







Increase quality and productivity



With over 50 years of sensor experience, Balluff is a leading global sensor specialist with its own line of connectivity products for every area of factory automation. Balluff is based in Germany and has a tight international network of 54 representatives and subsidiaries.

Balluff stands for comprehensive systems from a single source, continuous innovation, the most modern technology, highest quality and greatest reliability and prides itself on distinctive customer orientation, custom-tailored solutions, fast worldwide service and outstanding application assistance.

High-quality, innovative products tested in our own accredited laboratory and a quality management system certified according to DIN ISO 9001 (EN 2008) form a secure foundation for optimized added value for our customers.

Whether electronic and mechanical sensors, rotary and linear transducers, identification systems or optimized connection technology for high-performance automation, Balluff masters not only the entire technological variety with all of the different operating principles, but also provides technology that fulfills regional quality standards and is suitable for use worldwide. Wherever you are in the world, Balluff technology is never far away. You won't have to look far for you nearest Balluff expert.

Balluff products increase performance, quality and productivity around the world every day. They satisfy prerequisites for meeting demands for greater performance and cost reductions on the global market. Even in the most demanding areas. No matter how stringent your requirements may be, Balluff provides appropriate state-of-theart solutions.







Mature technology, individual solutions - more efficiency! Fully exploit the potential of high quality.

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VISIONSENSOR

Easy to use – As simple as a sensor

Balluff Vision Sensors increase your quality and productivity.

Balluff stands for comprehensive systems expertise from a single source, continuous innovation, the most modern technology, the highest quality and greatest reliability. And more than that: for distinct customer orientation, i.e. custom-tailored solutions, fast worldwide service and outstanding applications assistance. Use our know-how. And you profit from long years of experience.

Your customers expect you to provide more reliable and higherperformance machines. Balluff supports you: with the BVS Vision Sensor.

Fast-running machines, frequent format changes or exact positions all require precise, reliable and adaptable sensors. No problem for Balluff. Which means no problem for you. With us you handle your growing requirements with ease.

- Flexible mounting
- Industrial grade
- Simple to integrate
- Check variable parts positions

Replace up to 25 of the same sensors. Just one BVS, for example, is all you need to verify that a candy box is full. It detects all the pieces at one time. With absolute reliability.

→ 7 in one!

Replace up to seven different sensors. The BVS handles alternating tasks with ease. It carries out various functions in one pass: It checks brightness and contour, compares contrasts and width, detects patterns, counts edges and monitors the position. Precisely.

BVS Vision Sensors Easy to use – As simple as a sensor

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The Balluff BVS Vision Sensor is available in two product lines: the BVS-E configured from a PC, and the BVS-C with separate configurator, with display and operating software already integrated. Simply choose the right one for your application and profit from a multi-talented sensor!

Once you have configured the Vision Sensor in three steps, it runs fully automatically. It even checks up to 25 different features in one pass. And you can combine all seven tools in any way you like.

Productive and economical – Cost reduction made easy

VISIONSENSOR

100 % quality - one sensor is all you need

With our BVS Vision Sensors, you've chosen higher productivity, greater efficiency and 100% quality. Use Balluff BVS Vision Sensors wherever multiple monitoring functions are required at the same time or in rapid succession. Simply adapt the Vision Sensor to your requirements. Reconfigurations, even in-process, are always possible. So you always remain flexible. Monitor your production using the BVS with absolute reliability. One sensor is all you need for high efficiency.

VISIONSENSOR Reduce costs

The Balluff Vision Sensor combines the functions of expensive vision systems with the ease of handling of photoelectric sensors.

Hardware

Reduce hardware costs. One BVS Vision Sensor can replace up to 25 standard sensors.

Engineering and project planning

One sensor instead of 25 - for even faster product selection. And you need only one sensor holder. Mounting becomes even simpler, especially since a mounting system exactly matched to the BVS is available. Save time and reduce costs with a multi-talented sensor.

Startup

Configuration is as easy as using a simple sensor: Operation of the BVS is entirely intuitive. Clear guidance eliminates the need to learn a programming language or undergo expensive training.

Operation and maintenance

Simply switch the BVS back and forth between different inspection tasks. No cumbersome realignment of various sensors. Reduce both effort and stress. Shortened setup times increase your productivity.

Improve quality

One Vision Sensor in credit card size with integrated processing electronics, illumination and digital outputs. Once configured, the BVS Vision Sensor runs fully self-sufficiently. The results are received on three outputs in the form of digital signals and you can even use the inputs to change the monitoring modes (inspections) during the process.

BVS Vision Sensors increase productivity

One sensor – with many functions One inspection – while monitoring up to 25 features Simple format changing – for short setup times

BVS Vision Sensors increase productivity

- Each part is checked for 100% quality control
- Defect image memory on-board find and eliminate defect causes faster
- Integrated quality inspection becomes possible for optimized process control

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BVS Vision Sensors Applications – Process reliability for automation

VISIONSENSOR

Checking for presence

V-belt pulleys are attached using four nuts. The Vision Sensor checks the presence of all nuts at any one time, simultaneously and independently of the alignment position.

Detecting location

In the feeder on an oscillating conveyor, screws are provided for assembly. With the BVS you prevent problems, since incorrectly located screws or different screw types are immediately detected and shunted out.

Check labeling

Quality assurance requires that a socket can be checked for correct printing in any position. The BVS provides you with seven different tools which can be combined with each other depending on the product line.

BVS Vision Sensors Applications - Process reliability for automation

Checking for completeness

After manual assembly, the completeness of a product is checked. Three flexibly configurable outputs allow you for example to monitor the completeness of each series or special features.

Verify position

Each package requires a label. But sometimes the label is located in the wrong place. With the BVS Vision Sensor you check exactly whether the label is present and whether it is properly applied.

Check contour

Injection molded parts need to be checked at the inspection station: Defective parts or parts with flashing are shunted out for special rework.

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- Quality inspection
- Feed monitoring in integrated production

Purpose

- Visual, 100% reliable monitoring
- Flexible setup

- Monitoring outgoing packages in shipping
- Assembly inspection

Purpose

- Control product flow correctly
- Ensure product labeling
- Ensure quality

- Processing inspection
- Feed processes
- Quality-selective process control

Purpose

- Check shape, height, absence of flashing
- Send back defective parts
- Nominal/Actual comparison

BVS Vision Sensors Applications – Process reliability for automation

VISIONSENSOR

Checking bottle caps

To seal bottles perfectly, the cap needs to be seated correctly. Leave the inspection to our Vision Sensor. It checks positions absolutely reliably and reduces scrap while simultaneously increasing productivity. When formats are changed, reconfigurations are even possible in-process.

Checking blister filling

Tablet blisters are inspected after the automated filling process as a form of quality assurance measure. Check whether each nest is filled and the correct preparation is inserted. Reconfigurations, even in-process, are always possible. So you always remain flexible. Monitor your production using the BVS with absolute reliability.

Monitoring seals

Checks must be performed during the automated manufacturing process to establish whether two seals are present and located in the correct position. A combination of different tools completes the task reliably.

BVS Vision Sensors Applications – Process reliability for automation

Checking completeness

Before the blister is filled, a check is performed to determine whether all blisters are present, inserted correctly and empty to reduce the number of reject blisters as well as decrease idle times.

Detecting and reading barcodes

Barcodes are a way of uniquely identifying products during the manufacturing process. The BVS-E Identification incorporates two modes: 1. a taught-in barcode is inspected and an OK/NOK signal is output. 2. any code is read and output via the serial interface.

Detecting and reading Data Matrix codes

Data Matrix codes are used in industrial environments. This BVS tool also incorporates two modes: 1. a taught-in Data Matrix code is inspected and an OK/NOK signal is output. 2. any code is read and output via the serial interface so that you always know what is happening during the production process.

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- Prevent incorrect filling
- Downtimes prevented
- Part identification
- Process monitoring
- Print image monitoring
- Part identification
- Process monitoring
- Print image monitoring

Vision Sensor BVS

Tool overview – seven functions in one sensor

VISIONSENSOR

BVS Vision Sensors offer several tools for reliable monitoring of your **BVS-C** with configurator production processes. All variants include special features. Simply **3VS-E Identification** concentrate on your task and select the right version according to **BVS-E Advanced** your needs. The BVS offers the best solutions - for every application. **BVS-E Standard** Check brightness - Checks whether the brightness (gray values) in the selected image area is greater than a configured threshold. - Identify different types and parts - Check illumination brightness - Detect the function of a display Compare contrast - Determines whether a certain contrast is present in the image. - Monitor presence of labels - Detect a label - Check completeness Count edges - Counts the gray value edges in the image area. - Monitor the number of pins on ICs - Check threads for completeness - Monitor the quality of gear wheels Compare width - Compares the absolute distance between two edges in an image. - Check for presence (e.g. lids) - Differentiate parts - Monitor location and orientation Detect pattern – Detects patterns and differentiates objects using image processing. Digital patterns are "extracted" from the objects which are compared with the pattern of the reference object. - Check parts quality - Differentiate types Check contour – Checks the shape of an object. - Check for absence of burrs and flashing - Check stamped parts - Differential parts shapes - Nominal/Actual comparison Monitor position - Checks the relative object position in the image. - Monitor level - Position parts and products - Position labels Compare character (OCV) - Compares characters. - Check labels - Monitor printing (e.g. ensure correct dates for different lots) Check logos 360° position detection – Align parts - Robot control (via Ethernet interface) - Inspection irrespective of the position Detect and identify barcode and Data Matrix code - Code verification - Documentation of parts used Verify characters

Vision Sensor BVS Product overview -The possibilities at a glance

BVS will help you to optimize your process control, regardless of which version you use in your application. Benefit from greater efficiency.

The following provides an overview of different functions and special features to help you select the right Vision Sensor for your application.

Choose the best solution.

		BVS-E Standard	BVS-E Advanced	BVS-C with configurator	BVS-E Identification
Features					
Tools		7	7	8	3
Features per	inspection	up to 25	up to 25	1	up to 25
Inspections		20	20	20	20
Connection		Multiple sensors	Multiple sensors		Multiple sensors
		in the network	in the network		in the network
Bus interface	•	Ethernet	Ethernet		Ethernet
Connection	PNP				
type	NPN				
Focal length	6 mm				
	8 mm				
	12 mm				
Parameter	ConVis	-	-		
configuration	Configurator				
Starter kit av	ailable				
The benefit	s to you				
		 Short setup times and convenient format changing on the PC Flexible adaptation to your process through simple switching of the monitoring modes Simultaneous check- ing of multiple features 	 In addition to the functions of the BVS-E Standard: Logical linking of tools to the outputs Efficient hardware for higher processing rates 360° position detec- tion 	 Easy to retrofit into your equipment Configurator for fast startup Simple to make on-site corrections during the process Continuous status monitoring on the display Operated without a PC 	 1D codes: detects or reads all common barcodes 2D codes: detects or reads Data Matrix codes Verify characters Output via serial interface RS232
From page		26	28	30	32

www.balluff.com

Contents

Balluff Vision Sensors were designed for the reliable monitoring of production processes and objects. The sensor compares the features of the current image with the features taught in from the reference image. The outputs are set depending on the result. The BVS can retrieve the properties of any image characteristic and is capable of performing several tasks simultaneously as a result.

Optical and electrical properties	16
Control options	20
Mechanical properties	22
Quality	23

Optical and electrical properties

Sensor overview		Teach and recovery button
	and a second	Indicator LEDs
ſ	C 12	Internal lighting
1		Lens
	BALLUFF	Focus ring
		Power connection (M12 connector, 8-pin)
		Ethernet connection (M12 connector, 4-pin)
Current image	is the image captured by the sensor, which is then processed/inspected.	
Reference image	Saved reference image. The pattern/contour/corner pregion of interest within the reference image define th contour) detected by the "Detect pattern", "Detect 36 tern" and "Detect contour" tool. The reference image does not have a direct influence tools, it is used as a reference for detecting OK or NC	points in the e pattern (or 50 degree pat- on any other DK parts.
ROI (region of interest)	is the area within an image marked by a frame and tool. In the case of the tools "Detect pattern" and "Detern", the ROI is the pattern that the sensor is search the image area being inspected is the search area.	inspected by a stect 360° pat- ing for whereas
Inspection	 An inspection consists of: a taught-in reference image the tools that inspect one or more regions of intere within the digital image on the object and the three functions assigned to digital outputs e.g. output 1 signals the result "<i>Inspection OK</i>" and output 2 signals "<i>Inspection not OK</i>". All settings such as trigger, lighting etc. are saved during an inspection. 	st
Inspection result	Possible results include: " <i>Inspection OK</i> " if the inspect a positive result for all tools. " <i>Inspection not OK</i> " if at least one tool returns a nega or one or more tools are not taken into account. Outp assigned directly to single inspections.	tion returns tive result buts can be

Optical and electrical properties

Inspection times	The total inspection time consists of the exposure time, capture time and processing time.			
	<i>Exposure time:</i> the exposure time is referred to as the "shutter speed". The amount of light that shines on the image sensor is directly proportional to the exposure time and the light currently available. The longer the exposure time, the greater the amount of light that shines on the image sensor. When configuring the correct exposure time, the following factors are most important:			
	 Speed of the part scheduled for inspection Number of parts per second Continuously available light 			
	<i>Capture time:</i> The time required to capture an image. After exposure of the image sensor, the image must be transferred to the memory on the device. The whole process takes approximately 30 ms for a complete image. The time decreases considerably if only part of the complete image is captured.			
	<i>Processing time:</i> The time taken to process the captured image. Depends on the operations and tools used for the inspection.			
Position tracking tool	A position tracking tool can be used to compensate for a part that frequently changes position. However, the part must not leave the field of view. The position tracking tool "follows" the position of the part within the field of view and aligns all other tools according to the current position of the part.			
Working distance and field of view	The working distance describes the minimum and maximum distance between the sensor lens and object. The field of view is			

the surface area that the sensor can detect at the specified working distance. The larger the working distance, the larger the field of view. The light intensity of the illuminated object decreases by the square root of the working distance. Objects positioned further away appear darker than closer objects as a result.

Wide-angle lens, focal length 6 mm Standard lens, focal length 8 mm
 Telephoto lens, focal length 12 mm

Bring your working range up close with the telephoto lens. Or take advantage of the larger field of view at the same working distance offered by the wide-angle and standard lenses. Use the distance computer: www.balluff.de/vision

Contrast

... is the difference in brightness between two adjacent regions of interest. The correct lighting should maximize the contrast between good and poor features.

Quality

Optical and electrical properties

Trigger

The trigger signal starts an event. A trigger signal initiates the capture and evaluation of an image in conjunction with the BVS. The BVS has different trigger settings that can be configured using software available free of charge.

Eye safety acc. to IEC 62471:2006

Photoelectric sensors and lights are categorized into different groups based on the degree of risk to human eyes and skin.

Extempt group Sensors or lights do not pose a photobiological risk.

- Vision Sensors BVS-E and BVS-C
- Spotlights, red and white light
- Background lights, red light
- Dark field illumination, red light
- Ring lights, red and white light
- Line lights, red and white light
- Line lights, infrared during normal operation

Risk group 1 Sensors or lights do not pose a risk due to standard precautionary measures

- **taken by the user.** – Ring lights, infrared
- Line lights, infrared during boost mode

VISIONSENSOR

Lighting

The success and failure of the Vision Sensor in different applications often determines which lighting is selected. Illumination at the place of operation must be carefully selected, adjusted and remain as constant as possible during all object inspections.

See page 38 for more information on lighting.

Software

You will require ConVis software to operate Balluff Vision Sensors, which is available free of charge. The product is supplied with a CD ROM containing the software. Alternatively, the software is available for download at **www.balluff.com/vision**

The software can be installed as many times as required and used without a license.

Optical and electrical properties

IP address	The IP address is a unique address that identifies a network device and allows you to communicate with the sensor. The standard address of all BVS devices is: 172.27.101.208			
Switching function	PNP (+) sourcing	NPN (-) sinking		
Supply voltage U _s	is the voltage range in which flawless functioning of the sensor is assured. It includes all voltage tolerances and ripple.			
Rated operating current I _e	On BVS Vision Sensors: is the maximum current with whitits output in continuous operation. On BAE lights: is the current required for operation	ch the sensor may be loaded at ion.		
Typ. detection rate	Different calculating times are required to evaluate the tools in an inspection. The typical detection rate is a guide value that indicates how often a part can be inspected per second.			
Ambient temperature range T _a	The ambient temperature determines the temperature range in which the sensor may be operated.			
Short-circuit protection and overload protection	All DC sensors feature this protection device. In the event of overload or short-circuit at the output, the output transistor is automatically switched off. As soon as the malfunction has been corrected, the output stage is reset to normal functioning.			

Optical and electrical properties Control options Mechanical properties Quality

Control options

VISIONSENSOR

ConVis software

Step 1 Connect

Establish a connection between the ConVis software and the sensor. Determine the image brightness and lighting settings.

BVS-E –

with Balluff BVS ConVis – the "Easy to Use" software

Determine the features you wish to inspect and select all the relevant tools. Configure the output signals.

Test the inspection – view the results and correct if necessary.

Connect the BVS-E Vision Sensor to your PC over Ethernet. The built-in software wizard guides you to successful configuration in just three steps. Simply enter your desired inspection parts or features, test your inspection, and check the results on the screen. Slight changes and corrections are easily made. Clear guidance eliminates the need to learn a programming language or undergo expensive training.

Configurator

Step 1 Connect Connect the sensor to the monitor.

especially easy to set up using the configurator

image section.

Select the appropriate tool and define image settings including

Step 3 Run

Set the tool parameters and test your inspection.

The software is already integrated into the separate configurator with keypad. Once the configurator and Vision Sensor are connected, simply select the tool for your application and define image settings such as image section. Then set your tool parameters and test your inspection. That's it.

Making corrections in-process is also easy. Because the display provides continuous status monitoring in-place, so that you are continually checking the sensor function and can immediately correct deviations. Product defects are detected directly.

Control options

Special features of Balluff BVS ConVis Vision Sensor software You only need one software package, whichever BVS you use. The software detects the connected sensor automatically. You can also use the software to simulate all sensor models and establish whether an alternative sensor model is compatible with your application.

BVS-E Standard

The standard version of the Vision Sensor software has the following features: 20 inspection memory slots, free rotation of tools and a zoom function. You have the choice of seven independent tools. Needless to say, free software updates are included and existing sensors can be updated easily.

BVS-E Advanced

The BVS-E Advanced offers all the features of the standard version in addition to 360° position detection and logical linking.

These features allow the combination of a maximum of 25 tools as well as full utilization of three digital outputs.

BVS-E Identification

This version allows you to detect and read all standard codes available on the market. Barcodes or Data Matrix codes within the field of view are read and inspected and/or output via the serial interface, depending on the settings. The large number of codes that the sensor can recognize allows you to use devices capable of reading varying code types.

and electrical properties Control options Mechanical properties Quality

VISIONSENSOR

Installation

Four accompanying M4×6 mm screws are used to secure the sensor. A comprehensive range of accessories is available for easy sensor mounting. The illustration shows the accessories used to mount the sensor.

Do not install the sensor in a position exposed to direct sunlight or strongly fluctuating ambient light.

If you wish to check an object with reflective surfaces, we recommend mounting the BVS at an angle of 5 to 15° in relation to the vertical axis to prevent reflections.

Materials

Motorial	Line and characteristics			
wateriai	Use and characteristics			
Plastics				
ABS	Impact-resistant, stiff, limited chemical resistance.			
Acrylonitrile Butadiene Styrene	Some types flame-retardant. Used	d for housings.		
PMMA	Clear, transparent, hard, scratch-r	esistance, UV resistant, mainly for		
Polymethylmethacrylate	optical applications.			
PUR	Elastic, abrasion-resistant, impact	-resistant. Good resistance		
Polyurethane	to oils, greases, solvents (used for	gaskets and cable jackets).		
PVC	Good mechanical strength and ch	nemical resistance (cable).		
Polyvinylchloride				
Vetal				
AI	Standard aluminum for cut shaping. Can be anodized.			
Aluminum wrought alloy	Used for housings and mounting components.			
Stainless steel	Excellent corrosion resistance and strength.			
	Quality 1.4034, 1.4104:	Standard material		
	Quality 1.4305, 1.4301:	Standard material for		
		foods industry		
	Quality 1.4401, 1.4404, 1.4571:	For foods industry with higher		
		requirements regarding		
		chemical resistance at elevated		
		temperatures		
GD-Zn	Good resistance and strength. Usually with protective surface			
Cast zinc	coating.			
Other				
Glass	Good chemical resistance and strength. Used primarily in optical applications (lenses, cover lenses).			

Degree of protection

The enclosure ratings IP 20, IP 40, IP 54, IP 64 up to IP 68 are in accordance with IEC 60529. Code letters IP (International Protection) designate protection against shock hazard, ingress of solid foreign bodies, and water, for electrical equipment.

First digit:

- 2 Protection against penetration of solid bodies larger than 12 mm, shielding from fingers and objects
- 4 Protection against penetration of solid bodies larger than
 1 mm, shielding from tools and wires
- 5 Protection against harmful dust deposits, complete shock-hazard protection
- 6 Protection against penetration of dust, complete shock-hazard protection

Second digit:

- 0 No special protection
- 4 Protection against water spraying from all directions against the piece of equipment concerned
- 5 Protection against a water jet from a nozzle, directed from all directions against the piece of equipment concerned
- 7 Protection against water, when the piece of equipment concerned (housing) is immersed in water under specified pressure and time conditions
- 8 Protection against water during continuous submersion

Optical and electrical properties

Control options Mechanical properties Quality

Quality

Quality management system	Balluff companies			
acc. to DIN EN ISO 9001:2008	Balluff GmbH	Germany	DIN EN ISO 9001	
	Balluff SIE Sensorik GmbH	Germany		
	Balluff Elektronika Kft	Hungary		
	Balluff Sensors (Chengdu) Co., Ltd.	China	A THE STATES	
	Balluff Ltd.	Great Britain		
	Balluff Automation S.R.L.	Italy		
	Balluff Inc.	USA		
	Balluff GmbH	Austria		
	Balluff CZ, s.r.o	Czech Republic		
	Balluff Hy-Tech AG	Switzerland		
	Balluff Sensortechnik AG	Switzerland		
	Balluff Controles Elétricos Ltda.	Brazil		
	Balluff de México S.A. de C.V.	Mexico		
	Balluff S.L.	Spain		
Environmental management	Balluff companies			
system acc. to	Balluff GmbH	Germany		
DIN EN ISO 14001:2005	Balluff Elektronika Kft	Hungary		
	Balluff Sensors (Chengdu) Co., Ltd.	China		
Balluff products comply with EU directives	Products that require labeling are subject to a conformity evaluation process according to the EU directive and the product is labeled with the CE marking. Balluff products fall under the following EU directive:			
	2004/108/EC EMC directive			
Approvals	are granted by national and international institutions. Their symbols affirm that our products meet the specifications of these institutions. "US Safety System" and "Canadian Standards Association" under the auspices of Underwriters Laboratories Inc. (cUL).			
Balluff is a member of ALPHA	ALPHA, an association for testing and certification of low-voltage devices, promotes the individual responsibility of the manufacturer of such devices by means of uniform test procedures according to current standards and thereby supports the attainment of such high product quality. Under certain prerequisites, ALPHA also grants nationally recognized product certificates. ALPHA certificates are also recognized in other European countries because it is a member of LOVAG (Low Voltage Agreement Group).			

BVS Vision Sensors Contents

The range of Vision Sensors is divided into four main groups in order to offer customized solution for each application:

- **BVS-E Standard** completes simple tasks with ease.
- The BVS-E Advanced provides a solution for quick, demanding applications.
- The BVS-C with configurator is used to teach in inspections via a separate operating module and monitor progress directly on the live screen.
- The BVS-E Identification reads 1D and 2D codes and outputs the information directly via the serial interface.

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Vision Sensors BVS-E Standard

VISIONSENSOR

For increased quality and productivity

Inspect and monitor your production process with the BVS-E Standard. Choose the correct tool for your application from a large selection and set up your inspection. You can replace several sensors with a combination of tools. If different components are used, activate the relevant inspection via the PLC control to allow production to continue seamlessly without requiring a teach-in/setup process.

- Simple operation
- Convenient setup
- Reliable evaluation
- Extensive range of accessories
- Function module for PLC available

Software version 1.2

- 20 inspection memory cells
- Free rotation of tools
- Zoom function
- Existing sensors updated at no extra cost
- Seven independent tools

Vision Sensors BVS-E Standard

For increased quality and productivity

4	.0	
6		10
3		10
-	S.	V

Series		Vision sensor		Vision sensor		Vision sensor		DVC
Series		BVS-E Standard		BVS-E Standard		BVS-E Standa	rd	Stan
Lens, fo	ocal length	Wide-angle lens, 6 mm		Standard lens, 8 mm		Telephoto lens,	12 mm	BVS-E
PNP	Ordering code	BVS000E		BVS0003		BVS0005		Advar
	Part number	BVS OI-3-005-	E	BVS OI-3-001-E		BVS OI-3-003-E	Ξ	BVS-(
NPN	Ordering code	BVS000C		BVS0004		BVS0006		BVS-I
	Part number	BVS OI-3-006-	E	BVS 0I-3-002-E		BVS OI-3-004-E	Ξ	Identi
Supply	voltage U _s	24 V DC ±10 %	, D	24 V DC ±10 %	,)	24 V DC ±10 %	>	BVS s
Switchi	ng inputs	1× Trigger, 1× S	Select	1× Trigger, 1× S	Select	1× Trigger, 1× S	Select	
Switchi	ng outputs	1× lighting sync	hron. or PNP,	1× lighting sync	hron. or PNP,	1× lighting sync	hron. or PNP,	
		3× PNP or NPN	l configurable	3× PNP or NPN	l configurable	3× PNP or NPN configurable		
Rated of	operating current I _e	100 mA		100 mA		100 mA		
Configuration interface		Ethernet 10/100 Base T		Ethernet 10/100 Base T		Ethernet 10/100 Base T		
Parame	eter configuration	ConVis for Windows		ConVis for Windows		ConVis for Windows		
Typ. detection rate		315 Hz (depending		315 Hz (depending		315 Hz (depe	nding	
		on evaluation fu	unction)	on evaluation fu	Inction)	on evaluation fu	Inction)	
Image s	sensor	CMOS-SW-VO	GA 640×480	CMOS-SW-VG	GA 640×480	CMOS-SW-VG	A 640×480	
Working	g range	501000 mm		501000 mm		501000 mm		
Working	g distance,	50 mm,	1000 mm,	50 mm,	1000 mm,	50 mm,	1000 mm,	
Field of	view (horizontal×vertical)	42×30 mm	640×480 mm	25×20 mm	460×380 mm	17×12 mm	320×210 mm	
Lighting)	LED, incident light (red), deselectable		LED, incident light	t (red), deselectable	LED, incident light	t (red), deselectable	
Eye saf	ety acc. to IEC 62471	Extempt group		Extempt group		Extempt group		
Dimens	ions	58×52×40 mm		58×52×40 mm		58×52×40 mm		
Connec	Connection 2 connectors M12 (8- and 4-pin)		2 connectors M12		2 connectors M	112		
			(8- and 4-pin)		(8- and 4-pin)			
Degree of	of protection as per IEC 60529	tion as per IEC 60529 IP 54		IP 54	IP 54 IP 54			
Ambier	bient temperature range Ta –10+55 °C		−10+55 °C −10+55 °C					

Refer to the chapter "Basic information and definitions" on page 15 for optical and electrical information. To define the field of view and working distance, use the distance calculator at: www.balluff.com/vision

EPLAN macros – **Electrical project planning** made easy. Also for the BVS!

Description	Starter kit
Version	for BVS-E Standard
Ordering code	BVS000A
Part number	BVS Z-SK-OI-01
Contents	Vision Sensor, mounting
	bracket, installation
	accessories, connector,

software and quick guide

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Lights, connectors

and mounting components,

see chapter "Accessories' on page 37

Vision Sensors BVS-E Advanced

360° detection for optimized process control

In addition to the standard functions of the BVS-E, the advanced vision sensor also monitors the rotational position. It can detect objects regardless of the location and position. Production can be monitored more efficiently through shorter process times and the option of using logical functions to combine individual checks.

- 360° position tracking
- Faster processor reduces process times
- Features linked by logical functions
- Extensive range of accessories
- Function module for PLC available

Logical connections

1

Vision Sensors BVS-E Advanced

360° detection for optimized process control

Series		Vision sensor		Vision sensor		Vision sensor		DVC
Series		BVS-E Advance	ed	BVS-E Advance	ed	BVS-E Advance	ed	Stand
Lens, fo	ocal length	Wide-angle lens	s, 6 mm	Standard lens, 8	3 mm	Telephoto lens, 7	l2mm	BVS
PNP	Ordering code	BVS000L		BVS000J		BVS000K		Adva
	Part number	BVS OI-3-055-E	Ξ	BVS OI-3-051-E	Ξ	BVS OI-3-053-E		BVS-
NPN	Ordering code	BVS000R		BVS000P		BVS000N		BVS-
	Part number	BVS OI-3-056-E	Ξ	BVS OI-3-052-E	Ξ	BVS OI-3-054-E		Ident
Supply	voltage U _s	24 V DC ±10 %		24 V DC ±10 %		24 V DC ±10 %		BVS
Switchi	ng inputs	1× Trigger, 1× S	Select	1× Trigger, 1× S	Select	1× Trigger, 1× S	elect	
Switchi	ng outputs	1× lighting synch	nron. or PNP,	1× lighting syncl	hron. or PNP,	1× lighting synch	ron. or PNP,	
		3× PNP or NPN	configurable	3× PNP or NPN	configurable	3× PNP or NPN	configurable	
Rated of	operating current I _e	100 mA		100 mA		100 mA		
Configu	iration interface	Ethernet 10/100 Base T		Ethernet 10/100) Base T	Ethernet 10/100	Base T	
Parame	eter configuration	ConVis for Windows		ConVis for Wind	lows	ConVis for Wind	ows	
Typ. de	tection rate	350 Hz (depending		350 Hz (depe	nding	350 Hz (deper	nding	
		on evaluation function)		on evaluation fu	nction)	on evaluation fur	nction)	
Image s	sensor	CMOS-SW-VG	A 640×480	CMOS-SW-VG	A 640×480	CMOS-SW-VG/	A 640×480	
Working	g range	501000 mm		501000 mm		501000 mm		
Working	g distance,	50 mm,	1000 mm,	50 mm,	1000 mm,	50 mm,	1000 mm,	
Field of	view (horizontal×vertical)	42×30 mm	640×480 mm	25×20 mm	460×380 mm	17×12 mm	320×210 mm	
Lighting]	LED, incident light	t (red), deselectable	LED, incident light	t (red), deselectable	LED, incident light	(red), deselectable	
Eye safety acc. to IEC 62471		Extempt group		Extempt group		Extempt group		
Dimensions		58×52×40 mm		58×52×40 mm		58×52×40 mm		
Connection		2 connectors M	12	2 connectors M	12	2 connectors M	12	
		(8- and 4-pin)		(8- and 4-pin)		(8- and 4-pin)		
Degree of	of protection as per IEC 60529	IP 54		IP 54		IP 54		
Ambier	t temperature range Ta	−10+55 °C		−10+55 °C		−10+55 °C		

Refer to the chapter "Basic information and definitions" on page 15 for optical and electrical information. To define the field of view and working distance, use the distance calculator at: www.balluff.com/vision

www.balluff.com

EPLAN macros – Electrical project planning made easy. Also for the BVS!

Description	Starter kit
Version	for BVS-E Advanced
Ordering code	BVS000M
Part number	BVS Z-SK-OI-03
Contents	Vision Sensor, mounting
	bracket, installation
	accessories, connector,

software and quick guide

Lights, connectors

and mounting components,

see chapter "Accessories on **page 37**

BVS-E Standard BVS-E Advanced BVS-C with configurator BVS-E Identification BVS starter kits

Vision Sensors BVS-C with Configurator

with Configurator Maximum productivity

with a local solution

For fast and simple retrofitting of machines and equipment, you can also get the BVS Vision Sensor with a separate configurator including display and software. You can also use the same tools on the BVS-E series as the BVS-C. The difference? Tasks are taught in using a configurator.

- Quick and easy to retrofit
- Simple operation, without a PC
- Process monitoring in live screen
- Application statistics
- Configurator and/or PLC for changing between inspections
- Setup times minimized
- Extensive range of accessories
- Function module for PLC available

The complete solution including BVS-C configurator

- Color 3.5 inch display and handy operating buttons
- 20 inspection memory cells
- Eight independent tools
- On-site teach-in and correction
- Password protection possible

VISIONSENSOR

Series Series Lens, focal length PNP Ordering code Part number Supply voltage U_s Switching inputs Switching outputs

Rated operating current I_e Parameter configuration Typ. detection rate

Image sensor Working range Working distance, Field of view (horizontal×vertical) Lighting Eye safety acc. to IEC 62471 Dimensions Connection

Degree of protection as per IEC 60529 Ambient temperature range T_a Display

Refer to the chapter "Basic information and definitions" on page 15 for optical and electrical information. To define the field of view and working distance, use the distance calculator at: www.balluff.com/vision

EPLAN

EPLAN macros – Electrical project planning made easy. Also for the BVS!

Vision Sensors BVS-C with Configurator

Maximum productivity with a local solution

Configurator with display BVS-C

BAE PD-VS-001-C 24 V DC ±10 %

BAE009C

96×96×42.4 mm 1 connector M12 (8-pin) IP 40 -10...+55 mm 3.5" color LCD

BVS-E Standard

BVS-E Advanced BVS-C with configurator

BVS-E Identification BVS starter kits

•		
Vision sensor	Vision sensor	
BVS-C with configurator	BVS-C with configurator	
Standard lens, 8 mm	Telephoto lens, 12 mm	
BVS0008	BVS0007	
BVS OI-3-011-C	BVS OI-3-013-C	
24 V DC ±10 %	24 V DC ±10 %	
1× Trigger, 1× Select	1× Trigger, 1× Select	
1× lighting synchron. or PNP,	1× lighting synchron. or PNP,	
3× PNP or NPN configurable	3× PNP or NPN configurable	
100 mA	100 mA	
Configurator	Configurator	
315 Hz (depending	315 Hz (depending	
on evaluation function)	on evaluation function)	
CMOS-SW-VGA 640×480	CMOS-SW-VGA 640×480	
501000 mm	501000 mm	
50 mm, 1000 mm,	50 mm, 1000 mm,	
25×20 mm 460×380 mm	17×12 mm 320×210 mm	
LED, incident light (red), deselectable	LED, incident light (red), deselectable	
Extempt group	Extempt group	
58×52×40 mm	58×52×40 mm	
2 connectors M12	2 connectors M12	
(8-pin)	(8-pin)	
IP 54	IP 54	
−10+55 °C	–10+55 °C	

		Lighta connectore	
Description	Starter kit	and mounting	
Version	for BVS-C with configurator	components,	
Ordering code	BVS0009	"Accessories",	
Part number	BVS Z-SK-OI-02	on page 37	
Contents	Vision Sensor, configurator,		
	mounting bracket, installation	~	
	accessories, connector,		
	software and quick quide		

Vision Sensors BVS-E Identification

- ECC 200

Detecting and identifying varied codes

Check the marking on your products. Regardless of whether you label them with 1D codes (barcodes) or 2D codes (Data Matrix codes), the BVS reads all common codes on the market. Text and sequences of numbers such as code plain text can be verified using OCV. The result: "Inspection OK" or "Inspection not OK". If you need to view the read code data to find out which parts are being processed, you can output it via the RS232 or Ethernet interface.

- Simple operation
- Read several codes in an inspection simultaneously
- Output code data via RS232 or Ethernet interface
- Verify character strings
- Change between inspections via PLC
- 360° position detection
- Extensive range of accessories
- Function module for PLC available

Readable barcodes

- Interleaved 2-of-5
 - Code 39
- Code 128 _
- Pharmacode
- Codabar
- EAN 8

_

- EAN 13
- UPC-E
- Postnet
- IMB

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Vision Sensors BVS-E Identification

Detecting and identifying varied codes

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Series		Vision sensor	Vision sensor	
Series		BVS-E Identification	BVS-E Identification	Standard
Lens, f	ocal length	Standard lens, 8 mm	Telephoto lens, 12 mm	BVS-E
PNP	Ordering code	BVS0001	BVS000U	Advanced
	Part number	BVS ID-3-001-E	BVS ID-3-003-E	BVS-C with configurator
Supply	voltage U _s	24 V DC ±10 %	24 V DC ±10 %	BVS-E
Switch	ing inputs	1× Trigger, 1× Select	1× Trigger, 1× Select	Identification
Switch	ing outputs	1× lighting synchron., 1× PNP	1× lighting synchron., 1× PNP	BVS starter kits
Interfac	ce	RS232	RS232	
Rated	operating current l	100 mA	100 mA	
Config	uration interface	Ethernet 10/100 Base T	Ethernet 10/100 Base T	
Param	eter configuration	ConVis for Windows	ConVis for Windows	
Typ. detection rate		315 Hz (depending	315 Hz (depending	
		on evaluation function)	on evaluation function)	
Image	sensor	CMOS-SW-VGA 640×480	CMOS-SW-VGA 640×480	
Workin	ig range	501000 mm	501000 mm	
Workin	ig distance,	50 mm, 1000 mm,	50 mm, 1000 mm,	
Field o	f view (horizontal×vertical)	25×20 mm 460×380 mm	17×12 mm 320×210 mm	
Lightin	g	LED, incident light (red), deselectable	LED, incident light (red), deselectable	
Eye safety acc. to IEC 62471		Extempt group	Extempt group	
Dimensions		58×52×40 mm	58×52×40 mm	
Connection		2 connectors M12 2 connectors M12		
		(8- and 4-pin) (8- and 4-pin)		
Degree of protection as per IEC 60529		IP 54	IP 54	

-10...+55 °C

Refer to the chapter "Basic information and definitions" on page 15 for optical and electrical information. To define the field of view and working distance, use the distance calculator at: www.balluff.com/vision

eplan[®]

EPLAN macros -

made easy. Also for the BVS!

Electrical project planning

Ambient temperature range Ta

-10...+55 °C

		Lighta conno
Description	Starter kit	and mounting
Version	for BVS-E Identification	components,
Ordering code	BVS000T	"Accessories
Part number	BVS Z-SK-ID-04	on page 37
Contents	Vision Sensor, mounting	
	bracket, installation	
	accessories, connector,	
	software and guick guide	

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Vision Sensor BVS Starter Kits All in one box

VISIONSENSOR

Our starter kits include all the most important products in a single package. In addition to a starter kit, you only require a 24 V power supply to start setting up your application. The sensor is quick and easy to integrate in existing environments as a result.

The main components of the kit:

- Vision Sensor
- Mounting brackets
- Ethernet cable
- Supply cable
- Setup and assembly materials

Furthermore, a starter kit also contains the latest copy of the product catalog, the relevant user's guide and a software CD.

Description Version Ordering code Part number Contents Additional information

All starter kits are supplied with standard lenses, 8 mm focal length!

Vision Sensor BVS Starter Kits All in one box

Lights, connectors and mounting components, see chapter "Accessories", on **page 37**

The correct accessories will help you integrate Balluff Vision Sensors BVS perfectly in your system. Regardless of whether you require a retrofit or new installation, Balluff offers you all the components you need from a single source:

- Lights selecting the best illumination option for your application
- Connector and connection cable – designed for Vision Sensors and lights
- Mounting components mounting brackets and assembly systems integrate sensors and lights quickly and easily

liahta	Introduction	
Lights	introduction,	
	basic information	38
	Ring lights	41
	Line lights	42
	Background lights	44
	Spotlights	46
	Dark field illumination	47
Connectors	Vision Sensor connection	48
	parameter configuration	48
	Configurator connection	10
		43
	Illumination connection	49
Mounting components	Mounting components	50
	Mounting system	52

Lights used in an industrial environment depend on maximum reliability, outstanding quality and a good price/performance ratio. Balluff offers different versions of light to suit your needs. Select the best solution for your task and profit from our mature technology.

We offer different versions:

- Ring lights
- Line lights
- Background lighting
- Spotlights
- Dark field illumination

Product overview

Ring lights

- Compatible mounting bracket for sensor and light
- Shadow free illumination with a high degree of brightness
- For inspections with a large working distance

See page 41 for information on ring lights.

Line lights

- Homogeneous, directed light
- Generate shadows to check features
- Available with red, infrared and white light

Background lights

- Simple monitoring of dimensions and shapes
- Independent of material and surface type
- Various light field sizes available

See page 44 for information on background lights.

Spotlights

- Accurate illumination
- Implement larger inspection distances
- Available with red and white light

Dark field illumination

- Monitors scratches and dents in surfaces
- Independent of material and surface type
- Various light field sizes available

See page 47 for information on dark field illumination.

Highest quality

Our wide range of lights is subject to strict quality standards. For example, the function of all lights is tested for 24 hours prior to delivery. Our lights are protected against damages from burst pulses on the connection cable or electrostatic discharge (ESD). EMC tests performed by an accredited test laboratory have proven this.

Eye safety acc. to IEC 62471

Strong artificial radiation as from LEDs, for example, can affect your vision. Our lights are therefore tested by an independent, certified test laboratory according to the latest applicable standard (IEC 62471). All of our lights are categorized into the "Extempt group" or "Risk group 1" and are therefore considered extremely safe. By comparison: the sun falls into risk group 3.

Fast, simple mounting

All lights are quick, easy and economical to mount and align with the Balluff Mounting System BMS.

Long service life

We use only extremely luminous LEDs of the highest quality to manufacture our lights. Our extremely luminous ring and line lights are equipped with an excess temperature deactivation mechanism to extend the useful life of an LED, which depends primarily on the temperature load.

Simple startup

You only need a conventional 24 V power supply to connect our lights. Expensive control units are not required. Our background and dark field lights are connected to a 24 V DC power supply. That's it. Ring and line lights are triggered directly by the Vision Sensor or a PLC.

Boost function

Ring and line lights have a boost function that increases light intensity by 30 % and reduces the influence of ambient light. Overall process reliability is increased as a result.

Accessories Optimizing illumination – Process reliability

Ring lights

Ring lights are used as additional incident lights. The design of the light and powerful integral LEDs ensure virtually shadow free illumination with a high degree of intensity. Ring lights are particularly suited to applications where the distance between the BVS and the detected object is greater than 300 mm. Due to the high intensity of the light generated, these lights can also be used to suppress influences from changing ambient light.

The ring light can be fitted and aligned together with the Vision Sensor using our mounting bracket specially adapted to the Balluff Mounting System.

As an accessory, we offer diffuser attachments that prevent strong reflections on shiny components, for example.

Strip light

Line lights generate specific homogeneous lighting that brightens the image area directly. When used for lateral illumination, the light can generate subtle reflections and shadows. The subtle reflection generates an even illumination pattern without shiny areas. The shadows generated allow you to check the presence or absence of features on the object more easily.

Background light

With the through beam method, the background lighting is positioned behind the object you wish to detect. The Vision Sensor only detects the outline of the object based on this position and allows you to monitor part dimensions or shapes extremely easily. Extraneous light also poses no problems. Changes in the surface (markings, color, etc.) can be suppressed almost completely and have no influence on the test result.

Our background lights are particularly bright and versatile. You can also use them as subtle incident lights to illuminate highly reflective components.

Due to the extremely flat design, they are ideal for use in applications with limited space.

Spotlight

A spotlight is perfect for the precision illumination of specific areas. Greater inspection distances can be implemented if a spotlight is used. Unlike ring lights, spotlights can be attached in any position and the light swiveled towards the area that you wish to illuminate.

Dark field illumination

The dark field light allows you to illuminate and identify scratches, dents and impurities on surfaces extremely well. The dark field light must be attached to the detection object at a distance of 10...20 mm so that the surfaces on the component can be inspected. If the diameter of the dark field is insufficient, two or more line lights can also be installed to implement this type of illumination.

Frequently asked questions:

What should the distance between the light and the component be?

The light intensity on an object decreases with the working distance. Objects positioned further away appear darker than closer objects as a result, e. g. if a bright object is inspected once at a distance of 10 cm and once at 100 cm. The brightness of the object 10 cm is 100 times greater than at a distance of 100 cm. Select the best distances between the light source, sensor and target object. In order to prevent saturation, make sure that the brightness of the light source is correct.

Keep the lighting of the part to be inspected constant.

Avoid brightness fluctuations caused by ambient light, sunlight or other external light sources. These fluctuations are the most frequent cause of errors in image processing and are often difficult to identify. Errors can be limited by decreasing the exposure time of the sensor. External lighting may be required in addition to the light inside the sensor. Alternative solutions include covers or any kind of physical screen that specifically controls the light within the inspection area.

How should the field of view be illuminated?

The entire image area should be illuminated as evenly as possible. Avoid extremely bright points or dark areas. The component features you wish to inspect should, however, contrast as much as possible and show up clearly on the background. If you wish to check whether a specific feature is present, you can illuminate the component so that a clear shadow is cast upon the feature you wish to detect. The Vision Sensor can then detect the feature.

How should reflective components be illuminated?

When inspecting highly reflective surfaces, the sensor must be mounted with extreme care and if necessary an external light should be attached to a suitable bracket in order to maximum the contrast between the detected object and the background.

CE

Series		BAE LX-VS	BAE LX-VS	BAE LX-VS	
Version		Ring light	Ring light	Ring light	
Ordering code		BAE000J	BAE000K	BAE00AN	
Part number		BAE LX-VS-RR100	BAE LX-VS-RI100	BAE LX-VS-RW100	
Supply voltage U _s		24 V DC	24 V DC	24 V DC	
Operating current	Normal	800 mA	800 mA	700 mA	
	Boost	1300 mA	1400 mA	1200 mA	Li
Trigger		524 V DC	524 V DC	524 V DC	UC M
Mode	Normal				CC
	Boost				
Light field size		Ø 100/60 mm	Ø 100/60 mm	Ø 100/60 mm	
Emitter, light type		LED, red light	LED, infrared	LED, white light	
Wavelength		617 nm	875 nm		
Dimension		Ø116×20.5 mm	Ø116×20.5 mm	Ø116×20.5 mm	
Attachment		M4 screws	M4 screws	M4 screws	
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Housing material		Anodized aluminum	Anodized aluminum	Anodized aluminum	
Optical surface		Glass	Glass	Glass	
Weight		360 g	360 g	360 g	
Degree of protection a	s per IEC 60529	IP 65	IP 65	IP 65	
Eye safety acc. to	Normal	Extempt group	Risk group 1	Extempt group	
IEC 62471	Boost	Extempt group	Risk group 1	Extempt group	
Polarity reversal protected		Yes	Yes	Yes	
Short-circuit protected		Yes	Yes	Yes	
Ambient temperatu	ire range T _a	–10+55° C	–10+55° C	–10+55° C	
Storage temperature range		–25+75 °C	–25+75 °C	–25+75 °C	

Light accessories

See page 49 for connectors. See page 52 for information on mounting brackets for direct assembly or compatible with Balluff mounting system BMS.

The diffuser attachment en-

sures even light without disturbing reflections in applications with reflective surfaces. The diffuser is made of high-quality glass and can be installed directly on the light.

Description Version **Ordering code** Part number

Diffuser attachment for ring lights **BAM01A7** BAM OF-VS-001-D-RX100

CE	4

Light field 85 mm

Light field 170 mm

Series		BAE LX-VS	BAE LX-VS
Version		Strip light	Strip light
Ordering code		BAE00AP	BAE00AZ
Part number		BAE LX-VS-LR085	BAE LX-VS-LR170
Supply voltage Us		24 V DC	24 V DC
Operating current	Normal	200 mA	400 mA
	Boost	500 mA	800 mA
Trigger		524 V DC	524 V DC
Mode	Normal		
	Boost		
Light field size		10×79 mm	10×170 mm
Emitter, light type		LED, red light	LED, red light
Wavelength		617 nm	617 nm
Dimension		113.5×13×18 mm	197.5×13×18 mm
Attachment		M4 screws	M4 screws
Connection		M12 connector, 4-pin	M12 connector, 4-pin
Housing material		Anodized aluminum	Anodized aluminum
Optical surface		Glass	Glass
Weight		80 g	110 g
Degree of protection as	s per IEC 60529	IP 54	IP 54
Eye safety acc. to	Normal	Extempt group	Extempt group
IEC 62471	Boost	Extempt group	Extempt group
Polarity reversal protected		Yes	Yes
Short-circuit protect	ted	Yes	Yes
Ambient temperatu	ire range T _a	–10+55° C	–10+55° C
Storage temperatur	re range	–25+75 °C	–25+75 °C

Light accessories

See page 49 for connectors. See page 52 for information on mounting brackets for direct assembly or compatible with Balluff mounting system BMS.

> The line lights can illuminate rectangular areas right up to the corners. Shadows can also be generated in grooves and along edges and then used for evaluation purposes.

Light field 170 mm

Light field 85 mm

Light field 170 mm	
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1	п
S-LW170	. "Д
	그이
	Lights

Connectors Mounting components

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BAE LX-VS	BAE LX-VS	BAE LX-VS	BAE LX-VS
Strip light	Strip light	Strip light	Strip light
BAE00AT	BAE00AY	BAE00AR	BAE00AW
BAE LX-VS-LI085	BAE LX-VS-LI170	BAE LX-VS-LW085	BAE LX-VS-LW170
24 V DC	24 V DC	24 V DC	24 V DC
200 mA	400 mA	200 mA	400 mA
400 mA	800 mA	500 mA	900 mA
524 V DC	524 V DC	524 V DC	524 V DC
10×71 mm	10×170 mm	10×83 mm	10×170 mm
LED, infrared	LED, infrared	LED, white light	LED, white light
875 nm	875 nm		
113.5×13×18 mm	197.5×13×18 mm	113.5×13×18 mm	197.5×13×18 mm
M4 screws	M4 screws	M4 screws	M4 screws
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum
Glass	Glass	Glass	Glass
80 g	110 g	80 g	110 g
IP 54	IP 54	IP 54	IP 54
Extempt group	Extempt group	Extempt group	Extempt group
Risk group 1	Risk group 1	Extempt group	Extempt group
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
–10+55° C	–10+55° C	–10+55° C	–10+55° C
–25+75 °C	−25+75 °C	–25+75 °C	–25+75 °C

85 mm

170 mm

13

Light field 25×25 mm

Series	BAE LX-VS	
Version	Background light	
Ordering code	BAE000E	
Part number	BAE LX-VS-HR025	
Supply voltage U _s	24 V DC	
Operating current	225 mA	
Light field size	25×25 mm	
Emitter, light type	LED, red light	
Wavelength	617 nm	
Dimension	105×80×9.5 mm	
Attachment	M4 screws	
Connection	M12 connector, 4-pin	
Housing material	Anodized aluminum	
Optical surface	Glass	
Weight	66 g	
Degree of protection as per IEC 60529	IP 54	
Eye safety acc. to IEC 62471	Extempt group	
Polarity reversal protected	Yes	
Short-circuit protected	Yes	
Ambient temperature range T _a	–10+55° C	
Storage temperature range	–25+75 °C	

Light accessories

See page 49 for connectors. See page 52 for information on mounting brackets for direct assembly or compatible with Balluff mounting system BMS.

Background lights are suitable for the through beam method or subtle object illumination. The contours of the object appear sharper when these lights are used as background lights and allow you to make more accurate comparisons.

Accessories Background lights

 \checkmark

Light field 100×100 mm

Light field 150×100 mm

Lights Connectors

Mounting components

BAE LX-VS
Background light
BAE000F
BAE LX-VS-HR050
24 V DC
225 mA
50×50 mm
LED, red light
617 nm
105×80×9.5 mm
M4 screws
M12 connector, 4-pin
Anodized aluminum
Glass
155 g
IP 54
Extempt group
Yes
Yes
–10+55° C
–25+75 °C

BAE LX-VS	BAE LX-VS
Background light	Background light
BAE000H	BAE00C5
BAE LX-VS-HR100	BAE LX-VS-HR150
24 V DC	24 V DC
425 mA	500 mA
100×100 mm	150×100 mm
LED, red light	LED, red light
617 nm	617 nm
155×130×9.5 mm	105×80×9.5 mm
M4 screws	M4 screws
M12 connector, 4-pin	M12 connector, 4-pin
Anodized aluminum	Anodized aluminum
Glass	Glass
345 g	435 g
IP 54	IP 54
Extempt group	Extempt group
Yes	Yes
Yes	Yes
–10+55° C	–10+55° C
–25+75 °C	–25+75 °C

Series	BAE LX-VS	BAE LX-VS
Version	Spotlight	Spotlight
Ordering code	BAE002R	BAE002T
Part number	BAE LX-VS-SR030-S75	BAE LX-VS-SW030-S75
Supply voltage U _s	24 V DC	24 V DC
Operating current	100 mA	100 mA
Trigger	524 V DC	524 V DC
Light field size	Ø 30 mm	Ø 30 mm
Emitter, light type	LED, red light	LED, white light
Wavelength	630 nm	
Dimension	Ø40×89 mm	Ø40×89 mm
Attachment	M3 screws	M3 screws
Connection	M8 connector, 4-pin	M8 connector, 4-pin
Housing material	Anodized aluminum	Anodized aluminum
Optical surface	PMMA	PMMA
Weight	160 g	160 g
Degree of protection as per IEC 60529	IP 65	IP 65
Eye safety acc. to IEC 62471	Extempt group	Extempt group
Polarity reversal protected	Yes	Yes
Short-circuit protected	Yes	Yes
Ambient temperature range T _a	-10+40° C	-10+40° C
Storage temperature range	–25+70 °C	-10+70 °C

Light accessories

Connectors, see page 49.

Accessories Dark field illumination

CE

Series	BAE LX-VS	
Version	Dark field illumination	
Ordering code	BAE00AM	
Part number	BAE LX-VS-DR090	
Supply voltage U _s	24 V DC	
Operating current	425 mA	
Light field size	Ø 90 mm	
Emitter, light type	LED, red light	
Wavelength	617 nm	
Dimension	105×80×9.5 mm	
Attachment	M4 screws	
Connection	M12 connector, 4-pin	
Housing material	Anodized aluminum	
Optical surface	PMMA	
Weight	250 g	
Degree of protection as per IEC 60529	IP 54	
Eye safety acc. to IEC 62471	Extempt group	
Polarity reversal protected	Yes	
Short-circuit protected	Yes	
Ambient temperature range Ta	–10+55° C	
Storage temperature range	-25+75 °C	

Light accessories

See page 49 for connectors. See page 52 for information on mounting brackets for direct attachment or compatible with the Balluff mounting system BMS.

The dark field light allows you to illuminate surfaces in order to clearly reveal indentations or scratches, so that they can be inspected quickly and reliably.

Lights Connectors Mounting components

Connection cables for Vision Sensors BVS-E and BVS-C Straight female PIN 1: white PIN 5: gray PIN 6: pink PIN 7: blue

	PIN 2: brown PIN 3: green PIN 4: yellow	PIN 6: pink PIN 7: blue PIN 8: red
1		

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	 Shield to I

10...30 V DC Molded 8×0.25 mm² IP 67

–25...+90 °C

Parameterization cable for Vision Sensors BVS-E Straight female/RJ45

10...30 V DC Molded 4×0.34 mm² IP 65 –25...+70 °C

Power supply max. U	S	
Cable		
No. of wires × cross-s	section	
Degree of protection a	as per IEC 6	60529
Ambient	PUR	
temperature T _a	PUR shi	ielded
	PVC	
A 1 1 A 1 1	• •	

Version

Version

and wiring

Connector diagram

Cable material	Color	Length
PUR	Black	2 m
PUR	Black	5 m
PUR	Black	10 m
PUR shielded	Black	5 m
PUR shielded	Black	10 m
PVC	Gray	2 m
PVC	Gray	5 m
PVC	Gray	10 m

Ordering code		
Part number		
	BCC02H1	
	BKS-AD-05-RJ45/GS180-05	
	BCC02H2	
	BKS-AD-05-RJ45/GS180-10	
BCC009U		
BKS-S139-PU-05		
BCC009W		
BKS-S139-PU-10		

Other cable materials, colors and lengths on request.

More about our cables and connectivity products can be found in our brochures or online at: www.balluff.com

Connection cable for configurator BVS-C Straight female/straight female

10...30 V DC Molded 8×0.25 mm² IP 68 per BWN Pr. 20 -20...+80 °C

Ordering code

Connection cable for ring, background, dark field and Line lights Straight female

Accessories

250 V DC Molded 4×0.34mm² IP 68 -25 °C...+80 °C

-5 °C...+80 °C

44.0

BALLUFF

Connection cable for spotlights

Connectors - for quick connecting

Connectors Mounting components

4×0.34mm ²
IP 67
−25 °C+80 °C
−5 °C+80 °C
BCC02N2

32.2

BALLUFF

ØD

30 V DC

Molded

Part number		
BCC06ER	BCC032F	BCC02N2
BCC M418-M418-5A-322-PS0825-020	BCC M415-0000-1A-003-PX0434-020	BCC M314-0000-10-003-PX0434-020
BCC06EP	BCC032H	BCC02N3
BCC M418-M418-5A-322-PS0825-050	BCC M415-0000-1A-003-PX0434-050	BCC M314-0000-10-003-PX0434-050
	BCC032J	BCC02N4
	BCC M415-0000-1A-003-PX0434-100	BCC M314-0000-10-003-PX0434-100
	BCC0367	BCC02PL
	BCC M415-0000-1A-003-VX8434-020	BCC M314-0000-10-003-VX8434-020
	BCC0368	BCC02PM
	BCC M415-0000-1A-003-VX8434-050	BCC M314-0000-10-003-VX8434-050
	BCC0369	BCC02PN
	BCC M415-0000-1A-003-VX8434-100	BCC M314-0000-10-003-VX8434-100

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www.balluff.com

Accessories Mechanical accessories – for easy installation

 Mounting bracket

 For Vision Sensors

 and clamping cylinders

 Holding Vision Sensor for

 mounting on base plates or using

 Balluff BMS mounting system

 BAM00WN

 BVS Z-MB-01

 GD-Zn

Mounting bracket for Vision Sensors, ring lights and clamping cylinders Holding Vision Sensors and ring lights for mounting on base plates or using BMS mounting system **BAM01AC** BAM MB-XA-003-B03-1 Anodized aluminum

Mounting is part of optimal integration of the BVS Vision Sensor. The variety of different mounting options allows you to integrate your BVS ideally into your equipment. Balluff accessories are perfectly matched to our sensors.

Description

Ordering code

Part number

Material

Version

Version

With flexible Balluff accessories, you can position the BVS quickly without elaborate preparatory work or time-consuming planning, even if space is limited. You save material and time by using the right mounting element.

Accessories Mechanical accessories – for easy installation

Mounting bracket for strip and background lights

Holding strip and background lights for mounting on base plates or using BMS mounting system BAM01AE

BAM MB-XA-002-B02-1 Anodized aluminum

Stop for Vision Sensor focus ring

The preset focus is locked and can no longer be adjusted.

Display housing for display BAE PD-VS-001-C

Bracket for mounting the BVS display

 BAM01JH
 BAM01A8
 Lights Connectors

 BAM FK-VS-002-02-1
 BAM PC-AE-002-1
 Mounting components

 Anodized aluminum
 Anodized aluminum
 Connectors

Focus ring lock BAM FK-VS-002-02-1

The preset focus is locked and cannot be readjusted. Errors caused by inadvertently adjustment of the focus are therefore prevented. If the focus needs to be readjusted, the focus lock can be removed in seconds.

Accessories

Balluff Mounting System BMS – simply align and mount

Cross-connector For 2 rods Ø 12 mm Connecting element for 2 rods Ø 12 mm BAM002Z BMS CC-M-D12-B-00 Anodized aluminum

Base holder

For 1 rod Ø 12 mm (vertical or horizontal) For mounting on base plates or extrusions **BAM002W** BMS CU-M-D12-A040-00 Anodized aluminum

Description Version Version

Ordering code Part number Material

Use the Balluff BMS Mounting System

Optimized for tubular and blockstyle sensors, with the BMS Mounting System you can attach your Vision Sensor perfectly on base plates and on all commonly available profiles. Gain a high degree of flexibility and cover virtually any required spatial angle with the variable accessories kit. Simplify your installation with supplementary accessories such as reflector holders or adapter plates.

Mounting rods Ø 12 mm, anodized Al

BMS RS-M-D12-0150-00 = 150 mm BMS RS-M-D12-0250-00 = 250 mm BMS RS-M-D12-1000-00 = 1000 mm (for user assembly)

The mounting rods are knurled full-length. This prevents any position change.

More mounting accessories can be found in our "Accessories Line" catalog or online at: www.balluff.com

Accessories Balluff Mounting System BMS – simply align and mount

Base holder

For clamping cylinders For mounting on base plates or extrusions BAM0044 BMS CU-M-D12-IO60-01 Stainless steel

Clamping cylinder

Accommodates all holders, sensors and reflectors

BAM0031

BMS CS-M-D12-IZ GD-Zn

Adapter ring For 2× BMS CS-M-D12-IZ For clamping cylinders

BAM003J BMS AD-M-003-D12/IZ Anodized aluminum

Sales and Logistics Services

Retrieve product information online

- All catalog products are available: inductive sensors, photoelectric sensors, sensors for pneumatic cylinders, micropulse transducers, industrial RFID systems, Vision Sensors BVS, mechanical single and multiple position switches, industrial networking and connectivity, and so on.
- Graphics reduced to the essentials for optimized performance

EPLAN macros - Electrical project planning made easy

And now users of EPLAN electrical project planning software can also profit from this free service.

On our Web site planners and designers can download macros for selected Balluff products at no charge and implement them in their design. These macros include all the necessary graphics, technical and commercial information for the electrical design and documentation. Benefit from significant time and cost savings. Thanks to complete, non-redundant data you are assured of smooth transfer of the various engineering phases such as preliminary and detail planning, documentation or maintenance. To shorten overall project time and increase quality. Regardless of whether you need technical macros for creating wiring diagrams, ordering codes for purchasing, presentation images, etc., everything can be added to the CAE project using drag-and-drop.

This free service is available to all EPLAN users. If for some reason any information is missing, simply get in touch with us. And since the commercial data are also integrated directly in the software database, the existing links from ERP systems to article management can still be used.

CAD formats on the Cadenas PARTserver

UGS PLM SOLUTIONS HICAD N

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The benefits to you

- Faster and more efficient designingFree availability of all
- Balluff catalog products
- All common CAD formats
- Convenient preview in 3DConfigurable products

product area – You are automatically redirected to the Cadenas PARTserver

 Select a sensor and perform an optional check via 3D preview

And here's how it works

At www.balluff.com, go

to 3D data in the respective

- Add to shopping basket
- Once you have entered your details, the CAD files of your choice are sent to you by e-mail

Alphanumerical directory

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A Sorted by ordering code

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Riedstrasse 6

8953 Dietikon Phone +41 43 3223240

Taiwan

Thailand Compomax Co. Ltd. 16 Soi Ekamai 4,

Turkey

Sukhumvit 63 Rd.

Bangkok 10110

Prakanongnua, Vadhana,

Phone +66 2 7269595

info@compomax.co.th

Balluff Sensor Otomasyon

Sanayi Ve Ticaret Ltd. Sti.

34381 Okmeydani/Istanbul

Phone +90 212 3200411

Fax +90 212 3200416

Perpa Ticaret Is Merkezi A Blok, Kat 1-2-3 No: 0013-0014

Fax +66 2 7269800

Balluff Sensortechnik AG

Fax +41 43 3223241

Canaan Electric Corp.

6F-5, No. 63 Sec. 2

Chang An East Road 10455 Taipei

Phone +886 22 5082331

sales@canaan-elec.com.tw

Fax +886 22 5084744

sensortechnik@balluff.ch

1.100.

Through-beam fork sensors BGL Dynamic optical windows BOWA

Fiber optic devices BFB

Photoelectric Product Line

Capacitive sensors BCS Ultrasonic sensors BUS Pressure sensors BSP

Dynamic optical windows BOWA Light grids BLG Contrast sensors BKT Luminescence sensors BLT Color sensors BFS Photoelectric distance sensors BOD

Retro-reflective sensors BOS Through-beam sensors BOS (emitter/receiver)

Diffuse energetic BOS with fore- and background suppression

Mechanical Product Line

Mechanical single and multiple position switches Mechanical single and multiple position switches to DIN EN 60204-1/VDE 0113 Mechanical single and multiple position switches with forced opening Mechanical single and multiple position switches with quick-change plunger unit Inductive single and multiple position switches Inductive single and multiple position switches Mechanical wireless position switches Mixed assembly multiple position switches

Linear Position Sensing

Linear Displacement Product Line Micropulse® transducer BTL Profile series Micropulse® transducer BTL AT series Micropulse® transducer BTL Rod series Micropulse® transducer BTL Compact Rod series Micropulse® processors, BUS interfaces Magnetic linear encoder system BML Incremental and absolute encoders BDG/BRG Inductive linear position sensors BIW Inductive distance sensors BAW Magneto-inductive position sensors BIL Photoelectric distance sensors BOD Ultrasonic sensors BUS

Industrial Identification

Industrial Networking and Connectivity

Mechanical Accessories

Industrial RFID systems BIS S Vision sensor BVS Industrial Networking and Connectivity Connectors and cables BCC Passive splitter boxes BPI Active splitter boxes BNI IO-Link Remote inductive transmission systems

Industrial Identification

Industrial RFID systems BIS C Industrial RFID Systems BIS L Industrial RFID systems BIS M

Remote inductive transmission systems Inductive couplers BIC BUS systems Wireless Electrical devices

Mechanical Accessories

Holders and fastening systems Mounting system BMS

Please check and send fax!

sensors worldwide Fax +49 7158 173-299

Company
Name,
Department
Street
Postal Code/City
Phone

Object Detection

Linear Position Sensing

Industrial Identification

Industrial Networking and Connectivity

Mechanical Accessories

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