PRODUCT INFORMATION

Visionary-T

3D SNAPSHOT – WIDE RANGE OF APPLICATIONS FOR INDOOR USE

SICK
Sensor Intelligence.

3D vision

FULL FLEXIBILITY FOR INDOOR USE

The streaming cameras in the Visionary-T 3D vision product family deliver high-quality data for industrial applications. Both the hardware and the software have been designed specifically for indoor use in industrial environments. The cameras can be used 24/7. They have an IP67 enclosure rating and a reliable software interface.

Features

Supporting a wide range of applications, reliable as part of a system, customized for each specific application – these are the features that characterize Visionary-T cameras. Additional features such as thermal management for high functionality, a special concept for optimum illumination, and camera coexistence modes for the simultaneous operation of multiple cameras contribute to the reliability of the cameras.

Your benefits

Thermal management allows the Visionary-T cameras to be used in a defined temperature range without impairing heat dissipation or data quality and without any external cooling components. Visionary-T data is perfectly calibrated for the prevailing temperature range. The illumination concept ensures uniform light distribution over the whole field of view. As a result, the cameras can be relied upon to capture data even at the edges of images. Various camera coexistence modes enable multiple cameras to be operated simultaneously. They prevent mutual interference caused by the light sources of the cameras during operation, for example. They allow multiple cameras to operate in a dynamic environment. This is useful, for example, in intralogistics or quality control applications. These and many more features make the cameras in the Visionary-T product family intelligent solutions for any industrial application.

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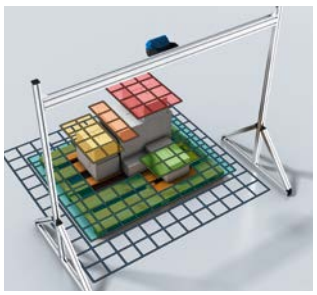
Visionary-T CX

The Visionary-T CX is a 3D streaming camera. It is suitable for users who want to develop applications for their specific requirements. The camera offers full flexibility in terms of the provided distance, intensity and confidence values on an external evaluation unit (a PC, for example).

Polar data reduction: Projection of more than 25,000 distance points onto a single line which can be represented by just a small number of points.



Cartesian data reduction: Selection of the required measurement volume and output of data in Cartesian coordinates (X-Y-Z).

Visionary-T AG

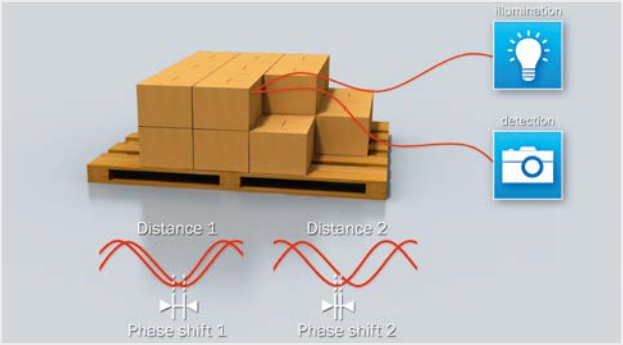
The smart Visionary-T AG streams either the complete 3D data, as the Visionary-T CX does, or reduced data which has already been preprocessed to meet specific application needs. One feature, for example, allows the user to effectively represent 3D information in 2D. The camera does this by projecting data from more than 25,000 distance points onto a curve which is represented by just a small number of points (polar data reduction). Another way to reduce the data is to choose a specific measurement volume and output the data in suitable Cartesian coordinates. In addition, a variety of filter options improve the performance of the Visionary-T AG still further. All of these properties enable the Visionary-T AG to be used in a wide range of applications including intralogistics, robotics, or quality control.

3D DATA IN REAL TIME

The Visionary-T product family operates according to the 3D time-of-flight measurement principle. To capture an image, the time-of-flight of a light signal between the camera and the sensor is measured for each pixel. The distance between the camera and the object can be calculated by detecting the time-of-flight through phase shift between the emitted light signal and the reflected light signal. Different phase shifts, therefore, equate to different distances. Accordingly, thousands of pixels captured in a single shot deliver a detailed three-dimensional distance image – a 3D snapshot – of the image area.

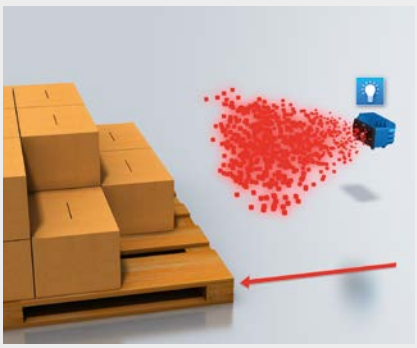
Phase shift

Modulated light is emitted and then captured by the camera after the reflection from the object. The distance is calculated by detecting the phase shift.



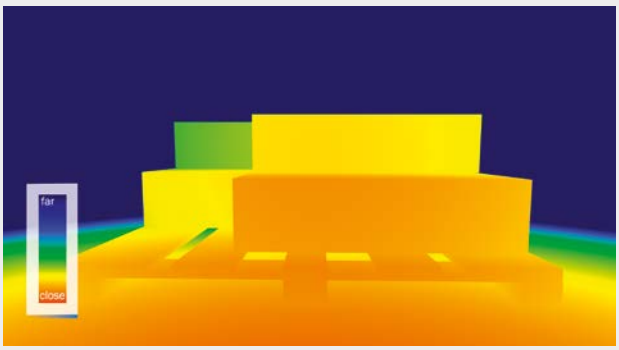
3D time-of-flight

The Visionary-T uses 3D time-of-flight technology to capture more than 25,000 pixels in a 3D snapshot.



A resulting distance image

The camera uses the 3D time-of-flight data to calculate a distance image. Similar to conventional 2D cameras, the same 3D snapshot also contains intensity values.



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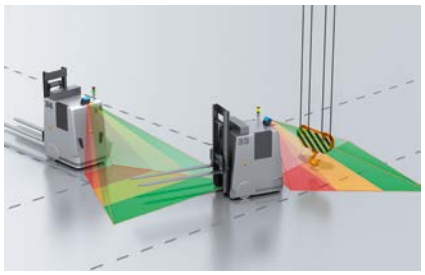
VERSATILE AREAS OF APPLICATIONS

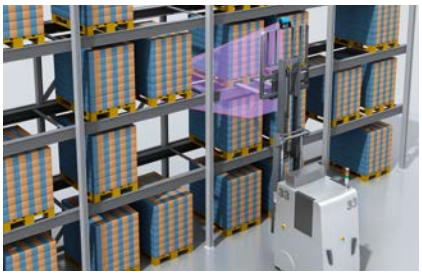
Visionary-T cameras are used in numerous processes in automation networks in both factory automation and logistics automation. With their powerful visualization tools and reliable 3D information, Visionary-T cameras are an effective solution wherever spatial detection can assist with quality control, process optimization, and functional safety.

Collision awareness



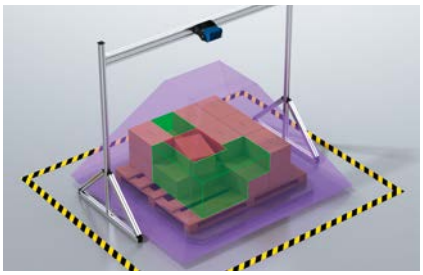
Detection of objects on and above ground, such as the manned forklift trucks or cranes shown here.

Object detection



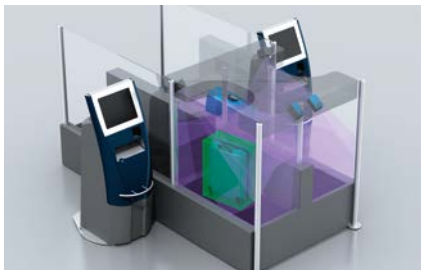
Precise position detection of a pallet for loading or unloading tasks in a high-bay warehouse.

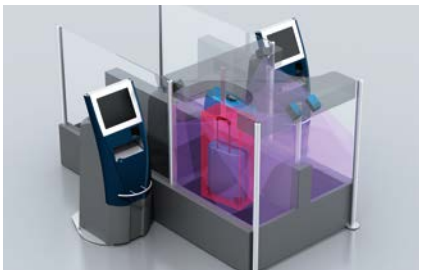
Palletizing and depalletizing



Detection of available and occupied areas to control and optimize palletizing solutions.

Automated bag drop





Detection of the volume of bags at automatic bag drop counters. In the image on the right, the permissible dimensions have been exceeded because the handle of the case has not been pushed down.

Robotics

Detection of single boxes and free space for automated pick-and-place applications.

Quality check – Factory automation

Detection of undesirable deviations by comparing an image against a predefined model to recognize improper conditions. In the image on the right, there is a screwdriver on the seat.

3D SNAPSHOT – FOR VERSATILE USE INDOORS

Product description

Visionary-T 3D vision sensors from SICK offer maximum flexibility for indoor use due to their innovative 3D-snapshot technology. The Visionary-T provides real-time depth information for each pixel – even for stationary applications – based on time-of-flight measurement. This involves transferring all 3D raw data – or application-specific information which has already been preprocessed – in a way which has been customized to suit the respective application. High-performance visualization tools and reliable 3D information make Visionary-T the ideal solution in applications including intralogistics, robotics, or industrial vehicles.

At a glance

- Record up to 30 3D images per second
- Distance values: 144 x 176 pixels per snapshot
- Output 3D data via a Gigabit Ethernet interface
- Depth reproducibility of 3 mm and 30 mm at 1 m and 7 m distances respectively
- Temperature range: 0 °C to 50 °C or up to 45 °C (depending on the housing), Enclosure rating: IP67; light sensitivity: 0 klx ... 50 klx

Your benefits

- More than 25,000 distance and intensity values in a single recording. As a result, no actuator is required and 3D information is also available for stationary applications.
- Easy mounting and rapid sensor replacement
- Solutions which provide the exact information required for the application
- Programming interface for using 3D data for further analysis on an external host
- The Visionary-T AG product version supports intelligent data reduction

Additional information

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→ www.sick.com/Visionary-T

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.

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Detailed technical data

Features

Task	No specific application
Technology	3D-snapshot, image analysis
Working distance	0.5 m ... 7.2 m [1]
Example field of view	7 m x 5.3 m [2]
Light source	Invisible infrared light (LED, 850 nm)
LED class	Risk group 0 in accordance with EN 62471
Grayscale measurements	✔
Factory calibrated	✔
Detection angle	69° x 56°

[1] Radial distance for targets having 100% remission.

[2] See table for individual values.

Performance

	Visionary-T CX	Visionary-T AG
Pixel count	176 px x 144 px	
Scan/frame rate	0.03 s per 3D image (30 fps) 2,250,000 3D data points/s	
On delay	< 20 s	
Response time	< 66 ms	
Integrated application	Data stream	Data stream with the option of filtering, reducing, and manipulating data inside the device

Interfaces

	Visionary-T CX	Visionary-T AG
Configuration software	SOPAS, API (Java, Matlab), Webserver, Telegram listing (universal use, e.g. Python, C++, C#), visualization also possible via ROS	
Ethernet	✔	
Function	Complete data stream combining distance, intensity, and confidence values plus device control	With the option to output both polar data and Cartesian data simultaneously
Data transmission rate	36 Mbit/s	≤ 36 Mbit/s (depending on type)
Protocol	Communication interface Gigabit Ethernet (TCP/IP)	
Digital inputs	2	
Digital outputs	4, wahlweise auch als Eingänge konfigurierbar	
Optical indicators	2 status LEDs	

Mechanics/electronics

Connections	M12 8-pin Gigabit Ethernet, X-coded M12, 17-pin (voltage supply/data), system plug
Supply voltage	24 V DC [1]
Power consumption	≤ 16 W Typical (without digital I/Os)
Enclosure rating	IP67
Protection class	III
Housing color	Blue, black

[1] (-30% / +20%), >1 ms latency.

[2] With cooling fins.

[3] Without cooling fins.

Weight	1.9 kg [2] 1.4 kg [3] (depending on type)
Dimensions (L x W x H)	162 mm x 116 mm x 104 mm [2] 162 mm x 93 mm x 78 mm [3] (depending on type)
Mounting	Any or can be determined by raster

[1] (-30% / +20%), >1 ms latency.

[2] With cooling fins.

[3] Without cooling fins.

Ambient data

Electromagnetic compatibility (EMC)	EN 61000-6-2:2005-08, EN 61000-6-3:2007-01
Shock load	EN 60068-2-27:2009
Vibration load	EN 60068-2-6 / EN 60068-2-64
Ambient operating temperature	0 °C ... +50 °C [1] (depending on type)
Ambient storage temperature	–20 °C ... +70 °C
Light sensitivity	< 50 klx, sunlight
Depth precision	Approx. 3 mm, at 1 m range Approx. 30 mm, at 7 m range [2]

[1] Without cooling fins up to 45 °C.

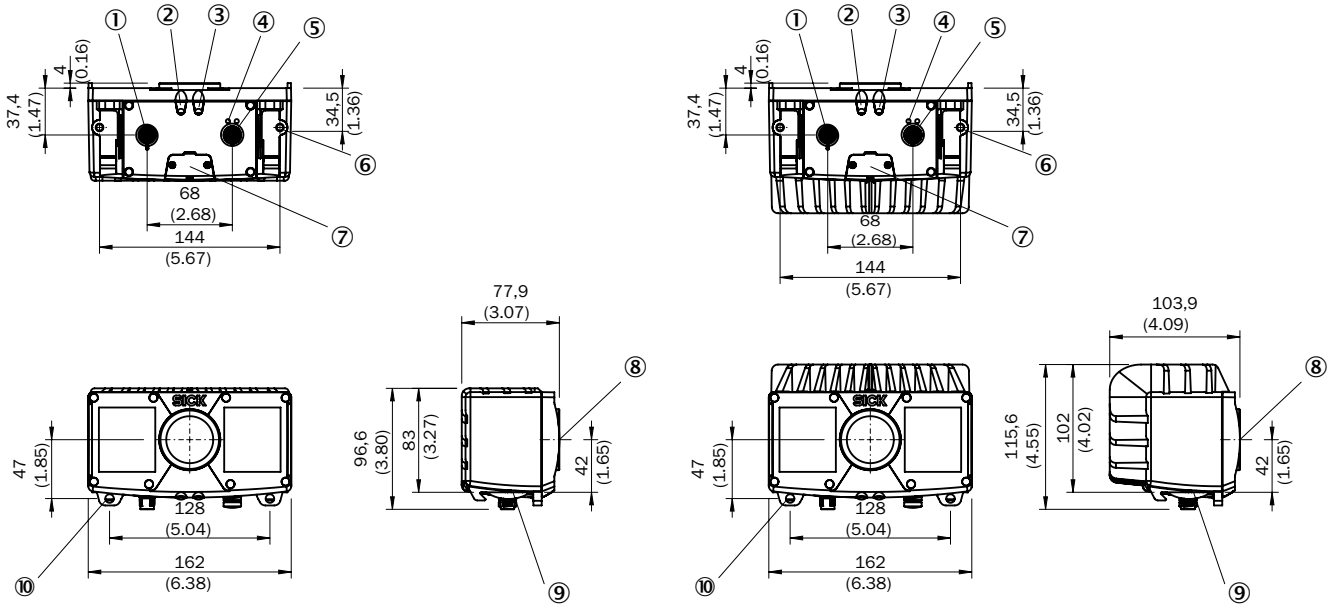
[2] See table for individual values.

Ordering information

- **Maximum performance:** 0.03 s per 3D image (30 fps)
  2,250,000 3D data points/s

Sub product family	Type	Part no.
Visionary-T CX	V3S100-1AAAAAA	1067189
	V3S100-1AABAAB	1075027
Visionary-T AG	V3S110-1AAAAAA	1075613
	V3S110-1AABAAB	1075614

Dimensional drawings (Dimensions in mm (inch))



① Power connection / digital inputs and outputs / service
② Device display
③ Application display
④ Ethernet status display
⑤ Ethernet connection
⑥ M6 blind tapped holes, 7 mm deep (2 x), for mounting
⑦ Service interface
⑧ Optical axis
⑨ Interface bracket
⑩ Bracket mounting (accessories)

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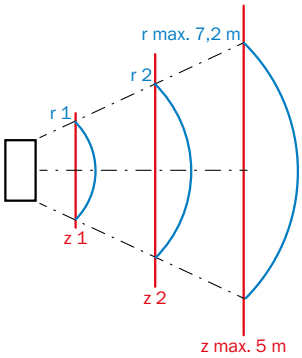
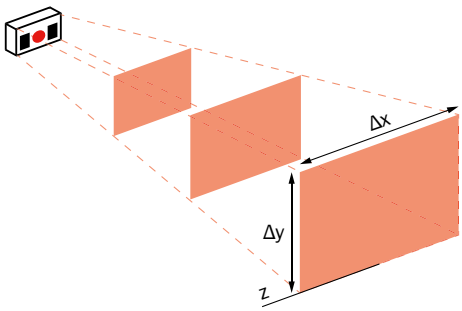
Working distance radial/absolute



Absolute accuracy (z-axis) and repeatability at 10 % and 100 % remission and without background light for integration time of 1 ms (central detection zone)

Working distance radial (r)	Accuracy (100 % remission)	Repeat-ability (1σ - 100 % remission)	Accuracy (10 % re-misssion)	Repeatabil-ity (1σ - 10 % remis-sion)
0.50 m	± 15 mm	± 2 mm	± 15 mm	± 4 mm
1.00 m	± 15 mm	± 3 mm	± 15 mm	± 8 mm
2.00 m	± 15 mm	± 4 mm	± 20 mm	± 25 mm
3.00 m	± 15 mm	± 7 mm	± 35 mm	± 50 mm
4.00 m	± 20 mm	± 10 mm	± 50 mm	± 100 mm
5.00 m	± 25 mm	± 15 mm	-	-
7.00 m	± 35 mm	± 30 mm	-	-

Detection zone and field of view (Δx X Δy)



Working distance absolute (z)	Range (Δx)	Range (Δy)
0.50 m	0.70 m	0.53 m
1.00 m	1.40 m	1.06 m
1.50 m	2.10 m	1.60 m
2.00 m	2.80 m	2.13 m
2.50 m	3.50 m	2.66 m
3.00 m	4.20 m	3.19 m
3.50 m	4.90 m	3.72 m
4.00 m	5.60 m	4.25 m
4.50 m	6.30 m	4.79 m
5.00 m	7.00 m	5.32 m

Accessories

Mounting systems

Terminal and alignment brackets

	Type	Part no.
	2x clamps, 2x screws	2077709
	Mounting set (2-part) incl. clamps and screws	2077710

Connection systems

Modules

	Brief description	Type	Part no.
	Connection device basic for connecting one sensor with 2 A fuse, 5 cable glands and RS-232 interface to sensor via M12, 17-pin female connector, all outputs available on screw/spring-loaded terminals.	CDB650-204	1064114

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Plug connectors and cables

- **Signal type/application:** Power, serial, CAN, digital I/Os

	Connection type head A	Connection type head B	Cable	Cable length	Type	Part no.
	Female connector, M12, 17-pin, straight, A-coded	Cable	17-wire, suitable for 2 A, Changed color coding of the flying leads, drag chain use, stripped	3 m	Connecting cable (female connector - open)	2070425
				10 m	Connecting cable (female connector - open)	2070427
				5 m	Connecting cable (female connector - open)	2070426
		Male connector, M12, 17-pin, straight, A-coded	To connection module CDB650, 17-wire, suitable for 2 A, drag chain use	3 m	Connection cable (male connector - female connector)	6051194

- **Signal type/application:** Gigabit Ethernet

	Connection type head A	Connection type head B	Cable	Cable length	Type	Part no.
	Male connector, M12, 8-pin, straight, X-coded	Male connector, RJ45, 8-pin, straight	AWG26	5 m	Connection cable (male connector-male connector)	6049729
				2 m	Connection cable (male connector-male connector)	6049728

Reflectors and optics

Optics cloths

	Brief description	Type	Part no.
	Cloth for cleaning the front screen	Lens cloth	4003353

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SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 8,000 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, we are always close to our customers. 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 various 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 round out our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is "Sensor Intelligence."

Worldwide presence:

Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Hong Kong, India, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Arab Emirates, USA, Vietnam.

Detailed addresses and further locations → www.sick.com

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