Leuze electronic

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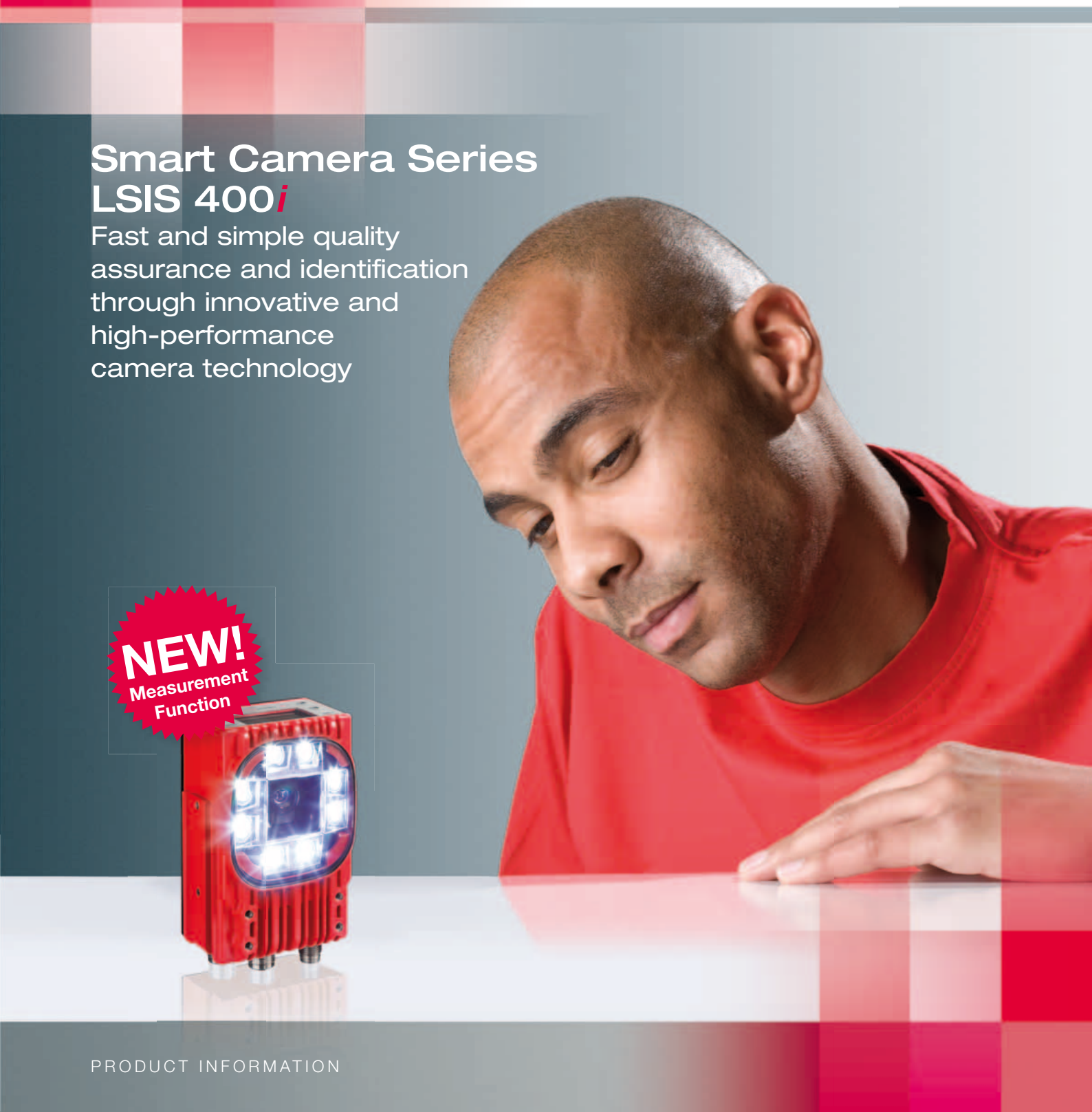
the sensor people

Smart Camera Series LSIS 400*i*

Fast and simple quality assurance and identification through innovative and high-performance camera technology



PRODUCT INFORMATION

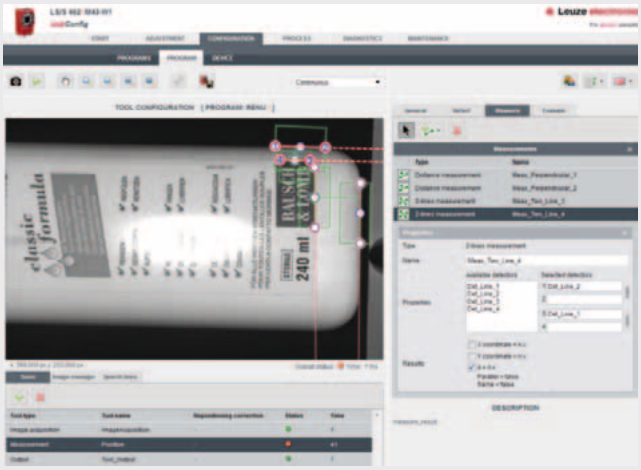
The LSIS 400*i* series – the smart camera of the next generation.

Its advantages in detail.

- **NEU LSIS 462i:** Measurement function facilitates efficient use in entirely new applications
- **NEU LSIS 462i:** Three functions in one device (BLOB analysis, code reading, measurement through edge scanning)
- **Cost-effective – all in one device:** illumination, image processing, image and program memory, display, display of the results, interfaces
- **Fast integration:** Operation via standard web browser, networking via Ethernet
- **Simple to operate:** Well-structured software with online help, integrated display with control panel
- **High availability:** No configuration software to be installed separately, independent of operating system, all stored in the device
- **Safe functioning:** High homogeneous illumination over the whole field of view through specially developed lenses
- **Flexible illumination for each application:** Pulsed or continuous operation, 4 individually switchable illumination segments
- **Different colours of the integrated illumination are available:** white, infrared or RGBW
- **No manual adjustment on lot changes:** Automated, motor-driven focus and illumination adjustment
- **No opening of the housing is required:** Digital adjustment of the illumination and focus position via software, protection against tampering and soiling
- **Low integration expenses:** All interfaces (Ethernet, RS 232, 8x digital I/O) are integrated, no interfacing units are necessary
- **Short start-up times:** Simple mounting with dovetail or threaded holes
- **Industrial – robust:** Safe with EMC, schock, vibrations, IP65/67, scratch resistant protective glass or plastic window, M 12 connection technology
- **All from a single source:** Fasteners, cable, adapter, connector, accessory lights and much more

Faster integration through webConfig

- Configuration directly via the web browser
- Faster and simpler access to the device via Ethernet interface
- No configuration software needs to be installed on the PC

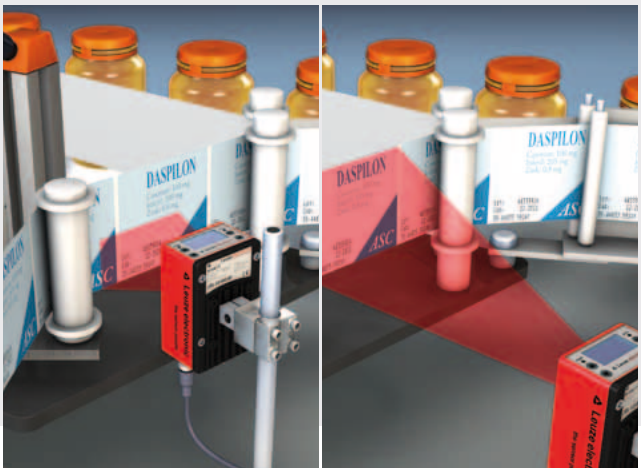


More flexible use through motor-driven focus adjustment

- On lot changes, the new test program is loaded with the focus setting for the specific camera distance. By means of the motor-driven focus adjustment, the device moves to the appropriate focus position, i.e. no manual focusing is necessary on the device
- The motor-driven focus adjustment is also an advantage if the installation position of the machine is very limited or if the smart camera was mounted in such a way that it cannot be accessed from the outside during normal operation

Better results through homogeneous illumination

- Intense and uniformly illuminated rectangular field of view, particularly homogeneous at a distance from 50 mm to 250 mm to the test object
- Compared with conventional LED illumination, the recorded image is considerably more homogenous and more detailed. This results in better, faster and more reliable image processing.

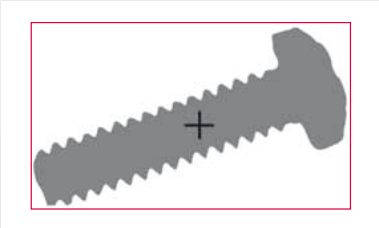


LSIS 412*i* – the camera with the BLOB analysis. The workhorse for image processing.

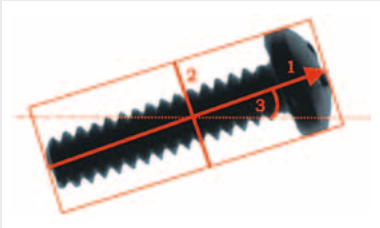
Intelligent, pixel-precise image processing.

BLOB stands for “Binary Large Object” and identifies a contiguous area of pixels whose light intensity lies between defined limit values. By setting BLOB features, individual objects or object groups can be reliably detected and differentiated on the basis of their geometric features – also when other processes already supply incorrect results. Typical applications of the BLOB analysis are the check for presence, completeness or the type, position and orientation detection.

Fundamental evaluation criteria of objects in the BLOB analysis



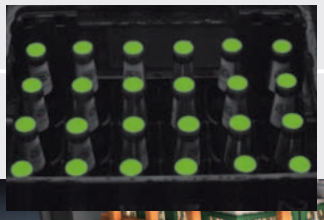
- **Area:** Summation of the pixels included in a BLOB; optional: Including possible holes within a BLOB
- **Perimeter:** Length in pixels of the outer contour of a BLOB
- **Shape factor:** Ratio between area and perimeter of the BLOB
- **Height / width:** Height and width of the smallest rectangle that encloses the BLOB with sides parallel to the X and Y axes
- **Center X / Y:** X and Y coordinates of the center of area of the BLOB



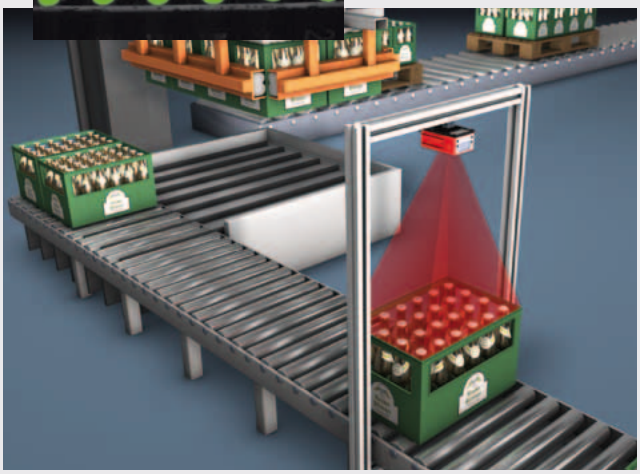
- **Length of the primary axis (1):** Length of the smallest rotated rectangle that encloses the BLOB
- **Length of the secondary axis (2):** Height of the smallest rotated rectangle that encloses the BLOB
- **Angle of the primary axis (3):** Orientation of the primary axis – measured towards the “heavy” side of the BLOB, relative to the X axis (0°... 360°)

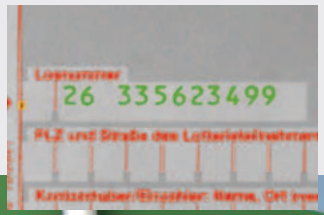
BLOB applications in practice.

With the LSIS 412i, you can utilize a camera system that is equipped with a powerful, software-based BLOB detection tool. Use it to simply and reliably perform a wide range of tasks of completeness and presence inspections or position detection.

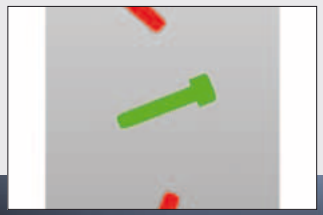


Completeness inspection

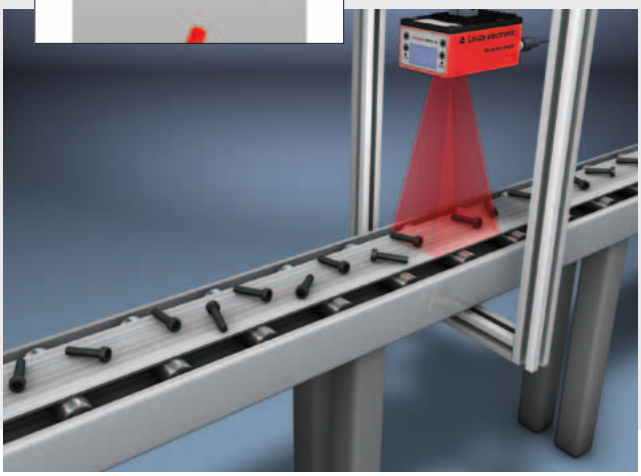




Presence inspection



Position and orientation



LSIS 422*i* – the code reader.
Reliable reading of 1D and 2D codes.

The best of two worlds.

Innovative camera technology and decades of know-how from the area of 1D code reading are united in the stationary LSIS 422i code reader. It reads 1D and 2D codes with absolute reliability, both printed and directly marked. And it does so omnidirectionally, statically, or with fast motion, codes with high or low contrast as well as inverted or reflected codes – even a reference code comparison is possible. The innovations of the LSIS 400i series, such as outstanding illumination and motor-driven focus adjustment assist here.

Important features:

- Reads the most important 1D and 2D codes
- Reading of printed, laser-etched or dot-peened codes
- Multiple codes can be read – up to 99 codes on each image
- Default setting can be used to read 90 % of all codes – optimization for specific code types or increasing the read performance is possible
- Display of the code content, configurable data output
- Evaluation of the code quality of printed codes on the basis of quality parameters for 1D and 2D codes
- Reference code comparison function
- Commissioning and operation via standard web browser – no software installation necessary

Code reading under industrial conditions.

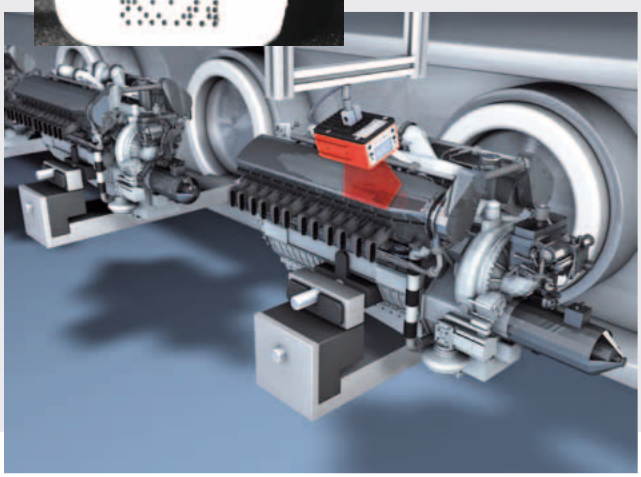
LSIS 422i offers maximum reading reliability with numerous applications:

- Automotive industry and its suppliers
- Circuit board manufacturing
- Semiconductor, photovoltaic and solar
- Packaging (Food, Beverage and Pharma)
- Conveyor/storage systems
- In general: traceability

Code verification

Laser-etched Data Matrix code

Dot-peened Data Matrix code



NEW! Measurement Function

LSIS 462*i* – the all-rounder.

Quality inspection and code reading in one device.

Particularly economic for many applications.

In addition to Blob analysis and code reading, the LSIS 462i smart camera offers the option of measuring distances and geometric shapes such as circles, lines and edges, both with high detection reliability and under a single user interface. With the edge scanning process, all detectable edges can be tested for completeness (edge counting). The LSIS 462i smart camera can also be used anywhere different labels have to be detected and evaluated at high speed. It reads printed and directly marked 1D/2D-codes, independent of contrast, with absolute reliability. The new version of our top product is the best and – thanks to its attractive price – the most efficient solution for many applications.

Important features:

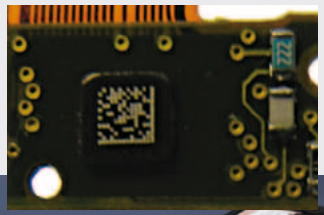
- **NEW:** The new measurement function in the LSIS 462i makes possible minimal tolerances and thereby reduces, e.g., the scrapping of good parts!
- **NEW:** Three functions in one device (BLOB analysis, code reading, measurement through edge scanning)
- Reliable detection of objects or object groups on the basis of geometric features
- Test for presence, completeness, type, position and orientation
- Position correction in X, Y and rotation (0…360°)
- Omnidirectional reading of the most important 1D and 2D codes with reference code comparison
- Reading of printed and directly marked codes, up to 99 codes on each image
- Evaluation of the code quality of printed codes
- Storage of maximum 100 check programs on the device
- Commissioning and operation via standard web browser – no software installation necessary

Score double points with a diverse range of applications.

The LSIS 462i is suitable for a variety of tasks in quality inspection and code reading, e.g.:

- Automotive industry and its suppliers
- Circuit board manufacturing
- Packaging (Food, Beverage and Pharma)
- Semiconductor, photovoltaic and solar

Presence inspection of caps and code reading



Components completeness and traceability

Measure the label position

Specifications of the LSIS 400*i* series.

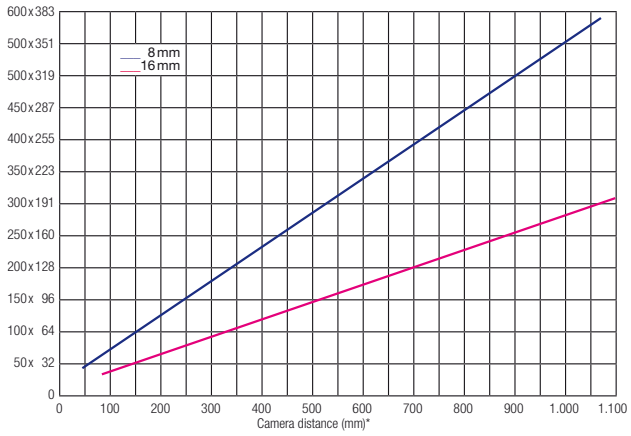
8 mm / 16 mm integrated lens

White light

RGBW

Infrared

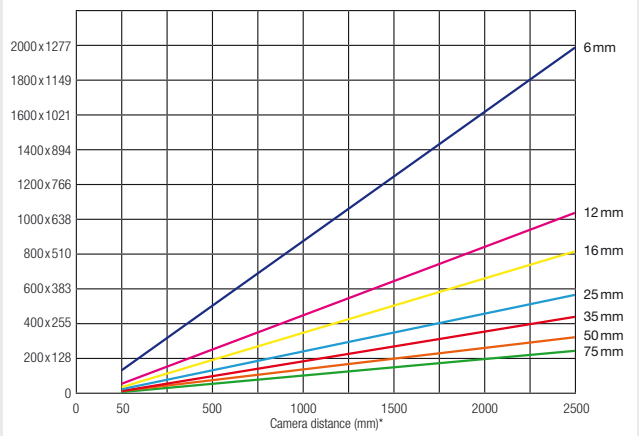
The diagram shows the field of view as a function of camera distance for focal lengths 8 mm and 16 mm. The camera distance is the distance between the front edge of the camera and the object.



* At a distance of 250 mm, particularly homogenous illumination of the field of view is ensured through the integrated illumination. Longer camera distances can also be realized with the system — if necessary with external illumination. For this purpose, simply extrapolate the axes of the diagram.

C-Mount lens

The diagram shows the field of view depending on the camera distance for C-mount lenses with different focal lengths which must be ordered as a separate accessory. The camera distance is the distance between the front edge of the camera and the object.



* Camera distances greater than 2500 mm can be realized. In this case, the diagram axis is extrapolated accordingly. The use of spacer rings may be necessary in the case of short camera distances.

Functions overview

Tasks	LSIS 412i	LSIS 422i	LSIS 462i
BLOB analysis			
Presence / completeness	X	–	X
Type detection	X	–	X
Position, angle	X	–	X
Repositioning (X, Y, 360°)	X	–	X
Up to 99 objects for each tool	X	–	X
Code reading			
1D codes	–	X	X
2D codes	–	X	X
Omnidirectional reading	–	X	X
Multiple codes reading (max. 99)	–	X	X
Reference code comparison	–	X	X
Quality parameters for printed 1D and 2D codes	–	X	X
Display of the read result	–	X	X
Measurement			
Point, line, distance, circle	–	–	X
Edge counting	–	–	X
Coordinate measurement	–	–	X
Additional Functions			
Integrated homogeneous LED illumination*	X	X	X
Motor-driven focus adjustment*	X	X	X
Software operation via standard web browser	X	X	X
Statistical information	X	X	X
Image memory	X	X	X
Result documentation	X	X	X
Program change (dig. I / O)	X	X	X
Multi-language display	X	X	X
Online help	X	X	X
Real-time clock	X	X	X
Process time display	X	X	X
User management	X	X	X
Memory capacity for max. 100 programs	X	X	X
Options			
Cable	O	O	O
Fastening material	O	O	O
External illuminations	O	O	O

* Not available for the C-Mount model.

Common technical data

Electrical data	
Operating voltage	18 … 30 V DC (PELV, Class 2)
Power consumption	Max. 10 W, C-Mount models max. 8 W
Process interface	RS 232, Ethernet 10/100 Mbit/s
Service interface	Ethernet 10/100 Mbit/s
Sw. inputs/outputs	8, freely configurable
Inputs	18 … 30 V DC
Outputs	max. 60 mA for each output, max. 100 mA total current
Optical data	
Image sensor	Global shutter CMOS
Number of pixels	752 x 480
Electronic shutter speeds	54 µs … 20 ms
Integrated LED illumination*	white, infrared or RGBW
Focal length	8 mm / 16 mm / C-Mount
Object distance	50 mm … ∞ / 75 mm … ∞ / n. a.
Mechanical data	
Protection class	IP 65 / 67
VDE safety class	III
Housing	Die-cast aluminum
Weight	500 g
Dimensions (L x W x H)	113 x 75 x 55 mm³ (standard device) 113 x 75 x 55 mm³ (C-Mount variant)
Environmental data	
Ambient temperature operation (storage)	0 °C … +45 °C (-20 °C … +70 °C)
Rel. air humidity (non-condensing)	max. 90 %
Laser class	LED Class 1 acc. to EN 60825-1:2003-10
Vibration	IEC 60068-2-6, test FC
Shock	IEC 60068-2-27, Test Ea
Continuous shock	IEC 60068-2-29, Test Eb
Electromagnetic compatibility	EN 61000-6-2, EN 61000-6-4 IEC 60068-2-27, Test Ea

Switching sensors
Optical sensors
Ultrasonic sensors
Fiber optic sensors
Inductive switches
Forked sensors
Light curtains
Special sensors

Measuring sensors
Distance sensors
Sensors for positioning
3D sensors
Light curtains
Forked sensors

Products for safety at work
Optoelectronic safety sensors
Safe locking devices and switches
Safe control components
Machine Safety Services

Identification
Bar code identification
2D-code identification
RF identification

Data transmission/ control components
MA modular interfacing units
Data transmission
Safe control components

Industrial image processing
Light-section sensors
Smart camera

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