

In a class of its own.

VISOR[®] – the new generation of vision sensors



The needle in the haystack.

Vision sensors see more.



Digital image processing has developed into an indispensable tool in industrial automation over recent years. Modern vision systems have long been able to solve complex inspection tasks (which were once only possible using the human eye) better, more rapidly and cheaper. Regardless of whether this involves the detection of assembly differences, quality or colour deviations, the tracking of components and assemblies, or the general optimisation of production processes: in many cases nothing would be possible without the “clairvoyant on the conveyor”.

VISOR® – the new generation of industrial image processing.

Vision sensors from SensoPart have always impressed through their robust, industry-oriented design and excellent price-performance ratio. Decisive parameters such as camera resolution, processor power and detection algorithms have been substantially further improved in the new VISOR® vision platform, and the opportunities for use of the sensors have been expanded by means of brighter LED illumination and new lenses for greater distances and depths of focus. The update of the proven, easy-to-operate SensoPart software also opens up new applications. Positions must often be precisely determined even if the target object varies greatly as a result of injection moulding burrs, printing or even reflections. VISOR® allows masks of any shape to be applied to the target marks. For example, on the drilled holes of a circuit board whose external dimensions and components have high tolerances – the robot therefore places the circuit board reliably on the retention pins in a tight-fitting housing. Upgrading to the new VISOR® performance class thus pays in every way!



Which part is good, which is defective?

A vision sensor sees more rapidly and better than the human eye, does not get tired and costs less.

Everything with a single glance:

One vision sensor can inspect several object features simultaneously and thus replace several switching sensors.

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VISOR®

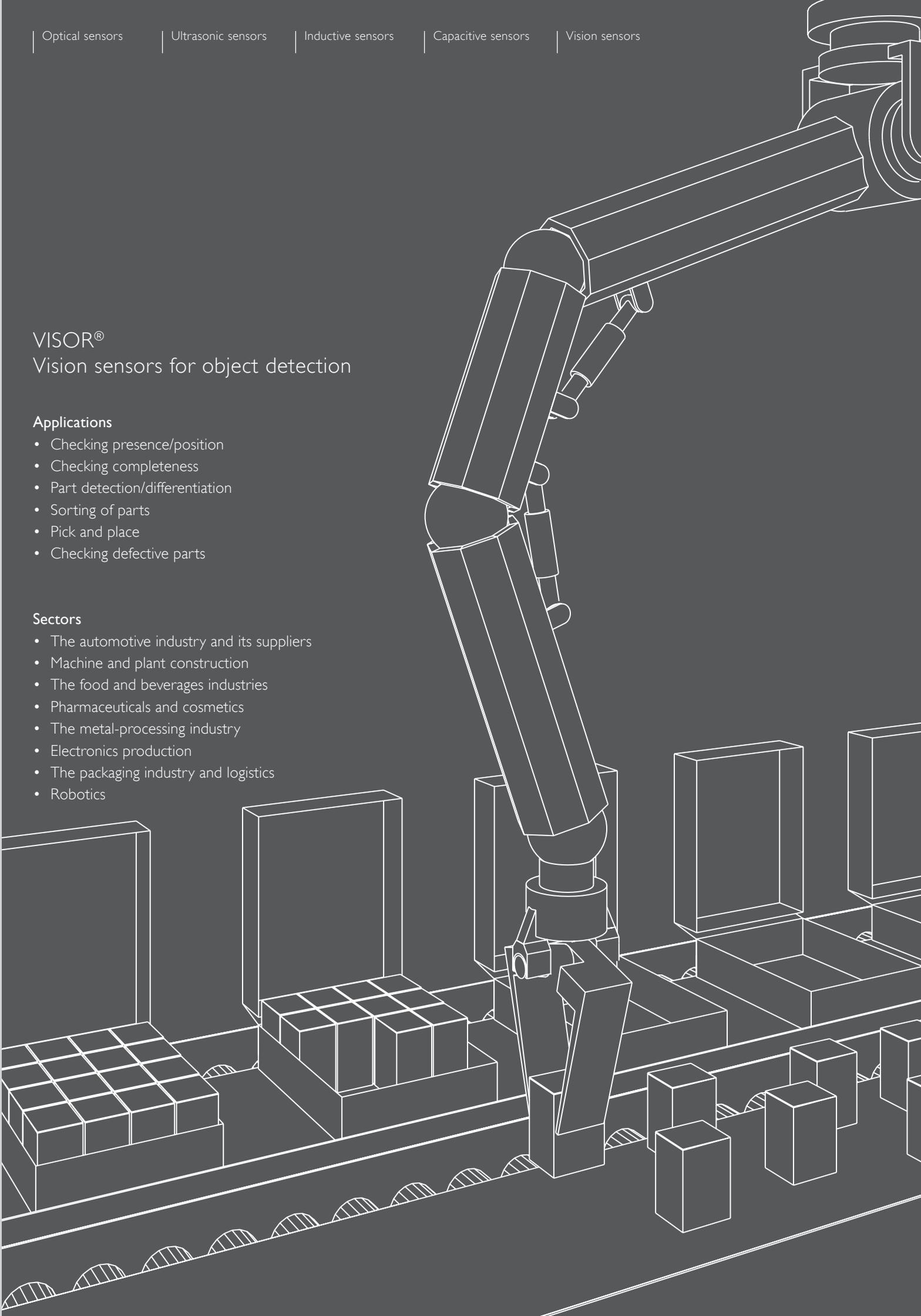
Vision sensors for object detection

Applications

- Checking presence/position
- Checking completeness
- Part detection/differentiation
- Sorting of parts
- Pick and place
- Checking defective parts

Sectors

- The automotive industry and its suppliers
- Machine and plant construction
- The food and beverages industries
- Pharmaceuticals and cosmetics
- The metal-processing industry
- Electronics production
- The packaging industry and logistics
- Robotics



Master of the situation.

The VISOR® detects the right part in the wrong place – and vice-versa.

Objects with complex shapes and small details can often fool a standard optical sensor. Not with the VISOR® object detection sensor from SensoPart: It is always able to keep track of the item, instantaneously detecting defective parts irrespective of their orientation, or position within the field of view. With its fantastically accurate detection algorithms for both part location and subsequent check, the VISOR® sets new standards in vision sensor capability from SensoPart. With its high processor power, its enhanced field-of-view (WideVGA) and the use of ultra bright LED technology, it masters even the most challenging of vision sensor tasks.

Five detectors plus position detection: pattern matching, contour, brightness, grey level and contrast. Position tracking allows reliable detection of such features even if they are not accurately and repeatedly in the taught-in position. All evaluations take place relative to the current part position and orientation. You can also master demanding pick-and-place applications with this powerful tool!

HIGHLIGHTS VISOR® V10

- Twice the range compared to the FA 45/46 vision platform
- WVGA-resolution pattern matching, typically in 20 ms
- Powerful finding and tracking of parts
- Highly accurate position determination: X/Y positions and orientation
- 2 inputs, 4 outputs, up to 4 selectable inputs/outputs, configurable, with encoder evaluation
- Comprehensive configuration and viewer software with graduated user rights



Glue dot present?

Early detection by checking presence (here using seals for the beverages packaging industry as an example) long before final quality assurance, preventing expensive rejects later on.



Position and orientation tolerance measurement:

The sensor "learns" the contours and their direction on the basis of a picture, and reliably reacts to deviations. It masters the situation even if the screws were to lie laterally.



Spout present or not?

Too deeply shrunken – or not deep enough? During the production of blood bags the contour detector of the vision object sensor keeps an eye on all the essential details.

Well served.

Image processing can be so easy.

The VISOR® object detection sensor from SensoPart not only impresses with its excellent performance, but thanks to its easy to understand user interface software you remain master of the situation without indepth knowledge of image processing. You define and test your inspection tasks ('Jobs') with a few mouse clicks. You will immediately see the effect of the inspection on the screen in front of you.

By utilising the in built logic functionality even complex inspection results can be allocated to any one of the six onboard digital outputs, and if you need more then simply add an IO expansion module for a further 32.

Encoder input feature that is also included allows the sequencing of outputs further down your production line, freeing up valuable PLC resources in your main control system. Integrated picture recording allows you to go back in time and check the recent faulty parts rejected at a later date.

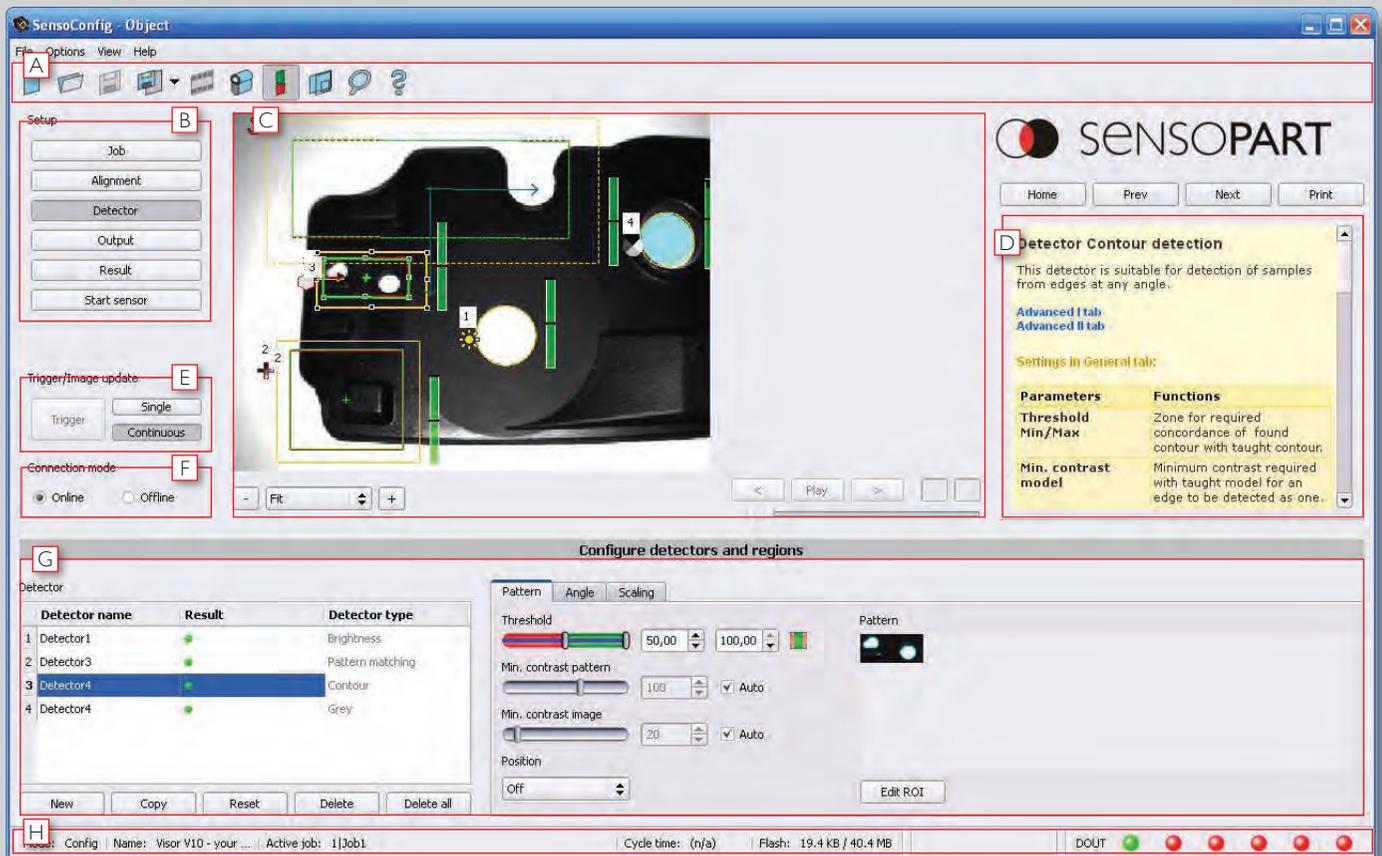
Everything in sight with the 'viewer': after completing the configuration, the vision object sensor works in your production plant autonomously, i.e. without a PC connection. Data can, of course, be called up at any time during running operation: viewer software is available for this purpose – with restricted user rights that reliably prevent unintentional changes to the configuration. This is how easy and user-friendly professional image processing can be!

Step-by-step to achieving your aim

1. **Job:** select an inspection task or create a new one.
2. **Alignment:** define a position detector (optional).
3. **Detector:** define the desired evaluations.
4. **Output:** assign the inspection results to the switching outputs.
5. **Result:** test your configuration.
6. **Start sensor:** carry out your job with the sensor.

The right product for every position: vision object sensor variants

Features/sensors	Standard	Advanced
Functions		
Resolution	736 x 480	736 x 480
Frames per second	25	50
Number of jobs detectors	2 32	n n
Position tracking	–	✓
Pattern matching (X-,Y-translation)	✓	✓
Contour matching (X-,Y-translation, orientation)	✓	✓
Grey level	✓	✓
Contrast	✓	✓
Brightness	✓	✓
Free shape tool	only contour	✓
Interfaces		
Inputs outputs	2 4	2 4
Freely definable switching inputs/ outputs, PNP or NPN	2	4
Encoder input	–	✓
I/O expansion	–	✓
RS422	–	✓
Ethernet/data transmission	✓	✓
EtherNet/IP	✓	✓
Connection Profibus-Interface	–	✓
Lens		
Integrated 6 mm 12 mm 25 mm	✓ ✓ –	✓ ✓ ✓
C-mount	–	✓
Operation/visualisation		
Viewer software with user guidance	✓	✓
Graduated user rights	✓	✓



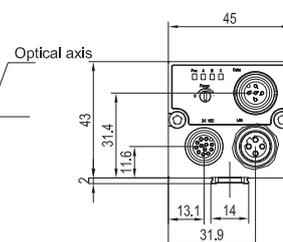
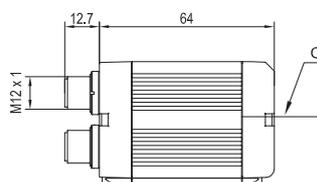
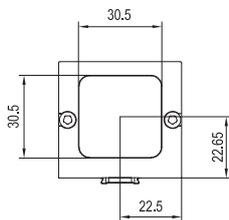
An overview of the user interface

- A **Menu bar:** rapid access to the most important functions
- B **Setup navigation:** reliably guides the user through the configuration process
- C **Display window:** live picture of the object with graphic display of the test area and results
- D **Context-sensitive online help:** precise information on each work step
- E **Trigger function:** triggered operation or free-running, single-picture or serial switching
- F **Online/offline operation:** operation with connected sensor or simulation with stored pictures
- G **Configuration window:** input of parameters for each navigation step
- H **Status line:** current information on the active job and output states

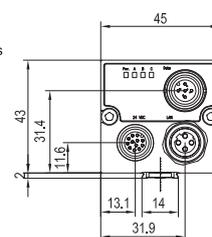
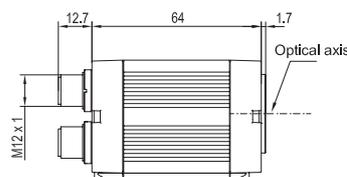
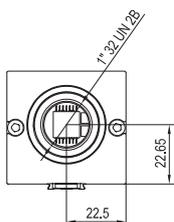
Technical data and order information

Vision sensors

The VISOR® vision camera



153-00911



153-00912

Electrical data

Operating voltage U_b	24V DC (-25%/+10%)
Ripple	< 5Vss
Power consumption (without I/O)	≤ 200 mA
Power consumption (without illumination and I/O)	≤ 120 mA
All inputs	PNP/NPN High > U_b -1V, Low < 3V
Input resistance	> 20 kOhm
Encoder input	High > 4V
Outputs	PNP/NPN
Max. output current (per output)	50 mA 100 mA (Pin 12)
Short-circuit protection (all outputs)	Yes
Reverse-polarity protection	Yes
Interfaces, VISORV 10-XX Standard	Ethernet (LAN)
Interfaces, VISORV 10-XX Advanced	Ethernet (LAN), RS422
Time to readiness	Approx. 13 s after power on

Optical data

Integrated measurement illumination	8 LEDs
Integrated lens, focal length	6, 12 or 25 mm, focal position adjustable
Lens (adjustable to ∞)	6 12 25
Min. measurement distance	6 30 140 mm
Min. field of view X×Y	5×4 8×6 18×14 mm

Mechanical data

Length x Width x Height	65 x 45 x 45 mm ³ (without plug)
Weight	Approx. 160 g
Vibrations/impacts	EN 60947-5-2
Operating ambient temperature	0 °C ... 50 °C (80% air humidity, non-condensing)
Storage temperature	-20 °C ... 60 °C (80% air humidity, non-condensing)
Enclosure rating	IP 65/67
Plug connection	Power and I/O M12 12-pin, Ethernet M12 4-pin, Data M12 5-pin
Housing material	Aluminium, plastic

Functions and properties

Evaluation modes	<ul style="list-style-type: none"> Alignment Contour comparison with/without position evaluation Pattern comparison with/without position evaluation Area test: grey level/brightness Area test: contrast Co-ordinate output for position tracking, contour and pattern matching
Cycle time per detector with QVGA resolution in Advanced version. For Standard: Double duration.	typ.: 20 ms pattern matching typ.: 30 ms contour typ.: 2 ms brightness typ.: 2 ms contrast typ.: 2 ms grey level

Part no. ¹	Type designation	Description	Optics	Depth of focus	Illumination	Interfaces		
Advanced White								
535-91001	V10-OB-A1-W6	VISOR V 10 Advanced, fast CPU, as many jobs as required can be configured, several detectors can be used per job, position tracking, encoder input	6	Normal	White	Ethernet, EtherNet/IP, RS422, 24V inputs/outputs, 2 inputs, 4 outputs, 4 selectable inputs/ outputs		
535-91002	V10-OB-A1-W12		12					
535-91012	V10-OB-A1-W25		25					
535-91013	V10-OB-A1-W6D		6	Enhanced				
535-91014	V10-OB-A1-W12D		12					
Advanced Red								
535-91003	V10-OB-A1-R6		VISOR V 10 Standard, two jobs can be configured, several detectors can be used per job	6	Normal		Red	Ethernet, EtherNet/IP, 24V inputs/outputs, 2 inputs, 4 outputs, 2 selectable inputs/outputs
535-91004	V10-OB-A1-R12			12				
535-91015	V10-OB-A1-R25			25				
535-91016	V10-OB-A1-R6D			6	Enhanced			
535-91017	V10-OB-A1-R12D			12				
Advanced IR								
535-91006	V10-OB-A1-I6 ³	VISOR V 10 Standard, two jobs can be configured, several detectors can be used per job		6	Normal	Infrared	Ethernet, EtherNet/IP, 24V inputs/outputs, 2 inputs, 4 outputs, 2 selectable inputs/outputs	
535-91007	V10-OB-A1-I12 ³			12				
535-91018	V10-OB-A1-I25 ³			25				
535-91019	V10-OB-A1-I6D ³			6	Enhanced			
535-91020	V10-OB-A1-I12D ³			12				
Advanced C-mount								
535-91005	V10-OB-A1-C ^{2,3}			C-Mount		Extern		
Standard White								
535-91008	V10-OB-S1-W6		VISOR V 10 Standard, two jobs can be configured, several detectors can be used per job	6	Normal	White		Ethernet, EtherNet/IP, 24V inputs/outputs, 2 inputs, 4 outputs, 2 selectable inputs/outputs
535-91009	V10-OB-S1-W12			12				
Standard Red								
535-91010	V10-OB-S1-R6	VISOR V 10 Standard, two jobs can be configured, several detectors can be used per job	6	Normal	Red	Ethernet, EtherNet/IP, 24V inputs/outputs, 2 inputs, 4 outputs, 2 selectable inputs/outputs		
535-91011	V10-OB-S1-R12		12					

¹ Further types on request.

² When C-mount version of VISOR V 10 is used, a C-mount lens with a 5 mm intermediate ring or a C-mount outer casing will always be required.

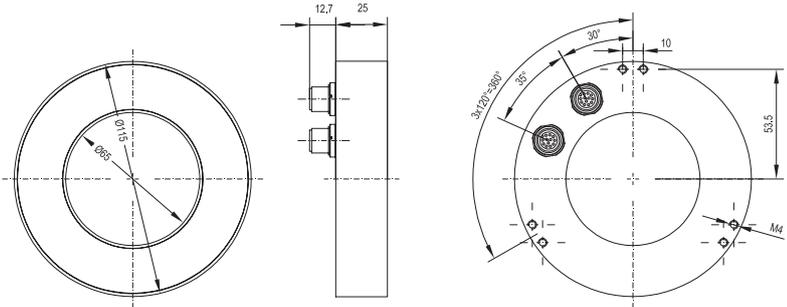
³ External IR illumination is only possible with IR types or C-mount sensors.

Flat area light for incident light illumination			
	Part no.	Order designation	Description
	525-51147	LF45 W-24-2L12	Flat area light, white, 12-pin
	525-51148	LF45 R-24-2L12	Flat area light, red, 12-pin
	525-51149	LF45 IR-24-2L12	Flat area light, IR, 12-pin*
153-00924			

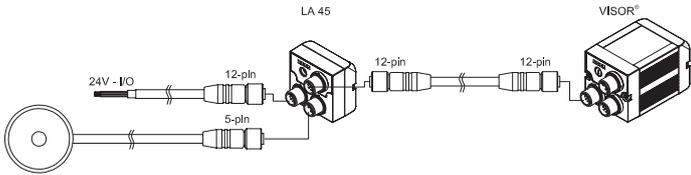
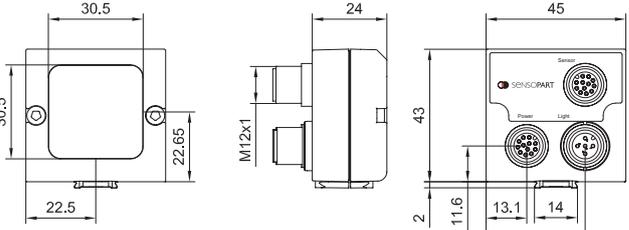
* External IR illumination is only possible with IR types or C-mount sensors.

Technical data and order information

Vision accessories

Ring light				
	Part no.	Order designation	Description	Mounting bracket
	525-51150	LFR 115 WD-24-2L12	Ring light, white, 12-pin	543-11015
	525-51151	LFR 115 RD-24-2L12	Ring light, red, 12-pin	543-11015
	525-51152	LFR 115 ID-24-2L12	Ring light, IR, 12-pin*	543-11015
				
153-00926				

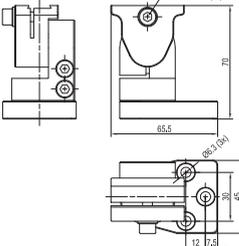
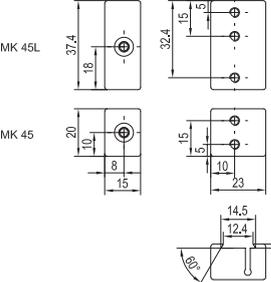
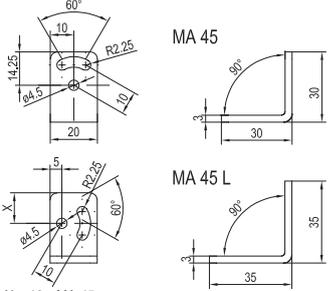
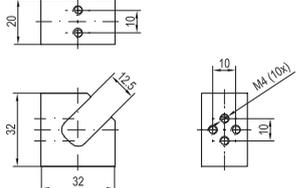
* External IR illumination is only possible with IR types or C-mount sensors.

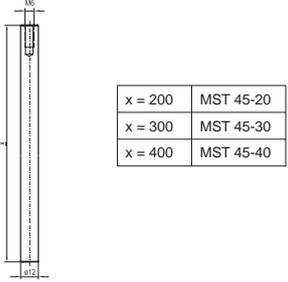
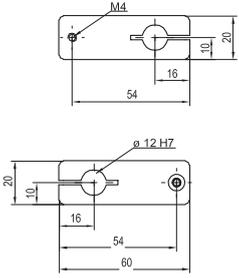
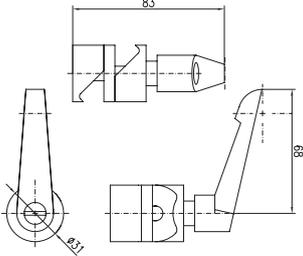
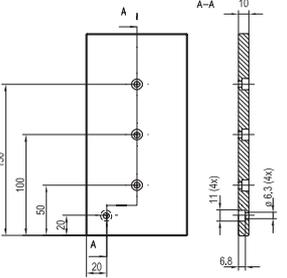
Connection adapter for illumination on VISOR®			
	Part no.	Order designation	Description
	525-01001	LA 45 V-24-2L12	Connection adapter with switching amplifier for LED illumination with 5-pole connector
		155-01365	
			
153-00916			

Distributor and switching amplifier for chronologically synchronous illumination

Mounting accessories, sensor		
Part no.	Order desig.	Description
543-11023	MG 2A	Mounting bracket with 2 axes
543-11000	MK 45	Mounting clamp, dovetail
543-11021	MK 45 L	Mounting clamp, dovetail, long
543-11001	MA 45	Mounting bracket, short
543-11013	MA 45 L	Mounting bracket, long
543-11002	MB 45	Mounting block, rod

Mounting accessories, sensor		
Part no.	Order desig.	Description
543-11005	MST 45-20	Mounting rod, 20 cm
543-11006	MST 45-30	Mounting rod, 30 cm
543-11007	MST 45-40	Mounting rod, 40 cm
543-11004	MZ 45	Intermediate mounting piece
543-11008	MG 45	Mounting hinge
543-11003	MP 45	Mounting plate, laboratory

Mounting accessories, sensor	
<p>MG 2A</p> 	 <p>153-00913</p>
<p>MK 45 / MK 45 L</p> 	 <p>153-00949</p>
<p>MA 45 / MA 45 L</p> 	 <p>X = 13 MA 45 X = 9 MA 45 L</p> <p>153-00957</p>
<p>MB 45</p> 	 <p>153-00481</p>

Mounting accessories, sensor							
<p>MST 45-xx</p> 	 <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x = 200</td> <td>MST 45-20</td> </tr> <tr> <td>x = 300</td> <td>MST 45-30</td> </tr> <tr> <td>x = 400</td> <td>MST 45-40</td> </tr> </table> <p>153-00545</p>	x = 200	MST 45-20	x = 300	MST 45-30	x = 400	MST 45-40
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x = 400	MST 45-40						
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<p>MG 45</p> 	 <p>153-00776</p>						
<p>MP 45</p> 	 <p>153-00547</p>						

Technical data and order information

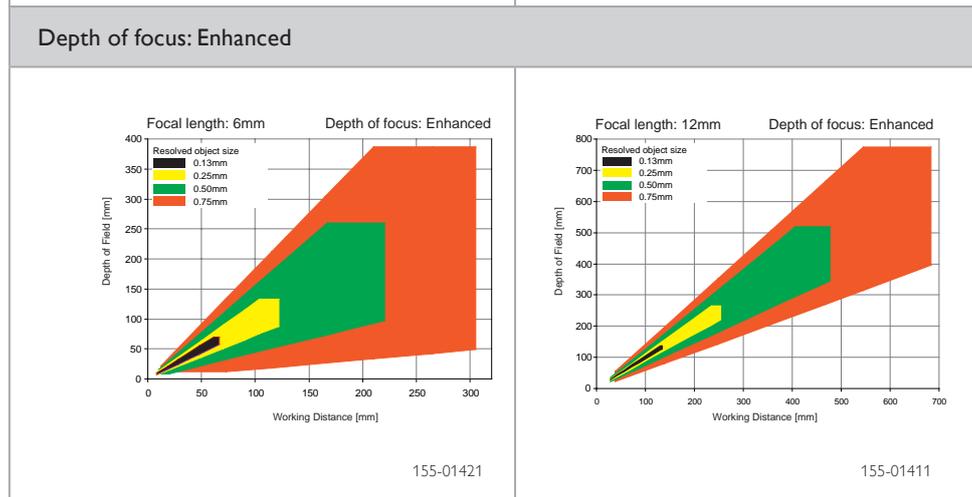
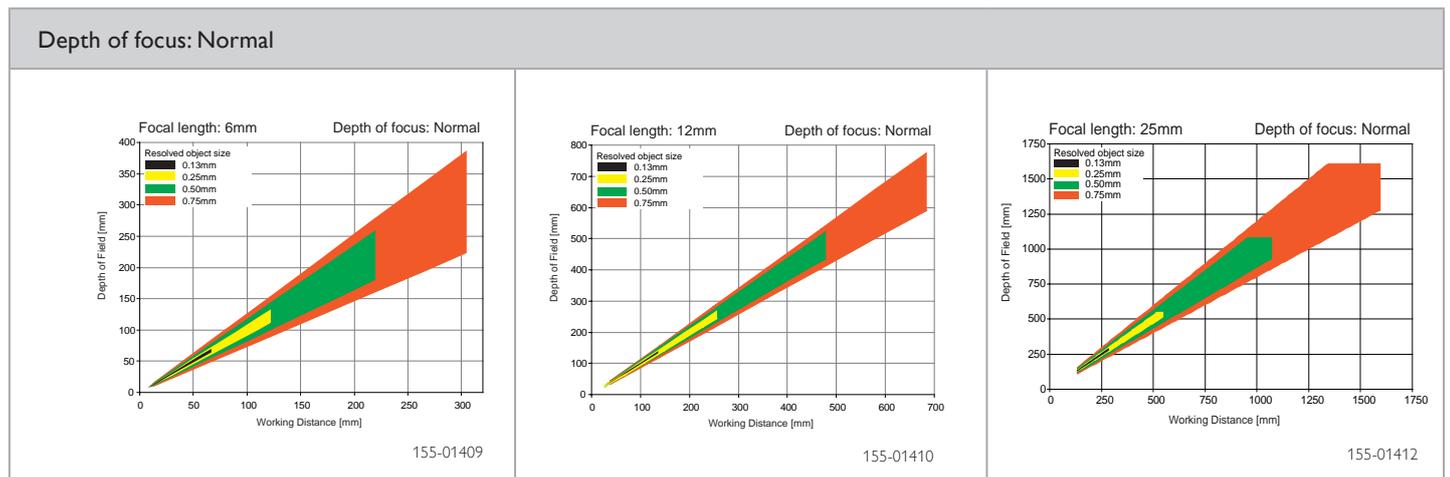
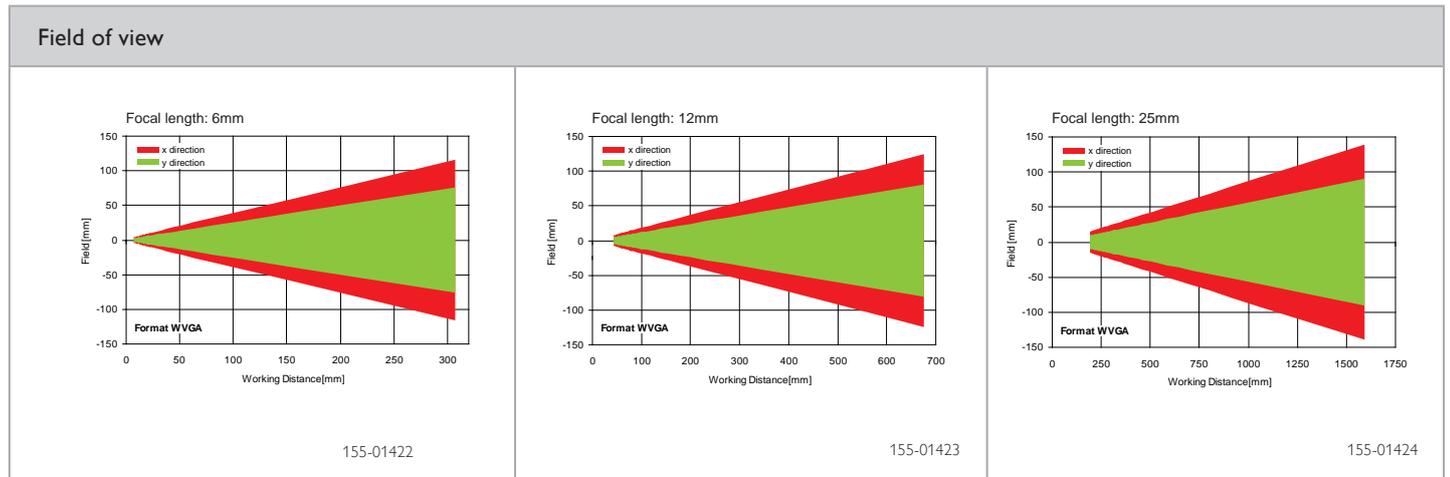
Vision accessories

Connection, interface and illumination cables



Part no.	Order designation	Description
902-51801	C L12FG-2m-PUR	Power supply and I/O cable, M12/12-pin, 2 m, straight connector; shielded
902-51796	C L12FG-5m-PUR	Power supply and I/O cable, M12/12-pin, 5 m, straight connector; shielded
902-51797	C L12FG-10m-PUR	Power supply and I/O cable, M12/12-pin, 10 m, straight connector; shielded
902-51798	C L12FW-2m-PUR	Power supply and I/O cable, M12/12-pin, 2 m, 90° connector; shielded
902-51799	C L12FW-5m-PUR	Power supply and I/O cable, M12/12-pin, 5 m, 90° connector; shielded
902-51800	C L12FW-10m-PUR	Power supply and I/O cable, M12/12-pin, 10 m, 90° connector; shielded
902-51813	CI L5FS-2m-G-PUR	Data cable, 2 m, straight connector; shielded
902-51814	CI L5FS-5m-G-PUR	Data cable, 5 m, straight connector; shielded
902-51815	CI L5FS-10m-G-PUR	Data cable, 10 m, straight connector; shielded
902-51816	CI L5FS-2m-W-PUR	Data cable, 2 m, 90° connector; shielded
902-51817	CI L5FS-5m-W-PUR	Data cable, 5 m, 90° connector; shielded
902-51818	CI L5FS-10m-W-PUR	Data cable, 10 m, 90° connector; shielded
902-51754	CI L4MG / RJ45G-GS-3m-PUR	Ethernet cable, 3 m, M12, straight, 4-pin / RJ45, shielded
902-51782	CI L4MG / RJ45G-GS-5m-PUR	Ethernet cable, 5 m, M12, straight, 4-pin / RJ45, shielded
902-51784	CI L4MG / RJ45G-GS-10m-PUR	Ethernet cable, 10 m, M12, straight, 4-pin / RJ45, shielded
902-51786	CI L4MW / RJ45G-SG-3m-PUR	Ethernet cable, 3 m, M12, 90°, 4-pin / RJ45, shielded
902-51788	CI L4MW / RJ45G-SG-5m-PUR	Ethernet cable, 5 m, M12, 90°, 4-pin / RJ45, shielded
902-51790	CI L4MW / RJ45G-SG-10m-PUR	Ethernet cable, 10 m, M12, 90°, 4-pin / RJ45, shielded
902-51806	CB L12FS / L12FS-0,5m-GG-PUR	Illumination cable 2 x M12/12-pin, 0,5 m, straight connector; shielded
902-51807	CB L12FS / L12FS-2m-GG-PUR	Illumination cable 2 x M12/12-pin, 2 m, straight connector; shielded
902-51808	CB L12FS / L12FS-0,5m-WW-PUR	Illumination cable 2 x M12/12-pin, 0,5 m, 90° connector; shielded
902-51809	CB L12FS / L12FS-2m-WW-PUR	Illumination cable 2 x M12/12-pin, 2 m, 90° connector; shielded
902-51810	CB L12FS / L8MS-0,15m-GG-PUR	Power supply and I/O adapter cable 12-pin to 8-pin
994-51135	ST M12-12	Mains VISOR power supply with M12 12-pin connector; Euro-plug
994-51138	ST M12-12-M	Mains VISOR power supply with M12 12-pin connector; multi-plug
543-11022	ST V 10	Testbox VISOR®

Field size/Working distances



For checking moving objects, a sensor with normal depth of focus should be used. In this case, shutter speed can be reduced in order to avoid motion blur.

We look ahead.

Yesterday, today and in the future.

 **SENSOPART**



Since SensoPart was founded in 1994, we have constantly focussed on the future. Our motto has always been: We gauge ourselves not by what is possible today, but by our ideas for what can be achieved in the future. Many ground-breaking ideas from that time have since become successful products, which are now indispensable in modern automation technology – endorsed by the numerous prizes for innovation which we have received over recent years. Today, SensoPart is the technological leader in many areas of industrial sensor technology. And we still have many ideas for the future.

SENSOR TECHNOLOGY

- Light barriers
- Proximity switches
- Laser sensors
- Miniature sensors
- Distance sensors
- Colour sensors
- Contrast sensors
- Anti-collision sensors
- Slot sensors
- Fibre-optic amplifiers
- Inductive sensors
- Capacitive sensors
- Ultrasonic sensors

VISION

- Vision sensors
- Smart cameras
- Object detection
- Object measurement
- Colour detection
- Code reading
- Lighting
- Lenses

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