










Vision Sensors Inspector

The intelligent vision solution in an easy-to-use sensor package.

SICK
Sensor Intelligence.

Product overview



Inspector I10	Inspector I20	Inspector I40	Inspector P30
Tough and reliable part inspection	Part inspection with added flexibility	Powerful part inspection with excellent production control	Well-positioned to guide your applications
Versions: <div>   </div> I10 Standard I10 Dome	Versions: <div>   </div> I20 Flex I20-UV Flex	Versions: <div>   </div> I40 Flex I40-LUT Flex	Versions: <div>  </div> P30 Flex

Inspector

A decision for quality!



Meeting the challenge of quality control

The Inspector is an intelligent vision solution in an easy-to-use sensor package. No matter what orientation your product comes down the line, the Inspector is up to the challenge. Verify completeness and quality or find a part's position – you'll increase throughput with SICK's family of Inspectors.

Industry proven

The sensors' robust design and IP 67 metal housing makes them ideal for tough environments and intelligent processing technology is perfect for high-speed applications.

Flexible for your application

Solving vision applications is all about getting top-quality images – even with tough targets, such as highly reflective metal parts and multi-colored labels. The Inspector's unique housing design and variants with interchangeable lenses will optimize the optical needs of your application.

Easy integration in production systems

The Inspector family offers a pre-defined package for production control within the SICK SOPAS user interface. It includes image viewing, recording and off-line support. In addition, there are variants that support PLC control over Ethernet and unlimited image storing using FTP.

Inspector I-series

High-performance part inspection made easy



The Inspector I-series is built to meet inspection challenges! These sensors' precise and powerful part inspection tool set verifies quality and completeness. Variations in ambient light and slight distance variations are no problem for these Inspectors.

With its flexible, interchangeable lens design, the I-series also offers options with integrated UV illumination – providing unique, single component solutions for wide area luminescence inspection and high absorbing solar wafer inspection.

The I-series is the absolute choice for inspection!

At a glance

- High-speed part inspection
- Powerful “object locator” tool, independent of position, rotation and scale
- Locate and multi-feature inspection
- Multiple, simultaneous inspections of patterns and details
- Multi-reference object teaching
- User defined outputs
- Input and output extensions via I/O box
- Image storage to FTP and PLC communication

Inspector I-series Applications

Label inspection and logo verification



Verification of hole presence as well as nuts, safety springs and washers



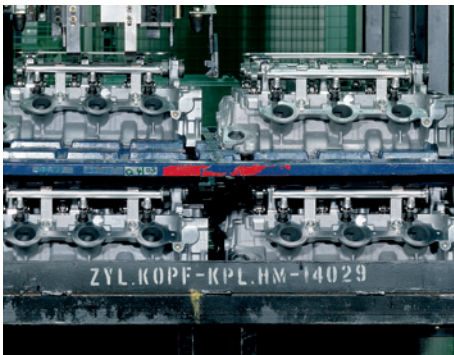
Solar wafer edge damage detection



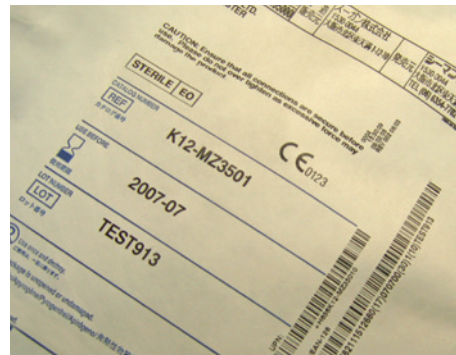
Bottle inspection: molded details and alignment verification



Verification of part assembly before next station



Verification of code and text presence on packages



Inspector P-series

Reliable positioning and guidance



The Inspector P-series positions you for higher throughput! When the challenge is to find the right position, the Inspector P-series' part positioning tool set provides a precise positioning point of a free-form and a known target. For example, the P-series is ideal for finding the center position of a free-form target, such as food picked from a belt, or for more precise applications, such as providing coordinates of a pre-defined pick point of a known target. These sensors are able to adapt to variations in ambient light and slight distance variations do not affect them.

The vision sensors provide result data that shows precise pixel coordinates and angle over Ethernet, as well as a directional guidance over digital outputs.

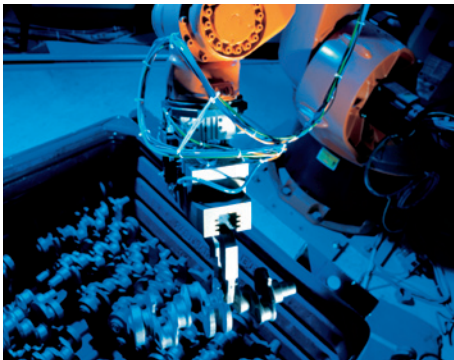
The P-series is the absolute choice for positioning and guidance!

At a glance

- High-speed positioning and guidance
- Powerful "object locator" tool, independent of position, rotation and scale
- "Object locator" tool gives position of taught-in objects
- Easy-to-use "blob locator" tool to find free-form targets
- Directional guidance over digital outputs
- Precise pixel position and angle orientation data provided over Ethernet

Inspector P-series Applications

Positioning of objects with known shape for automated picking



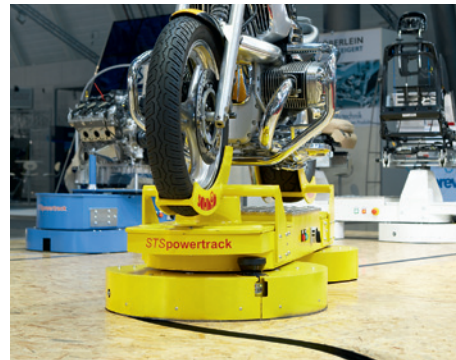
Positioning of objects in order to align equipment for the next step in a production process



Positioning of objects with free-form shape



Two-directional guidance of unmanned vehicles



Eight-directional guidance for final positioning of stacker cranes



Paper cut coordination

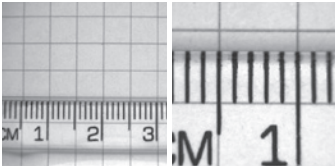


Inspector Flex

Unique, interchangeable housing design provides the easiest way to improve image quality



The key to solving vision problems is to work on a good quality image – the Flex concept makes this easy. Apart from easy lens exchange, this unique concept is designed to reuse the illumination in combination with different front windows, resulting in red, green, blue or diffused white illumination – without any extra wiring. Illumination has never been easier!



Lenses

You can easily exchange lenses to optimize the field of view to your distance needs

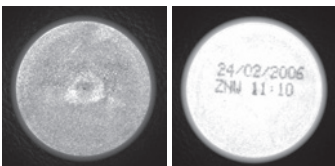
- Ensure accuracy at longer distances with a narrow lens
- Handle with larger parts at shorter distances in tight machines with a wide lens



Dome

You can easily get rid of unwanted glare on glossy or reflective materials by using the dome accessory, which distributes light evenly

- Create even illumination on glossy surfaces with the dome



Color filters

You can easily emphasize any detail on multi-colored backgrounds by the use of color filters

- Increase contrast on multi-colored objects using color filters



Replacement windows

You can easily exchange the front window in case of scratches or damage on your device

- Keep a clear view in harsh environments

Inspector illumination

Light the way to better performance



Light is a crucial component in vision. With the correct lighting, details of interest on the part are emphasized – providing a high-quality image for analysis. The Inspector family provides full flexibility with integrated light, “Flex” window options or external solutions to match your illumination needs.

Inspectors with integrated white illumination

White light is used as it creates contrast between targets of all colors. When combined with the “flex” front windows, you can improve quality on highly reflective or multi-colored materials

- Photo with color camera versus grey image from Inspector with white illumination



Inspector I40-LUT

This variant makes invisible luminescent agents visible. Compared to traditional luminescent registration sensors, which operate on a fixed spot, the I40-LUT scans an entire area

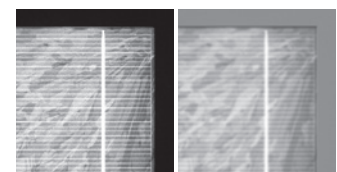
- Inspector I40-LUT versus Inspector with white illumination on paper currency



Inspector I20-UV

This variant emphasizes contrast between materials that have high versus low absorption to UV

- Inspector I20-UV versus Inspector with white illumination inspecting edge breakage on a blue solar wafer against a dark production belt



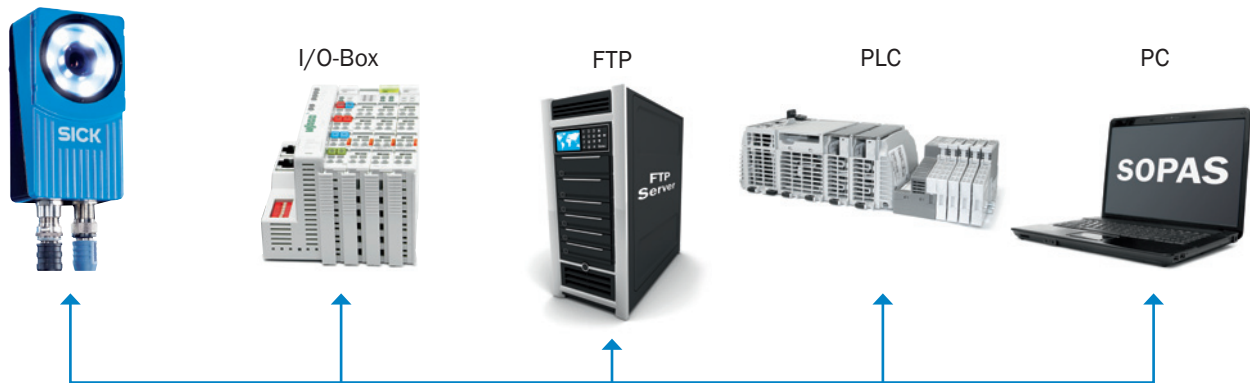
External lights

SICK offers a wide range of lights to support vision applications. The lights are available in different colors and sizes, with both front and back light variants. These lights are easily controlled and powered via a standard M12 connector on the Inspector.

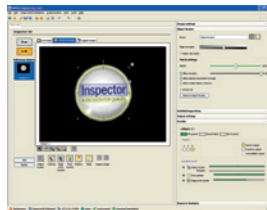


Inspector connectivity

Take greater control of your production plant with the Inspector



The Inspector family offers a pre-defined package for production control within the SICK SOPAS user interface. It includes image viewing, recording and off-line support. In addition, there are variants that support PLC control over Ethernet and unlimited image storing using FTP.



Off-line support with emulator

Image recording and post-analysis in emulator enable machine builders to remotely support customers



Expandable I/O

Unique detailed inspection results via I/O extension box enable direct feedback about the cause of failures

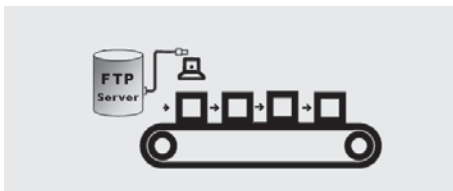
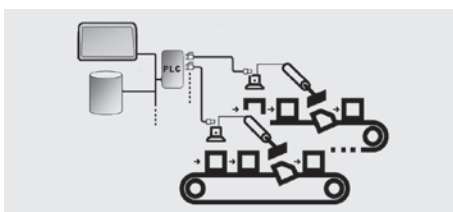


Image storage

Continually storing images to FTP in powertrain assembly stations provides the easiest way to diagnose and resolve the root cause to a problem



Data communication

PLC communication enables centralized control, such as for drift correction and specialized statistics in large packaging plants

Inspector Viewer

Monitor multiple Inspectors for improved quality and throughput



The Inspector Viewer is a tool that provides advanced monitoring and trending capabilities for the Inspector family. The Viewer's functional design is optimized to make it easier for the operator to oversee daily work more efficiently. The Inspector Viewer has an easy-to-use touch screen display for performing the functions as described below.

Monitoring images

Verify your application and setup by monitoring live or logged images in full resolution. The Viewer's screen displays all "Pass," "Fail" or "Not Located" inspection results live for the Inspector I-series, as well as the position for the P-series.



View results

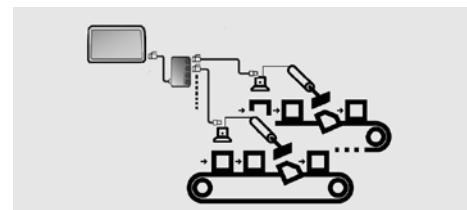
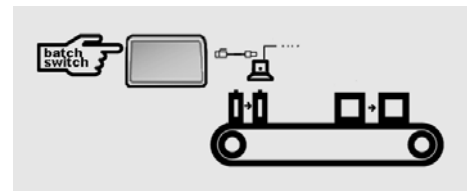
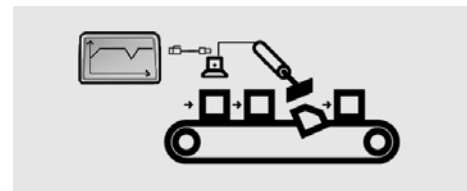
Using the Inspector Viewer, you can see detailed results and trending information for presence detection and damage and shape verification. This information enables you to adjust production parameters in order to increase throughput and reduce costs.

Simplify product changeover

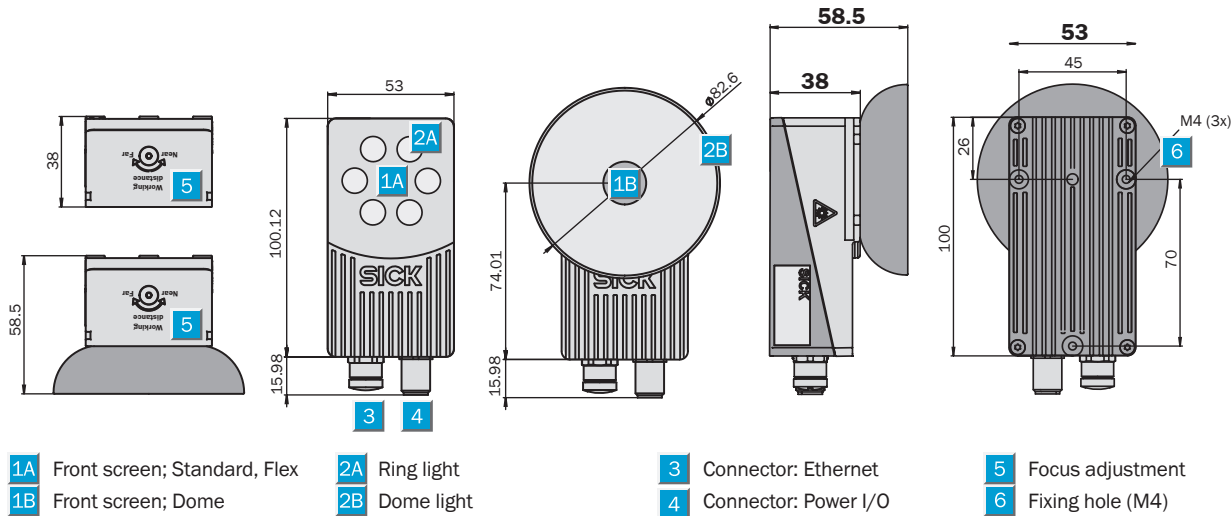
Easily change reference objects to make line changes faster and more efficient, such as in packaging applications. The Inspector Viewer provides the ability to save and export configurations, allowing virtually an infinite number of reference objects.

Manage Multiple Inspectors

Multiple Inspectors can be monitored from one Viewer, making it economical to use in plants with more than one Inspector. In addition, the Viewer enables users to easily duplicate the parameters of one Inspector to multiple Inspectors.

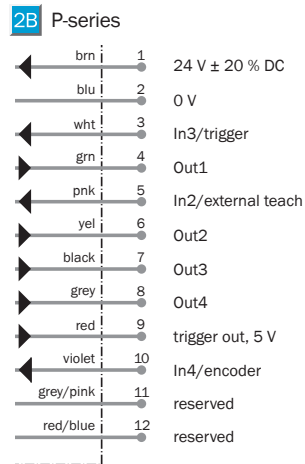
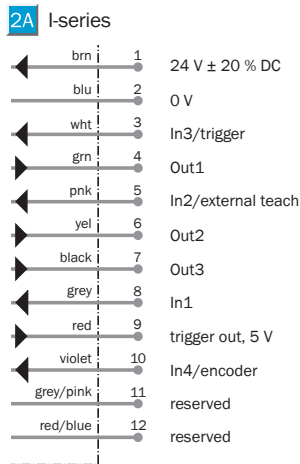
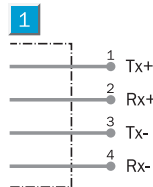
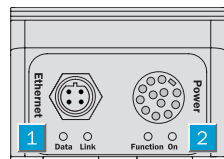


Dimensional drawings – Inspector

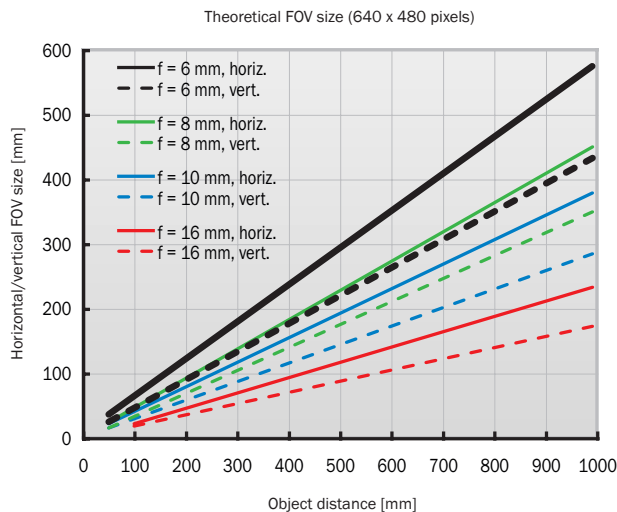
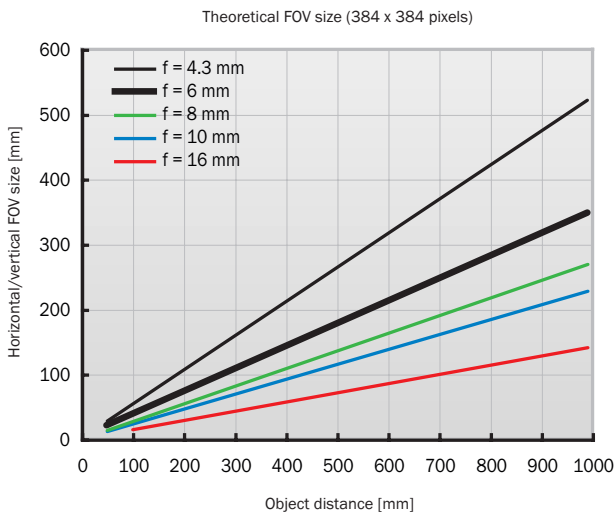


Connection type

- 1 Ethernet: M12, 4-pin, female
- 2 Power I/O M12, 12-pin, male



Theoretical FOV size



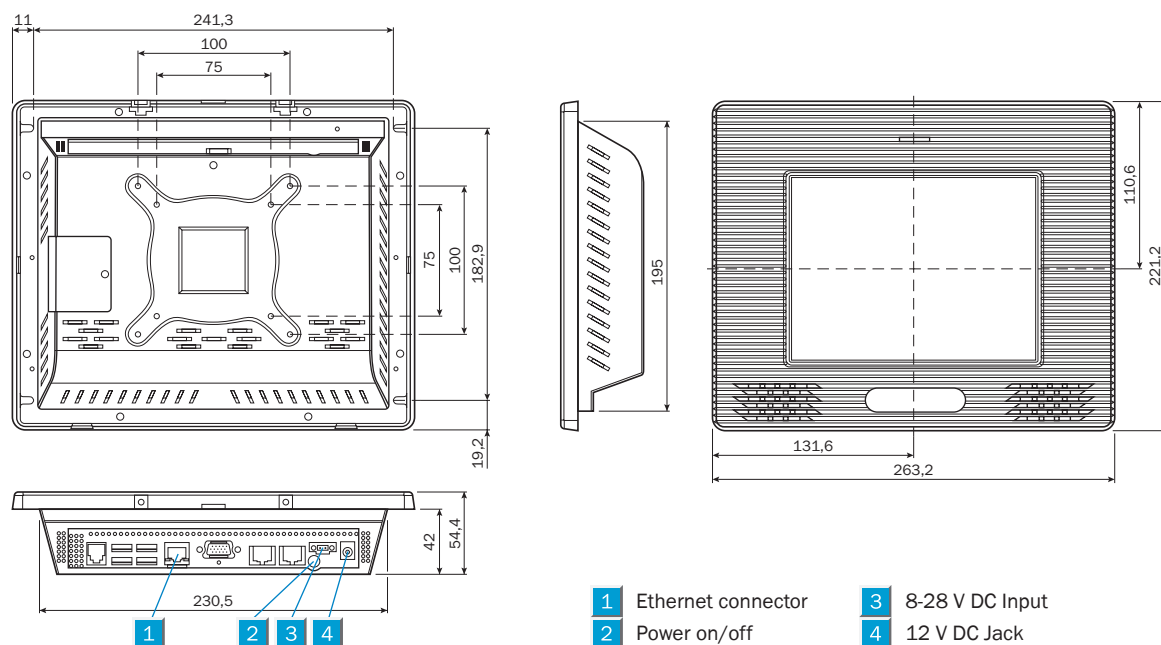
Technical data

		VSPI- IR111 I10 Standard	VSPI- ID111 I10 Dome	VSPI- 2F111 I20 Flex	VSPI- 2F121 I20-UV Flex	VSPI- 4F2111 I40 Flex	VSPI- 4F2311 I40-LUT Flex	VSPP- 3F1122 P30 Flex
Working distance	50 ... ∞ mm							
Working distance, internal illumination	50 ... 200 mm							
	50 mm							
Field of view ¹⁾ / default lens	20 x 20 ... 72 x 72 mm ² / 6 mm							
	30 x 30 mm ² / 4.3 mm							
	22 x 15 ... 79 x 58 mm ² / 10 mm							
Optics	Exchangeable							
Max. performance	250 fps							
	75 fps							
Typical performance ²⁾	40 fps							
	50 fps							
Repeatability, position	± 0.1 pixels							
Repeatability, angle	± 0.02°							
Toolset	Object locator							
	Pixel count, Edge pixel count, Contour							
	Pattern							
	Blob locator							
Max reported positions	16							
Reference images	16 objects							
	32 objects							
Offline support	Emulator							
Data store and retrieve	30 images device log							
	Record images on PC							
	Store images to FTP							
PLC communication	EtherNet/IP							
	TCP/IP configurable protocol							
I/O Box extension	4x inputs for object selection							
	5x inputs for object selection							
	16x outputs							
Resolution	384 x 384 pixels							
	640 x 480 pixels							
Light source	White ring light, 6x high-power LEDs							
	White dome light							
	UV ring light							
Spectral response	Approx. 400 ... 750 nm							
	Near UV < 400 nm							
Supply voltage	24 V DC ± 20 %							
	< 450 mA, without load							
Digital outputs	3 outputs 24 V (B-type)							
	4 outputs 24 V (B-type)							
- Output current	100 mA							
- Default outputs	No object detected, all pass, any fail							
	Directional guidance							
- Configurable outputs	Output by logical expressions							
	Store images to FTP overflow							
Control of external light	5 V TTL							
Digital inputs	4 inputs 24 V							
	3 inputs 24 V							
- Configurable inputs	External trigger, encoder, external teach							
	Reference object selection							
Interface	100 Mb Ethernet							
Ambient temperature ³⁾	Operation: 0 °C ... +45 °C							
	Storage: -20 °C ... +70 °C							
Housing material	Aluminium							
Window material	PMMA (plastic)							
	Glass							
Weight	350 g							
	400 g							
Enclosure rating	IP 67							

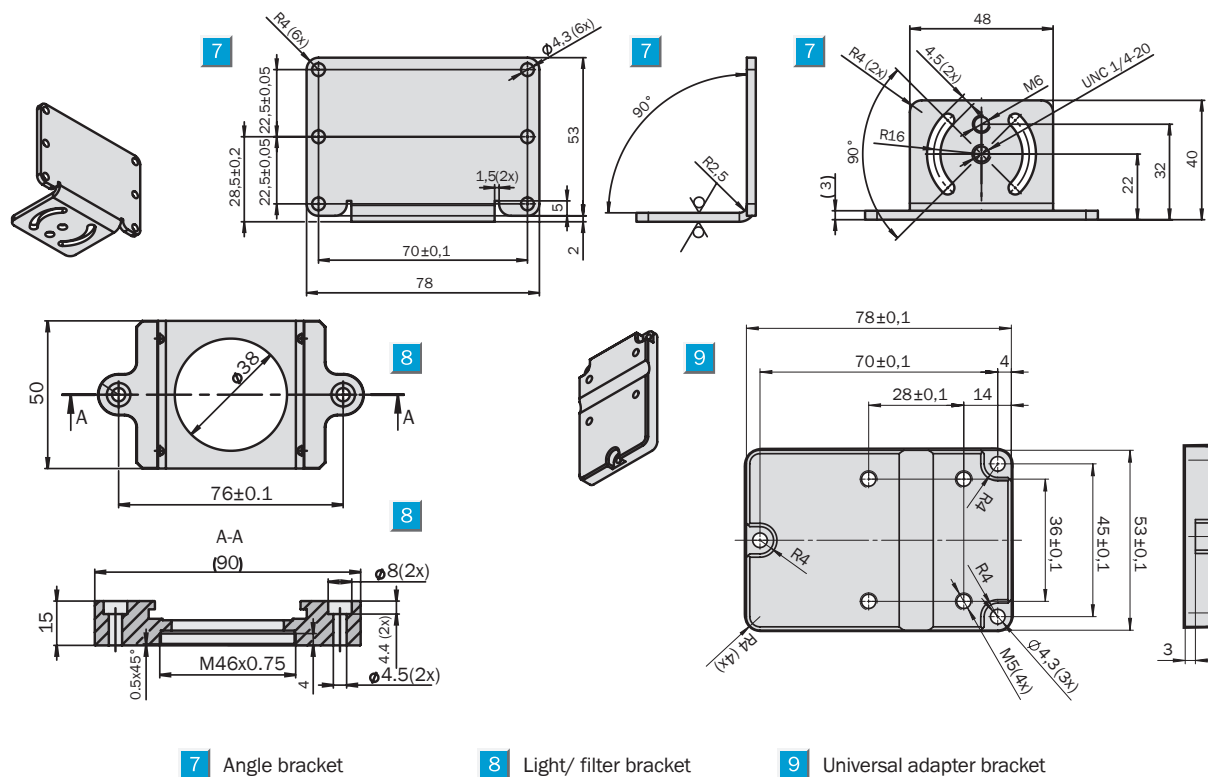
¹⁾ Internal illumination. ²⁾ Full resolution, full rotation, high speed mode. ³⁾ Rel. Humidity: 35 ... 85 %, 95 % at storage.

For more technical details and ordering information: www.sick.com


Dimensional drawings – Inspector Viewer



Dimensional drawings – Brackets



Order information

	Working dist. 50 ... ∞ mm 50 mm
Inspector vision sensors	

Order information	
Inspector I-series	
Type	Order no.
VSPI-1R111 I10 Standard	1042779
VSPI-1D111 I10 Dome	1044038
VSPI-2F111 I20 Flex	1046732
VSPI-2F121 I20-UV Flex	1048353
VSPI-4F2111 I40 Flex	1047913
VSPI-4F2311 I40-LUT Flex	1050694

Order information	
Inspector P-series	
Type	Order no.
VSPP-3F1122 P30 Flex	1051982

Accessories	
Type	Order no.
DOL-1212-G02MAS01 cable 2 m, M12 *	6036555
DOL-1212-G05MAS01 cable 5 m, M12	6036556
DOL-1212-G10MAS01 cable 10 m, M12	6037356
PIO extension cable 2 m M12/M12	6041763
SSL-2J04-G03ME cable 3 m, RJ45 *	6029630
SSL-2J04-G05ME cable 5 m, RJ45	6035389
SSL-2J04-G10ME cable 10 m, RJ45	6030928
T-coupler 12/12/8P, M12x1	6034950
Inspector angle bracket	2045167
Inspector light/filter adapter	2045397
Inspector Universal arm + adapter bracket	1048400
Lens focal length 4.3 mm	2049491
Lens focal length 6 mm	2049668
Lens focal length 8 mm	2056692
Lens focal length 10 mm	2049415
Lens focal length 16 mm	2049418
Inspector Flex color filter red (> 588 nm)	2050675
Inspector Flex color filter green (544 ± 53 nm)	2050677
Inspector Flex color filter blue (468 ± 62 nm)	2050676
Inspector Flex Dome	2050678
I/O extension box (4 inputs, 8 outputs)	6037654
I/O module, 2 extra digital inputs	6039038
I/O module, 8 extra digital outputs	6037750
Inspector Viewer VSPV-22222	2057556

* minimal needed accessories to get started

Spare parts	
Type	Order no.
Front window, Inspector Flex (glass)	2052266
Front window, Inspector Flex (PMMA)	2050690
Tool, front window Inspector Flex	2050703

Device specific accessories

	VSPI- 1R111 I10 Standard	VSPI- 1D111 I10 Dome	VSPI- 2F111 I20 Flex	VSPI- 2F121 I20-UV Flex	VSPI- 4F2111 I40 Flex	VSPI- 4F2311 I40-LUT Flex	VSPP- 3F1122 P30 Flex
Lenses, focal length	4.3 mm						
Lenses, focal length	6 mm, 8 mm, 10 mm, 16 mm						
Glass front filters ⁴⁾	Red, Green, Blue						
Dome	Optimal for 50 mm working distance						
I/O extension box (4 inputs, 8 outputs)							
I/O module, 2 extra digital inputs							
I/O module, 8 extra digital outputs							
Inspector light/filter adapter							

³⁾ Full accessory list at www.sick.com. ⁴⁾ > 60 % transmission.

For more technical details and ordering information: www.sick.com

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