Product overview

Sensors for factory automation

Strong performance on colored surfaces

FT 55-CM – Full-spectrum color sensor

Smart allrounder for color detection and assignment

The number of potential applications for the FT 55-CM is virtually unlimited. This includes precise differentiation of colors on shiny surfaces or the sorting and automatic assignment of colored objects. Due to this wide scope of performance, the sensor demonstrates outstanding ability in many sectors.

Contents

Generation 4.0 – future-oriented sensors from SensoPart

The basis for interaction with parent IT systems and compatible with Industry 4.0

How will intelligent production look in the future?

The answer is simple: it will be connected, communicative, digital, innovation-friendly as well as easy to install and to operate. And these are just some of its facets. Implementation requires sensors that can deliver information in real-time and monitor themselves. SensoPart groups these specifications under three key words: communication, innovation and usability.

![SENSOPART]

Generation 4.0

Communication

Innovation

Usability
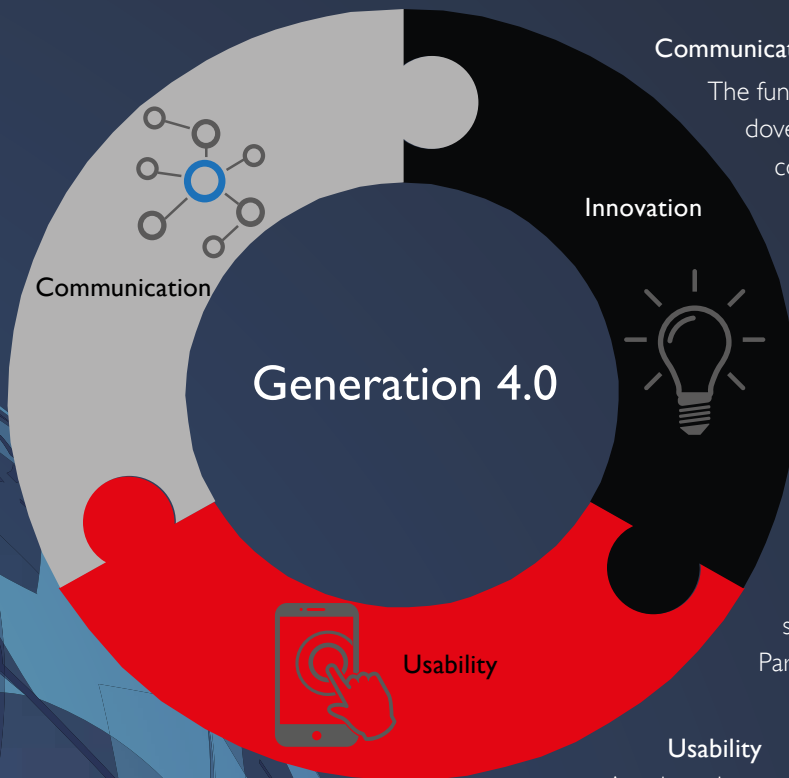
Communication

The fundamental concept of the fourth industrial revolution is the dovetailing of production with state-of-the-art information and communication technology. Sensors allowing two-way communication, i.e. they can send and also receive information, form the technical foundation. This enables access to data and parameters that were previously withheld from the control system, providing a basis for standardised communication.

Innovation

SensoPart's aim is to always be one step ahead, and to be able to offer our customers the most innovative product on the market. These include BlueLight sensors, as well as high-end sensors, such as the FT 55-CM color sensor. The world's smallest distance sensor is also a SensoPart innovation.

Usability

Another element in the implementation of Industry 4.0 concepts is the easy installation and usability of sensors. SensoPart has achieved this by equipping sensors with an extensive range of additional functions. One example is digital color value output, which makes it possible to distinguish any number of different colors. SensoVisualize – the standard software tool – enables parameter settings and the visualisation of process data.

Interconnected system architecture

Efficient, communicative, scalable

EtherNet/IP

Automated communication
When data storage is enabled, the master saves the settings and transfers them to the new sensor. All IO-Link sensors from SensoPart support this function.

PROFINET
EtherNet/IP

PROFINET
EtherNet/IP

Simple
Use of existing unshielded IO cables, up to 20 m in length for IO-Link sensors.

Cost-saving
Fast installation through simple, decentralised cabling. Less cables = less effort.

IO-Link

I / O

IO-Link

I / O

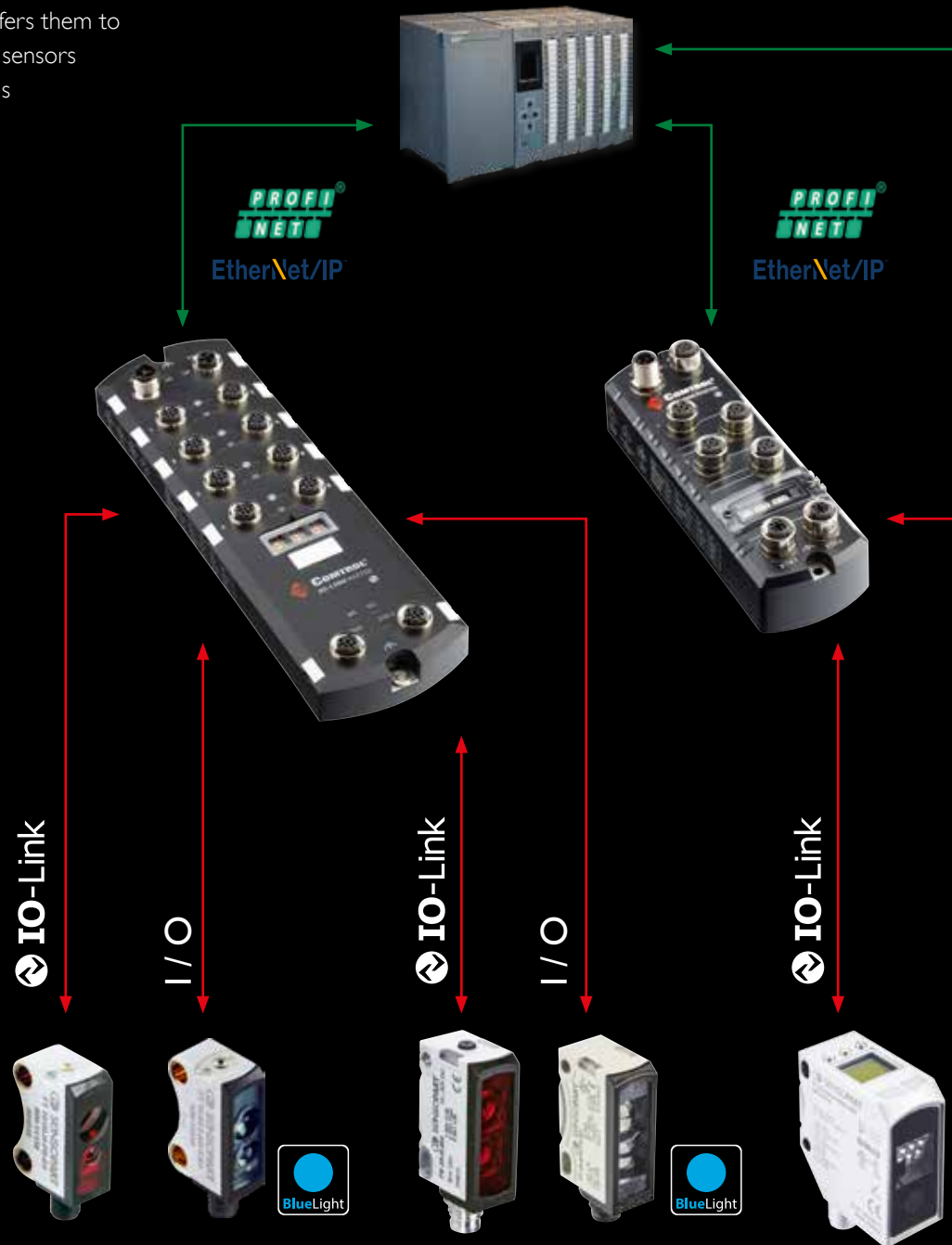**IO**-Link

Transparency
Two-way communication up to the lowest field level, allowing greater transparency. Availability of a large amount of relevant data, e.g. for condition monitoring.

BlueLight

BlueLight

Versatility
Combined use of IO-Link and binary sensors is easily possible on the IO-Link Master. All IO-Link sensors from Senso-Part can also be operated in standard binary mode.

Functionality
Example FT55-CM: output of color values via IO-Link, additional functions (e.g. smart functions) are directly in the sensor.

Robot Controller

PROFI NET®

EtherNet/IP™

IO-Link

IO-Link

■■ made in Germany

e.g. distance [mm]

Precision
The digital transfer of previously analogue measurement values avoids cable-related transmission errors and the general limitations of analogue measuring technology. This enables considerably higher transmission accuracy.

Compatibility
The cascadability of the IO-Link Master allows combinations with other Profinet / EthernetIP devices. For example, in robotics applications, the X and Y value and also rotation can be detected with the VISOR® and the Z value with a distance sensor. This architecture also reduces cabling work.

FT 55-CM color sensor – smart performance

Compact sensor family for reliable color detection or assignment

made in Germany
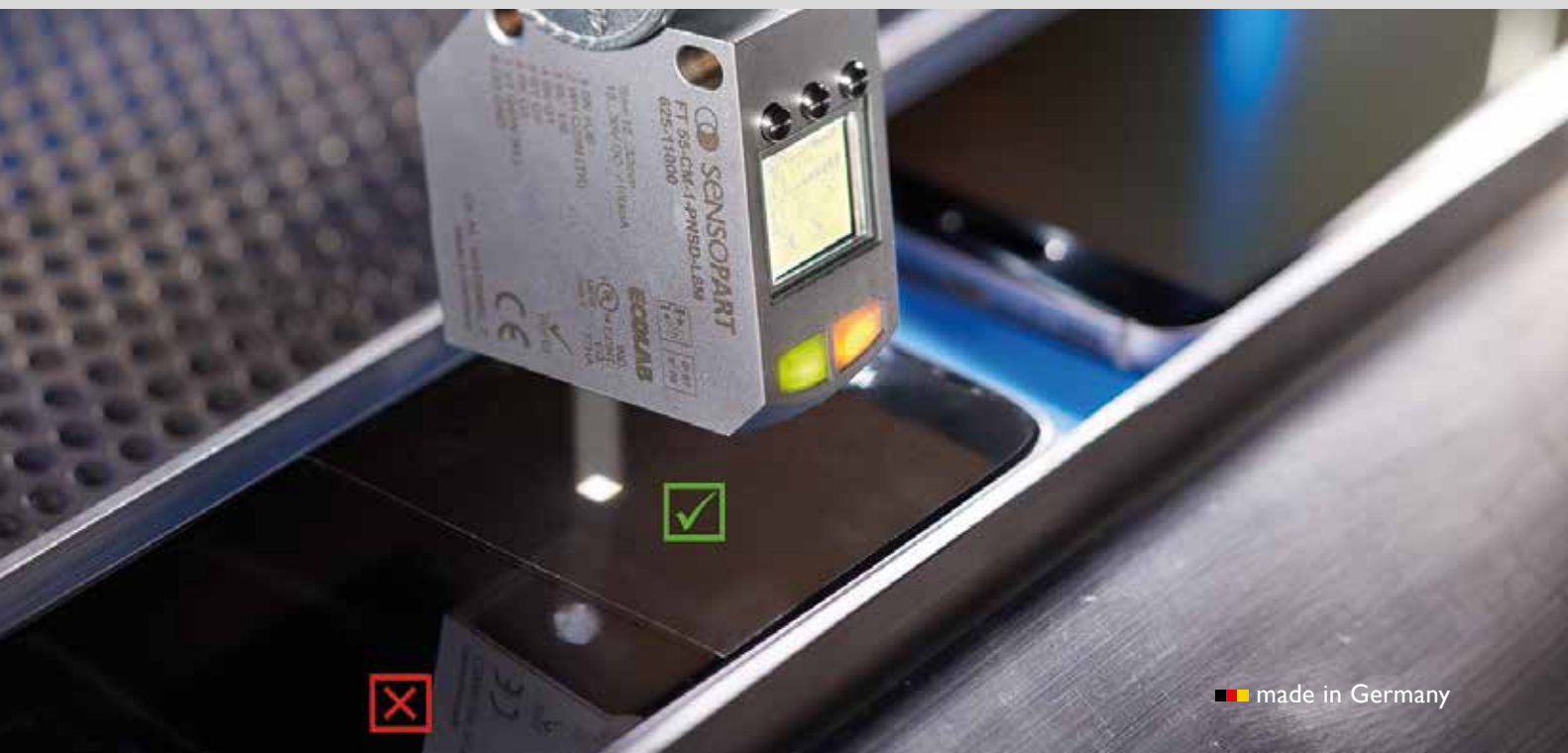
The new compact color sensor from SensoPart is a true allrounder:

The FT 55-CM color sensor offers a scope of functions and level of user-comfort that are unsurpassed in its performance class. The wide operating range – independent of distance – combined with the flexible color detection feature gives a diverse range of applications. The large integrated **LCD display** and **remote** configuration through **IO-Link** or the associated sensor software set new standards in ease of use and connectivity. This unique combination of characteristics makes the sensor ideally suited for challenging color detection and sorting tasks, for example in machine construction and in the automotive, plastics, pharmaceutical or packaging industries.

TYPICAL FT 55-CM

- Stable processes thanks to intelligent color detection regardless of distance
- Economical solutions through up to twelve storable colors or jobs
- Dependable switching behaviour through reliable glare suppression (depending on model)
- Intuitive sensor setup with integrated LCD display
- Application customisation through digital color value output using IO-Link
- Stable processes with non-flat objects thanks to trigger mode

IO-Link   ECOLAB   IP 69   c UL us LISTED   CE

Inspection of car fuses

Inspection of shiny blister packs

Distinguishing between polished and non-polished metal surfaces; foil detection on shiny surfaces

Inspection of lids or labels

Well-equipped with FT 55-CM:

The number of potential applications for the FT 55-CM is virtually unlimited. This includes precise differentiation of colors on shiny surfaces or the sorting and automatic assignment of colored objects. Due to this wide scope of performance, the sensor demonstrates outstanding ability in many sectors.

Color detection of packaging elements

Examples of sectors and applications:

- Color differentiation of plastic and leather components (automotive industry)

- Color check of packaging elements, e.g. glue spots (packaging industry)

- Differentiation of contents based on different caps (pharmaceutics industry)

- Sorting of plastic or glass bottles (food and beverage industry)

- Detection of colored markings on metal surfaces (metal processing)

FT 55-RLAM – The allrounder for distance measurement

Compact sensors for precision measuring tasks and reliable object detection
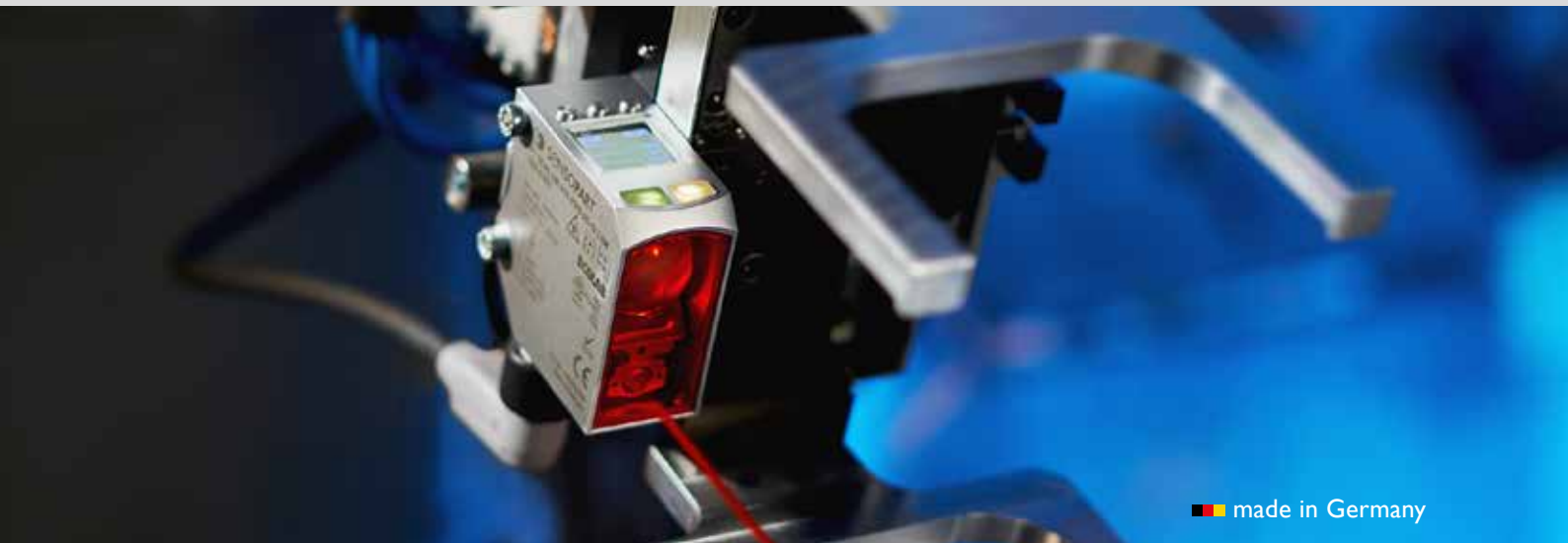
made in Germany

A universal allrounder:

The FT 55-RLAM reliably detects surfaces from black to shiny. Offering extensive connectivity, the triangulation sensor is equipped with an analogue output, two switching outputs, an **IO-Link** interface and an optional RS485 interface. The laser class 1 sensor comes with an innovative and user-friendly operating concept including a large LCD display, unusual in this performance category.

TYPICAL FT 55-RLAM

- Stable processes thanks to excellent sensor qualities across the entire operating range
    - Operating range up to 600 mm / 1000 mm
    - Repeatability ≤ 40 µm / ≤ 100 µm
    - Linearity ± 0.6 mm / ± 1.5 mm
    - Resolution 30 µm / 50 µm

- IO-Link – a future-proof interface that meets the demands of Industry 4.0
- Laser class 1 – for optimum security
- Simple and fast setup using the intuitive LCD display
- Robust metal housing – sensor durability even in challenging processes
- Thickness or parallel differential measurement in master-slave mode

IO-Link ECOLAB IP69 c UL us LISTED C E

Utmost precision for diverse applications

This unique combination of characteristics makes the FT 55-RLAM sensor ideally suited for diverse sectors and applications, for example precise positioning in robotics tasks, measuring coil diameters or monitoring the tension of web materials. Thanks to the master-slave function, the sensor can also be used for width or thickness measurements. One sensor – countless applications!

Determining the exact position of parts on an assembly line

Determining the position of a package so that it can be gripped by a robotic arm

Checking if injection moulding tools are empty from a long distance

Master-slave mode for measuring material thickness or detecting a double feed

Examples of sectors and applications:

- Determining the position of car body parts to be mounted (automotive industry)
- Determining the position of parts to be gripped (robotics)
- Monitoring the diameter of web material (packaging industry)
- Determining the diameter of metal coils (metal processing)

BlueLight sensors from the F 10, F 25 and F 55 series.

Reliable identification of objects that are difficult to detect

■■■ made in Germany

Developed specifically for recognising objects that are difficult to detect, **BlueLight** sensors are true allrounders. The BlueLight series offers much greater detection efficiency in special applications – even with very dark or highly transparent objects. Reflective surfaces are no longer a problem!

Increased detection efficiency is achieved by the higher intensity of blue light and by the varying interaction of different light colors with the surface of the target object. Short-wave blue light does not penetrate as deeply into the target object as red light and a greater proportion is therefore reflected. This can be a decisive feature when detecting poorly reflective transparent objects.

TYPICAL BLUELIGHT

- Stable process thanks to reliable detection of highly transparent or strongly light-absorbing objects

- Reliable detection even at angles of almost 90° (e.g. with round objects)

- Absolute background suppression using SensoPart BGS technology – critical background situations are no longer an issue

- Adjustable background suppression

- Complete portfolio:
    - BlueLight sensors in three different sizes
    - Subminiature, miniature and compact housing

ECOLAB IP 69 c (UL) us LISTED C E

BlueLight

SensoPart BlueLight sensors are also equipped with a high-precision optical concept tailored specifically to blue light, a sophisticated electrical design and SensoPart receiver technology with the best background suppression on the market. A combination of the latest algorithms and SensoPart BlueLight technology opens up completely new possibilities in the detection of 'difficult' objects.
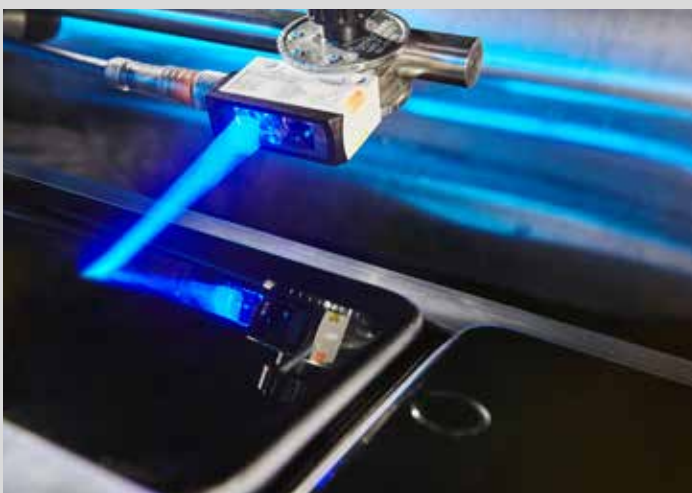

In subminiature housing
Measuring just 21.1 x 14.6 x 8 mm, the F 10 BlueLight is perfect for installation in confined spaces.

Transparent objects become visible
No complex installation of reflectors, no background reflections. Thanks to SensoPart BlueLight technology, transparent objects are reliably detected.

Exceptionally flexible
Even extreme angles of view are no problem for BlueLight sensors.

Examples of sectors and applications:

• Detection of metal parts and black plastic components (automotive industry)

• Presence of bottles or dark plastic lids (beverage industry)

• Detection of transparent film / containers / labels / blister packs (packaging industry)

• Presence of transparent test tubes / syringes / pipette tips (medical technology / pharmaceuticals)

• Presence and positioning of wafers (solar industry)

# FT 10-RLA – The smallest optical distance sensor in the world

Subminiature distance sensor for precision measurement tasks in confined spaces

made in Germany

When things get too cramped:

The **FT 10-RLA** demonstrates outstanding ability, even in extremely cramped installation conditions. As the smallest optical distance sensor in the world, it is ideally suited to challenging measurement tasks, e.g. during assembly of semi-conductor devices or in robotics applications.

8 mm   14.6 mm

21.1 mm
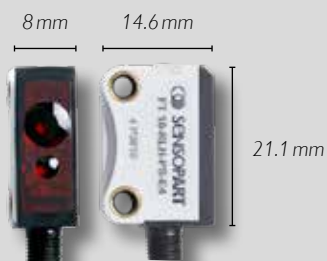
Small but powerful
Measuring just 21.1 x 14.6 x 8 mm in size and only 10 grammes in weight, it is scarcely larger than the tip of your finger – and therefore ideal for cramped conditions.

TYPICAL FT 10-RLA

- Minimum weight, ideal for robotics applications
- Also suited to smallest installation space thanks to minimal dimensions
- Output of measured values via IO-Link
- Excellent sensor characteristics with repeat accuracy and linearity
- Measuring range 10 to 70 mm
- Laser class 1 for optimum eye safety

IO-Link   ECOLAB   IP67   c UL us LISTED   CE
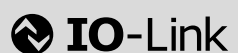
Small sensor with big performance

- Excellent repeat accuracy and linearity. Ideal for challenging applications.
- With a blind zone of just 10 mm, nothing escapes the sensor!
- Can also be used in cramped conditions; ideal alternative to fibre-optic cables.
- Digital output of measured values via IO-Link – equipped for the future!

Checking accuracy of installation or presence of components

Detection of double layers on printed-circuit boards, or checking the height and presence of components

Distance measurement in robotics applications directly from the gripper

Examples of sectors and applications:

- Robotics, e.g. distance measurement on gripper
- Electronics production, e.g. double layer control on printed circuit boards or height check of components
- Assembly and handling technology, e.g. for checking accuracy of installation

IO-Link @ SensoPart

Utmost process security thanks to smart sensor technology

made in Germany
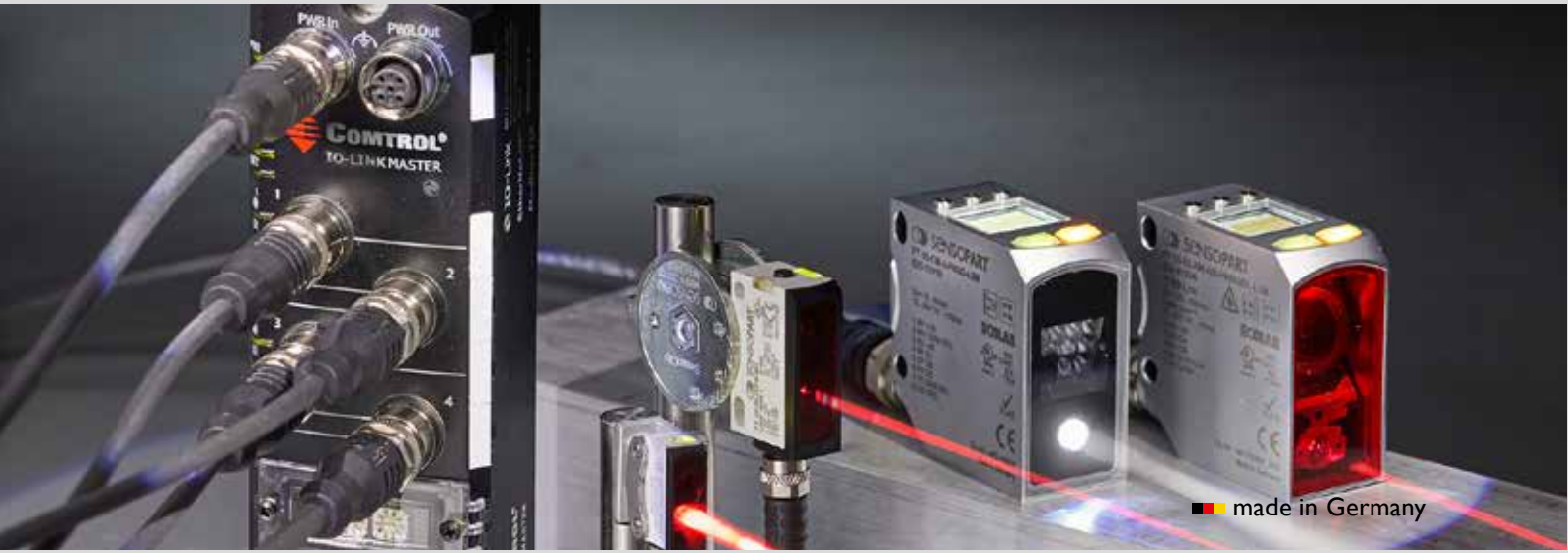
Absolute adjustable switching point

- Precise setting of switching points and measuring areas in mm, directly on the PC

- Fast and easy set-up as sensors can be pre-configured directly with information from the installation diagram

- High precision settings thanks to factory-calibrated switching points

- Applies to all measuring and BGS-IO-Link sensors from SensoPart

Output of RGB color values

- Output of RGB values with color sensors via process data

- Virtually any number of colors can be detected via the control system

- Applies to the color sensor FT 55-CM

Modern sensors are not just distinguished by high-performance hardware but also by a sophisticated software, which can at last exploit the full potential of the sensors' technical characteristics. These functions can solve common tasks with absolute process reliability or open up new fields of application.
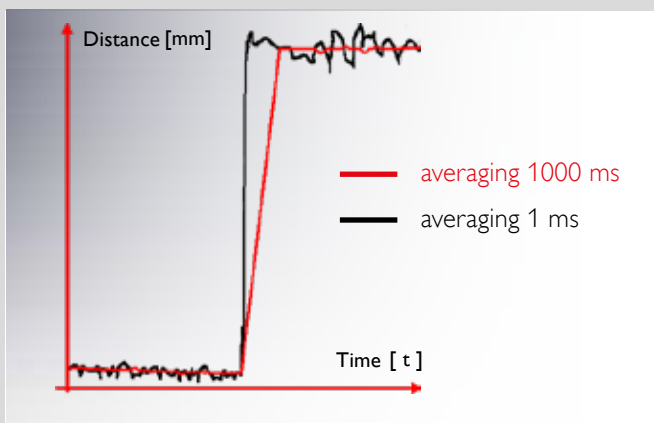
Adjustable mean value filter

- Arithmetic mean value for smoothing signal path
- Reduced signal noise and improved repeatability
- For slow processes with high precision demands, a high mean value filter can be set and repeatability improved
- Applies to all measuring IO-Link sensors from SensoPart

Signal quality

- Cyclic or acyclic output of signal quality
- Immediate feedback for correct sensor alignment
- Detection of contamination on sensor and early information to service team. This reduces downtime and increases productivity
- Applies to all measuring and BGS-IO-Link sensors from SensoPart
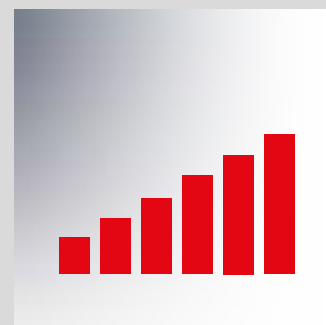
SensoVisualize – Software for parameter settings & visualisation

Quick and intuitive to use


■■ made in Germany

SensoVisualize is a software that can be used to set parameters on sensors and visualise process data, and can be utilised with all sensors with an integrated IO-Link interface. The interface is designed so that functions are read from the device description file (IODD). For example, switching points can be set centrally without having to carry out adjustments on the sensor itself.

TYPICAL SENSOVISUALIZE

- Software tool for sensor parameter settings and the visualisation of process data over time
- Touch control possible
- Creation and management of jobs, e.g. for batch changes

IO-Link

Smart functions
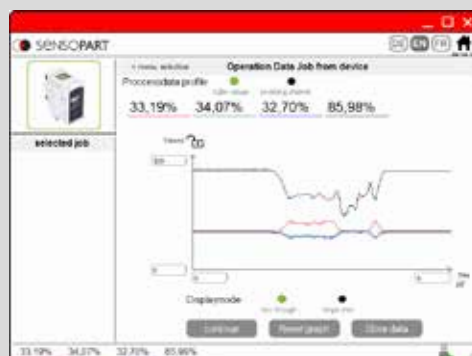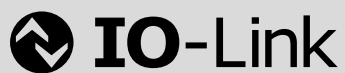
Stable processes through intelligent sensors
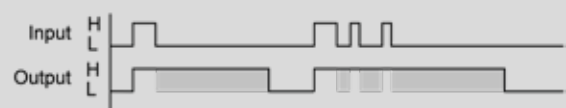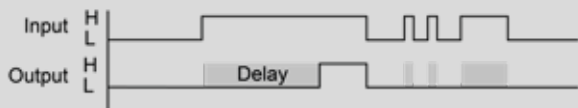
Delay functions – stable detection even with difficult objects and external influence

- When detecting objects through scanning, faulty switching can be caused by interfering particles such as sparks, sawdust or dust particles.

- A start-up delay ignores these interferences and only switches when an adjustable time signal X is received.

- A switch-off delay suppresses, for example, the glare from a shiny object – and emits a stable switching signal.

Counter – counting objects

- The counter function is often used with secondary packaging.

- The sensor only switches once all of the parts have been inserted.

Our sensor series F 10, F 25 and F 55

The right sensor for every application.

Optimally equipped

Switching and measuring sensors are the standard solution in industrial automation. At SensoPart you will find the right sensor for virtually every imaginable application: our product portfolio offers a comprehensive choice of different sizes, scanning ranges and operating principles.

The special characteristics and excellent performance data of our products speak for themselves – and you will undoubtedly find the right sensor for your application.

Discover an expansive range

- From the smallest sensors in subminiature format for cramped installation conditions to compact sensors for long scanning ranges

- Outstanding performance data, high reliability and solid workmanship across all form factors

- Special versions available for individual applications

made in Germany

*SensoPart sensors from the **F 10** series in LED and laser versions form one of the most comprehensive series of subminiature sensors on the market. The laser sensors with precise background suppression, adjustable via teach-in, are unparalleled.*

*The **F25** sensor family is extremely diverse – from the LED photo-electric through-beam sensor or the diffuse laser sensor with adjustable background suppression to color and distance sensors, it offers everything a user requires.*

*The products from the **F 55** series combine excellent performance data with a robust housing design and numerous user-friendly details. They guarantee reliable detection using a focused laser light or LEDs, as well as precise background suppression.*

F 10 – family of sub-miniature sensors

Small size, big performance

■ made in Germany

The right sensor for every application:

In many applications there is simply not enough room for conventional sensors. But there is for F 10: it fits in almost every nook and cranny. Whether used in handling and positioning applications, in the production of solar cells or in the assembly of semi-conductor components - F 10 can achieve top performances even when installed in confined spaces.

8 mm   14.6 mm

21.1 mm
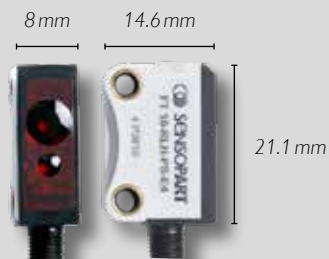
A tiny power package
The light-weight photoelectric diffuse sensor with BGS is 21.1 x 14.6 x 8 mm in size and weighs just 3 grammes. It thus even fits on a robotic gripper where it is literally no burden.

TYPICAL F 10

- Sub-miniature sensor for installation in the smallest of spaces and in moving machine parts

- The world's smallest laser sensor with background suppression, adjustable via teach-in

- Sensors as LED or laser versions

- F 10 BlueLight: specially designed for scanning solar wafers and strongly light-absorbing objects

- User-friendly set-up via electronic teach-in key or control line

- Well thought-out mounting accessories for rapid and simple integration

Blue light in the smallest space
*SensoPart's innovative BlueLight techno-logy is also available in the smallest sensor format, the **F 10**. Thanks to its compact dimensions, the **F 10 Blue-Light** is also suited for cramped installa-tion conditions.*

Consistent precision
*The **F 10** sensors with **background suppression** can resolve a change in distance (ob-ject displacement) of 0.25 mm in the switching point – a measure enabling utmost positioning accuracy regardless of the object's color or surface properties.*

The smart alternative
Instead of using a sender and a receiver as with a fibre-optic system, the photo-electric diffuse sensors of the F 10 family do not require a counterpart – and of-fer a space-saving solution that is easy to install.

A lightweight miniature
Miniature in size and extremely light in weight, the sensors from the F 10 series are tailor-made for use in extremely confined spaces or even on moving machine parts, for example in seamlessly integrated production machines or handling and assembly systems.

F 10 – Product overview			
Article	Type of light	Adjustment	Scanning distance/range
Photoelectric diffuse sensors with background suppression			
FT 10-RLH	Laser	Teach-in	70 mm
FT 10-B-RLF	Laser	Fixed focus	15 mm / 30 mm
FT 10-RH	LED	Teach-in	70 mm
FT 10-RF	LED	Fixed focus	15 mm / 30 mm / 50 mm
FT 10-BF	LED, blue	Fixed focus	30 mm / 50 mm

F 10 – Product overview			
Article	Type of light	Adjustment	Scanning distance/range
Photoelectric retro-reflective sensors			
FR 10-RL	Laser	Teach-in	3 m
FR 10-R	LED	Teach-in	1,6 m
Photoelectric through-beam sensors			
FS/FE 10-RL	Laser	Teach-in	4 m
FS 10-RL/FE 10-RL	Laser	Teach-in	4 m
Distance sensor			
FT 10-RLA	Laser	Teach-in	70 mm

F 25 – A miniature sensor family of a new generation

The best in the category

◼◼ made in Germany
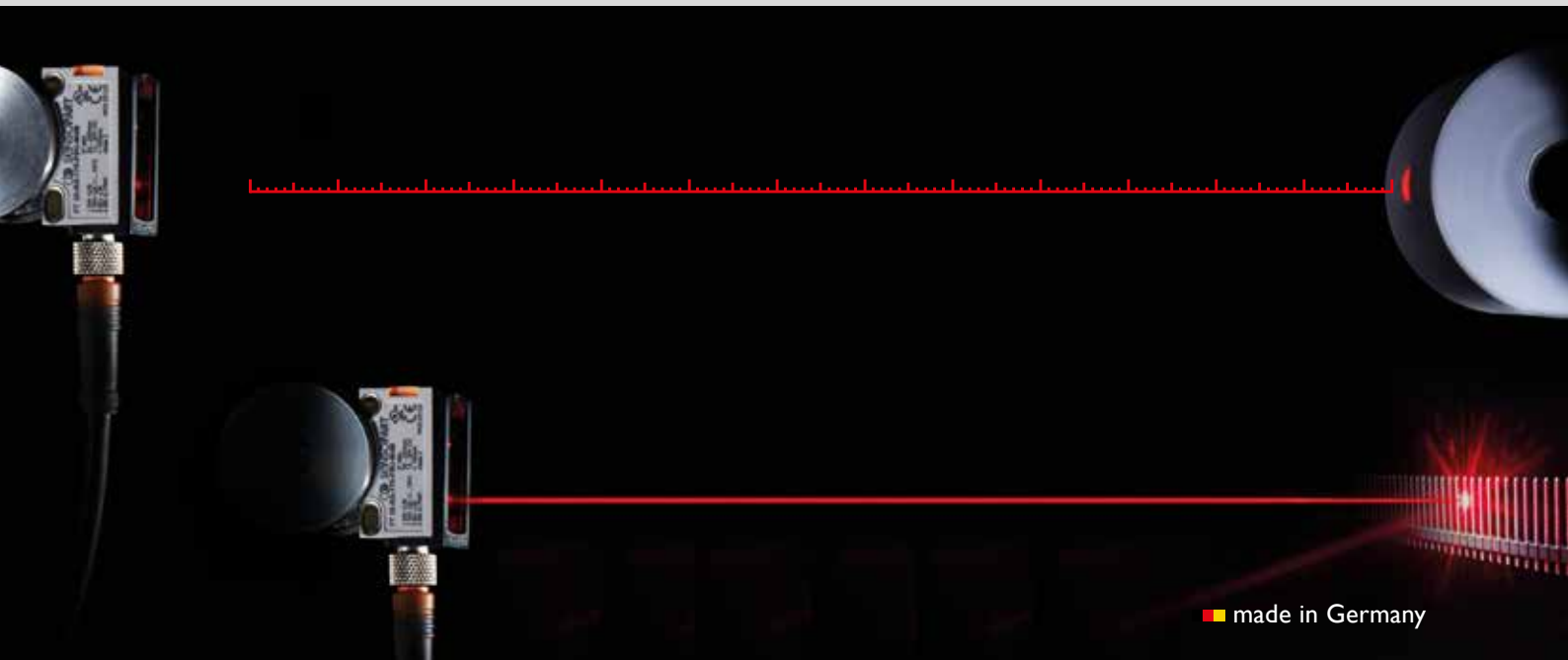
Countless objects, one sensor family:
The F 25 family from SensoPart offers a diverse range of sensors in identical housing – from the LED photoelectric through-beam sensor or the diffuse laser sensor with adjustable background suppression to color and distances sensors; everything that the user requires.

One hundred percent suitable for industrial applications:
Thanks to a cutting-edge design and outstanding workmanship, F 25 sensors from SensoPart are optimally equipped for harsh operating environments.

TYPICAL F 25

- Choice of LED or laser light (class 1)
- Most comprehensive sensor family on the market
- User-friendly teach-in key (alternative: fixed focus)
- Best black/white shift on the market in this sensor class
- Precise background suppression thanks to ASIC microchip
- Auto-detect – automatic adjustment of the switching output (PNP/NPN)
- Long ranges with compact miniature housing
- Robust glass-fibre-reinforced plastic housing (IP 69 & IP 67, Ecolab)
- Robust sensor design with metal connector, and mounting holes reinforced with metal inserts
- SensoClip dovetail mount for easy fine alignment

An eye for detail
The **FR 25-RLO** is the expert for small part detection. Even objects measuring just tenths of a millimetre can be reliably detected.

Distance measurement
The **FT 25-R(L)A** distance sensor with analogue output and high repeat accuracy is primarily used for measurement and control tasks, fill level checks/ measurements or high-precision tasks.

The specialist for glass detection
The **FR 25-RGO** photoelectric retro-reflective sensor has been specially designed for detecting transparent objects. It offers absolutely precise and reproducible switching behaviour thanks to its autocollimation principle and automatic adjustment of the switching threshold (the DELTA function).

Reliable detection of print marks
The main task of the RGB color sensor **FT 25-C** is detecting a defined color. Thanks to its high switching frequency, the sensor is also suited to very fast applications.

Impervious to interference
Whether in handling or assembly applications, whether identifying small or large objects made of paper or metal – the photoelectric diffuse sensors with background suppression **FT 25-RHD** and **FT 25-RLH** reliably detect the most diverse range of objects – even despite background interference.
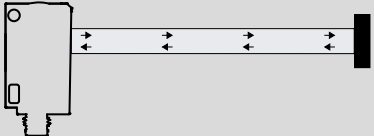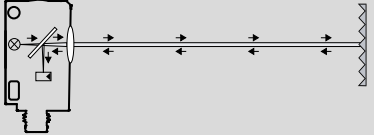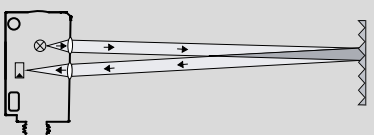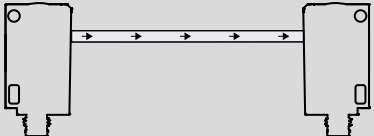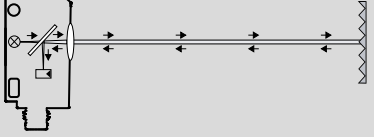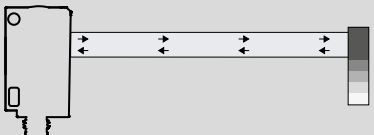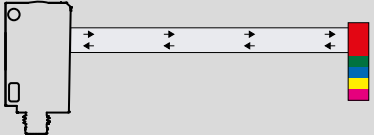
For challenging tasks
The **F 25 BlueLight** allows the reliable detection of light-absorbing or highly transparent objects, for example, presence detection of carbon-fibre components or matt black interior trim panels.

One housing, hundreds of variants

Discover versatility in unity

Photoelectric diffuse sensors

Functional principle	Type	Type of light	Adjustment	Scanning distance
Background suppression (photoelectric diffuse sensor)	FT 25-RLH	Laser	Teach-in	120 mm
	FT 25-RHD	LED	Teach-in	400 mm
	FT 25-RH	LED	Teach-in	200 mm
	FT 25-BF2	LED, blue		80 mm
	FT 25-RF1/2	LED		60/80 mm
Foreground suppression (photoelectric diffuse sensor)	FT 25-RV	LED	Teach-in	200 mm
Energetic (photoelectric diffuse sensor)	FT 25-RL	Laser	Teach-in	250 mm
	FT 25-R	LED	Teach-in	800 mm

Light barriers

Functional principle	Type	Type of light	Adjustment	Scanning distance
Photoelectric retro-reflective sensor with autocollimation	FR 25-RLO	Laser	Teach-in	4 m
	FR 25-RGO2	LED	Teach-in	2 m
Photoelectric retro-reflective sensor with double lens	FR 25-RL	Laser	Teach-in	15 m
	FR 25-R	LED	Teach-in	7 m
	FR 25-RF	LED		
Photoelectric through-beam sensor	FS/FE 25-RL	Laser	Teach-in	20 m
	FS/FE 25-R	LED	Teach-in	15 m
	FS/FE 25-RF	LED		6 m

Special sensors

Functional principle	Type	Type of light	Adjustment	Scanning distance
Photoelectric retro-reflective sensor with autocollimation for transparent objects	FR 25-RGO	LED	Teach-in	2 m
Distance sensor	FT 25-RLA 80	Laser	Teach-in	20 ... 100 mm
	FT 25-RA60/170	LED		20 ... 80 mm / 30 ... 200 mm
Contrast sensor	FT 25-W	LED, white	Teach-in	12 ± 2.5 mm
	FT 25-RGB	LED, red/green/blue	Teach-in	12 ± 3 mm
Color sensor	FT 25-C	LED, red/green/blue	Teach-in	12 ± 3 mm

Special features	Application examples
Most accurate small-part detection	Small-part detection against any background
Long scanning distance	Object detection against any background
	Object detection against any background
Background supp. of 100 mm	Object detection against any background
	Object detection against any background
With adjustable window function	Object detection on conveyor belts, selection of objects acc. to height
	Object detection
	Selection of coated and uncoated parts

Special features	Application examples
Switching frequency 4 kHz or 10 kHz, small-part detection from 0.2 mm	Detection of objects through narrow openings
	Object detection
Long range	Object detection
	Object detection
	Object detection
Long range	Object detection
	Object detection
	Object detection

Special features	Application examples
With DELTA function (switching threshold adaptation)	Detection of foils, clear glass and plastic
Precise small-part detection, adjustable analogue and switching output	Small-part detection (e.g. O-rings), distance measurement on robot grippers
Long measurement range, adjustable analogue and switching output	Unwinding check, dancer roll regulation, stacking height measurement, double layer detection
Switching frequency 10 kHz or 25 kHz, automatic selection of ideal transmission color "communicating" light spot	Detection of printed marks on endless materials
Switching frequency 2.5 kHz or 10 kHz, "communicating" light spot	Color detection on packaging and labels

Even if all the sensors of the F 25 family look identical externally, they offer an astonishing wealth of variants. You can therefore choose between numerous functional principles – from photo-electric diffuse sensors with background suppression, through autocollimation retro-reflective sensors, to color sensors. And within each of these basic principles there are, in turn, numerous functional variants.

Most of the F 25 sensors are each available in a laser and an LED design. Differing types of connection and switching variants, as well as special designs such as auto-detect (which combines a real PNP and NPN switching function in a single device) expand the total selection to over one hundred different sensors. And this is just a snapshot, because new functions and variants are always being added.

Whatever the particular function or variant, the excellent performance data of all the F 25 sensors are impressive. For example, the long ranges and scanning distances, the very high switching frequencies, the minimal black-white shift or the particularly precise background suppression. So much quality and variety in a single sensor series – that is really unique!
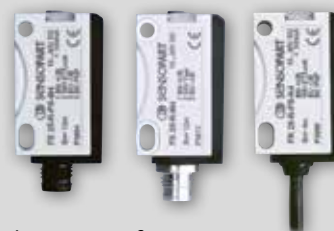
Large variety of connections
• M8 plastic plug
• M8 metal plug
• 2 m cable
• 150 mm, M8 or M12 pigtails

Simple operation
Choice of teach-in or fixed focus

F 55 – New standards in a compact design

The compact class with a long scanning range
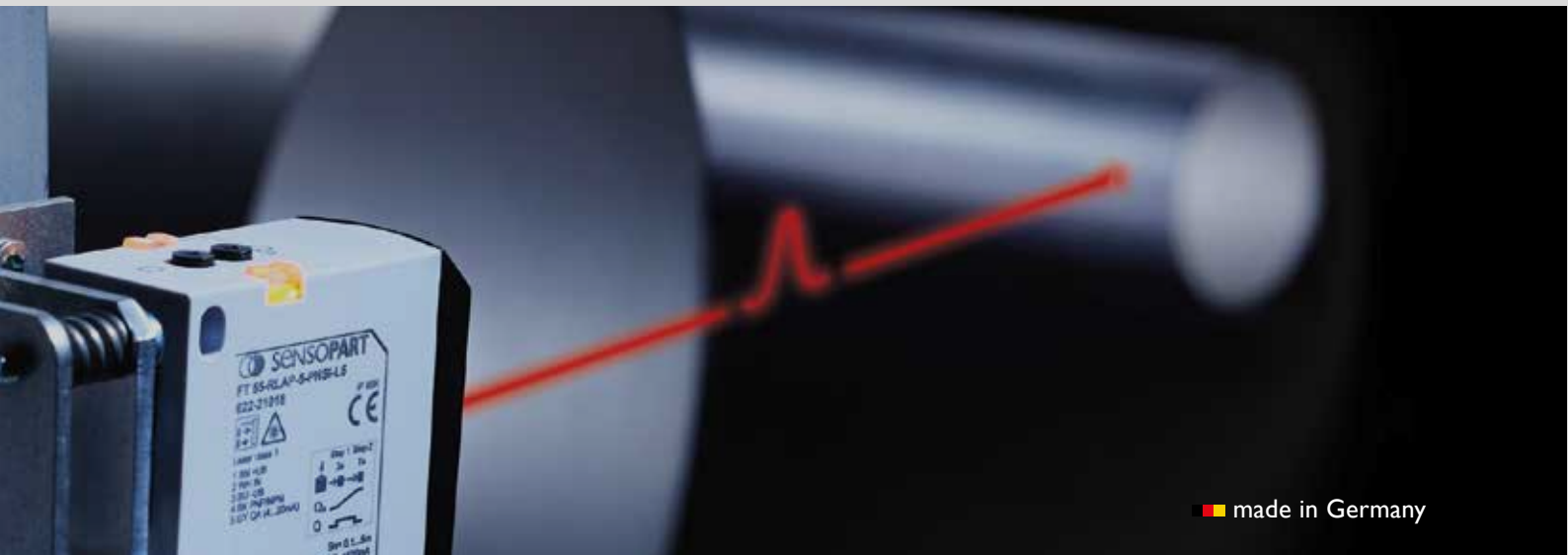
■■ made in Germany

SensoPart sets new standards in the compact class with its F 55 series of photoelectric sensors. The products in this family combine excellent performance data with a robust housing design and many user-friendly details. They guarantee
reliable detection by means of a focused laser light or red-light LED as well as precise background suppression.

Comprehensive accessories for flexible installation

Housing in either a metal or plastic version

TYPICAL F 55

- Precise laser distance sensors with operating ranges of up to 1 m for diverse applications

- Time-of-flight sensors for distance measurement and reliable object detection in front of any background, with a range of up to 5 m

- High-end color sensor FT 55-CM: high performance and ease of use

- All laser versions are laser class 1 – for optimum safety

- Precise background suppression and minimal black/white-shift

- User-friendly operation of all "energetic" variants via electronic teach-in key or control line

Blue light for challenging tasks
The most powerful blue light sensor, F 55 BlueLight is suited to difficult applications requiring long scanning ranges

Color specialist
The wide operating range – independent of distance – combined with the flexible color detection feature of FT 55-CM enables a diverse range of applications. The large integrated LCD display and remote configuration via SensoVisualize and IO-Link set new standards in ease of use and connectivity.

F 55 – Product overview			
Article	Type of light	Adjustment	Scanning distance/ range/ operating range
Photoelectric diffuse sensors with background suppression			
FT 55-RLH	Laser	Potentiometer	800 mm
FT 55-RLH2	Laser	Potentiometer	1 m
FT 55-RLHP2	Laser	Teach-in	5 m
FT 55B-RH	LED	Potentiometer	800 mm
FT 55-RH	LED	Potentiometer	1.2 m
FT 55 BH	LED, blue	Potentiometer	1.2 m
Photoelectric diffuse sensors			
FT 55-RL	Laser	Teach-in	1.2 m
FT 55-R	LED	Teach-in	2 m
Photoelectric retro-reflective sensors			
FR 55-RLO (1/2)	Laser	Teach-in	20 m
FR 55-RL	Laser	Teach-in	14 m
FR 55-R	LED	Teach-in	14 m

F 55 – Product overview			
Article	Type of light	Adjustment	Scanning distance/ range/ operating range
Photoelectric through-beam sensors			
FS/FE 55-RL	Laser	Teach-in	30 m
FS/FE 55-R	LED	Teach-in	25 m
Distance sensors			
FT 55-RLAP(2)	Laser	Teach-in	0.1 / 0.06 ... 5 m
FR 55-RLAP	Laser	Teach-in	0.3 ... 70 m
FT 55-RLAM	Laser	Teach-in	up to 1 m
Color sensors			
FT 55-CM-1	LED white	Display	18 ... 32 mm
FT 55-CM-3	LED white	Display	18 ... 60 mm
FT 55-CM-4	LED white	Display	20 ... 150 mm

Distance sensors

On any machine and for any application
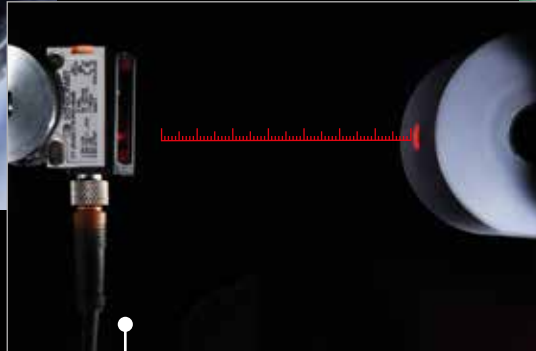
0 mm ‖ **500 mm** ‖ **1 m**

Under tension

Thanks to excellent repeatability, the **FT 25-RA** distance sensor determines the exact change in position of dancer rolls. This guarantees precise control of an unwinding process.

The sensors can be easily and accurately aligned after installation with the aid of the **SensoClip** mounting component.

The compact class for measurement and control tasks

The **FT 25-R(L)A** distance sensor accurately determines the roll diameter of an unwinding machine and therefore supplies early information about an impending roll change. Designed in small housing for easy integration, it offers excellent precision regardless of the surface properties of the object detected.

Double layers excluded

One of the typical applications of **FT 50-RLA** is stack height control, e.g. of cardboard boxes, or double layer detection, e.g. printed circuit boards in electronics production. Thanks to excellent repeatability, it is also suited to monitoring coils, e.g. in packaging machines.
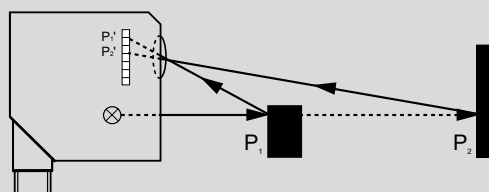
Triangulations principle

5 m

70 m

Allrounder for any surface

FT 55 time-of-flight sensors reliably detect objects and measure distances up to 5 m with utmost precision. Using the principle of time-of-flight, the sensors enable measurements on any material and surface. For example, the **FT 55-RLAP** can accurately determine the position of a robot gripper, e.g. for seizing car body parts.

A secure grip

The **FT 55-RLAP** allows long scanning ranges up to 5 m, ideal for checking the occupancy of storage bays in high bay warehouses.

Long scanning range

Thanks to its long scanning range of up to 70 m, the reflector device **FR 55-RLAP** is ideal for detecting the exact position of overhead cranes or determining the distance between forklift trucks.

t

Object

Distance d
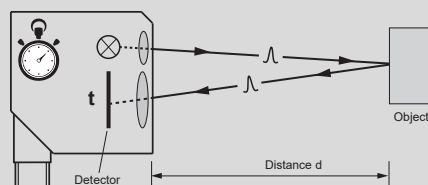
Detector

Time of flight technology

Color sensors

Anything but color-blind

Color contrast marks

*Whether in the printing industry or on steel strips: contrast marks must be detected precisely. With a switching frequency of 10 kHz, this is an easy task for the **FT 25-C**. A color coding often adds additional information to the marks, which can be decrypted by the miniature color sensor **FT 25-C**. Even fluttering strips can be detected without difficulty with a depth of field of up to 6 mm.*

The small color expert

*The sensors **FT 25-W/-RGB** are considerably smaller than the standard size on the market, while still offering better performance data. With the aid of mounting rod MZ F 25, it is easy to switch from the large standard size to the compact miniature housing – without any additional effort.*

The right lid?

*Checking that each bottle has the right lid is an easy task for the **FT-55 CM**. Equipped with an enormous depth of field and an operating range of up to 150 mm, and able to check up to 12 colors simultaneously, the sensor is the perfect solution for applications of this type.*
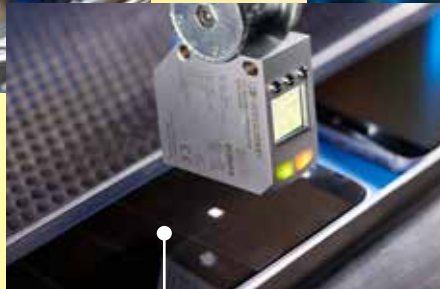
The right color?

A faulty mixing ratio of plastic granulates can produce plastic elements with the wrong color. Color is therefore checked in many applications. High color selectivity, extreme ease of use and an adjustable tolerance with 9 levels make **FT 55-CM** ideal for such applications.

Shining performance

Is the surface polished, coated or has film been applied? This is a quality assurance step in many inspection applications. Thanks to its very precise color differentiation, and an additional version with glare suppression, **FT 55-CM** is optimally suited for shiny objects.

Sorting colored objects

Has the correct vehicle fuse been supplied? Has the correct toothbrush been seized? This can easily be checked by their color. With Best Fit mode, the **FT 55-CM** provides a powerful function for sorting tasks, ideally suited to such applications.

Print mark sensors

Precise detection of any print marks
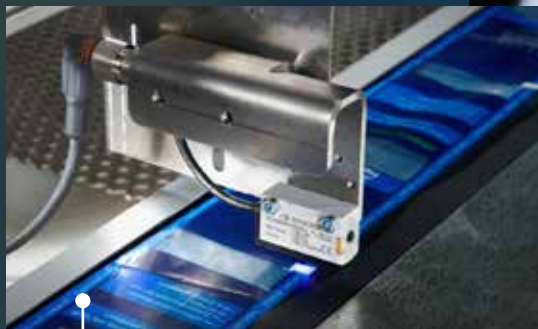
Compatible with standard housing

*The contrast sensors from the **F 25** series are compatible with standard housing when it comes to installation and connection. The fastening bores are aligned in the same distance from each other. The integrated cable with a M12 connector fits the corresponding female connector.*

Small size – big performance

*The sensors **FT 25-W/-RGB** are considerably smaller than the standard size on the market, while still offering better performance data. An easy teach-in method and a very robust housing guarantee a quick set-up and trouble-free operation.*

Subsequent digital printing on labels

*With a minimum response time of 20 µs, at jitter of 10 µs and a switching frequency of 25 kHz, the print mark sensors **FT 25-RGB** and **FT 25-W are** ideal for these applications.*

Color contrast marks

Contrast marks are often color coded to store additional information or to distinguish them from the colors of the label. The **FT 25-C** detects the color coding with a switching frequency of 10 kHz, allowing high positioning accuracy in relation to the colored contrast marks. Different teach modes allow diverse settings in depth of field and color tolerance.

Smart teach-in process

Teaching contrast marks and the background is not always simple in large machines when the sensor is already mounted. The **contrast mark sensors** from SensoPart can therefore be taught dynamically, i.e. in a running process.

Fluttering strips – no problem

Printing and cutting processes involve high speed, which can result in fluttering carrier strips despite high strip tension. The sensors **FT 25-C** can be taught with a double depth of field for this type of situation.

Object detection

Whether large or small: always reliably detected.

Technology gives a head start

The **FT 10-RLH**, the world's first sub-miniature sensor with laser light and adjustable background suppression, offers precise and consistent switching behaviour even with changing object surfaces and colors. Thanks to SensoPart ASIC technology, it still functions reliably in environments with shiny machine parts in the background, and is perfect for detecting the tiniest objects as well as for installation in the most compact spaces.

The small blue sensor

As the world's first blue light sensor, **F 10 BlueLight** enables reliable scanning detection of strongly light-absorbing, reflective and highly-transparent objects – in an ultra-compact subminiature format (21.1 x 14.6 x 8 mm)!

Maximum transparency

The **FR 25-RGO** allows optimum detection of transparent objects – partly thanks to the DELTA function. The sensor reliably adapts to changing ambient conditions – dust or contamination has no affect.

Dot precision

Thanks to the principle of autocol-
limation and an extremely fine la-
ser light spot, the **FR 25-RLO** is the
expert for small part detection.
Even objects measuring just tenths
of a millimeter can be reliably
detected.

For special angles of vision

BlueLight technology from SensoPart
demonstrates its outstanding ability
even at long scanning distances
(up to 1.2 m): very dark or transpa-
rent objects can be reliably detected
at huge scanning angles. The com-
pact version of the **F 55 BlueLight**
even offers adjustable background
suppression.

High process stability

With a high-speed scanning rate of
up to 500 Hz and a very long range,
time-of-flight sensors from the **FT 55**
series are experts when it comes to
reliable detection and precise measu-
rement of any object at a long
distance.

F 50 – Photoelectric sensors in a compact housing

The reliable standard series

■■ made in Germany

The photoelectric sensors of the F 50 series are virtually synony-mous with versatility and utmost reliability. They guarantee user-satisfaction in a wide variety of sectors from the automotive industry, mechanical engineering or wood processing to the packaging and printing industries.

The impressive F 50 sensors offer reliable detection, using either laser light, red light LED or infrared LED, as well as precise back-ground suppression.

TYPICAL F 50

- Universal use in numerous automation applications
- Reliable laser distance sensors with operating ranges up to 300 mm
- Autocollimation variants with high precision and no blind zone
- Photoelectric diffuse sensor with precise background sup-pression
- Versions with laser, LED or infrared light emitter
- Simple adjustment via potentiometer or keys
- UL-certification

FL 70 – Sensor for use with fibre-optic cables

Functional DIN-rail device

made in Germany

The FL 70 sensor for use with fibre-optic cables comes in three different versions: FL 70 RA-…D with an analogue output, FL 70 R without display and FL 70 R-…D with display. The FL 70 with analogue output offers major benefits for complex applications, such as connecting a so-called cross-section converter. The version FL 70 R without display is a cost-efficient alternative for standard applications.

The FL 70 R-…D with a 4-character display is the high-end version. Its combination of display and teach-in keys offers high ease of use. The sensor is also equipped with numerous additional functions, e.g. fine adjustment of the switching point.

All three versions come with a user-friendly teach-in mode.

TYPICAL FL 70

- High ease of use – simple teach-in method
- High precision
- High switching frequency
- No mutual interference thanks to automatic communication when mounted side by side
- DIN-rail mounting
- Robust enclosure rating of IP 64
- Wide range of fibre-optic cables
- Little space required for installation at control site

Congestion control with fiber-optic cables
Small plastic plugs are fed in on a vibration conveyor and separated on a conveyor section. Congestion is monitored with an FL 70 R-PSD fiber-optic device in combination with SensoPart's K2L-34 plastic fibre-optic cable.

Fork sensors and optical windows

Experts in small part detection and counting tasks
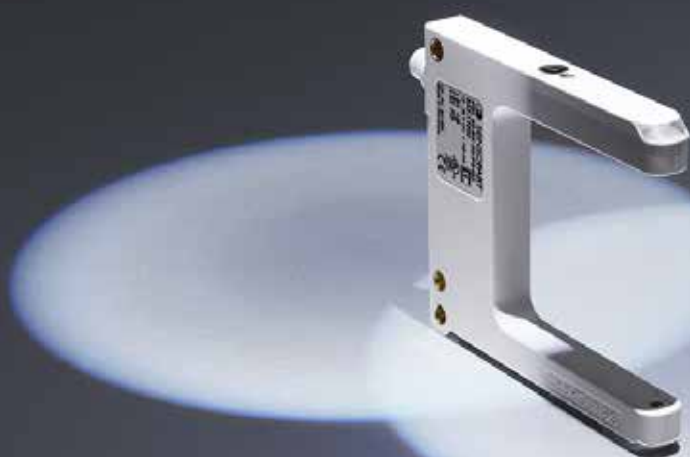
■■■ made in Germany

Fork sensors and optical windows demonstrate characteristic properties as a result of their special housing design: thanks to a precise beam guide they are particularly suited to small part detection. The sensors are also easy to mount as there is no need for time-consuming adjustment.

The fork sensors of the FGL-RK and FGL-IK series detect parts from a diameter of 0.2 mm. They are used, for example, for small part detection on conveyor sections and chutes or for counting bulk goods on vibration conveyors. Rotational speed measurement is another typical application. The optical windows of the FG series are employed, for example, for detecting thread breaks in the textile industry, for part detection in transparent tubes in pneumatic conveyors, or for ejection control. Thanks to their robust housing and fixed light beam, fork sensors and optical windows are frequently the first choice for use in installations subject to strong vibrations.

TYPICAL SENSOPART

- Simple and robust housing
- Quick and easy mounting thanks to dovetail bracket and teach-in function
- Metal or plastic housing
- High resolution for precise small part detection (fork sensors from 0.2 mm, optical windows from 0.8 mm)
- Various fork and window widths available
- Red light or infrared LED options
- High switching frequency of up to 3 kHz
- Dynamic signal evaluation (FG)
- 3- or 4-pin connector depending on variant
- Reliable function even in harsh conditions
- LED-indicators easy to see from all sides
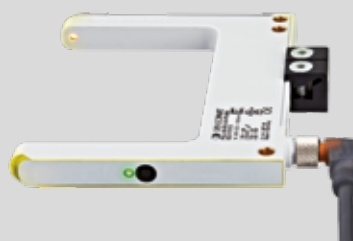
FGL with mounted bracket MBD-S94 and LED-indicators clearly visible on the side of the fork sensor.

Ultrasonic sensors

Reliable on virtually every surface

■■ made in Germany

Ultrasonic sensors may be a useful alternative in applications where optical sensors come up against their physical limits. This is the case, for example, when dealing with objects with uneven surfaces or difficult ambient conditions, as well as with highly transparent media as or moving, highly reflective liquid surfaces. Typical uses of ultrasonic sensors are therefore checking the presence of highly transparent film and measuring fill levels in fluid containers. A major advantage is the absolutely reliability of the background suppression function that results from the measurement of the time of flight of sound.

TYPICAL SENSOPART

- Reliable detection of objects with critical surfaces and highly transparent objects

- Available in a cuboid (32 × 20 × 12 mm) or barrel (M12/M18/M30) shape

- Simple adjustment via teach-in, control input or display

- PNP, NPN or analogue output options

- Metal or plastic housings (IP 67 & IP 65)

- Wide range of mounting accessories
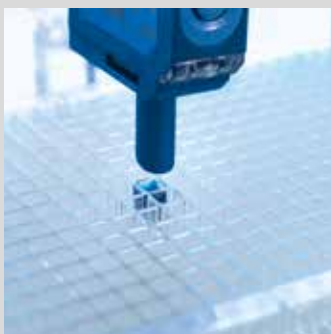
The UT 20-S measuring levels in microplate wells.

The ultrasonic sensors of the UMT 30 series are multi-functional experts. Thanks to a three-digit display, sensor settings are always an easy task for users.

Inductive sensors

The metal detectors

Due to their functional principle, inductive sensors are suitable exclusively for the detection of metal objects. But they do this extremely reliably and are also very robust and resistant (e.g. to environmental influences). This makes them an interesting alternative for numerous industrial applications. Inductive sensors are mainly used wherever the detection of uniform movements is involved – for example, as a proximity switch for determining the position of moving machine parts, such as carriages or hydraulic cylinders, as a tachometer on vehicle crankshafts or as a pulse generator for engine ignition.

Inductive sensors are extremely precise due to their high repeatability. Their simple design and uncomplicated initial set-up ensure minimal downtimes. Whether used in robotics, assembly and handling, factory automation or mechanical engineering: inductive sensors from SensoPart are reliable, require no maintenance, and offer versatile use thanks to a wide choice of housings and sizes.

TYPICAL SENSOPART

- Reliable detection of metallic objects
- From 3 mm miniature format to M30 housing
- Product variants for standard or triple switching distances
- Robust barrel or cuboid metal housing
- Simple installation thanks to integrated metric threads
- Different designs for flush, quasi-flush and non-flush mounting
- Available with either switching or analogue output
- NAMUR-compliant design on request

Accessories

A sensor is rarely unaccompanied

Accessories for mounting, set-up and use are essential for the reliable functioning of an automation solution. The characteristic practical focus of SensoPart products is thus also evident in a particularly versatile and user-friendly range of accessories.

The functionality and robustness of optical sensors often depends on the mounting bracket. Changing applications or product batches also entail realignment of the sensor. All of this is possible with the unique SensoClip concept: the position of sensors can be easily modified along the mounting rod, and the angle can be adjusted as required via two rotation axes.
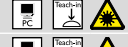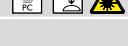
Optimum connections:
*With the **IO-Link Master**, sensors can be smoothly integrated into systems and processes. The IO-Link interface enables two-way communication between the sensors and the connected components, and data can be easily read out and evaluated.*

Quickly aligned: F 10, F 25 and F 55 sensors can be quickly and precisely aligned with the aid of the robust alumni-um dovetail bracket.

Product overview – optical sensors

Product family Dimensions (H × W × D)	Distance sensors	Color (C), contrast (K) and luminescence sensors (UV)	Photoelectric diffuse sensors
F 10 21,1 × 14,6 × 8 mm	FT 10-RLA | **10–70 mm**		
F 25 34 × 20 × 12 mm	FT 25-RLA | **20–100 mm** FT 25-RA | **20–80 mm** FT 25-RA | **30–200 mm**	FT 25-RL | **250 mm** | K FT 25-W | **12 mm** | K FT 25-RGB | **12 mm** | K FT 25-C | **12 mm** | C	FT 25-RL | **250 mm** FT 25-R | **800 mm**
F 55 Metal 50 × 50 × 25 mm Plastic 50 × 50 × 23 mm	FT 55-RLAP | **5 m** FR 55-RLAP | **70 m** FT 55-RLAP2 | **5 m** FT 55-RLAM | **1 m**	FT 55-CM | **150 mm**	FT 55-RL | **1.2 m** FT 55-R | **2 m**
F 20 32 × 20 × 12 mm			
F 50 50 × 50 × 17 mm	FT 50-RLA-20 | **40–60 mm** FT 50-RLA-40 | **45–85 mm** FT 50-RLA-70 | **30–100 mm** FT 50-RLA-100 | **70–170 mm** FT 50-RLA-220 | **80–300 mm**	FT 50-C | **32 mm** | C FT 50-C-UV | **50 mm** | UV	
Barrel type Ø 4/5 mm Ø 12 mm Ø 18 mm Ø 30 mm			FM 04/05 | **50 mm** FT 12-R | **300 mm** FT 18-2-R | **400 mm** FMS 18-B | **400 mm** FT 18-2-IR | **800 mm** FMS 30-B | **1 m**
FL 70 84 × 35 × 10 mm	FL 70-RA-xD | Fiber-optic sensors Diffuse **310 mm** Through-beam **810 mm**		
F 80 83 × 65 × 25 mm **F 90** 95 × 93 × 42 mm	FT 80-RLA-500 | **250–750 mm** FT 91/92-ILA | **6 m** FT 90-ILA | **10 m** FR 91/92-ILA | **50 m** FR 90-ILA | **250 m**		
FG | FGL			

Legend:

- ⬛ = Display
- ◎ = Potentiometer
- ⬚ = Transparent objects/glass
- ▪ PC = PC
- ⬚ Teach-in = Teach-in
- 🔵 = BlueLight
- ⚠ = Laser
- Lasernorm IEC 60825-1:2014
- ◈ = IO-Link

SENSOPART

Photoelectric diffuse sensors with background suppression (BGS) / with foreground suppression (FGS)	Photoelectric retro-reflective sensors	Photoelectric through-beam sensors	Fiber-optic sensors
FT 10-RLH | **70 mm** ◈ ⬚ ⚠	FR 10-RL | **2 m** ⬚ ⚠	FS/FE 10-RL | **3 m** ⬚ ⚠	
FT 10-B-RLF | **15/30 mm** ⚠	FR 10-R | **1.6 m** ⬚		
FT 10-RH | **70 mm** ◈ ⬚			
FT 10-RF | **15/30/50 mm**			
FT 10-BF | **30/50 mm** 🔵			
FT 25-RLH | **120 mm** ◈ ⬚ ⚠	FR 25-RL | **13 m** ◈ ⬚ ⚠	FS/FE 25-RL | **18 m** ◈ ⬚ ⚠	
FT 25-RH | **200 mm** ◈ ⬚	FR 25-R | **6 m** ◈ ⬚	FS/FE 25-R | **13 m** ◈ ⬚	
FT 25-RHD | **400 mm** ◈ ⬚	FR 25-RF | **3 m**	FS/FE 25-RF | **4 m**	
FT 25-RF | **60/80 mm** ◈	FR 25-RGO | **2 m** ◈ ⬚ ⬚		
FT 25-BF | **80 mm** 🔵			
FT 25-RV (FGS) | **200 mm** ⬚	FR 25-RLO | **4 m** ◈ ⬚ ⚠		
FT 55-RLH | **800 mm** ◎ ⚠	FR 55-RL | **12 m** ⬚ ⚠	FS/FE 55-RL | **25 m** ⬚ ⚠	
FT 55-RLH2 | **1 m** ◎ ⚠	FR 55-R | **12 m** ⬚	FS/FE 55-R | **20 m** ⬚	
FT 55-B-RH | **800 mm** ◎	FR 55-RLO | **20 m** ⬚ ⚠		
FT 55-RH | **1.2 m** ◎	FR 55-RLP | **70 m** ⬚ ⚠		
FT 55-BH(2) | **1.2 m** ◎ 🔵			
FT 55-RLHP2 | **5 m** ◈ ⬚ ⚠			
			FL 20-R | Diffuse **100 mm** Through-beam **1 m** ⬚
FT 50-RLH | **150 mm** ◎ ⚠	FR 50-RL | **20 m** ◎ ⚠	FS/FE 50-I | **15 m** ◎	
FT 50-RLHD | **300 mm** ◎ ⚠	FR 50-R | **5.5 m** ◎		
FT 50-RH | **300 mm** ◎			
FT 50-IH | **600 mm** ◎			
FT 12-RH | **60 mm** ⬚	FR 12-R | **1.5 m**	FS/FE 12-RL | **5 m** ⚠	
FT 12-RF | **24 mm**		FS/FE 12-R | **4 m**	
FMH 18 | **120 mm**		FS/FE 18-RL | **50 m** ⚠	FMS 18-U | Diffuse **160 mm** Through-beam **700 mm**
	FR 18-2-R | **3 m**	FS/FE 18-R | **20 m**	FMS 30-U | Diffuse **800 mm** Through-beam **4.8 m**
	FR 18-2-IR | **3.6 m**	FLS/FLE 18-W | **50 m** ⚠	
		FSE 18-2-I | **10 m**	FAV 30 | **500 mm**
			FL 70-R | Diffuse **310 mm** Through-beam **810 mm** ⬚
			FL 70-R-xD | Diffuse **310 mm** Through-beam **810 mm** ⬛ ⬚
FT 92-IL ⬚ ⚠			
		FGL-RK /-IK | **30 – 120 mm** ⬚	
		FGL 5-IK | **5 mm** ⬚	
		FGL | **5 – 220 mm** ◎	
		FG | **40 – 120 × 80 mm²** ◎	

Ultrasonic sensors

Products		Adjustment		Scanning distances	Special features
UT 20		Teach-in	Teach-in	140 mm / 150 mm / 240 mm / 700 mm	Ultrasonic sensors with soundpipe, PNP, NPN, analogue output
UT 12		Via control input		400 mm	PNP, NPN, analogue output
UT/UM 18		Via control input		250 mm / 300 mm / 800 mm	Variants with stainless steel housings, PNP, NPN, analogue output
UMT 30		Teach-in or display	Teach-in / Display	350 mm / 1.3 m / 3.4 m / 6 m	Display, PNP, 2 × PNP or analogue output
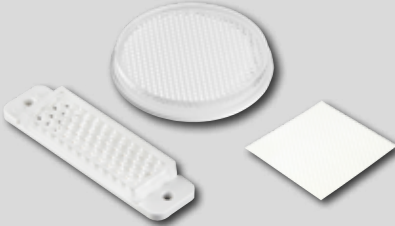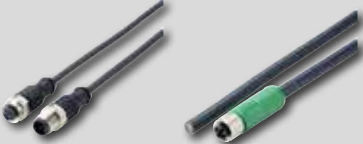
Inductive sensors

Products		Design	Switching distance	Special features
IT 8 / 10 / 12 / 40 IS 455 / 588		Cubic	0.8 mm / 1.5 mm / 3mm / 4 mm / 8 mm / 15 mm / 20 mm / 35 mm	Miniature housing, AC/DC variants
IS 33		Barrel type Ø 3 mm	0.6 mm	PNP, NPN
ISN 44-20 IS 34 IT 4		Barrel type Ø 4 mm	0.8 mm	PNP, NPN, NAMUR, stainless steel housing
IMT 5		Barrel type Ø 5 mm	0.8 mm	PNP, NPN, stainless steel housing
ISZ 46 IS 46 / 56 IDT 6		Barrel type Ø 6,5 mm	1.5 mm / 2 mm / 3 mm	PNP, NPN
IS 48 / 58 IMT 8		Barrel type Ø 8 mm	1.5 mm / 2 mm / 3 mm / 6 mm	PNP, NPN
IMT 12 IT 12 IS 512		Barrel type Ø 12 mm	2 mm / 4 mm / 6 mm / 10 mm	PNP, NPN
IS 514		Barrel type Ø 14 mm	3 mm	PNP, stainless steel housing
IMT 18 IS 518 IT 18		Barrel type Ø 18 mm	5 mm / 8 mm / 10 mm / 12 mm / 20 mm	PNP, NPN, stainless steel housing
IMT 30 IS 530 IT 30		Barrel type Ø 30 mm	10 mm / 15 mm / 20 mm / 22 mm / 40 mm	PNP, NPN, stainless steel housing
IS 512 / 518		Barrel type Ø 12 mm / 18 mm analogue	6 mm / 10 mm	Analogue output

SmartPlug

Products	Special features
MFI (Inverter)	Inverts NPN to PNP or PNP to NPN devices, N.C./N.O. also adjustable
MFC (Counter)	Adjustable counter (pulses or intervals) between 1 … 65535
MFT (Timer)	Adjustable on-delay or drop-out delay between 1 … 65535 ms
MFF (Frequency)	Adjustable frequency monitoring between 15 … 1000 Hz
MFW (Wipe Function)	Adjustable wipe function for falling or rising edges; time range 1 … 65535 ms
MFU (Universal)	All-in multifunctional switching device programmable via USB

Accessories

Products		Description
Mechanical accessories		Brackets for sensors
Optical accessories		Reflectors and reflective tape
Electrical accessories		Cables and Converters
IO-Link Master		IO-Link Master for PROFINET, SensoIO, EthernetIP/Modbus TCP, USB

We look ahead

Yesterday, today and in the future

''We gauge ourselves not by what is possible today, but by our vision of what can be achieved'' – this has been our motto since the foundation of SensoPart in 1994. Our goal is to always be a step ahead and to be able to offer our customers the most innovative sensor for industrial automation.

True to this motto, we offer easy-to-integrate VISOR® vision sensors and compact laser sensors with outstanding background suppression made in Germany.

We still also have plenty of ideas for the future - watch this space.

SENSOR TECHNOLOGY

Light barriers	Vision sensors
Diffuse sensors	Smart cameras
Laser sensors	Vision systems
Miniature sensors	Object detection
Distance sensors	Object measurement
Color sensors	Color detection
Contrast sensors	Code reading
Anti-collision sensors	Lighting
Slot sensors	Lenses
Fiber-optic sensors	
Inductive sensors	
Ultrasonic sensors	

VISOR® Product Overview

VISOR® vision sensors for factory automation

Calibration of vision sensors

Metric world and robot coordinates at a mouse click.

Increased efficiency when setting up vision sensors:

Vision sensor intelligence has risen continuously over recent years and can be trusted with more and more complex tasks. The calibration function offered by the VISOR® series is a prime example: it saves considerable time when setting up pick and place applications, as there is no need for programming in the robot control system or PLC. This represents a significant boost in efficiency both for users and integrators.

Contents

Vision with foresight

At SensoPart we already anticipate the future of automation

"Our standard is not what is possible today, but the vision of what will be achievable in future" – this has been our credo since the founding of SensoPart in 1994. Our aim is to remain one step ahead and be able to offer our customers the most innovative products on the market.

When we have identified a path as correct we follow it consistently. As a **family-run company** we can act independently and as we see fit – a major prerequisite for the extremely successful development that SensoPart has achieved since its start.

Successful products, now considered indispensable for modern factory automation, have been created from the many future-oriented ideas of earlier days. But we do not simply rest on our laurels – because we still have many ideas for the future. Here the future concepts of **Industry 4.0** are playing an important role for us. Some of them have already been implemented with our products.

Milestones in the company's history

Year	Event
2004	1st place: German Sensor Application Prize
2004	Founding of SensoPart Inc., USA
2003	2nd place: German Sensor Application Prize
1994	Founding of SensoPart Industriesensorik GmbH in Wieden/Black Forest
1999	Founding of SensoPart France SARL
2002	Special prize for young companies, awarded by state of Baden-Württemberg
1997	Founding of SensoPart UK Ltd
2001	Opening of second site in Gottenheim near Freiburg-im-Breisgau
2001	Baden-Württemberg Innovation Prize
2005	Extension building in Gottenheim

"Dependability, responsibility and trust"
SensoPart is a family-run German company and this also influences our attitude towards work: we believe that dependability is important, we take responsibility for our activities, and we value close and trusting relations within the company as well as with our customers and business partners.

Dr. Theodor Wanner,
Founder and Managing Director of SensoPart

2006 Baden-Württemberg Innovation Prize

2009 Freiburg Innovation Prize

2008 "Top 100" Innovation Prize

Automation Award **2014**

2012 Founding of SensoPart China

Vision Systems Design Innovators Award (Silver-Level Award) **2017**

Opening of the new production and logistics building in Gottenheim

2019 25 years of SensoPart
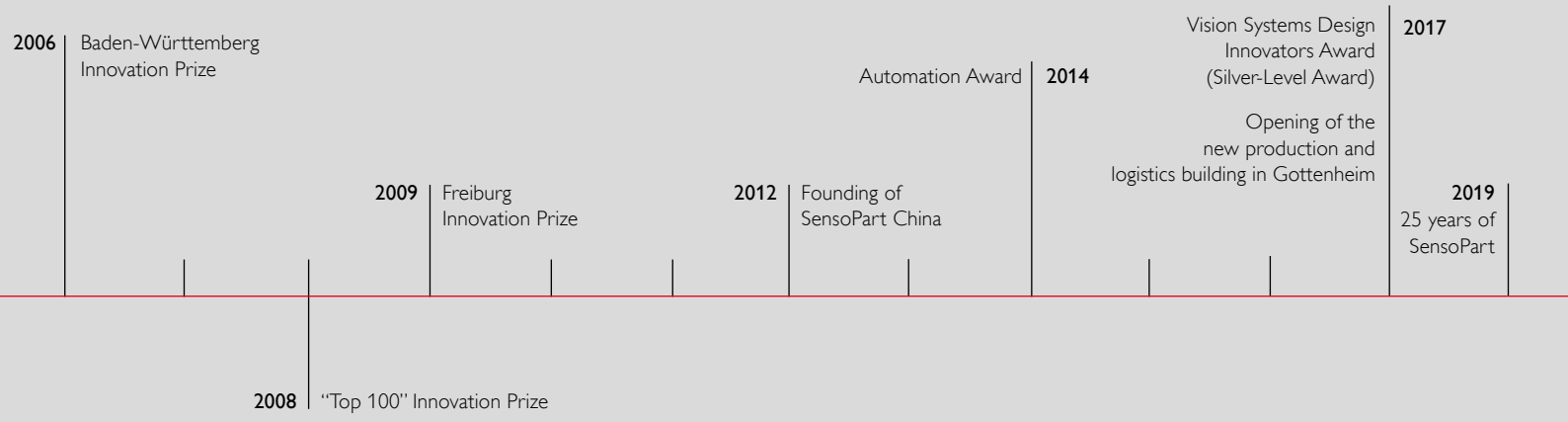
Thoroughly equipped

Sophisticated design and extensive features

4 x VISOR® ready-to-use:

- VISOR® Allround
- VISOR® Object
- VISOR® Robotic
- VISOR® Code Reader

- User-friendly configuration software
  (also available offline)

- External panel PC for visualisation

High-resolution
monochrome or color imaging chip

- 800 x 600 pixels
- 1440 x 1080 pixels
- 2560 x 1936 pixels

- Target Laser

- High-performance, integrated LED
  lighting (white, red, infrared)

- Can be combined with external
  lighting

- Integrated lens
  (wide, medium, narrow)

- Motorised focus adjustment

- Optional C-mount version

- Integrated processing unit with high-performance processor

- Robust and vibration-resistant metal housing, IP 65 / IP 67

- Compact dimensions: 71 x 45 x 45 mm

- Status LEDs

- Simple and flexible installation using dovetail mount

- Extensive range of mounting accessories and holders

Power supply and I/O, M12, 12-pin

- Power supply
- I/Os
- Encoder
- External lighting

Configuration and data output, Ethernet, M12, 4-pin

- Ethernet
- EtherNet/IP
- PROFINET
- sFTP/SMB archiving
- SensoWeb

Unpack, set up – it's ready to run! Vision sensors have never been as easy and intuitive to use despite unprecedented levels of performance. The VISOR® is ready in just a few mouse clicks. Thanks to VISOR® technology from SensoPart, there is now a simple and effective solution for even the most challenging vision tasks. Whether these involve complex object shapes, color detection, data matrix codes, fluorescent display elements – our application-specific vision sensors reliably detect all relevant object characteristics.

Setup requires just a few simple steps

Complex tasks made easy - with VISOR® software packages

SensoFind

Lists all the VISOR® vision sensors available in the network. Configuration or Viewer mode can be accessed directly from here and offline simulation can also be started.
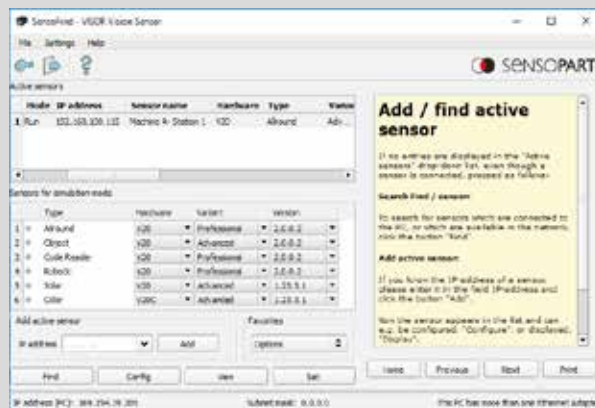
SensoConfig

VISOR® configuration software.

Complex inspection tasks can be easily set up in a step by step process. The effect of each setting is immediately visible on the screen. Comprehensive logic functions enable the direct assignment of complex inspection results to one of six digital result outputs. The integrated image recorder, which enables error analysis and simulations, is also very useful.
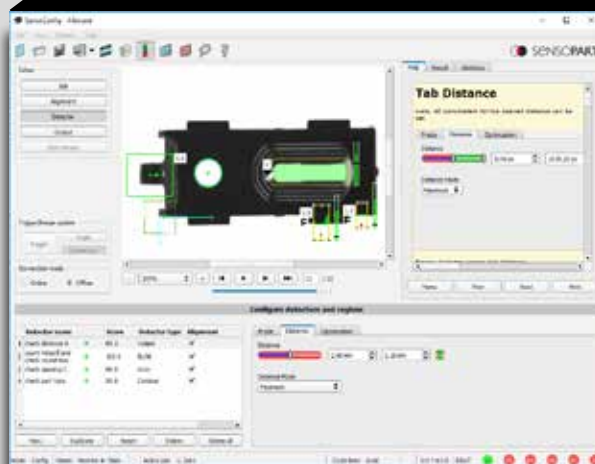
SensoView & SensoWeb

Once configuration has been completed, the vision sensor operates as a free-standing unit- i.e. without a PC connection. Data can of course be called up at any time while the sensor is running: a unique viewer software 'SensoView' with restricted user rights is available for this purpose – inadvertent changes to configuration settings are thus reliably avoided. 'SensoWeb'' enables easy connection to system visualisation by web browser. Professional image processing is that simple!
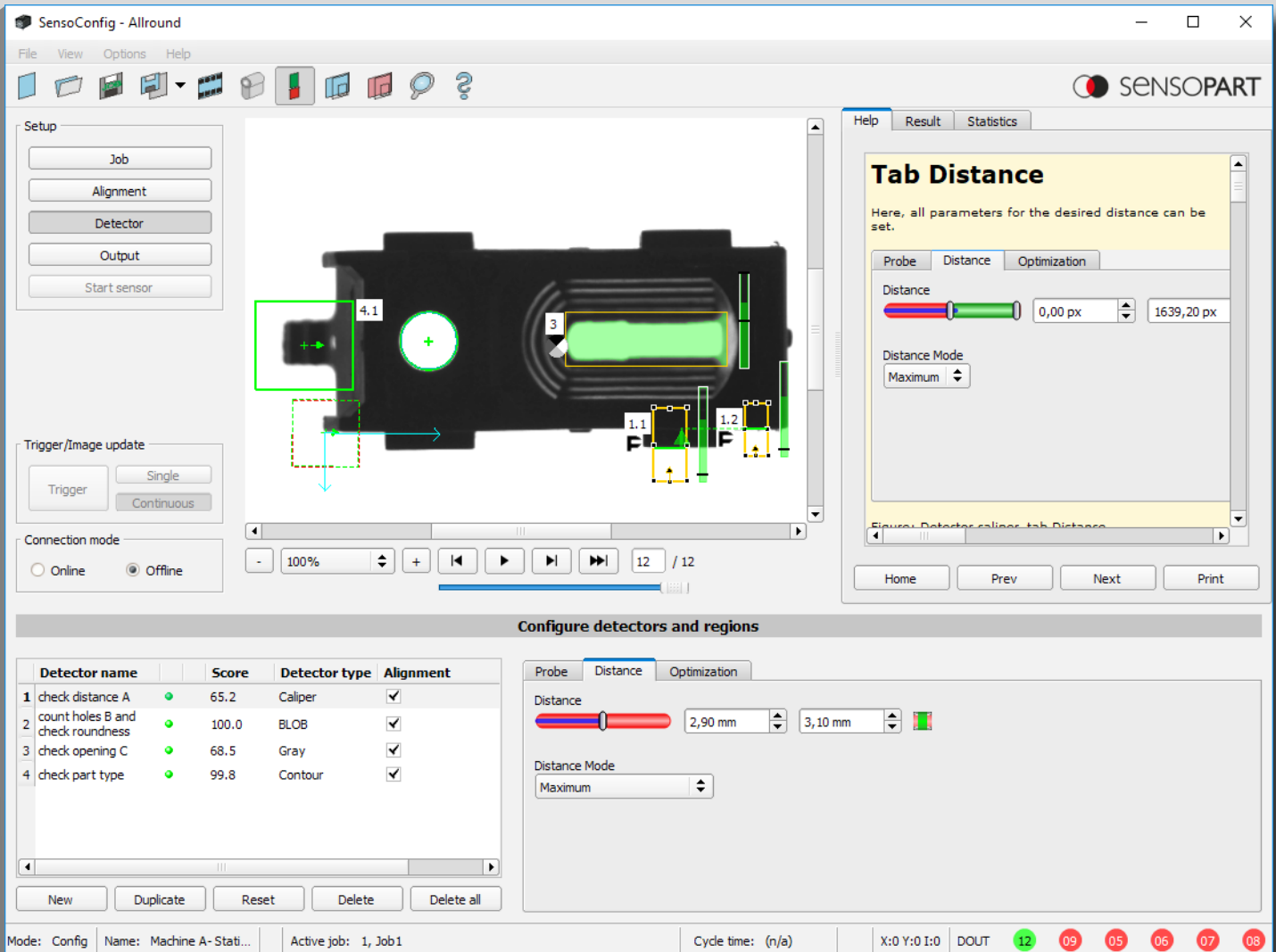
Step by step guide

1. Set up job and image

2. Set up image tracking and detectors

3. Result output/communication

A convincing portfolio

An impressive range of outstanding sensors

Advantages of VISOR® vision sensors

- Universal interface for all VISOR® devices, which means universal PLC modules

- Versions with increased depth of field, motorised focus adjustment

- PROFINET (Conformance Class B) with update rate of 4 ms, incl. image transmission via Ethernet

- Easily configurable image processing tools and preprocessing filters
  for reliable evaluation

- Image resolution can be scaled in software for high-speed analysis

- Standardised electrical and mechanical design

- ONE VISOR® software for ALL versions – this minimises the need for training

VISOR® red
VISOR® white
VISOR® infrared

VISOR® C-mount

Easily extendible

Innovative and user-friendly accessory and mounting concept
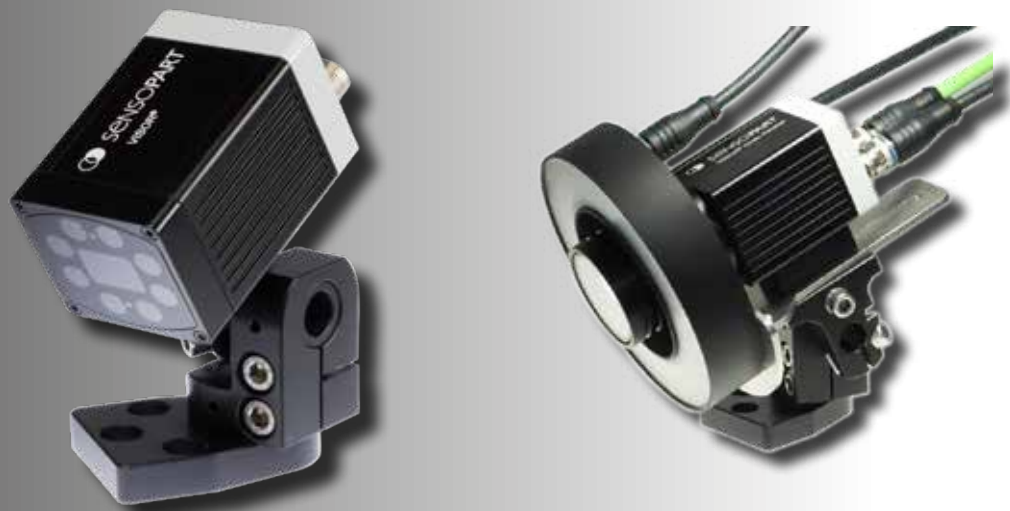
The MG 3A mounting bracket can be combined with mechanical accessories and external lighting.

External lighting can be controlled via VISOR®.
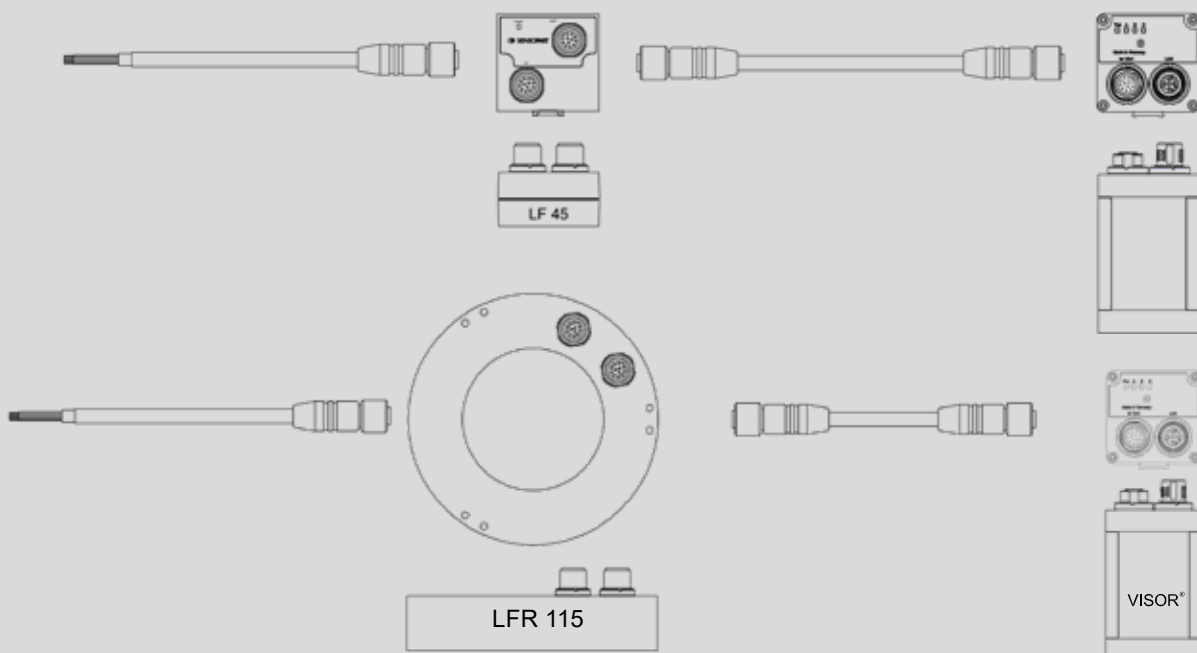
LF 45

LFR 115

VISOR®

External lighting (panel light LF 45, ring light LFR 115, spot illumination LS) can be connected directly between the vision sensor and power supply.

VISOR® vision sensors

Image processing can be so easy.

VISOR® Allround

VISOR® Object
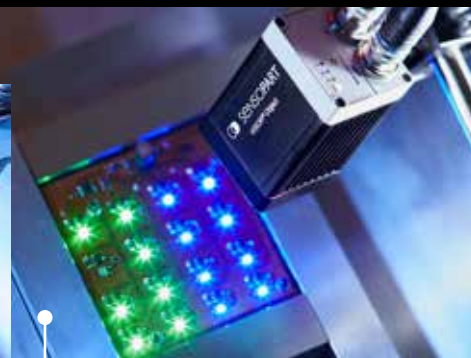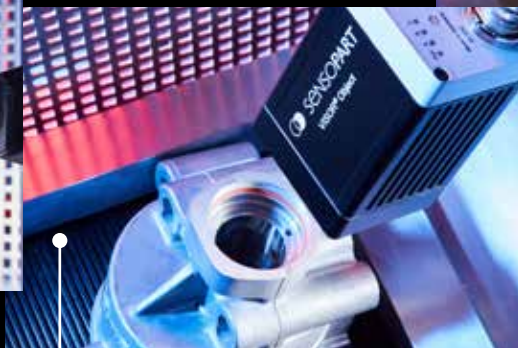
VISOR® Allround

Object detection and identification in one device

- All evaluations ("Detectors") of VISOR® Object and VISOR® Code Reader united in one device

- Highly accurate evaluation via 5 megapixel chip

- Powerful color detection of version with color chip

- Ethernet, Profinet and EtherNet/IP are available for data communication

VISOR® Object

Reliable detection and classification of objects

- Detectors for presence and completeness checks as well as for simple measurement tasks

- Precise determination of X/Y position, orientation and tracking

- Highly accurate evaluation via 5 megapixel chip

- Comprehensive logic and calculation functions for maximum flexibility

- Flexible definition of output data for easy communication with PLC or PC

VISOR® Object Color

Improved object detection through supplementary color information

- All functions of VISOR® Object

- Detectors for identifying, checking and differentiating color

- Powerful color detection, even with small color nuances or fluorescent components

- Powerful part-finding and tracking

- Up to 8 digital switching outputs

VISOR® Robotic

VISOR® Code Reader

VISOR® Robotic

The expert for robotics applications

- Compact and lightweight housing for moving or stationary applications
- Calibration methods tailored to the application
- 2D or 3D localisation in robot coordinates
- Simplified setup through 3D gripper point transformation.
- Less robot programming when images are captured in diverse positions
- Different hardware versions up to 5 megapixel chip

VISOR® Code Reader standard

Reading of barcodes and data matrix codes
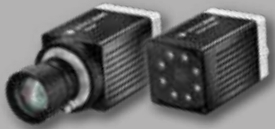
- Flexible definition of output data (header, trailer, net data)
- String comparison with signalling via the digital switching output

VISOR® Code Reader Adv. / Prof.

Reading of barcodes and data matrix codes, as well as detection of optical characters (OCR)

- Reads bar codes as well as printed and directly marked data matrix codes reliably; can also read several codes simultaneously and combinations of 1D/2D codes
- Evaluation of quality parameters according to ISO/IEC 15415 and AIM DPM 2006
- Supplementary object detection for features outside the code with "Professional" version

Camera + software = vision!

With its portfolio of vision solutions, SensoPart covers the entire spectrum of industrial image processing. Our VISOR® vision sensors are based on a powerful smart camera in a compact sealed sensor housing with a standardised dovetail mount. They also feature integrated signal processing, LED lighting (white, red, infrared), data interfaces and digital I/Os, integrated lens or C-mount as well as user-friendly configuration software.

Product overview VISOR® vision sensors

	VISOR® Allround		VISOR® Object	
	Presence, completeness, measurement, position check, color, reading of barcodes, data codes, text, multi-shot		Presence, completeness, measurement, position check, color	
	Advanced	Professional	Standard	Advanced
Resolution				
V10 (800 × 600): Mono | Color	✓	–	✓	
Images per second: Mono | Color	75 | 50	–	75 | 50	
V20 (1440 × 1080): Mono | Color	✓		–	✓
Number of images per second: Mono | Color	40 | 20		–	40 | 20
V50 (2560 × 1936): Mono | Color	–	✓	–	✓
Images per second: Mono | Color	–	22 | 8	–	22 | 8
Lighting	white, red1, infrared[1]			
Multishot (Mono)	✓		–	
Target laser	✓		–	✓
Lenses				
V10 wide | medium | narrow | c-mount	✓ | ✓| ✓| ✓	–	✓| ✓| ✓| –	✓ | ✓| ✓| ✓
V20 wide | medium | narrow | c-mount	✓ | ✓| ✓| ✓		– | – | – | –	✓| ✓| ✓| ✓
V50 wide | medium | narrow | c-mount	–	– | – | – | ✓	– | – | – | –	– | – | – | ✓
Interfaces	Ethernet/EtherNet/IP/PROFINET			
Inputs | outputs | selectable	2 | 2 | 6		2 | 2 | 4	2 | 2 | 6
Encoder input	✓		–	✓
Ethernet | EtherNet/IP | PROFINET | SensoWeb	✓ | ✓| ✓| ✓		✓ | ✓| ✓| ✓	
Service Port	✓		–	✓
Job/Detectors				
Number of jobs (max.)	255		8	255
Number of detectors per job (max.)	255		32	255
Calibration				
Scaling | Perspective	✓ | ✓		✓ | –	✓ | ✓
Point-pair list | Calibration plate (robot)	–	✓	–	– | –
Hand-eye | Base-eye calibration (robot)	–	✓	–	
Preprocessing				
Preprocessing filter	✓		–	✓
Multiple image capture | Shutter variation	✓		–	✓
Freeform search area	✓		✓	
Position tracking				
Contour comparison (translation, rotation 360°)	✓		✓	
Pattern matching (translation, rotation 360°)	✓		–	✓
Edge detection (translation, rotation)	✓		–	✓
Object detection				
Contour | Multiple detection	✓		✓ | –	✓ | ✓
Pattern comparison | Multiple detection	✓		✓ | –	✓ | ✓
Grey level | Contrast | Brightness	✓		✓	
Calliper	✓		✓	
BLOB	✓		–	✓
3D contour	–	✓	–	–
Identification				
Barcodes | Datacode	✓		–	
Barcode Advanced | Datacode Advanced	✓		–	
Clear text (OCR)	✓		–	
Robotics functions				
Result offset image | 2D | 3D	–	✓	– | – | –	– | – | –
Checking space around gripper	–	✓	–	
Color detectors V10C / V20C / V50C				
Color field | Color value | Color list	✓ | ✓| ✓		✓ | – | –	✓ | ✓| ✓
Color distance | Binarisation	✓ | ✓		– | –	✓ | ✓
Result processing				
Result processing - Text | Math	✓ | ✓		– | –	– | ✓

	VISOR® Robotic		VISOR® Code Reader		
	Robotics, presence, completeness, measurement, positioning		Reading of barcodes, 2D codes, text		
	Advanced	Professional	Standard	Advanced	Professional
Resolution					
V10 (800 × 600): Mono | Color	✓	–		✓ | –	
Images per second: Mono | Color	75	–		75 | –	
V20 (1440 × 1080): Mono | Color	✓			✓ | –	
Number of images per second: Mono | Color	40 | 20			40 | –	
V50 (2560 × 1936): Mono | Color	–	✓	–	✓ | –	
Images per second: Mono | Color	–	22 | 8	–	22 | –	
Lighting	white, red1, infrared[1]				
Multishot (Mono)	–		–		
Target laser	✓		only V20	✓	
Lenses					
V10 wide | medium | narrow | c-mount	✓ | ✓ | ✓ | ✓	–	✓ | ✓ | ✓ | –	✓ | ✓ | ✓ | ✓	
V20 wide | medium | narrow | c-mount	✓ | ✓ | ✓ | ✓		✓ | ✓ | ✓ | –	✓ | ✓ | ✓ | ✓	
V50 wide | medium | narrow | c-mount	–	– | – | – | ✓	–	– | – | – | ✓	
Interfaces	Ethernet/EtherNet/IP/PROFINET				
Inputs | outputs | selectable	2 | 2 | 6		2 | 2 | 4	2 | 2 | 6	
Encoder input	✓		–	✓	
Ethernet | EtherNet/IP | PROFINET | SensoWeb	✓ | ✓ | ✓ | ✓		✓ | ✓ | ✓ | ✓		
Service Port	✓		–	✓	
Job/Detectors					
Number of jobs (max.)	255		8	255	
Number of detectors per job (max.)	255		2	255	
Calibration					
Scaling | Perspective	✓ | ✓		–		
Point-pair list | Calibration plate (robot)	✓ | ✓		–		
Hand-eye | Base-eye calibration (robot)	–	✓	–		
Preprocessing					
Preprocessing filter	✓		–	✓	✓
Multiple image capture | Shutter variation	✓		–	✓	✓
Freeform search area	✓		–	–	✓
Position tracking					
Contour comparison (translation, rotation 360°)	✓		–		✓
Pattern matching (translation, rotation 360°)	✓		–		✓
Edge detection (translation, rotation)	✓		–		✓
Object detection					
Contour | Multiple detection	✓ | ✓		– | –		
Pattern comparison | Multiple detection	✓ | ✓		– | –		✓ | ✓
Grey level | Contrast | Brightness	✓		–		✓
Calliper	✓		–		
BLOB	✓		–		
3D contour	–	✓	–		
Identification					
Barcodes | Datacode	–	✓ | ✓		✓	
Barcode Advanced | Datacode Advanced	–	✓ | ✓	–	✓	
Clear text (OCR)	–	✓ | ✓	–		✓
Robotics functions					
Result offset image | 2D | 3D	✓ | ✓ | ✓		– | – | –		
Checking space around gripper	✓		–		
Color detectors V10C / V20C / V50C					
Color field | Color value | Color list	✓ | ✓ | ✓		– | – | –		
Color distance | Binarisation	✓ | ✓		– | –		
Result processing					
Result processing - Text | Math	– | ✓	✓ | ✓	– | –	✓ | –	

[1] not with color hardware V10C/V20C   [2] only color hardware

VISOR® vision sensor
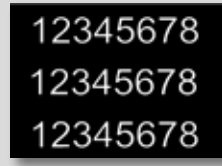
Detectors and application examples

Identification

Barcode	Reading and quality assessment of most barcode types, such as EAN, UPC, RSS, 2/5 Interleaved, 2/5 Industrial, Code 32, Code 39, Code 93, Code 128, GS1, Pharmacode, Codabar.		–	
Data code	Reading and quality assessment of 2D codes, such as ECC200, QR code, ECC200 (GS1), QR code (GS1), PDF 417. High-performance decoder algorithm for directly marked, low-contrast and damaged codes.		–	
OCR	Optical character reading of printed, laser-etched or dot-peened characters. High reading rate with difficult characters or fluctuating marking quality through use of neural networks. Easy to use. Fast segmentation mode for high reading rates.		–	
Result processing: Text	Comparison of character strings; formatting, adding and cutting of character srings; sorting, simple calculations. Output of a digital (good/bad) result.			

Object detection

Pattern matching	Object search based on pattern matching: once a pattern has been taught, consecutive images are then scanned for the same pattern. The degree of similarity can be defined by switching thresholds. Free form function for teaching random shapes with random orientation.			
Contour	Object search based on contour comparison: once a contour has been taught, images are then scanned for the same contour. The degree of similarity can be defined by switching thresholds. Function for teaching random shapes. Orientation and scaling variations are configurable.			
3D Contour	3D localisation of individual or multiple objects. Inclination and height offset are precisely detected.			
Brightness	Contrast analysis in search zone. Definition of result output via switching threshold.			

Object detection (continued)

	Brightness	Brightness analysis in search zone. Definition of result output via switching threshold.	
	Grey threshold	Analysis of grey threshold in search zone. Definition of result output via switching threshold.	
	Calliper	Measurement of the distance between edges. Diverse detection options. Measurement of minimum, maximum or averaged distance values. Innovative visualisation of detected edges. Definition of measurement sensitivity by dividing the measurement field into search beams.	
	BLOB	Counting and evaluation of objects: Analysis and sorting of objects based on user-defined criteria (area, height, width, circumference, position face up/face down and more).	
	Result processing: Math	Offset of numerical results; calculation of distances and angles; comparison of results; output of a digital (good/bad) result.	

Color detection

	Color value	Output of color values via interfaces, setting options for color space: RGB, HSV, LAB.	–
	Color list	Color evaluation via list: find a color from a list of taught colors, evaluation of colors according to color deviation (delta e) in the color spaces RGB, HSV and LAB.	
	Color area	Color evaluation via area: evaluation of interrelated color area according to size and color. Innovative configuration via histogram for color spaces RGB, HSV and LAB.	

VISOR® vision sensor

Detectors and application examples

Position tracking

/// **Edge detection**	High-performance edge finder for position tracking. Combination of different search strategies possible. Innovative visualisation of edges found. Definition of measurement sensitivity by dividing the measurement field into search beams.		
Pattern matching	Object search based on pattern matching: once a pattern has been taught, consecutive images are then scanned for the same pattern. The degree of similarity can be defined by switching thresholds. Free form function for teaching random shapes. Detection of rotated patterns.		
Contour	Object search based on contour comparison: once a contour has been taught, images are scanned for the same contour. The degree of similarity can be defined by switching thresholds. Free form function for teaching random shapes. Orientation and scaling variations are configurable.		

Functions & preprocessing filters

Pattern matching	Object search based on pattern matching: once a pattern has been taught, consecutive images are then scanned for the same pattern. The degree of similarity can be defined by switching thresholds. Free form function for teaching random shapes.		
Filter	Large number of preprocessing filters to improve the picture before actual image processing.		
Color filters	Definition of any color as software color filter to enable OCR on multi-colored backgrounds or the highlighting of edges during object detection tasks (e.g. for parts on colored conveyor belts)		

Interfaces	
SensoWeb	Visualisation of images and results. Easy connection to system visualisation by web browser.
PROFI NET®	Industrial Ethernet in compliance with PROFINET standard (Conformance Class B) through integrated Ethernet interface. VISOR® control options via PROFINET commands.
EtherNet/IP™	Industrial Ethernet in compliance with EtherNet/IP standard through integrated Ethernet interface. VISOR® control options via EtherNet/IP commands.
Ethernet TCP/IP	Ethernet interface with user-configurable protocol. VISOR® control options via TCP/IP commands.

Calibration	
Calibration (scaling/ perspective)	Output of results in customised units (mm, cm, inch). Effects of perspective corrected according to the calibration method.
Robotic calibration	Output of results in customised units (mm, cm, m, inch) in a world coordinates system. A number of different methods are available for high flexibility.

VISOR® Allround

Advanced allround vision sensor for complex inspection tasks.
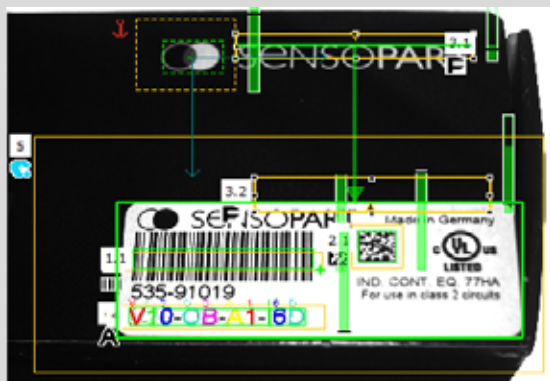
made in Germany

VISOR® Allround – Object detection in color plus identification united in one device.
The VISOR® Allround is a real multi-talent among vision sensors. In the allround version, the device combines the functions of the object sensor (i.a. calibration, pattern matching, contour, calliper, BLOB) with the powerful tools of the code reader (barcode, datamatrix and optical character recognition).

HIGHLIGHTS OF VISOR® ALLROUND

- All evaluations („Detectors") of VISOR® Object and VISOR® Code Reader united in one device

- Highly accurate evaluation via 5 megapixel chip

- Powerful color detection of version with color chip

- EtherNet/IP PROFINET (conformance class B), EtherNet (TCP/IP) supported

- Multishot function reveals minimal height differences and suppresses printed markings

- Calibration function for measurement tasks and robotics applications
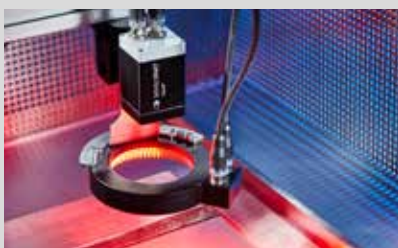
Raised or recessed object details – such as embossed digits and characters on a credit card – are difficult to detect with standard image processing methods. A remedy for this problem was found in the new Multishot function of VISOR® vision sensor range of SensoPart.

VISOR® Allround – Object detection in colour plus identifi-
cation united in one device.
The VISOR® Allround is the latest member in the VISOR® family
and a real multi-talent among vision sensors. In the new allround
version, the device unites the functions of the object sensor
(i.a. calibration, pattern matching, contour, calliper, BLOB) with
the powerful tools of the code reader (bar code, datamatrix and
optical character recognition). When feeding parts in correct
alignment or positioning components, additional data matrix
codes for example can now also be read. With a resolution of
up to 5 megapixel even the smallest details are reliably detected
and evaluated.

In addition to the monochrome version, the VISOR® Allround
is also available as a colour version with up to 5 megapixel.
Thus additional "Detectors" are available for colour evaluation.
Even the subtlest nuances in shade can be reliably detected.
The relevant object colours, for example, can be taught-in quite
simply by push of a button or - thanks to the intuitive colour
histogram - set graphically for each channel in the colour space.
The authorised colour tolerances can be defined by the user.

VISOR® Allround – Product Overview				
	Product variant	Resolution	Focal Length	Integrated illumination
V50x-ALL-P3-C-2	Professional	2560 x 1936 mono/color	C-Mount	None
V20x-ALL-A3-xxx	Advanced	1440 x 1080 mono/color	Wide	White, red[1] or infrared[1] LEDs
V20x-ALL-A3-xxx			Medium	White, red[1] or infrared[1] LEDs
V20x-ALL-A3-xxx			Narrow	White, red[1] or infrared[1] LEDs
V20x-ALL-A3-C-2			C-Mount	None
V20x-ALL-P3-xxx	Professional	1440 x 1080 mono/color	Wide	White, red[1] or infrared[1] LEDs
V20x-ALL-P3-xxx			Medium	White, red[1] or infrared[1] LEDs
V20x-ALL-P3-xxx			Narrow	White, red[1] or infrared[1] LEDs
V20x-ALL-P3-C-2			C-Mount	None
V10x-ALL-A3-xxx	Advanced	800 x 600 mono/color	Wide	White, red[1] or infrared[1] LEDs
V10x-ALL-A3-xxx			Medium	White, red[1] or infrared[1] LEDs
V10x-ALL-A3-xxx			Narrow	White, red[1] or infrared[1] LEDs
V10x-ALL-A3-C-2			C-Mount	None

[1] only with monochrome version

VISOR® Allround

System description

VISOR® Allround – Object detection in color plus identification combined in one device

The VISOR® Allround leaves nothing to be desired. The VISOR® Allround combines the functions of the object sensor (i.a. calibration, pattern matching, contour, calliper, BLOB) with the powerful tools of the code reader (barcode, datamatrix and optical character recognition). When feeding parts in correct alignment or positioning components, additional data matrix codes for example can now also be read. With a resolution of up to 5 megapixel even the smallest details are reliably detected and evaluated.

Special image filters for image pre-processing can be used, e.g. to highlight edges or to suppress distracting details.

Communication interfaces

In addition to EtherNet/IP and TCP/IP, the VISOR® vision sensors also support the fieldbus standard Profinet IO and thus "understand" the most common communication standards of Industrial Ethernet. Thanks to freely available PLC function blocks for Siemens S7, Codesys and Allen Bradley, the VISOR® can also be easily and flexibly connected to PLC environments. The new VISOR® Allround is thus one of the most powerful vision sensors in the market.

Raised or recessed object details – such as embossed digits and characters on a credit card – are difficult to detect with standard image processing methods. Even use of lateral lighting generally results in poorly identifiable contours due to overexposure and shadows. The solution comes in the shape of SensoPart's VISOR® vision sensor series with the new Multishot function. Contours now stand out clearly so that raised or recessed letters and digits can be easily read, e.g. using the vision sensor's OCR function. Other application examples for VISOR® Multishot include the reading of data matrix codes moulded directly into plastic surfaces, detection of damage such as dents or scratches, or the recognition of raised adhesive beads on the same colored background.

[1] not with color hardware V10C/V20C   [2] only color hardware

Product variants VISOR® Allround

VISOR® Allround Presence, completeness, measurement, position check, color, reading of barcodes, data codes, text, multi-shot	Advanced	Professional
Resolution		
V10 (800 × 600): Mono | Color	✓	–
Images per second: Mono | Color	75 | 50	–
V20 (1440 × 1080): Mono | Color	✓	
Number of images per second: Mono | Color	40 | 20	
V50 (2560 × 1936): Mono | Color	–	✓
Images per second: Mono | Color	–	22 | 8
Lighting	white, red[1], infrared[1]	
Multishot (Mono)	✓	
Target laser	✓	
Lenses		
V10 wide | medium | narrow | c-mount	✓ | ✓ | ✓ | ✓	–
V20 wide | medium | narrow | c-mount	✓ | ✓ | ✓ | ✓	
V50 wide | medium | narrow | c-mount	–	– | – | – | ✓
Interfaces	Ethernet/EtherNet/IP/PROFINET	
Inputs | outputs | selectable	2 | 2 | 6	
Encoder input	✓	
Ethernet | EtherNet/IP | PROFINET | SensoWeb	✓ | ✓ | ✓ | ✓	
Service Port	✓	
Job/Detectors		
Number of jobs (max.)	255	
Number of detectors per job (max.)	255	
Calibration		
Scaling | Perspective	✓ | ✓	
Point-pair list | Calibration plate (robot)	–	✓
Hand-eye | Base-eye calibration (robot)	–	✓
Preprocessing		
Preprocessing filter	✓	
Multiple image capture | Shutter variation	✓	
Freeform search area	✓	
Position tracking		
Contour comparison (translation, rotation 360°)	✓	
Pattern matching (translation, rotation 360°)	✓	
Edge detection (translation, rotation)	✓	
Object detection		
Contour | Multiple detection	✓	
Pattern comparison | Multiple detection	✓	
Grey level | Contrast | Brightness	✓	
Calliper	✓	
BLOB	✓	
3D contour	–	✓
Identification		
Barcodes | Datacode	✓	
Barcode Advanced | Datacode Advanced	✓	
Clear text (OCR)	✓	
Robotics functions		
Result offset image | 2D | 3D	–	✓
Checking space around gripper	–	✓
Color detectors V10C / V20C / V50C		
Color field | Color value | Color list	✓ | ✓ | ✓	
Color distance | Binarisation	✓ | ✓	
Result processing		
Result processing - Text | Math	✓ | ✓	

Overview of the user interface

A   **Menu bar:** rapid access to the most important functions.

B   **Setup navigation:** dependable user guidance through the configuration process.

C   **Image window:** live picture of the object with graphic display of inspection area and results.

D   **Context help:** precise information on every work step.

E   **Trigger function:** triggered operation or free-running, single picture or serial switching.

F   **Online/offline operation:** operating with sensor connected or simulation with stored pictures.

G   **Result window:** Overview of all results.

H   **Status line:** current information on active job and on state of outputs.

VISOR® Object

Detects the right part in the wrong place and vice versa.

■■■ made in Germany

The one with a BLOB: *With the BLOB detector (Binary Large Object), the VISOR® detects even small differences between objects, counts parts or detects whether a part is face up or face down.*

The same or not the same?
The VISOR® detects even the smallest of color nuances more reliably than the human eye. This allows, for example, the detection of color deviations or the sorting of parts by color.

HIGHLIGHTS OF VISOR® OBJECT

- Detectors for presence and completeness checks, position control and simple measurement tasks

- Precise position determination: x/y-position and orientation

- Easy to use calibration for measuring tasks. Conversion into mm and correction of distortion and perspective

- Improved object detection through additional color information

- Extensive logic and calculation functions allow the complete evaluation directly on the sensor

- Flexible definition of output data

- EtherNet/IP PROFINET (conformance class B), EtherNet (TCP/IP) supported

- Comprehensive possibilities for archiving images and data

Objects that sometimes appear in unexpected positions and have complex shapes and details – classic switching sensors would be completely overwhelmed by such detection tasks. Not the VISOR® Object from SensoPart: it always maintains its overview, detecting defective parts, parts in the wrong position, wrong orientation, wrong sequence or a combination of them all – in an instant. The comprehensive calibration functions range from a simple scaling factor to the correction of image and lens distortions at a mouse click. With its highly precise position and orientation detection, our VISOR® Object is one of the best in its class.

Seven detectors plus position detection

An expansive range of detectors is available for inspection tasks and evaluations: pattern matching, contour detection, calliper, BLOB, brightness, grey threshold and contrast detection. Position tracking offers reliable detection of those features that do not repeatedly appear in the original position taught. All evaluations take place relative to the current part position and orientation, without them having to be defined for every possible position of an individual feature. The color version features detectors for color detection, enabling VISOR® to also distinguish between the finest nuances in shade. This powerful tool allows you to solve even demanding applications confidently!

VISOR® Object – Product overview				
	Product variant	Resolution	Focal Length	Integrated illumination
V50x-OB-A3-xxx	Advanced	2560 x 1936 mono/color	C-Mount	None
V20x-OB-A3-xxx			Wide	White, red[1] or infrared[1] LEDs
V20x-OB-A3-xxx	Advanced	1440 x 1080 mono/color	Medium	White, red[1] or infrared[1] LEDs
V20x-OB-A3-xxx			Narrow	White, red[1] or infrared[1] LEDs
V20x-OB-A3-C-2			C-Mount	None
V10x-OB-S3-xxx			Wide	White, red[1] or infrared[1] LEDs
V10x-OB-S3-xxx	Standard	800 x 600 mono/color	Medium	White, red[1] or infrared[1] LEDs
V10x-OB-S3-xxx			Narrow	White, red[1] or infrared[1] LEDs
V10x-OB-A3-xxx			Wide	White, red[1] or infrared[1] LEDs
V10x-OB-A3-xxx	Advanced	800 x 600 mono/color	Medium	White, red[1] or infrared[1] LEDs
V10x-OB-A3-xxx			Narrow	White, red[1] or infrared[1] LEDs
V10x-OB-A3-C-2			C-Mount	None

[1] Only with monochrome version

VISOR® Object

System description

The VISOR® Object from SensoPart not only impresses with its excellent performance data, but also with its sophisticated operating concept: even the definition of complex inspection tasks is achieved rapidly and without complication thanks to its comfortable and easily understood user interface – even without detailed image-processing knowledge. You define and test your inspection tasks ("job") and desired evaluations ("detectors") in a few intuitive setup steps.

The effect of every setting is immediately visible in the image. Comprehensive logic functions allow the direct assignment of more complex inspection results to one of six digital result outputs. Time-based control of signal output is also possible via the integrated encoder function. The integrated image recorder, with which you can carry out fault analyses and simulations, is also very helpful.

Everything in view with the Viewer: after completing configuration, the vision sensor works in your production plant autonomously, i.e. without a PC connection. Of course, data can be called up at any time during running operation: our own Viewer software "SensoView" with hierarchical user rights (reliably preventing unintentional changes to the configuration) is
available for this. "SensoWeb" enables a simple integration into the plant visualisation via web browser. Professional image processing can be this simple and comfortable!

Product variants VISOR® Object

VISOR® Object Presence, completeness, measurement, position check, color	Standard	Advanced
Resolution		
V10 (800 × 600): Mono | Color	✓	
Images per second: Mono | Color	75 | 50	
V20 (1440 × 1080): Mono | Color	–	✓
Number of images per second: Mono | Color	–	40 | 20
V50 (2560 × 1936): Mono | Color	–	✓
Images per second: Mono | Color	–	22 | 8
Lighting		
Multishot (Mono)	–	
Target laser	–	✓
Lenses		
V10 wide | medium | narrow | c-mount	✓| ✓| ✓| –	✓| ✓| ✓| ✓
V20 wide | medium | narrow | c-mount	– | – | – | –	✓| ✓| ✓| ✓
V50 wide | medium | narrow | c-mount	– | – | – | –	– | – | – | ✓
Interfaces	Ethernet/EtherNet/IP/PROFINET	
Inputs | outputs | selectable	2 | 2 | 4	2 | 2 | 6
Encoder input	–	✓
Ethernet | EtherNet/IP | PROFINET | SensoWeb	✓ | ✓| ✓| ✓	
Service Port	–	✓
Job/Detectors		
Number of jobs (max.)	8	255
Number of detectors per job (max.)	32	255
Calibration		
Scaling | Perspective	✓ | –	✓ | ✓
Point-pair list | Calibration plate (robot)	–	– | –
Hand-eye | Base-eye calibration (robot)	–	
Preprocessing		
Preprocessing filter	–	✓
Multiple image capture | Shutter variation	–	✓
Freeform search area	✓	
Position tracking		
Contour comparison (translation, rotation 360°)	✓	
Pattern matching (translation, rotation 360°)	–	✓
Edge detection (translation, rotation)	–	✓
Object detection		
Contour | Multiple detection	✓ | –	✓ | ✓
Pattern comparison | Multiple detection	✓ | –	✓ | ✓
Grey level | Contrast | Brightness	✓	
Calliper	✓	
BLOB	–	✓
3D contour	–	–
Identification		
Barcodes | Datacode	–	
Barcode Advanced | Datacode Advanced	–	
Clear text (OCR)	–	
Robotics functions		
Result offset image | 2D | 3D	– | – | –	– | –| –
Checking space around gripper	–	
Color detectors V10C / V20C / V50C		
Color field | Color value | Color list	✓ | – | –	✓ | ✓| ✓
Color distance | Binarisation	– | –	✓ | ✓
Result processing		
Result processing - Text | Math	– | –	– | ✓

Overview of the user interface

A   **Menu bar:** rapid access to the most important functions.

B   **Setup navigation:** dependable user guidance through the configuration process.

C   **Image window:** live picture of the object with graphic display of inspection area and results.

D   **Context help:** precise information on every work step.

E   **Trigger function:** triggered operation or free-running, single picture or serial switching.

F   **Online/offline operation:** operating with sensor connected or simulation with stored pictures.

G   **Configuration window:** input of parameters for every navigation step.

H   **Status line:** current information on active job and on state of outputs.

VISOR® Robotic

An eye on everything – the vision sensor for robotics applications

The VISOR® Robotic detects the position of the component in a load carrier and transmits the gripping position directly to the robot.

The VISOR® Robotic determines the exact position of the sensor housing. Offset data is used to correct the robot's trajectory.

HIGHLIGHTS OF VISOR® ROBOTIC

- Compact and lightweight housing for moving or stationary applications
- Calibration methods tailored to the application
- 2D or 3D localisation in robot coordinates
- Simplified setup through 3D gripper point transformation
- Less robot programming when images are captured in diverse positions
- Different hardware versions up to 5 megapixel chip

Material feed

Feeding systems in a production line are becoming increasingly versatile – in addition to universal load carriers, components can be supplied with utmost flexibility using hopper feeders. Thanks to the VISOR® Robotic, components can be reliably located and gripped with both feed options. When loose components are supplied, the sensor not only checks their position but also inspects the free space around the gripper. The VISOR® determines both sets of information and sends them to the robot controller via one of the integrated and standardised process interfaces. The process is managed on the basis of this information – the object is gripped or the feeder is triggered.

The application can also be flexibly adapted to individual goods carriers without the need for a costly centring device. The VISOR® detects the position and the fill level of the carrier and transmits this information to the robot. If the camera is mounted in a stationary manner, this is cycle time-neutral.

Processing of components

What happens after components have been reliably collected by the gripper? The VISOR® Robotic also supplies important information for the next work steps, and demonstrates its skills in robot-controlled applications, such as the placing of screws, the mounting of clips or the application of glue. The detection of component positions is carried out effortlessly; this allows the correction of any offset and increases the quality of production. Knowledge of the exact position of a component ensures, for example, the precise insertion of a windscreen. Mechanical effort is reduced, and the production line becomes even more flexible. The VISOR® Robotic concept enables direct communication between the VISOR® and the robot, an additional instance is no longer necessary for many applications.

VISOR® Robotic – product overview				
	Product variants	Resolution	Focal length	Integrated lighting
V50x-RO-P3-C-2	Professional	2560 × 1936 mono/color	C-Mount	None
V20x-RO-A3-xxx	Advanced	1440 × 1080 mono/color	wide	White, red[1] or infrared[1] LEDs
V20x-RO-A3-xxx			medium	White, red[1] or infrared[1] LEDs
V20x-RO-A3-xxx			narrow	White, red[1] or infrared[1] LEDs
V20x-RO-A3-C-2			C-Mount	None
V20x-RO-P3-xxx	Professional		wide	White, red[1] or infrared[1] LEDs
V20x-RO-P3-xxx			medium	White, red[1] or infrared[1] LEDs
V20x-RO-P3-xxx			narrow	White, red[1] or infrared[1] LEDs
V20x-RO-P3-C-2			C-Mount	None
V10-RO-A3-xxx	Advanced	800 × 600 mono	wide	White, red[1] or infrared[1] LEDs
V10-RO-A3-xxx			medium	White, red[1] or infrared[1] LEDs
V10-RO-A3-xxx			narrow	White, red[1] or infrared[1] LEDs
V10-RO-A3-C-2			C-Mount	None

[1] Only with monochrome version

VISOR® Robotic

System description

A diverse specialist

Expectations of today's robotics solutions are steadily rising in the context of Industry 4.0, paired with a simultaneous desire for greater ease-of-use. And this is precisely where the VISOR® Robotic demonstrates its outstanding ability. Available in several versions, it offers the perfect solution for a variety of automation tasks. Designed with integrated and standardised interfaces, VISOR® Robotic can be easily incorporated in existing installations and systems, and thanks to different calibration methods and flexible data structures, it is also suited to a diverse range of procedures.

Product variants VISOR® Robotic

VISOR® Robotic Robotics, presence, completeness, measurement, positioning	Advanced	Professional
Resolution		
V10 (800 × 600): Mono | Color	✓	–
Images per second: Mono | Color	75	–
V20 (1440 × 1080): Mono | Color	✓	
Number of images per second: Mono | Color	40 | 20	
V50 (2560 × 1936): Mono | Color	–	✓
Images per second: Mono | Color	–	22 | 8
Lighting	white, red1, infrared[1]	
Multishot (Mono)	–	
Target laser	✓	
Lenses		
V10 wide | medium | narrow | c-mount	✓ | ✓| ✓| ✓	–
V20 wide | medium | narrow | c-mount	✓ | ✓| ✓| ✓	
V50 wide | medium | narrow | c-mount	–	– | – | – | ✓
Interfaces	Ethernet/EtherNet/IP/PROFINET	
Inputs | outputs | selectable	2 | 2 | 6	
Encoder input	✓	
Ethernet | EtherNet/IP | PROFINET | SensoWeb	✓ | ✓| ✓| ✓	
Service Port	✓	
Job/Detectors		
Number of jobs (max.)	255	
Number of detectors per job (max.)	255	
Calibration		
Scaling | Perspective	✓ | ✓	
Point-pair list | Calibration plate (robot)	✓ | ✓	
Hand-eye | Base-eye calibration (robot)	–	✓
Preprocessing		
Preprocessing filter	✓	
Multiple image capture | Shutter variation	✓	
Freeform search area	✓	
Position tracking		
Contour comparison (translation, rotation 360°)	✓	
Pattern matching (translation, rotation 360°)	✓	
Edge detection (translation, rotation)	✓	
Object detection		
Contour | Multiple detection	✓ | ✓	
Pattern comparison | Multiple detection	✓ | ✓	
Grey level | Contrast | Brightness	✓	
Calliper	✓	
BLOB	✓	
3D contour	–	✓
Identification		
Barcodes | Datacode	–	✓ | ✓
Barcode Advanced | Datacode Advanced	–	✓ | ✓
Clear text (OCR)	–	✓ | ✓
Robotics functions		
Result offset image | 2D | 3D	✓ | ✓| ✓	
Checking space around gripper	✓	
Color detectors V10C / V20C / V50C		
Color field | Color value | Color list	✓ | ✓| ✓	
Color distance | Binarisation	✓ | ✓	
Result processing		
Result processing - Text | Math	– | ✓	✓ | ✓

Guide to user interface

A   **Select calibration plate:** choice of four different sizes.

B   **Start calibration:** VISOR® is calibrated in just one click.

C   **Fiducials:** image coordinates mapped to robot coordinates at four points.

D   **Calibration method:** a calibration method tailored to the application can be chosen in a clear selection list.

E   **Gripping space check:** a freely accessible object is always output if available.

F   **Result offset:** define the result point, and therefore the position that the robot moves to on the component, yourself.

G   **Blob detector:** localise components regardless of their shape and size. No need to teach a reference.

VISOR® Code Reader

Reads whatever is printed, dot-peened and lasered.

made in Germany

The VISOR® Code Reader from SensoPart easily reads barcodes of numerous types as well as printed and directly marked data matrix codes according to the ECC200 standard, regardless of the carrier materials (metal, plastic, paper, glass). The sensor even easily deciphers skewed or distorted codes, or those on to convex, reflective or transparent surfaces.

Built-in early warning system: the VISOR® Code Reader evaluates the quality of your printed and directly marked data matrix codes on the basis of standardised quality parameters according to ISO and AIM standards.

The VISOR® Code Reader Standard offers suitable tools for easily readable barcodes and data matrix codes (e.g. printed).
The Advanced or Professional versions provide high-performance reading algorithms for difficult codes (e.g. directly marked).

HIGHLIGHTS OF VISOR® CODE READER

- Reliably reads barcodes as well as printed and directly marked data matrix codes, and even several codes simultaneously and mixed 1D/2D codes

- Supplementary object detection for characteristics other than codes

- Evaluation of quality parameters according to ISO/IEC 15415 and AIM DPM 2006

- Flexible definition of output data (header, trailer, net data)

- String comparison with message via the digital switching output

- Support of EtherNet/IP and DHCP, PROFINET

- Comprehensive options for archiving images and data

- Reading of optical characters with OCR

Printed barcodes

Code on shiny metallic surface
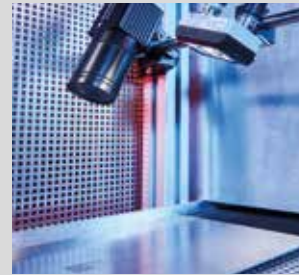
Dot-peened code with external lighting

A lot of information in a small space: up to 2,334 ASCII symbols (7 bit) or 3,116 digits can be coded with an ECC-200 data matrix code.

VISOR® Code Reader – product overview

	Product variants	Resolution	Field of view	Integrated lighting
V50-CR-A3-xxx	Advanced	2560 x 1936 mono	C-Mount	None
V50-CR-P3-xxx	Professional	2560 x 1936 mono	C-Mount	None
V20-CR-S3-xxx	Standard	1440 x 1080	wide	White, red or infrared LEDs
V20-CR-S3-xxx			medium	White, red or infrared LEDs
V20-CR-S3-xxx			narrow	White, red or infrared LEDs
V20-CR-A3-xxx	Advanced	1440 x 1080	wide	White, red or infrared LEDs
V20-CR-A3-xxx			medium	White, red or infrared LEDs
V20-CR-A3-xxx			narrow	White, red or infrared LEDs
V20-CR-A3-C-2			C-Mount	None
V20-CR-P3-xxx	Professional	1440 x 1080	wide	White, red or infrared LEDs
V20-CR-P3-xxx			medium	White, red or infrared LEDs
V20-CR-P3-xxx			narrow	White, red or infrared LEDs
V20-CR-P3-C-2			C-Mount	None
V10-CR-S3-xxx	Standard	800 x 600	wide	White, red or infrared LEDs
V10-CR-S3-xxx			medium	White, red or infrared LEDs
V10-CR-S3-xxx			narrow	White, red or infrared LEDs
V10-CR-A3-xxx	Advanced	800 x 600	wide	White, red or infrared LEDs
V10-CR-A3-xxx			medium	White, red or infrared LEDs
V10-CR-A3-xxx			narrow	White, red or infrared LEDs
V10-CR-A3-C-2			C-Mount	None
V10-CR-P3-xxx	Professional	800 x 600	wide	White, red or infrared LEDs
V10-CR-P3-xxx			medium	White, red or infrared LEDs
V10-CR-P3-xxx			narrow	White, red or infrared LEDs
V10-CR-P3-C-2			C-Mount	None

The VISOR® Code Reader

System description

With its integrated object detection, the VISOR® Code Reader is unique in its price segment. The compact sensor reads conventional 1D barcodes, 2D data matrix codes and now also optical characters (OCR). It also has four detectors for object detection (pattern comparison, brightness, grey level and contrast), with which other object features – for example, stamps or logos – can be evaluated in a single reading pass. Codes and object features are even reliably detected with deviations from the taught-in position – using position tracking (optionally activated).

A special image filter with expanded setting options guarantees excellent reading performance even under difficult reading conditions. The test results can largely be evaluated within the sensor itself – with the option of string comparison or regular printouts – so, in many cases it eliminates the connection requirement to PLC or PC. If, however, this proves necessary, it can be easily and flexibly connected using freely available PLC function blocks for Siemens S7, Codesys and Allen Bradley.
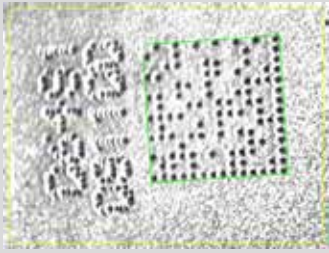
With integrated quality parameters complying with ISO and AIM standards, the VISOR® Code Reader also permits the informative evaluation of printed and direct marked 1D and 2D codes. Integrated red, infrared or white light variants provide maximum functional reliability through optimum code illumination.

In addition, the robust, compact and industry-oriented housings guarantee reliability even where space is restricted. Integrated 6 mm or 12 mm optics or C-mount devices also save effort and costs through their optimum adaptation to the most varied of code sizes and operating distances. The V20 variants also offer a resolution of 5 megapixels for particularly small codes or large search areas.

[1] not with color hardware V10C/V20C

Product variants VISOR® Code Reader

| VISOR® Code Reader Reading of barcodes, 2D codes, text	Standard	Advanced	Professional
Resolution			
V10 (800 × 600): Mono | Color		✓ | –	
Images per second: Mono | Color		75 | –	
V20 (1440 × 1080): Mono | Color		✓ | –	
Number of images per second: Mono | Color		40 | –	
V50 (2560 × 1936): Mono | Color	–	✓ | –	
Images per second: Mono | Color	–	22 | –	
Lighting			
Multishot (Mono)		–	
Target laser	nur V20	✓	
Lenses			
V10 wide | medium | narrow | c-mount	✓| ✓| ✓| –	✓| ✓| ✓| ✓	
V20 wide | medium | narrow | c-mount	✓| ✓| ✓| –	✓| ✓| ✓| ✓	
V50 wide | medium | narrow | c-mount	–	– | – | – | ✓	
Interfaces			
Inputs | outputs | selectable	2 | 2 | 4	2 | 2 | 6	
Encoder input	–	✓	
Ethernet | EtherNet/IP | PROFINET | SensoWeb		✓| ✓| ✓| ✓	
Service Port	–	✓	
Job/Detectors			
Number of jobs (max.)	8	255	
Number of detectors per job (max.)	2	255	
Calibration			
Scaling | Perspective		–	
Point-pair list | Calibration plate (robot)		–	
Hand-eye | Base-eye calibration (robot)		–	
Preprocessing			
Preprocessing filter	–	✓	✓
Multiple image capture | Shutter variation	–	✓	✓
Freeform search area	–	–	✓
Position tracking			
Contour comparison (translation, rotation 360°)	–		✓
Pattern matching (translation, rotation 360°)	–		✓
Edge detection (translation, rotation)	–		✓
Object detection			
Contour | Multiple detection		– | –	
Pattern comparison | Multiple detection	– | –		✓ | ✓
Grey level | Contrast | Brightness	–		✓
Calliper		–	
BLOB		–	
3D contour		–	
Identification			
Barcodes | Datacode		✓	
Barcode Advanced | Datacode Advanced	–	✓	
Clear text (OCR)	–		✓
Robotics functions			
Result offset image | 2D | 3D		– | – | –	
Checking space around gripper		–	
Color detectors V10C / V20C / V50C			
Color field | Color value | Color list		– | – | –	
Color distance | Binarisation		– | –	
Result processing			
Result processing - Text | Math	– | –	✓ | –	

Dot-peened code on rough substrate
Code is made legible by powerful reading algorithm. Presence of the nailed imprint in plain text can be checked using object detection.

Low-contrast code
Code is made legible through high tolerance – also towards weakly contrasting codes.

Optical character reading
Dot matrix printing can also be read with OCR.
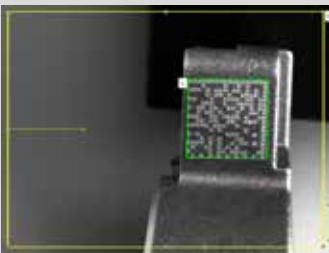
Code with small "quiet zone"
Even codes with a small quiet zone or damaged finder pattern can be read.

Code reading on solar cells
Even extremely small codes (e.g. on silicon solar cells) or highly reflective codes (e.g. on thin-layer solar cells) can be read.
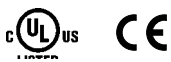
Printed codes on pharmaceutical packaging
ECC200 or bar codes (e.g. EAN 13) can be searched for simultaneously. In addition to code reading, the presence of optical characters can also be checked using object detection.

Special features of the VISOR® Code Reader

- Can be used for all common 2D codes (e.g. ECC 200 data matrix) and common 1D bar codes

- Optimum cost-effectiveness through combination of two functions in one device: code reading and object detection

- High operating dependability through reliable detection of even poorly readable codes under difficult ambient conditions

- Thanks to the function "Result Processing Text", the reading results can be emitted in virtually any format

- Flexible and simple connection to PC and PLC environments due to comprehensive possibilities for archiving pictures and read results, as well as freely available PLC function blocks for Siemens S7, Codesys and Allen Bradley

- Very high flexibility, e.g. also due to reading several similar or different codes in one reading pass

- Reading of optical characters with OCR based on neural networks, particularly suitable for point printing

Technical data

Optical data

Number of pixels, chip size	VISOR®- V10...: 800 (H) × 600 (V) VISOR®- V20...: 1440 (H) × 1080 (V) VISOR®- V50...:2560 (H) × 1936 (V)
Technology	CMOS (mono / color)
Integrated measuring lighting	8 LEDs (except C-mount)
Integrated measurement distance	wide, medium, narrow, motorised focus

Electrical data

Operating voltage +U_B	18 … 30 V DC[1]
Power consumption (without I/O)	≤ 300 mA
Protection circuits	Reverse-polarity protection, U_B / short-circuit protection of all outputs
Rise-time delay	Approx. 13 s after Power on
Outputs	PNP / NPN (switchable)
Max. output current (per output)	50 mA, 100 mA (pin 12)
Inputs	PNP/NPN High > U_B-1 V, Low < 3 V
Input resistance	> 20 kΩ
Encoder input	40 kHz
Interfaces	Ethernet (LAN), RS422, RS232, EtherNet/IP, PROFINET, SensoWeb
Inputs / Outputs	2 inputs, 2 outputs, 6 selectable inputs/outputs

Mechanical data

Dimensions	71 × 45 × 45 mm (without connector)
Enclosure rating	IP 67
Material housing	Aluminium, plastic, die-cast, RoHS compliant
Material, front screen	Plastic
Ambient temperature: operating	0 … +50° C[2]
Ambient temperature: Storage	-20 … +60° C[2]
Weight	Approx. 200 g
Plug Connections	Supply and I/O M12, 12-pin, Ethernet M12, 4-pin
Vibration / shock resistance	EN 60947-5-2

[1] Max. ripple < 5 V_{SS} [2] 80 % air humidity, non-condensing   [3] dependent on model

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Vision sensor VISOR® with integrated optics & lighting
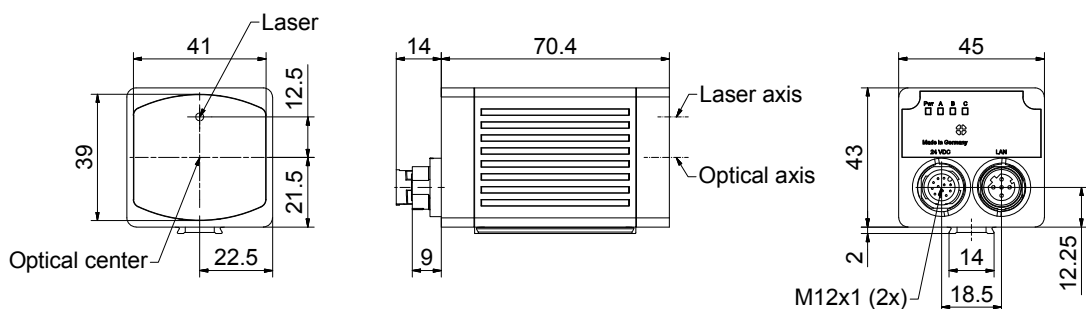
153-13554

Vision sensor VISOR® C-mount

153-13555

Version: 04/2020. Subject to changes; diagrams similar

Field of view V10 wide

155-03101

Depth of field: normal V20 wide

155-03279

Field of view V10 medium

155-03100

Depth of field: normal V20 medium

155-03099

Field of view V10 narrow

155-03097

Depth of field: normal V20 narrow

155-03098
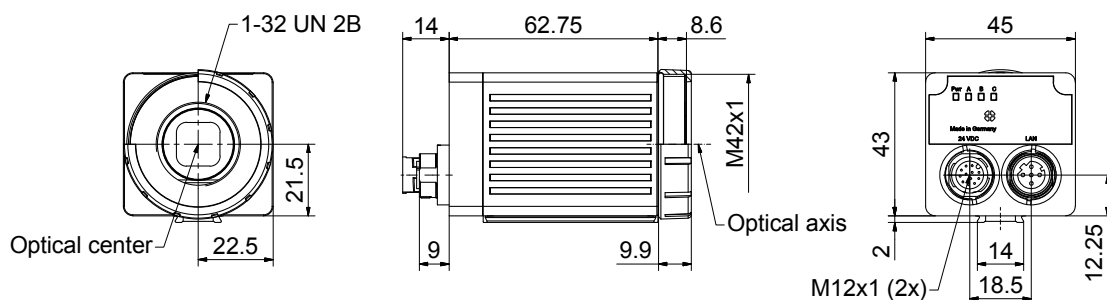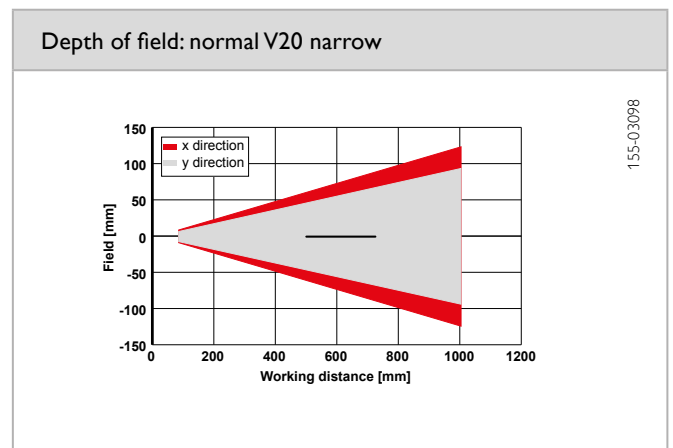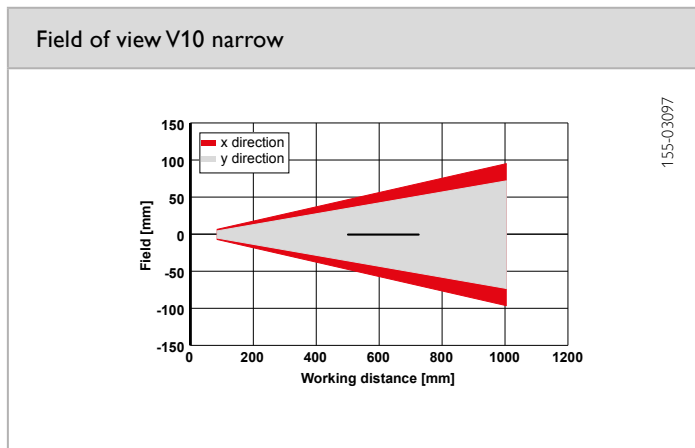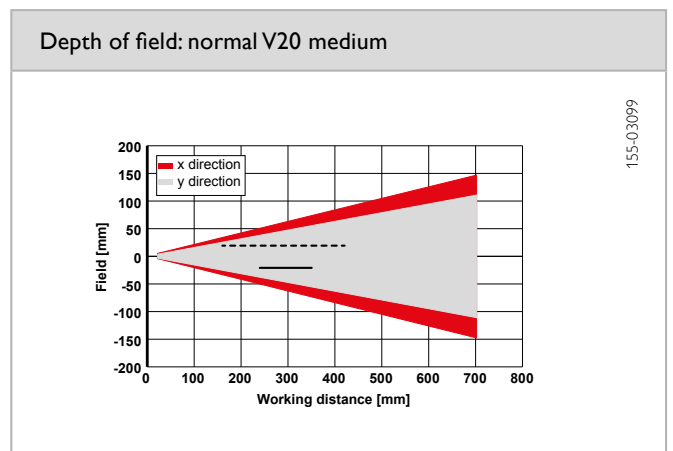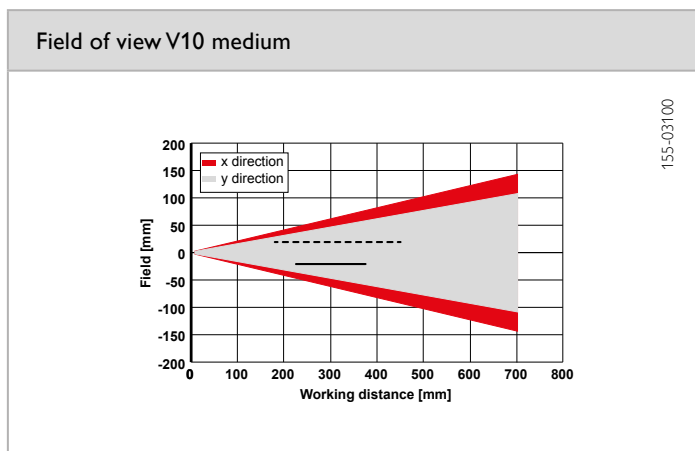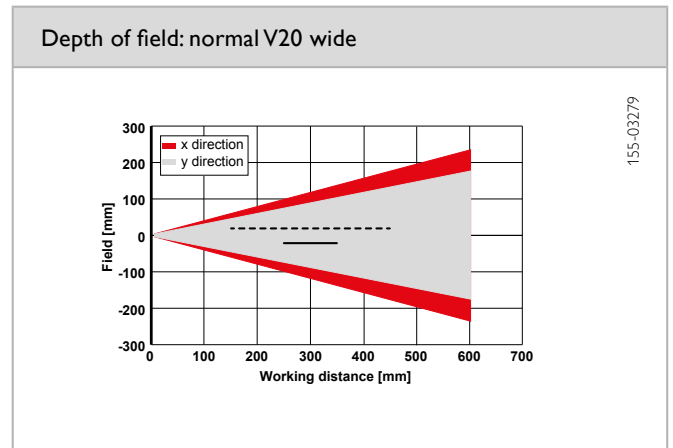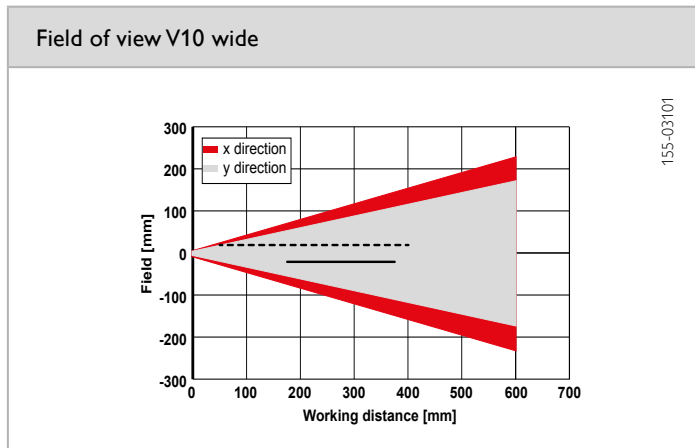
- - - - - Increased depth of field
———— Normal depth of field

Accessories

Brackets

Brackets for V10, V20, V50				
	 153-01181	Part number / Article number Description Suitable for	MG 3A / 543-11024 Mounting hinge with 3 axes and drilled hole for mounting rod Material: anodised aluminium V10 / V20	
	 153-12553	Part number / Article number Description Suitable for	MG 3A-MST12 / 543-11034 Mounting hinge with 3 axes for fixing at mounting rods 12 mm Material: anodised aluminium V10 / V20	

Accessories

Lenses

Lenses, C-mount			
 Sample image: lens 16 mm	 153-13655	Part number / Article number Für the lenses: V10/ V20/ V50	LOC-08-HD-30.5x0,5 / 526-51535 8 mm focal length LOC-12-HD-27x0,5 / 526-51536 12 mm focal length LOC-16-HD-27x0,5 / 526-51537 16 mm focal length LOC-25-HD-27x0,5 / 526-51538 25 mm focal length LOC-35-HD-27x0,5 / 526-51539 35 mm focal length LOC-50-HD-27x0,5 / 526-51540 50 mm focal length LOC-75-HD-34x0,5 / 526-51541 75 mm focal length

Accessories, lenses

	Part number	Article number	Description
	LR 5	543-11011	Intermediate ring 5 mm
	ETS	527-51143	Intermediate ring set: 1 x 0,5 mm 1 x 10 mm 2 x 1 mm 1 x 20 mm 1 x 5 mm 1 x 40 mm
	Part number	Article number	Description
	LOF-BP-R635-30,5x0,5	533-01015	Red filter for C-mount lens, Bandpass 610 - 660 nm
	LOF-LP-IR850-30,5x0,5	533-01010	Infrared filter for C-mount lens, Transmission > 825 nm
	LOF-PF-30,5 x 0,5	526-51531	Polarisation filter for C-mount lens

C-Mount protective casing for VISOR®

153-13561

Part number / Article number	LPT Vxx-G37.5 / 651-01006
Description	C-Mount IP 65 protective casing Flange 5 mm Maximum lens dimensions: diameter: 38 mm length: 33 mm
Suitable for	V10 / V20/ V50 C-Mount

153-13560

Part number / Article number	LPT Vxx-25.0 / 651-01007
Description	C-Mount IP 65 protective casing Flange 5 mm Maximum lens dimensions: extension diameter: 38 mm length: 25 mm
Suitable for	V10 / V20/ V50 C-Mount

155-03144

V10,V20,V50

C-Mount Objektive:
LOC-08-HD-30,5x0,5 / 526-51535
LOC-12-HD-27x0,5 / 526-51536
LOC-16-HD-27x0,5 / 526-51537
LOC-25-HD-27x0,5 / 526-51538
LOC-35-HD-27x0,5 / 526-51539
LOC-50-HD-27x0,5 / 526-51540
LOC-75-HD-34x0,5 / 526-51541

C-mount IP 65 protective casing
LPT Vxx-G37,5 / 651-01006

Protective tube extension 25.0 mm for
LPT Vxx-G37.5 LPT Vxx-25.0 / 651-01007

Protective casing and polarizer glasses

153-13556

Part number / Article number	LPC Vxx / 651-01001
Description	Removable protective casing for Vx0 with integrated lens/lighting
Suitable for	V10 / V20

153-13559

Part number / Article number	LPC Vxx S1-5 / 651-01002
Description	Replacement panels (glass) for LPC Vxx, set of 5 pieces Material: coated glass
Suitable for	LPC Vxx

153-13557

Part number / Article number	LPF Vxx S1 / 651-01003
Description	Polarising filter panel for LPC Vxx (100 % coverage) Material: coated glass
Suitable for	LPC Vxx

153-13558

|	
Part number / Article number	LPF Vxx S2 / 651-01004
Description	Polarising filter panel for LPC Vxx (50 % coverage, switchable) Material: coated glass
Suitable for	LPC Vxx

Accessories

Illumination

Ring light for V10, V20, V50

| Part number	Article number	Description	Angle bracket
LFR 115 WD-24-2L12	525-51150	Ring light, V10 / V20, white, diffuse, 12-pin	543-11015
LFR 115 RD-24-2L12	525-51151	Ring light, V10 / V20, red, diffuse, 12-pin	543-11015
LFR 115 ID-24-2L12	525-51152	Ring light, V10 / V20, infrared, diffuse, 12-pin*	543-11015
LFR 115 WK-24-2L12	525-51153	Ring light, V10 / V20, white, clear, 12-pin	543-11015
LFR 115 RK-24-2L12	525-51154	Ring light, V10 / V20, red, clear, 12-pin	543-11015
LFR 115 IK-24-2L12	525-51155	Ring light, V10 / V20, infrared, clear, 12-pin*	543-11015
		Does not require switching amplifier	
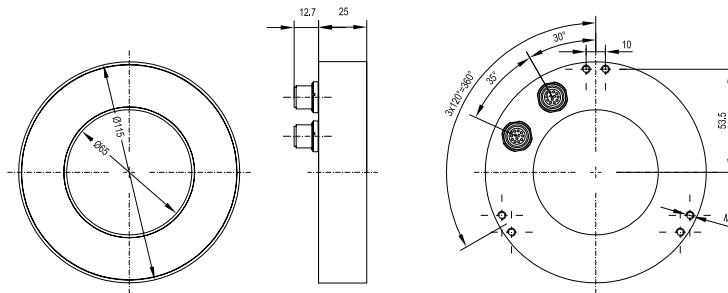
153-00926

Spot illumination V10, V20, V50

Part number	Article number	Description
LS 55 x 46 WK-24-A13 2L12	532-51101	Ring light, V10/V20, white, diffuse, 12-pin
LS 55 x 46 RK-24-A13 2L12	532-51102	Ring light, V10/V20, red, diffuse, 12-pin
LS 55 x 46 iRK-24-A13 2L12	532-51103	Ring light, V10/V20, infrared, diffuse, 12-pin*
		Does not require switching amplifier

Connection adapter for illumination on V10, V20, V50

Part number	Article number	Description
LA45V-24-2L12	525-01001	V10 / V20 connection adapter for LED illumination with 5-pin M12 plug
LA45VT-24-2L12	525-01002	V10 / V20 connection adapter for LED illumination with 5-pin M12 plug, with trigger output

Ring light
LR 100 xD

Connection adapter
LA 45 V-24-2L12

VISOR

24V - I/O
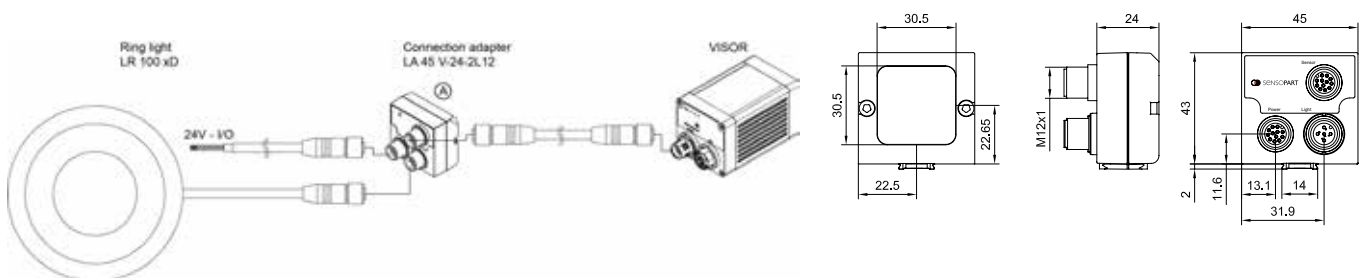
* External IR illumination is only possible for IR types or C-Mount sensors.
LED ring lighting for the incidental illumination of objects in IP67-tight housings. No switching amplifier is required and cascading is possible.
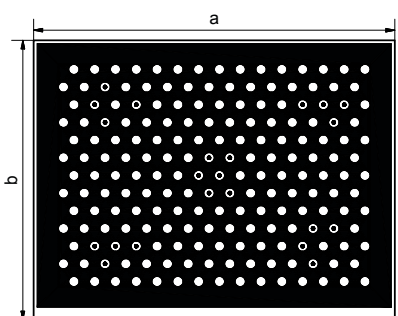
Cables

Part number	Article number	Description
M12 socket, 12-pin		**Supply and I/O lines i.a. for V10, V20** shielded 360 °, suitable for drag chains, suitable for robotics applications
C L12FG-S-2m-PUR	902-51801	2 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12FG-S-5m-PUR	902-51796	5 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12FG-S-10m-PUR	902-51797	10 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
M12 socket, 3-pin		**Supply and I/O lines i.a. for V10, V20 (3-pin - 24 V, GND, trigger)** shielded, suitable for drag chains, suitable for robotics aplications
C L12/3FG-S-2m-PUR	902-51833	2 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12/3FG-S-5m-PUR	902-51834	5 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12/3FG-S-10m-PUR	902-51835	10 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
M12 plug 4-pin, d-coding **to RJ45 plug**		**Ethernet lines i.a. for V 10, V 20, IO-Link master** shielded 360 °, suitable for drag chains, suitable for robotics applications
CI L4MG/RJ45G-GS-3m-PUR	902-51754	3 m, straight, d-coded, PUR, IP 65 / IP 67 / IP 68
CI L4MG/RJ45G-GS-5m-PUR	902-51782	5 m, straight, d-coded, PUR, IP 65 / IP 67 / IP 68
CI L4MG/RJ45G-GS-10m-PUR	902-51784	10 m, straight, d-coded, PUR, IP 65 / IP 67 / IP 68
M12 socker 4-pin to **M12 socket 12-pin**		**llumination lines for V10, V20** shielded 360 °, suitable for drag chains
CB L12FS/L12FS-0,35m-GG-PUR	902-51841	0.35 m, M12 straight socket a-coded to 12-pin straight socket a-coded, PUR, IP 65 / IP 67 / IP 68
CB L12FS/L12FS-0,5m-GG-PUR	902-51806	0.5 m, M12 straight socket a-coded to 12-pin straight socket a-coded, PUR, IP 65 / IP 67 / IP 68
CB L12FS/L12FS-2m-GG-PUR	902-51807	2 m, M12 straight socket a-coded to 12-pin straight socket a-coded, PUR, IP 65 / IP 67 / IP 68
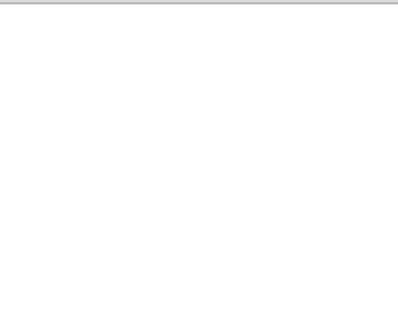
ZCP

Calibration accessories for SensoPart vision sensors

Calibration plates

Part number	Article number	Description	Typ
ZCP 50-13x15	533-11030	15x13 points, 50 mm × 37,9 mm	Standard
ZCP 100-13x15	533-11031	15x13 points, 100 mm × 75,8 mm	Standard
ZCP 200-13x15	533-11032	15x13 points, 200 mm × 151,7 mm	Standard
ZCP 500-13x15	533-11033	15x13 points, 500 mm × 379,2 mm	Standard
ZCP 50-13x15-X01	533-11037	15x13 points, crosshairs, 50 mm × 37,9 mm	X01
ZCP 100-13x15-X01	533-11038	15x13 points, crosshairs, 100 mm × 75,8 mm	X01
ZCP 200-13x15-X01	533-11039	15x13 points, crosshairs, 200 mm × 151,7 mm	X01
ZCP 500-13x15-X01	533-11040	15x13 points, crosshairs, 500 mm × 379,2 mm	X01
ZCP 100-13x15-X02	533-11035	15x13 points, fiducials, 100 mm × 75,8 mm	X02
ZCP 50-13x15-X03	533-11042	15x13 points, fitting holes, 50 mm × 37,9 mm	X03
ZCP 100-13x15-X03	533-11041	15x13 points, fitting holes, 100 mm × 75,8 mm	X03
ZCP 100-ECC200	533-11036	Calibration plate for Code Reader ECC200 quality parameters	-

The calibration plates are used for calibrating the VISOR® vision sensor.
Scaling, tilt angle against perpendicular view to the measurement plane or by lens distortion are all corrected.

Dimensional drawing Standard

153-13531

	a [mm]	b [mm]	c [mm]	d [mm]	e Ø [mm]	t [mm]	Recommended field of view [mm]
ZCP 50-13x15	54	47				2	22 - 50
ZCP 100-13x15	104	85				2	30 - 100
ZCP 200-13x15	204	161				4	60 - 200
ZCP 500-13x15	504	389				4	150 - 500

Supports calibration method „Calibration plate (Measurement)".
Reference marks: none.

Dimensional drawing X01

153-01300

	a [mm]	b [mm]	c [mm]	d [mm]	e Ø [mm]	t [mm]	Recommended field of view [mm]
ZCP 50-13x15-X01	98	54				2	22 - 50
ZCP 100-13x15-X01	180	100				2	30 - 100
ZCP 200-13x15-X01	340	176				4	60 - 200
ZCP 500-13x15-X01	820	403				4	150 - 500

Supports calibration method „Calibration plate (Robotics)".
With the reference marks, a reference to the absolute coordinate system is established.
Reference marks: crosshairs.

PV-AW10IoT10.4TX(-V)

Display and configuration device for SensoPart vision sensors

CE

IP 65

PRODUCT HIGHLIGHTS

- Display and configuration device for SensoPart vision sensors and systems
- Suitable for installation in switching cabinet doors and operating panels
- Completely preconfigured

Functions

Resolution	1024 × 768
Aspect ratio	4 : 3
Technology	TFT
Colors	16.2 millions
Backlight	LED
Backlight life time	30,000 h
Luminance [1]	350 cd/m²
Contrast ratio [1]	1200 : 1
Operating system	Windows® 10 IoT

Electrical data

Operating voltage $+U_B$	24 V DC ± 20 %
CPU	AMD® GX-415GA / Quad Core™ / 1.5 GHz 64 Bit / 2 MB Cache
USB	2 × USB Host 3.0
Ethernet	2 × 1 Gbit Ethernet
Communication	1 × RS232
Video	1 × DVI-I
Memory	4 GB DDR3L
Storage	64 GB MLC
BIOS	AMI BIOS, supports ACPI function

Mechanical data

Dimensions	266 × 213.2 × 52.4 mm
Enclosure rating	IP 65
Ambient temperature: operation	0 ... +50 °C
Ambient temperature: storage	-10 ... +70 °C
Weight	1700 g

[1] The values are refferring to the displays only

Part number	Article number	Description
PV-AW10IoT10.4TX	533-01031	Panel PC 10.4'', Win10 IoT, XGA, Touch, front panel mount
PV-AW10IoT10.4TX-V	533-01032	Panel PC 10.4'', Win10 IoT, XGA, VESA mount

Accessories

Connection cable (Ethernet cable)	From Page A-34

We look ahead

Yesterday, today and in the future

"We gauge ourselves not by what is possible today, but by our vision of what can be achieved" – this has been our motto since the foundation of SensoPart in 1994. Our goal is to always be a step ahead and to be able to offer our customers the most innovative sensor for industrial automation.

True to this motto, we offer easy-to-integrate VISOR® vision sensors and compact laser sensors with outstanding background suppression made in Germany.

We still also have plenty of ideas for the future - watch this space.

SENSOR TECHNOLOGY

Light barriers	Vision sensors
Diffuse sensors	Smart cameras
Laser sensors	Vision systems
Miniature sensors	Object detection
Distance sensors	Object measurement
Color sensors	Color detection
Contrast sensors	Code reading
Anti-collision sensors	Lighting
Slot sensors	Lenses
Fiber-optic sensors	
Inductive sensors	
Ultrasonic sensors	

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www.sensopart.com

05/20 069-00102

VISOR® and sensors

Effective automation solutions for practical use

Product overview VISOR® vision sensors

	VISOR® Allround		VISOR® Object	
	Presence, completeness, measurement, color, reading of barcodes, 2D codes		Presence, completeness, measurement, color	
	Advanced	Professional	Standard	Advanced
Resolution				
V10 | V10C 800 × 600	Monochrome | Color	–	Monochrome | Color	
Number of images per second V10 | V10 C	75 | 50	– | –	75 | 50	
V20 | V20C 1440 × 1080	Monochrome | Color		–	Monochrome | Color
Number of images per second V20 | V20 C	40 | 20		– | –	40 | 20
Lighting	white, red[1], infrared[1]			
Multishot (only at monochrome hardware)	✓		–	
Target laser	✓		–	✓
Lenses				
V10 wide | medium | narrow | c-mount	✓ | ✓ | ✓ | ✓		✓ | ✓ | ✓ | –	✓ | ✓ | ✓ | ✓
V20 wide | medium | narrow | c-mount	✓ | ✓ | ✓ | ✓		– | – | – | –	✓ | ✓ | ✓ | ✓
Interfaces				
Inputs | outputs | selectable	2 | 2 | 6		2 | 2 | 4	2 | 2 | 6
Encoder input	✓		–	✓
Ethernet | EtherNet/IP | Profinet | SensoWeb	✓ | ✓ | ✓ | ✓		✓ | ✓ | ✓ | ✓	
Service port	✓		–	✓
Job/Detectors				
Number of jobs (max.)	255		8	255
Number of detectors per job (max.)	255		32	255
Calibration				
Calibration (scaling, perspective)	✓		–	✓
Robot calibration	–	✓	–	
Preprocessing				
Preprocessing filter	✓		–	✓
Multiple image capture/Shutter variation	✓		–	✓
Free-form search area	✓		✓	
Position tracking				
Contour comparison (translation, rotation 360°)	✓		✓	
Pattern matching (translation, rotation 360°)	✓		–	✓
Edge detection (translation, rotation)	✓		–	✓
Object detection				
Contour comparison (translation, rotation 360°)	✓		✓	
Multiple contour detection	✓		–	✓
Pattern matching (translation, rotation 360°)	✓		✓	
Grey level | Contrast | Brightness	✓		✓	
Calliper	✓		–	✓
BLOB	✓		–	✓
Identification				
Datacode	✓		–	
Datacode advanced	✓		–	
Barcode	✓		–	
Barcode advanced	✓		–	
Clear text (OCR)	✓		–	
Robotics functions				
Result offset	–	✓	–	
Checking space around gripper	–	✓	–	
Color detectors[2]				
Color field	✓		✓	
Color value	✓		–	✓
Color list	✓		–	✓
Color distance | Binarisation	✓		–	✓

	VISOR® Robotic		VISOR® Code Reader		
	Robotics, presence, completeness, measurement, positioning		Reading of barcodes, 2D codes, text		
	Advanced	Professional	Standard	Advanced	Professional
Resolution					
V10 | V10C 800 × 600	Monochrome	–	Monochrome		
Number of images per second V10 | V10 C	75	– | –	75 | –		
V20 | V20C 1440 × 1080	Monochrome | Color		–	Monochrome	
Number of images per second V20 | V20 C	40 | 20		– | –	40 | –	
Lighting	white, red[1], infrared[1]				
Multishot	–		–		
Target laser	✓		–	✓	
Lenses					
V10 wide | medium | narrow | c-mount	✓ | ✓ | ✓ | ✓		✓ | ✓ | ✓ | –	✓ | ✓ | ✓ | ✓	
V20 wide | medium | narrow | c-mount	✓ | ✓ | ✓ | ✓		– | – | – | –	✓ | ✓ | ✓ | ✓	
Interfaces					
Inputs | outputs | selectable	2 | 2 | 6		2 | 2 | 4	2 | 2 | 6	
Encoder input	✓			✓	
Ethernet | EtherNet/IP | Profinet | SensoWeb	✓ | ✓ | ✓ | ✓		✓ | ✓ | ✓ | ✓		
Service port	✓		–	✓	
Job/Detectors					
Number of jobs (max.)	255		8	255	
Number of detectors per job (max.)	255		2	255	
Calibration					
Calibration (scaling, perspective)	✓		–		
Robot calibration	✓		–		
Preprocessing					
Preprocessing filter	✓		–	–	✓
Multiple image capture/Shutter variation	✓		–	–	✓
Free-form search area	✓		–	–	✓
Position tracking					
Contour comparison (translation, rotation 360°)	✓		–		✓
Pattern matching (translation, rotation 360°)	✓		–		✓
Edge detection (translation, rotation)	✓		–		✓
Object detection					
Contour comparison (translation, rotation 360°)	✓		–		
Multiple contour detection	✓		–		
Pattern matching (translation, rotation 360°)	✓		–		✓
Grey level | Contrast | Brightness	✓		–		✓
Calliper	✓		–		
BLOB	✓		–		
Identification					
Datacode	–	✓	✓	✓	
Datacode advanced	–	✓	–	✓	
Barcode	–	✓	✓	✓	
Barcode advanced	–	✓	–	✓	
Clear text (OCR)	–	✓	–		✓
Robotics functions					
Result offset	✓		–		
Checking space around gripper	✓		–		
Color detectors[2]					
Color field	–		–		
Color value	–		–		
Color list	–		–		
Color distance | Binarisation	✓		–		

[1] not with color hardware V10C/V20C   [2] only color hardware

Product overview – optical sensors

Product family Dimensions (H × W × D)	Distance sensors	Color (C), contrast (K) and luminescence sensors (UV)	Photoelectric diffuse sensors
F 10 21,1 × 14,6 × 8 mm	FT 10-RLA | **10 – 70 mm**		
F 25 34 × 20 × 12 mm	FT 25-RLA | **20 – 100 mm** FT 25-RA | **20 – 80 mm** FT 25-RA | **30 – 200 mm**	FT 25-RL | **250 mm | K** FT 25-W | **12 mm | K** FT 25-RGB | **12 mm | K** FT 25-C | **12 mm | C**	FT 25-RL | **250 mm** FT 25-R | **800 mm**
F 55 Metal 50 × 50 × 25 mm Plastic 50 × 50 × 23 mm	FT 55-RLAP | **5 m** FR 55-RLAP | **70 m** FT 55-RLAP2 | **5 m** FT 55-RLAM | **1 m**	FT 55-CM | **150 mm**	FT 55-RL | **1.2 m** FT 55-R | **2 m**
F 20 32 × 20 × 12 mm			
F 50 50 × 50 × 17 mm	FT 50-RLA-20 | **40 – 60 mm** FT 50-RLA-40 | **45 – 85 mm** FT 50-RLA-70 | **30 – 100 mm** FT 50-RLA-100 | **70 – 170 mm** FT 50-RLA-220 | **80 – 300 mm**	FT 50-C | **32 mm | C** FT 50-C-UV | **50 mm | UV**	
Barrel type Ø 4 mm M 5 M 12 M 18 M 30			FT 04 | **50 mm** FT 05 | **50 mm** FT 12-R | **300 mm** FT 18-2-R | **400 mm** FMS 18-B | **400 mm** FT 18-2-IR | **800 mm** FMS 30-B | **1 m**
FL 70 84 × 35 × 10 mm	FL 70-RA-xD | Fiber-optic sensors Diffuse **310 mm** Through-beam **810 mm**		
F 90 95 × 93 × 42 mm	FT 91/92-ILA | **6 m** FT 90-ILA | **10 m** FR 91/92-ILA | **50 m** FR 90-ILA | **250 m**		
FG | FGL			

Legend:

- ▯▯▯▯ = Display
- ⊙ = Potentiometer
- ⬚ = Transparent objects/glass
- ▪PC = PC
- ⟱ = Teach-in
- 🔵 = BlueLight
- ⚠ = Laser
- ⬡ = IO-Link

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SENSOPART

Photoelectric diffuse sensors with background suppression (BGS)	Photoelectric retro-reflective sensors	Photoelectric through-beam sensors	Fiber-optic sensors
FT 10-RLH | **60 mm** ⬡ [Teach-in] ⚠	FR 10-RL | **2 m** [Teach-in] ⚠	FS/FE 10-RL | **3 m** [Teach-in] ⚠	
FT 10-B-RLF | **15/30 mm** ⚠	FR 10-R | **1.6 m** [Teach-in]		
FT 10-RH | **70 mm** ⬡ [Teach-in]			
FT 10-RF | **15/30/50 mm**			
FT 10-BF | **30/50 mm** 🔵			
FT 25-RLH | **120 mm** ⬡ [Teach-in] ⚠	FR 25-RL | **13 m** ⬡ [Teach-in]	FS/FE 25-RL | **18 m** ⬡ [Teach-in] ⚠	
FT 25-RH | **200 mm** ⬡ [Teach-in]	FR 25-R | **6 m** ⬡ [Teach-in]	FS/FE 25-R | **13 m** ⬡ [Teach-in]	
FT 25-RHD | **400 mm** ⬡ [Teach-in]	FR 25-RF | **3 m**	FS/FE 25-RF | **4 m**	
FT 25-RF | **60/80 mm** ⬡	FR 25-RGO | **2 m** ⬡ [Teach-in] ⬚		
FT 25-BF | **80 mm** 🔵	FR 25-RLO | **4 m** ⬡ [Teach-in] ⚠		
FT 55-RLH | **800 mm** ⊙ ⚠	FR 55-RL | **12 m** [Teach-in] ⚠	FS/FE 55-RL | **25 m** [Teach-in] ⚠	
FT 55-RLH2 | **1 m** ⊙ ⚠	FR 55-R | **12 m** [Teach-in]	FS/FE 55-R | **20 m** [Teach-in]	
FT 55-B-RH | **800 mm** ⊙	FR 55-RLO | **20 m** [Teach-in] ⚠		
FT 55-RH | **1.2 m** ⊙	FR 55-RLP | **70 m** [Teach-in] ⚠		
FT 55-BH(2) | **1.2 m** ⊙ 🔵			
FT 55-RLHP2 | **5 m** ⬡ [Teach-in] ⚠			
			FL 20-R | Diffuse **100 mm** Through-beam **1 m** [Teach-in]
FT 50-RLH | **150 mm** ⊙ ⚠	FR 50-RL | **20 m** ⊙ ⚠	FS/FE 50-I | **15 m** ⊙	
FT 50-RLHD | **300 mm** ⊙ ⚠	FR 50-R | **5.5 m** ⊙		
FT 50-RH | **300 mm** ⊙			
FT 50-BH | **300 mm** ⊙ 🔵			
FT 50-IH | **600 mm** ⊙			
FT 12-RH | **60 mm** [Teach-in]	FR 12-R | **1.5 m**	FS/FE 12-RL | **5 m** ⚠	
FT 12-RF | **24 mm**		FS/FE 12-R | **4 m**	
FMH 18 | **120 mm**		FS/FE 18-RL | **50 m** ⚠	FMS 18-U | Diffuse **160 mm** Through-beam **700 mm**
	FR 18-2-R | **3 m**	FS/FE 18-R | **20 m**	
	FR 18-2-IR | **3.6 m**	FLS/FLE 18-W | **50 m** ⚠	FMS 30-U | Diffuse **800 mm** Through-beam **4.8 m**
		FSE 18-2-I | **10 m**	FAV 30 | **500 mm**
			FL 70-R | Diffuse **310 mm** Through-beam **810 mm** [Teach-in]
			FL 70-R-xD | Diffuse **310 mm** Through-beam **810 mm** [Display] [Teach-in]
FT 92-IL [Teach-in] ⚠			
		FGL-RK /-IK | **30 – 120 mm** [Teach-in]	
		FGL 5-IK | **5 mm** [Teach-in]	
		FGL | **5 – 220 mm** ⊙	
		FG | **40 – 120 x 80 mm²** ⊙	

Ultrasonic Sensors

| Products		Adjustment	Scanning distances	Special features
UT 20		Teach-in	140 mm / 150 mm / 240 mm / 700 mm	Ultrasonic sensors with soundpipe, PNP, NPN, analogue output
UT 12		Via control input	400 mm	PNP, NPN, analogue output
UT/UM 18		Via control input	250 mm / 300 mm / 800 mm	Variants with stainless steel housings, PNP, NPN, analogue output
UMT 30		Teach-in or display	350 mm / 1.3 m / 3.4 m / 6 m	Display, PNP, 2 × PNP or analogue output

Inductive Sensors

Products		Design	Switching distance	Special features
IT 8 / 10 / 12 IS 455 / 588		Cubic	0.8 mm / 1.5 mm / 3mm / 4 mm / 8 mm / 15 mm / 20 mm / 35 mm	Miniature housing, AC/DC variants
IS 33		Barrel type Ø 3 mm	0.6 mm	PNP, NPN
ISN 44-20 IS 34 IT 4		Barrel type Ø 4 mm	0.8 mm	PNP, NPN, NAMUR, stainless steel housing
IMT 5		Barrel type Ø 5 mm	0.8 mm	PNP, NPN, stainless steel housing
ISZ 46 IS 46 / 56 IDT 6		Barrel type Ø 6,5 mm	1.5 mm / 2 mm / 3 mm	PNP, NPN
IS 48 / 58 IMT 8		Barrel type Ø 8 mm	1.5 mm / 2 mm / 3 mm / 6 mm	PNP, NPN
IMT 12 IT 12 IS 512		Barrel type Ø 12 mm	2 mm / 4 mm / 6 mm / 10 mm	PNP, NPN
IMT 18 IS 518 IT 18		Barrel type Ø 18 mm	5 mm / 8 mm / 10 mm / 12 mm / 20 mm	PNP, NPN, stainless steel housing
IMT 30 IS 530 IT 30		Barrel type Ø 30 mm	10 mm / 15 mm / 20 mm / 22 mm / 40 mm	PNP, NPN, stainless steel housing
IS 512 / 518		Barrel type Ø 12 mm / 18 mm analogue	6 mm / 10 mm	Analogue output

accessories

SmartPlug

Products		Special features
MF**I** (Inverter)		Inverts NPN to PNP or PNP to NPN devices, N.C./N.O. also adjustable
MF**C** (Counter)		Adjustable counter (pulses or intervals) between 1 … 65535
MF**T** (Timer)		Adjustable on-delay or drop-out delay between 1 … 65535 ms
MF**F** (Frequency)		Adjustable frequency monitoring between 15 … 1000 Hz
MF**W** (Wipe Function)		Adjustable wipe function for falling or rising edges; time range 1 … 65535 ms
MF**U** (Universal)		All-in-one multifunctional switching device programmable via USB

Products		Description
Mechanical accessories		Brackets for sensors
		Mountings for VISOR® and illumination
Optical accessories		Reflectors and reflective tape
		Lenses and protective casings
		Illumination
Electrical accessories		Cables
		Converters
		Cables, SensoIO, power supply units and switching devices, Panel Viewer
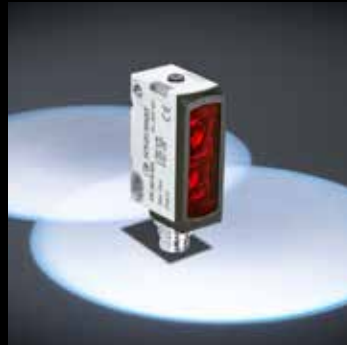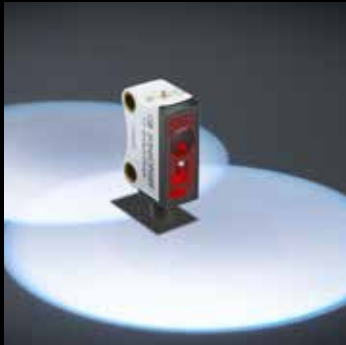
We look ahead

Yesterday, today and in the future

SENSOR TECHNOLOGY

"We gauge ourselves not by what is possible today, but by our vision of what can be achieved" – this has been our motto since the foundation of SensoPart in 1994. Our goal is to always be a step ahead and to be able to offer our customers the most innovative sensor for industrial automation.

With our easy to integrate VISOR® Vision sensors and our compact laser sensors with an amazing background suppression made in Germany, we stick up to this motto.

Get ready – we still have a lot of ideas for the future.

Light barriers	Vision sensors
Proximity switches	Smart cameras
Laser sensors	Vision systems
Miniature sensors	Object detection
Distance sensors	Object measurement
Color sensors	Color detection
Contrast sensors	Code reading
Anti-collision sensors	Lighting
Slot sensors	Lenses
Fibre-optic amplifiers	
Inductive sensors	
Ultrasonic sensors	

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