**Část 2 - 2D kamera pro orientaci robotického ramene**

- Kamera Cognex IS2001M-230-S-LAB
- Rozlišení kamery 1.2Mpx
- Minimální zorné pole 10x7,5 mm
- Detekovatelné objekty cca 1-5% oproti požadovaným 10%
- Interní osvětlení: ano, LED červené
- Objektiv: 6,2mm vyměnitelný
- Autofocus – žádná mechanika princip tekuté čočky
- Protokoly: přímá komunikace s UR robotem, další komunikační protokoly Profinet, ethernet IP, Modbus TCP,
- Video: https://www.youtube.com/watch?v=5QAgSxFvYJ0

# COGNEX

# IN-SIGHT 2000 SERIES VISION SENSORS

In-Sight® 2000 series vision sensors combine the power of an In-Sight vision system with the simplicity and affordability of a vision sensor. Ideal for solving error-proofing applications, these vision sensors set new standards for value, ease of use, and flexibility thanks to a powerful combination of proven In-Sight vision tools, simple setup, and a modular design featuring field-changeable lighting and optics.

The In-Sight Explorer™ EasyBuilder® interface, which provides fast, step-by-step application setup, allows even novice users to achieve extremely reliable inspection performance in nearly any production environment.

In-Sight 2000 series vision sensors are available in two form factors. This modular body design provides maximum flexibility to mount in tight spaces, allows for customized wiring and optical paths, and minimizes the need to design new mechanical fixtures.
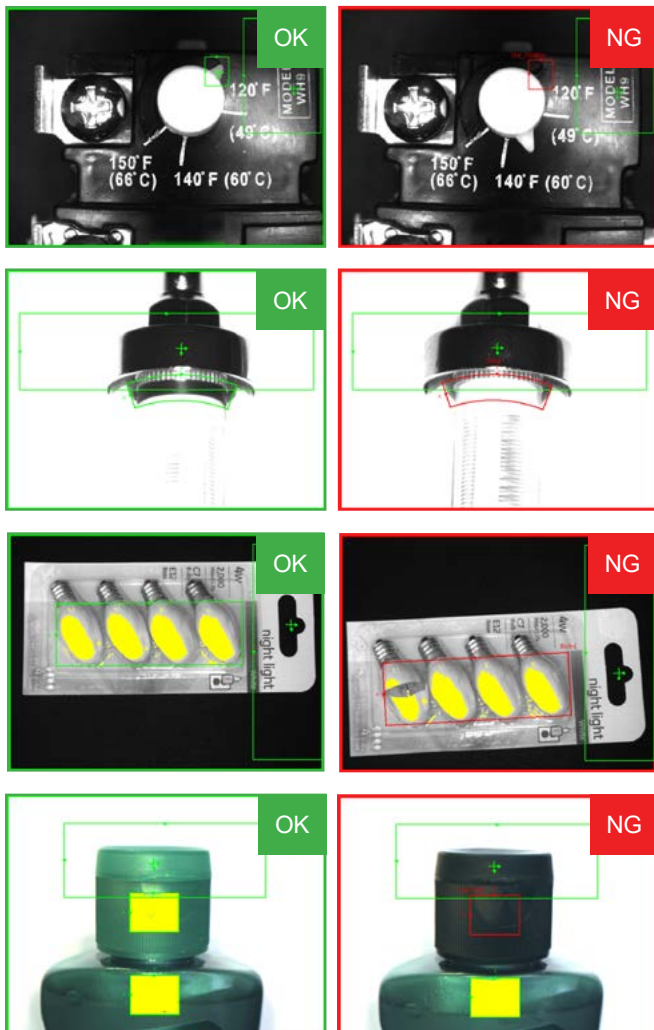
## Benefits at-a-glance

›	Affordable vision sensor powered by In-Sight Explorer software and EasyBuilder—the same interface used for all In-Sight vision systems

›	Simple for both new and existing users to meet their automated inspection challenges

›	Monochrome and color sensor models solve presence/absence applications, including color verification

›	Proven, reliable Cognex In-Sight vision tools

›	Compact, modular design with field-changeable, integrated optics and lighting

›	Autofocus lens eliminates the need to manually refocus or adjust the mounting height of the sensor during line changeovers

›	Fully compatible with Cognex VisionView® PC software and VisionView 900 HMI touchscreen panel

›	Single-cable Power over Ethernet (PoE) models simplify installation

## Fast, intuitive setup with EasyBuilder

With its intuitive, point-and-click presence/absence tools, the EasyBuilder interface is ideal for setting up simple pass/fail inspections. When more complex inspections are required, users can build on their experience to create vision applications using more advanced In-Sight vision systems in the same In-Sight Explorer interface.

Simple steps guide you through configuring and deploying your application

Choose tools from the list to add them to your inspection

See inspection results at a glance

Point and click controls make it quick and easy to set up any tool to achieve reliable results



## A solution for any industry

In-Sight 2000 series vision sensors deliver simple pass/fail results across a wide range of applications in multiple industries. Powerful vision tools deliver robust inspection results for parts in all shapes and sizes. Below, a contrast tool is used to detect the presence of a gasket in an electronics sub-assembly, a pixel count tool is used to identify QA marks on an automotive part, and a color pixel count tool is used to inspect the proper packaging for a fruit snack.

**Electronics**
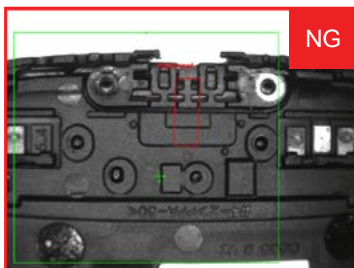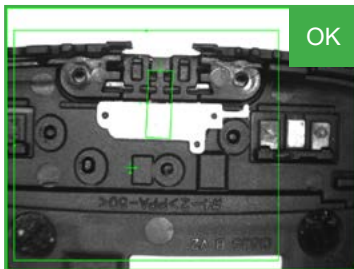


**Automotive**
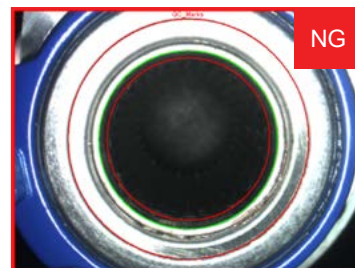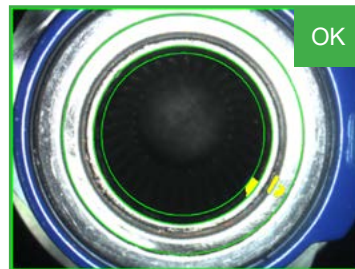


**Food and Beverage**

## Choice of lighting and optics for different application requirements

In-Sight 2000 series models include an integrated lens and LED illumination that eliminate the need for costly external lighting. Lenses and lighting are field-interchangeable to adjust to different application requirements. The In-Sight 2000 Mini has a smaller form factor making it ideal for mounting in tight spaces.

**In-Sight 2000**
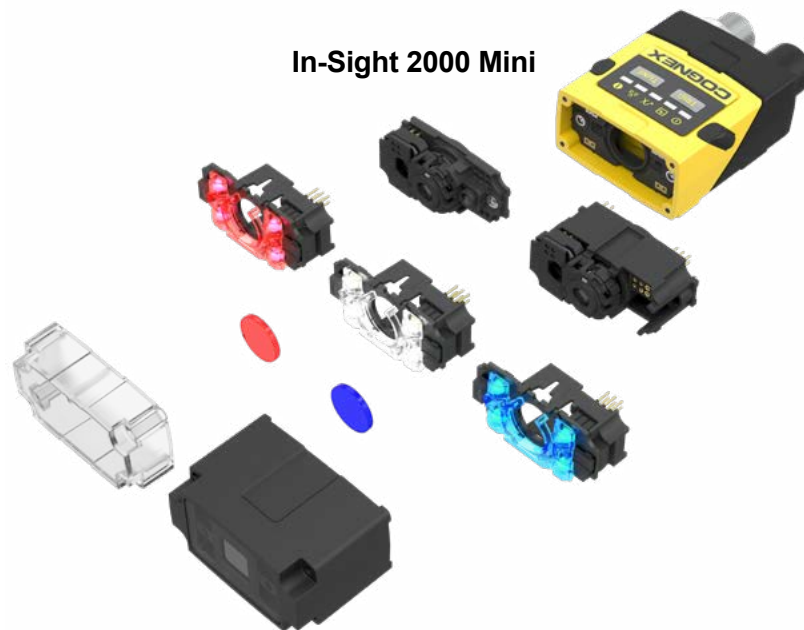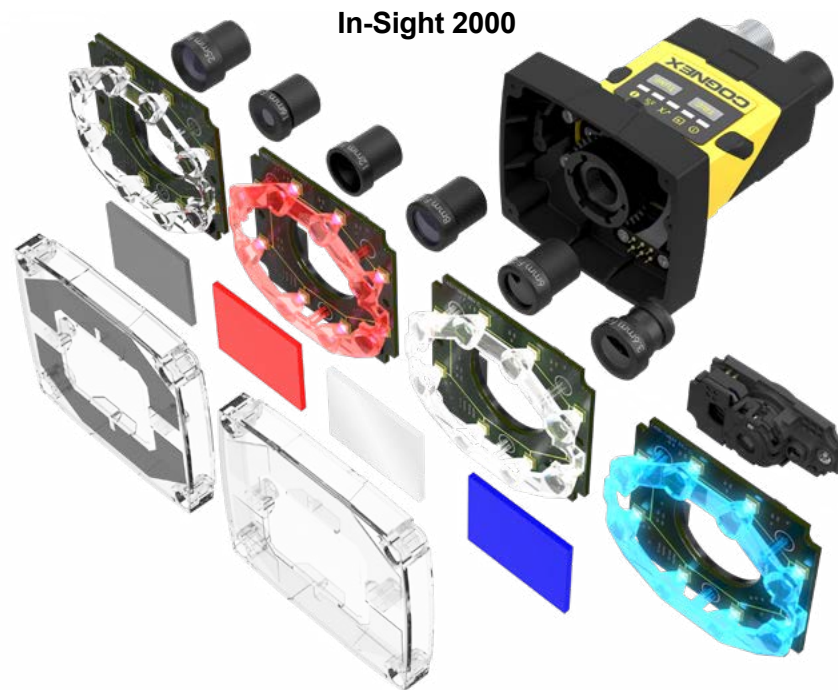


**In-Sight 2000 Mini**



## A model for any application

Available in both monochrome and color image models, and with different combinations of vision tools, the In-Sight 2000 series lets you choose the level of capability you need. Whatever your inspection application, there's an In-Sight 2000 vision sensor model that's right for the job.

# IN-SIGHT 2000 MODELS

| | | 2000-110 | 2000-120 | 2000-130 | 2000-230 | 2001-230 |
|---|---|---|---|---|---|---|
| User Interface | | In-Sight Explorer EasyBuilder, Cognex VisionView PC Software, and VisionView 900 HMI touchscreen panel | | | | |
| 1/3" CMOS Imager, Global Shutter | | Monochrome and Color | | | | |
| S-Mount/M12 Lenses | | Standard: Autofocus (liquid lens) 6.2 mm or manual focus 8 mm  Optional: Manual focus 3.6 mm, 6 mm, 12 mm, 16 mm, 25 mm | | | | |
| Image Modes | 640 x 480 (standard) | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 640 x 480 (2x magnification) | ✗ | ✓ | ✓ | ✓ | ✓ |
| | 800 x 600 (2x magnification) | ✗ | ✗ | ✓ | ✓ | ✓ |
| | 1280 x 960[1] | ✗ | ✗ | ✗ | ✗ | ✓ |
| Lighting | Standard | Diffuse white LED ring light | | | | |
| | Options | Red, blue and IR LED ring lights and lens filters, and polarized light cover | | | | |
| Maximum Acquisition Speed[2] | | 40 fps | 75 fps (mono)  55 fps (color) | | | 40 fps (mono)  24 fps (color) |
| Relative Processing Speed | | 1x | 2x | | | |
| Location Tools | Pattern | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Edge, Circle | ✗ | ✗ | ✓ | ✓ | ✓ |
| Inspection Tools | Pattern | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Pixel Count | ✗ | Grayscale and color | | | |
| | Brightness & Contrast | ✗ | ✓ | ✓ | ✓ | ✓ |
| | Edges | ✗ | ✗ | ✓ | ✓ | ✓ |
| Measurement & Counting Tools | Distance, Angle & Diameter | ✗ | ✗ | ✓ | ✓ | ✓ |
| | Patterns & Edges | ✗ | ✗ | ✓ | ✓ | ✓ |
| Advanced Features | OCR | ✗ | ✗ | ✗ | ✓ | ✓ |
| | Blob Detection | ✗ | ✗ | ✗ | ✓ | ✓ |
| | Image Filters | ✗ | ✗ | ✗ | ✓ | ✓ |
| Data Output | | Pass/Fail | | Pass/Fail, Numeric[3] | | |
| Communications & I/O | General Protocols | TCP/IP, UDP, FTP, Telnet, RS-232C | | | | |
| | Industrial Protocols | OPC UA, EtherNet/IP with AOP, PROFINET Class B, iQSS, SLMP, SLMP Scanner, CC-Link IE Field Basic, Modbus TCP | | | | |
| | Connectors | (1) Industrial M12 Ethernet, (1) M12 Power & I/O | | | | |
| | Inputs & Outputs | (1) Acquisition trigger, (1) General purpose input[4], (4) General purpose outputs[4] | | | | |
| Mechanical | Dimensions | In-line configuration: 92 mm (3.61 in) x 60 mm (2.38 in) x 52 mm (2.05 in)  Right-angle configuration: 61 mm (2.42 in) x 60 mm (2.38 in) x 52 mm (2.05 in) | | | | |
| | Weight | 200 g (7.05 oz) | | | | |
| | Material and Protection | Painted aluminum, IP65-rated housing | | | | |
| Operating | Power | 24 VDC ±10%, 48 W (2.0 A) maximum when the illumination is on | | | | |
| | PoE Configuration Available | No | | | | |
| | Temperature | 0 °C to 40 °C (32 °F to 104 °F) | | | | |

[1] Available in select regions. Ask your Cognex sales representative for more information.

[2] Maximum framerate with minimum exposure; no vision tools; and 640 x 480 image with 2x Image Magnification enabled (for 2000-120/130/230 models).

[3] Limited to Measurement & Counting Tools only.

[4] (7) general purpose inputs and (8) general purpose outputs when using optional CIO-1400 I/O Expansion Module.
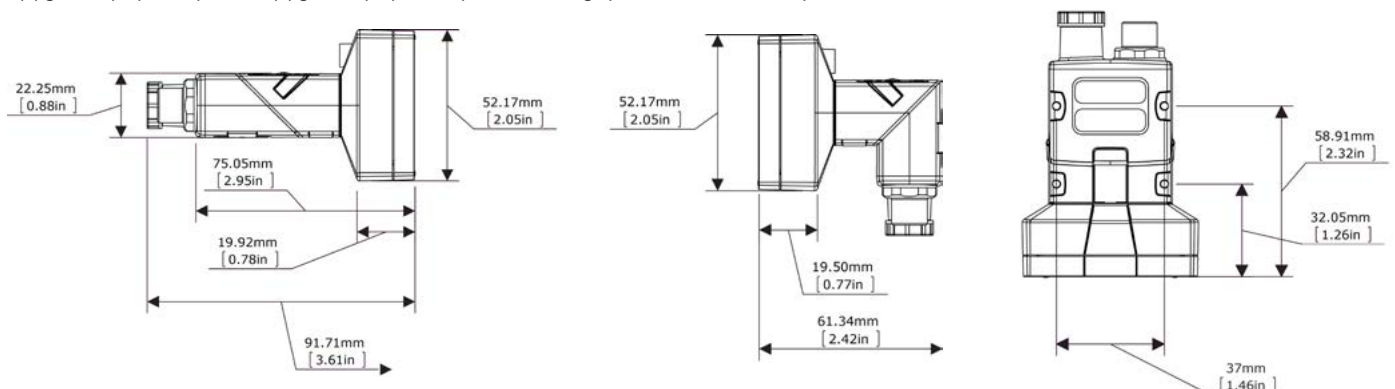
# IN-SIGHT 2000 MINI MODELS

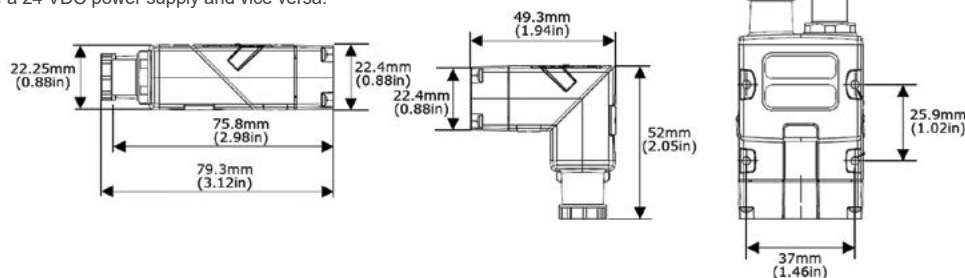| | | 2000-110 Mini | 2000-120 Mini | 2000-130 Mini | 2000-230 Mini | 2001-230 Mini |
|---|---|---|---|---|---|---|
| User Interface | | In-Sight Explorer EasyBuilder, Cognex VisionView PC Software, and VisionView 900 HMI touchscreen panel | | | | |
| 1/3" CMOS Imager, Global Shutter | | Monochrome | Monochrome and Color | | | |
| S-Mount/M12 Lenses | | Autofocus (liquid lens) 6.2 mm or 16 mm | | | | |
| Image Modes | 640 x 480 (standard) | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 640 x 480 (2x magnification) | ✗ | ✓ | ✓ | ✓ | ✓ |
| | 800 x 600 (2x magnification) | ✗ | ✗ | ✓ | ✓ | ✓ |
| | 1280 x 960[1] | ✗ | ✗ | ✗ | ✗ | ✓ |
| Lighting | Standard | Modular red LEDs | Modular red (mono) and white (color) LEDs | | | |
| | Options | White, blue & IR LED lights, band-pass filters & polarizing filter | White, blue & IR LED lights, band-pass filters, polarizing filter, and polarized light cover | | | |
| Maximum Acquisition Speed[2] | | 40 fps | 75 fps (mono) 55 fps (color) | | | 40 fps (mono) 24 fps (color) |
| Relative Processing Speed | | 1x | 2x | | | |
| Location Tools | Pattern | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Edge, Circle | ✗ | ✗ | ✓ | ✓ | ✓ |
| Inspection Tools | Pattern | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Pixel Count | ✗ | Grayscale | | | Grayscale and color |
| | Brightness & Contrast | ✗ | ✓ | ✓ | ✓ | ✓ |
| | Edges | ✗ | ✗ | ✓ | ✓ | ✓ |
| Measurement & Counting Tools | Distance, Angle & Diameter | ✗ | ✗ | ✓ | ✓ | ✓ |
| | Patterns & Edges | ✗ | ✗ | ✓ | ✓ | ✓ |
| Advanced Features | OCR | ✗ | ✗ | ✗ | ✓ | ✓ |
| | Blob Detection | ✗ | ✗ | ✗ | ✓ | ✓ |
| | Image Filters | ✗ | ✗ | ✗ | ✓ | ✓ |
| Data Output | | Pass/Fail | Pass/Fail, Numeric[3] | | | |
| Communications & I/O | General Protocols | TCP/IP, UDP, FTP, Telnet, RS-232C | | | | |
| | Industrial Protocols | OPC UA, EtherNet/IP with AOP, PROFINET Class B, iQSS, SLMP, SLMP Scanner, CC-Link IE Field Basic, Modbus TCP | | | | |
| | Connectors | (1) Industrial M12 Ethernet, (1) M12 Power & I/O | | | | |
| | Inputs & Outputs | (1) Acquisition trigger, (1) General purpose input[4], (4) General purpose outputs[4] | | | | |
| Mechanical | Dimensions | In-line configuration: 43.1 mm (1.69 in) x 22.4 mm (0.88 in) x 64 mm (2.51 in) Right-angle configuration: 43.1 mm (1.69 in) x 35.8 mm (1.40 in) x 49.3 mm (1.94 in) | | | | |
| | Weight | 142 g (5 oz) | | | | |
| | Material and Protection | Painted aluminum, IP65-rated housing | | | | |
| Operating | Power | 24 VDC ±10%, <3.0 W or Class 1 Power over Ethernet (PoE)[5] | | | | |
| | PoE Configuration Available | ✗ | ✓ | ✓ | ✓ | ✓ |
| | Temperature | 0 °C to 40 °C (32 °F to 104 °F) | | | | |

[1] Available in select regions. Ask your Cognex sales representative for more information.

[2] Maximum framerate with minimum exposure; no vision tools; and 640 x 480 image with 2x Image Magnification enabled (for 2000-120/130/230 models)

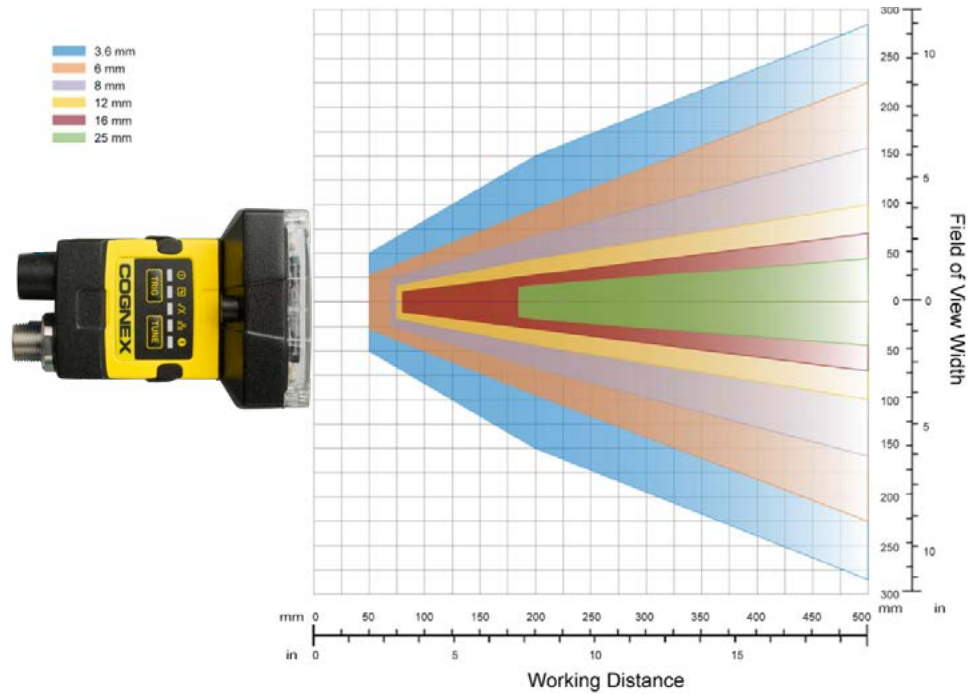[3] Limited to Measurement & Counting Tools.

[4] (7) general purpose inputs and (8) general purpose outputs when using optional CIO-1400 I/O Expansion Module.

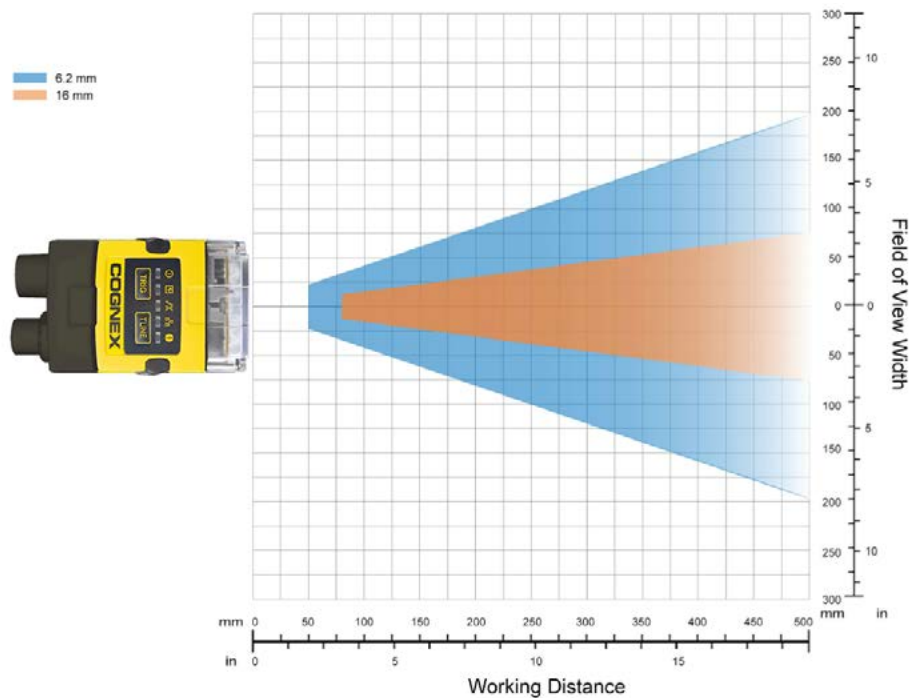[5] PoE models cannot use a 24 VDC power supply and vice versa.

# Field of View Diagrams

**In-Sight 2000**

Legend:
- 3.6 mm
- 6 mm
- 8 mm
- 12 mm
- 16 mm
- 25 mm

Field of View Width

Working Distance

**In-Sight 2000 Mini**

Legend:
- 6.2 mm
- 16 mm

Field of View Width

Working Distance

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