759 m (2517 ft)	31 m (100 ft)
Recognition	125 px/m (38 px/ft)	12 m (41 ft)	383 m (1259 ft)	15 m (50 ft)
Identification	250 px/m (76 px/ft)	6 m (20 ft)	191 m (629 ft)	8 m (25 ft)
	DORI (Detect, Observe, Recognize, Identify) according to EN-62676-4			
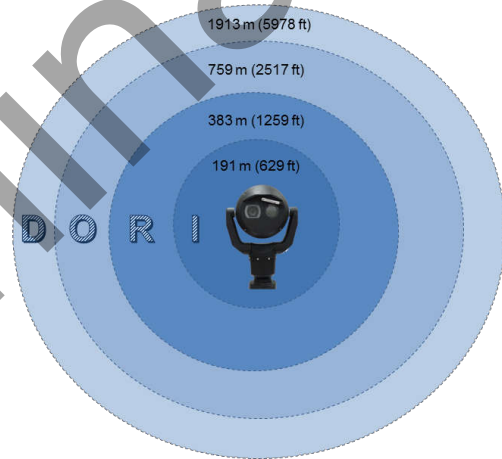
Visible imaging DORI performance

• **On Screen Display**

The camera offers many user-selectable on-screen display options, including camera title, preposition titles (20 characters), 16 Sector titles (20 characters), compass/telemetry read-out (azimuth, elevation degrees), and lens zoom factor.

In addition, the camera allows users to upload a custom logo bitmap.

With the camera's convenient live ticker feature, you can be sure that you are always viewing an active scene, rather than some frozen image stuck on a system monitor.

• **Alarms**

The camera supports advanced alarm control that uses sophisticated rules-based logic to determine how to manage alarms. In its most basic form, a "rule" could define which input(s) should activate which output(s).

In a more complex form, inputs and outputs can be combined with pre-defined or user-specified commands to perform advanced camera functions.

High performance PTZ operations

The camera has a closed-loop feedback control system using a 15-bit position resolver. This resolver ensures high accuracy coordinates are linked with every pan/tilt position. Because the camera always knows where it is pointed, it will return automatically to its original position even if moved by extremely high wind forces. The pan and tilt mechanism of the camera is a ruggedized, spur gear system. The brushless motors directly control the pan and tilt movement using a finely-tuned gear train designed to minimize backlash and support continuous operation without much wear and tear.

With a full 360º continuous rotation pan, 296º tilt control, and super-quick pan (120°/second) and tilt (90°/second) operational speeds, the camera outperforms other cameras in its class.
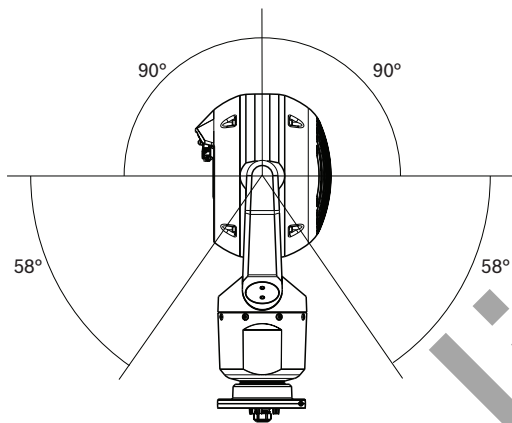
Tilt range of MIC IP fusion 9000i camera (upright orientation)

The camera's ability to operate at very slow speeds (<0.2°/second) means it excels at tracking slow-moving objects or objects at a distance.

The camera supports 256 pre-positions and two styles of Guard Tours: Preset and Record/Playback. One preset tour has capability for up to 256 consecutive pre-positions and the other with up to 256 user-defined pre-positions. Both offer configurable dwell time between pre-positions.

The camera also provides support for two custom recorded tours, which have a combined duration of 30 minutes of movements. The custom tours are recorded macros of an operator's movements, including pan, tilt, zoom, focus and pre-position activities. Operators can play back tours in a continuous manner.

Serial protocol support

The MIC IP fusion 9000i camera supports communication with legacy serial protocols, including Bosch (OSRD), Forward Vision, Pelco P/D, and Cohu.

This means it is possible to operate PTZ features of MIC camera from a conventional analog video control system that uses serial based control data.

Serial data connections can be made to front-end decoder devices operating in pass-through mode or directly to the electrical interface pigtail cable at the base of the MIC camera. (An optional Protocol eLicense is required to enable support for non-Bosch protocols.)

Note: Interfaces using serial protocols bypass the built-in data security features normally associated with a Bosch IP camera. Please take this into account when using these types of system solutions.

Certifications and approvals

HD standards

- Complies with the SMPTE 274M-2008 Standard in:
  - Resolution: 1920x1080
  - Scan: Progressive
  - Color representation: complies with ITU-R BT.709
  - Aspect ratio: 16:9
  - Frame rate: 25, 30, 50 and 60 frames/s
- Complies with the 296M-2001 Standard in:
  - Resolution: 1280x720
  - Scan: Progressive
  - Color representation: complies with ITU-R BT.709
  - Aspect ratio: 16:9
  - Frame rate: 25, 30, 50 and 60 frames/s

Standards	Type
Emission	EN 55032 class B EN 55022 FCC: 47 CFR Part 15 B, class A RCM: AS/NZS CISPR 22 VCCI: V2 & V3
Immunity	EN 50130-4 EN 50121-4 EN 55024
Environmental	EN 50130-5: Class IV
Safety	EN 60950-1 EN 60950-22 UL 60950-1, Ed. 2 CAN/CSA C22.2 No. 60950-1-07, Ed. 2 EN 62368-1 UL 62368-1
Marks	cUL, CE, WEEE, RCM, EAC, VCCI, FCC, RoHS

Installation/configuration notes
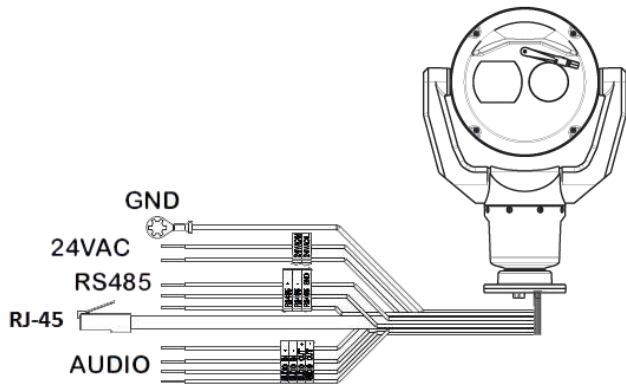
Interfaces for MIC IP fusion 9000i camera

The camera has been designed for quick and easy installation, a key feature from Bosch IP video security products.

The camera can be powered using a standard 24VAC power source and/or by a network-compliant 95W High Power-over-Ethernet (Bosch's version of High PoE). With a Bosch 95W midspan (NPD-9501A, sold separately), a single network (Cat5e/Cat6e) cable connection provides everything needed to view, power, and control the camera. Using High PoE makes installation easier and more cost effective, as cameras do not require a local power source.

Easy setup is guaranteed by using the camera's built-in web browser or Configuration Manager. Access to all settings, live video, and control functions is available in a user-friendly web page format.

Technical specifications

PRELIMINARY Specifications – Subject to change!

MIC IP fusion 9000i cameras are available with different housing colors, two thermal imager resolution options, and thermal frame rate options. The last two letters of the model number identifies the resolution and the thermal frame rates for the various MIC IP fusion 9000i cameras. Housing color is shown as "x," where "B" is for black, "W" is for white, and "G" is for grey.

Some models are not available in all regions.

Model	Resolution	Frame Rate*
MIC-9502-Z30-x**QS**	320 pixel (Standard)	<9Hz
MIC-9502-Z30-x**QF**	320 pixel (Standard)	50/60Hz
MIC-9502-Z30-x**VS**	640 pixel (High)	<9Hz
MIC-9502-Z30-x**VF**	640 pixel (High)	25/30Hz

Notice

* Models with frame rates above 9 Hz are export-controlled by the U.S. Department of Commerce (USDoC). Depending on country of installation and application, an export license may be required. For more information, contact your local Bosch Security Systems Customer Service Center.

Additional camera model combinations may be available with different mixes of housing color, resolution, and frame rates. Please contact your local Bosch representative if you require a variation not listed in the **Ordering Information** section.

MIC IP fusion 9000i camera - Thermal camera core, standard resolution (320 pixels)

Imager	Focal Plane Array (FPA), un-cooled Vanadium Oxide microbolometer
Resolution/Effective Picture Elements	320 x 240
Pixel Pitch	17 μm
Frame Rate	<9Hz ("QS" models) 60Hz ("QF" models)
Lens	Athermal 19 mm (F1.1)
Field of View (FOV)	16° x 12°
Spectral Response	8 to 14 μm
Thermal Sensitivity (NEDT at room temperature)	<60mk
Digital Zoom	1x - 4x
Focus	Factory-set at infinity focus

Performance Range	Human 1.8 x 0.5 m (5.9 x 1.6 ft)	Object 2.3 x 2.3 m (7.5 x 7.5 ft)
Detection	635 m (2080 ft)	1540 m (5050 ft)
Recognition	120 m (390 ft)	310 m (1020 ft)

User-selectable Thermal Modes (Color Options)	White Hot (default mode) Black Hot Fusion Rainbow Globow Ironbow 1 Ironbow 2 Sepia Color 1 Color 2 IceFire Rain

Thermal camera core, high resolution (640 pixels)

Imager	Focal Plane Array (FPA), un-cooled Vanadium Oxide microbolometer
Resolution/Effective Picture Elements	640 × 480
Pixel Pitch	17 µm
Frame Rate	<9Hz ("VS" models) 30Hz ("VF" models)
Lens	Athermal 50 mm (F1.2)
Field of View (FOV)	12.4° x 9.3°
Spectral Response	7.5 to 14 µm
Thermal Sensitivity (NEDT at room temperature)	<65mk
Digital Zoom	1x - 4x
Focus	Factory-set at infinity focus

Performance Range	Human 1.8 x 0.5 m (5.9 x 1.6 ft)	Object 2.3 x 2.3 m (7.5 x 7.5 ft)
Detection	1500 m (4960 ft)	3550 m (11,600 ft)
Recognition	320 m (1050 ft)	800 m (2630 ft)

User-selectable Thermal Modes (Color Options)	White Hot (default mode) Black Hot Fusion Rainbow Globow Ironbow 1 **Ironbow 2** **Sepia** **Color 1** **Color 2** **IceFire** **Rain** **RedHot** **GreenHot**

MIC IP fusion 9000i camera - Visible camera core

Imager	1/2.8-type Exmor R CMOS sensor
Effective Picture Elements (Pixels)	1945 x 1097 (2.13 MP)
Resolution	Full HD (1080p)
Lens	30x Zoom 4.3 mm to 129 mm F1.6 to F4.7
Field of View (FOV)	2.3° to 63.7°
Focus	Automatic with manual override

Iris	Automatic with manual override	
Digital Zoom	12x	
Zoom Movement Speed	4.6 seconds (optical Wide to optical Telephoto) 6.7 seconds (optical wide to digital Telephoto)	
Sensitivity (HighSensOn, 1/30, 30IRE)	Color 0.0077 lx	Monochrome 0.0008 lx
Gain Control	Auto/Manual/Max (0 dB to +50 dB, 0 to 28 steps)	
Aperture Correction	Horizontal and vertical	
Filter	Automatic IR cut filter	
Electronic Shutter Speed (AES)	1/1 sec to 1/10000 sec (22 steps)	
High Dynamic Range (HDR)	120 dB (25/30 fps) 90 db (50/60 fps)	
Signal-to-Noise Ratio (SNR)	>55 dB	
Backlight Compensation (BLC)	On/Off	
White Balance	2000 K to 10,000 K ATW, AWB Hold, Extended ATW, Manual, Sodium Lamp Auto, Sodium Lamp	
Day/Night	Monochrome, Color, Auto	
Defog mode feature	Improves visibility when viewing foggy or other low-contrast scenes.	

Video content analysis			
Analysis type	Intelligent Video Analytics		
Configurations	Silent VCA/Profile1/2/Scheduled/Event-triggered		
		Visible image	Thermal image
Geolocation		x	x
Masking		x	x
Alarm rules (combinable)	Any object	x	x
	Object in field	x	x
	Line crossing	x	x
	Enter / leave field	x	x
	Loitering	x	x
	Follow route	x	x
	Counting	x	x
	Condition change	x	x

Similarity search		x	x
Flow / counter flow		x	x
Face detection		x	
Tamper detection		x	
Motion+		x	x
Idle/removed object		x	
Crowd density estimation		x	
Object filters	Duration	x	x
	Size	x	x
	Aspect ratio	x	x
	Speed	x	x
	Direction	x	x
	Object classes (4)**	x	x
	Color	x	x
Tracking modes	Standard (2D) tracking	x	x
	3D tracking	x	x
	3D People tracking	x	x
	Ship tracking	x	x
	Museum mode	x	x

** Object classes: Person, Bike, Car, Truck

Network

Standard/Video compression	H.265, H.264 (ISO/IEC 14496), M-JPEG, JPEG
Streaming	Multiple and independent streams using H.264 or H.265, plus M-JPEG. Configurable frame rate and bandwidth. Regions of Interest (ROI).
Supported Streams	1080p 720p 4:3 1.3M 1280 1024 400x 720 upright (cropped) D1 4:3 (cropped) SD

Resolution (H x V)

1080p HD	1920 x 1080
720p HD	1280 x 720
432p SD	768 x 432
288p SD	512 x 288
144p SD	256 x 144

Protocols	IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP/RTCP, IGMP V2/V3, ICMP, ICMPv6, RTSP, FTP, Telnet, ARP, DHCP, APIPA (Auto-IP, link local address), NTP (SNTP), 802.1x, DNS, DNSv6, DDNS (Dyn.com, selfHOST.de, no-ip.com), SMTP, iSCSI, UPnP (SSDP), DiffServ (QoS), LLDP, SOAP, Dropbox, CHAP, digest authentication
Ethernet	10BASE-T/100BASE-TX, auto-sensing, half/full duplex
Encryption	TLS 1.0, SSL, DES, 3DES, AES
Ethernet connector	RJ45
Connectivity	ONVIF Profile S, Auto-MDIX
GOP Structure	IP, IBP, IBBP
Data Rate	9.6 kbps to 6 Mbps
Overall IP Delay	240 ms (typical)

The average typical optimized bitrate in kbits/s for various visible imaging frame rates is shown in the following table:

FPS	1080p	720p	480p
60	4200	2600	2000
30	2600	1300	1000
15	2100	1100	800
10	1800	1000	700
5	1250	600	450
2	500	270	200

Optimized bit rates for thermal image stream will typically average less than 800kbits/s.
Actual bitrate may vary depending on the scene complexities and encoding configurations.

Audio streaming	
Standard	G.711, 8 kHz sampling rate L16, 16 kHz sampling rate AAC-LC, 48 kbps at 16 kHz sampling rate AAC-LC, 80 kbps at 16 kHz sampling rate
Signal-to-Noise Ratio	>50 dB

Local Storage

Local storage	
Capacity	Maximum of 4 hours
Recording	Includes continuous recording of the HD 1080p visible image stream @60fps, the SD thermal image stream @60 fps, and audio. Scheduled recordings and alarm/event recordings are also supported.

Miscellaneous

Sectors / Title	4, 8, 12, or 16 user-selectable, independent sectors, each with 20 characters per title
Privacy Masks	32 individually configurable privacy masks; maximum 8 per preposition scene; Programmable with 3, 4 or 5 corners; Selectable color of black, white, grey, or red.
Virtual Masks	24 individually configurable masks to hide parts of the scene (background motion such as moving trees, pulsating lights, busy roads, etc.) which should not be considered for flow analysis to trigger Intelligent Tracking.
Pre-positions	256, each with 20 characters per title
Guard Tours	Custom Recorded Tours - two (2), total duration 30 minutes: Preposition tour - one (1), consisting of up to 256 scenes consecutively, and one (1) customized with up to 256 user-defined scenes
Supported Languages	English, Czech, Dutch, French, German, Italian, Polish, Portuguese, Russian, Spanish, Japanese, Chinese
Supported Serial Protocols	Bosch OSRD, Pelco D/P, Forward Vision, Cohu. Requires separate eLicense installation.
Washer Pump Interface	Control functions integrated. MIC-ALM-WAS-24 Alarm/Washer Interface Unit (sold separately) provides electrical interface to user supplied washer pump device.

Additional functions	
Video authentication	Off / Watermark / MD5 / SHA-1 / SHA-256
Display stamping	Name; Logo; Time; Alarm message
Pixel counter	Selectable area

Mechanical

Drive Unit	Brushless, integral pan/tilt motor drive
Pan Range	360° continuous rotation
Tilt Angle	296° (upright orientation) 256° (inverted orientation)
Tilt Range	-58° - +90° (upright orientation) -90° - +38° (inverted orientation)

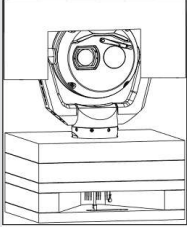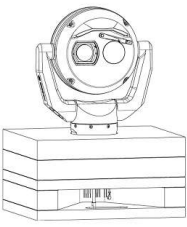|	
Variable Pan Speed	0.2°/second - 120°/second
Variable Tilt Speed	0.2°/second - 90°/second
Pre-position Speed	120°/second
Preset Accuracy	± 0.17° (typical)
Proportional Pan / Tilt to Zoom	Yes
Intelligent Tracking Speed	4°/second – 120°/second
Audible Noise	<65dB

Electrical

Input voltage	21-30 VAC, ±10%, 50/60 Hz, and/or High Power over Ethernet 56VDC nominal
Current Consumption	1.5A (24VAC) 3.0A (High PoE)
Power Consumption (Includes integrated heater, defroster, and fan)	72W (24VAC) 84W (High PoE)
High PoE	95W High Power over Ethernet (Requires NPD-9501A midspan from Bosch (sold separately).) 56VDC
Redundant configuration	Connect both High PoE Midspan and a separate 24 VAC power source. If either the High PoE or 24 VAC power source fails, the camera seamlessly transitions over to use the remaining power source.

Communications / Software Control

Camera Setup/ Control	Via Internet Explorer web browser version 7.0 or later, Bosch Configuration Manager, Bosch Video Management System (BVMS), Video Client (BVC), or support for third party software

User Connections

Accessory Interface/ Control Data	RS-485, Simplex, half and full duplex, user-selectable baud rate or auto-baud Used to communicate with optional MIC-ALM-WAS-24 Alarm/washer interface box or Bosch OSRD, Pelco P/D, Forward Vision, and Cohu serial protocols.
Power, network	Ethernet High PoE (95 W) RJ-45 100/1000Base-TX, male connector; Female to female RJ-45 coupler included
Power, pigtail	24 VAC (nominal)

Audio	Full duplex Line in: 9 kohm typical, 5.5 Vpp max Line out: 3.0 Vpp at 10 Kohm typical, 2.3 Vpp at 32 Kohm typical, 1.7 Vpp at 16 ohm typical
Chassis ground	Ground wire with connector lug

Pre-configuration options	In-box	Desktop (using packaging insert)

Environmental

Operating temperature	-40 °C to +65 °C (-40 °F to +149 °F)
Cold Start-up Temperature	-40 °C (-40 °F) (Requires 60-minute warm-up prior to PTZ operations.)
Storage Temperature	-40 °C to +70 °C (-40 °F to +158 °F)
Humidity	0-100%
Wind Load	240 kph (150 mph) (sustained) 290 kph (180 mph) (gusts) Camera: 517 N (116 lbf) MIC Wall Mount: 130 N (29 lbf)
Effective Projected Area (EPA):	Camera: 0.192 m² / 2.06 ft² MIC Wall Mount: 0.0483 m² / 0.52 ft²
Vibration	IEC 60068-2-6, Test Fc: Vibration (sinusoidal), 20m/s² (2.0g) Sinusoidal vibration test IAW MIL-STD-167-1A
Shock	IEC 60068-2-7, Test Ea: Shock, 40g, 6ms Half Sine Impulse Medium weight Hammer Shock IAW MIL-S-901D
Ingress Protection Rating/Standard	IP68 NEMA 6P, when using installed MIC-DCA or MIC wall mount IP67 (moisture and dust) rating on connectors in the base of the camera
IK Code	IK10 (excluding windows)

Construction

Dimensions (W x H x D)	TBD 267 mm x 452 mm x 201 mm (10.5 in. x 17.8 in. X 7.9 in.)
Weight	10 kg (22 lb)

|	
Window	Borosilicate glass (optical) Germanium (thermal)
Construction Material	Cast solid aluminum
Window Wiper	Integrated, long-life silicone wiper; Optional 'wiper brush' is available separately
Heater	Integrated
Fan	Integrated
Defroster	Integrated with de-icing capability (both optical and thermal windows)
Sunshield (to minimize sun loading in hot climates)	Optional; sold separately
Standard Colors	Black (RAL9005), White (RAL9010), Grey (RAL7001), Desert (Some colors may not be available in some regions.)
Standard Finish	Alodine 5200 surface treatment with powder coat paint, sand finish

Mounts/Accessories

Deep Conduit Adapter (DCA)	Hinged deep conduit adapter pedestal mount
Deep Conduit Adapter (DCA) with thread adapter	Hinged deep conduit adapter pedestal mount with thread adapter
Thread adapter	M25 to ¾" NPT thread adapter for use with DCA
Wall Mount	Allows camera mounting on a wall
Corner Mount	Allows camera mounting on a corner
Pole Mount	Allows camera mounting on a pole
Shallow Conduit Adapter	Allows routing of cables through a wall mount, pole mount, or spreader plate to camera
Spreader Plate	Allows camera mounting on brickwork
Network Midspan	Provides data and power to camera over Ethernet (CAT5e/CAT6 cable)
24VAC Power Supply	Provides 24VAC to camera
MIC-ALM-WAS-24	Provides interface to alarms and washer pump connections
MIC-IP67-5PK	Pack of connectors that provide IP67-rated protection from dust or moisture
Sunshield	Minimizes sun loading to camera
Wiper Brush	Cleans sand and dust from the camera's viewing window

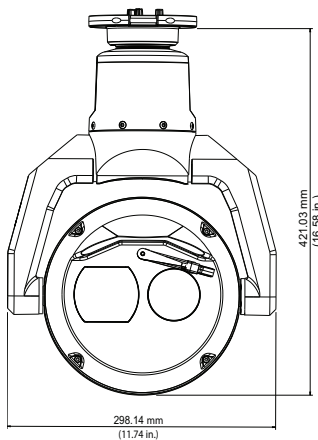| MIC-WKT-IR	Allows camera connection to a washer pump
Serial Protocol License	Software license (e-license) for IP cameras

Refer to individual accessory data sheets for complete details.
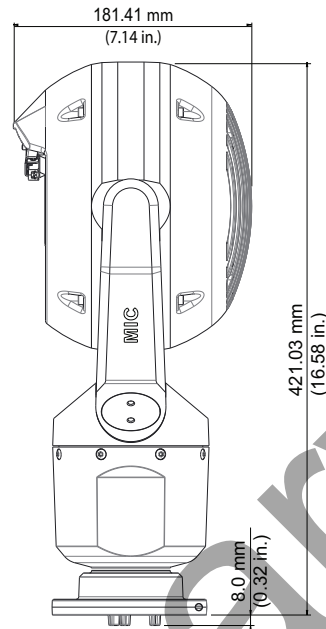
Dimensional Drawings
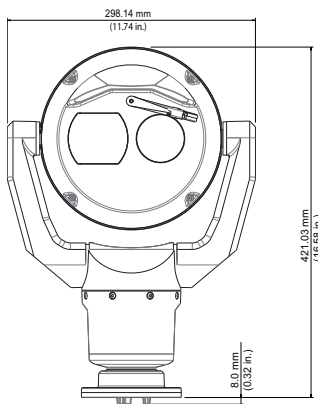
Front view – upright

Front view - inverted

Side view - upright

Ordering information

MIC-9502-Z30BQS Thermal PTZ QVGA <9Hz 2MP 30x black
Ruggedized dual thermal/visible PTZ camera. 30x visible zoom. Thermal imager with standard resolution (320x240 pixels), <9 Hz frame rate, and 19 mm lens. Black housing color.
Order number **MIC-9830-PB8TS**

MIC-9502-Z30WQS Thermal PTZ QVGA <9Hz 2MP 30x white
Ruggedized dual thermal/visible PTZ camera. 30x visible zoom. Thermal imager with standard resolution (320x240 pixels), <9 Hz frame rate, and 19 mm lens. White housing color.
Order number **MIC-9502-Z30WQS**

MIC-9502-Z30GQS Thermal PTZ QVGA <9Hz 2MP 30x grey
Ruggedized dual thermal/visible PTZ camera. 30x visible zoom. Thermal imager with standard resolution (320x240 pixels), <9 Hz frame rate, and 19 mm lens. Grey housing color.
Order number **MIC-9502-Z30GQS**

MIC-9502-Z30BVS Thermal PTZ VGA <9Hz 2MP 30x black
Ruggedized dual thermal/visible PTZ camera.30x visible zoom. Thermal imager with high resolution (640x480 pixels), <9 Hz frame rate, and 50 mm lens. Black housing color.
Order number **MIC-9502-Z30BVS**

MIC-9502-Z30WVS Thermal PTZ VGA <9Hz 2MP 30x white
Ruggedized dual thermal/visible PTZ camera.30x visible zoom. Thermal imager with high resolution (640x480 pixels), <9 Hz frame rate, and 50 mm lens. White housing color.
Order number **MIC-9502-Z30WVS**

MIC-9502-Z30GVS Thermal PTZ VGA <9Hz 2MP 30x grey
Ruggedized dual thermal/visible PTZ camera.30x visible zoom. Thermal imager with high resolution (640x480 pixels), <9 Hz frame rate, and 50 mm lens. Grey housing color.
Order number **MIC-9502-Z30GVS**

MIC-9502-Z30BVF Thermal PTZ VGA 30Hz 2MP 30x black
Ruggedized dual thermal/visible PTZ camera. 30x visible zoom. Thermal imager with high resolution (640x480 pixels), 30 Hz frame rate, and 50 mm lens. Black housing color.
Export controlled – U.S. Department of Commerce export license may be required.
Order number **MIC-9502-Z30BVF**

MIC-9502-Z30WVF Thermal PTZ VGA 30Hz 2MP 30x white
Ruggedized dual thermal/visible PTZ camera. 30x visible zoom. Thermal imager with high resolution (640x480 pixels), 30 Hz frame rate, and 50 mm lens. White housing color.
Export controlled – U.S. Department of Commerce export license may be required.
Order number **MIC-9502-Z30WVF**

MIC-9502-Z30GVF Thermal PTZ VGA 30Hz 2MP 30x grey
Ruggedized dual thermal/visible PTZ camera. 30x visible zoom. Thermal imager with high resolution (640x480 pixels), 30 Hz frame rate, and 50 mm lens. Grey housing color.
Export controlled – U.S. Department of Commerce export license may be required.
Order number **MIC-9502-Z30GVF**

MIC-M25XNPT34 Adapter, M25 to 3/4", Stainless Steel
Stainless Steel M25 to ¾" NPT thread adapter
Order number **MIC-M25XNPT34**

MIC-9K-SNSHLD-W Sunshield for MIC IP thermal cameras white
Sunshield kit for MIC IP fusion 9000i cameras, white color. Recommended for use with white color MIC IP fusion 9000i cameras installed in locations with high sun load.
Order number **MIC-9K-SNSHLD-W**

MIC-WIPER-BRSH Wiper Brush for MIC IP thermal cameras
Wiper brush for MIC IP fusion 9000i cameras, especially those installed in sandy/dusty locations
Order number **MIC-WIPER-BRSH**

Accessories

NPD-9501A High PoE midspan 95 W, single port, AC in
High PoE, 95 W, Single port indoor Midspan. 120/230VAC input. Supplies a data and power interface to camera using a single standard CAT5e (or better) network cable.
Order number **NPD-9501A**

VG4-A-PSU1 120 VAC Power Supply Unit
120VAC input, 24VAC output @ 100W power supply. Suitable for powering AUTODOME, MIC IP 7000, and MIC IP fusion 9000i cameras. White aluminum enclosure with cover. IP66 ingress. IK10 impact.
Order number **VG4-A-PSU1**

VG4-A-PSU2 230 VAC Power Supply Unit
230VAC input, 24VAC output @ 100W power supply. Suitable for powering AUTODOME, MIC IP 7000, and MIC IP fusion 9000i cameras. White aluminum enclosure with cover. IP66 ingress. IK10 impact.
Order number **VG4-A-PSU2**

MIC-ALM-WAS-24 Alarm/Washer Interface Unit for MIC cameras
Interface box for alarms and washer pump connections for MIC7000 and MIC IP fusion 9000i cameras. Requires user-supplied 24 VAC, 50/60 Hz input. Impact-resistant polycarbonate enclosure. IP67 and NEMA 4X rated ingress. Includes four (4) watertight glands. Grey (RAL 7035) enclosure color.
Order number **MIC-ALM-WAS-24**

MIC-DCA-HB MIC Hinged DCA, Black
DCA mount for MIC7000 and MIC IP fusion 9000i cameras. Provides a convenient mounting platform and a means for connecting signal cables using conduit or cable gland interfaces. Hinge allows camera to hang temporarily during installation for easier connection of cables/wiring. Aluminum. Two M25 holes for conduit/cable glands.
Black (RAL 9005) color.
Order number **MIC-DCA-HB**

MIC-DCA-HBA MIC Hinged DCA with Adapter, Black
DCA mount for MIC7000 and MIC IP fusion 9000i cameras. Provides a convenient mounting platform and a means for connecting signal cables using conduit or cable gland interfaces. Hinge allows camera to hang temporarily during installation for easier connection of cables/wiring. Aluminum. Two M25 holes for conduit/cable glands. Includes an conduit adapter (male M25 to female 3/4" NPT). Available in specific regions only.
Black (RAL 9005) color.
Order number **MIC-DCA-HBA**

MIC-DCA-HW MIC Hinged DCA, White
DCA mount for MIC7000 and MIC IP fusion 9000i cameras. Provides a convenient mounting platform and a means for connecting signal cables using conduit or cable gland interfaces. Hinge allows camera to hang temporarily during installation for easier connection of cables/wiring. Aluminum. Two M25 holes for conduit/cable glands.
White (RAL 9010) color.
Order number **MIC-DCA-HW**

MIC-DCA-HWA MIC Hinged DCA with Adapter, White
DCA mount for MIC7000 and MIC IP fusion 9000i cameras. Provides a convenient mounting platform and a means for connecting signal cables using conduit or cable gland interfaces. Hinge allows camera to hang temporarily during installation for easier connection of cables/wiring. Aluminum. Two M25 holes for conduit/cable glands. Includes an conduit adapter (male M25 to female 3/4" NPT). Available in specific regions only.
White (RAL 9010) color.
Order number **MIC-DCA-HWA**

MIC-DCA-HG MIC Hinged DCA, Grey
DCA mount for MIC7000 and MIC IP fusion 9000i cameras. Provides a convenient mounting platform and a means for connecting signal cables using conduit or cable gland interfaces. Hinge allows camera to hang temporarily during installation for easier connection of cables/wiring. Aluminum. Two M25 holes for conduit/cable glands.
Grey (RAL 7001) color. Available in specific regions only.
Order number **MIC-DCA-HG**

MIC-DCA-HGA MIC Hinged DCA with Adapter, Grey
DCA mount for MIC7000 and MIC IP fusion 9000i cameras. Provides a convenient mounting platform and a means for connecting signal cables using conduit or cable gland interfaces. Hinge allows camera to hang temporarily during installation for easier connection of cables/wiring. Aluminum. Two M25 holes for conduit/cable glands. Includes an conduit adapter (male M25 to female 3/4" NPT). Available in specific regions only.
Grey (RAL 7001) color.
Order number **MIC-DCA-HGA**

MIC-WMB-BD Wall Mount Bracket, Black
Wall mount bracket, black sand finish (RAL9005)
Order number **MIC-WMB-BD**

MIC-WMB-WD Wall Mount Bracket, White
Wall mount bracket, white sand finish (RAL9010)
Order number **MIC-WMB-WD**

MIC-WMB-MG Wall Mount Bracket, Grey
Wall Mount Bracket.
Grey (RAL 7001). Available in specific regions only.
Sand finish.
Order number **MIC-WMB-MG**

MIC-PMB Pole Mount Bracket
Pole mount bracket (includes 2 x 455 mm stainless steel banding straps for pole diameters 75 to 145 mm)
Order number **MIC-PMB**

MIC-CMB-BD Corner Mount Bracket, Black
Corner mount bracket, black sand finish (RAL9005)
Order number **MIC-CMB-BD**

MIC-CMB-WD Corner Mount Bracket, White
Corner mount bracket, white sand finish (RAL9010)
Order number **MIC-CMB-WD**

MIC-CMB-MG Corner Mount Bracket, Grey
Corner mount bracket.
Grey (RAL 7001). Available in specific regions only.
Sand finish.
Order number **MIC-CMB-MG**

MIC-SPR-BD Spreader Plate, Black
Aluminum spreader plate suitable for brickwork surface mounting, black sand finish (RAL9005)
Order number **MIC-SPR-BD**

MIC-SPR-WD Spreader Plate, White
Aluminum spreader plate suitable for brickwork surface mounting, white sand finish (RAL9010)
Order number **MIC-SPR-WD**

MIC-SPR-MG Spreader Plate, Grey
Aluminum spreader plate suitable for brickwork surface mounting.
Grey (RAL 7001). Available in specific regions only.
Sand finish.
Order number **MIC-SPR-MG**

MIC-SCA-BD Shallow Conduit Adapter, Black
Shallow conduit adapter for a MIC-WMB, a MIC-PMB, or a MIC-SPR, black sand finish (RAL9005)
Order number **MIC-SCA-BD**

MIC-SCA-WD Shallow Conduit Adapter, White
Shallow conduit adapter for a MIC-WMB, a MIC-PMB, or a MIC-SPR mount, white sand finish (RAL9010)
Order number **MIC-SCA-WD**

MIC-SCA-MG Shallow Conduit Adapter, Grey
Shallow conduit adapter for a MIC-WMB, a MIC-PMB, or a MIC-SPR.
Grey (RAL 7001). Available in specific regions only.
Sand finish.
Order number **MIC-SCA-MG**

MIC-IP67-5PK MIC7000 IP67 Connector Kit, 5Pack
5-pack weather protection kit for MIC7000 or MIC IP fusion 9000i thermal cameras. Provides an IP67-rated barrier against dust or moisture. Recommended when MIC camera is mounted directly to installation surface (instead of onto a MIC-DCA or MIC wall mount). White color.
Order number **MIC-IP67-5PK**

MIC-WKT-IR Washer Kit
Washer kit for analog infrared MIC camera models and
for MIC7000 camera models only.
Order number **MIC-WKT-IR**

Software Options

MVS-FCOM-PRCL Software License for IP Cameras
Serial Protocol Software License (e-license) for IP
Cameras
Order number **MVS-FCOM-PRCL**