



DATA SHEET

V3DX3-002BR21A

Ruler3000  
3D machine vision

**SICK** Sensor Intelligence



3D MACHINE VISION

V3DX3-002BR21A

ORDERING INFORMATION

| Type           | part no. |
|----------------|----------|
| V3DX3-002BR21A | 1126985  |

Further device versions and accessories at [www.sick.com/Ruler3000](http://www.sick.com/Ruler3000)



DETAILED TECHNICAL DATA

FEATURES

|                                     |                                                                                                                                                                                                                      |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Technology                          | 3D laser triangulation                                                                                                                                                                                               |
| Streaming                           | ✓                                                                                                                                                                                                                    |
| Pre-calibrated                      | ✓                                                                                                                                                                                                                    |
| Shutter technology                  | Global-Shutter                                                                                                                                                                                                       |
| Working range                       | 46.7 mm ... 55.4 mm                                                                                                                                                                                                  |
| Example field of view               | 25 mm x 6 mm                                                                                                                                                                                                         |
| Exposure mode                       | Linear<br>HDR                                                                                                                                                                                                        |
| Illumination                        | Integrated                                                                                                                                                                                                           |
| Illumination color                  | Blue, laser, Visible, 450 nm, ± 10 nm                                                                                                                                                                                |
| Laser class                         | 3R (EN 60825-1:2014+A11:2021; IEC 60825-1:2014, Complies with the FDA performance requirements for laser products except for conformance with IEC 60825-1 Ed.3., as described in Laser Notice 56 dated May 8, 2019.) |
| Data synchronization                | Free running, encoder triggered, external triggering                                                                                                                                                                 |
| 3D measurement                      | ✓                                                                                                                                                                                                                    |
| Scatter measurement                 | ✓                                                                                                                                                                                                                    |
| Reflectance measurement             | ✓                                                                                                                                                                                                                    |
| Ambient light suppression           | ✓ <sup>1)</sup>                                                                                                                                                                                                      |
| Scheimpflug adapter, integrated     | ✓                                                                                                                                                                                                                    |
| Width at minimum operating distance | 25 mm                                                                                                                                                                                                                |
| Width at maximum operating distance | 26.6 mm                                                                                                                                                                                                              |

<sup>1)</sup> Blue bandpass filter.

|                      |                                                                                                                                                                                            |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maximum height range | 8.7 mm                                                                                                                                                                                     |
| Task                 | Detecting - Standard objects<br>Detecting - Level<br>Measuring - Dimension, contour and volume<br>Monitoring and controlling - Quality<br>Determining position - 3D position determination |

<sup>1)</sup> Blue bandpass filter.

## MECHANICS/ELECTRONICS

|                        |                                     |
|------------------------|-------------------------------------|
| Connector material     | M12: Nickel-coated brass            |
| Supply voltage         | 24 V DC, $\pm 10\%$                 |
| Ripple                 | $< 5\text{ V}_{pp}$                 |
| Power consumption      | $\leq 12\text{ W}$                  |
| Enclosure rating       | IP65<br>IP67                        |
| Protection class       | III                                 |
| Housing material       | Aluminum                            |
| Housing color          | Blue                                |
| Window material        | Float glass, anti-reflective coated |
| Weight                 | 1.08 kg                             |
| Dimensions (L x W x H) | 154 mm x 60.3 mm x 100 mm           |

## PERFORMANCE

|                     |                                                                                                                            |
|---------------------|----------------------------------------------------------------------------------------------------------------------------|
| Image sensor        | CMOS sensor from SICK with ROCC technology, M30                                                                            |
| Scan/frame rate     | 46,000 3D profiles/s, In reduced ROI<br>7,000 3D profiles/s, full format                                                   |
| Data points/profile | 3,200                                                                                                                      |
| Repeatability       | 0.3 $\mu\text{m}$ <sup>1)</sup>                                                                                            |
| Typical resolution  | Z resolution (height): 0.8 $\mu\text{m}$ ... 1 $\mu\text{m}$ , X resolution (width): 11 $\mu\text{m}$ ... 12 $\mu\text{m}$ |

<sup>1)</sup> Height values measured for different positions in the field of view. 20 measurements are performed at each position. The repeatability value is the 3-fold of the standard deviation (3  $\sigma$ ) for all measurements at all positions.

## INTERFACES

|                                         |                                            |
|-----------------------------------------|--------------------------------------------|
| Ethernet                                | ✓, UDP/IP                                  |
| Remark                                  | GigE Vision Standard                       |
| Data transmission rate                  | $\leq 1\text{ Gbit/s}$                     |
| Configuration software                  | Stream Setup                               |
| Operating system                        | Windows 10                                 |
| Application programming interface (API) | GenAPI, GenTL, Proprietary SICK GenIStream |
| Inputs/outputs                          | 4 x HIGH = 10 V ... 28.8 V, configurable   |
| Encoder interface                       | RS-422 5 V, 2 x HTL single-ended           |

## AMBIENT DATA

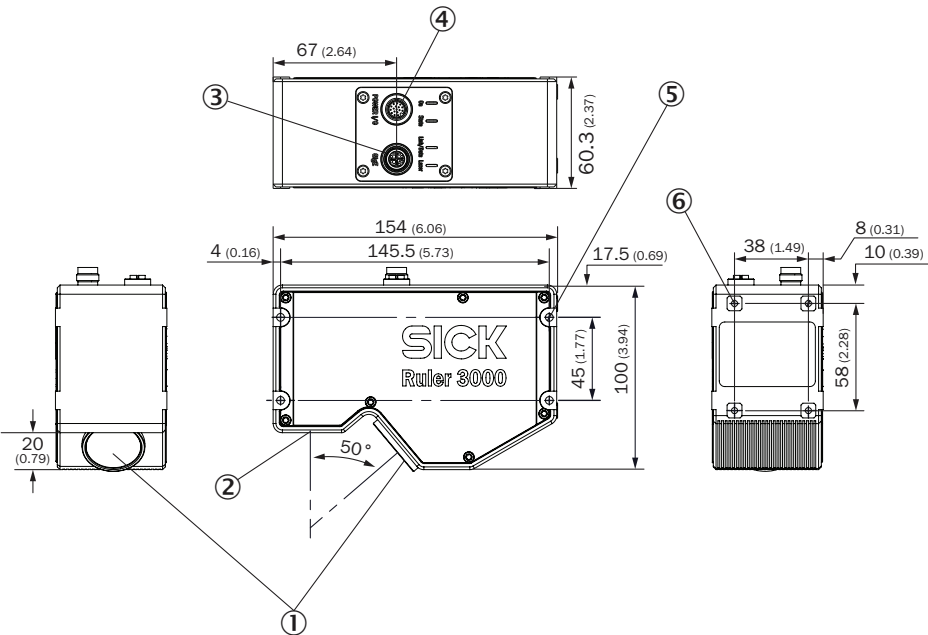
|                               |                                      |
|-------------------------------|--------------------------------------|
| Shock load                    | 15 g, 3 cycles per axis              |
| Vibration load                | 5 g, 10 Hz ... 150 Hz (EN 60068-2-6) |
| Ambient operating temperature | 0 °C ... +40 °C <sup>1)</sup>        |
| Storage temperature           | -30 °C ... +70 °C <sup>1)</sup>      |

<sup>1)</sup> Non-condensing.

CERTIFICATES

|                                                                       |   |
|-----------------------------------------------------------------------|---|
| EU declaration of conformity                                          | ✓ |
| UK declaration of conformity                                          | ✓ |
| ACMA declaration of conformity                                        | ✓ |
| China RoHS                                                            | ✓ |
| cTUVus certificate                                                    | ✓ |
| Information according to Art. 3 of Data Act (Regulation EU 2023/2854) | ✓ |
| GigE Vision                                                           | ✓ |
| GenICam                                                               | ✓ |

DIMENSIONAL DRAWING

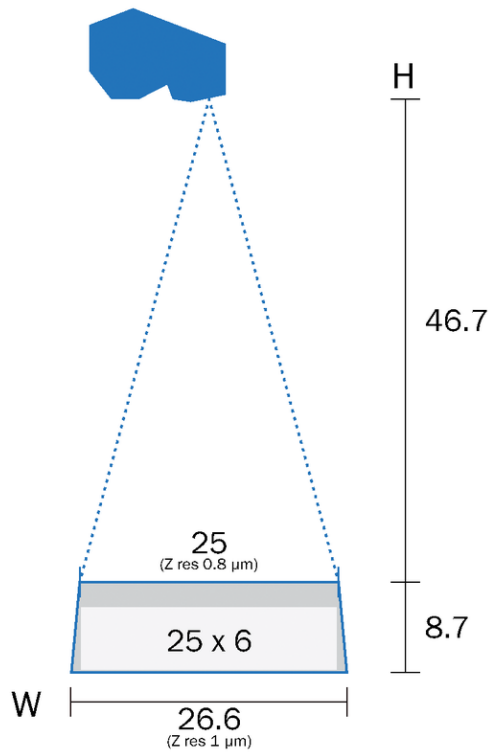


- Dimensions in mm (inch)
- ① Optical receiver (center)
  - ② Optical sender (center)
  - ③ Gigabit Ethernet connection (GbE)
  - ④ Power/I/O connection
  - ⑤ Threaded mounting hole M5
  - ⑥ M5 threaded mounting hole, 10 mm deep

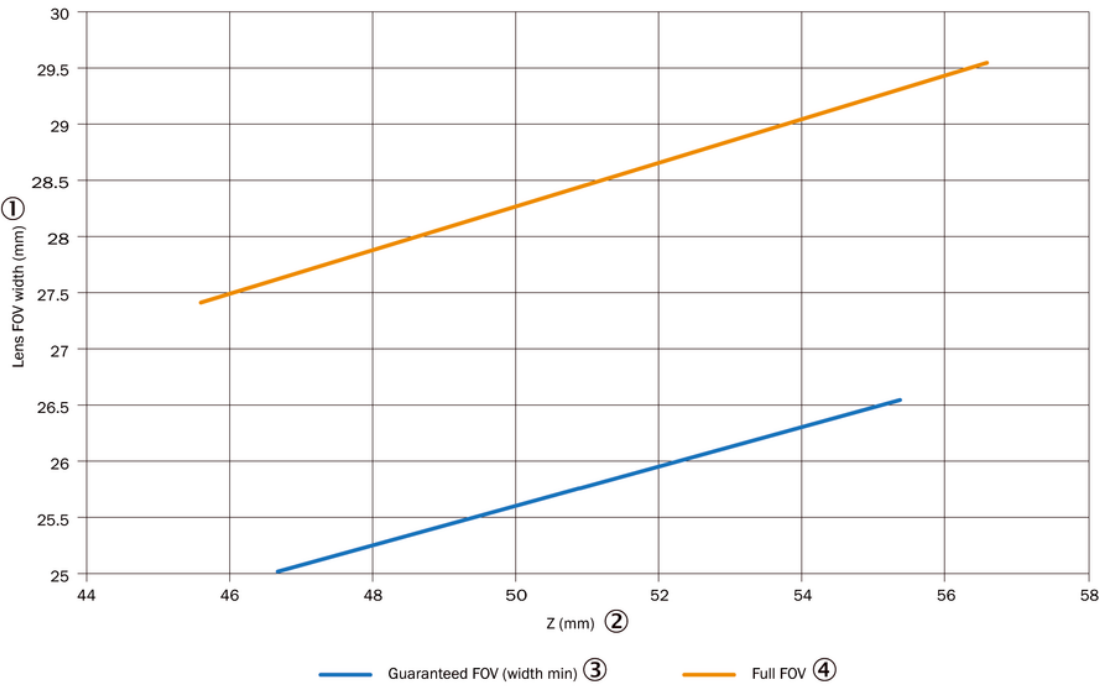
## FIELD OF VIEW

**Ruler3002**

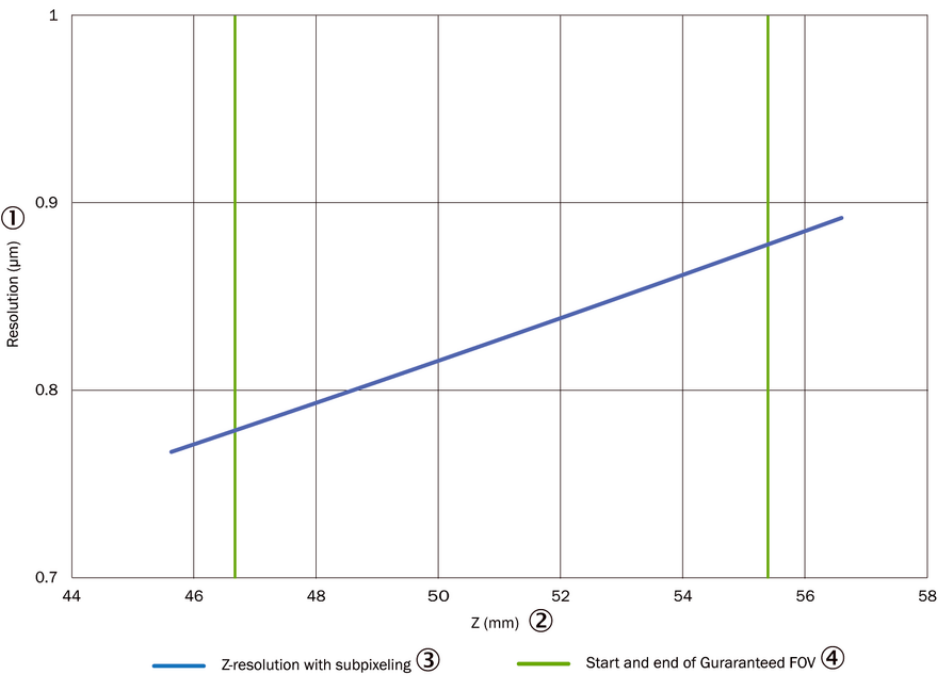
Guaranteed field of view in mm



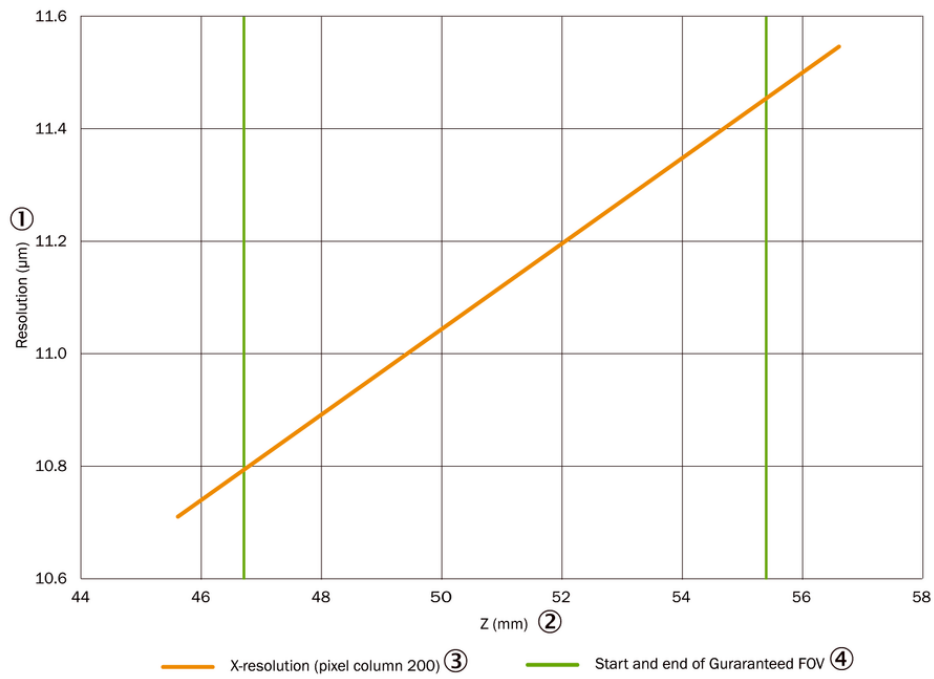
CHARACTERISTIC CURVE WIDTH OF THE FIELD OF VIEW VIA THE Z POSITION



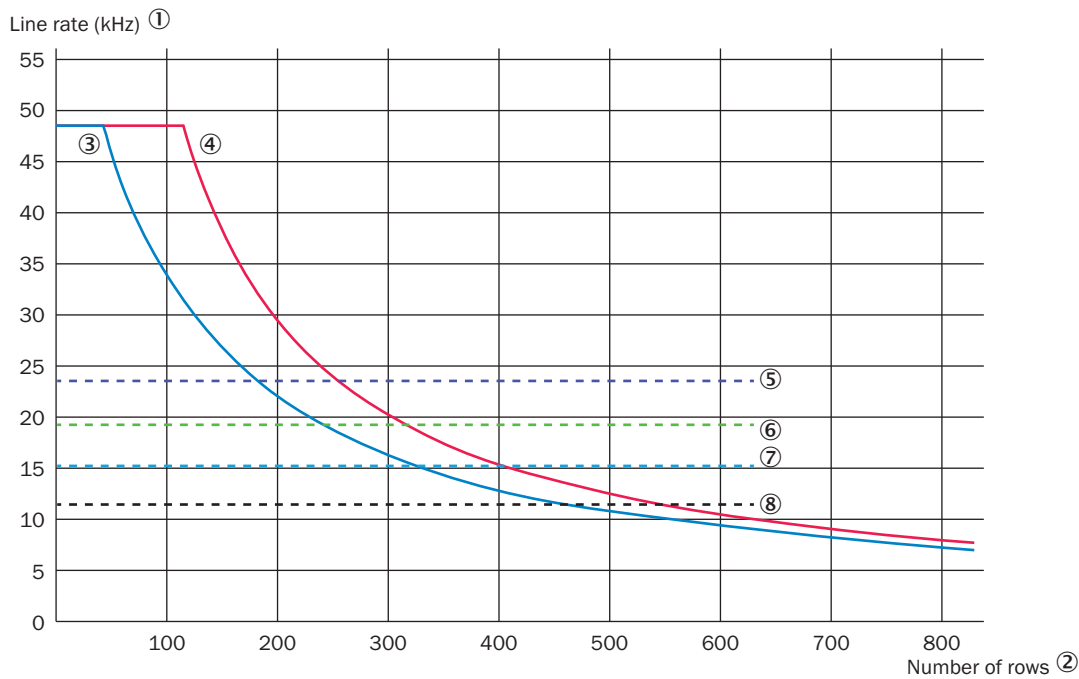
CHARACTERISTIC CURVE Z RESOLUTION VIA Z POSITION



## CHARACTERISTIC CURVE X RESOLUTION VIA Z POSITION



## CHARACTERISTIC CURVE



The maximum line rate is based on the number of sensor lines used

- ① Line rate (kHz)
- ② Number of lines
- ③ Ruler3000 with activated HDR
- ④ Ruler3000 without activated HDR
- ⑤ Bandwidth limit for image width 2,560, height range only
- ⑥ Bandwidth limit for image width 3,072, height range only
- ⑦ Bandwidth limit for image width 2,560, height range and reflectance
- ⑧ Bandwidth limit for image width 3,072, height range and reflectance

Further information as well as suitable accessories, example applications and downloads such as CAD dimensional models, operating instructions and software can be found at [www.sick.com/1126985](http://www.sick.com/1126985)



SICK AG  
WALDKIRCH  
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SICK.COM

# SICK AT A GLANCE

SICK is a leading global technology company for intelligent sensors and integrated solutions in industrial automation. Our technologies set benchmarks, making your industrial processes more efficient, safer and more sustainable – both in logistics and manufacturing operations.

SICK combines sensor intelligence with industry expertise and certified consulting services. We provide the ideal foundation for scalable as well as tailor-made automation solutions and create added value along the entire value chain. Our close partnerships with our customers are more than just a promise: Together, we optimize productivity, improve quality, protect health and safety, and help build a sustainable future. All with empathy and trust.

Since 1946, we have been developing innovative technologies with passion and a pioneering spirit. With a global network in around 40 countries, SICK has a global presence and is always close by. The company's headquarters are located in Waldkirch near Freiburg, Germany. Our customers benefit from our understanding of both local and global requirements, which enables us to deliver tailor-made solutions

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Sensor Intelligence