Data sheet

V3S146-1ABBBCA

Visionary AI-Assist

3D MACHINE VISION

SICK
Sensor Intelligence.

Ordering information

Type	part no.
V3S146-1ABBBCA	1144257

Included in delivery: V3S146-1ABBAAA (1), AI-Assist (1)

Other models and accessories ➜ www.sick.com/Visionary_AI-Assist

Detailed technical data

Features

Technology	3D snapshot stereoscopy
Configurable	✓
SensorApp	AI-Assist, for detecting people and objects [1]
Working range	0.28 m ... 16 m [2] 0.65 m ... 37 m [3]
Field of view	
wide	130° x 105° (configurable) [4]
narrow	90° x 60° (configurable) [4]
Exposure mode	Automatic Single or multiple (HDR)
Detectable objects	All objects (incl. people) [5]
Classified objects	Persons [6]
Neuronales Netzwerk	YOLOX-L, customized network, updatable
Task	Detecting - Standard objects Protecting objects - Vehicles Protecting people - Warning in outdoor areas Processing data - Visualizing Determining position - 3D position determination

[1] The SICK SensorApp can, if necessary, be deinstalled again.
[2] Valid for the 130° x 105° field of view.
[3] Valid for the 90° x 60° field of view.
[4] 2D and 3D data is available over the entire field of view.
[5] Detection based on 3D data. The performance depends on the scene and the ambient conditions.
[6] Based on AI classification.

Mechanics/electronics

Connection type	Power/I/O: M12 17-pin, A-coded Gigabit Ethernet: M12, 8-pin, X-coded
Supply voltage	10 V DC ... 57 V DC [1]
Power consumption	Typ. 19.5 W [2]

[1] These values apply to the voltage applied to the device. When selecting the voltage source, please consider the voltage drop across the cable.
[2] Applies to operation with 24 V supply voltage.
[3] At 12 V, 5 m cable.

Peak current	2 A [3]
Input voltage	5 V ... 60 V
Output voltage	9 V ... 57 V
Output current	
	≤ 100 mA
Enclosure rating	IP67, IP69, IPX9K
Protection class	III
Housing color	Anthracite
Weight	1.5 kg
Base distance	112 mm
Dimensions (L x W x H)	162 mm x 96.6 mm x 79.3 mm

[1] These values apply to the voltage applied to the device. When selecting the voltage source, please consider the voltage drop across the cable.
[2] Applies to operation with 24 V supply voltage.
[3] At 12 V, 5 m cable.

Safety-related parameters

$MTTF_D$	
GB, 50% stress 25 °C	84 years [1]
GB, 50% stress 40 °C	38 years [1]
GB, 50% stress 55 °C	17 years [1]
GM, 50% stress 25 °C	21 years [2]
GM, 50% stress 40 °C	9.5 years [2]
GM, 50% stress 55 °C	4.2 years [2]

[1] GB: Controlled, fixed environment with low operational stress according to the T332.2 standard.
[2] GM: Mobile, highly fluctuating environment with high loads according to the T332.2 standard.

Functions

Integrated application	The installed "AI-Assist" software enables the detection of people and/or objects in flexibly adaptable 3D fields. The data is processed within the device.
Filter	Ground filter Sensitivity of people detection Minimum object size
Language	English, German

Performance

Sensor properties	
Sensor resolution	1,024 px x 576 px [1]
AI accelerator	Hailo-8 [2]
Number of fields	≤ 16

[1] The specified sensor resolution corresponds to the usable resolution. Due to the stereo technology, the physical resolution of the individual camera sensors cannot be fully utilized.
[2] Up to 26 Tera Operations Per Second (TOPS).
[3] The performance depends on the scene and the ambient conditions.
[4] Valid for the 90° x 60° field of view. Individual values can be found in the graphs "Field of view "narrow" (90° x 60°) absolute measurement accuracy and repeatability" and "Field of view "wide" (130° x 105°) absolute measurement accuracy and repeatability". The tables can be found under "Technical drawings".
[5] The response time is affected by the exposure time.
[6] With a default setting of one 3D field.

Number of simultaneously monitored fields	≤ 16
Object resolution	The minimum object size is individually configurable for each field.
Person recognition	
In various poses such as:	Standing, sitting, squatting, partially concealed, lying down [3]
Scan/frame rate	≤ 18 fps
Measurement accuracy (typical)	± 2 mm, up to 5 m [4] ± 35 mm, up to 4 m [4] ± 850 mm, up to 20 m [4]
Repeatability	± 0.6 mm, up to 5 m [4] ± 6 mm, up to 4 m [4] ± 260 mm, up to 20 m [4]
Switch-on delay	Approx. 20 s
Response time	Typ. 200 ms [5] [6]

[1] The specified sensor resolution corresponds to the usable resolution. Due to the stereo technology, the physical resolution of the individual camera sensors cannot be fully utilized.

[2] Up to 26 Tera Operations Per Second (TOPS).

[3] The performance depends on the scene and the ambient conditions.

[4] Valid for the 90° x 60° field of view. Individual values can be found in the graphs "Field of view "narrow" (90° x 60°) absolute measurement accuracy and repeatability" and "Field of view "wide" (130° x 105°) absolute measurement accuracy and repeatability". The tables can be found under "Technical drawings".

[5] The response time is affected by the exposure time.

[6] With a default setting of one 3D field.

Interfaces

Ethernet	✓ , TCP/IP, UDP/IP
Remark	Gigabit-Ethernet (100/1000 Mbit/s)
Function	Data interface, Communication interface, Configuration interface
Data transmission rate	≤ 1,000 Mbit/s
REST API	✓
Function	Communication interface, Configuration interface
CAN	✓
Remark	J1939
Function	Data interface, Communication interface
Data transmission rate	250 kBaud
Digital inputs/outputs	
Number	4
Remark	Configurable
Function	Data interface, Communication interface, Configuration interface
Logic	HIGH active, LOW active
Detail	Invert, debouncing (0 ms ... 1,000 ms)
Operator	AND, OR, XOR
Output mode	PNP, NPN, Push-pull
Restart	Immediate, Time, Input
Digital inputs	
Number	2
Remark	Are available in addition to the 4 digital inputs/outputs

Function	Configuration interface
Logic	HIGH active, LOW active
Detail	Debouncing (0 ms ... 1,000 ms)
Configuration software	SOPASair browser-based user interface, SICK AppManager
Operating system	Windows, Linux
Optical indicators	2 status LEDs
Data output	2D video stream (RGB) Field evaluation System diagnostics
Video live stream	
Frame rate	≤ 30 fps
Resolution	1,024 px x 576 px
Protocol	RTSP
Compression	MJPEG
Ignition plus	✓

Ambient data

Electromagnetic compatibility (EMC)	Agricultural and forestry machinery / EN ISO 14982 Earth-moving and building construction machinery / EN ISO 13766-1 Industrial trucks / EN 12895+A1
Vibration resistance	5 g, 10 Hz ... 500 Hz (IEC 60068-2-6) 4.24 g RMS, 10 Hz ... 250 Hz (IEC 60068-2-64)
Shock resistance	100 g, 6 ms (IEC 60068-2-27)
Ambient operating temperature	–40 °C ... +55 °C
Storage temperature	–40 °C ... +85 °C
Ambient light immunity	5 lx ... 300 klx [1]

[1] Detection of a person (standing front on) at a distance of 5 meters for the "wide" field of view (130° x 105°).

Licenses

Description	The installed "AI-Assist" software enables the detection of people and/or objects in flexibly adaptable 3D fields. The data is processed within the device.
Product type	Software
License type	Device license
License description	The software is provided as a device license. A license is bound to a specific hardware ID. It is possible to move the license to another device, if necessary, if it has been properly removed from the original device. The license costs are included in the price.
Scope of use	Full version
License period	The license is issued without a time limit.
No. of licenses	1

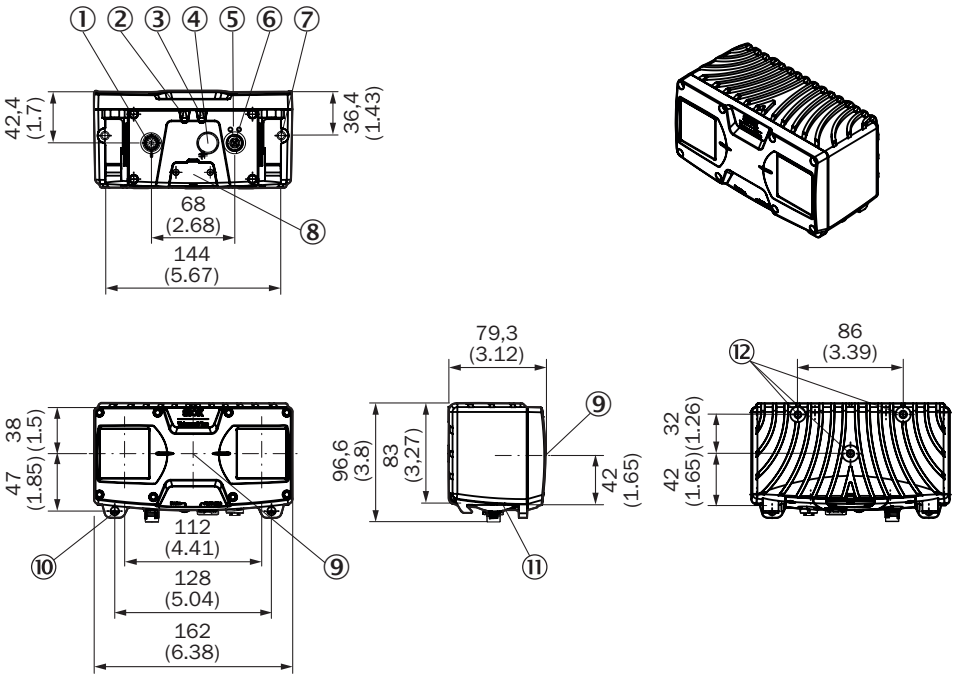
Certificates

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

Classifications

ECLASS 5.0	27310205
ECLASS 5.1.4	27310205
ECLASS 6.0	27310205
ECLASS 6.2	27310205
ECLASS 7.0	27310205
ECLASS 8.0	27310205
ECLASS 8.1	27310205
ECLASS 9.0	27310205
ECLASS 10.0	27310205
ECLASS 11.0	27310205
ECLASS 12.0	27310205
ETIM 5.0	EC001820
ETIM 6.0	EC001820
ETIM 7.0	EC001820
ETIM 8.0	EC001820
UNSPSC 16.0901	43211731

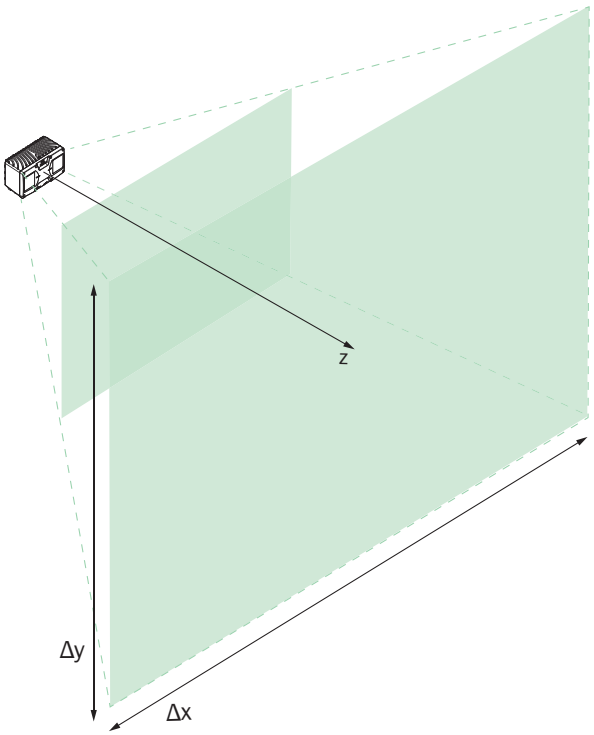
Dimensional drawing



Dimensions in mm (inch)
① Connection: Power/I/O
② “Device” status LED
③ “Application” status LED
④ Pressure compensation element
⑤ Ethernet status LED
⑥ Ethernet connection

⑦ M6 threaded hole, 7 mm deep (2x), for mounting
⑧ service interface
⑨ Sensor coordinate origin
⑩ Interface bracket
⑪ Mounting bracket (accessories)
⑫ M6 threaded hole, 10 mm deep (3x), for mounting

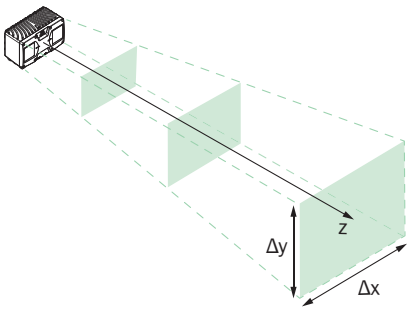
Field of view 130° x 105° (wide) absolute measurement accuracy and repeatability



The values are typical values and apply in the central image area for a well-lit scene and high-contrast objects.

Absolute working distance (z)	Measuring range (Δx x Δy)	Area per pixel	Measurement accuracy Δz (average value)	Repeatability σz (average value)
1.0 m	~ 4.3 m x 2.6 m	~ 4 mm x 4 mm	± 5 mm	± 0.5 mm
4.0 m	~ 17.2 m x 10.4 m	~ 17 mm x 17 mm	± 80 mm	± 12 mm
8.0 m	~ 34.3 m x 20.8 m	~ 35 mm x 35 mm	± 300 mm	± 50 mm
12.0 m	~ 51.5 m x 31.3 m	~ 52 mm x 52 mm	± 700 mm	± 100 mm
16.0 m	~ 68.6 m x 41.7 m	~ 70 mm x 70 mm	± 1,200 mm	–

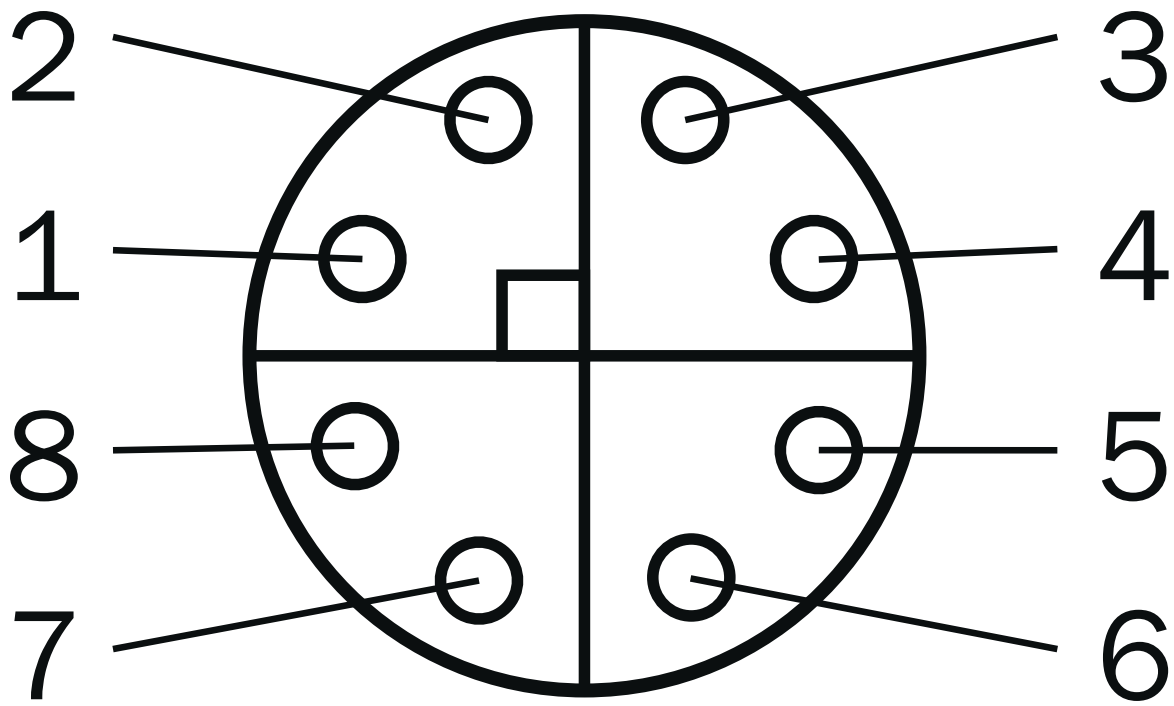
Field of view 90° x 60° (narrow) absolute measurement accuracy and repeatability



The values are typical values and apply in the central image area for a well-lit scene and high-contrast objects.

Absolute working distance (z)	Measuring range (Δx x Δy)	Area per pixel	Measurement accuracy Δz (average value)	Repeatability σz (average value)
1.0 m	~ 2.0 m x 1.2 m	~ 2 mm x 2 mm	± 2 mm	± 0.6 mm
4.0 m	~ 8.0 m x 4.6 m	~ 8 mm x 8 mm	± 35 mm	± 6 mm
8.0 m	~ 16.0 m x 9.2 m	~ 16 mm x 16 mm	± 140 mm	± 30 mm
12.0 m	~ 24.0 m x 13.9 m	~ 24 mm x 24 mm	± 300 mm	± 60 mm
20.0 m	~ 40.0 m x 23.1 m	~ 40 mm x 40 mm	± 850 mm	± 260 mm
25.0 m	~ 50.0 m x 28.9 m	~ 50 mm x 50 mm	± 1,300 mm	–

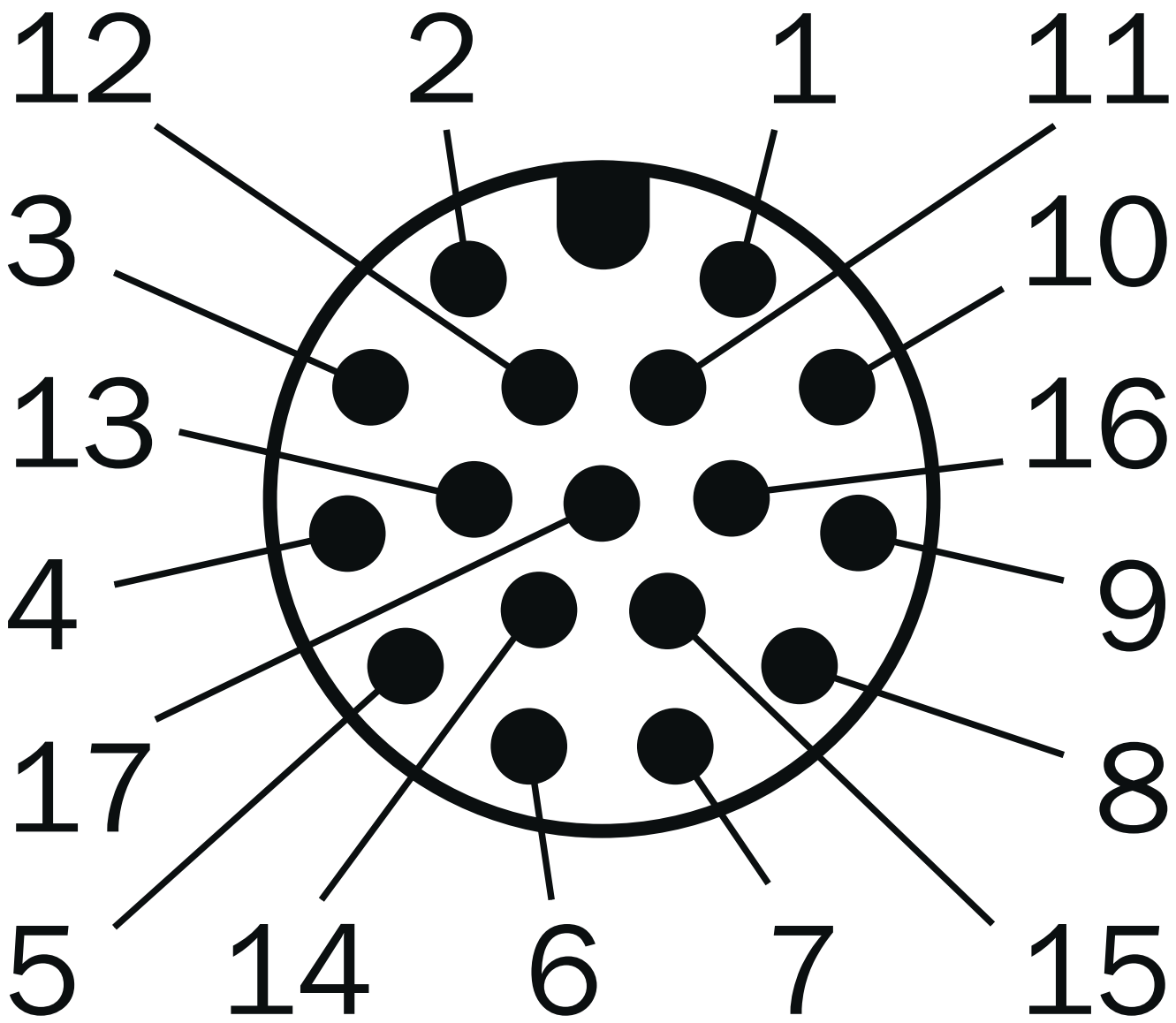
Connection type Gigabit Ethernet



socket: M12, 8-pin, X-coded

① DA+ (data A+)
② DA- (data A -)
③ DB+ (data B +)
④ DB- (data B -)
⑤ DD+ (data D +)
⑥ DD- (data D -)
⑦ DC- (data C -)
⑧ DC+ (data C +)

Connection type



① GND
② UV
③ CAN L
④ CAN H
⑤ IGN_EN
⑥ IGN_PLUS

⑦ TxD
⑧ RxD
⑨ SensGND
⑩ SENS in 1
⑪ GND
⑫ UV
⑬ DIO 1
⑭ DIO 2
⑮ SENS in 2
⑯ DIO 3
⑰ DIO 4

SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

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