PRODUCT OVERVIEW

VISION SYSTEMS – LIGHTING – OPTICS

the easy way of machine vision

VISION & CONTROL

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THE EASY WAY – WITH VISION & CONTROL

“The Easy Way of Machine Vision” – true to this motto, Vision & Control opens the doors to the fascinating possibilities of machine vision. Simple, intuitive and uncomplicated.

EFFICIENT

In line with a consistent product philosophy, we offer vision systems, lighting and optics for machine vision – all from a single source. Our optimally matched components relieve you of work and save time and money. Set-up and operation are simple and uncomplicated. We have made everything readily accessible for many application scenarios. You can conveniently choose from a comprehensive range of over 2,500 standard products.

FLEXIBLE

Certainly there are situations in real life in which standard components reach their limits, maybe because the process environment presents a special challenge. To master these demanding imaging tasks our development team offers individually tailored solutions.

SUSTAINABLE

We have all the in-house capabilities necessary for a quick and effective solution. For over 20 years we have developed, produced and sold imaging systems in Germany. Our expertise in research, development and manufacturing constantly redefines the leading edge of possibilities in our sector.

INTEGRATED APPROACH

Moreover, we are always there to provide support on practical issues: with full-service, wide-ranging consulting and also with the basic and advanced training programmes of our Vision Academy.

OUR SOLUTION APPROACH – SIMPLE, CUSTOM-FIT AND SEAMLESSLY INTEGRATED

STRIVING FOR THE HIGHEST QUALITY

POSSIBLE APPLICATIONS:

PACKING AND FILLING

... Inspecting packaging and packaged goods
... Filling level control
... Completeness control
... Location of packaged goods in the packing facility
... Closure control
... Label and print control
... Palletisation
... Traceability

ASSEMBLY AND HANDLING

... Palletisation and depalletisation
... Conveyor monitoring
... Completeness control
... Position control

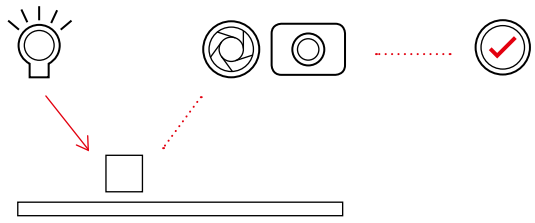
MEASURING AND INSPECTION

... Measuring and verifying of geometric dimensions
... Edge-break control
... Warp test
... Colour recognition and control

Imaging enhances the capabilities of machinery with possibilities which earlier could have only been performed by the human eye. In fact, imaging can go even further. It carries out complex controlling and regulating tasks to improve production quality and increase machine cycle rates.

Quick, contact-free and precise – imaging systems monitor, control and automate all types of manufacturing and assembly processes. For this we offer:

... High performance LED lighting that makes visible what needs to be recognised and processed
... Precision optics that provide high quality imaging standards for precise measurements and reliable results
... Vision systems that record and evaluate images and transmit the results to the machine controls



... For 100% quality control
... For increased production performance
... For greater process reliability in machine control
... For higher energy efficiency

INDUSTRY EXPERTISE

... Food
... Automotive
... Electronics/ semiconductors
... Beverage
... Print
... Pharmaceutical
... Solar

REFERENCE APPLICATIONS

BOSCH REXROTH AG

– Pick & place in packaging processes

The packaged goods are identified by the pictor® intelligent camera with Sercos interface and their position and rotational orientation are ascertained. These results are transmitted to the machine control, which takes these to generate the parameters for the drive system. The robot's movement and picking operations are then successively executed. Aided by the imaging sensor system, the Delta robots in use can pick, fill and pack 200 products per minute.

To achieve the required performance, the intelligent camera in use must simultaneously ascertain the position and orientation of six parts per pick cycle and transmit these to the robot control unit. Thus, only 300 ms are available per part for the entire data acquisition.

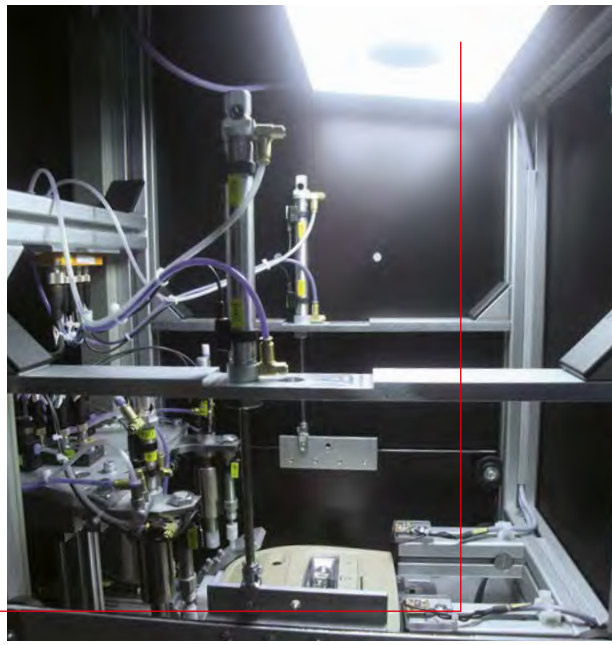
Pick & place robot control *(Source: Bosch Rexroth AG)*

TRUCK-LITE

– Quality control of motor vehicle lighting

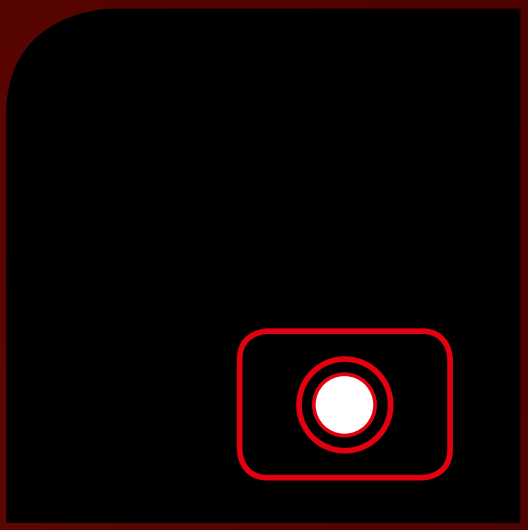
Here, the vicosys® multi-camera system works in combination with a 4-megapixel colour camera and high resolution optics for the quality control of roof module interior lighting for motor vehicles.

High performance vicolux® LED lighting with camera view uniformly illuminates the entire surface of the roof module. All details of the roof module – the buttons, switches and also design elements – are recognised with the utmost reliability. Another uniform illumination of areas from the opposite direction also makes it possible to monitor the elements of the hands-free phone system which is integrated in the roof module. In order to ensure 100% quality control, a complex checklist is executed with the aid of the comprehensive range of functions of the vicosys® multi-camera system.



Controlling vehicle interior lighting *(Source: Truck-Lite Europe GmbH)*

What really matters: precise results



INTELLIGENT CAMERAS

MULTI-CAMERA SYSTEMS

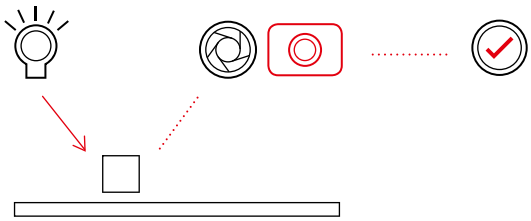
OPERATING SOFTWARE

IMAGING FUNCTIONALITY

VISION SYSTEMS

QUICK AND COMPREHENSIBLE, FLEXIBLE AND INDIVIDUAL

The heart of imaging is the vision system – an intelligent camera or multi-camera system. The vision system evaluates recorded images by means of a test programme. Within the test programme it is specified which attributes and traits of the inspected component are to be taken into account. The results can be displayed, transmitted to the machine control or used for the direct control of actuators.



Today, image processing systems monitor, control and automate highly complex manufacturing and assembly processes. A growing number of systems are equipped with decentralised, fieldbus-based control units. This means that it must be possible to integrate the evaluation unit – the vision system – into these control units.

Many years of practical experience, combined with expertise in development and manufacturing, and the ongoing dialogue with our customers – these factors define our trendsetting imaging systems.

From the intelligent camera to the multi-camera system, our device concept takes into account the requirements for performance capabilities, flexibility, combinability and reliability posed by day-to-day industrial operations.

ADVANTAGES/PROPERTIES

INDUSTRY-PROVEN HARDWARE

- ... Wide-range voltage input of 18 to 30 VDC
- ... Galvanically decoupled digital inputs/outputs
- ... Low-emission, interference-free hardware as per protection rating up to IP69K
- ... Drag chain and torsion-capable cables

RUGGED SOFTWARE BASIS

- ... Quick, stable and easy to parameterise imaging algorithms
- ... Customised software extension through the integration of proprietary algorithms by means of the Software Development Kit (SDK)
- ... Software simulator for all vision systems
- ... Comprehensive analysis and test tools for integration
- ... Linux operating system

VERSATILE COMMUNICATION

- ... A variety of hardware interfaces, including Ethernet, RS232, CAN and Sercos, as well as digital inputs and outputs
- ... Direct polling of sensors and direct actuation of actuators
- ... Support for various communications protocols, such as TCP/IP, Modbus/TCP, CANopen and Sercos, and various serial protocols
- ... Protocols for robot control – 3964R, Epson, HEX, ASCII, Schunk
- ... Remote maintenance and remote control capable

CONSISTENT OPERATING CONCEPT

- ... Operation in familiar Windows environment
- ... Various presentation options for configuring, setting up and monitoring
- ... Structuring of linear to complex branched test programmes
- ... Transferability of the test programmes between different systems
- ... Downward compatibility

THE INTELLIGENT PERSPECTIVE FOR YOUR AUTOMATION

Depending on the task at hand, various criteria take on a greater priority in selecting a suitable vision system. The object to be examined and the process environment are only a part of this. Only the interoperability of all components can ensure success. Numerous factors are decisive as to whether an intelligent camera or multi-camera system is used.

INTELLIGENT CAMERAS

... In an intelligent camera, image acquisition and evaluation units are combined in one device. Image capture, image processing and communication are optimally matched, right from the factory.

PICTOR® M

PICTOR® T

MULTI-CAMERA SYSTEMS

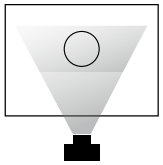
... Multi-camera systems offer maximum independence in configuring the cameras to be connected.

VICOSYS® 4300

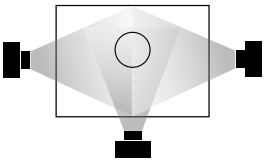
VICOSYS® 4400

The following criteria represent an initial reference point for selection. Together with you, we clarify all issues in order to find the right vision system for your application.

NUMBER OF VIEWS



... Single view



... Multiple views

ATTAINABLE RESOLUTION

... Area image sensor up to 2 MPixel
... Line image sensor up to 2 kPixel

... Matrix image sensor up to 16 MPixel
... Line image sensor up to 12 kPixel
... Thermographic image sensor up to VGA

COMMUNICATION WITH THE MACHINE CONTROL

... Ethernet
... Fieldbus interface (only pictor® T)

... Ethernet
... Fieldbus interface

IMAGE SENSOR

			Matrix resolution			Line resolution			
Properties	Mono-chrome	Colour	VGA to 1 Mpix	1-2 Mpix	>5 Mpix	up to 2k	>2k	NIR	Thermal imaging
pictor® M-16xx/18xx	●	●	●	●					
pictor® M-4x/5x	●	●	●	●		●			
pictor® T	●	●	●	○					
vicosys®	●	●	●	●	●	●	●	●	●

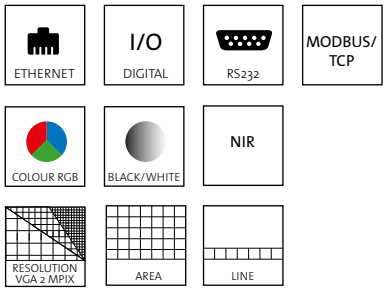
PROCESS INTERFACES

	Communication					Peripheral devices	
Properties	RS232	Ethernet	Digital I/O	CANopen	Sercos	Video output	Additional lighting interface
pictor® M-16xx/18xx	●	●	●			●	
pictor® M-4x/5x	●	●	●				
pictor® T	●	●	●	●	●		●
vicosys®	●	●	●	●	●	●	

● Available ○ In preparation

PICTOR®
INTELLIGENT CAMERAS

SERIES ... pictor® M ... pictor® T



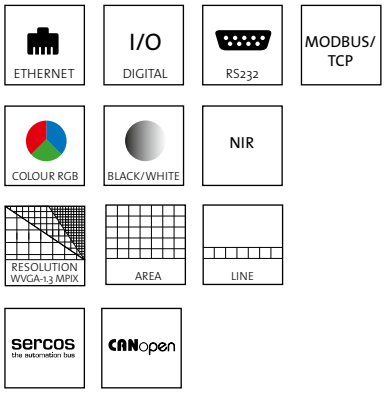
PICTOR® M – THE VERSATILE ONE

PROPERTIES

... All devices with monochrome or colour image sensors, with or without IR band-elimination filter
... CCD image sensor with long-time and short-time shutter
... Includes the powerful image processing software package and operating software vcwin® pro
... High-speed trigger input with constant capture delay (TTL compatible)
... C-mount lens mount

		M41/EL	M48/E M48/EC	M58/E M58/EC	M1606/E	M1617/E	M1817/E	M1821/E	M1856/E
Sensor size			1/3"	1/3"	1/3"	1/3"	1/3"	1/1.8"	1/3"
Number of pixels	Line: 2048	●							
	640 x 480		●		●				●
	720 x 480								
	1024 x 768			●		●	●		
	1280 x 1024								
	1600 x 1200							●	
Pixel size in µm²	4.4 x 4.4							●	
	4.65 x 4.65			●		●	●		
	5.3 x 5.3								
	6.0 x 6.0								
	7 x 7	●							
	7.4 x 7.4		●		●				●
Max. frame rate (images per second)		11 kHz	32	16	63	20	20	10	242
Number digital inputs/outputs		4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
Communication	Ethernet	●	●	●	●	●	●	●	●
	CAN								
	RS232	●	●	●	●	●	●	●	●
	Sercos								
Monitor output					●	●	●	●	●
Lighting Interface									

PICTOR® T – THE COMBINATION GENIUS



PROPERTIES

- ... All devices with monochrome or colour image sensors
- ... CMOS image sensor with (global) short-time shutter
- ... Rapid image acquisition thanks to area of interest support
- ... Includes the powerful image processing software package and operating software vcwin® pro
- ... CS/C mount lens mount
- ... Extension of the mathematics functions through the programming language Ruby
- ... Software Development Kit (SDK) available

		T303M-ETH / T303C-ETH	T303M-SC/ T303C-SC	T303M-ECAN/ T303C-ECAN	T313M-SC/ T313C-SC	T313M-ECAN/ T313C-ECAN
Sensor size		1/3"	1/3"	1/3"	1/1.8"	1/1.8"
Number of pixels	Zeile: 2048					
	640 x 480					
	720 x 480	●	●	●		
	1024 x 768					
	1280 x 1024				●	●
	1600 x 1200					
Pixel size in µm²	4.4 x 4.4					
	4.65 x 4.65					
	5.3 x 5.3				●	●
	6.0 x 6.0	●	●	●		
	7 x 7					
	7.4 x 7.4					
Max. frame rate (images per second)		60	60	60	50	50
Number digital inputs/outputs		4/6	4/4	4/6	4/4	4/6
Communication	Ethernet	●	●	●	●	●
	CAN	●		●		●
	RS232	●		●		●
	Sercos		●		●	
Monitor output						
Lighting Interface		●	●	●	●	●

PICTOR® T

THE COMBINATION GENIUS –
THE BASIS FOR A MULTITUDE OF POSSIBILITIES

A BASIC DEVICE – NUMEROUS COMBINATION POSSIBILITIES

... Combination with optical and lighting components from the extensive vicotar® and vicolux® ranges

VICOSYS®
MULTI-CAMERA SYSTEMS

SERIES ... 4300 ... 4400

The vicosys® multi-camera system consists of an evaluation unit and one or more connected cameras. In general, it acquires images of test objects from various views. These can be taken simultaneously, at staggered intervals or different locations. Different image-providing sources can be combined together as required with vicosys®: area and line scan cameras, monochrome and colour cameras, CCD and CMOS cameras, as well as NIR and thermographic cameras.

PROPERTIES

- ... Individually configured hardware based on the vicosys® series, the number and type of cameras and the process interfaces
- ... Guaranteed interoperability of the configured hardware
- ... Plug & play compatible with more than 200 camera types (FireWire or GigE Vision) from notable manufacturers
- ... Wide-range voltage input of 9 to 30 VDC
- ... Standard communications interfaces: Gigabit Ethernet, RS232 and USB
- ... Process interfaces: galvanically decoupled digital inputs/outputs (PNP or NPN), Sercos or CANopen fieldbus interfaces
- ... Includes the powerful image processing software package and operating software vcwin® pro

RECOMMENDED CAMERAS FOR VICOSYS®

The selection of suitable cameras is greatly dependent on the task to be solved. The vicosys® multi-camera system supports a multitude of cameras from different manufacturers with various properties, to handle nearly every image processing requirement.

	Area scan camera	Line scan camera	Infrared camera
Camera interface			
FireWire	///ALLIED		
GigE Vision	BASLER, ///ALLIED	BASLER	FLIR

4300 SERIES

- ... Intel® Atom™ processor
- ... Device for standard applications
- ... Little heat generation due to low energy consumption
- ... No fan and maintenance-free
- ... Up to max. 8 cameras can be connected

4400 SERIES

- ... Intel® Core i7 processor
- ... Device for high-end applications
- ... for processor-intensive applications with a high image data transfer
- ... Up to max. 16 cameras can be connected

CAMERA AND PROCESS INTERFACES

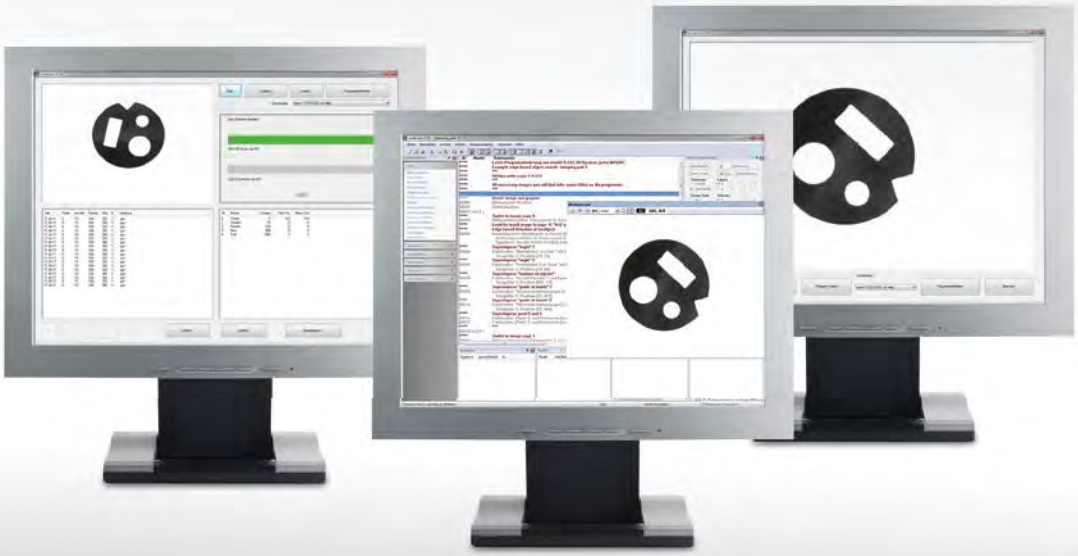
Series	vicosys® 4300								vicosys® 4400							
Model	F4	F4-SC	F4-CAN	F4-IO	G1	G1-SC	G1-CAN	G1-IO	F4	F4-SC	F4-CAN	F4-IO	G4	G4-SC	G4-CAN	G4-IO
Camera interface	4x FireWire				1x GigE Vision				4x FireWire				4x GigE Vision			
Process interface																
16 digital I/O NPN	●	●	●		●	●	●		●	●	●		●	●	●	
Sercos		●				●				●				●		
CANopen			●				●				●				●	
16 digital I/O PNP				●				●				●				●

VCWIN® PRO OPERATING SOFTWARE

vcwin® pro is a Windows-based programming environment for vision systems from Vision & Control. With the integrated editor programmes for solving industrial imaging measurement and test tasks can be created and transmitted. At the same time, vcwin® pro makes a user interface available for the visualisation of test results and for statistical evaluation. The putting together of test programmes with the operating software is extremely user-friendly, simple and intuitive.

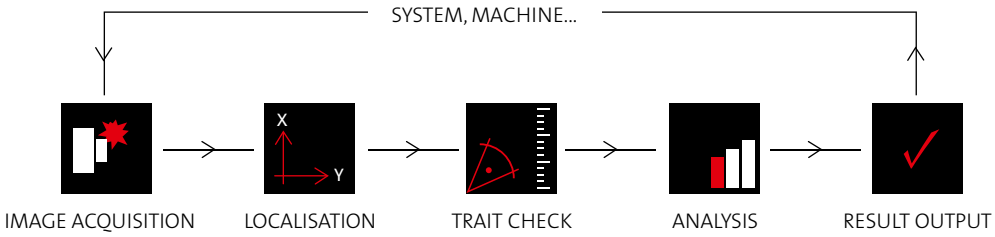
PROPERTIES

... Standardised programming environment for all vision systems from Vision & Control
... Flexible and clear structuring of the test programme
... Comprehensive test tools for effective configuration and system integration
... Software simulator for all image processing functions
... User specific user interfaces
... Customisable user interface layout
... Guaranteed backwards compatibility
... Centralised administration of several vision systems in the company network
... Completely compatible with Microsoft® Windows 8 and 7, XP and Vista (32 and 64-bit)
... Can be downloaded free of charge from the Vision & Control website

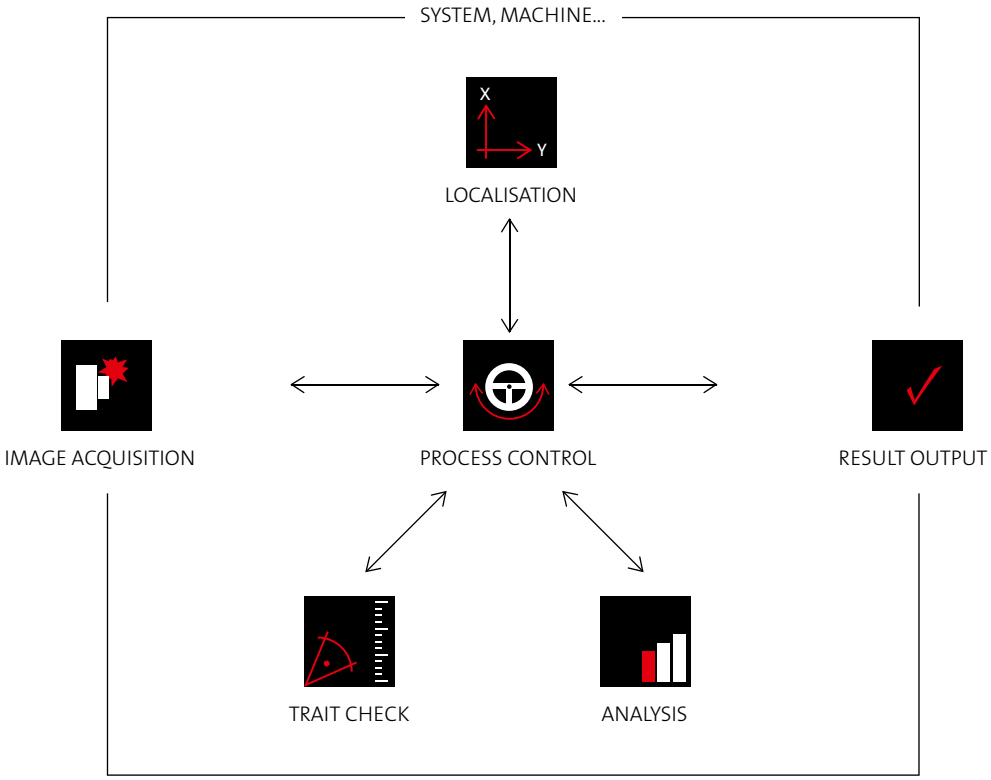


VCWIN®

SIMPLE TEST PROCEDURE WITH VCWIN® PRO



COMPLEX TEST PROCEDURE WITH VCWIN® PRO



IMAGING FUNCTIONALITY

SERIES ... pictor® M ... pictor® T ... vicosys® 4300 ... vicosys® 4400

The functions to be parameterised and test programmes to be produced with the vcwin® pro operating software are executed by the vision system. For this the functions implemented in the firmware of the vision system are executed in the vision system in the sequence specified in the test programme and with the parameters specified in vcwin®.

Depending on the type and model of the vision system a varying array of image processing functions is available to the user. This way different classes of tasks can also be processed with different vision systems.

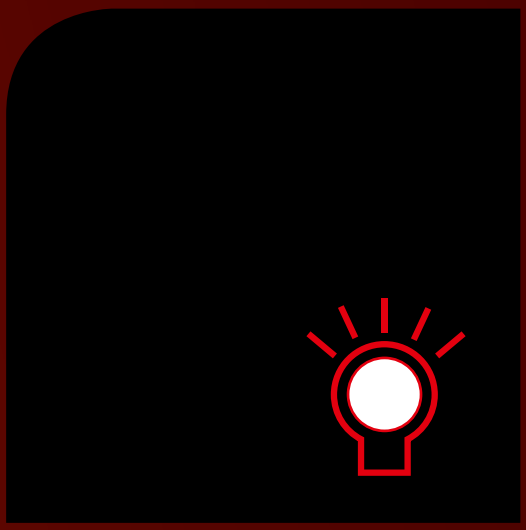
Should the extremely comprehensive possibilities of the Vision & Control algorithms be insufficient, extensions to functions anchored in the firmware can be carried out. With the aid of the Software Development Kit (SDK), functional extensions can be integrated in the vision systems from Vision & Control.

FUNCTION OVERVIEW

Group	Associated functions	Application
Image acquisition	... Image acquisition with long-time/ short-time light exposure ... Synchronous flash ... Line scan camera	... Adaptation of area cameras to diverse brightness ratios and image acquisition conditions in machinery ... Integration of diverse flash scenarios ... Synchronous image acquisition with multiple cameras ... Integration of line scan cameras
Image pre-processing	... Various digital image filters, image rectification	... Image enhancement ... Extract attributes/edges ... Data reduction ... Image noise/interference suppression ... Elimination of perspective and distortion errors
Character verification/ character recognition (OCV/OCR) Code reading	... Image difference ... Mask testing ... Count pixels ... Read characters ... String evaluation ... Data Matrix Code	... Completeness of printed images ... Print quality control ... Label control ... Logo control ... Object identification
Greyscale analysis and measurement functions	... Test greyscale values ... Luminance percentage ... Image difference ... Mask testing	... Completeness control ... Brightness measurement and testing
Colour image processing functions	... Colour conversion ... Colour binarisation ... Colour test ... Colour blob analysis	... Conversion from colour to greyscale images or Black and White images ... Weighting of colour values in various colour spaces ... Recognition of colour values on test objects ... Recognition of coloured objects based on size, colour, quantity ... Inspection of objects of different colours ... Sorting ... Inspection of colour homogeneity
Counting functions	... Count edges along a line ... Count edges on a circle ... Blob analysis/ colour blob analysis ... Count pixels	... Count parts/edges ... Presence/completeness check ... Assembly control

Object, position and rotational orientation detection (identification functions)	... Rotational orientation ... Rotational orientation analyses with moments ... Edge-based pattern search ... 360 degree pattern search ... Blob analysis ... Search for and identify objects	... Precise positional and rotational determination ... Positional/rotational orientation coordinates for pick & place robotics, handling ... Taught objects (contours or textures), find and assign rotational variant ... Parts recognition for inspection, robotics, picking up, positional tracking
Measurement functions	... Locate straight line ... Locate point ... Locate circle ... Angle measurement ... Distance	... Sub-pixel precise localisation of object edges of all types, foci and contrasts ... Distance and angle measurements based on object edges
Surface inspection	... Surface test ... Luminance percentage	... Detection of scratches, cracks and breakage ... Determination of the distribution of surface patterns
Shape analysis	... Contour analysis ... Contour comparison ... Contour extreme points	... Comparison of contours with reference parts ... Qualitative and quantitative control of complex part geometries
Programme sequence	... Port control ... Indexed programme branching ... Programme control ... Copy geometry variables ... Asynchronous processes	... Sub-programme technology for clearly-structured programming ... Dynamic programme branching for flexible part changes ... Coordination with the machine control ... Indexed access to geometry variables for processing lists
Communication with the machine control	... Remote control ... Sending images ... Data transfer ... External data storage media ... Line I/O, port I/O ... Process coupling module	... Save images for documentation ... Programme change ... Transfer of data from vision systems to control units for further evaluation or for storage ... Direct addressing/polling of digital inputs/outputs ... Communication with various field buses
Function for calibration and machine setting	... Calibration ... White balance ... Focus ... Reference geometry	... Production of metric calibrated dimensions ... Production of colorimetric calibrated dimensions ... Testing image sharpness ... Production of reproducible machine layouts ... Saving of reference values for evaluation
Mathematical evaluation functions	... Best straight line ... Best circle ... Result links ... Evaluate result ... Ruby script	... Extensive calculations already in vision system ... Convenient classification through effective sort definition tables ... Integrated script language for extensive calculations

The value of seeing more



BAR LIGHTS

FOCUSED BAR LIGHTS

AREA LIGHTS

RING LIGHTS

DARK FIELD LIGHTS

DOME LIGHTS

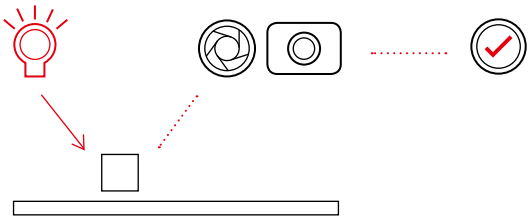
SPOT LIGHTS

TELECENTRIC LIGHTS

VICOLUX® LIGHTING

THE BEST PRECONDITION FOR SHARP RESULTS

An imaging system can only recognise what is visible. The most intelligent algorithm for information processing remains worthless if the object concerned is not recognisable. Having the right lighting is the key.



Each task requires special illumination that fits the circumstances. Because all materials – whether glass, plastic, metal, liquids, paste-like substances or textile fabrics – possess absorbent, transmitting and reflective properties. Furthermore, they also have their own highly individual shapes and geometries.

In order to quickly and economically come up with an optimal solution for our customers we offer a broad range of lighting that meets a multitude of requirements and can create a lighting system that:

- ... Illuminates a diverse array of geometries (surface areas, rings, lines)
- ... Allows for various lighting conditions (e.g. directed, diffuse, parallel, shadow-free, focused, polarised)
- ... Allows for a great variety of lighting principles (bright field, dark field, incident light, transmitted light)
- ... Works with diverse wavelengths (from UV365 to IR950)
- ... Can be actuated in a broad variety of ways (switchable, pulsable and flashable, with adjustable brightness and flash times)
- ... Can be quickly and easily combined with each other and also with optics and cameras

The vicolux® high performance LED lighting from Vision & Control lives up to these demands. It is particularly distinguished by the high performance illumination and control electronics which, despite the systems' compact design, are integrated. Vision & Control offers the right components for any lighting situation – completely uncomplicated. With trendsetting light generation, control and distribution that make visible precisely what needs to be recognised and processed.

ADVANTAGES/PROPERTIES

For over 20 years, Vision & Control has used the most powerful LEDs as light sources and is therefore able to offer the following:

HIGH RELIABILITY

- ... Stable light characteristics and long service life
- ... Integrated control units that are perfectly matched to the LEDs
- ... Rugged, industry compatible designs

MAXIMUM SPEED

- ... Rapid image evaluation based on homogeneous, high contrast images
- ... Short shutter speeds thanks to high efficiency illumination
- ... High process speeds due to powerflash control that is exact to the microsecond

REDUCED WORK AND INTEGRATION EFFORT

- ... Simple switching between continuous, pulsed and flash operation
- ... Quick set-up thanks to plug & play properties: Plug connectors, universal switch input, installation options, exchangeable accessories
- ... Electrically and mechanically combinable with optical components and vision systems
- ... Easy product selection thanks to our online catalogue and provision of all relevant technical data (CAD model, intensity distribution, etc.)

QUALITY AND SAFETY

- ... CE compliant components
- ... Tested photobiological safety, DIN EN 62471:2009-03
- ... Certification in accordance with 9001:2008

Vicolux® lighting reduces costs – from project planning to set-up, in ongoing operations and in maintenance.

BAR LIGHTS

SERIES

... LLL7
... LAL7
... LDL7
... LAL14
... LDL14
... LAL30
... LDL30
... LDLF30
... LDLF60

APPLICATIONS

... Automotive
- Presence control
- Surface inspection

... Packaging industry
- Printed image control
- Position determination

... Electronics industry
- Circuit path inspection
- Solder spots monitoring

PROPERTIES

... Lengthwise illumination of the inspection area, using incident or transmitted light or focused on a line

... Homogeneous light with a high luminosity

... Simple adjustment of the light distribution to the respective process environment (using accessories)

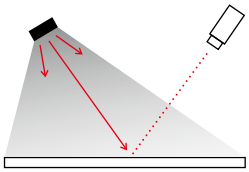
... Electrical connection by means of standard plug connectors

... Virtually borderless illumination area

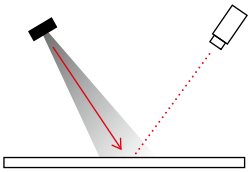
... Threaded holes for rotatable or fixed mounting

... Clamp adapters for variable fastening and the cascading of multiple bar lights

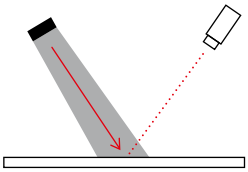
LIGHTING PRINCIPLE



DIFFUSE
(LDL/LDLF SERIES)
Homogeneous illumination of the inspection area in incident or transmitted light



DIRECTED
(LAL SERIES)
Powerful illumination of the inspection area in incident light



CONTINUOUSLY DIRECTED
(LLL SERIES)
Directed homogeneous illumination of the inspection area by means of integrated special optics

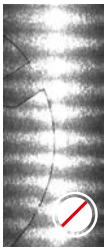
ELECTRONIC VERSIONS

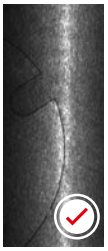
PLUG & PLAY

ADJUSTABLE LIGHTING

WITHOUT INTEGRATED CONTROL UNIT

SCANNING OF A MATT-GLOSS ALUMINIUM SURFACE





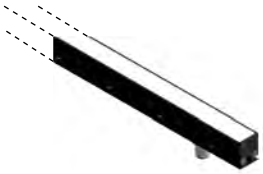
LEFT
Homogeneous but dark (diffuse)

CENTRE
Bright but only pointwise (directed)

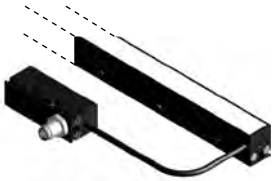
RIGHT
Continuous bright line (continuously directed)

VICOLUX®

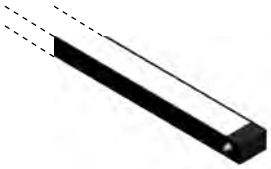
CONSTRUCTION DESIGNS



7 series and 14 series with integrated controller



7 series and 14 series with separate controller



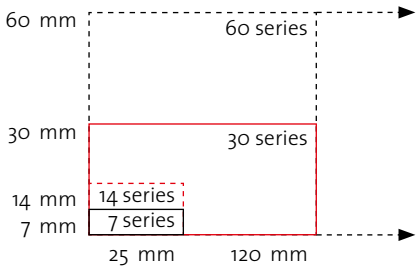
30 series and 60 series with integrated controller

WAVELENGTHS

Series	Light colour	365 nm	395 nm	455 nm	470 nm	525 nm	590 nm	617 nm	633 nm	white (5,700 K)	850 nm	880 nm	950 nm
		Ultraviolet			Visible light						Infrared		
LLL7		●			●	●		●	●	●	●	●	●
LAL7		●			●	●		●	●	●	●	●	●
LAL14		●			●	●		●	●	●	●	●	●
LAL30		●			●	●			●	●	●	●	●
LDL7					●	●	○	●	●	●	●	●	●
LDL14					●	●	○	●	●	●	●	●	●
LDLF30					●	●	○	●	●	●	●	●	●
LDL30					●	●	○	●	●	●	●	●	●
LDLF60					●	●	○	●	●	●	●	●	●

● Available ○ on request

LUMINOUS FIELD SIZES



Lengths starting from 25 mm or 120 mm

7 and 14 series
Lengths from 25 to 500 mm* (in 25 mm increments)

30 and 60 series
Lengths from 120 to 600 mm* (in 60 mm increments)

(*) Special lengths upon request

COMBINED LIGHTING

2-SIDED AND 4-SIDED LIGHTING

- Bar lighting with 4-sided bracket in radiating position from bright to dark field, individually adjustable
- Suitable for the 7 series and 14 series

TUNNEL LIGHTING

- Immersion of the test object in illumination possible with linearly moved processes
- Suitable for the 7 series and 14 series

FOCUSED BAR LIGHTS

- See following page for description

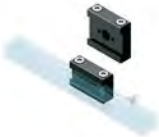
ACCESSORIES

CABLE

- Suitable for all series (exception: LAL30 series and LDL30 series have an open connecting cable)

MOUNTING ADAPTOR

- For mounting the lighting in the machine/system
- Suitable for the 7 series and 14 series



POLARISERS

- Influence the direction of propagation of the light-waves, prevent interfering reflections on the test object
- Suitable for all series

FOCUSED BAR LIGHTS

SERIES ... ZAL ... ZAL-SPO

APPLICATIONS

... Packaging industry
- . Printed image control
- . Edge detection of endless material/roll goods

... Solar industry
- . Inspection for microcracks

... Textile industry
- . Examining the fabric structure

... Glass industry
- . Foreign object detection in plate glass

PROPERTIES

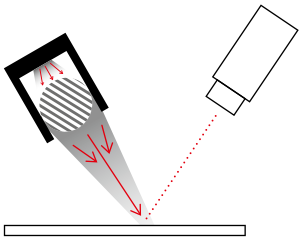
... Ideal for line-scan camera applications

... High luminosity focused on a thin line

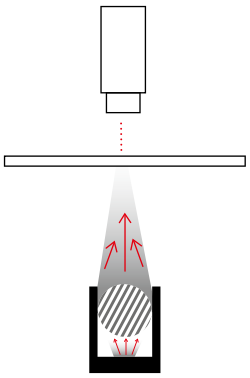
... Also suitable for incident light and transmitted light applications in bright field

... Passive cooling

LIGHTING PRINCIPLE



INCIDENT LIGHT (ZAL SERIES)
Powerful illumination of the inspection area



TRANSMITTED LIGHT (ZAL-SPO SERIES)
Powerful illumination of the inspection area

ELECTRONIC VERSIONS

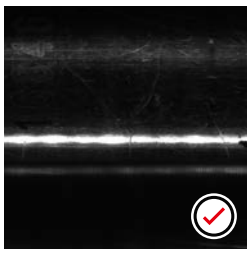
PLUG & PLAY

ADJUSTABLE LIGHTING

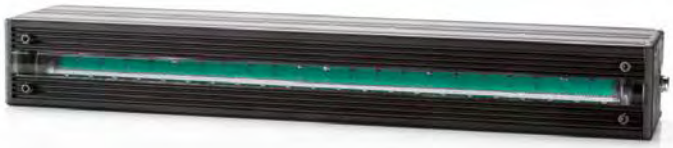
WITHOUT INTEGRATED CONTROL UNIT

INSPECTION OF A GLOSSY METAL SURFACE

LEDs reflect on the surface



The light is focused on a thin line by means of focused bar lighting



WAVELENGTHS

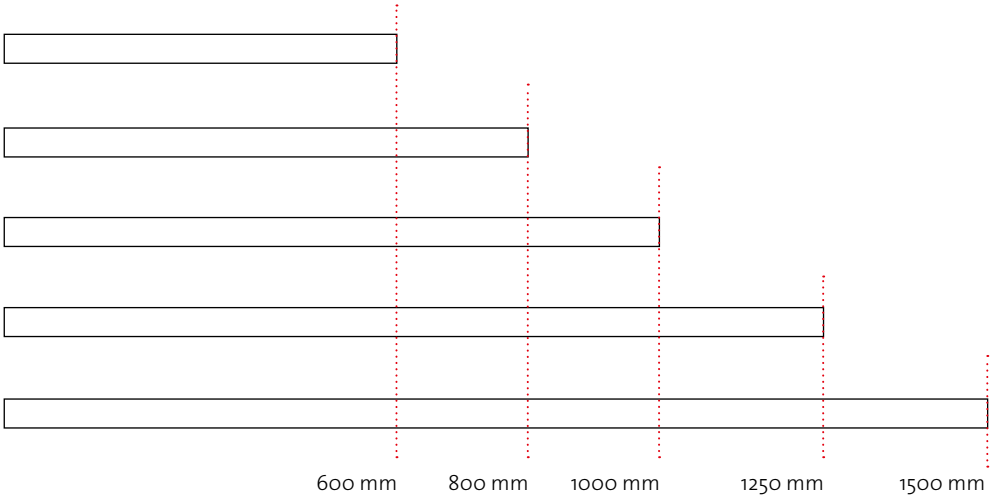
Series	Light colour	365 nm	395 nm	455 nm	470 nm	525 nm	590 nm	617 nm	633 nm	white (5700 K)	850 nm	880 nm	950 nm
		Ultraviolet			Visible light						Infrared		
ZAL					●	●		●	●	●		●	●
ZAL-SPO					●	●		●	●	●		●	●

● Available

TIP

You can easily configure your own individual bar lighting from the bar lighting items of the LAL7 and LLL7 series. You can mount a rod lens in front of the bar lighting using a bracket. They are available in various lengths and diameters. The lens is height-adjustable. With this the focal position can be changed. Consequently, a host of lighting scenarios are possible. This lighting combination can even be fitted into the most confined installation location, thanks to its very compact dimensions.

LUMINOUS FIELD SIZES



FREELY FOCUSABLE BAR LIGHTING

Rod lenses in various diameters and lengths

+

Lens bracket

+

Bar lighting of the LAL7 series and LLL7 series

=

AREA LIGHTS

SERIES	... AL	... FAL	... FDL	... FAL modular
	... DL	... FALRL	... FDLRL	... FDL modular
		... FALKD	... FDLKD	

APPLICATIONS

... Food industry
- . Positional determination
- . Completeness control

... Glass industry
- . Side wall inspection of hollow glass
- . Contaminants in plate glass

... Automotive
- . Presence and position control
- . Measurement tasks

PROPERTIES

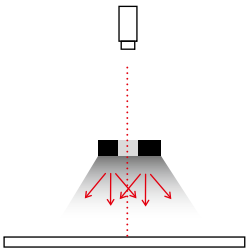
... Extensive range of tiny (30 x 30 mm) to very large-area standard lighting systems (180 x 240 mm)

... Modular area illumination in freely configurable sizes of up to 1.20 m edge length

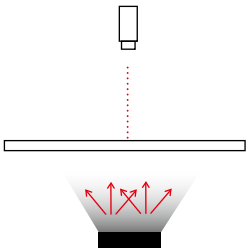
... Camera view possible

... Light and compact designs, suitable for installation on moving machine parts

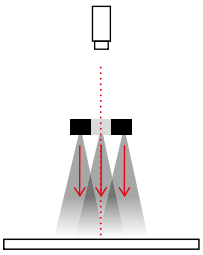
LIGHTING PRINCIPLE



DIFFUSE
Homogeneous illumination of the inspection area in incident light



DIFFUSE
Homogeneous illumination of the inspection area in transmitted light



DIRECTED
Powerful illumination of the inspection area in incident light

ELECTRONIC VERSIONS

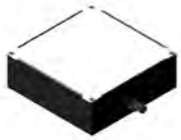
PLUG & PLAY

ADJUSTABLE LIGHTING

WITHOUT INTEGRATED CONTROL UNIT

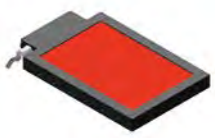
VICOLUX®

CONSTRUCTION DESIGNS



AL AND DL SERIES

- Compact, borderless, lightweight unit
- Illumination area size corresponds to the outer dimensions
- Integrated controller
- Mounting holes M3
- Easy set-up thanks to M5 plug



FAL AND FDL SERIES

- Scratchproof light-emitting surface made of glass
- Stable border with M6 mounting holes
- Lighting with camera view possible (FALKD and FDLKD series)
- Mounted (see Fig.) or separate controller (EPF or EC versions)

FALRL AND FDLRL SERIES

- Compact, borderless, lightweight unit with plastic light-emitting surface
- Mounting holes M3
- Mounted or separate controller (EPF or EC versions, see Fig.)

FAL AND FDL MODULAR SERIES

- Scratchproof light-emitting-surface made of glass
- Stable border with M6 mounting holes
- Illumination area can be freely defined with a grid of 30 x 30 mm
- Optionally with camera view (see Fig.)

COMBINED LIGHTING

COAXIAL MIRROR LIGHTING

- Diffuse light incidence that strikes the test object parallel to the optical axis of the camera system
- Suitable for DL30x30 and DL60x60 series with mounting adapter and beam splitter unit (STE series)

ACCESSORIES

CABLE

- For 80x100, 100x150, 30x30, 30x60, 60x60, 30x90 and 60x90 lighting
- Available in various lengths, optionally with angled plug connectors for easy set-up

WAVELENGTHS

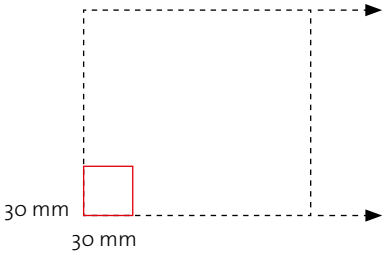
Series	Light colour	365 nm	395 nm	455 nm	470 nm	525 nm	590 nm	617 nm	633 nm	white (5,700 K)	850 nm	880 nm	950 nm
		Ultraviolet			Visible light						Infrared		
AL		●	●		●	●			●	●	●	●	●
DL					●	●	○	●	●	●	●	●	●
FAL			●		●	●			●	●	●	●	●
FALRL			●		●	●			●	●	●	●	●
FALKD			●		●	●			●	●	●	●	●
FAL modular					●	●			●	●	●	●	●
FDL					●	●	○	●	●	●	●	●	●
FDL modular					●	●	○	●	●	●	●	●	●
FDLRL					●	●	○	●	●	●	●	●	●
FDLKD					●	●		●	●	●	●	●	●

● Available ○ on request

NOTE

For the 60x90 model, Fresnel lenses, diffusers and polarisers are also available as accessories

LUMINOUS FIELD SIZES



! Modular area illumination: max. illumination area 30 x 1200 mm or 100 modules (1 module = 30 x 30 mm illumination area)

RING LIGHTS

SERIES

... RK613
... RK1220
... RK2036
... RK3652
... RK5268
... RK2029
... RK2037
... RK3950
... RK3056

APPLICATIONS

... Automotive
- . Read codes and characters
- . Positional determination of components
- . Inspect attributes

... Semiconductor industry
- . Positional determination of fiducial markers
- . Solder point inspection

... Food industry
- . Contour and shape control
- . Check and read identity codes

PROPERTIES

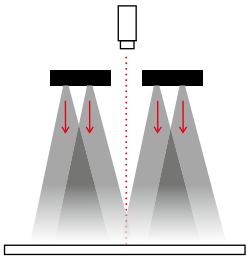
... Powerfully illuminating coaxial universal lighting for incident light applications

... Compact design with integrated controller

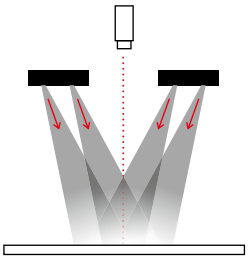
... Extensive accessories for quick and easy adapting of the light direction to the inspection task

... It is possible to combine different illumination area sizes with one another so that, for example, you have a 3-channel RGB light source or a round planar light with camera view

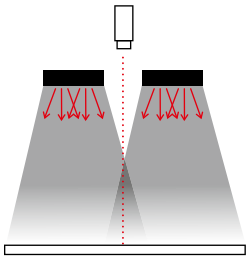
LIGHTING PRINCIPLE



DIRECTED
Coaxial incident light (without accessories)



DIRECTED, FOCUSED
Focusing of the light rays through a Fresnel lens



DIFFUSE
Homogeneous illumination without interfering reflections by attaching diffusers

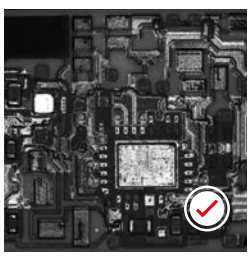
ELECTRONIC VERSIONS

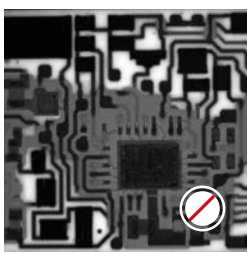
PLUG & PLAY

ADJUSTABLE LIGHTING

WITHOUT INTEGRATED CONTROL UNIT

INSPECTION OF CIRCUIT BOARD COATED WITH LACQUER





LEFT
Reflections predominate on the components

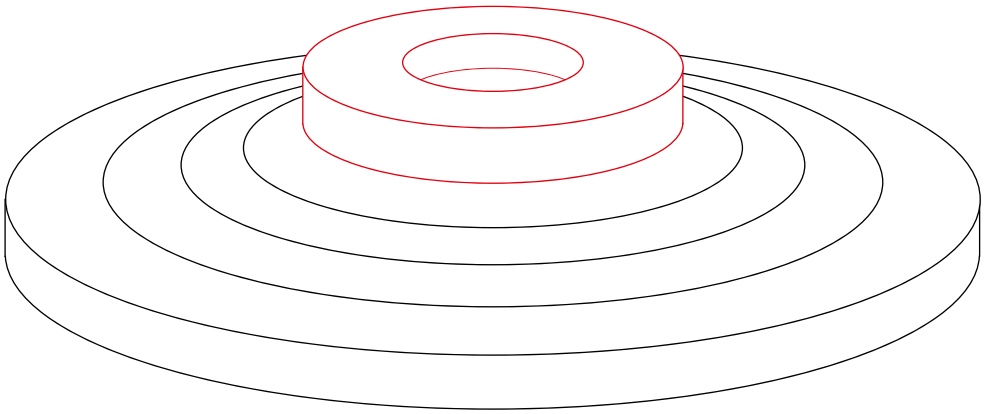
RIGHT
Suppression of all reflective surfaces by means of light and lens polarisation when extinguishing (polarised ring light)

WAVELENGTHS

Series	Light colour	365 nm	395 nm	455 nm	470 nm	525 nm	590 nm	617 nm	633 nm	white (5,700 K)	850 nm	880 nm	950 nm
		Ultraviolet			Visible light						Infrared		
RK613			●		●	●	●	●	●	●	●		●
RK1220			●		●	●		●	●	●	●		●
RK2036			●		●	●	●	●	●	●	●		●
RK3652			●		●	●	●	●	●	●	●		●
RK5268			●		●	●	●	●	●	●	●		●
RK2029			●		●	●	○		●	●	●	●	●
RK2037		●	●		●	●	○		●	●	●	●	●
RK3950					●	●	○		●	●	●	●	●
RK3056		●	●		●	●	○		●	●	●	●	●

● Available ○ on request

OUTER AND INNER DIAMETERS



12 mm ..... INNER DIAMETER ..... 104 mm

26 mm ..... OUTER DIAMETER ..... 136 mm

ACCESSORIES

CABLE

- Available in various lengths, optionally with angled plug connectors for easy set-up
- Suitable for RK2036, RK3652, RK5268

MOUNTING ADAPTOR

- For mounting directly on the lenses
- Suitable for all series

DIFFUSERS

- Diffuser discs in different intensities
- Homogeneous light, no disruptive reflections
- Suitable for all series

FRESNEL LENSES

- For focusing or defocusing on a specific area to be illuminated
- Suitable for all series

POLARISERS

- Influences the direction of propagation of the lightwaves
- Prevents interfering reflections on the test object
- Suitable for all series

DARK FIELD LIGHTS

SERIES	... RR19/8	... RR30/23	... RR3950	... RR64/22

APPLICATIONS

... Automotive
- . Detection of surface flaws
- . Reading of embossed codes and characters

... Electronics industry
- . Solder point inspection
- . Positional determination

... Metalworking industry
- . Embossing control
- . Inspection of cut and stamped edges

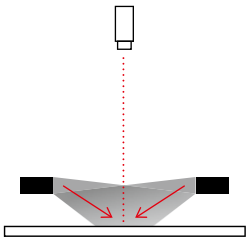
PROPERTIES

... Ring-shaped, radial LEDs

... Due to the lighting properties (lighting principle), the lighting is located very close to the object

... Even the smallest bumps and pits become visible

LIGHTING PRINCIPLE



! With dark field array, only the light rays deflected to the surface structure are directed into the lens and camera. For this, the light source is always located close above the object.

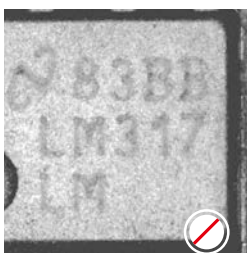
ELECTRONIC VERSIONS

PLUG & PLAY

ADJUSTABLE LIGHTING

WITHOUT INTEGRATED CONTROL UNIT

READING OF LASER MARKINGS ON SEMICONDUCTORS



LEFT
Recording with targeted area illumination

RIGHT
Dark field array

WAVELENGTHS

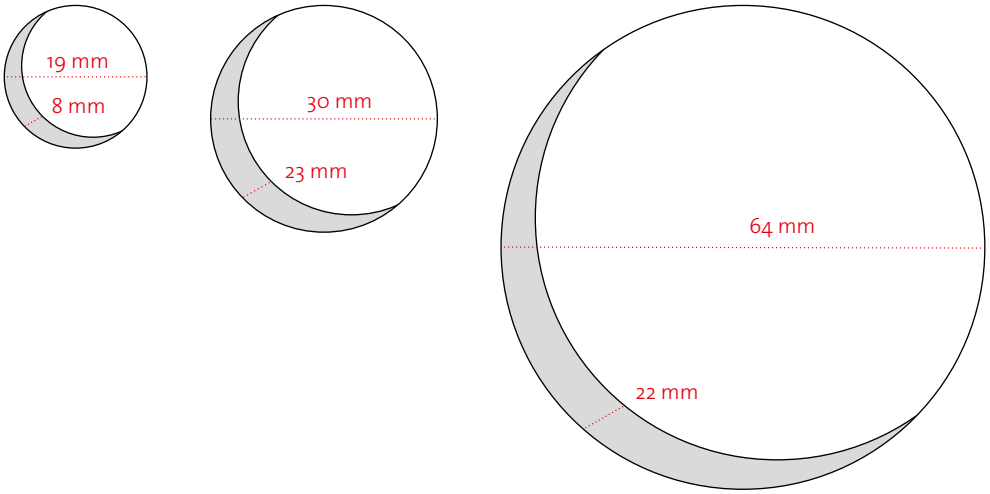
Series	Light colour	365 nm	395 nm	455 nm	470 nm	525 nm	590 nm	617 nm	633 nm	white (5700 K)	850 nm	880 nm	950 nm
		Ultraviolet			Visible light						Infrared		
RR19/8					●	●		○	●	●		●	●
RR30/23					●	●		○	●	●		●	●
RR3950					●	●			●	●		●	
RR64/22					●	●		●	●	●	●	●	●

● Available ○ on request

TIP

With the bar lighting of the 7 series and 14 series, you can attain the desired illumination area size for your individual inspection task. The bar lights are mounted in a 4-sided bracket to form a square dark field. The opposite sides can be selected in lengths from 25 mm to 250 mm.

ILLUMINATION AREA DIMENSIONS



FOUR-SIDED ILLUMINATION FOR DARK FIELD APPLICATIONS

Bar lighting of the 7 series and 14 series with external controllers

+

4-sided bracket

=

DOME LIGHTS

SERIES	... SFD30/9	... SFD42/12	... RD3950	... SF64

APPLICATIONS

... Glass industry
- . Inspecting the mouths of hollow glass
- . Inspecting bottle bases

... Automotive
- . Surface inspection
- . Presence control

... Pharmaceutical
- . Checking and reading identification codes
- . Inspection and position control of closing caps

PROPERTIES

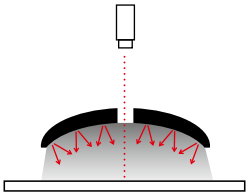
... Shadow-free and homogeneous illumination of the inspection area with an extremely high luminosity (500 W/m²)

... Use of power LEDs

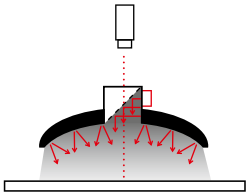
... Compact design height

... Also available in deep blue and infrared as standard

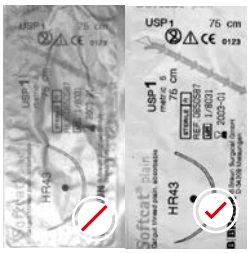
LIGHTING PRINCIPLE



SHADOW FREE INCIDENT LIGHT
The so-called "cloudy day" lighting produces an evenly distributed light from the half-space over the test object



FULL DOME
A coaxial mirror light is located between the camera/lens and dome. Advantage: the shadows that occur with extremely reflective surfaces are prevented by the camera view



TASK
Read characters on film label

LEFT
Disruptive reflections in diffuse light

RIGHT
Suppression of disruptive reflections by means of dome lighting

TASK
Reading of embossed characters on a hex nut

LEFT
Camera view of the dome lighting causes shadows to form in the marked area

RIGHT
Equal illumination of the marked area by extending the dome lighting with a coaxial mirror light (full dome)

ELECTRONIC VERSIONS

PLUG & PLAY

ADJUSTABLE LIGHTING

WITHOUT INTEGRATED CONTROL UNIT

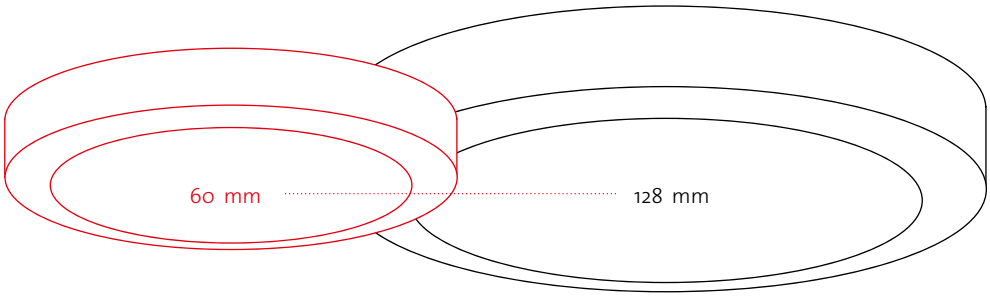
VICOLUX®

WAVELENGTHS

Series	Light colour	365 nm	395 nm	455 nm	470 nm	525 nm	590 nm	617 nm	633 nm	white (5700 K)	850 nm	880 nm	950 nm
		Ultraviolet		Visible light							Infrared		
SFD30/9				●	●	●	○	●	●	●	●		●
SFD42/12				●	●	●	○	●	●	●	●		●
RD3950					●	●		●	●	●	●	●	●
SF64									●				

● Available ○ on request

ILLUMINATION AREA DIAMETER



ACCESSORIES

CABLE

- Available in various lengths, optionally with angled plug connectors for easy set-up
- Suitable for SFD30/9 and SFD42/12

FULL DOME

- Beam splitter unit STE30x30 or STE60x60 in combination with the DL30x30 or DL60x60 area lights
- Suitable for SFD30/9 and SFD42/12

SPOT LIGHTS

SERIES ... ULS6 ... RAL10 ... SPOT50

APPLICATIONS

... Pharmaceutical
- Recognition and reading of diverse codes
- Presence and completeness control

... Automotive
- Targeted illumination for presence control of small components in large assemblies (fitting)
- Light direction in the working area of robots

... Semiconductor industry
- Positional determination of fiducial markers
- Read codes and characters

PROPERTIES

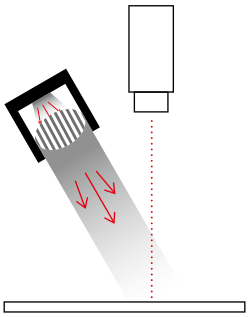
... LED light source produces a focused spot of light for working distances of up to two metres

... High luminosity power even at considerable object distances

... Small and light (22 g) spot light source, suitable for mounting on moving machine parts, e.g. a robot arm

... Integrated focusing optics for adjusting illumination area and working distance

LIGHTING PRINCIPLE



DIRECTED
Focused, targeted illumination of the inspection area

ELECTRONIC VERSIONS

PLUG & PLAY

ADJUSTABLE LIGHTING

WITHOUT INTEGRATED CONTROL UNIT

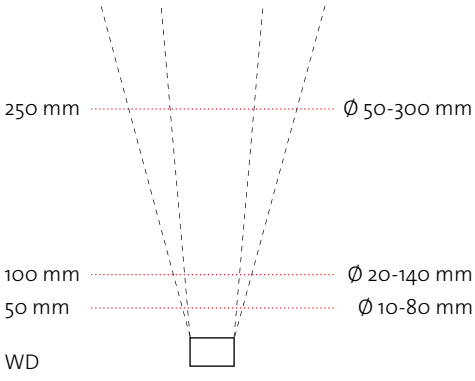
VICOLUX®

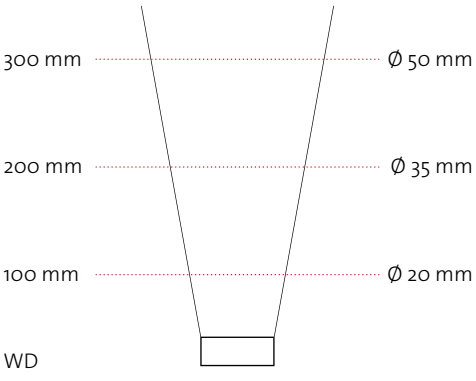
WAVELENGTHS

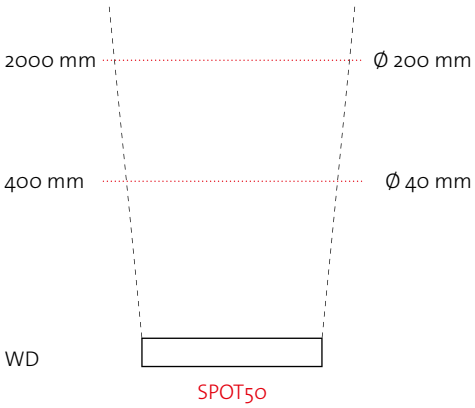
Series	Light colour	365 nm	395 nm	455 nm	470 nm	525 nm	590 nm	617 nm	633 nm	white (5700 K)	850 nm	880 nm	950 nm
		Ultraviolet		Visible light							Infrared		
ULS6		○	●	●	●	●	○	●	●	●	●	○	●
RAL10				●	●	●	○	●	●	●	●	○	●
SPOT50		○	●	○	●	●	○	●	●	●	●	●	●

● Available ○ on request

ILLUMINATION AREA DIAMETER







ULS6
Light exit diameter 6 mm

RAL10
Light exit diameter 10 mm

SPOT50
Light exit diameter 44 mm

WD: Working distance

ACCESSORIES

CABLE

- Available in various lengths, optionally with angled plug connectors for easy set-up
- Suitable for RAL10/ULS6

DIFFUSERS

- Diffuser discs in different intensities
- Homogeneous light, no disruptive reflections
- Use as extremely bright transmitted light
- Suitable for RAL10

SPOTLIGHT ADAPTER

- The ULS6 light direction is adaptable by means of front lens and C-mount lens
- Suitable for ULS6

POLARISERS

- Influences the direction of propagation of the lightwaves
- Prevents interfering reflections on the test object
- Suitable for RAL10

TELECENTRIC LIGHTS

SERIES

... TZB10
... TZB30
... TZB51
... TZB60
... TZB95
... TZB130

APPLICATIONS

... Glass industry
- Edge and foreign object detection
- Shape control

... Medical technology
- Inspection of miniature components and structures

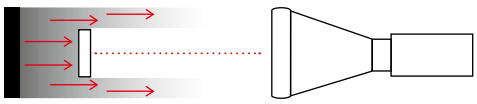
... Pharmaceutical
- High precision measurement tasks

... Automotive
- Control of the dimensional accuracy and outer contour
- Threading inspection

PROPERTIES

... Directed light source with parallel light direction
... For use in combination with telecentric lenses
... Illumination area diameters are attuned to the telecentric lenses of the vicotar® brand
... Suitable for flash operation in the microsecond range
... Highest precision measurement of reflective and transparent objects

LIGHTING PRINCIPLE



TELECENTRIC TRANSMITTED LIGHT
The telecentric lighting is located behind the test object

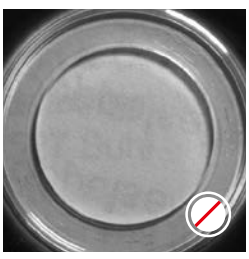
ELECTRONIC VERSIONS

PLUG & PLAY

ADJUSTABLE LIGHTING

WITHOUT INTEGRATED CONTROL UNIT

READING OF THE INNER BORDER MARKING ON A BLU-RAY DISC



With diffuse incident lighting no embossing is visible

The embossing on the Blu-Ray is recognisable thanks to telecentric incident lighting

WAVELENGTHS

Series	Light colour	365 nm	395 nm	455 nm	470 nm	525 nm	590 nm	617 nm	633 nm	white (5700 K)	850 nm	880 nm	950 nm
		Ultraviolet			Visible light						Infrared		
TZB10					●	●			●	●	○	●	○
TZB30					●	●			●	●	○	●	○
TZB51					●	●			●	●	○	●	○
TZB60					●	●			●	●	○	●	○
TZB95					●	●			●	●	○	●	○
TZB130					●	●			●	●	○	●	○

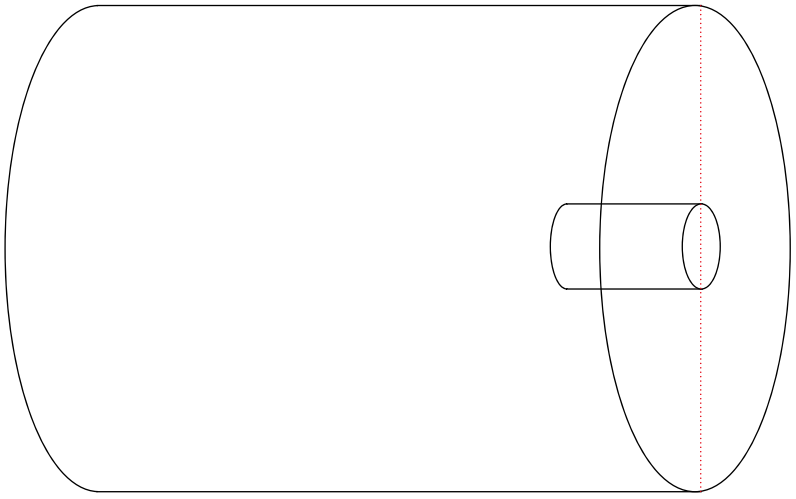
● Available ○ on request

COMBINED LIGHTING

TELECENTRIC INCIDENT LIGHT

- Beam splitter unit of the STE30 and STE60 series

LUMINOUS FIELD DIAMETERS



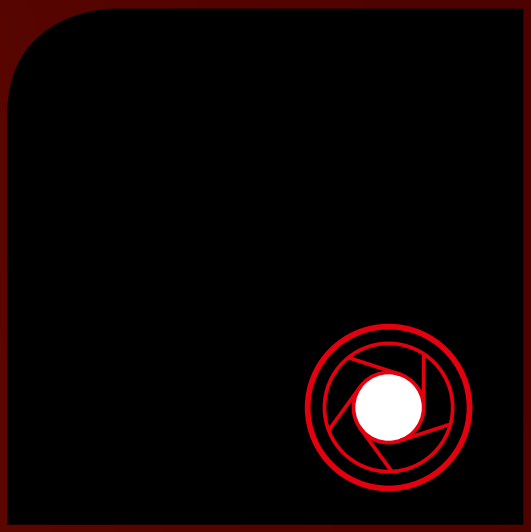
Ø 10 mm - 130 mm

ACCESSORIES

SAFETY GLASSES AND POLARISING FILTER

- Protect the front lens against contamination and mechanical influence
- Suitable for all series

When the image provides clarity



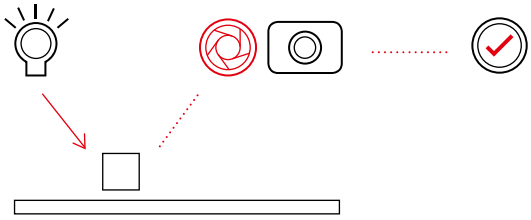
TELECENTRIC LENSES

ENTOCENTRIC LENSES

VICOTAR® OPTICS

A VIEW ANGLE THAT CAPTURES EVERYTHING

Lighting and imaging optics are located at the beginning of the image processing signal path and are thus especially important. Whatever goes wrong at this stage can only be remedied further down the signal path with great effort – if at all. The lens is the bottleneck in the signal chain. For this reason it so strongly influences the performance of an inspection system.



INDUSTRY-PROVEN

vicotar® optics offer a wide range of application options and rugged and precise functionality, even under the toughest production conditions. Thus, vicotar® optics from Vision & Control can be used in the entire range of applications for digital image processing – from simple to complex inspection tasks and from microscopic to macroscopic image acquisition.

WIDE PORTFOLIO

The company's own series of telecentric lenses is particularly comprehensive. They are designed to provide stable, distance-independent measurements. Telecentric lenses, particularly in combination with telecentric lighting, can reliably inspect optically difficult parts, such as glossy or glass objects. Several series of entocentric lenses in various qualities cover nearly all of the remaining application scenarios.

For ideal matching to the respective inspection task, vicotar® offers an extensive range of accessories. Altogether, the Vision & Control brand vicotar® comprises more than 250 components.

ADVANTAGES/PROPERTIES

- ... Use with contact-free test and measurement technology
- ... High quality imaging standards provide reliable results – wherever precise measurements and dependable quality control are crucial
- ... Extremely short image acquisition times and inspection cycles thanks to a highly luminous optical design
- ... Usable over a broad spectral range, from blue to infrared
- ... Deployable for a diverse array of tasks in assembly, handling, packaging and filling processes
- ... Inspection of the smallest details thanks to excellent imaging properties
- ... Industry compatible
- ... No software correction of images necessary due to the high grade quality of the images; this translates into high-speed operation of the imaging system
- ... Large selection of telecentric and entocentric lenses with diverse imaging properties available
- ... An extensive range of accessories allows for complete adaptation to the imaging task

vicotar® optics are an integral part of Vision & Control's component kit: They have been optimally matched to efficiently use all imaging components of Vision & Control's lighting and vision systems. This means:

- ... Exactly calculable project costs, since implementation is based on standard components
- ... Quick project realisation due to short delivery lead times
- ... Uncomplicated and efficient implementation of changed quality control requirements
- ... Quick setup times when changing types
- ... High availability and reduced service and maintenance costs

PRECISION FOR IMAGE PROCESSING

Depending on the test or measurement task, telecentric or entocentric lenses may be most suitable. Ambient conditions as well as many other factors play an important role in selecting the right lens. Our Service team would be pleased to assist you with this.

TELECENTRIC LENSES

Telecentric lenses reliably and precisely accomplish test and measurement tasks. Especially wherever geometrically-exact reproductions of three-dimensional objects are crucial.

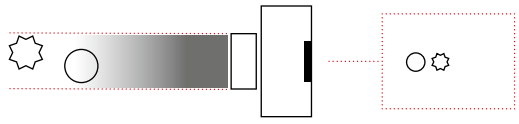
ENTOCENTRIC LENSES

Because of their perspective-related imaging properties, entocentric lenses are used for the inspection of attributes, i.e. when objects must be inspected with respect to certain attribute qualities.

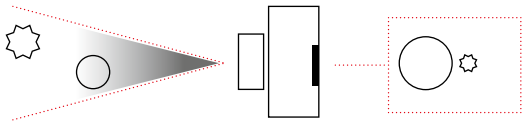
ADVANTAGES

- ... No change in the image scale due to object shifting
- ... Minimal distortion
- ... Perspective-free
- ... High-grade quality of images
- ... Edge masking is avoided
- ... Low weight
- ... Small dimensions
- ... Infinitely adjustable and fixable distance settings make it possible to adapt the lens to the working distance and inspection area

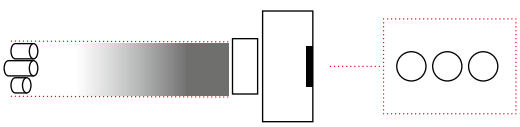
PRINCIPLE



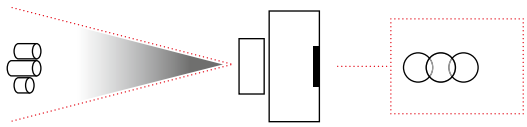
Objects are imaged perspective-free. In contrast to perspective-based imaging, the spatial orientation of the objects is lacking. That is why objects with the same dimensions at varying distances from the camera appear to be equally large in the image.



The further an object is away from the camera system, the smaller it appears in the image. This corresponds to the perception of the human eye (the natural perspective).



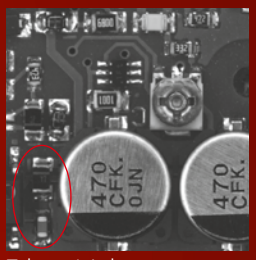
Perspective-free imaging makes it possible to represent all components without edge masking. The elements in the image do not cover up one another.



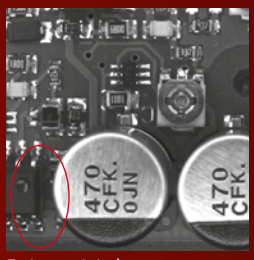
The perspective image has the effect that components of varying height can mask one another in the image. Not all objects or structures are visible.

COMPARISON WITH A TEST IMAGE

IMAGE ACQUISITION OF A CIRCUIT BOARD



Telecentric lens

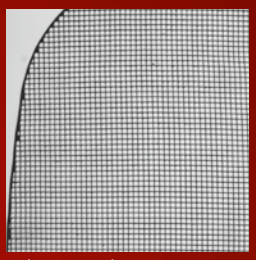


Entocentric lens

Fig. left: Viewed from the telecentric perspective, components on the base of the circuit board become visible.

Fig. right: From the entocentric perspective, the marked areas show those areas which are masked by raised components (condensers, height: 10 mm).

INSPECTION OF CATALYTIC CONVERTERS


Telecentric lens

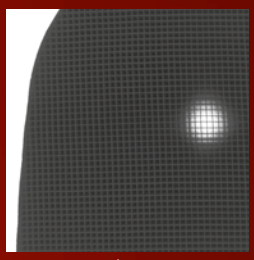

Entocentric lens

Fig. left: The honeycomb structure of the 100 mm deep ceramic body can be completely and thoroughly inspected.

Fig. right: In the perspective image, only a few honeycomb cross-sections can be seen.

MEASUREMENT OF DRILL HOLES IN A 10 mm THICK PERFORATED SHEET

Telecentric lens

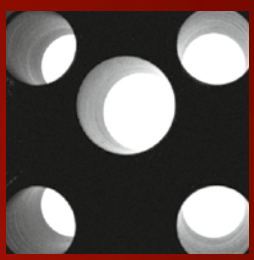

Entocentric lens

Fig. left: Hole diameters appear to be equally large and do not show a distorted perspective.

Fig. right: In the perspective image of the perforated sheet, the walls of the holes are visible. A measurement is therefore not possible.

TELECENTRIC LENSES

ENLARGING TELECENTRIC LENSES

... T10
... T24
... T42
... T43
... T45
... T51
... T80
... Microscope lenses

PROPERTIES

... Image scale from 0.7 to 10-fold magnification
... Object field between 0.4 x 0.3 mm² and 10.8 x 10.8 mm²
... Telecentric beam path on the object
... For use with matrix and line scan cameras up to a sensor diagonal/length of 21.4 mm
... High resolution and low-distortion

TIP

In case of very great enlargements, with transmitted light applications, diffraction effects can occur at the object edges. To minimise/prevent these occurrences, it is recommended to use blue telecentric lighting.

APPLICATION FIELDS

... Measuring/inspecting of very small, flat parts
... High detail resolution of small object fields (recognition of surface structures in the µm range)
... Measurement of vacuum pipette holes
... Inspection and measurement of high precision milled parts, miniature and microscopic injection-moulded parts

REDUCING TELECENTRIC LENSES

... T100
... T107
... T125
... T150
... T151/152
... T201
... T240
... T360

PROPERTIES

... Image scale from 0.07 to 0.7-fold magnification
... Object field of 6.6 x 4.9 mm² to 100 x 75 mm²
... For use with matrix and line scan cameras up to a sensor diagonal/length of 21.4 mm (1.2")
... Lens with long and short working distance for the same object field
... Adjustable aperture enables adaptation of resolution and depth of field
... Particularly precise in combination with telecentric lighting

APPLICATION FIELDS

... Measurement and inspection of objects which:
. Are located in different positions vis-à-vis the camera
. Could not be exactly positioned
... Control of deeper, more complex parts with holes, openings, raised areas, etc.
... Precise measurement of the outer contour of light-transmissive objects

VICOTAR®

TELECENTRIC WIDEFIELD LENSES

PROPERTIES

- ... Image scale from 0.03 to 0.08-fold magnification
- ... Object field between 77 x 58 mm² and 360 x 230 mm²
- ... Maximum image sensor diagonal 16 mm (1")
- ... Low weight with extremely large object field
- ... Most effective in combination with monochromatic lighting

APPLICATION FIELDS

- ... Large objects or a high quantity of objects to be controlled at one time
- ... Inspection of deeper objects with holes, openings, etc.
- ... Inspection of the honeycomb structure of catalytic converters

... TL250 ... TL371 ... TL380

TIP

In the detailed product overview table you will quickly find the right telecentric lens for your requirements.

http://www.vision-control.com/en/products-services/optics/product-overview/

ACCESSORIES

MICROSCOPE TUBES

- For use in cameras with C-mount connectors, in combination with microscope lenses

PSO90 SERIES

- Front-end unit for telecentric lenses and telecentric lighting for integration under confined environmental conditions
- Optical beam path is deflected by 90°.

LENS MOUNT

- For secure attachment of the telecentric lenses in the test stand or on the machine

FILTER

- For the focused filtering of certain light information
- To protect the lenses

SAFETY GLASSES AND POLARISING FILTER

- Protect the front lens against contamination and mechanical influence
- Suitable for all series

TELECENTRIC LIGHTS

- Is especially suitable for use in combination with telecentric lenses
- Application: High precision measurements, suppression of stray light on the outer contour of the test objects

ENTOCENTRIC LENSES

SERIES

... VCN
... VCG
... VCH
... VCR
... VCZ
... VCK
... RWO
... RWQ

APPLICATIONS

... Packaging industry
. Printed image control, presence control of packaged goods

... Glass industry
. Surface inspection of plate glass, inspecting the mouths of returnable bottles

... Automotive
. The presence of individual components in a complex assembly
. Read codes and characters

VCN

Lens series for typical machine vision tasks

... For cameras with image sensors up to 2/3"
... Minimum pixel size 6 µm
... Focal lengths of 3.5 to 100 mm
... Distance and aperture settings can be fixed

VCH

Lenses with high quality imaging optics

... For high resolution cameras up to 1"
... Minimum pixel size 4 µm
... Focal lengths of 4.8 to 50 mm
... Distance and aperture settings are adjustable

VCG

Lens series for typical machine vision tasks

... For cameras with image sensors up to 1.2"
... Focal lengths of 4.8 to 50 mm
... Distance and aperture settings are adjustable

VCR

High resolution lenses, smallest resolvable pixel pitch of 3.5 µm

... For cameras with image sensors up to 1.2"
... Minimum pixel size 3.5 µm
... Distance and aperture settings are adjustable

TIP

Focal length calculator
http://www.vision-control.com/en/products-services/optics/focal-length-calculator/

Use this to determine the focal length for entocentric lenses and the corresponding intermediate ring, if needed.

! The selection tables and focal length calculator provide initial assistance. If you have specific application scenarios, please contact our Support team: +49/0 3681-797420. To reliably select components in special borderline cases, a feasibility study is absolutely imperative. For this, our experienced Service staff are available to help you in our application lab.

VCZ

Zoom lens

... For cameras with image sensors up to 1.2"
... Adjustable focal length from 4.5 to 10 mm
... Distance and aperture settings are adjustable

VCK

Lenses with the smallest dimensions, low own weight (enables the use on moving machine parts)

... For cameras with image sensors up to 1/3"
... Focal lengths of 2.1 to 25 mm
... Fixed-focus lens with a fixed aperture, focusable by means of adapter

RWO

Lenses with a beam path deflected by 90°, for use under difficult installation conditions

... For cameras with image sensors up to 2/3"
... Fixed working distance
... Test areas from 2.1 x 2.1 mm² to 131 x 99 mm²
... Adjustable aperture
... Low distortion (<0.1%)

RWQ

Lenses with a beam path deflected by 90°, for use under difficult installation conditions

... For cameras with image sensors up to 1.2"
... Fixed working distance
... Test areas from 3.7 x 2.8 mm² to 226 x 226 mm²
... Adjustable aperture
... Low distortion (<0.1%)

ACCESSORIES

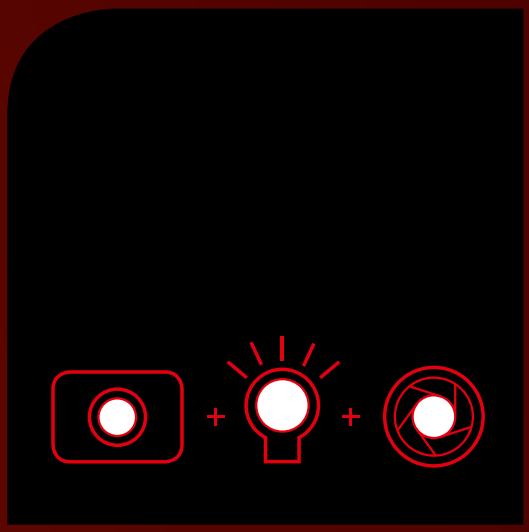
INTERMEDIATE RINGS

- The working distance and image scale of an entocentric lens can be adjusted by means of intermediate rings.
- By utilising intermediate rings it is also possible to use lenses at a lesser distance than the minimum object distance. The focal length calculator supports you in determining the exact size.

FILTER

- For the focused filtering of certain light information
- To protect the lenses

A dialogue on pioneering solutions



SERVICES

VISION ACADEMY

A UNIQUE POOL OF EXPERTISE

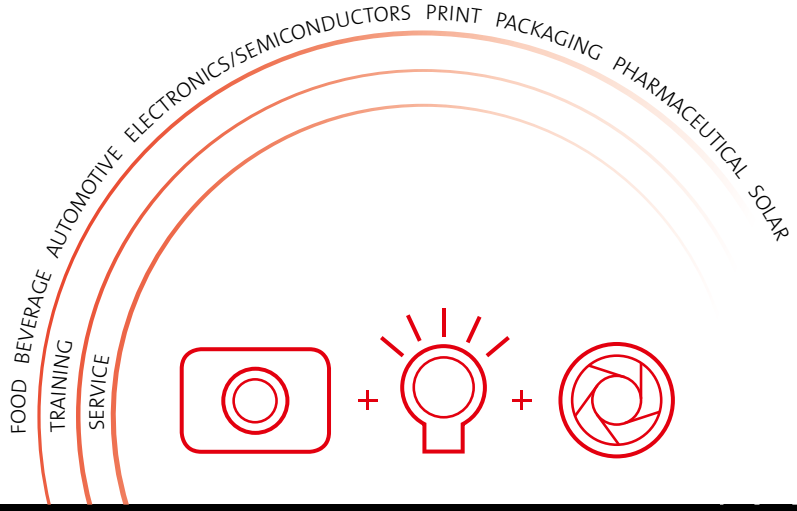
BASIC AND ADVANCED TRAINING, CONSULTING AND SERVICE

Our primary goal is to offer our customers a solution instead of a mere product. Such a solution should save time and make things easier. To achieve this, we are in close touch with our customers. Understanding the market and its requirements is indispensable for our product development.

Our staff has different scientific backgrounds which form a unique pool of expertise in imaging technology from research to development up to manufacturing.

This comprehensive knowledge influences the further development of our products and affects our search for new solutions in image processing. We continuously share our expertise with our customers: in trainings, consulting and daily service. Moreover, our Vision Academy – which is part of our group of companies – conveys manufacturer-independent know-how in practical trainings.

Reputable companies such as Manz, Philips, Bosch, Schaeffler, Wago and Krones belong to our standing customers, whom we have supported for many years.



SERVICES

FROM THE TASK TO THE SOLUTION

Eight to ten hours – that's approximately how much time it will take for you to design a solution for your imaging task with the help of your personal trainer. Our corresponding entry-level package "Training–Coaching–Start-Up" consists of the following:

PREPARATION You analyse your task together with our expert – your trainer. Keeping your special circumstances in mind, you then go through the first steps in the topic areas of illumination, optics and vision systems. You also receive insight into the structure and creation of test programmes with the operating software vcwin®.

IMPLEMENTATION From a comprehensive loan pool of imaging components, you select the suitable ones with the help of your trainer. Subsequently, you learn how to configure your imaging system by yourself. You create core parts of the test programme and acquire initial knowledge on how you can test the functionality of the overall system in your specific machine environment. After visually inspecting the installation location, your trainer makes recommendations on integration, handling and positioning the test object.

INTEGRATION Afterwards, you will already be in a position to integrate the entire system in your machinery or systems environment by yourself and perform optimisations, if required. Under realistic use conditions, you can now try out the test programme that you jointly created in the preparatory phase and put it into operation.

SUPPORT Finally, together with your trainer you will document the imaging system that you have created. Upon request, we also provide additional services, e.g. in-depth set-up or support services.

Vision & Control components and solutions represent the technological state-of-the-art and are suited for high quality imaging applications. In addition, we offer a broad range of services to support our customers in their daily business operations.

- ... Expert and solution-oriented consulting
- ... Professional analysis of the requirements
- ... Feasibility studies
- ... A thoroughly-equipped application laboratory
- ... A modular training programme and instruction on commissioning
- ... Personalised, on-site service

VISION ACADEMY

INDEPENDENT AND EFFECTIVE

Industrial imaging offers many possibilities, but at the same time requires specific capabilities, technology and knowledge. As a basic and advanced training institute, Vision Academy therefore offer comprehensive, manufacturer-independent expertise with practise-oriented user training courses and comprehensive consulting.

With the Vision Academy – a part of our group of companies – we offer you a partner who can systematically convey imaging know-how on an interdisciplinary basis – neutral, comprehensive and practise-oriented.

The course system is flexible and modular. Depending on your needs, level of knowledge and technical requirements, you can choose conduct courses at your site or individualised course packages at Vision Academy facilities. Furthermore the Academy offers personalised consulting, feasibility tests, laboratory usage and contacts to our networks.

All of the trainers come directly from the industry. They are seasoned staff members of imaging companies with a personal interest in instructing and providing basic and advanced training. In past years, they have contributed to expanding the expert knowledge in industrial imaging through hundreds of training courses, and thus to your success.

... Imaging consulting for newcomers
... Advice on component selection
... Advice on finding overall solutions
... Feasibility examinations and studies
... Solution and innovation workshops
... Assisted examinations in the Vision Academy's application lab

Ingmar Jahr, Vision Academy Training Manager

... Contact

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