

MACHINE VISION

AUTOMATION

System solutions – Functionality from one source

With the unique combination of consequent thinking in terms of customer advantage and intensive solution orientation, SCHUNK offers technically specialized products for the optimum implementation of diverse, individual applications. The addition of the SCHUNK SVS-VC to our extensive range of components and modules opens up new perspectives for your controlled production. Designed exactly for the requirements of automation systems, it exhibits the clearly defined basic features of SCHUNK system engineering: ruggedness, reliability, very simple operating concept and individual applicability.

The SCHUNK SVS-VC can be combined with all of our gripping, rotary and linear modules and can be integrated in modular installation technology and modular robotics.

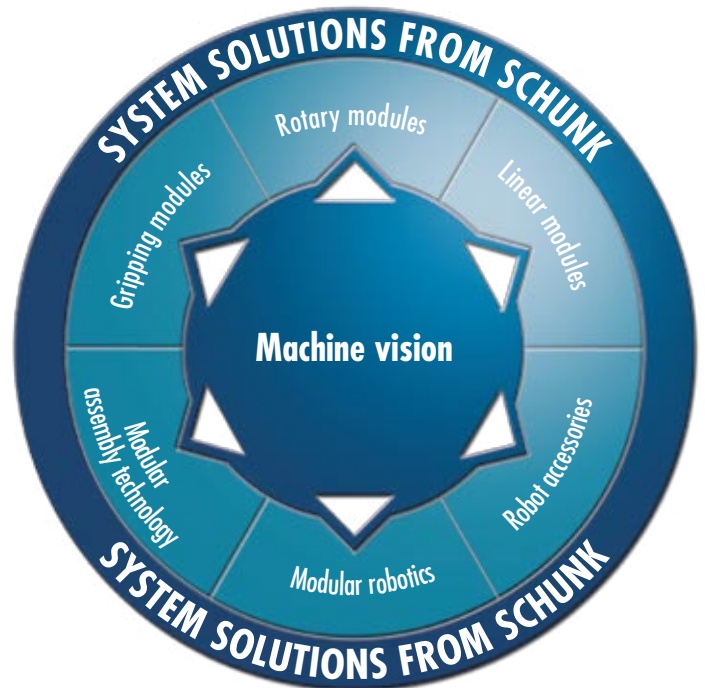
This means that SCHUNK offers you system solutions and complete function blocks from one source. From the component to the end solution. From engineering to component assembly.

Pick & place application for fast results

The SCHUNK SVS-VC, in combination with gripper applications, enables reliable gripping in pick & place applications, even of parts with widely differing rotational orientations or of flexible objects, such as cables and hoses.

In a special application, the SVS-VC is used in combination with additional automation modules for component assembly. The variously supplied parts spectrum is monitored and analyzed by means of image processing. The SVS-VC module transmits the commands reliably to a master controller (e.g. SPS), which controls a gripper that assembles the individual parts perfectly to form an assembly group.

The SVS-VC module achieves gripper positioning accuracy that would otherwise be possible only with high investment of time and money.



The SVS-VC all-in-one vision sensor

The new generation of machine vision in the automation sector

Uncompromisingly powerful, intelligent and easy to use. The machine vision sensor system SVS-VC rounds out SCHUNK's automation technology products, offering numerous new applications that can be implemented immediately.

All components of the SVS-VC all-in-one camera sensor are contained in a compact and robust, sealed industrial housing: camera, precision lens, super-bright LED lights, evaluation electronics and interfaces, in addition to powerful software.

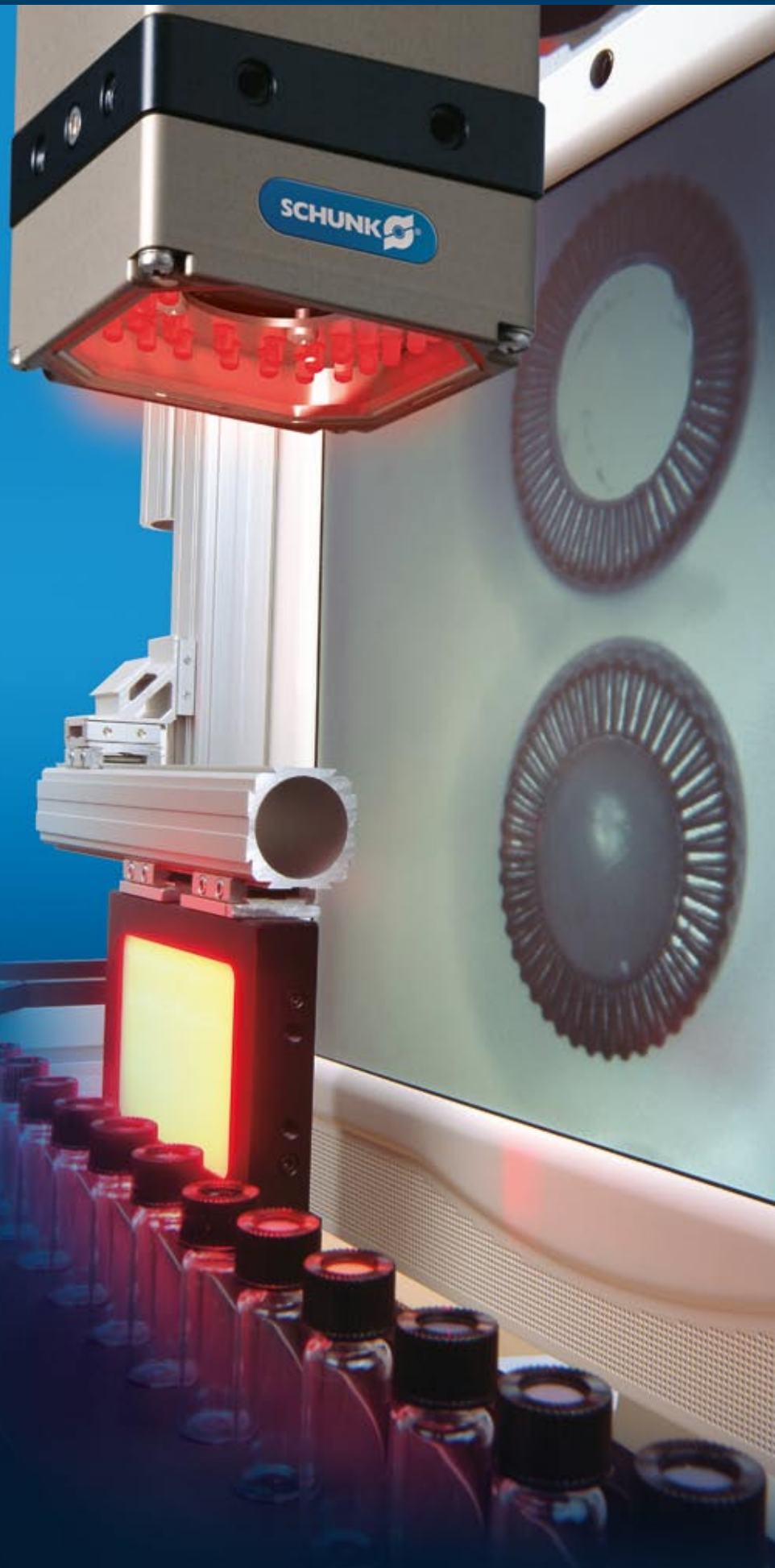
The SVS-VC camera sensor is capable of diverse complex image processing tasks, without additional peripheral equipment. The high-resolution image sensor enables two-dimensional analysis of 3-D objects in any position and rotational orientation.

- Completeness monitoring
- Presence monitoring
- Position monitoring / detection
- Orientation monitoring / detection
- Rotational orientation detection
- Brightness monitoring
- Pattern matching

Flexible in application and 100 % reliable

The SCHUNK SVS-VC is the flexible solution for a wide variety of sensor tasks in automated production processes.

Ease of operation, flexible adaptation of functions and high operational reliability and application security make the sensor ideal for the everyday demands of industry. All components are of high quality and are perfectly configured for optimum system performance. And the integrated software for object and position monitoring is a guarantee for 100 % controlled production.



Technology for optimum performance

Teaching instead of programming

The operation of the SVS-VC is optimized by teaching, which saves both time and effort!

The operations are designed for maximum user convenience. In the simplest scenario, it is sufficient to connect the sensor to a power supply for immediate teaching directly on the device with two buttons. The auto teach-in function automatically detects objects in the image and searches for significant features. Optimum parameters are automatically defined and compared during the object analysis. Afterwards, it is possible to automatically search for these objects. Position (x, y), rotational orientation and degree of consistency are determined and output for further processing.

For more complex tasks, software designed especially for object and positioning detection is available. The easy-to-use operation and the intuitive menu navigation based on a wizard principle ensure fast, step-by-step results within 10 minutes.



Reliable performance under difficult light conditions

SVS-VC is a compact machine vision unit with integrated high-performance LED lighting. The LED lighting is adjusted for maximum homogeneity and adapted for vignetting of the lens to support the effectiveness of the algorithms.

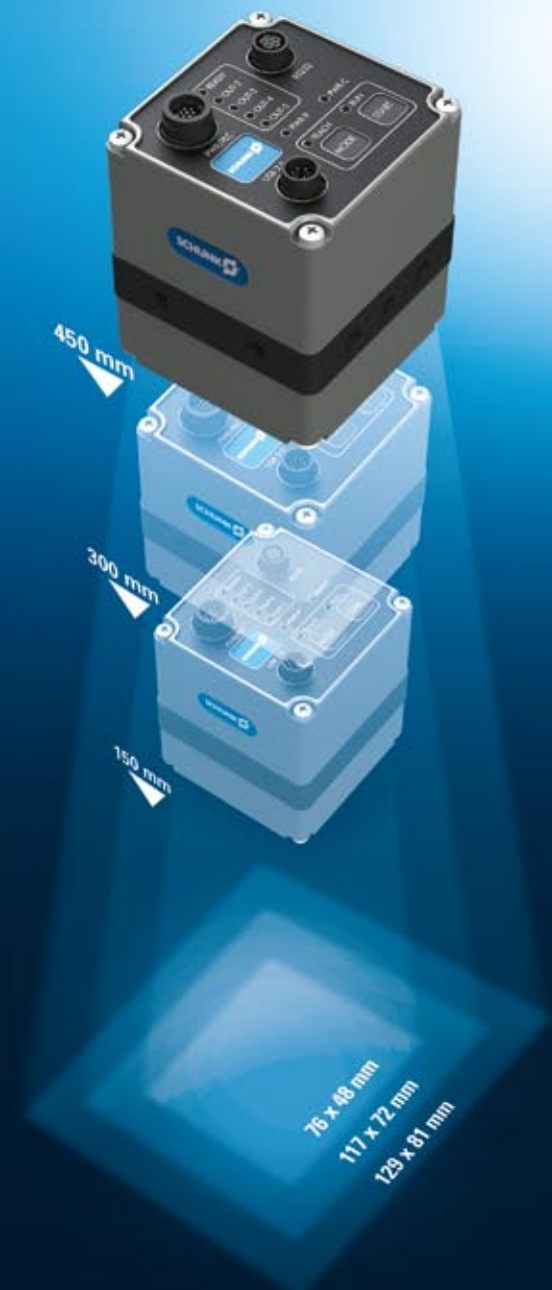
Depending on the application, the LEDs are available in red, blue or infrared. The SVS-VC image processor renders all object contours in gray scale images – even with minimum brightness contrast – in real time and with sub-pixel precision.

Your advantage:

- Reliable image processing function even under poor light conditions
- No additional or special lighting required
- Ease of operation with no complex parameterization

Reliable results with variable distance

The high resolution SVS-VC lens has an extremely low index of $< 2\%$. This even makes inspections on the image boundary possible. To prevent operator errors and to ensure interchangeability, the operating distance of the lens is set at a fixed value. Three lens model variants of the SVS-VC are available depending on the required operating distances and image field sizes. The lens is precision adjusted at the factory, exactly to the operating distance and the image sensor, to ensure optimum and reproducible results.



SCHUNK vision sensor – focused on your added value

All-in-one

- Integrated camera, precision lens, extremely efficient LED lighting, evaluation electronics
- vwin sensor software included
- Autonomous functionality without additional peripheral equipment
- Compact, robust industrial housing

Powerful

- Very high-speed inspections of up to 40 parts per second
- Digital signal processor from Analog Devices – optimized for image processing tasks and therefore as powerful as Pentium PCs with a clock rate of several GHz

Intelligent

Reliable performance

- Large-area image areas of up to 129 x 81 mm
- Pre-adjusted at factory to precision of +/- 20 pixels
- Very high resolution of 720 x 480 pixels
- High scan rate, 60 fps at full resolution
- Jitter-free image acquisition for moving processes
- Highly modern CMOS image detector from Micron for exact image quality
- Selectable, short to very long exposure times for matte and glossy parts

LED lighting

- Extremely bright due to high-performance LEDs
- Independent of external light sources, brightness is preset
- Switching is synchronous to image recording
- Long service life due to integrated temperature management
- Optional transmitted light operation possible
- Three illumination colors can be selected: red, blue and infrared
- Steady light and pulse operation are possible

Suitable for industrial use

- Wide-range voltage input from 20–36 VDC
- High protection class for housing: IP 67
- High electro-magnetic compatibility
- Scratchproof screen
- Temperature range 0–55 °C



Easy to use

User-friendly

- Easy teaching (auto teach-in) automatically detects objects and saves significant characteristics
- Results are visualized in the graphic user interface
- Step-by-step menu navigation based on wizard principle
- No image processing experience necessary
- Intuitive user interface
- Easy parameterization due to auto function for all commands (Tools) includes recommended exposure time through auto-shutter function
- Fast USB 2.0 interface to graphic user interface
- Interfaces to higher-ranking systems (e.g. SPS) via RS232 (serial) and one analog output (transmission of measuring results) and integrated, industrial I/O interfaces
- Serial transmission of the inspection results
- Easy installation due to factory pre-adjustment of lens, lighting and image detector, in addition to extensive mounting accessories
- Extremely short set-up times
- Interchangeable without subsequent teaching

Applications

Applications – as individual as the requirements

- As a "seeing gripper" – optical sensors for pick & place tasks for fixed-position and flexible objects (cables, hoses ...)
- Completeness and presence monitoring of mechanical components (e.g. pins, rings, nuts, screws, other metal and plastic parts)
- Pattern search (x, y, rotational orientation 360°, degree of consistency)
- Periodicity of objects is taken into account
- Assembly and characteristic monitoring
- Detection of broken edges
- Packing monitoring
- Sorting of defective parts
- Verification of molded parts
- Function inspection
- Fluid levels
- Closure and label position
- Print and symbol monitoring
- Display inspection
- Tracing of documentation for the purpose of consistent quality control

The inspection commands, object windows and search areas operate in the geometrical elements rectangle, ellipse and ellipse ring segment. All elements can be inspected in the rotational orientation as well.

Functions

SCHUNK vision sensor

- Contrast sensor
- Brightness sensor
- Position compensation
- Surface sensor
- Distance sensor
- Dot sensor
- Contour sensor
- Sample sensor
- Object sensor

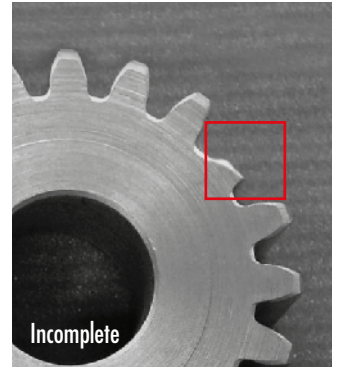
Areas of application

SCHUNK vision sensor

- Automation solutions especially in these sectors:
- Electronics
 - Automotive
 - Pharmaceuticals
 - Medicine
 - Packaging
 - Foods

Four function tools are available

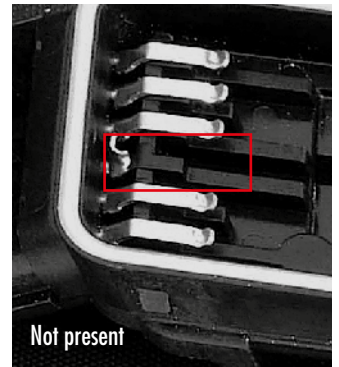
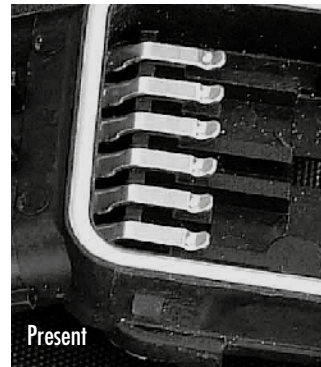
Pattern search



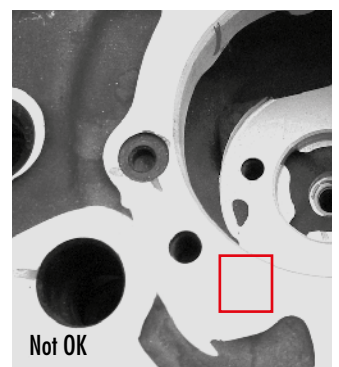
Gray scale analysis



Relative luminance



Pixel counting

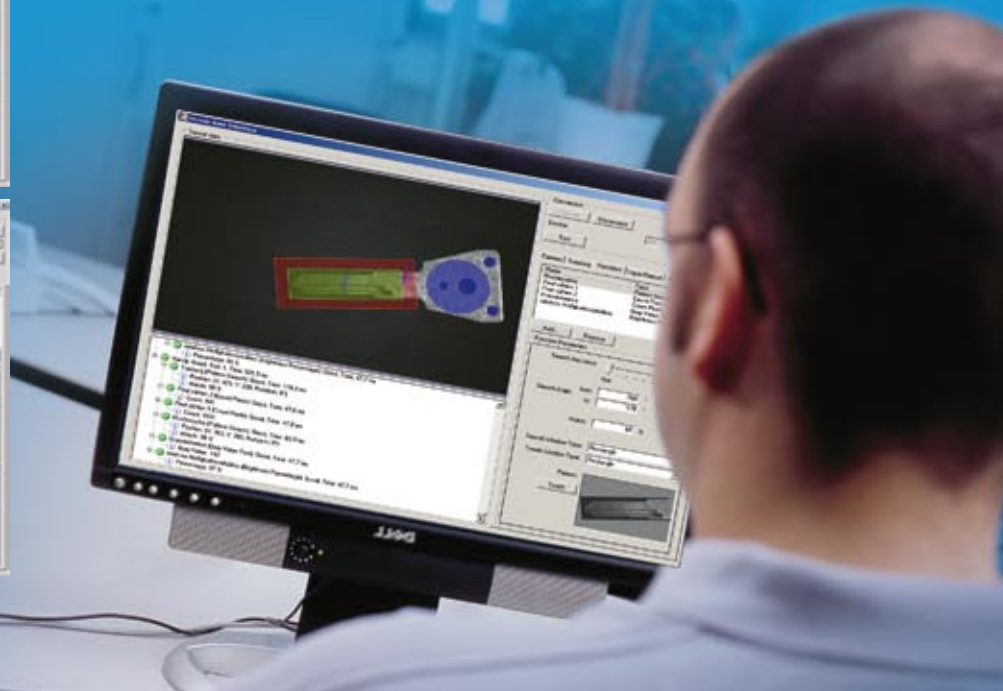
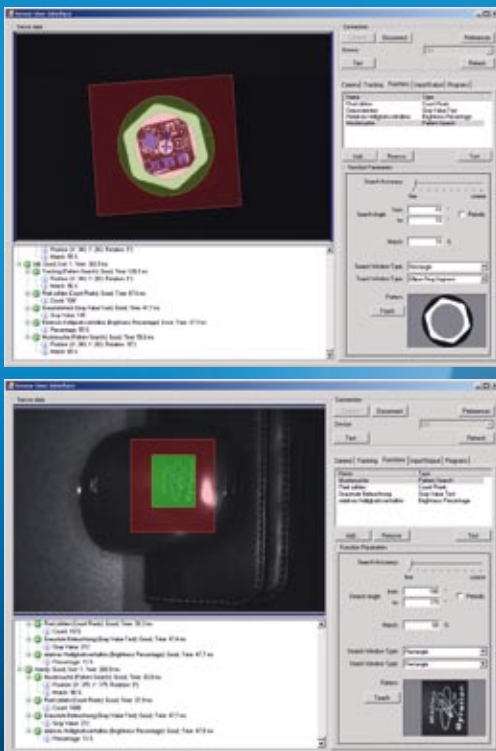


User-friendly – SVS-VC application software

A standardized graphic user interface makes it possible to conveniently enter configurations on a laptop or PC. Intuitive menu navigation allows the inexperienced user to navigate quickly in the operator control program, step-by-step based on the wizard principle.

With the SVS-VC, various additional functions are standard.

- Details of the processing time for each command enable optimization and time estimates during the integration phase
- Measured values for the statistics and images can be saved to the hard disk during the inspection process. Afterwards they can be opened and visualized on the graphical user interface
- The auto teach-in function features automatic brightness adjustment for optimized image capturing of glossy metal and also matte plastic parts
- Up to 100 different inspection functions can be parameterized for each application and saved in an inspection file
- About 100 different inspection files can be saved on the SVS-VC sensor and selected via RS232, digital input or parameterization interface



Interfaces:

The camera sensor can be parameterized via USB 2.0 for specific applications. Live images and diagnostic images can also be transmitted for documentation via this interface.

- USB 2.0 interface for configuration and operation of the sensor
- RS232 serial for transmission of measured values and images for measured data statistics and commissioning; baud rate configurable up to 115,200 kbit/s
- Analog output for transmission of measured values
- Digital I/O interfaces: 3 IN; 3 OUT

- Capability of job selection, triggering, teach-in, output of status messages and measured values in SCHUNK Motion Protocol (SMP)
- Short-circuit-proof due to digital insulators, therefore no slow optocouplers, very fast ca. 200 ns
- 4 different measuring results can be encoded (1 In = Trigger / 3 Out = 1 ready / waiting (configurable pulse time) and 4 results)
- Interface for the process for communication with external systems. (Industrial PCs, robot controller, SPS, μ C, etc.)
- Wide-range voltage input from 20 - 36 VDC
- Image transfers uncompressed in under 50 ms
- Robot-compatible cables optional

Technical data

SVS-VC camera sensor		SVS-VC 150	SVS-VC 300	SVS-VC 450	SVS-VC RH115
Working distance	[mm]	150	300	450	115
Image field size	[mm]	ca. 76 x 48	ca. 117 x 72	ca. 129 x 81	ca. 56.9 x 36.3
Dimensions	[mm]	64 x 64 x 79	64 x 64 x 79	64 x 64 x 79	27.5 x 30 x 30 Electronics: 64 x 64 x 45 connected with 0.7 m cable
Max. measuring accuracy	[mm]	0.1	0.15	0.2	0.08
Depth of focus	[mm]	-11, +13	-19, +22	-36, +43	-13, +21
LEDs		R, BL, IR	R, BL, IR	R, BL, IR	R, BL, IR
Weight	[g]	430	430	430	ca. 80 (head only)
Suitable for		PGN, PZN	PGN, PZN	PGN, PZN	PGN-plus 80 and higher

R red **BL** blue **IR** infrared **RH** remote head (camera head with remote electronic processor)

Processor: Analog Devices Blackfin 533 @ 500MHz
RAM: 64MB SDRAM
ROM: 8MB Flash
Interfaces: Communication USB 2.0, RS232, 3 Ins/3 Outs
(electrically isolated – inductive coupling),
1x analog OUT
Image detector: 1/3" Wide VGA – black/white – global shutter,
720 x 480, 60 fps maximal
Power supply: 20 V – 36 V

Power output: ca. 7 W
Operation: 2 buttons – debounced,
5 status LEDs, 2 power LEDs
Lighting: internal
Protection class: IP67
Mounting options: Photo thread 1/4", 2xM4 – to size
with centering ring 6h7 for each side
Operating temperature range: 0 – 55 °C



- ① Evaluation electronics
- ② 1/3"-WVGA-CMOS-Chip
- ③ Lens, low distortion
- ④ LED lighting, extremely homogeneous
- ⑤ Safety screen
- ⑥ Robust aluminum housing IP 67

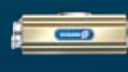
Automation performance requirements

Re-discover automation. With SCHUNK.

Design your technology. Dynamize your processes. Create added value. Wherever handling requires maximum precision and effectiveness, SCHUNK is your partner for the perfect implementation of these requirements. Our comprehensive product line makes us one of the most innovative market leaders in automation and clamping technology. In every sector. Worldwide. Take advantage of a complete line of automation products from one source. From standardized and individual gripping modules to complex function blocks. Re-discover SCHUNK. SCHUNK offers more.



GRIPPING MODULES



ROTARY MODULES



LINEAR MODULES



ROBOT ACCESSORIES