

A 360-DEGREE OVERVIEW IN A SINGLE IMAGE

FLEXIDOME panoramic 5100i
FLEXIDOME panoramic 5100i IR

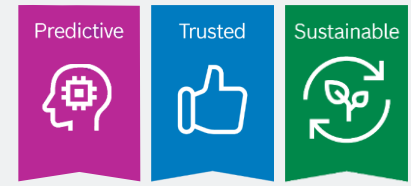
June 2021



BOSCH

FLEXIDOME panoramic 5100i (IR)

Agenda



New panoramic product family

- ▶ New features in Bosch panoramic cameras
- ▶ Applications and use cases

Predictive

Built-in artificial intelligence (AI)

- ▶ Intelligent Video Analytics (IVA)
- ▶ Camera Trainer
- ▶ Audio Analytics

Trusted

- ▶ High image quality
- ▶ Data management
- ▶ Data security

Sustainable

- ▶ Design and accessories
- ▶ Easy installation
- ▶ Remote maintenance and firmware updates with Remote Portal

Slide 3 - 7

Slide 8 - 16

Slide 17 - 23

Slide 24 - 32

FLEXIDOME panoramic 5100i (IR)

A 360-degree overview in a single image without blind spots

The new FLEXIDOME panoramic 5100i cameras combine built-in Artificial Intelligence with a 360-degree overview in a single image without blind spots.

They are prepared for Audio Analytics with a built-in microphone array that captures audio from any direction.

FLEXIDOME panoramic 5100i



NEW

6MP | 12MP

FLEXIDOME panoramic 5100i IR



NEW

6MP | 12MP

FLEXIDOME panoramic 5100i (IR)














5100i bringing more value to panoramic surveillance



| | 5100i | 7000 (ID) | 5100i (IR) | 7000 (OD) |
|-----------------------------|-------|-----------|------------|-----------|
| 12MP sensor | ✓ | ✓ | ✓ | ✓ |
| Intelligent Video Analytics | ✓ | ✓ | ✓ | ✓ |
| Edge dewarping | ✓ | ✓ | ✓ | ✓ |
| Local recording | ✓ | ✓ | ✓ | ✓ |
| Integrated microphone array | ✓ | ✗ | ✓ | ✗ |
| HDR | ✓ | ✗ | ✓ | ✗ |
| IK10 / IP66 | ✗ | ✗ | ✓ | ✓ |
| IR | ✗ | ✗ | ✓ | ✗ |
| HDMI | ✓ | ✗ | ✓ | ✗ |
| H.265 | ✓ | ✗ | ✓ | ✗ |
| Power input (12V / 24V) | ✗ | ✗ | ✓ | ✗ |

FLEXIDOME panoramic 5100i (IR)





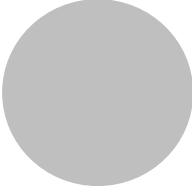

Evolution of AI and panoramic imaging

| Artificial Intelligence | | Highest quality of relevant images | | Designed for easy connectivity | | Easy installation | |
|---|---|--|--|--------------------------------|---|---|--|
| Prepared for Audio Analytics |  | Stereographic fish-eye lens (improved edge-to-edge resolution) |  | Audio I/O |  | 1,2,3 installation concept (outdoor) |  |
| Built-in Intelligent Video Analytics and Camera Trainer |  | Higher effective resolution (3008 x 3008 on 12MP sensor) |  | Alarm I/O |  | Twist & Click (indoor) |  |
| | | Infrared (outdoor models) |  | HDMI output |  | Ability to rotate the imager for easy field-of-view alignment |  |
| | | Perfect exposure in unevenly lit scenes |  | | | Full range of accessories |  |

Note: Certain features might not be available at release or performance can be limited (Audio Analytics, Onboard dewarping, HDMI out are expected to be available in Q4 2021)

FLEXIDOME panoramic 5100i (IR)

Panoramic vs multi-directional cameras

| | | |
|---------------|--|---|
| Product type |  Panoramic |  Multi-directional (repositionable) |
| Field of view |  360° |  |
| Image display |  |  |
| Benefits | No blind spots, compact size | Flexible set-up, zoom for detailed coverage |

FLEXIDOME panoramic 5100i (IR)

Verticals and applications

Education

- ▶ Entrances / lockers / stairways



Retail

- ▶ Cashiers / storage rooms / aisles
- ▶ Entrances / parking lots



Commercial

- ▶ Shopping malls
- ▶ Casinos



Airports

- ▶ Border control / entrances / waiting areas / check-in desks



Gas stations

- ▶ Inside the store / outside at petrol filling stations



Banking

- ▶ Entrance / ATM rooms / waiting areas / clerk counters / vaults



FLEXIDOME panoramic 5100i (IR)

Why choose Bosch panoramic cameras?

Predictive

Predictive



- ▶ Built-in AI
 - ▶ Intelligent Video Analytics
 - ▶ Camera Trainer
- ▶ Prepared for Audio Analytics
 - ▶ Recognizes and detects unique audio signatures
 - ▶ Locates approximate direction of an audio event source

Trusted

Trusted



- ▶ 360-degree coverage without blind spots
 - ▶ Offering 6/12MP resolution (30fps)
 - ▶ HDR imaging with improved details
- ▶ Integrated IR (up to 20m / 66ft)
- ▶ Prepared for the future with a new platform (CPP.14)

Sustainable

Sustainable



- ▶ Compact size
- ▶ Easy installation
- ▶ Remote maintenance and firmware updates with Remote Portal



FLEXIDOME panoramic 5100i (IR)

Intelligent Video Analytics

Video analytics helps to:



Focus attention
and alerts only
when needed



Quickly retrieve
correct data



Minimize
network strain

Video Analytics reliable in various environments:



Reliable alerts,
in extreme
weather

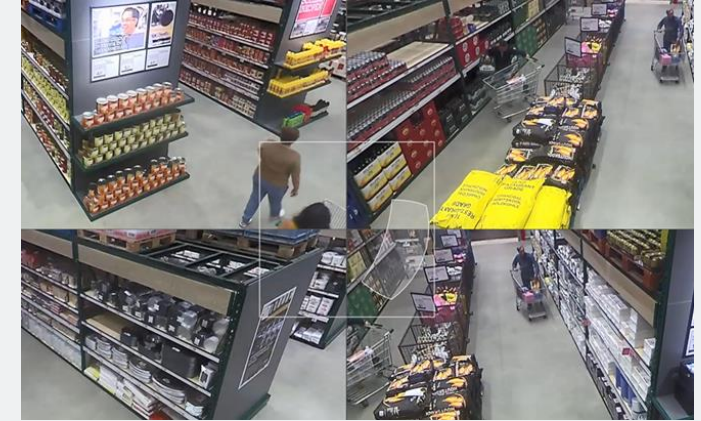


Extremely
resistant
against shaking



FLEXIDOME panoramic 5100i (IR)

Complete coverage in a single image without blind spots



Challenge

- ▶ Supermarket aisles, hallways in L shapes or corners of buildings are more difficult to secure

Solution

- ▶ Obtain high resolution overviews with one panoramic camera with 20m IR
- ▶ Use built-in Video Analytics to track anyone moving in the camera's field of view

Benefit

- ▶ Larger (and unusual shaped) areas are covered in high resolution
- ▶ Enhanced security with built-in intelligence



FLEXIDOME panoramic 5100i (IR)

Improve security and deliver business insights

Enforcing health and safety regulations



- Improve safety with blocked emergency exit notifications

Increasing customer service levels in retail



- Queue notification and management



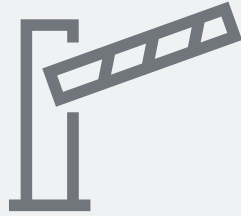
FLEXIDOME panoramic 5100i(IR)

Machine Learning - Camera Trainer

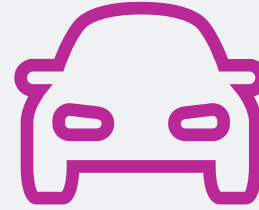
With the **Camera Trainer** you can teach your camera to:



**Detect
user-defined objects**



**Recognize
user-defined situations**



**Find
stationary objects**



**Separate objects
clustered together**

Enable cameras to detect objects or situations that matter most to you.

FLEXIDOME panoramic 5100i(IR) Camera Trainer

Predictive



Improve accuracy and make
Video Analytics more relevant
to customer needs



Improve operational safety
and efficiency



Open up new
business opportunities



Teach cameras to detect objects or situations that you previously couldn't detect



FLEXIDOME panoramic 5100i(IR)

An example of Camera Trainer in action



Challenge

- ▶ The need to know how many parking spaces are occupied plus reliable information to optimize traffic flow.

Solution

- ▶ With Camera Trainer you can teach your system to recognize occupied and free parking spots
- ▶ Panoramic cameras can cover parking lots opposite each other and show which spots are free (green/red)

Benefit

- ▶ Car drivers can easily identify free spots
- ▶ Alert when all spots are occupied
- ▶ Save costs by not having to put sensors in the ground
- ▶ Obtain business intelligence insights



FLEXIDOME panoramic 5100i IR

Prepared for Audio Analytics (planned for end 2021)

Integrated microphone array prepared for Audio Analytics



- ▶ 3 built-in digital Micro Electro-Mechanical System (MEMS) microphones

Understand semantics of audio data with Audio Analytics



- ▶ Audio events classification:
 - ▶ Glass breaking
 - ▶ Gunshot detection
 - ▶ Screaming or other loud noises
 - ▶ T3 and T4 alarm (smoke or CO alarm signal is recognized (by the camera))
- ▶ Audio localization to indicate direction of sound

Software supports informed decisions



- ▶ The classification of events and direction is passed to the software
- ▶ Alarm functionality (rules that trigger on certain sound types)



FLEXIDOME panoramic 5100i (IR)

Evaluate a complete scene with Intelligent Insights

Detect and monitor
build-up of people or objects



Early information about highly-occupied
areas to quickly initiate security measures

Accurate counting of
people or objects



Early indication of unusual increase of people
crossing a certain line, such as entrances

Area fill level traffic light



Support new regulatory requirements
regarding social distancing

FLEXIDOME panoramic 5100i (IR)

Bosch quality principles

Trusted



High quality imaging technologies



Data management



Highest levels of data security
and privacy protection



FLEXIDOME panoramic 5100i (IR)

A 360 overview in a single image

A powerful platform (CPP14) that offers:

Enhanced image performance

- ▶ 6MP/12MP sensors with IR (outdoor model)

Enhanced multi-streaming

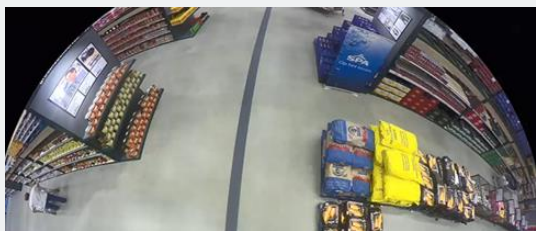
- ▶ Multiple streams in H.265, H.264 and M-JPEG, configurable frame rate and bandwidth.
- ▶ Multiple channels with edge dewarping

Intelligence

- ▶ Built-in Intelligent Video Analytics and Camera Trainer
- ▶ Prepared for Audio Analytics based on AI

Full suite of advanced data security features

- ▶ Secure boot, which only allows Bosch-signed firmware
- ▶ Secure Element (SE) with TPM functionality



FLEXIDOME panoramic 5100i (IR)

High quality imaging



120 dB



**360-degree overview in
high effective
resolution**

Capture every detail



**Available with
Infrared Illumination
(20m / 66ft)**

Clear images in low light
areas



High dynamic range

Perfect exposure in
unevenly lit scenes



Smooth images

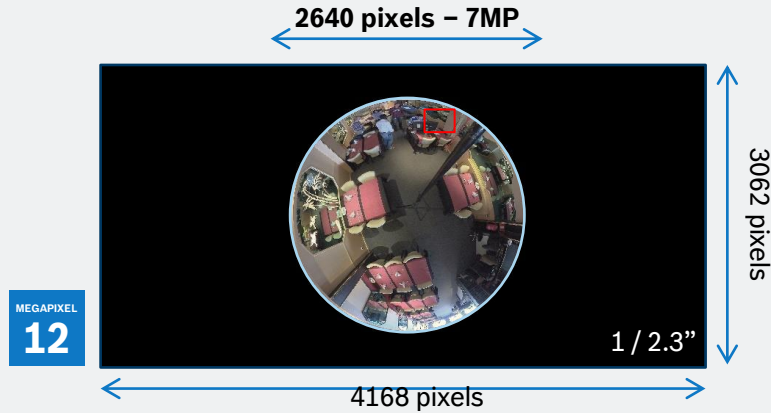
Frame rate 30fps (in edge
dewarping mode provides
30fps on all channels)

FLEXIDOME panoramic 5100i (IR)

More pixels on target

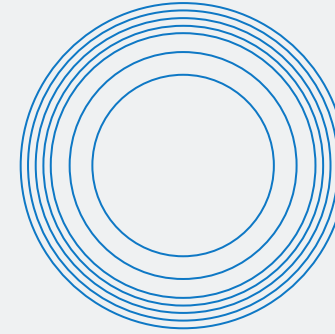


Higher effective resolution (+2MP)



Lens projection

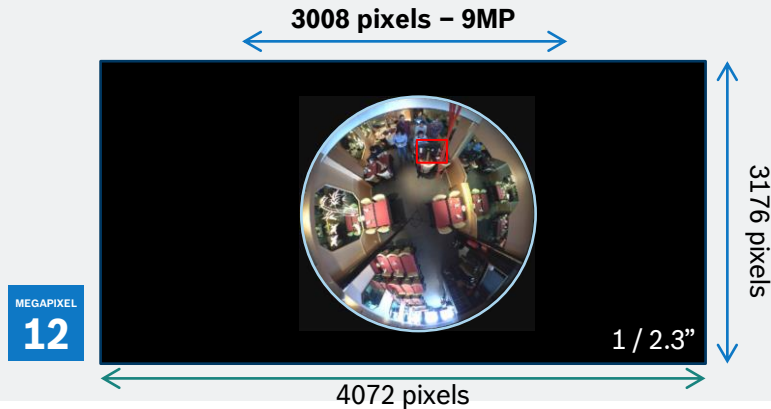
Equidistant



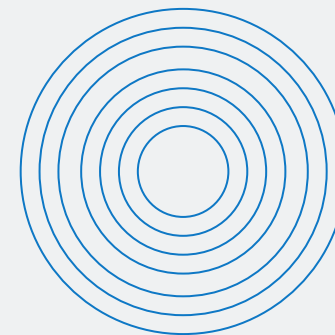
Highest resolution in the center

All straight lines are bent, especially towards the edges

NEW



Stereographic



Evenly spread resolution, gaining at edges

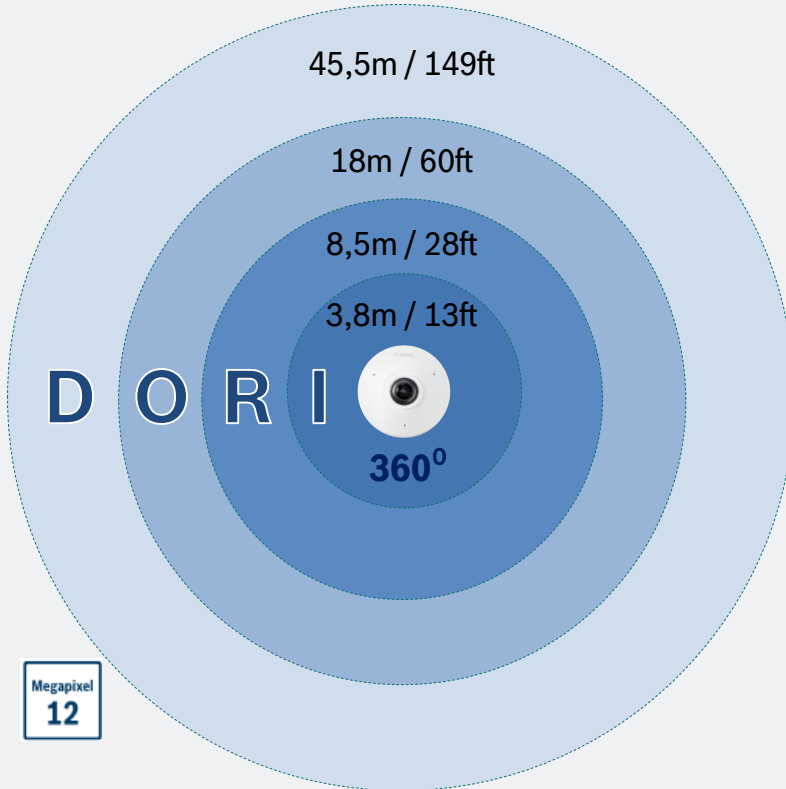
Objects retain their true shape, even near the edges

FLEXIDOME panoramic 5100i (IR)

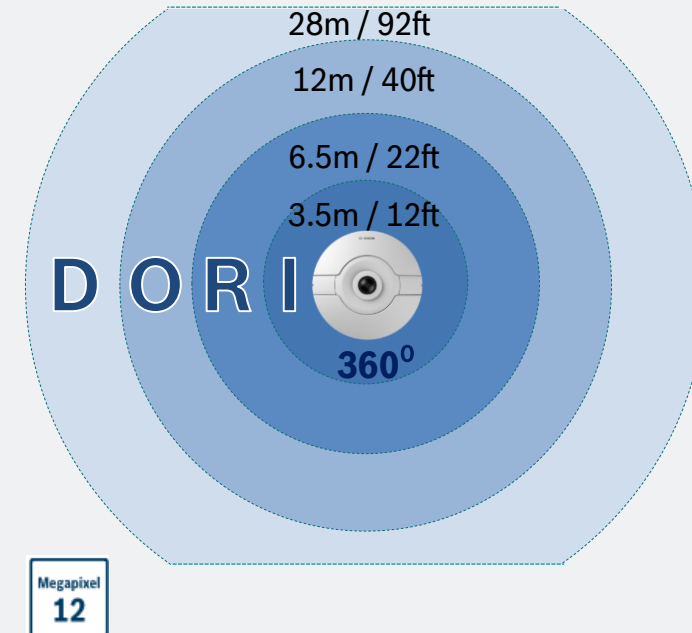
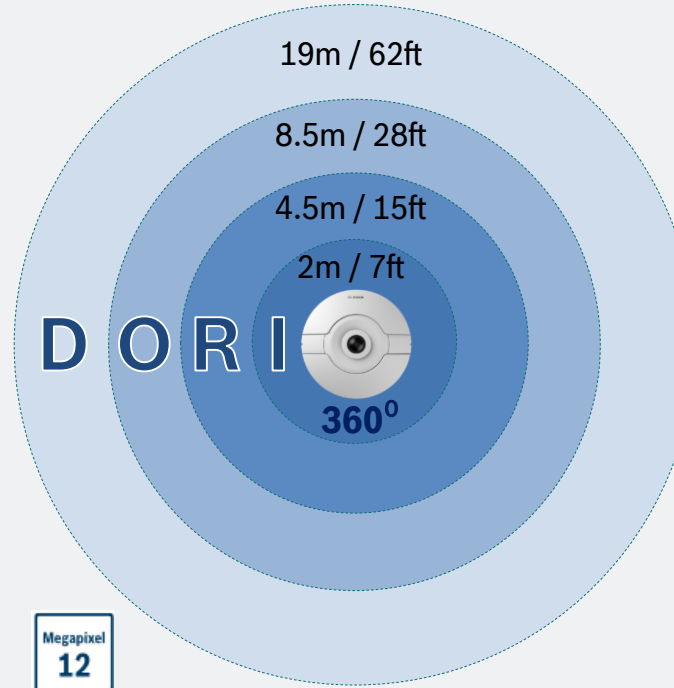
Same sensor resolution, but twice the DORI distance



FLEXIDOME panoramic 5100i (IR)



FLEXIDOME panoramic 6000 / 7000 MP



FLEXIDOME panoramic 5100i (IR)

Reduce bitrate



Lower storage cost

- ▶ Less storage is needed because less data is streamed
 - ▶ H.265 video compression
 - ▶ Dynamic Noise Reduction

Reduce network strain

- ▶ Less network strain because of low bitrate

Reduce number of devices

- ▶ Less rack space
- ▶ Less power consumption (equipment and cooling)

FLEXIDOME panoramic 5100i (IR)

Data security



Our security promise



1

Secured connections supported

2

Password enforcement at set up

3

Unsecure ports disabled

4

Unsecure remote communication disabled

5

Protection against execution of untrusted and malicious code

6

Firmware updates only possible via Bosch-signed firmware files

7

Embedded login firewall. Prevention of Denial of Service (DoS) attacks

8

Software sealing to detect configuration changes

9

Built-in **Secure Element** with TPM functionality. Supports RSA encryption key lengths of up to 4096 bits, ensuring data safety beyond 2030.



FLEXIDOME panoramic 5100i (IR)

A new design in the Bosch portfolio

FLEXIDOME panoramic 5100i (IR)



Protection against
water ingress (IR model)



IP66

NEMA 4X

NEMA TS2

Vandal resistant
(IR model)

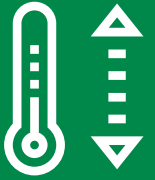


IK10

Two way audio,
alarm I/O, and 3 built-in
MEMS microphones



Wide operating
temperature



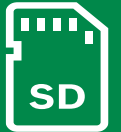
HDMI out

HDMI

Compatible with
modular accessories



Micro SD card slot





FLEXIDOME panoramic 5100i(IR)

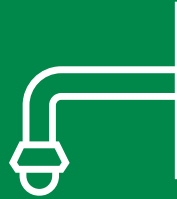
Bosch philosophy to make installation simple



Reduced
installation time
1,2,3 installation
process



Ability to rotate
the imager for
easy field-of-view
alignment



Unified
set of accessories



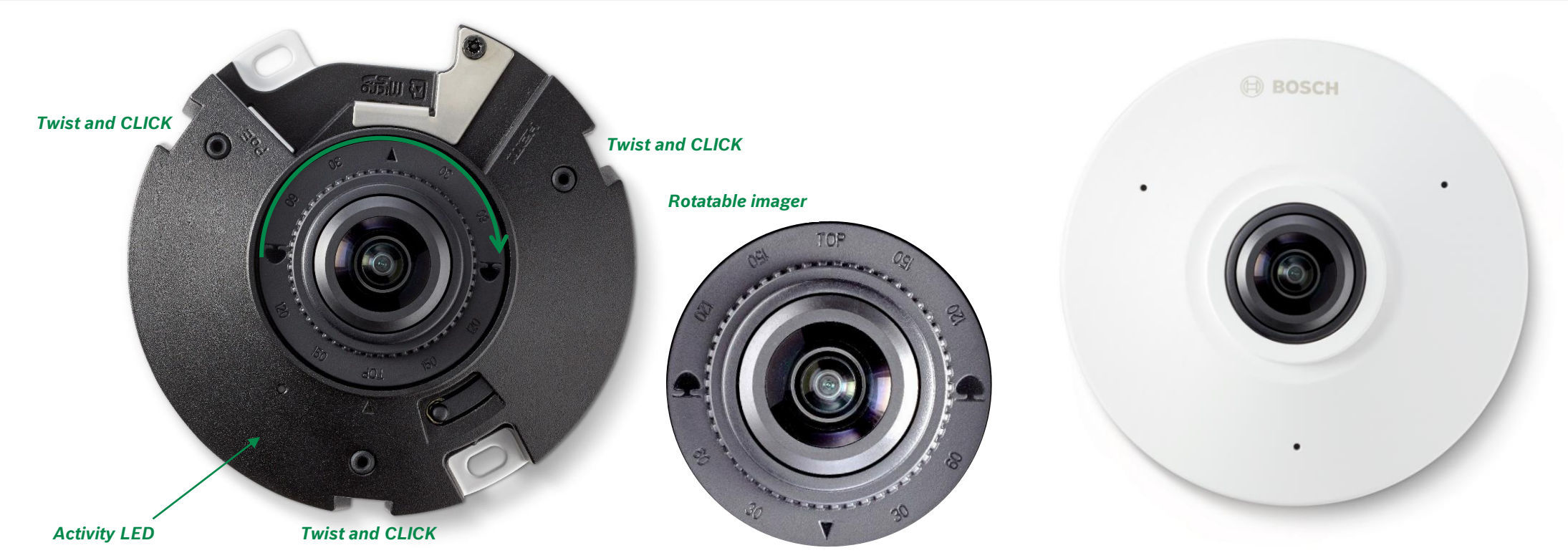
Standardized
screws and
footprint



Calibration
Video analytics is easy to
set up. Simply enter the
height of your camera and
the rest of the calibration is
carried out by the video
analytics itself.

FLEXIDOME panoramic 5100i

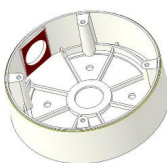
Standard - Easy installation



FLEXIDOME panoramic 5100i IR

Outdoor IR - 1, 2, 3 installation concept

1



Conduit back box sold separately

2



3





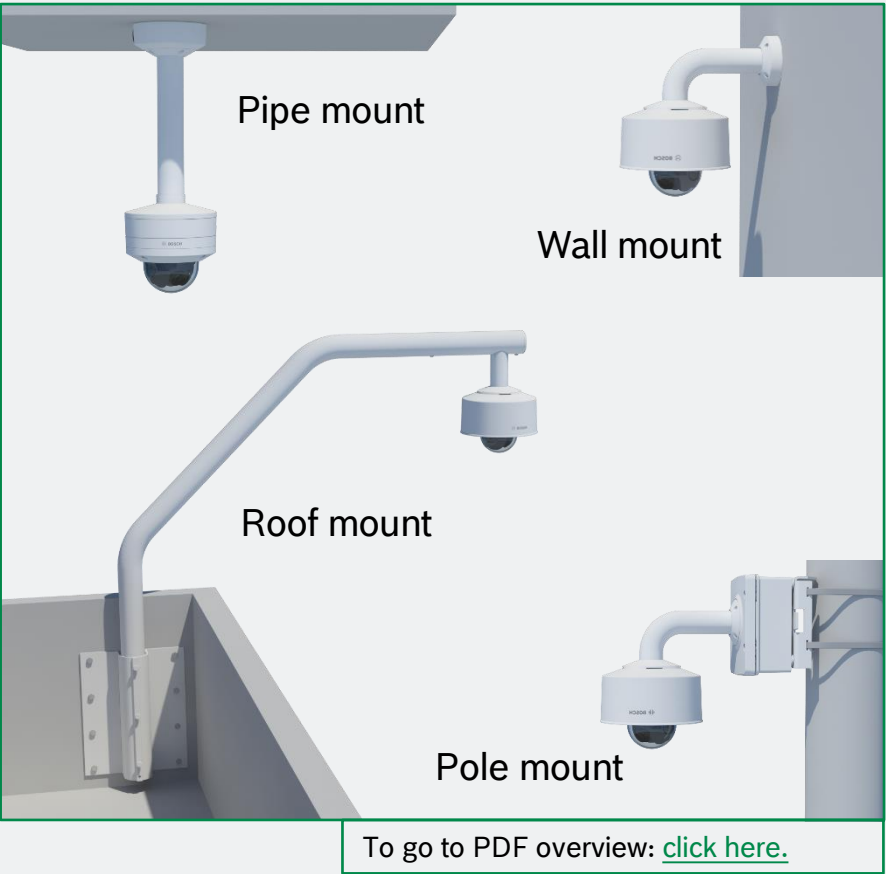
FLEXIDOME panoramic 5100i (IR)

Microphone and LED location

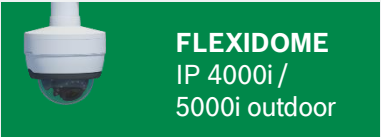
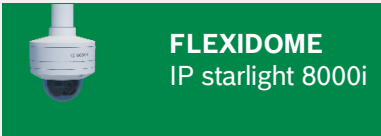


FLEXIDOME panoramic 5100i (IR)

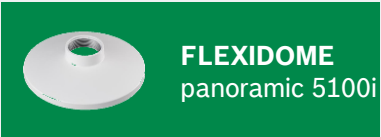
Compatible with modular accessories



Applicable to the following cameras:



And now also to the new
FLEXIDOME panoramic
5100i (IR)



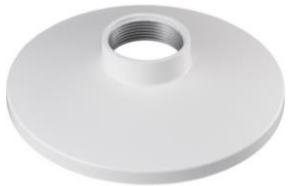


FLEXIDOME panoramic 5100i (IR)

New accessories

| | Material no. | CTN | SAP material description |
|---|---------------|---------------|---|
| 1 | F.01U.389.607 | NDA-5080-PIP | Pendant Interface plate, 148mm |
| 2 | F.01U.394.003 | NDA-5080-PIPW | Pendant interface plate, outdoor, 148mm |
| 1 | F.01U.391.131 | NDA-5081-PIP | Pendant Interface plate, 110mm |
| 2 | F.01U.391.130 | NDA-5081-TM | Tilt mount 20-deg, 110mm |
| 2 | F.01U.389.606 | NDA-5080-TM | Tilt Mount 20-deg, 148mm |
| 3 | F.01U.394.002 | NDA-5081-PLEN | In-ceiling Mount, Plenum rated, 110mm |
| 4 | F.01U.394.004 | NDA-5080-PC | Paintable Cover, NDS-550x-F360LE, 4 pcs |
| 4 | F.01U.394.005 | NDA-5081-PC | Paintable Cover, NDS-550x-F360, 4 pcs |
| 5 | F.01U.394.006 | NDA-U-CBB | Conduit Back Box, 148mm |

1



2



4



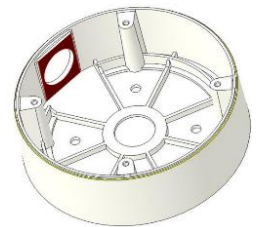
2



3



5



FLEXIDOME panoramic 5100i (IR)

What's in the box?

FLEXIDOME panoramic 5100i

- ▶ Camera base and cover
- ▶ QIG and safety manual
- ▶ Mount sticker
- ▶ TR15 tool (for uSD lock)



FLEXIDOME panoramic 5100i IR

- ▶ Camera base and cover
- ▶ Mount plate
- ▶ 2x I/O connector
- ▶ QIG and safety manual
- ▶ TR20 tool
- ▶ RJ45 punch through tool



FLEXIDOME panoramic 5100i (IR)

A 360-degree overview in a single image without blind spots

The new FLEXIDOME panoramic 5100i cameras combine built-in Artificial Intelligence with a 360-degree overview in a single image without blind spots.

They are prepared for Audio Analytics with a built-in microphone array that captures audio from any direction.



FLEXIDOME
panoramic 5100i



FLEXIDOME
panoramic 5100i IR

Installation made simple



Twist and click for indoor models



Mounting and cabling in three easy steps for outdoor models



Unified set of accessories



HDMI

Built-in Artificial Intelligence with Intelligent Video Analytics and Camera Trainer, prepared for audio analytics



Video Analytics extremely Reliable in various environments



Camera Trainer functionality



Integrated microphone array for Audio Analytics and audio AI

Outdoor models have



IR illumination



High impacts **IK10**



Withstands challenging weather conditions **IP66**

Excellent imaging









Stereographic lens



120 dB lens

Specifications

| FLEXIDOME panoramic 5100i |  |  | Audio I/O, Alarm I/O |  |  |  |  |
|------------------------------|---|---|----------------------|---|---|---|---|
| NDS-5703-F360 | 6MP (2110x2110) | 30fps | | | ● | | -10 to 45°C (-14 to 113°F) |
| NDS-5704-F360 | 6MP (2110x2110) | 30fps | | | ● | | -10 to 45°C (-14 to 113°F) |
| FLEXIDOME panoramic 5100i IR | | | | | | | |
| NDS-5703-F360LE | 6MP (2110x2110) | 30fps | ● | 20m / 66ft | ● | ● | -40 to 55°C (-40 to 131°F) |
| NDS-5704-F360LE | 6MP (2110x2110) | 30fps | ● | 20m / 66ft | ● | ● | -40 to 55°C (-40 to 131°F) |



BOSCH

Back up slides

FLEXIDOME panoramic 5100i (IR)

A 360 overview in a single image

FLEXIDOME panoramic 5100i

- ▶ 360° overview with HDR imaging with no blind spots, with improved details at the edge of the image thanks to stereographic lens
- ▶ 6MP / 12MP resolution
- ▶ Multi-exposure High Dynamic Range (120 dB)
- ▶ Client-side dewarping for easy integration and flexible viewing and recording
- ▶ Edge dewarping available with the next update
- ▶ HDMI out



FLEXIDOME panoramic 5100i (IR)

A 360 overview in a single image



FLEXIDOME panoramic 5100i IR

- ▶ 360° overview with HDR imaging with no blind spots, with improved details at the edge of the image thanks to stereographic lens
- ▶ 6MP / 12MP resolution
- ▶ Multi-exposure High Dynamic Range (120 dB)
- ▶ Client-side dewarping for easy integration and flexible viewing and recording
- ▶ Edge dewarping available with the next firmware update
- ▶ 360° Infrared Illumination (20m / 66ft) for images in low light conditions, with controllable zones
- ▶ POE, 12V and 24V power input for flexibility and redundancy
- ▶ Audio I/O and Alarm I/O
- ▶ HDMI out for connection to a Public View Monitor
- ▶ IK10 IP66 design for all weather conditions and protection against vandalism

THANK
YOU



BOSCH