

# General Catalog



## NEW

### INDUCTIVE SENSORS

- Full Inox Basic with IO-Link
- Full Inox Weld-Immune, M8
- Full Inox C23, cubic with IO-Link
- High Temperature, 230°C (440°F)

### PHOTOELECTRIC SENSORS

- Contrast sensor with IO-Link
- C12: Cubic Subminiature
- C23: Cubic with IO-Link
- C23 Distance: Triangulation
- C55 Distance: TOF

### SAFETY

- Type 2 light curtains for hand protection

### RFID

- LF + HF R/W modules in ContriNet
- HF tags for 180°C (356°F), embeddable in metal
- HF tags for 250°C (482°F)
- EtherCat interface



A  
Swiss  
Company

# INTRODUCTION

## CONTRINEX

Contrinex is a leading manufacturer of sensors for factory automation. The Swiss company, headquartered in Givisiez near Fribourg (CH), has a unique and innovative range of products whose features far surpass those of standard sensors.

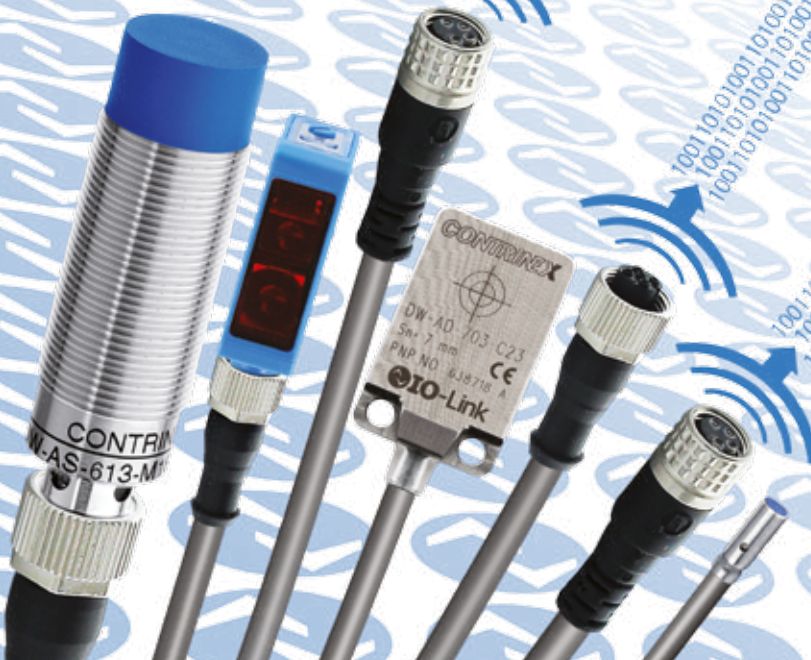
Since its foundation in 1972 by Peter Heimlicher, Dipl Ing ETH, Contrinex has grown from a one-man operation to a multinational group with over 500 employees worldwide. More than 15 subsidiaries cover the core markets in Europe, Asia, North and South America.

### At a glance

- Technology leading manufacturer of inductive and photoelectric sensors as well as safety and RFID systems
- World market leader for miniature sensors, sensors with long operating distances and devices for particularly demanding operating conditions (all-metal, high-pressure and high-temperature resistant sensors)
- Represented in over 60 countries worldwide, headquarters in Switzerland
- 8000 products

**Technology leader for sensor intelligence and industrial RFID**

## CONTRINEX - SENSE MORE, DO MORE



# INTELLIGENT SENSORS FOR THE 4TH INDUSTRIAL REVOLUTION: INDUSTRY 4.0

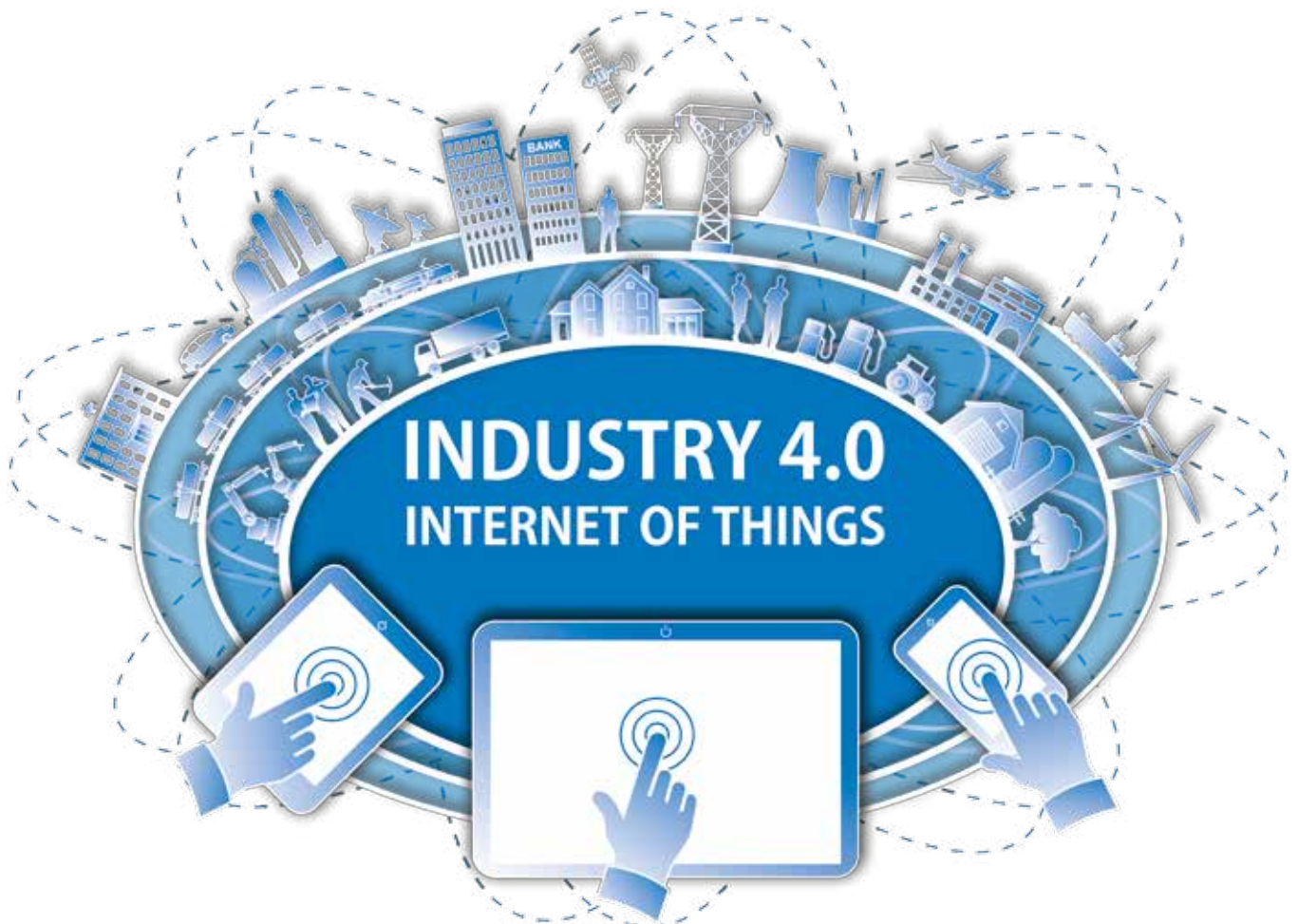
## Fit for the future with IO-Link

Intelligent sensors are the fundamental building blocks of modern smart factories. They enable sensor-supported production resources (machines, robots, etc.) to configure, control, manage and optimize themselves. Precise, reliable sensor data is now more essential than ever.

Sensors from Contrinex, the leader in intelligent sensor technology, ensure excellent data quality. To communicate that data, all Contrinex inductive and photoelectric ASIC sensors will be equipped with IO-Link as standard. Customers use either the sensor's binary PNP output or its intelligent IO-Link interface. Both are available in one and the same device.

Another advantage is the fact that, with Contrinex sensors, there is no extra charge for IO-Link. This makes them not only quick and simple to install, but also highly economic.

As the first standardized IO technology worldwide (IEC 61131-9) for communication with sensors and actuators, IO-Link is crucial to the 4th Industrial Revolution. By installing Contrinex ASIC sensors with IO-Link, users can make themselves fit for the future.



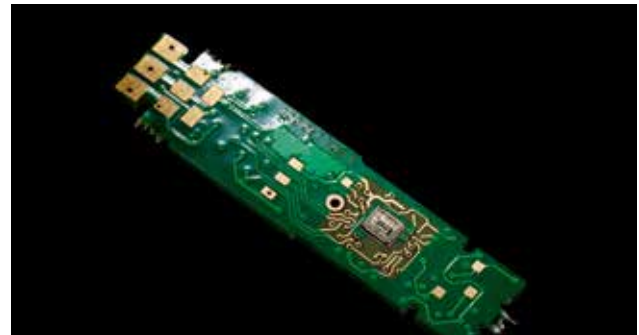


# MARKET-LEADING INNOVATION

- 1979** Sensor business starts with self-contained subminiature inductive sensors: Ø4 mm (instead of M8 before)
- 1982** Launch of inductive sensor with patented Condist® technology – market leadership with operating distances 3x standard
- 1986** Launch of Ø3 mm inductive sensors, now market leader for subminiature inductive sensors
- 1996** Market launch of Ø4 mm subminiature photoelectric sensors
- 1999** Launch of world's first inductive sensor with full-metal housing – thanks to patented Condet® technology
- 2005** Integration of Contrinex's excellent performance for inductive sensors in CMOS-ASIC (Application-Specific Integrated Circuit), a proprietary development
- 2007** Launch of RFID products for closed loop industrial applications. First RFID product range with tags and readers in full-metal housing
- 2008** Launch of Safetinex®, the industrial safety product range
- 2009** The smart sensor is born. Launch of next generation ASIC, a “system on a chip”, including IO-Link interface
- 2011** Development starts on Contrinex's first ASIC for photoelectric sensors
- 2014** Launch of photoelectric sensor with new generation Contrinex ASIC and IO-Link



*Early inductive sensor produced for own use in 1973 (special version for extreme conditions)*



*ASIC sensor technology*



*Safety product range*



*Subminiature photoelectric sensor*



### SENSORS

#### INDUCTIVE

- BASIC
- MINIATURE
- EXTREME
- EXTRA PRESSURE
- HIGH PRESSURE
- EXTRA TEMPERATURE
- HIGH TEMPERATURE
- WASHDOWN
- ANALOG OUTPUT
- 2-WIRE
- WELD-IMMUNE
- SPECIAL

#### PHOTOELECTRIC

- CYLINDRICAL SUBMINIATURE
- CYLINDRICAL MINIATURE
- CYLINDRICAL SMALL
- CUBIC SUBMINIATURE
- CUBIC MINIATURE
- CUBIC SMALL
- CUBIC COMPACT
- FIBER-OPTIC AMPLIFIERS, FIBERS

#### ULTRASONIC

- MINIATURE
- SMALL
- COMPACT

#### CAPACITIVE

- BASIC
- HIGH PERFORMANCE

### SAFETY

#### LIGHT CURTAINS



- FINGER PROTECTION type 4
- HAND PROTECTION type 4 and type 2
- SAFETY RELAYS
- ACCESS CONTROL type 4

### RFID

#### LOW AND HIGH FREQUENCY

- TRANSPONDERS
- CONTRINET
- USB READ/WRITE MODULES
- HANDHELD DEVICES
- ACCESSORIES
- SOFTWARE
- STARTER KITS

# SENSOR SELECTOR

	INDUCTIVE	PHOTOELECTRIC
		
SENSING DISTANCE	1 mm - 40 mm	1 mm - 50,000 mm
TARGET MATERIAL	Metal only	Any material that reflects light
SENSING SPEED	0.02 - 10 kHz	1 - 5 kHz
ENVIRONMENT	Versions for normal or harsh and dirty environments, with protection class up to IP 68 / IP 69K	For clean environments without dust or steam, with protection class up to IP 67
PROGRAM OVERVIEW	P. 16 - 19	P. 168 - 171
TASKS	<ul style="list-style-type: none"> <li>✓ Presence detection of metal objects</li> <li>✓ Position control of all kinds of metal targets</li> <li>✓ Counting tasks</li> <li>✓ Distance control on end positions</li> <li>✓ Quality control</li> </ul>	<ul style="list-style-type: none"> <li>✓ Sensing of light reflective objects</li> <li>✓ Position control of cartons and other objects on conveyors</li> <li>✓ Detection of small objects over large distances</li> </ul>

## ULTRASONIC

## CAPACITIVE



10 mm - 6000 mm

1 mm - 40 mm

Any material that reflects sounds

Metals, non-metals, liquids, powders

1 - 10 Hz

15 - 500 Hz

For industrial environments, with protection class up to IP 67

For normal or demanding environments, with protection class up to IP 67

P. 286 - 287

P. 312 - 313

- ✓ Detection of all objects that reflect ultrasound
- ✓ Monitoring of winding and un-winding processes
- ✓ Liquid level control
- ✓ Loop tension control
- ✓ Position feedback
- ✓ Distance or height control

- ✓ Level control of fluids, bulk materials and powder
- ✓ Presence detection of almost all materials
- ✓ Counting tasks for non-metallic materials
- ✓ Detection through non-metallic container walls



# APPLICATIONS

## AUTOMOTIVE MANUFACTURING INDUSTRY

Today, sensors of all types are common in automotive factories around the globe. Highly automated plants with demanding conformity requirements rely heavily on sensor technology to maintain world-class quality standards, particularly where harsh processes such as welding, metal finishing and high-temperature coating are required.

Manufacturing engineers working for automotive manufacturers and for first- and second-tier suppliers expect robust, reliable sensors that deliver accurate, repeatable results with minimal downtime.

### Recommended product ranges:

- Inductive - Full Inox - Extreme
- Inductive - Classics - Basic
- Inductive - Full Inox - Weld-Immune
- Inductive - Extra Distance - Basic



## PACKAGING MACHINES

On the journey from manufacturer to consumer, packaging protects all types of product, including foods, pharmaceuticals, white goods and cosmetics. Although packaging helps bring competitive products to target markets in the best possible condition, costs are often significant, and automation helps minimize the impact.

The packaging industry is highly innovative, using sensors to identify, select and position packaging of all types. Reducing manufacturing costs and ensuring environmental sustainability are key objectives, and sensors for packaging machines are chosen to maximize efficiency while ensuring reliable, repeatable operation.

### Recommended product ranges:

- Photoelectric - Cubic Small
- Photoelectric - Cylindrical Small
- Photoelectric - Cubic Miniature





## MACHINE TOOLS

Machine tools impose harsh operating conditions on the sensors needed to control cutting, forming and joining processes that run continuously in many metalworking factories. Common hazards include cutting fluid, cooling sprays, swarf particles and electromagnetic interference, making sensor selection particularly difficult where world-class performance is essential.

Size is another key factor, as modern tool-holders allow only limited space for the sensors needed to identify and position individual tools during rapid tool-changing. The right sensors contribute to efficient production, without interruption or error.

### Recommended product ranges:

Inductive - Classics - Miniature  
Photoelectric - Cylindrical Subminiature  
Inductive - Extra Distance - Basic



## LOGISTICS

Whatever the logistics system, choosing the right sensors is crucial to achieving the six “rights” of logistics: ensuring that the right goods, in the right quantities, in the right condition, are delivered to the right place, at the right time, for the right cost.

From large-scale containerized shipping to everyday internal logistics, engineers select the right sensor technology for each container, conveyor, palletizer or robot, ensuring reliable, repeatable detection and identification, together with trouble-free operation.

### Recommended product ranges:

Inductive - Extra Distance - Basic  
Photoelectric - Cubic Small  
Inductive - Classics - Basic  
Photoelectric - Cylindrical Small



# APPLICATIONS

## TEXTILE

Machinery manufacturers supplying the textile, leather and clothing industries rely on sensors for efficiency, reliability and precision. World-class accuracy is essential for production of technical textiles and for making the carbon or chemical fibers used in modern, innovative products, often in highly automated factories.

The high-speed machinery used by textile manufacturers must operate continuously and safely, relying on top-quality sensors for all aspects of access and control. The environmental challenges include industrial cleaning routines that test every sensor to the limit of its capability.

### Recommended product ranges:

- Inductive - Classics - Basic
- Inductive - Extra Distance - Basic
- Photoelectric - Cylindrical Small



## FILLING MACHINES

Filling machines are widespread in many industries, including solids handling, chemical, food, beverage and pharmaceutical, often operating continuously around the clock. Industrial sensors detect containers, lids, labels and caps, measure fill levels and more, and play a vital role in keeping automated filling equipment running reliably, accurately and with minimal downtime.

When handling bulk solids or aggressive chemicals, or working in environments that may operate harsh clean-in-place routines, choosing robust, high-quality sensors is essential to maximize operational efficiency and minimize total cost of ownership.

### Recommended product ranges:

- Photoelectric - Cubic Small
- Capacitive - Cylindrical - Basic
- Photoelectric - Cylindrical Small





## GREEN ENERGY AND ENVIRONMENT

The Green Economy relies heavily on technology for its continued advancement, and sensors are a major component of any eco-friendly strategy. Environmental initiatives include wind-, wave- and solar-power generation, industrial and domestic recycling, energy management and development of alternative fuels.

To deliver the green agenda, all of these sectors utilize sensors extensively for reliable detection and identification of materials, accurate measurement of operational parameters and consistent control of processes.

### Recommended product ranges:

Inductive - Full Inox - Washdown

Inductive - Classics - Basic

Inductive - Extra Distance - Basic



## MOBILE EQUIPMENT

Repairing and servicing equipment on site can be difficult and costly at best, and sometimes impossible. In these circumstances, robust, highly reliable sensors are vital for continuous operation in environments that may be challenging in the extreme. Exposure to dirt and dust, impact, vibration, seawater, corrosive chemicals and extremes of temperature and pressure are all part of a regular day's work.

Manufacturers of mobile and portable equipment, including forklifts, agricultural machines, construction plant, aircraft, vehicles and ships, expect exceptional reliability and life-expectancy when selecting fit-and-forget sensors for these demanding applications.

### Recommended product ranges:

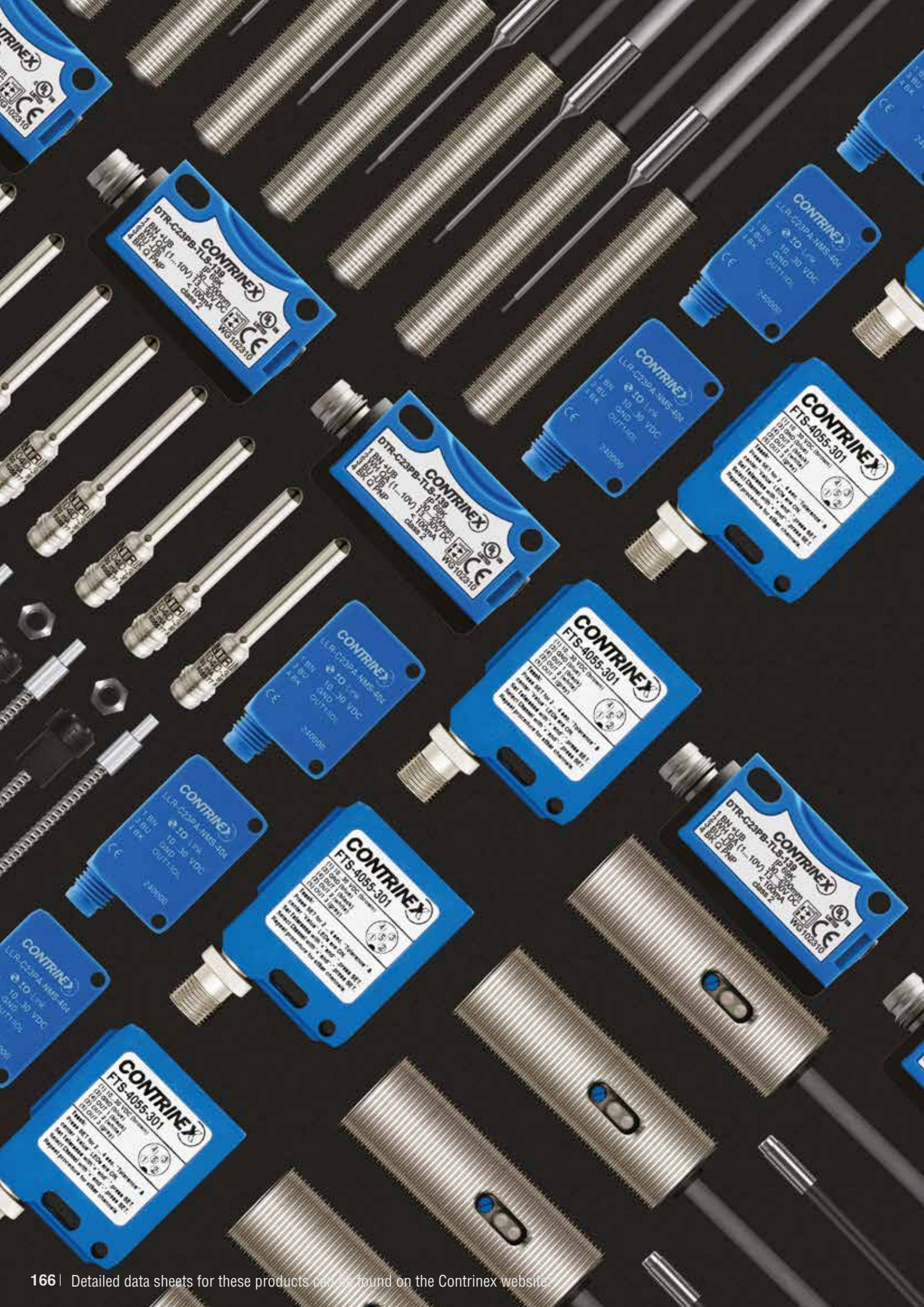
Inductive - Extra Distance - High pressure

Inductive - Full Inox - Extreme

Inductive - Extra Distance - Basic











# PHOTOELECTRIC SENSORS

## HIGHLIGHTS:

- ✓ Smallest self-contained subminiature sensors on the market
- ✓ Excellent background suppression characteristics
- ✓ Highly accurate laser sensors
- ✓ Analog output sensors for precise distance control
- ✓ Sensors with short housings and 90° sensing
- ✓ Wide range of fiber-optic amplifiers, including IO-Link
- ✓ Fiber-optic solutions for the most demanding environments
- ✓ Through-beam sensors for longest sensing ranges
- ✓ Excellent color recognition sensors

## NEW:

- ✓ High performance contrast sensor with IO-Link
- ✓ Miniature C23 Series with IO-Link
- ✓ Distance measurement sensors in C23 and C55 sizes
- ✓ Subminiature C12 sensors with pinpoint LED

# PROGRAM OVERVIEW

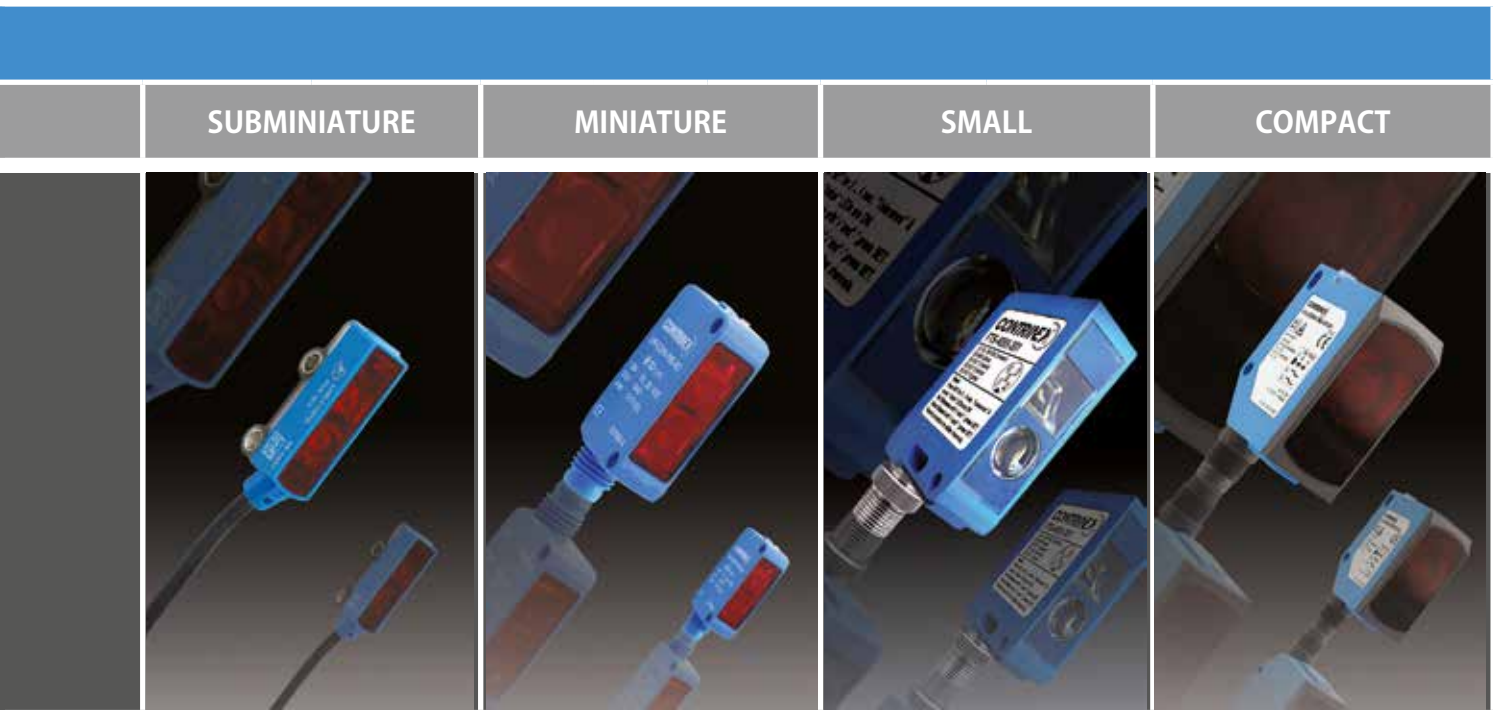


## CYLINDRICAL

SERIES		1040	1050	1120	1120L	1180 / 1180W	1180L
HOUSING SIZE IN MM		∅ 4	M5	M12	M12	M18	M18
SPECIAL					<b>Laser</b>		<b>Laser</b>
Operating principle	SENSING RANGE						
Diffuse	0 ... 1500 mm	p. 181-183	p. 183-186	p. 191		p. 198-199	p. 203
Background suppression	2 ... 5000 mm					p. 197-198	
Reflex	0 ... 8000 mm			p. 192		p. 200-201	
Through-beam	0 ... 50'000 mm		p. 186	p. 192	p. 193	p. 201-202	p. 204
Analog output	10 ... 100 mm						
Contrast	12 mm						
Color	30 ... 40 mm						
Fiber-optic amplifiers *	0 ... 200 mm						
Distance	20 ... 5000 mm						

\* Optical amplifiers are presented in the optical fiber section





Inductive  
 Photoelectric  
 Ultrasonic  
 Capacitive  
 Safety  
 RFID  
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# CUBIC

	C12	0507	C23	3030	3060	4040	4050	C55
	13x21x7 13x27x7	5x7x40	30x20x10 34x20x12	30x30x15	31x60x10	40x40x19	40x50x15	50x50x23
								<b>Laser</b>
		p. 213	p. 218	p. 225-226			p. 233	
	p. 209		p. 217	p. 223-224			p. 233	p. 241
	p. 210		p. 219	p. 227-228			p. 234	
	p. 210		p. 219	p. 229			p. 234	
				p. 223				
							p. 237	
							p. 237	
				p. 255-256	p. 259-261	p. 263		
			p. 221					p. 241

# PROGRAM OVERVIEW

HOUSING SIZE	SENSING RANGE						PAGE
	1 mm	10 mm	100 mm	1000 mm	10,000 mm	100,000 mm	
<b>DIFFUSE</b>							
∅ 4 mm / M5	10 mm						181, 183-184
∅ 4 mm / M5	20 mm						182, 184-185
∅ 4 mm / M5	50 mm						182-183, 185-186
5 x 7 mm	20 mm						213
5 x 7 mm	50 mm						213
5 x 7 mm	90 mm						213
M12	300 mm						191
M18 (M18W)	40 ... 600 mm						198-199
M18 △	40 ... 250 mm						203
M18 △	60 ... 600 mm						203
C23	1500 mm						218
30 x 30 mm	600 mm						225
30 x 30 mm	1200 mm						226
40 x 50 mm	30 ... 1200 mm						233
<b>BACKGROUND SUPPRESSION</b>							
M18 (M18W)	10 ... 120 mm						197-198
C12	1 ... 120 mm						209
C23	10 ... 300 mm						217
30 X 30 mm	15 ... 200 mm						223-224
40 X 50 mm	30 ... 500 mm						233
C55 △	0 ... 5000 mm						241
<b>REFLEX</b>							
M12	1500 mm						192
M18 (M18W)	2000 mm						200-201
C12	3000 mm						210
C23	8000 mm						219
30 X 30 mm	2000 mm						227
30 X 30 mm	4000 mm						228
40 X 50 mm	4000 mm						234
<b>ANALOG OUTPUT</b>							
30 x 30 mm	10 ... 100 mm						223

HOUSING SIZE	SENSING RANGE						PAGE
	1 mm	10 mm	100 mm	1000 mm	10,000 mm	100,000 mm	
<b>THROUGH-BEAM</b>							
M5	250 mm						186
M12					10,000 mm		192
M12 $\Delta$					50,000 mm		193
M18 (M18W)					20,000 mm		201-202
M18 $\Delta$					50,000 mm		204
C12					2000 mm		210
C23					30,000 mm		219
30 x 30 mm					6000 mm		229
30 x 30 mm					12,000 mm		229
40 x 50 mm					50,000 mm		234
<b>FIBER-OPTIC AMPLIFIER</b>							
30 x 30 mm	60 mm						255
30 x 30 mm	120 mm						256
31 x 60 mm	100 mm						259
31 x 60 mm	200 mm						259-261
40 x 40 mm	150 mm						263
<b>CONTRAST</b>							
40 x 50 mm	12 mm						237
<b>COLOR</b>							
40 x 50 mm	30 ... 40 mm						237
<b>DISTANCE MEASURING</b>							
C23	20 ... 80 mm						221
C23					30 ... 200 mm		221
C55 $\Delta$					100 ... 5000 mm		241

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

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# INTRODUCTION

## OPERATING PRINCIPLE

The light-emitting diode (LED) emits a beam of modulated light towards the target. This beam is interrupted by the target, causing partial reflection. A part of the reflected light reaches the sensing face of the receiver. Depending on the operating principle, either the interrupted beam or the reflected light is used for further processing.

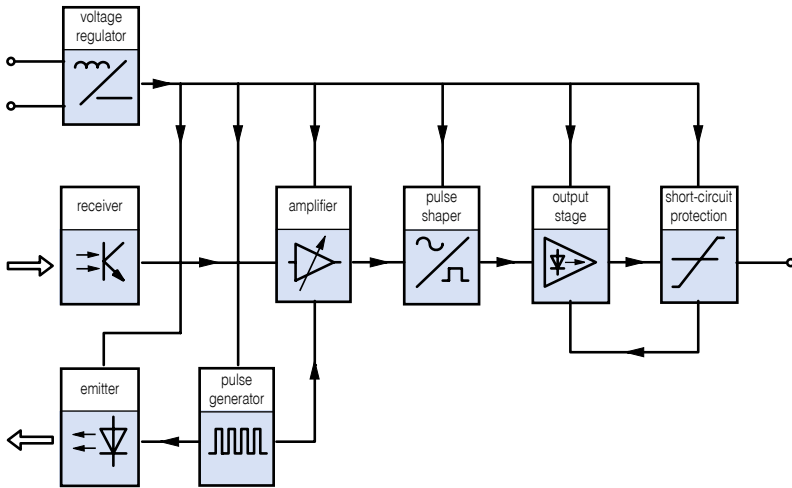


Fig. 9: Functional blocks of a photoelectric sensor

returns to the sensor, striking a position-sensitive receiver. The receiver distinguishes between reflections from the target and reflections from background objects, only triggering the sensor when the signal reaches a value that relates to the preset target distance.

The sensing range is practically insensitive to the target's size, color, shape and surface finish, and background-suppression sensors provide highly reliable detection of "difficult" targets, even against a light background. Stable, accurate detection of small, fast-moving parts on conveyors or automated machinery is possible over the entire sensing range, eliminating false triggering by objects in the background.

## REFLEX

### Long sensing range in a single-housing device

A reflex, or reflective, photoelectric sensor contains a transmitter and a receiver in a single housing, and emits a pulsed, focused light beam toward a distant reflector. Reflected light returns to the sensor, arriving at the receiver. When a target object interrupts the light beam, the

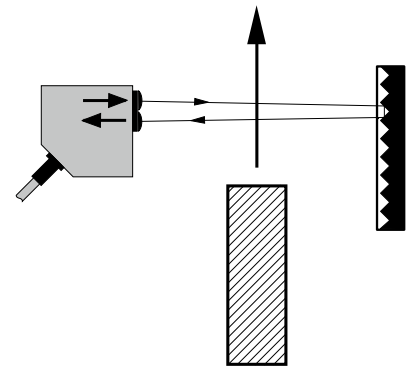


Fig. 11: Reflex sensing

receiver detects the reduced light intensity and triggers the sensor.

The relatively high level of reflected light allows reflex sensors to achieve sensing distances up to eight meters. For applications where the target object itself reflects light back toward the sensor, models with polarization filters are available. The filters ensure that only light returned from the reflector reaches the receiver, ensuring reliable detection, even with reflective targets.

## TECHNOLOGY FAMILIES

Contrinex photoelectric devices are divided into **nine technology families**, depending on their operating principle and use. The program includes energetic **diffuse** sensors, diffuse sensors with **background suppression**, **reflex** sensors, **through-beam** sensors, sensors with **analog output**, **color** sensors, **contrast** sensors, **distance measuring** sensors and **optical amplifiers**.

## DIFFUSE

### Versatile and cost-effective

A diffuse-mode, or energetic-diffuse, photoelectric sensor is a reflective sensor, containing a transmitter and a receiver in a single housing. The sensor emits a light beam toward a distant target that acts as a reflector, returning part of the transmitted light to the sensor. The receiver detects the amount of light reflected by the target, triggering the sensor when the light intensity reaches a threshold value.

Diffuse-mode sensors are cost-effective as they do not require separate reflectors or receivers, and detect reflective targets with ease. Sensing range depends on the target's size, shape, color and surface finish, although sensor sensitivity is adjustable during installation to compensate for targets with poor reflective qualities.

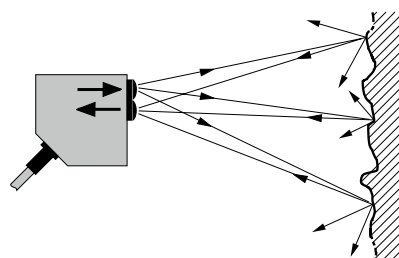


Fig. 10: Diffuse sensing

## BACKGROUND SUPPRESSION

### Excellent suppression of light-colored backgrounds

Diffuse-mode photoelectric sensors with background suppression emit a focused light beam toward a distant target. Part of the beam is reflected from the target and

## THROUGH-BEAM

### Emitter and receiver in separate housings for sensing ranges from 0 to 50 mm

A through-beam photoelectric sensor comprises an emitter and receiver, each mounted in a separate housing. The emitter is aligned so that the greatest possible amount of pulsed light from its emitting diode reaches the receiver (Fig. 12). The receiver, which is mounted beyond the target area, processes incoming light in such a way that it is clearly separated from ambient and other light sources. Any interruption of the light beam by a target triggers the sensor, causing its output signal to switch. For reliable operation, the target must be completely opaque, and its size should be at least equal to the diameter of the receiver's aperture.

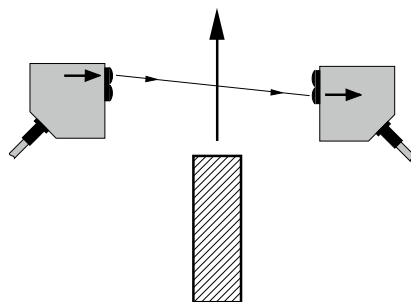


Fig. 12: Through-beam sensing

Contrinex through-beam photoelectric sensors are ideal for industrial applications where sensing components must be mounted some distance from the target area. Through-beam sensors utilize infrared, visible and laser light sources to detect opaque and semi-transparent targets, reliably and repeatably, at extended distances. They are available in cylindrical versions from subminiature ( $\varnothing 4$ ) to small (M18) and cubic versions from miniature (20 mm x 30 mm x 10 mm) to small (40 mm x 50 mm x 15 mm).

## ANALOG OUTPUT

### Precise distance control

Photoelectric sensors with analog outputs are ideal for measuring absolute values of distance. Using background suppression-mode technology, analog photoelectric sensors produce an output signal that is accurately calibrated and approximately proportional to the distance of the target from the sensor. Users have a choice of current or voltage outputs that are compatible with all modern control systems.

Contrinex analog photoelectric sensors provide all the advantages of standard diffuse-mode sensors, and measure target distances up to 100 mm.

## DISTANCE

### Ultra-precise distance measurement and detection of very large distances

Measurement with C23 and C55 distance sensors is largely independent of color and surface texture. Results are characterized by high accuracy and repeatability. In both types of sensors, the measurements are transmitted through an adjustable analog output. The sensors also offer a second output for a switching window, which is defined by teach-in. The sensor housings have an IP69K enclosure rating. In addition, the C55 is Ecolab certified and therefore suitable for the food industry.

The cubic C23 sensors use triangulation to measure distances up to 200 mm with extreme precision. Measuring just 20 mm x 34 mm x 12 mm, this sensor is suitable for numerous applications.

The C55 Series uses the time-of-flight (TOF) method for highly reliable measurement of large distances from 100 mm to 5000 mm. TOF technology calculates distance by measuring the time light takes to travel from the sensor to the target and back to the sensor. Thanks to this technology, C55 distance measuring sensors offer long detection ranges with excellent precision.

## CONTRAST

### The best contrast resolution for optimum print-mark detection

Contrast sensors are ideal for detecting print marks in printing, labelling and packaging processes. Using a narrowly focused light beam and RGB emission technology,

contrast sensors automatically select the best emission color (red, green or blue) during the teach-in procedure. Excellent contrast resolution, a high switching frequency (up to 10 kHz) and five tolerance levels ensure accurate detection and positioning, even when contrast differences are minimal. The integral IO-Link interface may be used to reduce changeover times through remote teach-in and parameterization. Other control functions, including monitoring, diagnosis and switching timer adjustment are also available.

Contrinex contrast sensors have a rugged PBTP housing (40 mm x 50 mm x 15 mm) with IP67 enclosure rating and are available in cable or adjustable (0°, 45° or 90°) connector versions.

## COLOR

### Reliable detection of fine color variations, even in harsh environments

Color photoelectric sensors utilize energetic-diffuse sensing technology to detect variations in target color, allowing color sorting or color control that is independent of target speed or distance. Using a "teach-in" function to program up to three separate outputs, the sensor recognizes or ignores even the smallest variations of shade.

Ideal for automated production processes that need reliable, repeatable color detection for accurate quality control, Contrinex color photoelectric sensors feature five selectable tolerance levels for each shade of color. Robust design ensures that sensor performance is unaffected by varying ambient light levels.

## OPTICAL AMPLIFIER

### Reliable short and long-range sensing

Customers requiring intrinsically-safe photoelectric sensors with DIN-rail-mounted electronics need not look beyond the Contrinex 3060 series of fiber-optic amplifiers. Packed with functionality in a Crastin® molded-resin housing measuring only 31 mm x 60 mm x 10 mm, every model combines ease of set-up with market-leading features. With switching times as low as 0.1 millisecond, 3060 fiber-optic amplifiers are ideal for sensing fast-moving targets in demanding environments, including robotics, precision handling systems and

# INTRODUCTION

printed circuit board production.

Distance setting is accomplished either by adjustment of a multi-turn potentiometer or by use of a teach-in function with manual fine adjustment; an optional digital display (model 3066) is also available. Using blue-light sources (models 3360 and 3365), detecting glass and other materials with similar absorption spectra is possible at distances up to 100 mm.

Fiber-optic sensors are common in explosive environments or in the presence of strong electromagnetic fields - in these areas, sensors that rely on electrical signals may present a risk of explosion or fail to operate correctly. Contrinex manufactures world-class fiber-optic sensors and amplifiers that not only meet these needs, but also present a highly practical means of sensing in confined spaces. With bend-radii as small as 2 mm, reliable, accurate sensing is possible even in the most inaccessible areas.

With self-contained fiber-optic sensors available in housings as small as 30 mm x 30 mm x 15 mm, and several models of small DIN-rail mounted amplifiers that accommodate multiple-sensor applications, the Contrinex range is highly versatile. A choice of synthetic optical fibers with impressively low attenuation rates for general use or glass optical fibers for high ambient temperatures and aggressive environments provides options for even the most demanding applications.

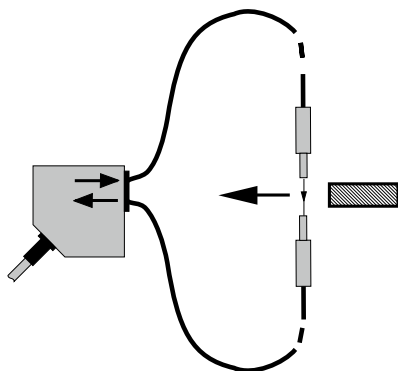


Fig. 13: Optical fiber, through-beam sensing

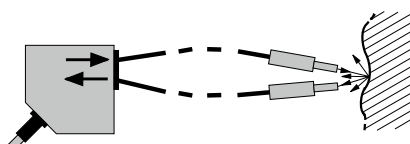


Fig. 14 Optical fiber, diffuse sensing

## PRODUCT RANGES

### SUBMINIATURE

**Cubic (5 mm x 7 mm and 13 mm x 21 mm x 7 mm) and Cylindrical (Ø 4 and M5)**

The Contrinex **Subminiature** range packs exceptional position- and presence-sensing performance into the smallest self-contained photoelectric sensors on the market. Through-beam or diffuse sensors in Ø 4 and M5 cylindrical or 5 mm x 7 mm rectangular stainless-steel housings offer multiple mounting methods and possibilities for beam orientation. For fully embedded applications, sensors with spherical sapphire-glass lenses produce focused, cylindrical light beams. Best-in-class sensing distances of up to 90 mm (diffuse) and 250 mm (through-beam) allow sensors to be positioned at a safe distance from the target, minimizing the risk of accidental impact damage. Thanks to robust construction that includes rugged sensing faces, Contrinex **Subminiature** sensors are resistant to chemical contamination and abrasion, delivering maximum operational uptime and world-class reliability.

The C12 Series (13.5 mm x 21.8 mm x 7.7 mm) with small visible light spot thanks to red pinpoint LED offers long sensing ranges up to 2000 mm in a through-beam type and 3000 mm in a polarized reflex type. Two background suppression types are available with fixed sensing ranges up to 15 mm or 30 mm. A third type with 3-turn potentiometer (13.5 mm x 27.5 mm x 7.7 mm) reliably detects objects up to 120 mm.

- Long sensing ranges
- Background suppression up to 120 mm
- Excellent background suppression characteristics
- 45° angle cable outlet for easy installation



### MINIATURE

**Cubic (20 mm x 30 mm and 30 mm x 30 mm) and Cylindrical (M12)**

Contrinex **Miniature** photoelectric sensors provide market-leading performance and reliability in rugged, industry-standard housings to ensure excellent resistance to machine vibration or shock from accidental impact. They are recommended for general automation in the printing, packaging or machine tool industries, and for electronic assembly or mechanical handling systems.

Ideal for applications where space is tight, they also offer excellent sensing distances. Available technologies include diffuse sensing, polarized reflex sensing, through-beam sensing and amplifiers. Versions with excellent background suppression allow ultra-reliable target detection, even against light backgrounds. For applications where precise sensing is required but space is limited, the range includes fiber-optic amplifiers that allow the sensor housing to be mounted remotely.

The C23 series (20 mm x 30 mm x 10 mm) of miniature cubic sensors offers solutions for a wide range of industries and applications. With IO-Link communication on all PNP-type sensors, the C23 series bridges the gap between machines and the digital world to meet the demands of smart factories.





The C23 distance measurement sensor (20 mm x 34 mm x 12 mm) uses triangulation technology to offer precise measurement in an IP 69K rated, cubic housing. Distance measurement is also possible by utilizing the analog voltage outputs available on other cubic models. Contrinex M12 photoelectric sensors are ideal for high-speed applications in the most challenging environments, with the 1121L capable of detecting even the smallest targets. This laser through-beam sensor is suitable for extended sensing ranges up to 50 meters and has a 1000 Hz maximum switching frequency.



### SMALL

#### Cubic (40 mm x 40/50 mm) and Cylindrical (M18)

Contrinex **Small** photoelectric sensors are rugged and highly reliable.

**Cubic** (40 mm x 40/50 mm) models are suitable for industrial applications including packaging and wrapping machinery, filling systems and general automated equipment. Available in diffuse (energetic or background-suppression),



polarized and non-polarized reflex or through-beam technologies with glass or coated-plastic windows, they are insensitive to high levels of ambient light. Best-in-class background suppression allows ultra-reliable target detection, even against light backgrounds. All models feature LED indication of signal degradation if the sensing face is obscured or becomes contaminated, eliminating the risk of errors or lost production. Mounted in a robust, industry-standard 40 mm x 50 mm x 15 mm housing, these sensors are Ecolab approved and rated to IP 67.

The range includes amplifiers and color sensors with 3 different teachable shades of color and 5 levels of tolerance. For precise print mark detection, contrast sensors are available with excellent contrast resolution, a high switching frequency (up to 10 kHz), five tolerance levels and IO-Link.

**Cylindrical** M18 models are ideal for demanding industrial environments, including automotive assembly, packaging machinery, conveyor systems and general automation equipment. A comprehensive range comprises diffuse sensors (both energetic and background-suppression variants), reflex sensors and through-beam sensors with the option of either axial or lateral sensing for sensing distances up to 50 meters. The range includes energetic diffuse sensors and through-beam sensors with laser light sources (1180L and 1181L models), allowing extended sensing distances for objects as small as 0.1 mm in size. Robust construction with metal housings and vacuum-encapsulated electronics on all models ensures maximum reliability and minimum downtime.

### COMPACT

#### Cubic (50 mm x 50 mm)

The Contrinex C55 series (50 mm x 50 mm x 23 mm) uses time-of-flight (TOF) technology to measure long distances up to 5000 mm. With an IP 69K enclosure rating and Ecolab approval, these sensors are ideal for the food industry. A background suppression type is also available.



Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

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## IO-LINK FUNCTIONALITY\* WITH PHOTOELECTRIC SENSORS

### Data monitoring:

- 1 Detection status is monitored and continuously transmitted through IO-Link process data. This data contains both the detection state and the stability of detection (sufficient detection margin). It is possible, therefore, to determine whether the sensor is working too close to its detection threshold, for example due to window contamination.

### Diagnosis:

- 2 The operating state of the sensor is checked. In case of wire break, under-voltage, disturbances on the receiver, sensor malfunction or installation of the wrong sensor, information is provided directly through IO-Link to enable fast repair, maintenance and replacement.

### Sensitivity and teach:

- 3 The sensitivity of the sensor can be adjusted remotely by changing the threshold. Alternatively, the teach function can be used to adapt the threshold to the application. Calibrated sensing ranges ensure easy sensor replacement by uploading the existing sensitivity to the replacement sensor.

### Light-on/Dark-on selection:

- 4 The output switching mode can be selected as light-on or dark-on. A single sensor type is configurable for the various needs of an application. This helps reduce the number of different sensor types required in stock.

### Switching timer:

- 5 The timing of output switching can be configured. Depending on the needs of an application, output switching can be delayed or the duration stretched.

### Sensor mode:

- 6 3 different modes are selectable depending on the application needs: "Normal", "Fast" and "Fine". "Normal" mode is a good balance of speed and precision. In "Fast" mode, speed is higher and in "Fine" mode precision is higher.

### Sequence selection:

- 7 For cross-talk immunity with through-beam sensors, up to 10 different emitting sequences can be selected to pair the emitter with the receiver.

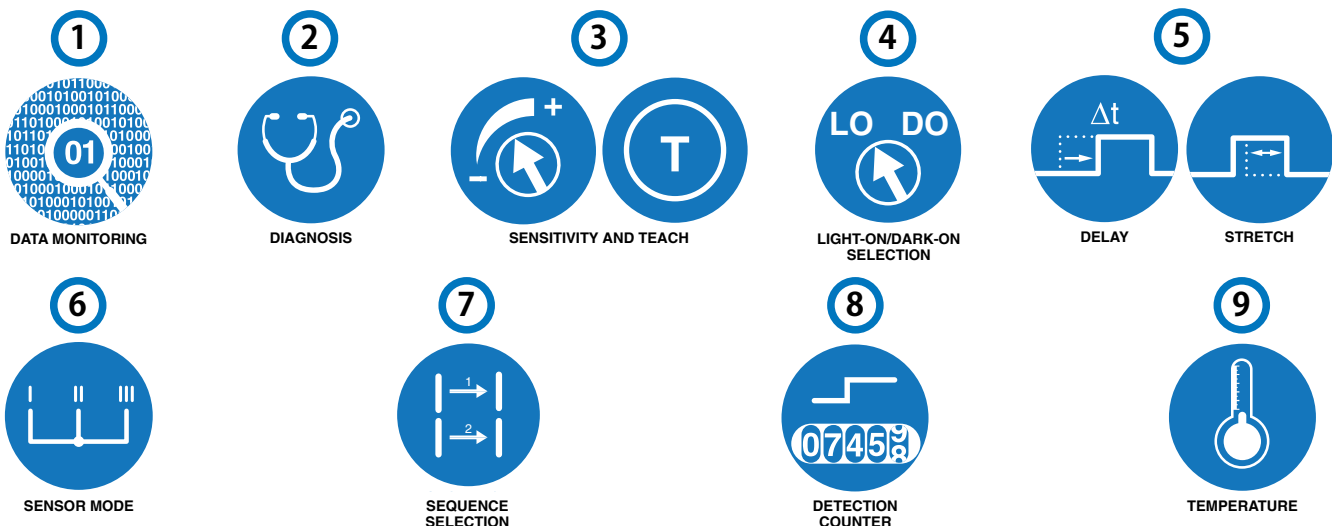
### Detection counter:

- 8 Detection events are counted. By registering the number of detections, it is possible to calculate the speed or number of parts. The counter can be reset by means of a unique IO-Link message.

### Temperature:

- 9 The internal temperature of the sensor is measured continuously, which provides an indication about the ambient temperature in the application. Moreover, the maximum temperature measured is saved for diagnosis and preventive maintenance purposes.

\* Functionalities may vary depending on series and sensor type





CONTRINEX

CONTRINEX  
DW-AS-512

SK-1120  
Pnp  
PSOP

CONTRINEX  
IS-009-1412

CONTRINEX  
DAO-350  
Pnp  
PSOP





THE SMALLEST ON THE MARKET

# CYLINDRICAL SUBMINIATURE

## PHOTOELECTRIC SENSORS

### KEY ADVANTAGES

- ✓ Ø 4 and M5 housings for target detection in limited spaces
- ✓ Rugged metal housing
- ✓ Accurate target detection due to cylindrical light beam
- ✓ Rugged sapphire glass or glass sensing face, scratch and chemically resistant
- ✓ Shock and vibration resistant due to fully vacuum potted electronics
- ✓ High system reserves (excess gain)

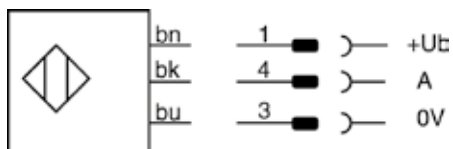
RANGE OVERVIEW	Distance mm	Diffuse	Through-beam
CYLINDRICAL SUB- MINIATURE	10	p. 181, 183-184	
	20	p. 182, 184-185	
	50	p. 182-183, 185-186	
	250		p. 186

## OVERVIEW

Housing material	Stainless steel V2A
Emitter	IR LED 880 nm
Hysteresis	10 % typ.
Degree of protection	IP 67
Supply voltage range	10 ... 30 VDC
Ambient temperature range	0 ... +55 °C / 32 ... +131 °F
Output current	≤ 100 mA
Output voltage drop	≤ 2 V
Switching frequency	≤ 250 Hz
Switching time	2 msec
Max. ambient light halogen	5000 Lux
Max. ambient light sun	10,000 Lux

## WIRING DIAGRAM

PNP/NPN Light-ON / Dark-ON



HOUSING SIZE MM

OPERATING PRINCIPLE

SENSING RANGE MM

PHOTOELECTRIC

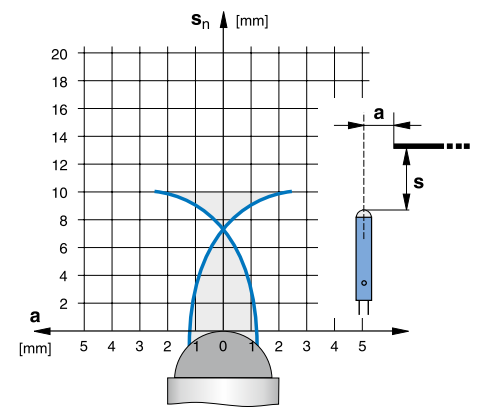
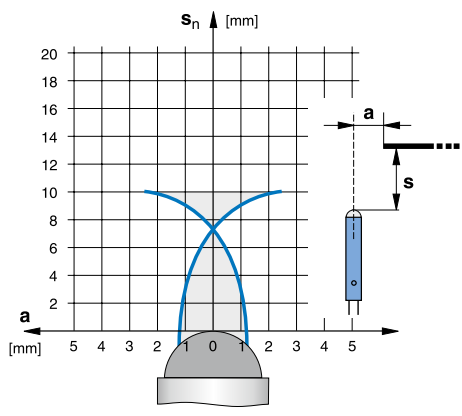
DATA

Standard target  
 No-load supply current  
 Lens material  
 PNP Light-ON  
 NPN Light-ON  
 Other types available



# CYLINDRICAL SUBMINIATURE

Ø 4	Ø 4
DIFFUSE SENSOR	DIFFUSE SENSOR
10	10



100 x 100 mm white	100 x 100 mm white
≤ 15 mA	≤ 15 mA
Sapphire glass	Sapphire glass
<b>LTK-1040-303-505</b>	<b>LTS-1040-303-505</b>
<b>LTK-1040-301-505</b>	<b>LTS-1040-301-505</b>

- Inductive
- Photoelectric
- Ultrasonic
- Capacitive
- Safety
- RFID
- Connectivity
- Accessories
- Glossary
- Index

# CYLINDRICAL SUBMINIATURE

HOUSING SIZE MM

Ø 4

Ø 4

OPERATING PRINCIPLE

DIFFUSE SENSOR

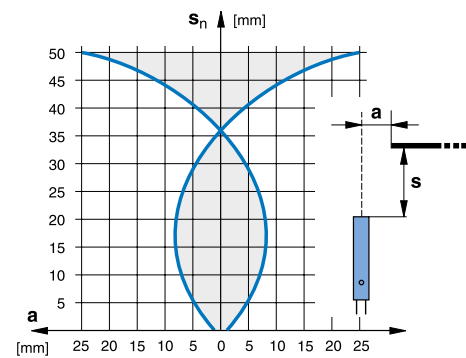
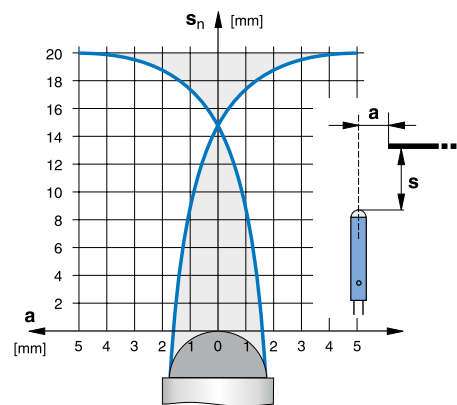
DIFFUSE SENSOR

SENSING RANGE MM

20

50

PHOTOELECTRIC



## DATA

Standard target

100 x 100 mm white

100 x 100 mm white

No-load supply current

≤ 15 mA

≤ 15 mA

Lens material

Sapphire glass

Glass

PNP Light-ON

**LTK-1040-303-506**

**LTK-1040-303**

NPN Light-ON

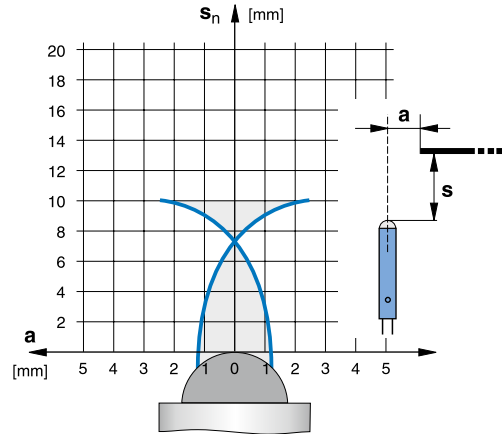
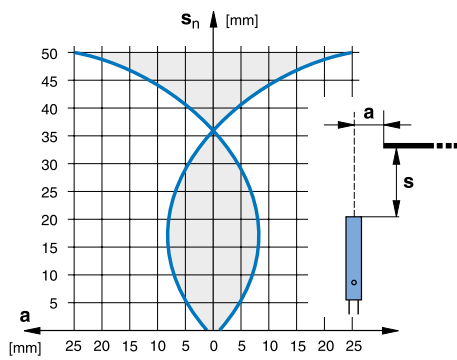
**LTK-1040-301-506**

**LTK-1040-301**

Other types available

# CYLINDRICAL SUBMINIATURE

Ø 4	M5
DIFFUSE SENSOR	DIFFUSE SENSOR
50	10



100 x 100 mm white	100 x 100 mm white
≤ 15 mA	≤ 15 mA
Glass	Sapphire glass
<b>LTS-1040-303</b>	<b>LTK-1050-303-505</b>
<b>LTS-1040-301</b>	<b>LTK-1050-301-505</b>
	PNP Dark-ON

Inductive
Photoelectric
Ultrasonic
Capacitive
Safety
RFID
Connectivity
Accessories
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Index



# CYLINDRICAL SUBMINIATURE

HOUSING SIZE

M5

M5

OPERATING PRINCIPLE

DIFFUSE SENSOR

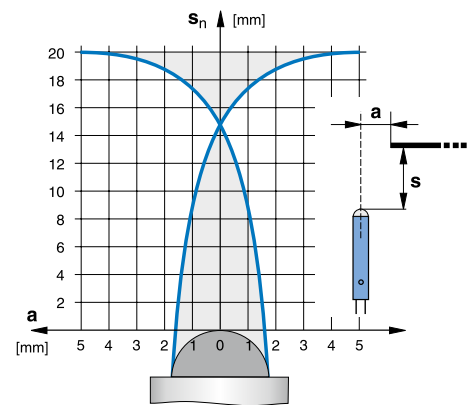
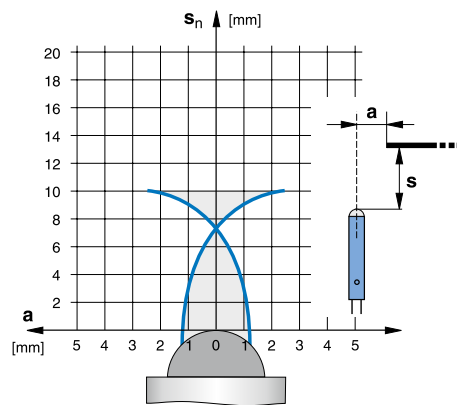
DIFFUSE SENSOR

SENSING RANGE MM

10

20

PHOTOELECTRIC



## DATA

Standard target

100 x 100 mm white

100 x 100 mm white

No-load supply current

≤ 15 mA

≤ 15 mA

Lens material

Sapphire glass

Sapphire glass

PNP Light-ON

**LTS-1050-303-505**

**LTK-1050-303-506**

NPN Light-ON

**LTS-1050-301-505**

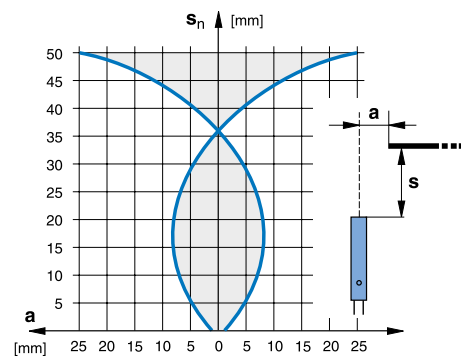
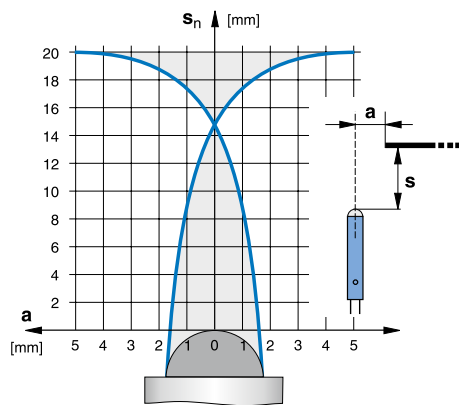
**LTK-1050-301-506**

Other types available

PNP Dark-ON

# CYLINDRICAL SUBMINIATURE

M5	M5
DIFFUSE SENSOR	DIFFUSE SENSOR
20	50



100 x 100 mm white	100 x 100 mm white
≤ 15 mA	≤ 15 mA
Sapphire glass	Glass
<b>LTS-1050-303-506</b>	<b>LTK-1050-303</b>
<b>LTS-1050-301-506</b>	<b>LTK-1050-301</b>

Inductive
Photoelectric
Ultrasonic
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Safety
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# CYLINDRICAL SUBMINIATURE

HOUSING SIZE

M5

M5

OPERATING PRINCIPLE

DIFFUSE SENSOR

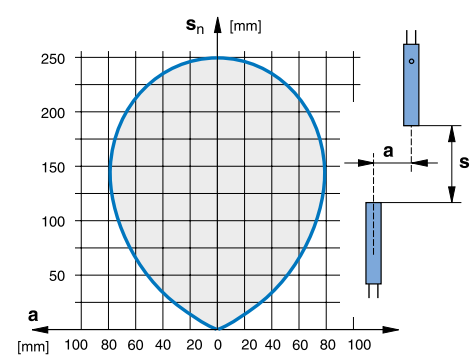
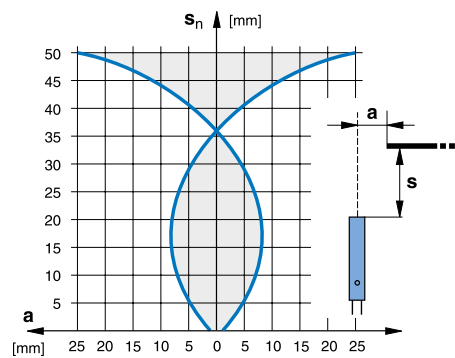
THROUGH-BEAM SENSOR

SENSING RANGE MM

50

250

PHOTOELECTRIC



DATA

Standard target

100 x 100 mm white

-

No-load supply current

≤ 15 mA

≤ 5 mA (receiver) / ≤ 10 mA (emitter)

Lens material

Glass

Glass

PNP Light-ON / Emitter

**LTS-1050-303**

**LLS-1050-200 (emitter)**

PNP Dark-ON

**LLS-1050-204 (receiver)**

Other types available

NPN Light-ON

NPN Dark-ON







# M12 STANDARD SIZE FOR MULTIPLE USES

# CYLINDRICAL MINIATURE

# PHOTOELECTRIC SENSORS

## KEY ADVANTAGES

- ✓ M12 miniature sensor series
- ✓ Rugged metal housing
- ✓ Accurate and speed-independent target detection; response time 0.5 msec (laser: 0.1 msec)
- ✓ Shock and vibration resistant due to fully vacuum potted electronics
- ✓ High system reserves (excess gain)
- ✓ Easy adjustment (due to visible red light)
- ✓ Laser sensor (protection class 2)

RANGE OVERVIEW	Distance mm	Diffuse	Reflex	Through- beam	Laser
<b>CYLINDRICAL MINIATURE</b>	300	p. 191			
	1500		p. 192		
	10,000			p. 192	
	50,000				p. 193

## OVERVIEW

	1120	1121L
Housing material	Chrome-plated brass	Stainless steel V2A
Hysteresis	10 % typ.	10 % typ.
Degree of protection	IP 67	IP 67
Laser protection class	--	2
Supply voltage range	10...36 VDC	10 ... 36 VDC
Ambient temperature range	-25...+55 °C / -13...+131 °F	-10...+50 °C / +14...+122 °F
Output current	≤ 200 mA	≤ 200 mA
Output voltage drop	≤ 2 V	≤ 2 V
Switching frequency	≤ 1000 Hz	≤ 5000 Hz
Switching time	0.5 msec	0.1 msec
Max. ambient light halogen	5000 Lux	5000 Lux
Max. ambient light sun	10,000 Lux	10,000 Lux

HOUSING SIZE

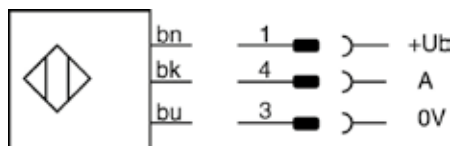
OPERATING PRINCIPLE

SENSING RANGE MM

PHOTOELECTRIC

## WIRING DIAGRAM

PNP / NPN Light-ON / Dark-ON / Emitter



DATA

Standard target

No-load supply current

Emitter

Setup

PNP Light-ON

NPN Light-ON

Other types available

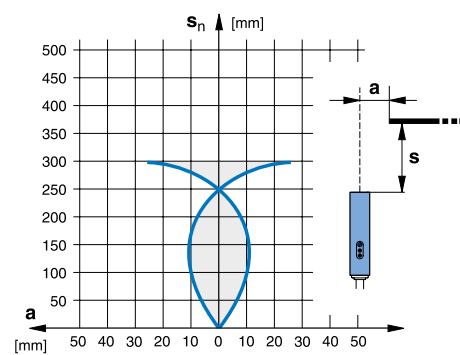
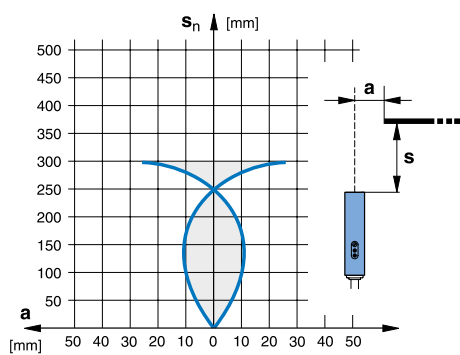


# CYLINDRICAL MINIATURE

M12	M12
DIFFUSE SENSOR	DIFFUSE SENSOR
300	300



Inductive
Photoelectric
Ultrasonic
Capacitive
Safety
RFID
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Index



100 x 100 mm white	100 x 100 mm white
≤ 15 mA	≤ 15 mA
LED red 660 nm	LED red 660 nm
Potentiometer	Potentiometer
<b>LTK-1120-303</b>	<b>LTS-1120-303</b>
<b>LTK-1120-301</b>	<b>LTS-1120-301</b>

# CYLINDRICAL MINIATURE

HOUSING SIZE

M12

M12

OPERATING PRINCIPLE

REFLEX SENSOR

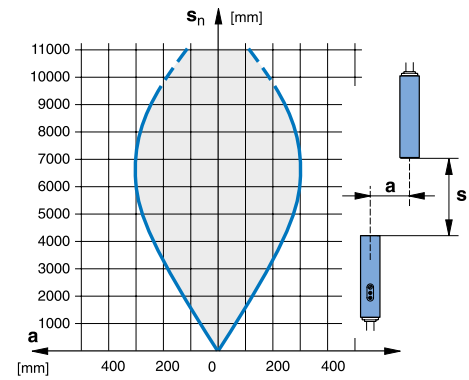
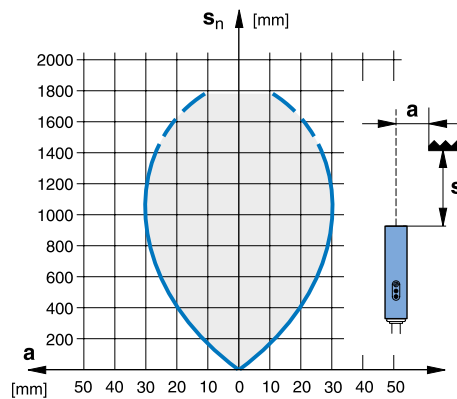
THROUGH-BEAM SENSOR

SENSING RANGE MM

1500

10,000

PHOTOELECTRIC



## DATA

Standard target / Reflector type

LXR-0000-084 (see page 247)

-

No-load supply current

≤ 15 mA

≤ 15 mA

Emitter

LED red polarized 660 nm

LED red 660 nm

Setup

-

-

Emitter

**LLS-1120-200 (emitter)**

PNP Dark-ON

**LRS-1120-304**

**LLS-1120-204 (receiver)**

Other types available

NPN Dark-ON, cable version

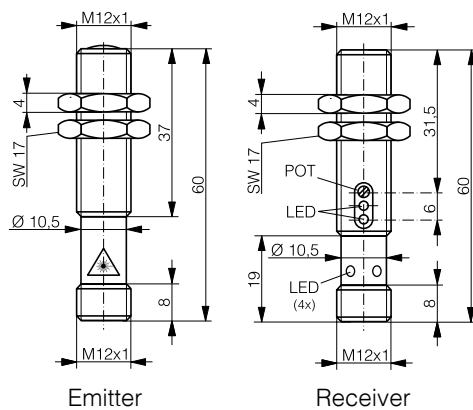
NPN Dark-ON, cable version

# CYLINDRICAL MINIATURE

M12 LASER

THROUGH-BEAM SENSOR

50,000



Emitter

Receiver

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

Glossary

Index

≤ 10 mA

Laser red pulsed 660 nm

**LLS-1121L-200 (emitter)**

**LLS-1121L-204 (receiver)**

NPN Dark-ON, cable version





M18 STANDARD SIZE, INCLUDING 90° SENSING

# CYLINDRICAL SMALL

## PHOTOELECTRIC SENSORS

### KEY ADVANTAGES

- ✓ Small sensor M18
- ✓ Models for lateral sensing
- ✓ Rugged metal housing
- ✓ Accurate and speed-independent target detection
- ✓ Shock and vibration resistant due to fully vacuum potted electronics
- ✓ High system reserves (excess gain)
- ✓ Easy adjustment (due to visible red light)
- ✓ Laser sensor (protection class 2)

RANGE OVERVIEW	Distance mm	Diffuse	Reflex	Through- beam	Background suppression	Laser
<b>CYLINDRICAL SMALL</b>	120				p. 197-198	
	250					p. 203
	600	p. 198-199				p. 203
	2000		p. 200-201			
	20,000				p. 201-202	
	50,000				p. 204	p. 204

## OVERVIEW

	1180 / 1180W	1180L
Housing material	Stainless steel V2A	Stainless steel V2A
Hysteresis	10 % typ.	10 % typ.
Degree of protection	IP 67	IP 67
Laser protection class	-	2
Supply voltage range	10 ... 36 VDC	10 ... 36 VDC
Ambient temperature range	-25...+55 °C / -13...+131 °F	-10...+50 °C / +14...+122 °F
Output current	≤ 200 mA	≤ 200 mA
Output voltage drop	≤ 2 V	≤ 2 V
Switching frequency	≤ 1000 Hz	LT: ≤ 1000 Hz/LL: ≤ 5000 Hz
Switching time	1 msec	0.5 msec
Max. ambient light halogen	5000 Lux	5000 Lux
Max. ambient light sun	10,000 Lux	10,000 Lux

HOUSING SIZE

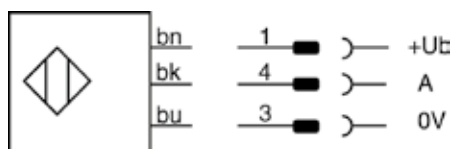
OPERATING PRINCIPLE

SENSING RANGE MM

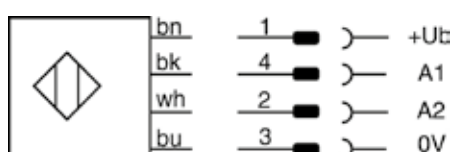
PHOTOELECTRIC

## WIRING DIAGRAMS

PNP/NPN Light-ON / Dark-ON / Emitter



PNP/NPN Changeover

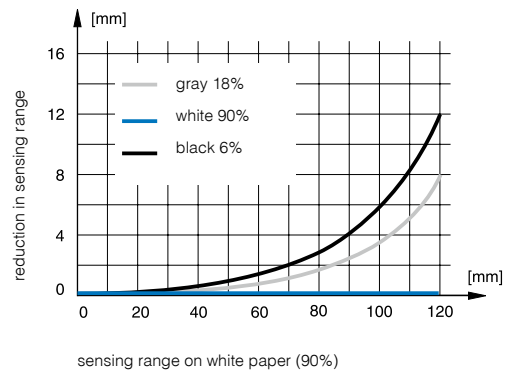
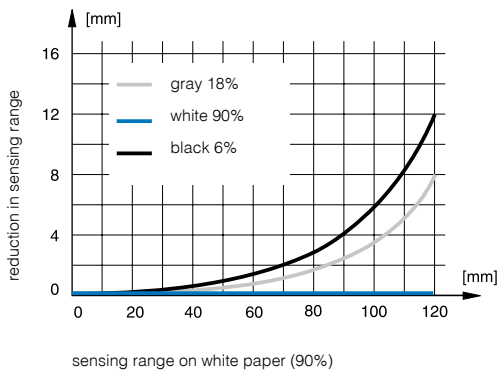


DATA

Standard target  
 No-load supply current  
 Emitter  
 Setup  
 PNP Light-ON  
 NPN Light-ON  
 Other types available

# CYLINDRICAL SMALL

M18	M18
DIFFUSE SENSOR WITH BACKGROUND SUPPRESSION	DIFFUSE SENSOR WITH BACKGROUND SUPPRESSION
10 ... 120	10 ... 120



100 x 100 mm white ≤ 25 mA LED red 680 nm Potentiometer <b>LHK-1180-303</b> <b>LHK-1180-301</b>	100 x 100 mm white ≤ 25 mA LED red 680 nm Potentiometer <b>LHS-1180-303</b> <b>LHS-1180-301</b>
--	--

- Inductive
- Photoelectric
- Ultrasonic
- Capacitive
- Safety
- RFID
- Connectivity
- Accessories
- Glossary
- Index

# CYLINDRICAL SMALL

HOUSING SIZE

M18W

M18

OPERATING PRINCIPLE

DIFFUSE SENSOR WITH BACKGROUND SUPPRESSION

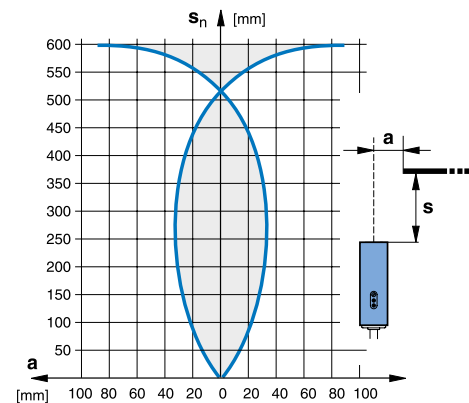
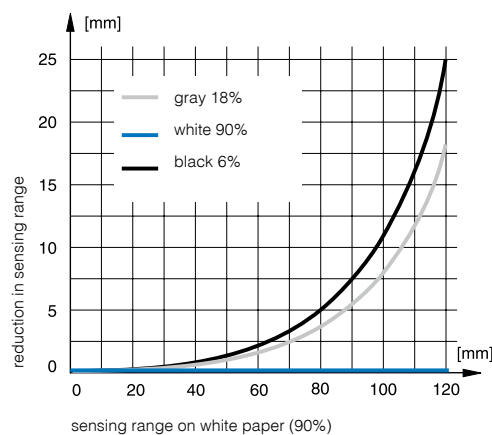
DIFFUSE SENSOR

SENSING RANGE MM

10 ... 120

40 ... 600

PHOTOELECTRIC



## DATA

Standard target

100 x 100 mm white

200 x 200 mm white

No-load supply current

≤ 25 mA

≤ 20 mA

Emitter

LED red 680 nm

LED red 630 nm

Setup

Potentiometer

Potentiometer

PNP Light-ON

**LHS-1180W-303**

**LTK-1180-303**

PNP Changeover

**LTK-1180-103**

NPN Changeover

**LTK-1180-101**

Other types available

NPN Light-ON, cable version

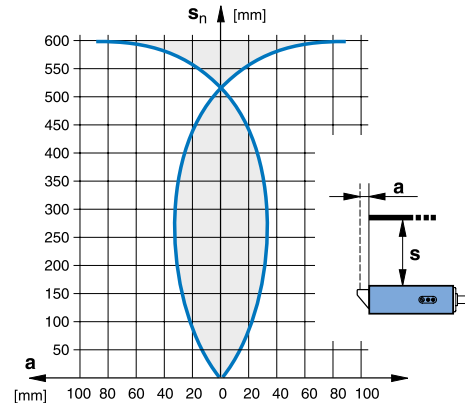
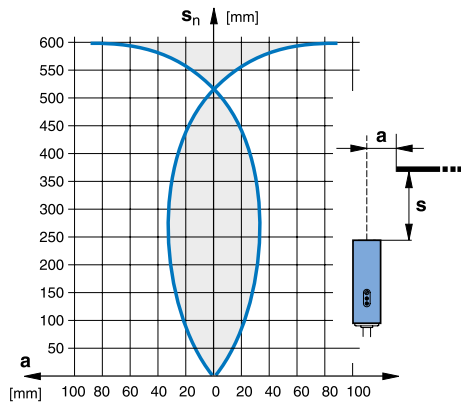
NPN Light-ON



# CYLINDRICAL SMALL

M18	M18W
DIFFUSE SENSOR	DIFFUSE SENSOR
40 ... 600	40 ... 600

Inductive
Photoelectric
Ultrasonic
Capacitive
Safety
RFID
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Index



200 x 200 mm white	200 x 200 mm white
≤ 20 mA	≤ 20 mA
LED red 630 nm	LED red 630 nm
Potentiometer	Potentiometer
<b>LTS-1180-303</b>	<b>LTS-1180W-303</b>
<b>LTS-1180-103</b>	<b>LTS-1180W-103</b>
<b>LTS-1180-101</b>	<b>LTS-1180W-101</b>
NPN Light-ON	NPN Light-ON, cable version

# CYLINDRICAL SMALL

HOUSING SIZE

M18

M18

OPERATING PRINCIPLE

REFLEX SENSOR

REFLEX SENSOR

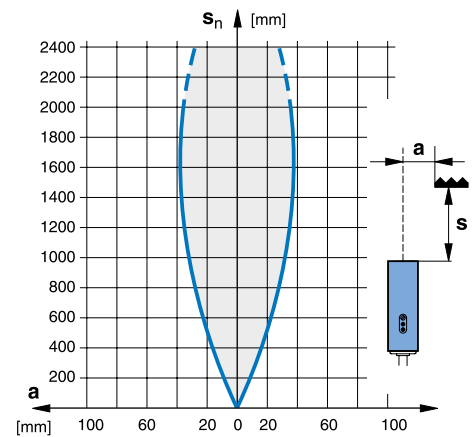
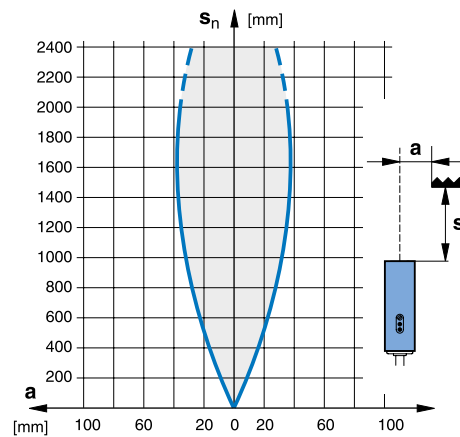
SENSING RANGE MM

2000

2000



PHOTOELECTRIC



## DATA

Standard target / Reflector type

LXR-0000-084 (see page 247)

LXR-0000-084 (see page 247)

No-load supply current

≤ 15 mA

≤ 15 mA

Emitter

LED red polarized 660 nm

LED red polarized 660 nm

Setup

-

-

PNP Dark-ON

**LRK-1180-304**

**LRS-1180-304**

Emitter

PNP Changeover

NPN Changeover

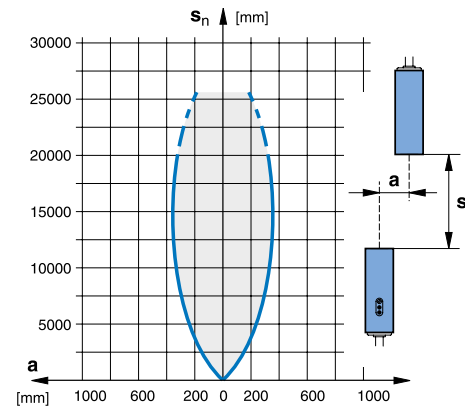
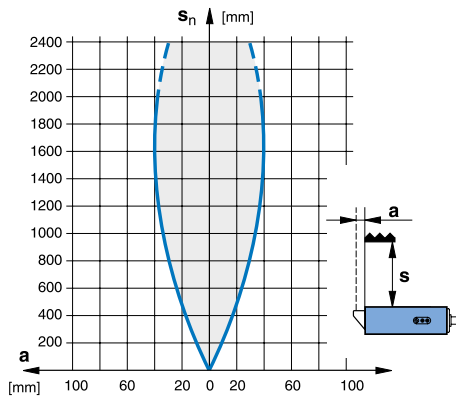
Other types available

NPN Dark-ON

NPN Dark-ON

# CYLINDRICAL SMALL

<b>M18W</b>	<b>M18</b>
<b>REFLEX SENSOR</b>	<b>THROUGH-BEAM SENSOR</b>
<b>2000</b>	<b>20,000</b>



Inductive
Photoelectric
Ultrasonic
Capacitive
Safety
RFID
Connectivity
Accessories
Glossary
Index

LXR-0000-084 (see page 247)
≤ 15 mA
LED red polarized 660 nm
-
<b>LRS-1180W-304</b>
NPN Dark-ON, cable version

-
≤ 10 mA (receiver) / ≤ 15 mA (emitter)
LED red 660 nm
-
<b>LLK-1180-000</b>
<b>LLK-1180-003 (receiver)</b>
<b>LLK-1180-001 (receiver)</b>

# CYLINDRICAL SMALL

HOUSING SIZE

M18

M18W

OPERATING PRINCIPLE

THROUGH-BEAM SENSOR

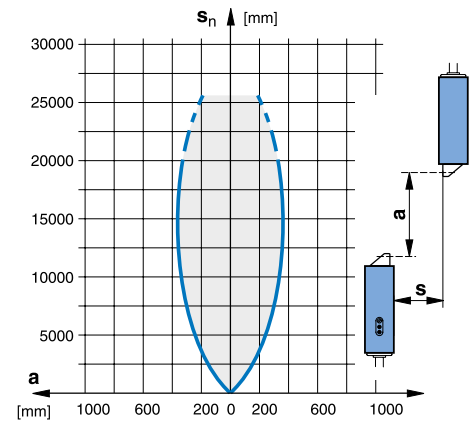
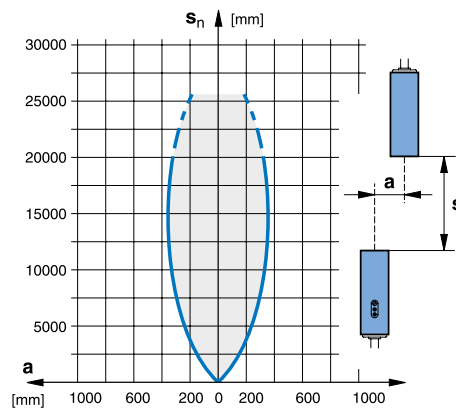
THROUGH-BEAM SENSOR

SENSING RANGE MM

20,000

20,000

PHOTOELECTRIC



## DATA

Standard target

-

-

No-load supply current

≤ 10 mA (receiver) / ≤ 15 mA (emitter)

≤ 10 mA (receiver) / ≤ 15 mA (emitter)

Emitter

LED red 660 nm

LED red 660 nm

Setup

-

-

Emitter

**LLS-1180-000**

**LLS-1180W-000**

PNP Changeover

**LLS-1180-003 (receiver)**

**LLS-1180W-003 (receiver)**

NPN Changeover

**LLS-1180-001 (receiver)**

**LLS-1180W-001 (receiver)**

Other types available



# CYLINDRICAL SMALL

M18 LASER

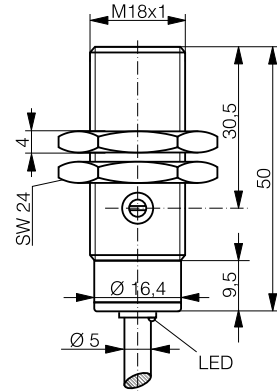
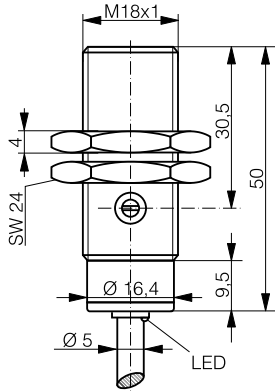
M18 LASER

DIFFUSE SENSOR

DIFFUSE SENSOR

40 ... 250

60 ... 600



Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

Glossary

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100 x 100 mm white

≤ 20 mA

Laser red pulsed 660 nm

Potentiometer

**LTS-1180L-103-516**

**LTS-1180L-101-516**

Cable version

100 x 100 mm white

≤ 20 mA

Laser red pulsed 660 nm

Potentiometer

**LTS-1180L-103**

**LTS-1180L-101**

Cable version

# CYLINDRICAL SMALL

HOUSING SIZE

M18 LASER

M18 LASER

OPERATING PRINCIPLE

THROUGH-BEAM SENSOR

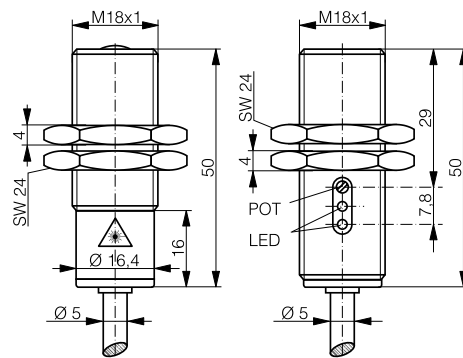
THROUGH-BEAM SENSOR

SENSING RANGE MM

50,000

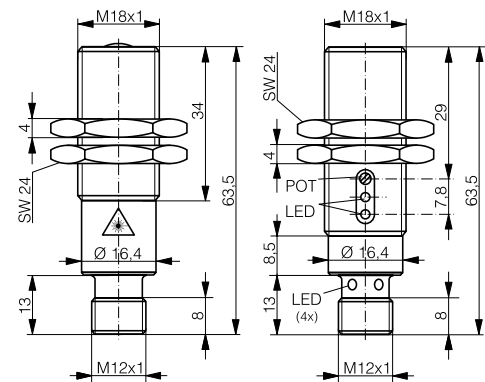
50,000

PHOTOELECTRIC



Emitter

Receiver



Emitter

Receiver

## DATA

Standard target

-

-

No-load supply current

≤ 10 mA

≤ 10 mA

Emitter

Laser red pulsed 660 nm

Laser red pulsed 660 nm

Setup

Potentiometer (receiver)

Potentiometer (receiver)

Emitter

**LLK-1181L-000**

**LLS-1181L-000**

PNP Changeover

**LLK-1181L-003 (receiver)**

**LLS-1181L-003 (receiver)**

NPN Changeover

**LLK-1181L-001 (receiver)**

**LLS-1181L-001 (receiver)**

Other types available





SAVE SPACE, KEEP PERFORMANCE

# CUBIC SUBMINIATURE

## PHOTOELECTRIC SENSORS

### KEY ADVANTAGES

#### C12 series

- ✓ Plastic housing, 13 mm x 21 mm / 27 mm x 7 mm
- ✓ Red pinpoint LED, small visible light spot
- ✓ Excellent background suppression up to 120 mm with 3-turn potentiometer
- ✓ Long sensing ranges

#### 0507 series

- ✓ Rugged diffuse-type sensors in steel housing, 5 mm x 7 mm x 40 mm
- ✓ Accurate target detection due to cylindrical light beam
- ✓ Steel sensors with sapphire-glass sensing face, scratch and chemically resistant

RANGE OVERVIEW	Distance mm	Diffuse	Background suppression	Reflex	Through-beam
CUBIC SUB- MINIATURE	20	p. 213			
	50	p. 213			
	90	p. 213			
	120		p. 209		
	15 / 30		p. 209		
	3000			p. 210	
	2000				p. 210



# CUBIC SUBMINIATURE

## OVERVIEW

	C12
Housing material	ABS / PMMA
Light source	Red pinpoint LED 640 nm
Degree of protection	IP 67
Supply voltage range	10 ... 30 VDC
Ambient temperature range	-20... +50 °C / -4 ... +122 °F
Output current	≤ 50 mA
Output voltage drop	≤ 2 V
Switching frequency	≤ 800 Hz
Switching time	0.6 msec

HOUSING SIZE

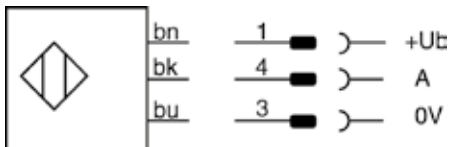
OPERATING PRINCIPLE

SENSING RANGE MM

PHOTOELECTRIC

## WIRING DIAGRAM

PNP/NPN Light-ON / Dark-ON / Emitter



DATA

Standard target

Setup

No load supply current

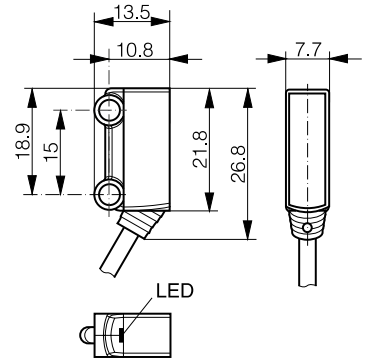
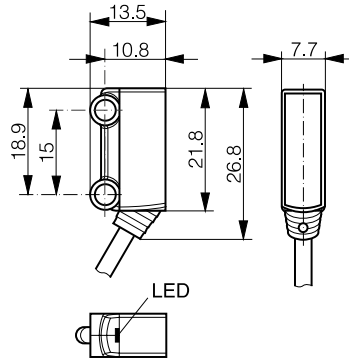
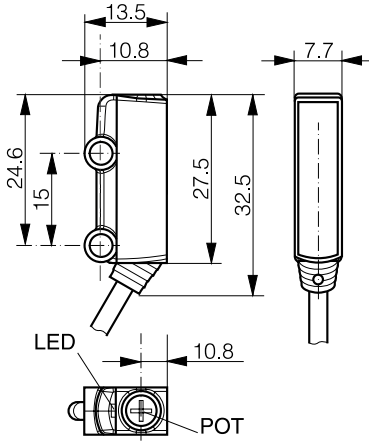
PNP Light-ON

NPN Light-ON

Other types available

# CUBIC SUBMINIATURE

□ 13 X 27 X 7	□ 13 X 21 X 7	□ 13 X 21 X 7
DIFFUSE SENSOR WITH BACKGROUND SUPPRESSION	DIFFUSE SENSOR WITH BACKGROUND SUPPRESSION	DIFFUSE SENSOR WITH BACKGROUND SUPPRESSION
2 ... 120	1 ... 15	1 ... 30



Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

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100 x 100 mm white	100 x 100 mm white	100 x 100 mm white
3-turn potentiometer	-	-
≤ 20 mA	≤ 20 mA	≤ 20 mA
<b>LHR-C12PA-PLK-303</b>	<b>LHR-C12PA-NSK-303</b>	<b>LHR-C12PA-NMK-303</b>
<b>LHR-C12PA-PLK-301</b>	<b>LHR-C12PA-NSK-301</b>	<b>LHR-C12PA-NMK-301</b>
0.2 m cable + connector M8	0.2 m cable + connector M8	0.2 m cable + connector M8

# CUBIC SUBMINIATURE

HOUSING SIZE

□ 13 X 21 X 7

□ 13 X 21 X 7

OPERATING PRINCIPLE

REFLEX SENSOR

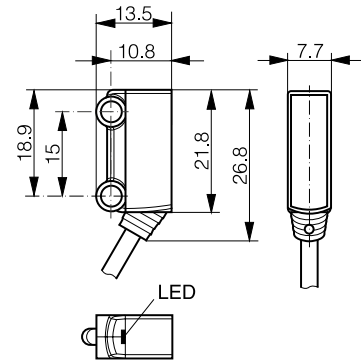
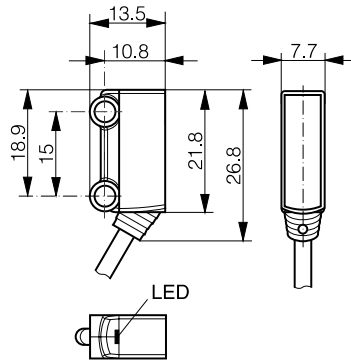
THROUGH-BEAM SENSOR

SENSING RANGE MM

3000

2000

PHOTOELECTRIC



DATA

Standard target

LXR-0001-064 (see page 249)

-

Sensitivity adjustment

-

-

No load supply current

≤ 20 mA

≤ 20 mA

Emitter

**LLR-C12PA-NMK-300**

PNP Dark-ON

**LRR-C12PA-NMK-304**

**LLR-C12PA-NMK-304**

NPN Dark-ON

**LRR-C12PA-NMK-302**

**LLR-C12PA-NMK-302**

Other types available

0.2 m cable + connector M8

0.2 m cable + connector M8

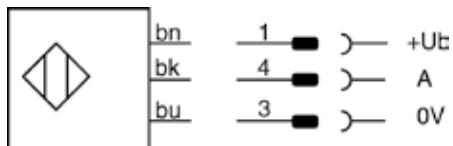


## OVERVIEW

	0507
Housing material	Stainless steel V2A
Light source	IR LED 880 nm
Hysteresis	10 % typ.
Degree of protection	IP 67
Supply voltage range	10 ... 30 VDC
Ambient temperature range	0 ... +55 °C / 32 ... +131 °F
Output current	≤ 100 mA
Output voltage drop	≤ 2 V
Switching frequency	≤ 250 Hz
Switching time	2.5 msec
Max. ambient light halogen	5000 Lux
Max. ambient light sun	10,000 Lux

## WIRING DIAGRAM

PNP/NPN Light-ON / Dark-ON



HOUSING SIZE MM

OPERATING PRINCIPLE

SENSING RANGE MM

PHOTOELECTRIC

DATA

Standard target  
 No-load supply current  
 Lens material  
 PNP Light-ON  
 NPN Light-ON  
 Other types available



# CUBIC SUBMINIATURE

□ 5 X 7 X 40	□ 5 X 7 X 40	□ 5 X 7 X 40
DIFFUSE SENSOR	DIFFUSE SENSOR	DIFFUSE SENSOR
20	50	90



Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

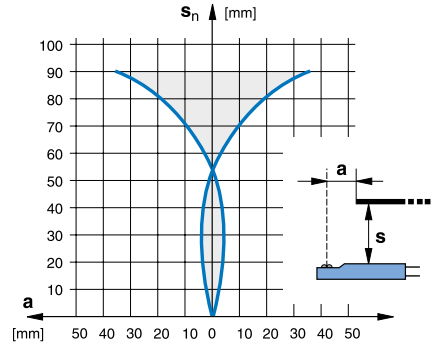
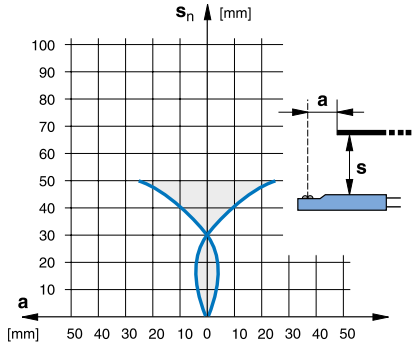
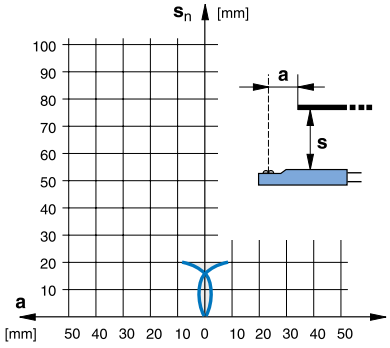
RFID

Connectivity

Accessories

Glossary

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100 x 100 mm white
≤ 15 mA
Sapphire glass
<b>LTK-0507-303-501</b>
<b>LTK-0507-301-501</b>

100 x 100 mm white
≤ 15 mA
Sapphire glass
<b>LTK-0507-303</b>
<b>LTK-0507-301</b>

100 x 100 mm white
≤ 15 mA
Sapphire glass
<b>LTK-0507-303-502</b>
<b>LTK-0507-301-502</b>



# CUBIC MINIATURE

# PHOTOELECTRIC SENSORS

## KEY ADVANTAGES

### C23 series

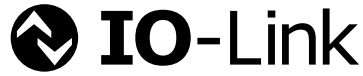
- ✓ Complete series, 20 mm x 30 mm x 10 mm
- ✓ Long sensing ranges
- ✓ Special optics for excellent background suppression characteristics
- ✓ Through-beam type with sensing range up to 30,000 mm, cross-talk immunity and alignment aid
- ✓ IO-Link on all PNP sensors

### C23 Distance measuring sensors

- ✓ IP 69K housing, 20 mm x 34 mm x 12 mm
- ✓ Two distance measurement ranges: 20...80 mm and 30...200 mm
- ✓ High precision and repeatability
- ✓ Settable analog range for optimum distance measurement
- ✓ Adjustable digital output for window of acceptance

RANGE OVERVIEW	Distance mm	Diffuse	Reflex	Through-beam	Background suppression	Analog	Distance
<b>CUBIC MINIATURE</b>	600 / 1200	p. 225-226					
	2000 / 4000		p. 227-228				
	6000 / 12,000			p. 229			
	200				p. 223-224		
	10 ... 100					p. 223	
	300				p. 217		
	1500	p. 218					
	8000		p. 219				
	30,000				p. 219		
	20...80/30...200						p. 221

# OVERVIEW



HOUSING SIZE

OPERATING PRINCIPLE

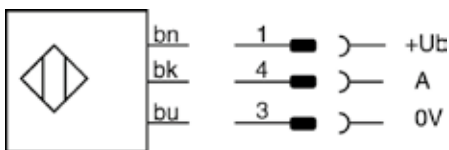
SENSING RANGE MM

	C23
Housing material	ABS / PMMA
Degree of protection	IP 67
Supply voltage range	10 ... 30 VDC
Ambient temperature range	-25 ... +65 °C / -13 ... +149 °F
Output current (total both outputs)	≤ 100 mA
Output voltage drop	≤ 2 V
Max. ambient light halogen	5000 Lux
Max. ambient light sun	10,000 Lux
Compatible mounting bracket	See pages 242-244

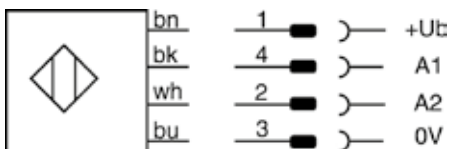
PHOTOELECTRIC

# WIRING DIAGRAMS

PNP/NPN Light-ON / Dark-ON / Emitter



PNP/NPN Light-ON / Dark-ON



## DATA

Standard target
No-load supply current
Light source
Switching frequency (normal mode)
Setup
PNP Light-ON / IO-Link
PNP Light-ON/Dark-ON / IO-Link
PNP Light-ON/IO-Link+stability alarm
NPN Light-ON
NPN Light-ON / Dark-ON
NPN Light-ON + stability alarm
Other types available

# CUBIC MINIATURE

□ 20 X 30 X 10

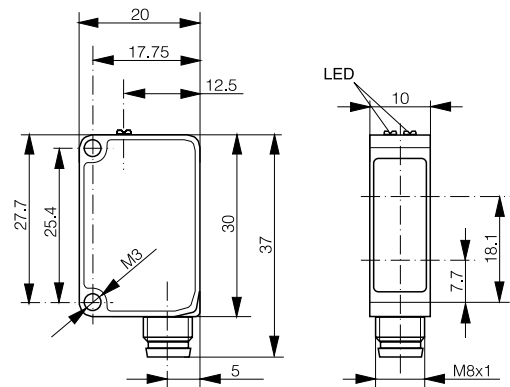
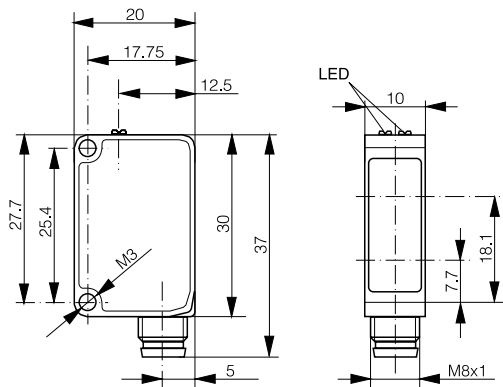
DIFFUSE SENSOR WITH  
BACKGROUND SUPPRESSION

10 ... 300

□ 20 X 30 X 10

DIFFUSE SENSOR WITH  
BACKGROUND SUPPRESSION

10 ... 300



100 x 100 mm white

≤ 30 mA

Red pinpoint LED 640 nm

≤ 1000 Hz

Potentiometer

**LHR-C23PA-PMS-403**

**LHR-C23PA-PMS-603**

**LHR-C23PA-PMS-60C**

**LHR-C23PA-PMS-301**

**LHR-C23PA-PMS-101**

**LHR-C23PA-PMS-10A**

Cable version

100 x 100 mm white

≤ 30 mA

Red pinpoint LED 640 nm

≤ 1000 Hz

Teach button

**LHR-C23PA-TMS-403**

**LHR-C23PA-TMS-603**

**LHR-C23PA-TMS-60C**

**LHR-C23PA-TMS-301**

**LHR-C23PA-TMS-101**

**LHR-C23PA-TMS-10A**

Cable version

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

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Accessories

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# CUBIC MINIATURE

HOUSING SIZE

□ 20 X 30 X 10

□ 20 X 30 X 10

OPERATING PRINCIPLE

DIFFUSE SENSOR

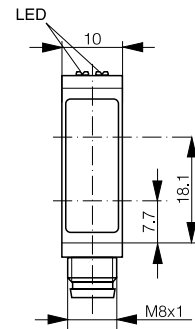
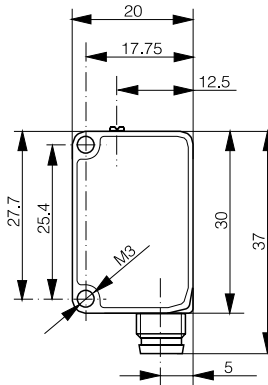
DIFFUSE SENSOR

SENSING RANGE MM

1500

1500

PHOTOELECTRIC



DATA		
Standard target	200 x 200 mm white	200 x 200 mm white
No-load supply current	≤ 15 mA	≤ 15 mA
Light source	Red LED 630 nm	Red LED 630 nm
Switching frequency (normal mode)	≤ 1500 Hz	≤ 1500 Hz
Setup	Potentiometer	IO-Link
Emitter / IO Link		<b>LTR-C23PA-NMS-403</b>
PNP Light-ON / IO-Link	<b>LTR-C23PA-PMS-403</b>	
PNP Light-ON/Dark-ON / IO-Link	<b>LTR-C23PA-PMS-603</b>	
PNP Light-ON/IO-Link+stability alarm	<b>LTR-C23PA-PMS-60C</b>	
NPN Light-ON	<b>LTR-C23PA-PMS-301</b>	
NPN Light-ON / Dark-ON	<b>LTR-C23PA-PMS-101</b>	
NPN Light-ON + stability alarm	<b>LTR-C23PA-PMS-104</b>	
Other types available	Cable version	Cable version

# CUBIC MINIATURE

□ 20 X 30 X 10

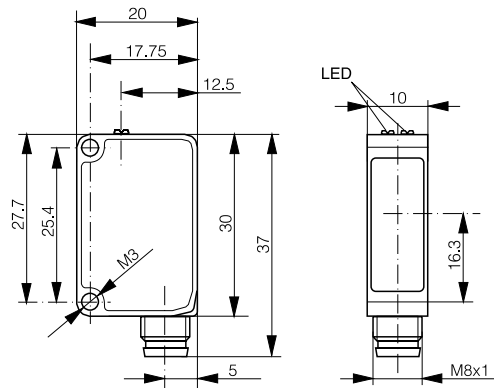
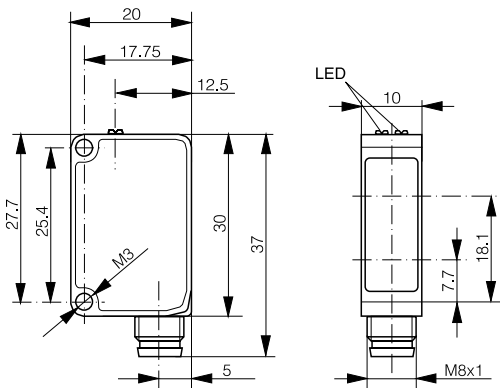
REFLEX SENSOR

8000

□ 20 X 30 X 10

THROUGH-BEAM SENSOR

30,000



LXR-0000-084 (see page 247)

≤ 15 mA

Red LED 630 nm

≤ 1500 Hz

IO-Link

**LRR-C23PA-NMS-404**

**LRR-C23PA-NMS-603**

**LRR-C23PA-NMS-60D**

**LRR-C23PA-NMS-302**

**LRR-C23PA-NMS-101**

**LRR-C23PA-NMS-10B**

Cable version

≤ 9 mA (receiver) / ≤ 7 mA (emitter)

Red LED 630 nm

≤ 1000 Hz

IO-Link

**LLR-C23PA-NMS-400 (emitter)**

**LLR-C23PA-NMS-404**

**LLR-C23PA-NMS-603**

**LLR-C23PA-NMS-60D**

**LLR-C23PA-NMS-302**

**LLR-C23PA-NMS-101**

**LLR-C23PA-NMS-10B**

Alignment aid, cable version

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

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## OVERVIEW

	C23 DISTANCE
Housing material	ABS / PMMA
Degree of protection	IP 67 / IP 69K
Supply voltage range	13 ... 30 VDC
Ambient temperature range	-20 ... +60 °C / -4 ... +140 °F
No-load supply current	≤ 30
Output current	≤ 100
Output voltage drop	≤ 2 V
Switching frequency	≤ 1000 Hz
Response time (analog)	0.4 msec (80 mm) / 3.4 msec (200 mm)
Setup	Teach button
Compatible mounting bracket	See pages 242-244

HOUSING SIZE

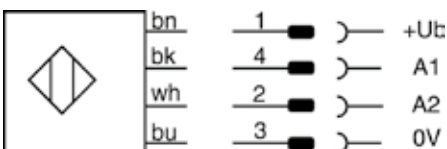
OPERATING PRINCIPLE

MEASUREMENT RANGE MM

PHOTOELECTRIC

## WIRING DIAGRAM

PNP/NPN Light-ON/Dark-ON + Analog 1 ... 10V



DATA

Light source

Light spot size

Resolution

Linearity

Repeatability

PNP Light/Dark-ON+analog 1...10V

NPN Light/Dark-ON+analog 1...10V

Other types available

# CUBIC MINIATURE

□ 20 X 34 X 12

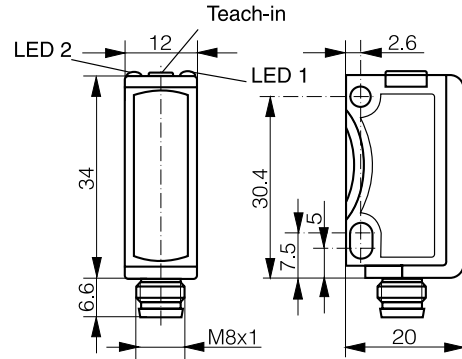
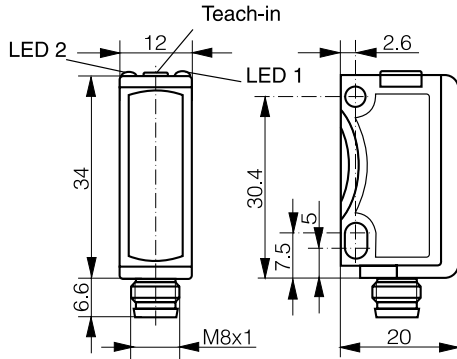
DISTANCE MEASURING SENSOR

20 ... 80

□ 20 X 34 X 12

DISTANCE MEASURING SENSOR

30 ... 200



LED red 632 nm

5 mm at 50 mm

0.12 mm

+/- 0.4 mm

≤ 0.4 mm

**DTR-C23PB-TMS-139**

**DTR-C23PB-TMS-129**

LED red 632 nm

7 mm at 60 mm

0.68 mm

+/- 2 mm

≤ 1 mm

**DTR-C23PB-TLS-139**

**DTR-C23PB-TLS-129**

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

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# OVERVIEW

	3#3#
Housing material	PBTP (Crastin)
Hysteresis	10 % typ.
Degree of protection	IP 67
Supply voltage range	10 ... 36 VDC / 15 ... 36 VDC (LA#-3130-119)
Ambient temperature range	-25 ... +55 °C / -13 ... +131 °F
Output current (total both outputs)	≤ 200 mA / -- (LA)
Output voltage drop	≤ 2 V / -- (LA)
Max. ambient light halogen	5000 Lux
Max. ambient light sun	10,000 Lux
Setup	Potentiometer
Compatible mounting bracket	See page 245

HOUSING SIZE MM

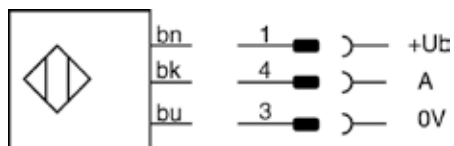
OPERATING PRINCIPLE

SENSING RANGE MM

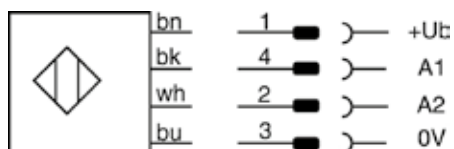
# PHOTOELECTRIC

## WIRING DIAGRAMS

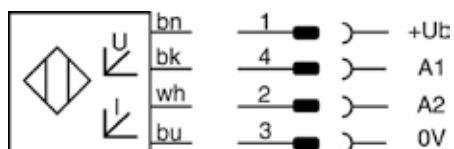
PNP/NPN Light-ON / Dark-ON / Emitter



PNP/NPN Changeover



Analog



## DATA

- Standard target
- No-load supply current
- Emitter
- Max. switching frequency
- Switching time
- Analog output
- PNP Changeover
- Other types available

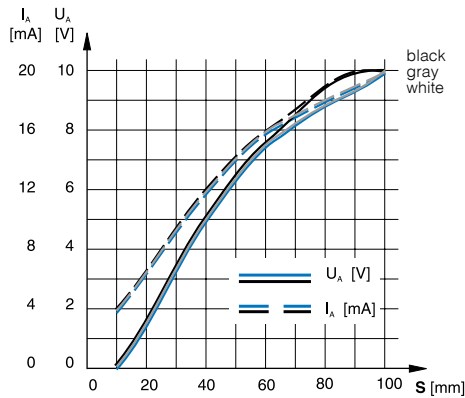


# CUBIC MINIATURE

□ 30 X 30 X 15

WITH ANALOG OUTPUT

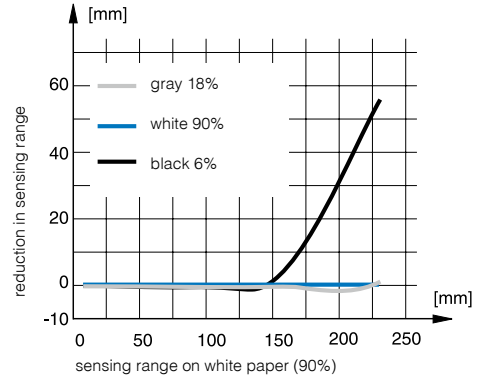
10 ... 100



□ 30 X 30 X 15

DIFFUSE SENSOR WITH BACKGROUND SUPPRESSION

15 ... 200



Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

Glossary

Index

100 x 100 mm white

≤ 25 mA

LED red 660 nm

-

-

**LAS-3130-119**

Cable version

100 x 100 mm white

≤ 25 mA

LED red 660 nm

500 Hz

1 msec

**LHS-3130-103**

NPN Changeover

# CUBIC MINIATURE

HOUSING SIZE MM

□ 30 X 30 X 15

□ 30 X 30 X 15

OPERATING PRINCIPLE

DIFFUSE SENSOR WITH  
BACKGROUND SUPPRESSION

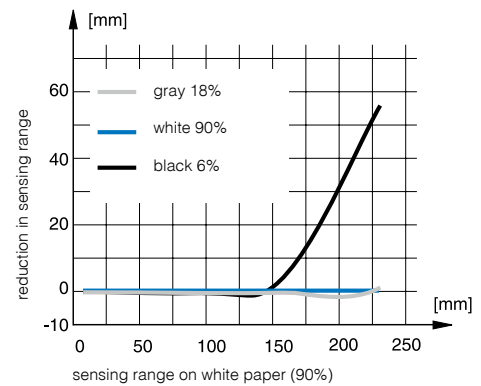
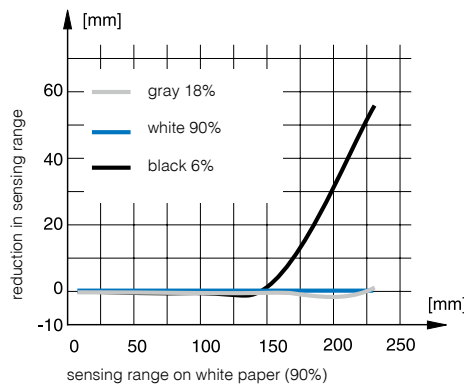
DIFFUSE SENSOR WITH  
BACKGROUND SUPPRESSION

SENSING RANGE MM

15 ... 200

15 ... 200

PHOTOELECTRIC



## DATA

Standard target

100 x 100 mm white

100 x 100 mm white

No-load supply current

≤ 25 mA

≤ 25 mA

Emitter

LED red 660 nm

LED red 660 nm

Max. switching frequency

500 Hz

500 Hz

Switching time

1 msec

1 msec

PNP Light-ON

**LHK-3131-303**

**LHS-3131-303**

NPN Light-ON

**LHK-3131-301**

**LHS-3131-301**

Other types available

# CUBIC MINIATURE

□ 30 X 30 X 15

DIFFUSE SENSOR

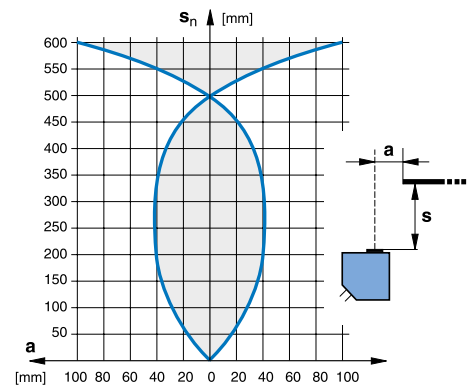
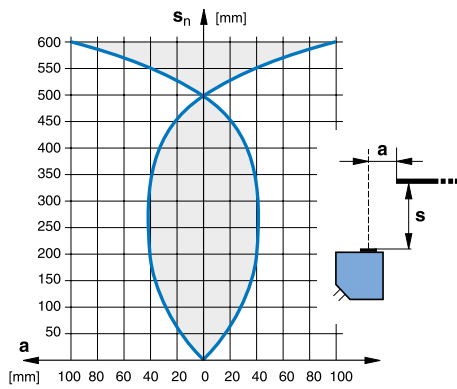
600



□ 30 X 30 X 15

DIFFUSE SENSOR

600



200 x 200 mm white

≤ 15 mA

IR LED 880 nm

1000 Hz

0.5 msec

**LTS-3031-303**

**LTS-3031-301**

200 x 200 mm white

≤ 15 mA

IR LED 880 nm

1000 Hz

0.5 msec

**LTK-3031-303**

**LTK-3031-301**

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

Glossary

Index

# CUBIC MINIATURE

HOUSING SIZE MM

□ 30 X 30 X 15

□ 30 X 30 X 15

OPERATING PRINCIPLE

DIFFUSE SENSOR

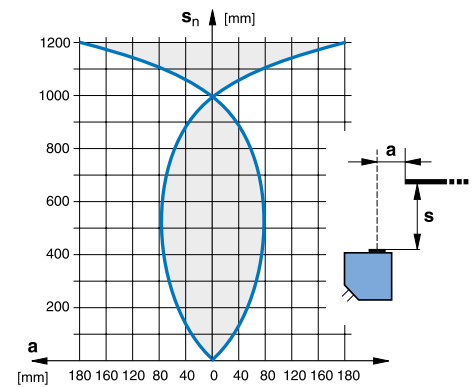
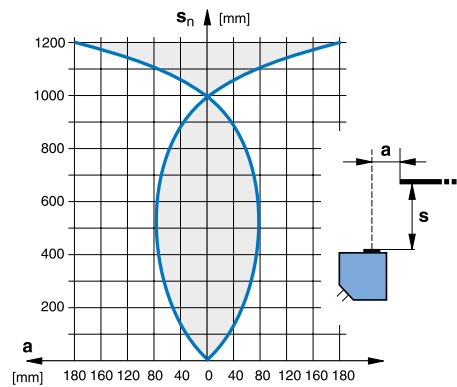
DIFFUSE SENSOR

SENSING RANGE MM

1200

1200

PHOTOELECTRIC



## DATA

Standard target / Reflector type

200 x 200 mm white

200 x 200 mm white

No-load supply current

≤ 20 mA

≤ 20 mA

Emitter

IR LED 880 nm

IR LED 880 nm

Max. switching frequency

1000 Hz

1000 Hz

Switching time

0.5 msec

0.5 msec

PNP Changeover

**LTS-3030-103**

**LTK-3030-103**

NPN Changeover

**LTS-3030-101**

**LTK-3030-101**

PNP Dark-ON

Other types available

# CUBIC MINIATURE

□ 30 X 30 X 15

REFLEX SENSOR

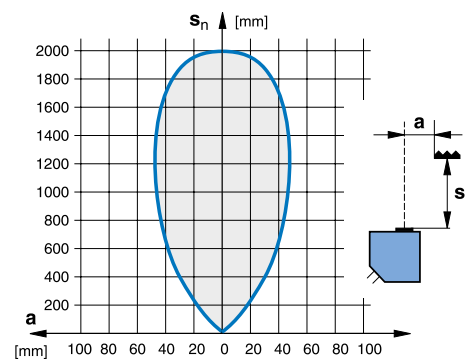
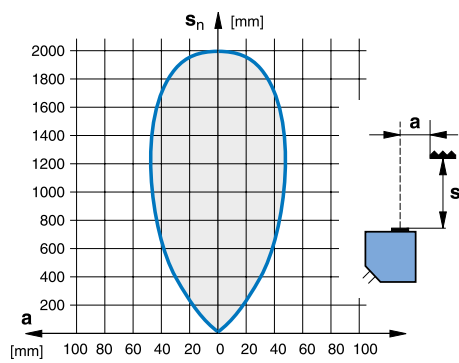
2000



□ 30 X 30 X 15

REFLEX SENSOR

2000



LXR-0000-084 (see page 247)

≤ 15 mA

LED red polarized 660 nm

1000 Hz

0.5 msec

**LRS-3031-304**

NPN Dark-ON

LXR-0000-084 (see page 247)

≤ 15 mA

LED red polarized 660 nm

1000 Hz

0.5 msec

**LRK-3031-304**

NPN Dark-ON

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

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# CUBIC MINIATURE

HOUSING SIZE MM

□ 30 X 30 X 15

□ 30 X 30 X 15

OPERATING PRINCIPLE

REFLEX SENSOR

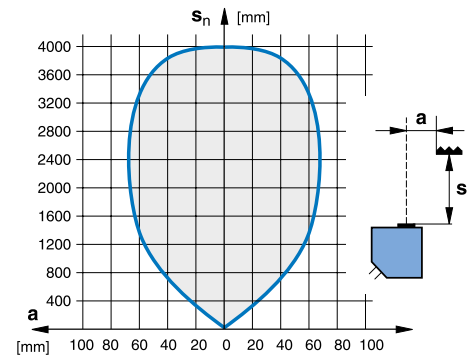
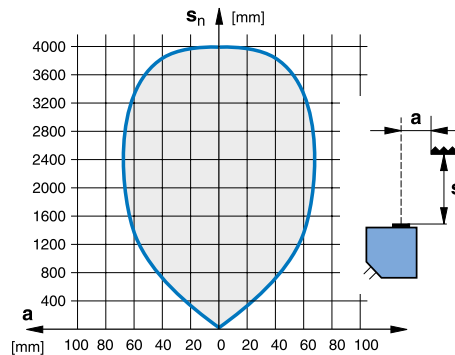
REFLEX SENSOR

SENSING RANGE MM

4000

4000

PHOTOELECTRIC



## DATA

Standard target / Reflector type

LXR-0000-084 (see page 247)

LXR-0000-084 (see page 247)

No-load supply current

≤ 20 mA

≤ 20 mA

Emitter

LED red polarized 660 nm

LED red polarized 660 nm

Max. switching frequency

1000 Hz

1000 Hz

Switching time

0.5 msec

0.5 msec

Emitter

PNP Changeover

**LRS-3030-103**

**LRK-3030-103**

NPN Changeover

**LRS-3030-101**

**LRK-3030-101**

PNP Dark-ON

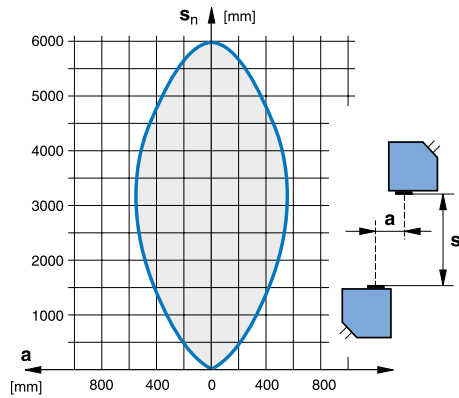
Other types available

# CUBIC MINIATURE

□ 30 X 30 X 15

THROUGH-BEAM SENSOR

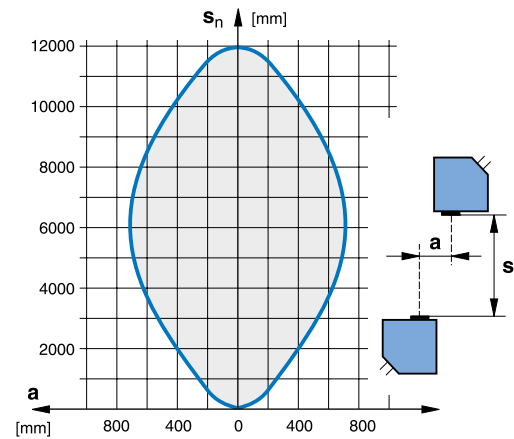
6000



□ 30 X 30 X 15

THROUGH-BEAM SENSOR

12,000



Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

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≤ 10 mA (receiver) / ≤ 15 mA (emitter)

IR LED 880 nm

1000 Hz

0.5 msec

**LLS-3031-200**

**LLS-3031-204 (receiver)**

NPN Dark-ON

≤ 10 mA (receiver) / ≤ 15 mA (emitter)

IR LED 880 nm

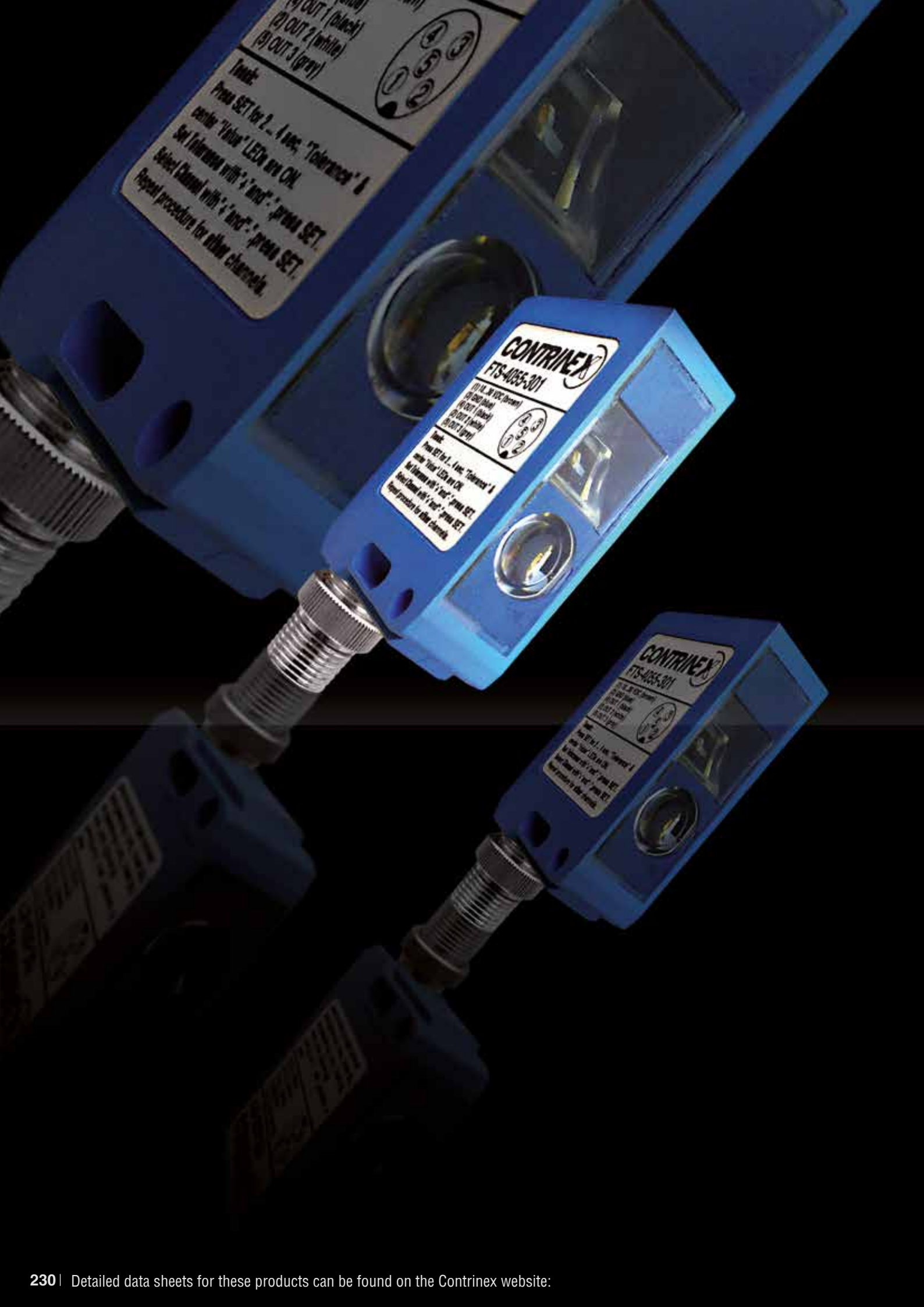
1000 Hz

0.5 msec

**LLS-3030-000**

**LLS-3030-003 (receiver)**

**LLS-3030-001 (receiver)**



(1) OUT 1 (black)  
(2) OUT 2 (white)  
(3) OUT 3 (grey)

Note:  
Press SET for 2...4 sec; "Tolerance" &  
center "Value" LEDs are ON.  
Set tolerance with "↑" and "↓"; press SET.  
Select channel with "↑" and "↓"; press SET.  
Repeat procedure for other channels.

**CONTRINEX**  
FTS-4035-301

U.S. & CAN. ONLY  
24 VDC (max)  
100 mA (max)  
IP67 (max)  
IP69K (max)  
IP69K (max)  
IP69K (max)

Note:  
Press SET for 2...4 sec; "Tolerance" &  
center "Value" LEDs are ON.  
Set tolerance with "↑" and "↓"; press SET.  
Select channel with "↑" and "↓"; press SET.  
Repeat procedure for other channels.

**CONTRINEX**  
FTS-4035-301

U.S. & CAN. ONLY  
24 VDC (max)  
100 mA (max)  
IP67 (max)  
IP69K (max)  
IP69K (max)  
IP69K (max)

Note:  
Press SET for 2...4 sec; "Tolerance" &  
center "Value" LEDs are ON.  
Set tolerance with "↑" and "↓"; press SET.  
Select channel with "↑" and "↓"; press SET.  
Repeat procedure for other channels.

EXCELLENT VALUE FOR DEMANDING APPLICATIONS

# CUBIC SMALL

## PHOTOELECTRIC SENSORS

### KEY ADVANTAGES

- ✓ Small sensor series with outstanding performance, 40 mm x 50 mm x 15 mm
- ✓ Ecolab tested and approved
- ✓ Sensing face of coated plastic
- ✓ Color sensor
- ✓ Contrast sensor for precise print mark detection
- ✓ IO-Link interface

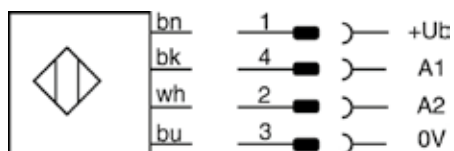
RANGE OVERVIEW	Distance mm	Diffuse	Reflex	Through-beam	Background suppression	Color	Contrast
<b>CUBIC SMALL</b>	12						p. 237
	30 ... 40					p. 237	
	500				p. 233		
	1200	p. 233					
	4000		p. 234				
	50,000				p. 234		

## OVERVIEW

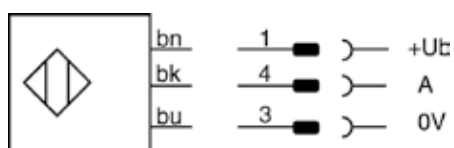
	4050
Housing material	PBTP
Hysteresis	$\leq 10\% s_n$
Degree of protection	IP 67
Supply voltage range	10 ... 36 VDC
Ambient temperature range	-5 ... +55 °C / 23 ... +131 °F
Output current (total of both outputs)	$\leq 200$ mA
Output voltage drop	$\leq 2$ V
Max. ambient light halogen	5000 Lux
Max. ambient light sun	10,000 Lux
Compatible mounting bracket	See page 246

## WIRING DIAGRAMS

### PNP/NPN Changeover



### Emitter



HOUSING SIZE MM

OPERATING PRINCIPLE

SENSING RANGE MM

PHOTOELECTRIC

## DATA

Standard target
No-load supply current
Emitter
Max. switching frequency
Switching time
Setup
PNP Changeover
NPN Changeover
Other types available



# CUBIC SMALL

□ 40 X 50 X 15

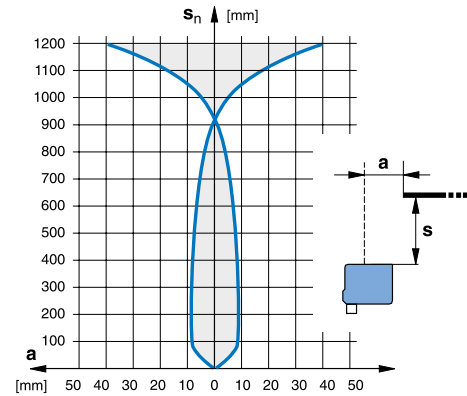
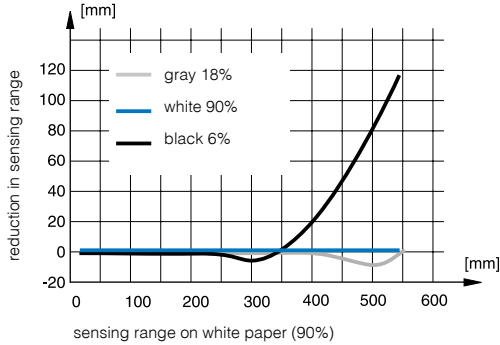
**DIFFUSE SENSOR WITH  
BACKGROUND SUPPRESSION**

30 ... 500

□ 40 X 50 X 15

**DIFFUSE SENSOR**

1200



100 x 100 mm white

≤ 30 mA

LED red 630 nm

500 Hz

1 msec

Potentiometer

**LHS-4150-103**

**LHS-4150-101**

Cable version

200 x 200 mm white

≤ 25 mA

LED red 630 nm

1500 Hz

0.5 msec

Potentiometer

**LTS-4150-103**

**LTS-4150-101**

Cable version

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

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# CUBIC SMALL

HOUSING SIZE MM

□ 40 X 50 X 15

□ 40 X 50 X 15

OPERATING PRINCIPLE

REFLEX SENSOR

THROUGH-BEAM SENSOR

SENSING RANGE MM

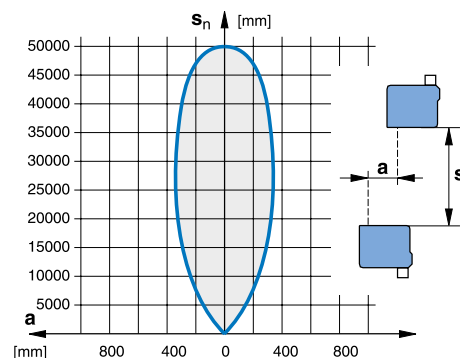
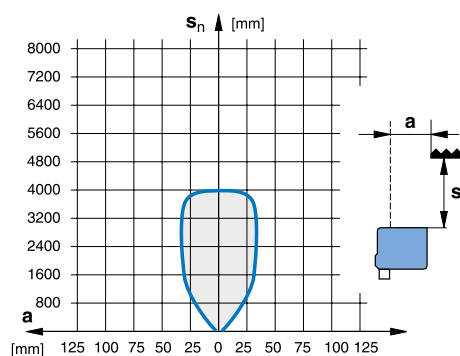
4000

50,000

PHOTOELECTRIC



AUTOCOLLIMATION



## DATA

Standard target/Reflector type

LXR-0000-084 (see page 247)

-

No-load supply current

≤ 20 mA

≤ 15 mA

Emitter

LED red polarized 680 nm

LED red 630 nm

Max. switching frequency

1500 Hz

1500 Hz

Switching time

0.5 msec

0.5 msec

Setup

Potentiometer

Potentiometer (receiver)

PNP Changeover

**LRS-4150-103**

**LLS-4150-003 (receiver)**

Emitter

**LLS-4150-000**

Other types available

NPN Changeover, PNP/NPN Light-ON  
+ Excess gain

NPN Changeover, PNP/NPN Light-ON  
+ Excess gain



## OVERVIEW



HOUSING SIZE MM

OPERATING PRINCIPLE

SENSING RANGE MM

	4050 COLOR	4050 CONTRAST
Housing material	PBTP	PBTP
Average positioning tolerance	± 5 mm (tol. 3)	± 2 mm (min.)
Degree of protection	IP 67	IP 67
Supply voltage range	10 ... 30 VDC	10 ... 30 VDC
Ambient temperature range	-5 ... +55°C / 23 ... +131°F	-5 ... +55°C / 23 ... +131°F
Output current	≤ 200 mA	≤ 100 mA
Output voltage drop	≤ 2 V	≤ 2.5 V
Switching frequency	4000 Hz	10,000 Hz
Switching time	0.4 msec	50 μsec (micro)
Max. ambient light halogen	5000 Lux	5000 Lux
Max. ambient light sun	10,000 Lux	10,000 Lux
Compatible mounting bracket	See page 246	See page 246

PHOTOELECTRIC

## WIRING DIAGRAMS

3 X PNP Light-ON



PUSH-PULL + Teach / Switching mode selector



## DATA

Light source
Light spot size (distance)
No-load supply current
Setup
3xPNP Light-ON
PUSH-PULL / IO-Link
Other types available

# CUBIC SMALL

□ 40 X 50 X 15

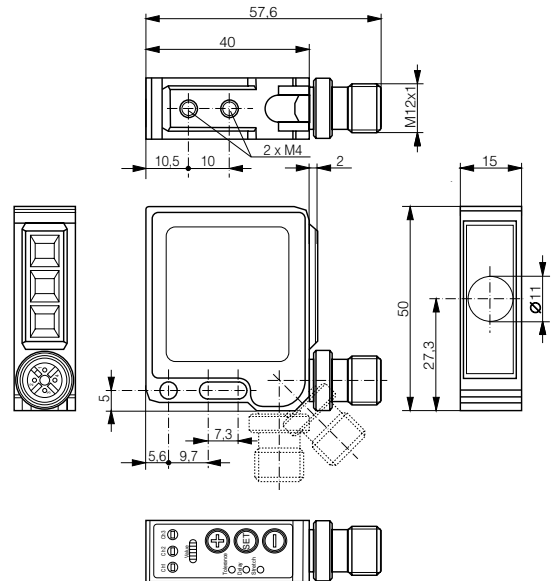
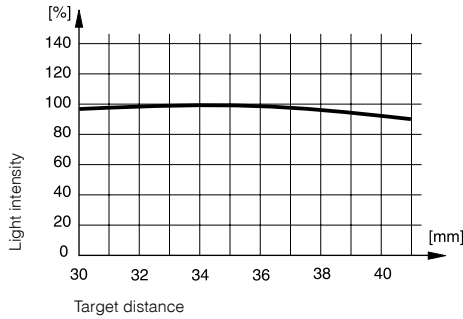
COLOR SENSOR (DIFFUSE)

30 ... 40

□ 40 X 50 X 15

CONTRAST SENSOR (DIFFUSE)

12



Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

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LED white

Ø 4 mm (35 mm)

≤ 35 mA

Teach button

**FTS-4155-303**

Cable version

LED red, green, blue (autoselect)

1.5 x 3.5 mm (12 mm)

≤ 35 mA

Teach button / Teach input / IO-Link

**KTS-4155-407**

Cable version





TOP QUALITY, RUGGED AND COST-EFFECTIVE

# CUBIC COMPACT

## PHOTOELECTRIC SENSORS

### KEY ADVANTAGES

#### C55 distance measuring sensors

- ✓ Distance measurement up to 5000 mm, housing 50 mm x 50 mm x 23 mm
- ✓ High precision and repeatability
- ✓ Settable analog range for optimum distance measurement
- ✓ Adjustable digital output for window of acceptance
- ✓ Background suppression variant with 2 outputs
- ✓ Types available with enclosure rating IP 69K and Ecolab

RANGE OVERVIEW	Distance mm	Distance measuring	Background suppression
<b>CUBIC COMPACT</b>	5000	p. 241	p. 241

## OVERVIEW

	C55 DISTANCE
Housing material	ABS / PMMA
Degree of protection	IP 67 / IP 69K, Ecolab
Supply voltage range	18 ... 30 VDC
Ambient temperature range	-40 ... +60 °C / -40 ... +140 °F
No-load supply current	≤ 60 mA
Output current	≤ 100 mA
Output voltage drop	≤ 2 V
Switching frequency	≤ 250 Hz (DTL) / ≤ 500 Hz (LHL)
Response time (analog)	2 msec (DTL) / 1 msec (LHL)
Setup	Teach button
Compatible mounting bracket	See page 245

## WIRING DIAGRAM

PNP/NPN auto-detect, Light-ON/Dark-ON + Analog + Teach



HOUSING SIZE

OPERATING PRINCIPLE

MEASUREMENT RANGE MM

PHOTOELECTRIC

DATA

Light source

Light spot size

Resolution

Linearity

PNP/NPN auto-detect  
+ Analog 4 ... 20 mA

PNP/NPN auto-detect  
+ Analog 0 ... 10 V

PNP/NPN auto-detect (x2)

Other types available

# CUBIC COMPACT

□ 50 X 50 X 23

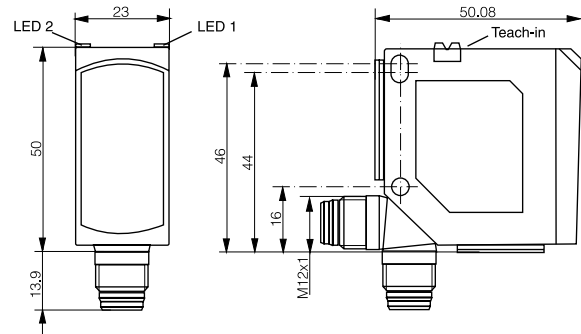
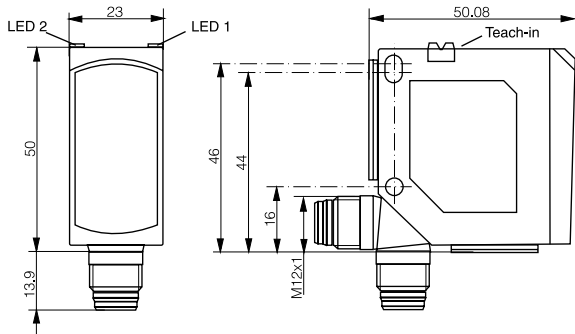
**DISTANCE MEASURING SENSOR**

100 ... 5000

□ 50 X 50 X 23

**DIFFUSE SENSOR WITH BACKGROUND SUPPRESSION**

0 ... 5000



Laser class 1 red 650 nm  
5 mm x 4 mm at 3000 mm  
< 5 mm  
+/- 30 mm

**DTL-C55PA-TMS-119-502**

**DTL-C55PA-TMS-119-503**

Laser class 1 red 650 nm  
5 mm x 4 mm at 3000 mm

-

-

**LHL-C55PA-TMS-119-501**

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

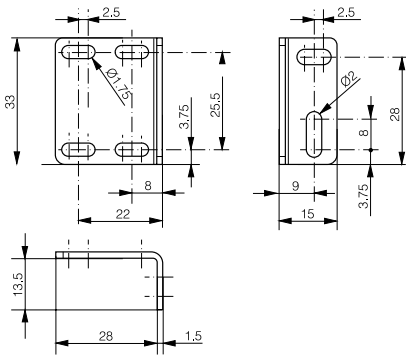
Glossary

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# PHOTOELECTRIC ACCESSORIES

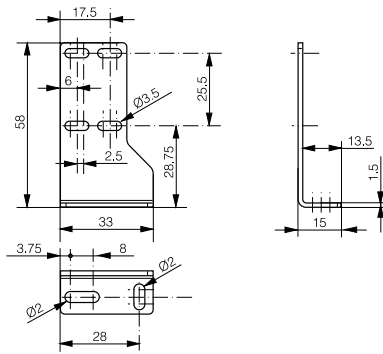
## UNIVERSAL MOUNTING BRACKET

Material: stainless steel V2A  
Part reference: **LXW-C23PA-000**



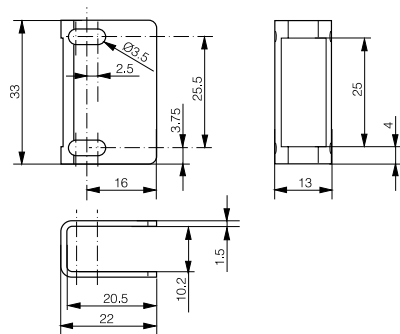
## UNIVERSAL MOUNTING BRACKET

Material: stainless steel V2A  
Part reference: **LXW-C23PA-001**



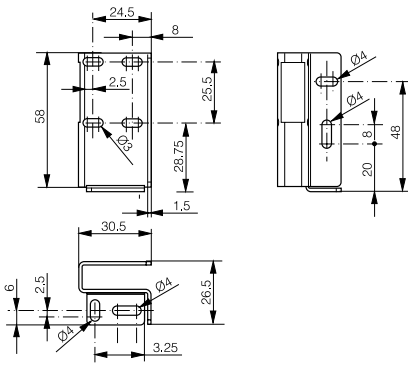
## UNIVERSAL MOUNTING BRACKET

Material: stainless steel V2A  
Part reference: **LXW-C23PA-002**



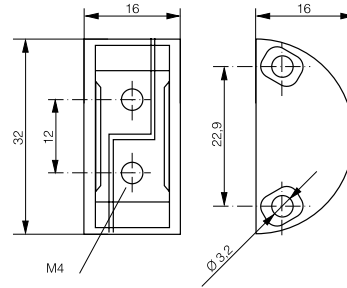
**UNIVERSAL MOUNTING BRACKET**

Material: stainless steel V2A  
 Part reference: **LXW-C23PA-003**



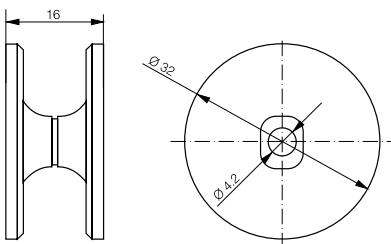
**UNIVERSAL MOUNTING BRACKET**

Material: aluminum anodised  
 Part reference: **LXW-C23PB-000**



**UNIVERSAL MOUNTING BRACKET**

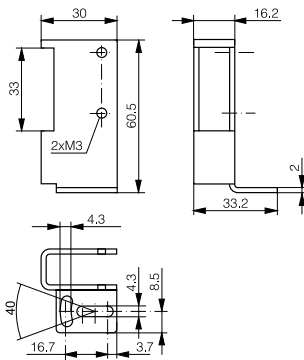
Material: aluminum  
 Part reference: **LXW-C23PB-001**



# PHOTOELECTRIC ACCESSORIES

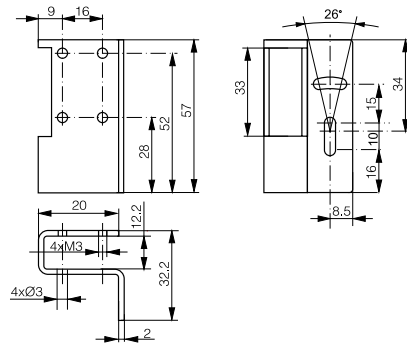
## UNIVERSAL MOUNTING BRACKET

Material: stainless steel V2A  
Part reference: **LXW-C23PB-002**



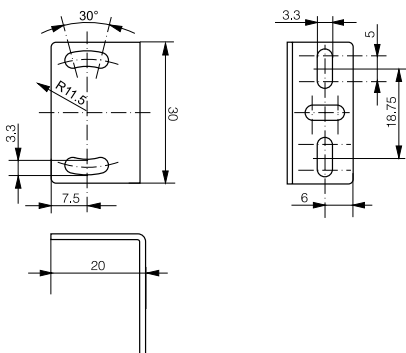
## UNIVERSAL MOUNTING BRACKET

Material: stainless steel V2A  
Part reference: **LXW-C23PB-003**



## UNIVERSAL MOUNTING BRACKET

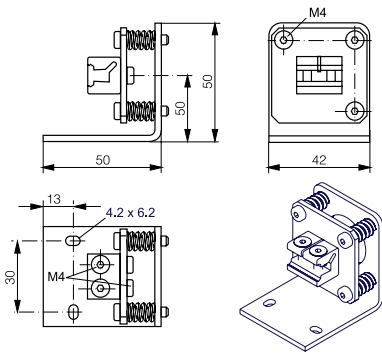
Material: nickel-plated steel  
Part reference: **LXW-C23PB-004**





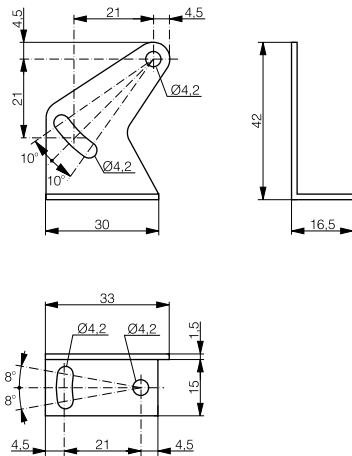
### UNIVERSAL MOUNTING BRACKET

Material: stainless steel V2A  
 Part reference: **LXW-C55PA-000**



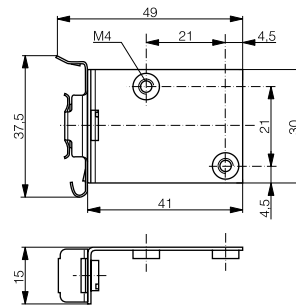
### UNIVERSAL MOUNTING BRACKET

For 3#30 / 3#31 series  
 Material: stainless steel V2A  
 Part reference: **LXW-3030-000**



### DIN-RAIL MOUNTING BRACKET

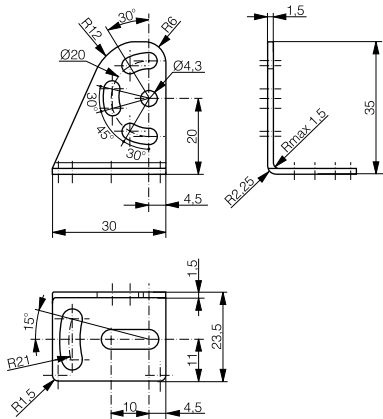
(TS35) for 3#30 / 3#31 series  
 Material: stainless steel V2A  
 Part reference: **LXW-3030-001**



# PHOTOELECTRIC ACCESSORIES

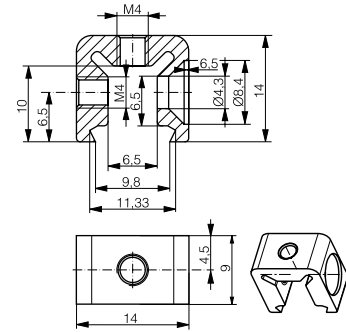
## UNIVERSAL MOUNTING BRACKET

For 4050 series  
 Material: stainless steel V2A  
 Part reference: **LXW-4050-000**



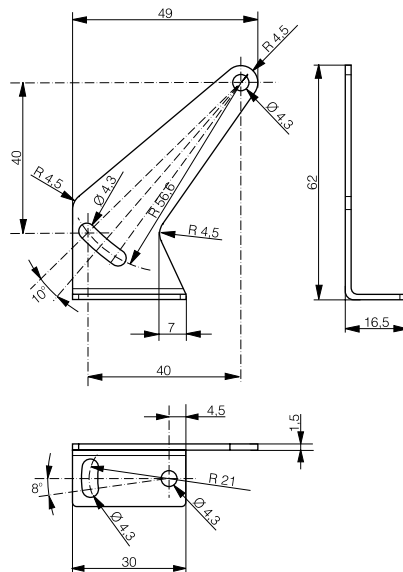
## CLAMP BRACKET

For 4050 series  
 Material: aluminum  
 Part reference: **LXW-4050-002**

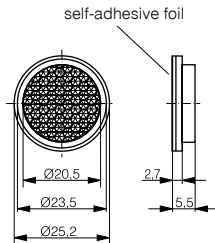


## UNIVERSAL MOUNTING BRACKET

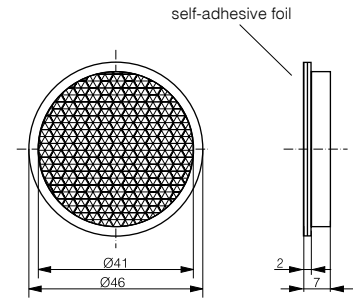
For 5050 series  
 Material: stainless steel V2A  
 Part reference: **LXW-5050-000**



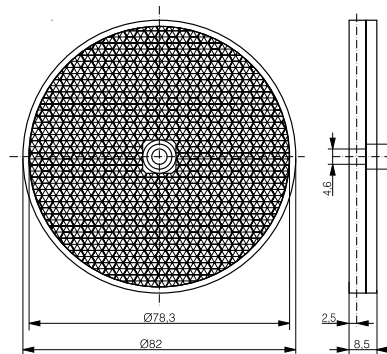
## REFLECTOR Ø 25 MM

Part reference: **LXR-0000-025**

## REFLECTOR Ø 46 MM

Part reference: **LXR-0000-046**

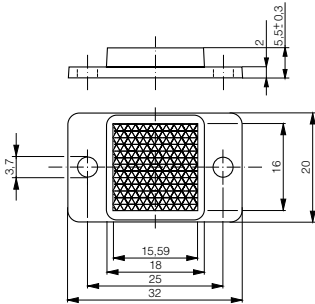
## REFLECTOR Ø 82 MM

Reference reflector for all reflex sensors  
Part reference: **LXR-0000-084**

# PHOTOELECTRIC ACCESSORIES

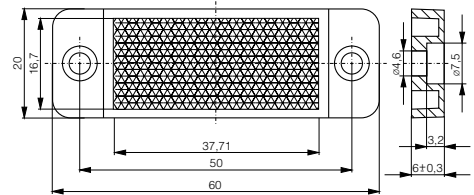
## REFLECTOR 32 X 20 MM

Part reference: **LXR-0001-032**



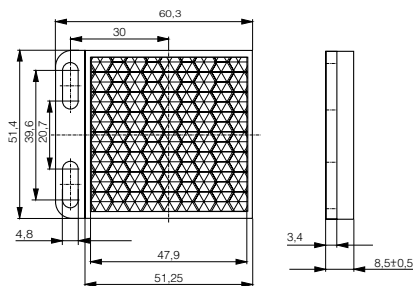
## REFLECTOR 60 X 20 MM

Part reference: **LXR-0001-062**



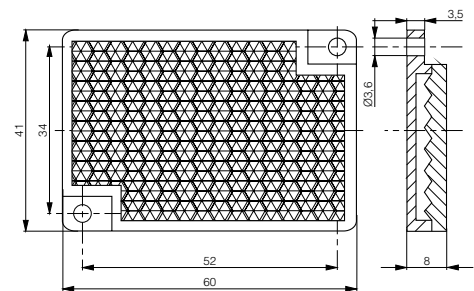
## REFLECTOR 60 X 51 MM

Part reference: **LXR-0001-065**



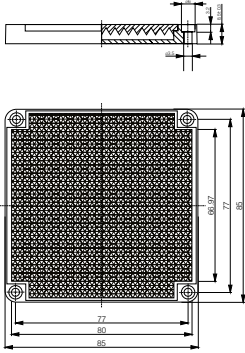
## REFLECTOR 60 X 41 MM

Part reference: **LXR-0001-064**



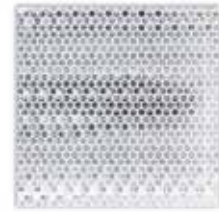
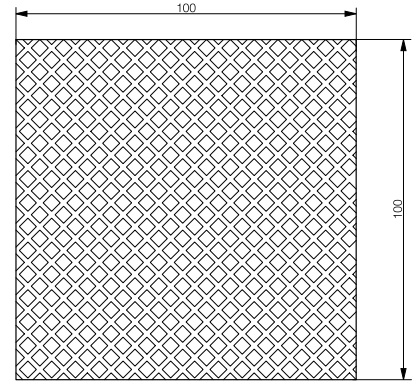
**REFLECTOR 85 X 85 MM**

Part reference: **LXR-0001-088**



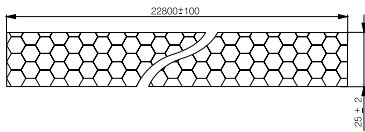
**REFLECTIVE FOIL 100 X 100 MM**

For all reflex sensors (IMOS IRF 6000)  
Part reference: **LXR-0002-100**



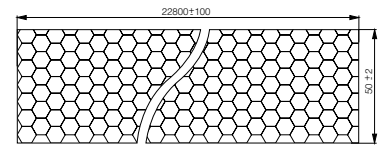
**REFLECTIVE ROLL 25 MM X 22.8 M**

Part reference: **LXR-0003-025**



**REFLECTIVE ROLL 50 MM X 22.8 M**

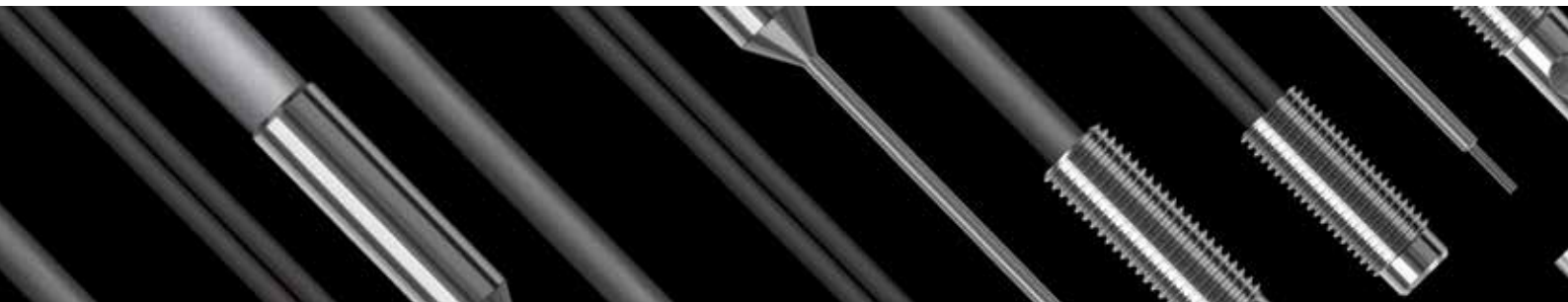
Part reference: **LXR-0003-050**



# PROGRAM OVERVIEW

FAMILY	PRODUCT RANGE		SUBMINIATURE				
OPTICAL FIBERS	CYLINDRICAL						
	HOUSING SIZE		No sensing head	Ø 2.3	M3	Ø 3.2	Ø 4
	SYNTHETIC FIBERS	Diffuse	p. 265	p. 265	p. 265		
		Through-beam	p. 268		p. 268	p. 268	
		Cylindrical light beam					p. 271
		Background suppression					
		Liquid level monitoring					
		Low and high temperatures					
		Multi-beam detection					
	GLASS FIBERS	Diffuse					
Through-beam							

FAMILY	PRODUCT RANGE	MINIATURE	SMALL		
AMPLIFIERS	CUBIC				
	SERIES	303#	3060		
	HOUSING SIZE	30 x 30 x 15 mm	31 x 60 x 10 mm		
	MAX. DISTANCE	120 mm	200 mm		
	SETUP	Potentiometer	Potentiometer		
	FOR USE WITH SYNTHETIC FIBERS	p. 255-256	p. 261		
	FOR USE WITH GLASS FIBERS	p. 255-256			





									Inductive
SUBMINIATURE			MINIATURE				SMALL		
CYLINDRICAL							CUBIC		Photoelectric
M4	M5	Ø 6	M6	Ø 8	M8	□ 27 x 30	□ 18 x 32		
			p. 266-267						
p. 269-270			p. 270						
	p. 271								
						p. 272			
					p. 273				
p. 274			p. 274						
							p. 273		
		p. 277-278	p. 282	p. 277-278					
p. 282		p. 279, 281		p. 280-281					

Inductive
Photoelectric
Ultrasonic
Capacitive
Safety

SMALL

CUBIC

	3065	3066	3360	4040	
	31 x 60 x 10 mm	31 x 60 x 10 mm	31 x 60 x 10 mm	40 x 40 x 19 mm	
	200 mm	200 mm	100 mm	150 mm	
	Teach-in	Teach / IO-Link	Potentiometer	Potentiometer	
	p. 259-260	p. 260-261	p. 259		
				p. 263	

RFID
Connectivity
Accessories



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# PROGRAM OVERVIEW

HOUSING SIZE	SENSING RANGE														PAGE
	12 mm	20 mm	45 mm	60 mm	70 mm	80 mm	140 mm	150 mm	200 mm	260 mm	550 mm	700 mm	900 mm	1800 mm	

## SYNTHETIC OPTICAL FIBERS

DIFFUSE SENSING		
Double fiber (10 m)	60 ... 200 mm	265
∅ 2.3 miniature	20 ... 70 mm	265
M3 miniature	20 ... 70 mm	265
M6 standard	60 ... 200 mm	266-267
M6 flexible	45 ... 150 mm	266-267
M6 luminous	80 ... 260 mm	266
M6 coaxial	60 ... 200 mm	266
THROUGH-BEAM SENSING		
Indiv. fiber (10 m)	200 ... 700 mm	268
M3 miniature	60 ... 200 mm	268
∅ 3.2 standard 90°	60 ... 200 mm	268
M4 standard	200 ... 700 mm	269
M4 flexible	150 ... 550 mm	269-270
M4 luminous	250 ... 900 mm	269
M6 standard 90°	550 ... 1800 mm	270
CYLINDRICAL LIGHT BEAM		
∅ 4 miniature	60 ... 140 mm	271
M5 miniature	60 ... 140 mm	271
BACKGROUND SUPPRESSION		
27 x 30 mm flexible 90°	12 mm	272
27 x 30 mm flexible	12 mm	272
LIQUID LEVEL MONITORING		
M8		273
LOW & HIGH TEMPERATURES		
M4	150 ... 550 mm	274
M6	45 ... 150 mm	274
MULTI-BEAM		
18 x 32 mm	45 ... 150 mm	273



HOUSING SIZE	SENSING RANGE													PAGE
	5 mm	15 mm	30 mm	50 mm	60 mm	120 mm	150 mm	200 mm	250 mm	500 mm	800 mm	1500 mm		

Inductive  
Photoelectric

## GLASS OPTICAL FIBERS (FOR SERIES 4040 SENSORS)

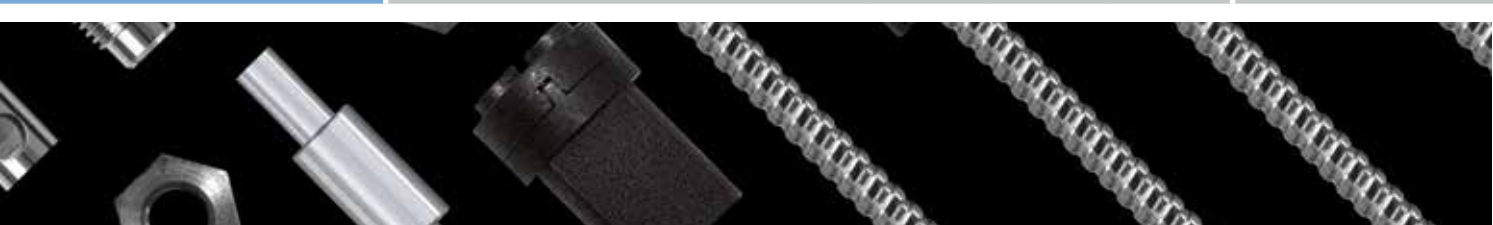
AXIAL DIFFUSE SENSING														
∅ 6 mm	5 mm												277	
	15 mm												277	
∅ 8 mm	50 mm											277		
	150 mm												277	
RADIAL DIFFUSE SENSING														
∅ 6 mm	15 mm												278	
∅ 8 mm	30 mm											278		
	150 mm												278	
AXIAL THROUGH-BEAM SENSING														
∅ 6 mm	50 mm												279	
	200 mm												279	
∅ 8 mm	800 mm												280	
	1500 mm												280	
RADIAL THROUGH-BEAM SENSING														
∅ 6 mm	200 mm												281	
∅ 8 mm	800 mm												281	
	1500 mm												281	

Ultrasonic  
Capacitive  
Safety  
RFID  
Connectivity

## GLASS OPTICAL FIBERS (FOR SERIES 3030/3031 SENSORS) Connection as with synthetic fibers

DIFFUSE AND THROUGH-BEAM SENSING														
M6 diffuse sensing	60 ... 120 mm												282	
M4 through-beam sensing	250 ... 500 mm												282	

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## OVERVIEW

	303#
Housing material	PBTP (Crastin)
Hysteresis	10 % typ.
Degree of protection	IP 67
Supply voltage range	10 ... 36 VDC
Ambient temperature range	-25 ... +55 °C / -13 ... +131 °F
Output current (total both outputs)	≤ 200 mA
Output voltage drop	≤ 2 V
Max. ambient light halogen	5000 Lux
Max. ambient light sun	10,000 Lux
Setup	Potentiometer
Compatible mounting bracket	See page 275

HOUSING SIZE MM

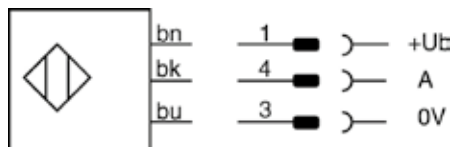
OPERATING PRINCIPLE

SENSING RANGE MM

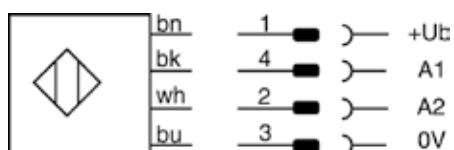
PHOTOELECTRIC

## WIRING DIAGRAMS

PNP Light/Dark-ON / NPN Light-ON



PNP/NPN Changeover



DATA

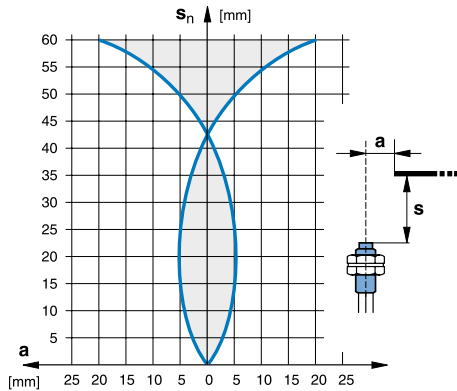
Standard target
No-load supply current
Emitter
Max. switching frequency
Switching time
PNP Light-ON
PNP Dark-ON
NPN Light-ON
Other types available

# CUBIC MINIATURE

□ 30 X 30 X 15

FIBER-OPTIC AMPLIFIER

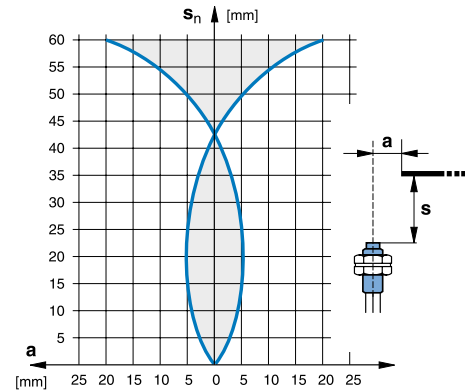
60



□ 30 X 30 X 15

FIBER-OPTIC AMPLIFIER

60



100 x 100 mm white

≤ 15 mA

LED red 660 nm

1000 Hz

0.5 msec

**LFS-3031-303**

**LFS-3031-304**

**LFS-3031-301**

NPN Dark-ON

100 x 100 mm white

≤ 15 mA

LED red 660 nm

1000 Hz

0.5 msec

**LFK-3031-303**

**LFK-3031-304**

**LFK-3031-301**

NPN Dark-ON

Inductive

Photoelectric

Ultrasonic

Capacitive

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# CUBIC MINIATURE

HOUSING SIZE MM

□ 30 X 30 X 15

□ 30 X 30 X 15

OPERATING PRINCIPLE

FIBER-OPTIC AMPLIFIER

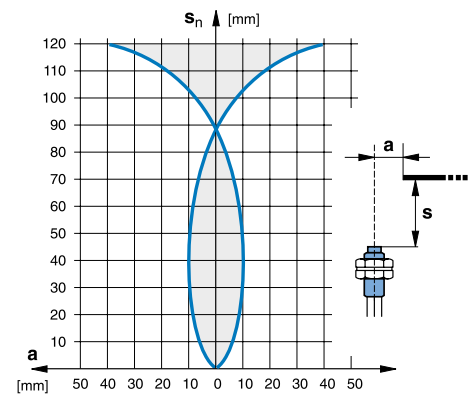
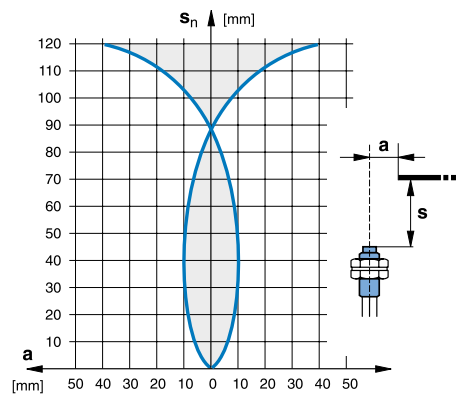
FIBER-OPTIC AMPLIFIER

SENSING RANGE MM

120

120

## PHOTOELECTRIC



### DATA

Standard target

100 x 100 mm white

100 x 100 mm white

No-load supply current

≤ 20 mA

≤ 20 mA

Emitter

LED red 660 nm

LED red 660 nm

Max. switching frequency

1000 Hz

1000 Hz

Switching time

0.5 msec

0.5 msec

PNP Changeover

**LFS-3030-103**

**LFK-3030-103**

Other types available

NPN Changeover

NPN Changeover





# OVERVIEW



HOUSING SIZE MM

OPERATING PRINCIPLE

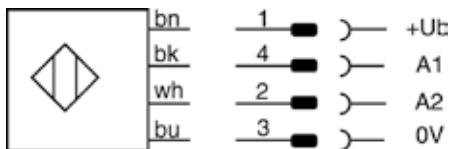
SENSING RANGE MM

	3#6#
Housing material	PBTP (Crastin)
Hysteresis	10 % typ. / ≤ 5 % (3066)
Degree of protection	IP 64
Supply voltage range	10 ... 30 VDC
Ambient temperature range	-25...+55 °C/-13...+131 °F // -5...+55 °C/+23... +131 °F (3066)
Output current	≤ 200 mA
Output voltage drop	≤ 2 V
Max. ambient light halogen	5000 Lux
Max. ambient light sun	10,000 Lux
Compatible mounting bracket	See page 275

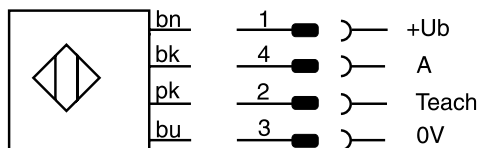
PHOTOELECTRIC

# WIRING DIAGRAMS

PNP Light/Dark-ON switchable



PNP Light/Dark-ON with teach-in



## DATA

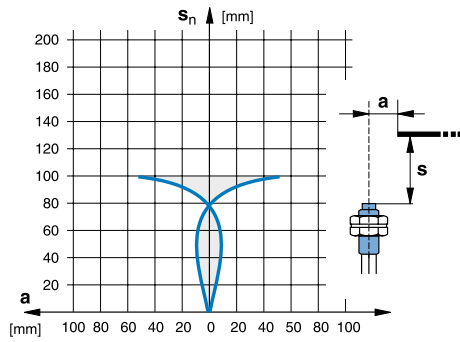
Standard target
No-load supply current
Emitter
Max. switching frequency
Setup
PNP Light-ON/Dark-ON switchable + Excess gain
Other types available

# CUBIC SMALL

□ 31 X 60 X 10

FIBER-OPTIC AMPLIFIER - BLUE LIGHT

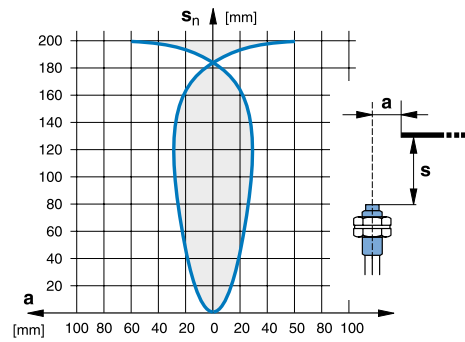
100



□ 31 X 60 X 10

FIBER-OPTIC AMPLIFIER

200



100 x 100 mm white

≤ 15 mA

LED blue 465 nm

1500 Hz

Potentiometer

**LFS-3360-103**

NPN Light-ON/Dark-ON + Excess gain

100 x 100 mm white

≤ 25 mA

LED red 680 nm

1500 Hz

Teach-in

**LFK-3065-103**

NPN / Blue light devices / Increased switching frequency

Inductive

Photoelectric

Ultrasonic

Capacitive

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# CUBIC SMALL

HOUSING SIZE MM

□ 31 X 60 X 10

□ 31 X 60 X 10

OPERATING PRINCIPLE

FIBER-OPTIC AMPLIFIER

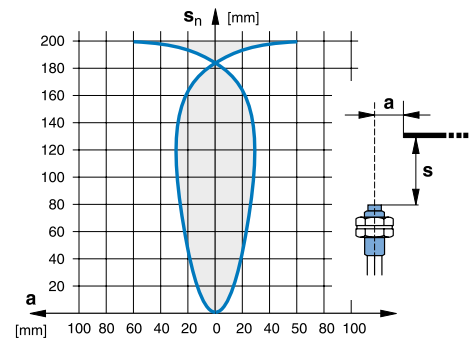
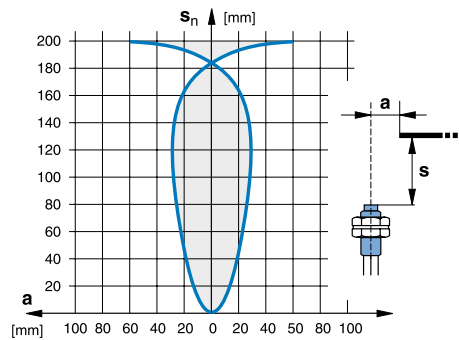
FIBER-OPTIC AMPLIFIER

SENSING RANGE MM

200

200

PHOTOELECTRIC



## DATA

Standard target	100 x 100 mm white
No-load supply current	≤ 25 mA
Emitter	LED red 680 nm
Max. switching frequency	1500 Hz
Setup	Teach-in
PNP Light-ON/Dark-ON switchable + Excess gain	<b>LFS-3065-103</b>
PNP Light-ON/Dark-ON switchable	<b>LFS-3066-103</b>
PNP Light-ON/Dark-ON switchable + IO Link	
Other types available	NPN Light-ON/Dark-ON switchable + Excess gain

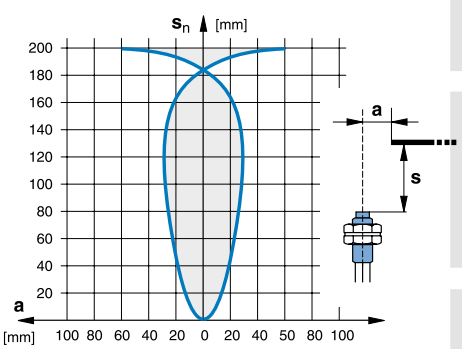
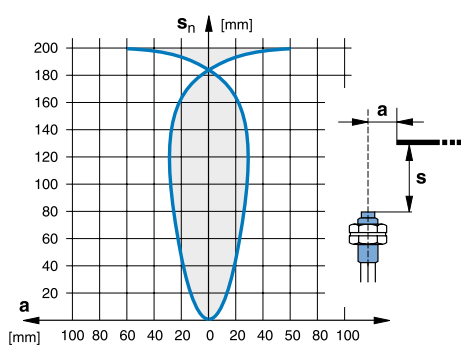
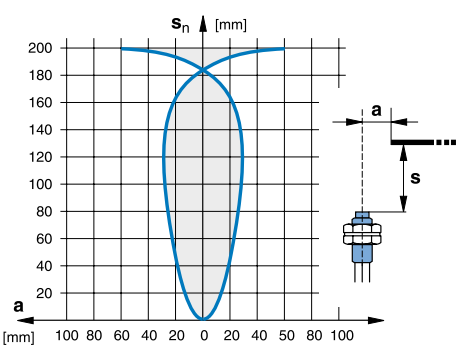
Standard target	100 x 100 mm white
No-load supply current	≤ 30 mA
Emitter	LED red 680 nm
Max. switching frequency	4000 Hz
Setup	Teach-in
PNP Light-ON/Dark-ON switchable + Excess gain	<b>LFS-3065-103</b>
PNP Light-ON/Dark-ON switchable	<b>LFS-3066-103</b>
PNP Light-ON/Dark-ON switchable + IO Link	
Other types available	NPN Light-ON/Dark-ON switchable

Standard target	100 x 100 mm white
No-load supply current	≤ 30 mA
Emitter	LED red 680 nm
Max. switching frequency	4000 Hz
Setup	Teach-in
PNP Light-ON/Dark-ON switchable + Excess gain	<b>LFS-3065-103</b>
PNP Light-ON/Dark-ON switchable	<b>LFS-3066-103</b>
PNP Light-ON/Dark-ON switchable + IO Link	
Other types available	NPN Light-ON/Dark-ON switchable

# CUBIC SMALL

□ 31 X 60 X 10	□ 31 X 60 X 10	□ 31 X 60 X 10
FIBER-OPTIC AMPLIFIER	FIBER-OPTIC AMPLIFIER	FIBER-OPTIC AMPLIFIER
200	200	200

**IO-Link**



100 x 100 mm white ≤ 30 mA LED red 680 nm 4000 Hz Teach-in	100 x 100 mm white ≤ 15 mA LED red 680 nm 1500 Hz Potentiometer	100 x 100 mm white ≤ 15 mA LED red 680 nm 1500 Hz Potentiometer
<b>LFS-3066-403</b>	<b>LFK-3060-103</b>	<b>LFS-3060-103</b>
NPN Light-ON/Dark-ON switchable + Excess gain		NPN Light-ON/Dark-ON switchable + Excess gain

Inductive
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## OVERVIEW

	4040
Housing material	PBTP (Crastin)
Hysteresis	10 % typ.
Degree of protection	IP 67
Supply voltage range	10 ... 36 VDC
Ambient temperature range	-25 ... +55 °C / -13 ... +131 °F
Output current (total of both outputs)	≤ 200 mA
Output voltage drop	≤ 2 V
Switching frequency	≤ 1000 Hz
Switching time	0.5 msec
Max. ambient light halogen	5000 Lux
Max. ambient light sun	10,000 Lux
Compatible mounting bracket	See page 275

HOUSING SIZE MM

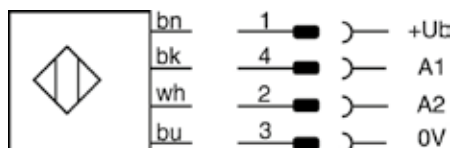
OPERATING PRINCIPLE

SENSING RANGE MM

PHOTOELECTRIC

## WIRING DIAGRAM

PNP/NPN Changeover



DATA

Standard target  
 No-load supply current  
 Emitter  
 Setup  
 PNP Changeover  
 Other types available

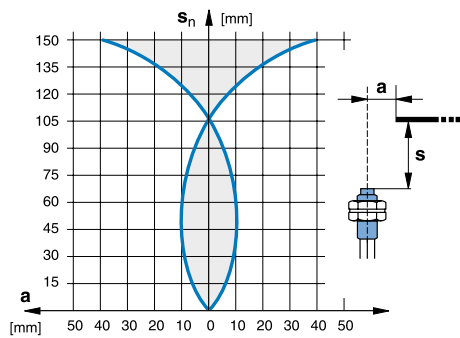


# CUBIC SMALL

□ 40 X 40 X 19

FIBER-OPTIC AMPLIFIER

150



Inductive

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Ultrasonic

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100 x 100 mm white

≤ 20 mA

IR LED 880 nm

Potentiometer

**LFS-4040-103**

NPN Changeover

# SYNTHETIC OPTICAL FIBERS

- ✓ Very small dimensions
- ✓ Long sensing ranges
- ✓ Small bending radii
- ✓ Can be cut on site
- ✓ Large selection of types
- ✓ Mechanically rugged sensing head

TECHNICAL DATA	
Ambient temperature range	-25 ... +70°C / -55 ... +105°C* (-13 ... +158°F / -67 ... +221°F*)
Standard length	2 m ± 0.1 m (other lengths on request)
Fiber bending radii:	
miniature / multi-beam	15 mm
standard / coaxial	25 mm
low & high temperature	25 mm
liquid level monitoring	25 mm
flexible / background suppression	2 mm
luminous (enhanced brightness)	40 mm
Bending radius of light-outlet tube	25 mm
Tensile load	30 N max.
Fiber material	PMMA
Sleeve material	Polyethylene
Sensing head material	Stainless steel V2A / PBTP**
Sensing head light-outlet tube material	Stainless steel V2A
Optical attenuation:	
standard / luminous (enhanced brightness)	0.2 dB / m max. at 660 nm
miniature / low & high temperature	0.2 dB / m max. at 660 nm
flexible / coaxial / multi-beam	0.3 dB / m max. at 660 nm
Angle of incidence	See data sheets
Tightening torque:	
M3	1 Nm
M4	2 Nm
M5	3 Nm
M6	4 Nm
M8	10 Nm

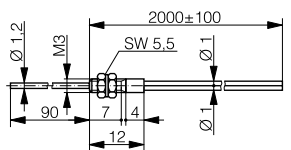
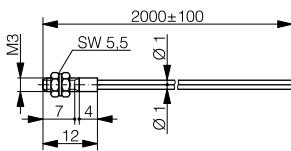
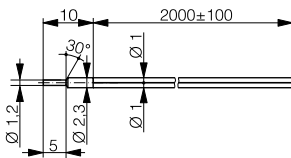
\* LFP-1002-020-002 / LFP-2002-020-002

\*\* LFP-1108 / 1109 / 1011-020

# SYNTHETIC OPTICAL FIBERS

## DIFFUSE SENSING

**Dimensions:** light emission on the left



Double fiber (10 m)		No sensing head	
<b>Part reference</b>	LFP-0005-100		
Sensing range	with series 3030	120 mm	(2 m fiber, diffuse sensing)
	with series 3031	60 mm	(2 m fiber, diffuse sensing)
	with series 3060/65/66	200 mm	(2 m fiber, diffuse sensing)
Outside fiber	separable double fiber, $\varnothing$ 2.2 mm		
Inner fiber	$\varnothing$ 1.0 mm		
Special characteristics	Long sensing range		

Housing size: $\varnothing$ 2.3 mm		Miniature	
<b>Part reference</b>	LFP-1012-020		
Sensing range	with series 3030	40 mm	(with 2 m fiber length)
	with series 3031	20 mm	(with 2 m fiber length)
	with series 3060/65/66	70 mm	(with 2 m fiber length)
Outside fiber	1 separable double fiber, $\varnothing$ 1 mm*		
Inner fiber	$\varnothing$ 0.5 mm		
Special characteristics	Highest resolution		
* Adaptor included in delivery package			

Housing size: M3		Miniature	
<b>Part reference</b>	LFP-1001-020		
Sensing range	with series 3030	40 mm	(with 2 m fiber length)
	with series 3031	20 mm	(with 2 m fiber length)
	with series 3060/65/66	70 mm	(with 2 m fiber length)
Outside fiber	1 separable double fiber, $\varnothing$ 1 mm*		
Inner fiber	$\varnothing$ 0.5 mm		
Special characteristics	Highest resolution		
* Adaptor included in delivery package			

Housing size: M3		Miniature	
<b>Part reference</b>	LFP-1004-020		
Sensing range	with series 3030	40 mm	(with 2 m fiber length)
	with series 3031	20 mm	(with 2 m fiber length)
	with series 3060/65/66	70 mm	(with 2 m fiber length)
Outside fiber	1 separable double fiber, $\varnothing$ 1 mm*		
Inner fiber	$\varnothing$ 0.5 mm		
Special characteristics	Sensing head with bendable light-outlet tube for ease of positioning; highest resolution		
* Adaptor included in delivery package			

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

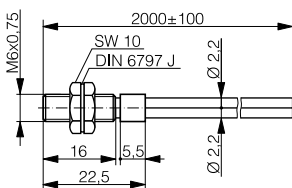
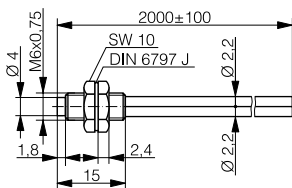
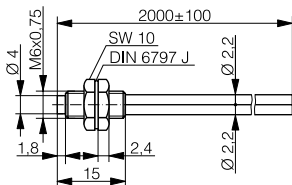
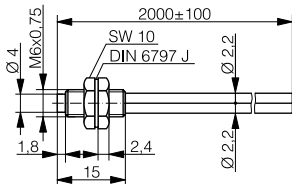
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# SYNTHETIC OPTICAL FIBERS

## DIFFUSE SENSING

**Dimensions:** light emission on the left



Housing size: M6	Standard	
<b>Part reference</b>	LFP-1002-020	
Sensing range	with series 3030	120 mm (with 2 m fiber length)
	with series 3031	60 mm (with 2 m fiber length)
	with series 3060/65/66	200 mm (with 2 m fiber length)
Outside fiber	1 separable double fiber, Ø 2.2 mm	
Inner fiber	Ø 1.0 mm	
Special characteristics	Long sensing range	

Housing size: M6	Flexible	
<b>Part reference</b>	LFP-1102-020	
Sensing range	with series 3030	90 mm (with 2 m fiber length)
	with series 3031	45 mm (with 2 m fiber length)
	with series 3060/65/66	150 mm (with 2 m fiber length)
Outside fiber	1 separable double fiber, Ø 2.2 mm	
Inner fiber	151 x Ø 75 µm	
Special characteristics	Very small bending radius	

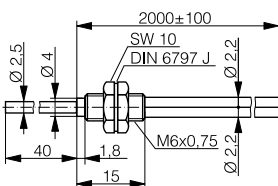
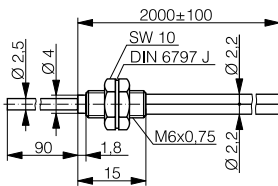
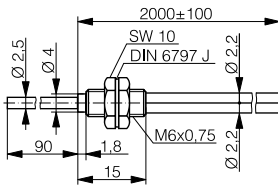
Housing size: M6	Luminous (enhanced brightness)	
<b>Part reference</b>	LFP-1202-020	
Sensing range	with series 3030	160 mm (with 2 m fiber length)
	with series 3031	80 mm (with 2 m fiber length)
	with series 3060/65/66	260 mm (with 2 m fiber length)
Outside fiber	1 separable double fiber, Ø 2.2 mm	
Inner fiber	Ø 1.5 mm	
Special characteristics	Longest sensing range	

Housing size: M6	Coaxial	
<b>Part reference</b>	LFP-1003-020	
Sensing range	with series 3030	120 mm (with 2 m fiber length)
	with series 3031	60 mm (with 2 m fiber length)
	with series 3060/65/66	200 mm (with 2 m fiber length)
Outside fiber	1 separable double fiber, Ø 2.2 mm	
Inner fiber	Ø 1.0 mm	
Special characteristics	Coaxial arrangement of fibers, thus axially symmetric beam	

# SYNTHETIC OPTICAL FIBERS

## DIFFUSE SENSING

**Dimensions: light emission on the left**



Housing size: M6		Standard
<b>Part reference</b>	LFP-1005-020	
<b>Sensing range</b>	with series 3030	120 mm (with 2 m fiber length)
	with series 3031	60 mm (with 2 m fiber length)
	with series 3060/65/66	200 mm (with 2 m fiber length)
<b>Outside fiber</b>	1 separable double fiber, Ø 2.2 mm	
<b>Inner fiber</b>	Ø 1.0 mm	
<b>Special characteristics</b>	Sensing head with bendable light-outlet tube for ease of positioning	
	Long sensing range	

Housing size: M6		Flexible
<b>Part reference</b>	LFP-1105-020	
<b>Sensing range</b>	with series 3030	90 mm (with 2 m fiber length)
	with series 3031	45 mm (with 2 m fiber length)
	with series 3060/65/66	150 mm (with 2 m fiber length)
<b>Outside fiber</b>	1 separable double fiber, Ø 2.2 mm	
<b>Inner fiber</b>	151 x Ø 75 µm	
<b>Special characteristics</b>	Sensing head with bendable light-outlet tube for ease of positioning	
	Very small bending radius	

Housing size: M6		Standard
<b>Part reference</b>	LFP-1013-020	
<b>Sensing range</b>	with series 3030	120 mm (with 2 m fiber length)
	with series 3031	60 mm (with 2 m fiber length)
	with series 3060/65/66	200 mm (with 2 m fiber length)
<b>Outside fiber</b>	1 separable double fiber, Ø 2.2 mm	
<b>Inner fiber</b>	Ø 1.0 mm	
<b>Special characteristics</b>	Sensing head with bendable light-outlet tube for ease of positioning	
	Long sensing range	

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

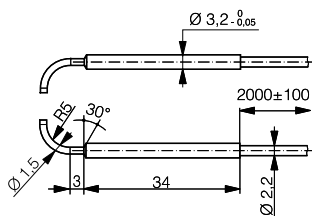
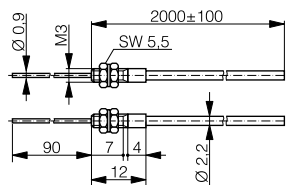
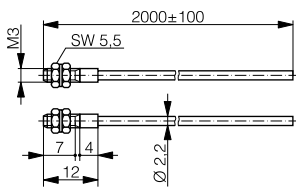
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# SYNTHETIC OPTICAL FIBERS

## THROUGH-BEAM SENSING

**Dimensions:** light emission on the left



Individual fiber (10 m)	No sensing head	
<b>Part reference</b>	LFP-0004-100	
Sensing range	with series 3030	400 mm (2 m fiber, thru-beam sensing)
	with series 3031	200 mm (2 m fiber, thru-beam sensing)
	with series 3060/65/66	700 mm (2 m fiber, thru-beam sensing)
Outside fiber	individual fiber, Ø 2.2 mm	
Inner fiber	Ø 1.0 mm	
Special characteristics	Long sensing range	

Housing size: M3	Miniature	
<b>Part reference</b>	LFP-2001-020	
Sensing range	with series 3030	120 mm (with 2 m fiber length)
	with series 3031	60 mm (with 2 m fiber length)
	with series 3060/65/66	200 mm (with 2 m fiber length)
Outside fiber	2 individual fibers, Ø 2.2 mm	
Inner fiber	Ø 0.5 mm	
Special characteristics	Highest resolution	

Housing size: M3	Miniature	
<b>Part reference</b>	LFP-2003-020	
Sensing range	with series 3030	120 mm (with 2 m fiber length)
	with series 3031	60 mm (with 2 m fiber length)
	with series 3060/65/66	200 mm (with 2 m fiber length)
Outside fiber	2 individual fibers, Ø 2.2 mm	
Inner fiber	Ø 0.5 mm	
Special characteristics	Sensing head with bendable light-outlet tube for ease of positioning	
	Highest resolution	

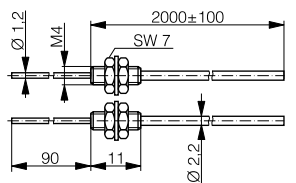
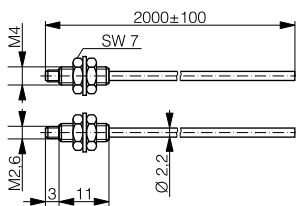
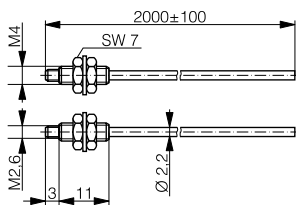
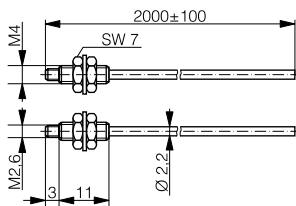
Housing size: Ø 3.2 mm	Standard 90°	
<b>Part reference</b>	LFP-2006-020	
Sensing range	with series 3030	120 mm (with 2 m fiber length)
	with series 3031	60 mm (with 2 m fiber length)
	with series 3060/65/66	200 mm (with 2 m fiber length)
Outside fiber	2 individual fibers, Ø 2.2 mm	
Inner fiber	Ø 1.0 mm	
Special characteristics	Lateral sensing	



# SYNTHETIC OPTICAL FIBERS

## THROUGH-BEAM SENSING

**Dimensions:** light emission on the left



Housing size: M4		Standard
<b>Part reference</b>	LFP-2002-020	
Sensing range	with series 3030	400 mm (with 2 m fiber length)
	with series 3031	200 mm (with 2 m fiber length)
	with series 3060/65/66	700 mm (with 2 m fiber length)
Outside fiber	2 individual fibers, $\varnothing$ 2.2 mm	
Inner fiber	$\varnothing$ 1.0 mm	
Special characteristics	Long sensing range	

Housing size: M4		Flexible
<b>Part reference</b>	LFP-2102-020	
Sensing range	with series 3030	300 mm (with 2 m fiber length)
	with series 3031	150 mm (with 2 m fiber length)
	with series 3060/65/66	550 mm (with 2 m fiber length)
Outside fiber	2 individual fibers, $\varnothing$ 2.2 mm	
Inner fiber	151 x $\varnothing$ 75 $\mu$ m	
Special characteristics	Very small bending radius	

Housing size: M4		Luminous (enhanced brightness)
<b>Part reference</b>	LFP-2202-020	
Sensing range	with series 3030	500 mm (with 2 m fiber length)
	with series 3031	250 mm (with 2 m fiber length)
	with series 3060/65/66	900 mm (with 2 m fiber length)
Outside fiber	2 individual fibers, $\varnothing$ 2.2 mm	
Inner fiber	$\varnothing$ 1.5 mm	
Special characteristics	Longest sensing range	

Housing size: M4		Standard
<b>Part reference</b>	LFP-2004-020	
Sensing range	with series 3030	400 mm (with 2 m fiber length)
	with series 3031	200 mm (with 2 m fiber length)
	with series 3060/65/66	700 mm (with 2 m fiber length)
Outside fiber	2 individual fibers, $\varnothing$ 2.2 mm	
Inner fiber	$\varnothing$ 1.0 mm	
Special characteristics	Sensing head with bendable light-outlet tube for ease of positioning	
	Long sensing range	

Inductive

Photoelectric

Ultrasonic

Capacitive

Safety

RFID

Connectivity

Accessories

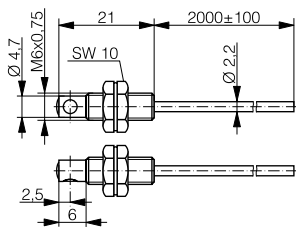
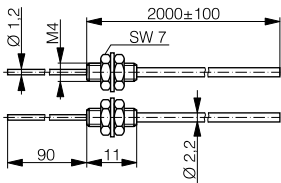
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# SYNTHETIC OPTICAL FIBERS

## THROUGH-BEAM SENSING

**Dimensions:** light emission on the left



Housing size: M4	Flexible	
<b>Part reference</b>	LFP-2104-020	
Sensing range	with series 3030	300 mm (with 2 m fiber length)
	with series 3031	150 mm (with 2 m fiber length)
	with series 3060/65/66	500 mm (with 2 m fiber length)
Outside fiber	2 individual fibers, $\varnothing$ 2.2 mm	
Inner fiber	151 x $\varnothing$ 75 $\mu$ m	
Special characteristics	Sensing head with bendable light-outlet tube for ease of positioning	
	Very small bending radius	

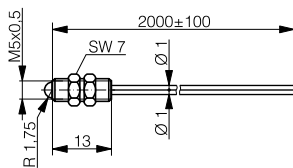
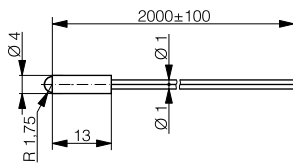
Housing size: M6	Standard 90°	
<b>Part reference</b>	LFP-2005-020	
Sensing range	with series 3030	1100 mm (with 2 m fiber length)
	with series 3031	550 mm (with 2 m fiber length)
	with series 3060/65/66	1800 mm (with 2 m fiber length)
Outside fiber	2 individual fibers, $\varnothing$ 2.2 mm	
Inner fiber	$\varnothing$ 1.0 mm	
Special characteristics	Lateral sensing	
	Long sensing range	

# SYNTHETIC OPTICAL FIBERS

## APPLICATION-SPECIFIC CYLINDRICAL LIGHT BEAM

**Dimensions:** light emission on the left

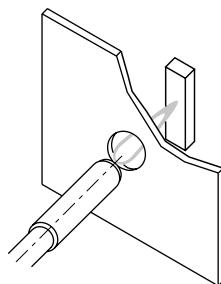
- ✓ Diffuse fibers particularly suitable for the detection of objects in recesses and behind covers (through holes and gaps)
- ✓ Extremely small sensing heads
- ✓ Quasi-cylindrical light beam
- ✓ Recessed mounting possible
- ✓ Sapphire glass optical parts, thus easy to clean



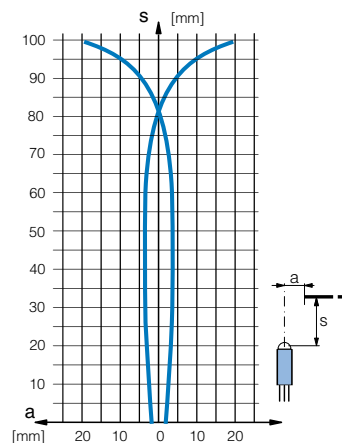
Housing size: $\varnothing$ 4 mm	Miniature / spherical optics	
<b>Part reference</b>	LFP-1006-020	
<b>Sensing range</b>	with series 3030	100 mm (with 2 m fiber length)
	with series 3031	60 mm (with 2 m fiber length)
	with series 3060/65/66	140 mm (with 2 m fiber length)
<b>Outside fiber</b>	1 separable double fiber, $\varnothing$ 1 mm*	
<b>Inner fiber</b>	$\varnothing$ 0.5 mm	
<b>Special characteristics</b>	Spherical optics for cylindrical light beam	
* Adaptor included in delivery package		

Housing size: M5	Miniature / spherical optics	
<b>Part reference</b>	LFP-1007-020	
<b>Sensing range</b>	with series 3030	100 mm (with 2 m fiber length)
	with series 3031	60 mm (with 2 m fiber length)
	with series 3060/65/66	140 mm (with 2 m fiber length)
<b>Outside fiber</b>	1 separable double fiber, $\varnothing$ 1 mm*	
<b>Inner fiber</b>	$\varnothing$ 0.5 mm	
<b>Special characteristics</b>	Spherical optics for cylindrical light beam	
* Adaptor included in delivery package		

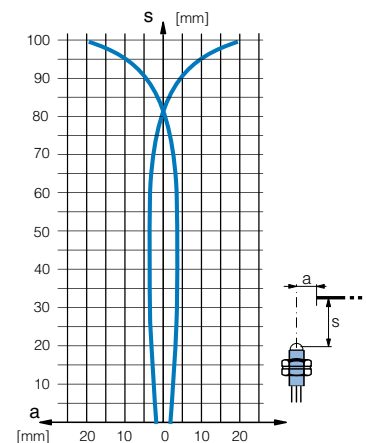
Response curves (with series 3030):



Detection through holes and gaps



LFP-1006-020

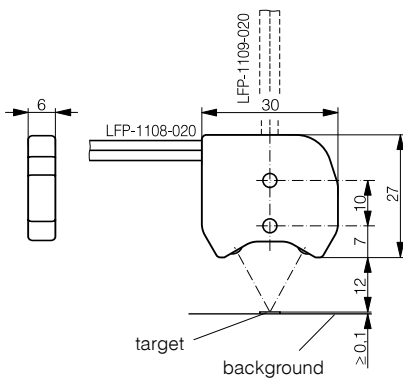


LFP-1007-020

# SYNTHETIC OPTICAL FIBERS

## APPLICATION-SPECIFIC BACKGROUND SUPPRESSION

- ✓ Diffuse fiber with background suppression
- ✓ Factory adjusted operating distance of 12 mm
- ✓ Fully potted optical parts
- ✓ Recognition of position and thickness differences of only 0.1 mm
- ✓ Suitable for rough environments, thanks to glass-fiber reinforced PBTP housing
- ✓ Scratch resistant, easy-to-clean glass lenses



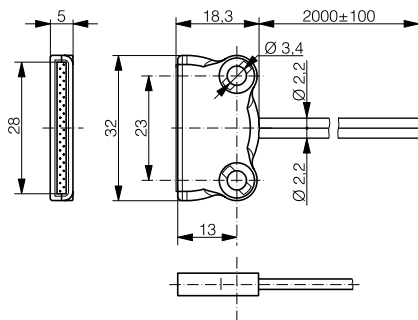
Housing size: □ 27 x 30	Background suppression / flexible / 90°
<b>Part reference</b>	LFP-1108-020
Operating distance	12 mm
Outside fiber	2 separate fibers, $\varnothing$ 2.2 mm
Inner fiber	151 x $\varnothing$ 75 $\mu$ m
Special characteristics	Lateral sensing
	Detectable height difference: 0.1 mm
	Minimum detectable target size: 0.15 mm <sup>2</sup>
	Minimum detectable wire diameter: 0.1 mm

Housing size: □ 27 x 30	Background suppression / flexible
<b>Part reference</b>	LFP-1109-020
Operating distance	12 mm
Outside fiber	2 separate fibers, $\varnothing$ 2.2 mm
Inner fiber	151 x $\varnothing$ 75 $\mu$ m
Special characteristics	Axial sensing
	Detectable height difference: 0.1 mm
	Minimum detectable target size: 0.15 mm <sup>2</sup>
	Minimum detectable wire diameter: 0.1 mm

# SYNTHETIC OPTICAL FIBERS

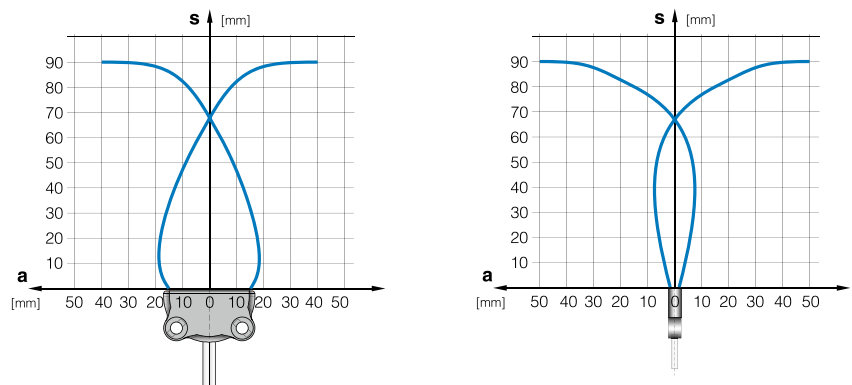
## APPLICATION-SPECIFIC MULTI-BEAM

- ✓ Multi-beam diffuse fiber
- ✓ Detection of objects across the whole width of the sensing head (28 mm)
- ✓ Suitable for rough environments, thanks to PBTP housing
- ✓ Lateral mounting



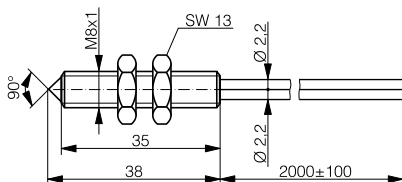
<b>Housing size:</b> □ 18 x 32	<b>Multi-beam</b>	
<b>Part reference</b>	LFP-1011-020	
<b>Sensing range</b>	with series 3030	90 mm (with 2 m fiber length)
	with series 3031	45 mm (with 2 m fiber length)
	with series 3060/65/66	150 mm (with 2 m fiber length)
<b>Outside fiber</b>	2 separate fibers, $\varnothing$ 2.2 mm	
<b>Inner fiber</b>	16 x $\varnothing$ 0.265 mm	
<b>Special characteristics</b>	Wide detection range (28 mm)	

Response curves (with series 3030):



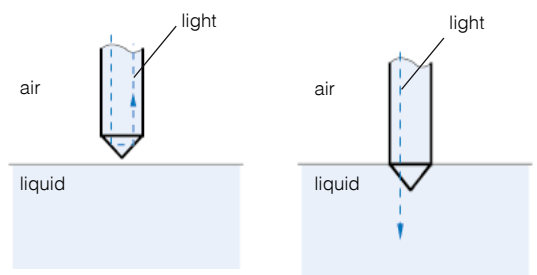
## APPLICATION-SPECIFIC LIQUID LEVEL MONITORING

- ✓ Contact liquid detection (with the exception of white milky liquids)
- ✓ Fully potted optical parts
- ✓ Scratch-resistant, easy-to-clean glass prism
- ✓ Impervious (degree of protection: IP 68)



<b>Housing size:</b> M8	<b>Liquid level monitoring</b>	
<b>Part reference</b>	LFP-1010-020	
<b>Outside fiber</b>	2 separate fibers, $\varnothing$ 2.2 mm	
<b>Inner fiber</b>	$\varnothing$ 0.5 mm	
<b>Special characteristics</b>	Contact liquid detection	

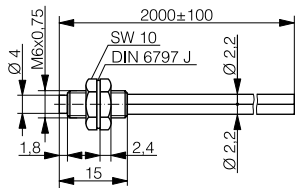
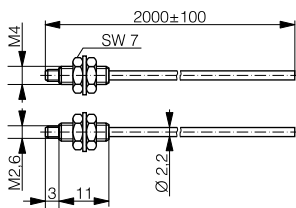
Operating principle:



# SYNTHETIC OPTICAL FIBERS

## APPLICATION-SPECIFIC LOW & HIGH TEMPERATURES

**Dimensions:** light emission on the left



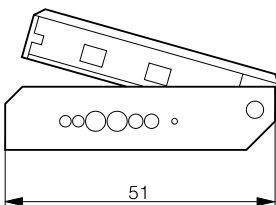
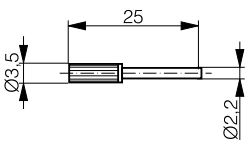
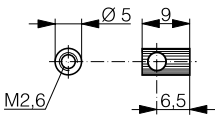
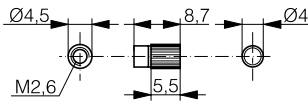
- ✓ Diffuse (LFP-1002-020-002) and through-beam (LFP-2002-020-002) fibers
- ✓ Extended temperature range : -55 ... +105°C / -67 ... +221°F
- ✓ Very small dimensions
- ✓ Long sensing ranges
- ✓ Small bending radii
- ✓ Can be cut on site

Housing size: M4	Low & high temperature resistant	
<b>Part reference</b>	LFP-2002-020-002	
Sensing range	with series 3030	300 mm (with 2 m fiber length)
	with series 3031	150 mm (with 2 m fiber length)
	with series 3060/65/66	550 mm (with 2 m fiber length)
Outside fiber	2 individual fibers, Ø 2.2 mm	
Inner fiber	Ø 1.0 mm	
Special characteristics	Extended temperature range of -55...+105°C / -67...+221°F	

Housing size: M6	Low & high temperature resistant	
<b>Part reference</b>	LFP-1002-020-002	
Sensing range	with series 3030	90 mm (with 2 m fiber length)
	with series 3031	45 mm (with 2 m fiber length)
	with series 3060/65/66	150 mm (with 2 m fiber length)
Outside fiber	1 separable double fiber, Ø 2.2 mm	
Inner fiber	Ø 1.0 mm	
Special characteristics	Extended temperature range of -55...+105°C / -67...+221°F	

# SYNTHETIC OPTICAL FIBERS

## ACCESSORIES



### Axial front lens for increased sensing ranges

<b>Part reference</b>	LFP-0001-000	
Sensing range	with series 3030	3000 mm (2 m fibers)
	with series 3031	1500 mm (2 m fibers)
	with series 3060/65/66	5000 mm (5 m fibers)
Can be used with	LFP-2#02-020	
Delivery package	1 pair	

### 90° front lens for increased sensing ranges

<b>Part reference</b>	LFP-0002-000	
Sensing range	with series 3030	1000 mm (2 m fibers)
	with series 3031	500 mm (2 m fibers)
	with series 3060/65/66	1700 mm (2 m fibers)
Can be used with	LFP-2#02-020	
Delivery package	1 pair	

### Adaptor

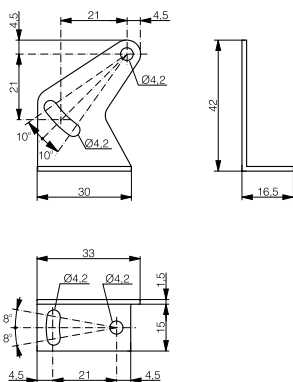
<b>Part reference</b>	LFP-0003-000
Suitable for	fine synthetic optical fibers

### Cutting tool

<b>Part reference</b>	LXF-0000-000
Suitable for	all synthetic optical fibers

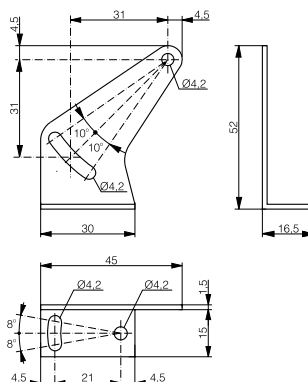
### UNIVERSAL MOUNTING BRACKET

For 3#30 / 3#31 series  
Material: stainless steel V2A  
Part reference: **LXW-3030-000**



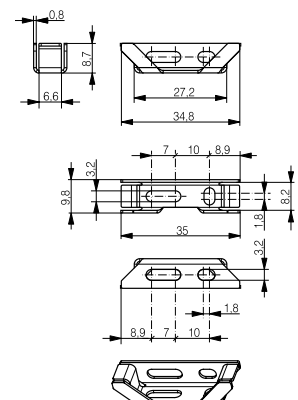
### UNIVERSAL MOUNTING BRACKET

For 4040 series  
Material: stainless steel V2A  
Part reference: **LXW-4040-000**



### UNIVERSAL MOUNTING BRACKET

For 3#6# series  
Material: stainless steel V2A  
Part reference: **LXW-3060-000**



Inductive

Photoelectric

Ultrasonic

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# GLASS OPTICAL FIBERS

- ✓ For high ambient temperatures (models with chrome-plated brass and silicone sleeves)
- ✓ Executions for extreme environmental conditions
- ✓ Small dimensions
- ✓ Long sensing ranges
- ✓ Suitable for the detection of smallest objects
- ✓ Large selection of types

TECHNICAL DATA		
Ambient temperature range	PVC sleeve	0 ... +70°C
		32 ... +158°F
	Wound brass sleeve	-25 ... +160°C
		-13 ... +320°F
	Silicone sleeve	-25 ... +150°C
		-13 ... +302°F
Protection degree of sensing head	IP 65 (optional up to IP 68)	
Protection degree of optical fiber	PVC sleeve	IP 67
	Wound brass sleeve	IP 54
	Silicone sleeve	IP 67
Standard lengths	250 mm, 500 mm, 1000 mm	
Sensing head material	Aluminum	
Sensing head light-outlet tube material	Stainless steel	
Optical attenuation	0.01 dB / m max. at 880 nm	
Angle of incidence	See data sheets	

Depending on the type involved, glass optical fibers consist of 200 to 5000 individual fibers with diameters of 30 to 50  $\mu\text{m}$ . The fiber bundle is surrounded by a sleeve, which can be selected according to the application:

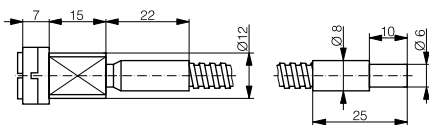
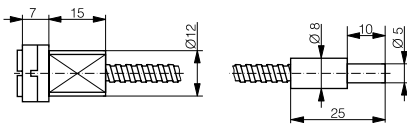
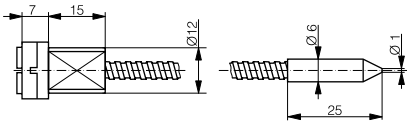
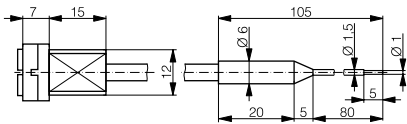
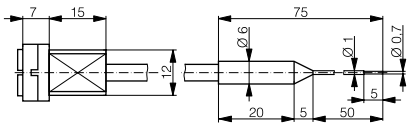
- PVC sleeve: the economical solution if no special stresses are to be expected.
- Wound sleeve of chrome-plated brass: for permanent operating temperatures of up to +160°C (+320°F), and maximum protection against crushing.
- Silicone sleeve with stainless-steel braiding for strain relief: for use in corrosive media, at temperatures of up to +150°C (+302°F), and where mechanical strain relief is required.

The sensing heads are available with straight or right-angle light outlets. The range comprises models for use as diffuse sensors (emitting and receiving fiber bundles in the same sleeve) and as through-beam sensors (the fiber bundles are in separate sleeves). In order to cover various application needs, a number of different bundle cross-sections are available: large cross-sections for long sensing ranges, small cross-sections for short ranges, high resolutions, and detection of small objects.

# GLASS OPTICAL FIBERS

## AXIAL DIFFUSE SENSING

**Dimensions:** light emission on the right



### length of glass fiber in cm, standard lengths -025 (250 mm) / -050 (500 mm) / -100 (1000 mm)

### Housing size: $\varnothing$ 6 mm

<b>Part reference</b>	LFG-1005-###
Sensing range	with series 4040 5 mm
Special characteristics	With bendable light-outlet tube For the detection of smallest objects
Sleeve	Silicone, $\varnothing$ 4.7 mm
Min. bending radius	20 mm / light-outlet tube: 5 mm (do not bend the inner and outer 10 mm)
Max. tensile load	10 N

### Housing size: $\varnothing$ 6 mm

<b>Part reference</b>	LFG-1015-###
Sensing range	with series 4040 15 mm
Special characteristics	With bendable light-outlet tube For places difficult to access
Sleeve	Silicone, $\varnothing$ 4.7 mm
Min. bending radius	20 mm / light-outlet tube: 5 mm (do not bend the inner and outer 10 mm)
Max. tensile load	10 N

### Housing size: $\varnothing$ 6 mm

<b>Part reference</b>	LFG-1010-###
Sensing range	with series 4040 15 mm
Special characteristics	For the detection of smallest objects in places difficult to access
Sleeve	Wound sleeve of chrome-plated brass, $\varnothing$ 4.7 mm
Min. bending radius	23 mm
Max. tensile load	20 N

### Housing size: $\varnothing$ 8 mm

<b>Part reference</b>	LFG-1020-###
Sensing range	with series 4040 50 mm
Special characteristics	Multi-purpose medium sensing range model
Sleeve	Wound sleeve of chrome-plated brass, $\varnothing$ 4.7 mm
Min. bending radius	25 mm
Max. tensile load	50 N

### Housing size: $\varnothing$ 8 mm

<b>Part reference</b>	LFG-1030-###
Sensing range	with series 4040 150 mm
Special characteristics	For long sensing range
Sleeve	Wound sleeve of chrome-plated brass, $\varnothing$ 6.7 mm
Min. bending radius	25 mm
Max. tensile load	50 N

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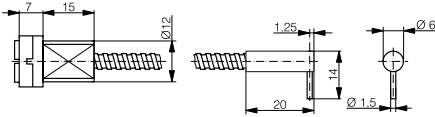
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# GLASS OPTICAL FIBERS

## RADIAL DIFFUSE SENSING

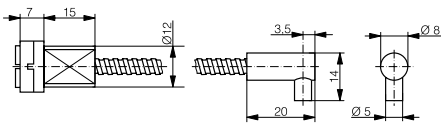
### length of glass fiber in cm, standard lengths -025 (250 mm) / -050 (500 mm) / -100 (1000 mm)

**Dimensions:** light emission on the right



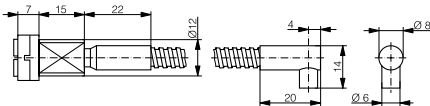
### Housing size: Ø 6 mm

<b>Part reference</b>	LFG-2010-###
<b>Sensing range</b>	with series 4040 15 mm
<b>Special characteristics</b>	For the detection of smallest objects in places difficult to access
<b>Leg length</b>	14 mm
<b>Sleeve</b>	Wound sleeve of chrome-plated brass, Ø 4.7 mm
<b>Min. bending radius</b>	23 mm
<b>Max. tensile load</b>	20 N



### Housing size: Ø 8 mm

<b>Part reference</b>	LFG-2020-###
<b>Sensing range</b>	with series 4040 30 mm
<b>Special characteristics</b>	Multi-purpose medium sensing range model
<b>Leg length</b>	14 mm
<b>Sleeve</b>	Wound sleeve of chrome-plated brass, Ø 4.7 mm
<b>Min. bending radius</b>	25 mm
<b>Max. tensile load</b>	50 N



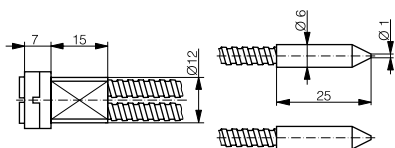
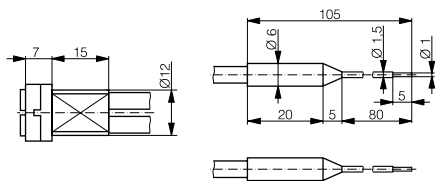
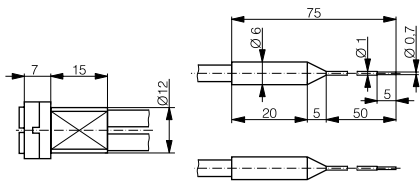
### Housing size: Ø 8 mm

<b>Part reference</b>	LFG-2030-###
<b>Sensing range</b>	with series 4040 150 mm
<b>Special characteristics</b>	For long sensing range
<b>Leg length</b>	14 mm
<b>Sleeve</b>	Wound sleeve of chrome-plated brass, Ø 6.7 mm
<b>Min. bending radius</b>	25 mm
<b>Max. tensile load</b>	50 N

# GLASS OPTICAL FIBERS

## AXIAL THROUGH-BEAM SENSING

**Dimensions:** light emission on the right



### length of glass fiber in cm, standard lengths -025 (250 mm) / -050 (500 mm) / -100 (1000 mm)

### Housing size: Ø 6 mm

<b>Part reference</b>	LFG-3005-###
<b>Sensing range</b>	with series 4040 50 mm
<b>Special characteristics</b>	With bendable light-outlet tube For the detection of smallest objects
<b>Sleeve</b>	Silicone, Ø 4.7 mm
<b>Min. bending radius</b>	20 mm / light-outlet tube: 5 mm (do not bend the inner and outer 10 mm)
<b>Max. tensile load</b>	10 N

### Housing size: Ø 6 mm

<b>Part reference</b>	LFG-3015-###
<b>Sensing range</b>	with series 4040 200 mm
<b>Special characteristics</b>	With bendable light-outlet tube For places difficult to access
<b>Sleeve</b>	Silicone, Ø 4.7 mm
<b>Min. bending radius</b>	20 mm / light-outlet tube: 5 mm (do not bend the inner and outer 10 mm)
<b>Max. tensile load</b>	10 N

### Housing size: Ø 6 mm

<b>Part reference</b>	LFG-3010-###
<b>Sensing range</b>	with series 4040 200 mm
<b>Special characteristics</b>	For the detection of smallest objects in places difficult to access
<b>Sleeve</b>	Wound sleeve of chrome-plated brass, Ø 4.7 mm
<b>Min. bending radius</b>	23 mm
<b>Max. tensile load</b>	20 N

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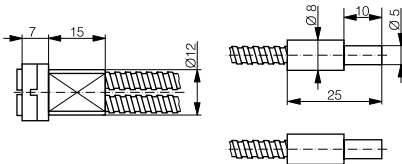
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# GLASS OPTICAL FIBERS

## AXIAL THROUGH-BEAM SENSING

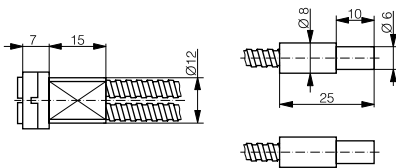
### length of glass fiber in cm, standard lengths -025 (250 mm) / -050 (500 mm) / -100 (1000 mm)

**Dimensions:** light emission on the right



### Housing size: Ø 8 mm

<b>Part reference</b>	LFG-3020-###	
Sensing range	with series 4040	800 mm
Special characteristics	Multi-purpose medium sensing range model	
Sleeve	Wound sleeve of chrome-plated brass, Ø 4.7 mm	
Min. bending radius	25 mm	
Max. tensile load	50 N	



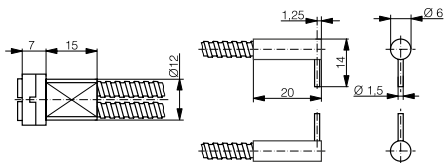
### Housing size: Ø 8 mm

<b>Part reference</b>	LFG-3030-###	
Sensing range	with series 4040	1500 mm
Special characteristics	For long sensing range	
Sleeve	Wound sleeve of chrome-plated brass, Ø 4.7 mm	
Min. bending radius	25 mm	
Max. tensile load	50 N	

# GLASS OPTICAL FIBERS

## RADIAL THROUGH-BEAM SENSING

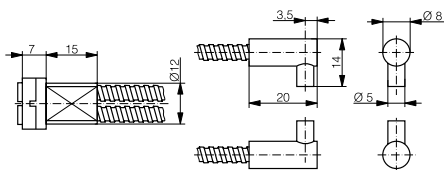
**Dimensions:** light emission on the right



### length of glass fiber in cm, standard lengths -025 (250 mm) / -050 (500 mm) / -100 (1000 mm)

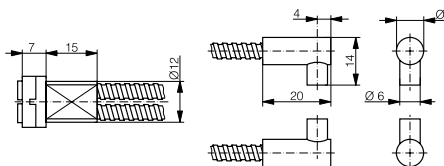
### Housing size: $\varnothing$ 6 mm

<b>Part reference</b>	LFG-4010-###
<b>Sensing range</b>	with series 4040 200 mm
<b>Special characteristics</b>	For the detection of smallest objects in places difficult to access
<b>Leg length</b>	14 mm
<b>Sleeve</b>	Wound sleeve of chrome-plated brass, $\varnothing$ 4.7 mm
<b>Min. bending radius</b>	23 mm
<b>Max. tensile load</b>	20 N



### Housing size: $\varnothing$ 8 mm

<b>Part reference</b>	LFG-4020-###
<b>Sensing range</b>	with series 4040 800 mm
<b>Special characteristics</b>	Multi-purpose medium sensing range model
<b>Leg length</b>	14 mm
<b>Sleeve</b>	Wound sleeve of chrome-plated brass, $\varnothing$ 4.7 mm
<b>Min. bending radius</b>	25 mm
<b>Max. tensile load</b>	50 N



### Housing size: $\varnothing$ 8 mm

<b>Part reference</b>	LFG-4030-###
<b>Sensing range</b>	with series 4040 1500 mm
<b>Special characteristics</b>	For long sensing range
<b>Leg length</b>	14 mm
<b>Sleeve</b>	Wound sleeve of chrome-plated brass, $\varnothing$ 4.7 mm
<b>Min. bending radius</b>	25 mm
<b>Max. tensile load</b>	50 N

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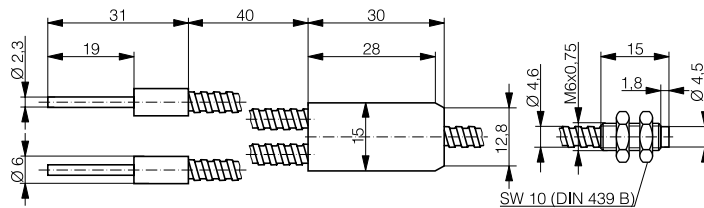
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# GLASS OPTICAL FIBERS

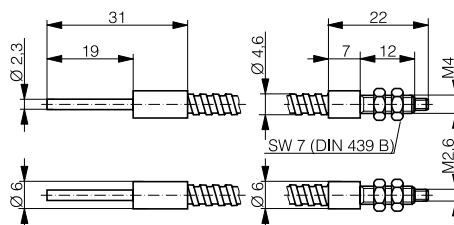
*Dimensions: light emission on the right*

## FOR SERIES 3030 / 3031 SENSORS (CONNECTION AS WITH SYNTHETIC FIBERS)

Housing size: M6	Diffuse sensing
<b>Part reference</b>	LFG-1022-050
Sensing range	with series 3030 120 mm with series 3031 60 mm
Special characteristics	For difficult environmental conditions
Sleeve	Wound sleeve of chrome-plated brass, $\varnothing$ 4.6 mm
Min. bending radius	25 mm
Max. tensile load	20 N



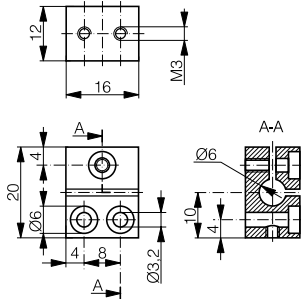
Housing size: M4	Through-beam sensing
<b>Part reference</b>	LFG-3022-050
Sensing range	with series 3030 500 mm with series 3031 250 mm
Special characteristics	For difficult environmental conditions
Sleeve	Wound sleeve of chrome-plated brass, $\varnothing$ 4.6 mm
Min. bending radius	25 mm
Max. tensile load	20 N





# GLASS OPTICAL FIBERS

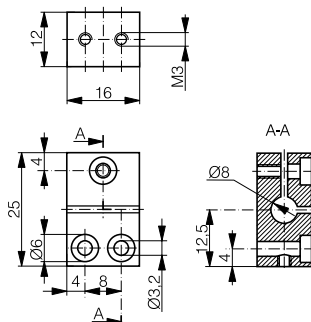
## ACCESSORIES



### For Ø 6 mm heads

### Fiber mounting clamp

<b>Part reference</b>	LXG-0000-060
<b>Characteristics</b>	Mounting clamp for axial and radial light-outlet tubes
<b>Material</b>	Nickel-plated brass
<b>Suitable for the following fibers</b>	LFG-1005-### / LFG-1015-###
	LFG-1010-### / LFG-2010-###
	LFG-3005-### / LFG-3015-###
	LFG-3010-### / LFG-4010-###



### For Ø 8 mm heads

### Fiber mounting clamp

<b>Part reference</b>	LXG-0000-080
<b>Characteristics</b>	Mounting clamp for axial and radial light-outlet tubes
<b>Material</b>	Nickel-plated brass
<b>Suitable for the following fibers</b>	LFG-1020-### / LFG-1030-###
	LFG-2020-### / LFG-2030-###
	LFG-3020-### / LFG-3030-###
	LFG-4020-### / LFG-4030-###

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# PHOTOELECTRIC SENSORS

## LTR-C23PA-PMS-403-(-XXX)

### SENSOR TYPE

Diffuse	LT
Retro-reflex	LR
Through-beam	LL
Background suppression	LH
Distance diffuse	DT

### EMISSION TYPE

Red	R
Laser	L

### HOUSING TYPE

Cubic	C
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### HOUSING SIZE

Cubic 1# mm x 2# mm	12
Cubic 2# mm x 3# mm	23
Cubic 5# mm x 5# mm	55

### HOUSING MATERIAL

Plastic	P
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### PERFORMANCE

Standard	A, B
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### ADJUSTMENT TYPE

No teach or potentiometer	N
Potentiometer	P
Teach	T

### SPECIAL EXECUTIONS

#### OUTPUT

##### 4-wire devices, NPN

Light-ON + Dark-ON	01
Light-ON + stability alarm	0A
Dark-ON + stability alarm	0B

##### 4-wire devices, PNP

Light-ON + Dark-ON	03
Light-ON + stability alarm	0C
Dark-ON + stability alarm	0D

##### 3-wire devices, NPN

Light-ON	01
Dark-ON	02

##### 3-wire devices, PNP

Light-ON	03
Dark-ON	04

##### Other

3- or 4-wire through-beam sensor (emitter)	00
Analog	#9
Special	##

4-wire sensor	1
3-wire sensor	3
3-wire sensor with IO-Link	4
4-wire sensor with IO-Link	6

### CONNECTION TYPE

Cable	K
Connector	S
Pigtail	V

### DETECTION DISTANCE

Short	S
Standard	M
Long	L
Extra long	X

# PHOTOELECTRIC SENSORS

## LTS-1180-303 (-XXX)

<b>PHOTOELECTRIC SENSOR</b>	<b>L</b>
<b>COLOR SENSOR</b>	<b>F</b>

### SENSOR TYPE

With analog output	<b>A</b>
For fibers / fiber	<b>F</b>
With background suppression	<b>H</b>
Through-beam sensor	<b>L</b>
Reflex sensor	<b>R</b>
Diffuse sensor	<b>T</b>
Accessories	<b>X</b>
Device with cable	<b>K</b>
Device with connector	<b>S</b>
Device with screw terminal	<b>T</b>
Device with molded connector	<b>V</b>
Synthetic optical fiber	<b>P</b>
Glass optical fiber	<b>G</b>
Reflector	<b>R</b>
Cutting tool	<b>F</b>
Mounting bracket	<b>W</b>

### SERIES

Cylindrical devices	
Ø 4	<b>1040</b>
M5	<b>1050</b>
M12	<b>1120</b>
M12 laser	<b>112#L</b>
M18	<b>1180</b>
M18 laser	<b>118#L</b>
M18 with lateral light emission	<b>1180W</b>

Rectangular devices	
5 x 7 mm	<b>0507</b>
30x30 mm (high-performance)	<b>3#30</b>
30x30 mm (standard)	<b>3#31</b>
31x60 mm (standard)	<b>3#60</b>
31x60 mm (teach-in)	<b>3#65</b>
31x60 mm (teach-in & digital display)	<b>3066</b>
31x60 mm (high frequency)	<b>326#</b>
31x60 mm (blue light)	<b>336#</b>
40 x 40 mm	<b>4040</b>
40 x 50 mm	<b>4#5#</b>

Synthetic optical fibers	
Diffuse sensor	<b>1###</b>
Through-beam sensor	<b>2###</b>
Miniature / standard / coaxial	<b>#0##</b>
Flexible	<b>#1##</b>
Luminous (enhanced brightness)	<b>#2##</b>

Glass optical fibers	
Axial diffuse sensor	<b>1###</b>
Radial diffuse sensor	<b>2###</b>
Axial through-beam sensor	<b>3###</b>
Radial through-beam sensor	<b>4###</b>
Accessories	<b>0###</b>

### SPECIAL EXECUTIONS

#### EXECUTION

3- or 4-wire through-beam sensor (emitter)	<b>00</b>
<b>4-wire devices, NPN, output:</b>	
Changeover or switchable	<b>01</b>
Light-ON and excess gain	<b>02</b>
<b>4-wire devices, PNP, output:</b>	
Changeover or switchable	<b>03</b>
Light-ON and excess gain	<b>04</b>
<b>AC/DC devices</b>	
Through-beam sensor (emitter)	<b>10</b>
With relay output	<b>15</b>
With relay output and timer	<b>65</b>
<b>3-wire devices, NPN, output:</b>	
Light-ON	<b>01</b>
Dark-ON	<b>02</b>
<b>3-wire devices, PNP, output:</b>	
Light-ON	<b>03</b>
Dark-ON	<b>04</b>
With built-in timer	<b>+50</b>

### DIMENSIONS

Synthetic optical fibers	
Length in dm (2 m)	<b>020</b>
Glass optical fibers	
Length in cm (0.25 m)	<b>025</b>
Length in cm (0.50 m)	<b>050</b>
Length in cm (1 m)	<b>100</b>
Accessories	
General	<b>###</b>

4-wire through-beam sensor	<b>0</b>
4-wire basic device	<b>1</b>
3-wire through-beam sensor	<b>2</b>
3-wire basic device	<b>3</b>
With IO-Link	<b>4</b>

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# PHOTOELECTRIC SENSORS

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DTL-C55PA-TMS-119-503	2/241	LLS-1180W-001 (receiver)	2/202	LTS-1040-301	2/183
DTR-C23PB-TLS-129	2/221	LLS-1180W-003 (receiver)	2/202	LTS-1040-301-505	2/181
DTR-C23PB-TLS-139	2/221	LLS-1181L-000	2/204	LTS-1040-303	2/183
DTR-C23PB-TMS-129	2/221	LLS-1181L-001 (receiver)	2/204	LTS-1040-303-505	2/181
DTR-C23PB-TMS-139	2/221	LLS-1181L-003 (receiver)	2/204	LTS-1050-301-505	2/184
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LHR-C12PA-NMK-303	2/209	LRK-3030-103	2/228	LTS-1180L-101	2/203
LHR-C12PA-NSK-301	2/209	LRK-3031-304	2/227	LTS-1180L-101-516	2/203
LHR-C12PA-NSK-303	2/209	LRR-C12PA-NMK-302	2/210	LTS-1180L-103	2/203
LHR-C12PA-PLK-301	2/209	LRR-C12PA-NMK-304	2/210	LTS-1180L-103-516	2/203
LHR-C12PA-PLK-303	2/209	LRR-C23PA-NMS-10B	2/219	LTS-1180W-101	2/199
LHR-C23PA-PMS-10A	2/217	LRR-C23PA-NMS-60D	2/219	LTS-1180W-103	2/199
LHR-C23PA-PMS-60C	2/217	LRR-C23PA-NMS-101	2/219	LTS-1180W-303	2/199
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