INVISIBLE PROTECTION

SENSORS FOR THE PROTECTION AND MOVEMENT OF PEOPLE AND VEHICLES

ISSUE 2012/2013

PEPPERL+FUCHS
SENSING YOUR NEEDS

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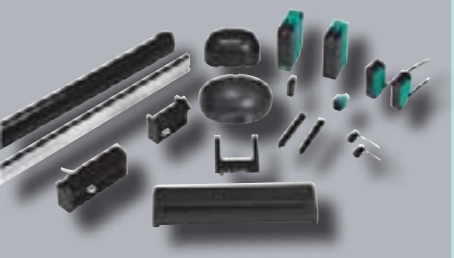
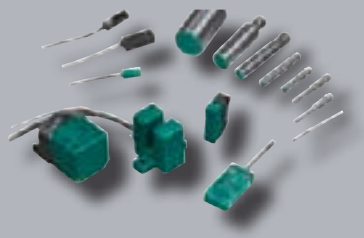


Photoelectric sensors

1. Active infrared scanners
1.1 DIN 18650-Compliant Light Curtains
2. Active infrared area scanners
3. Passive infrared scanners
4. Radar sensors
5. Distance sensors
6. Thru-beam sensors
7. Retroreflective sensors
8. Diffuse mode sensors
9. Fire protection sensors
10. Photoelectric slot sensors
11. Thru-beam light grids
12. Safety light grids

1



Proximity sensors

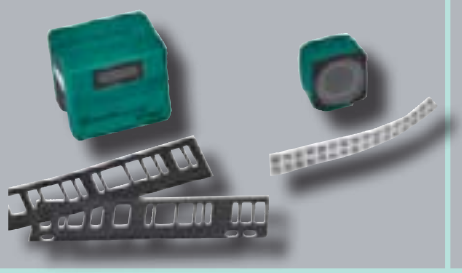
1. Inductive sensors
2. Inductive slot sensors
3. Loop detectors

2

Ultrasonic sensors

1. Diffuse mode sensors

3



Analog measuring systems

1. Position encoding system WCS
2. Data Matrix positioning system PCV

4

Rotary encoders

1. Incremental rotary encoders
2. Absolute rotary encoders

5

Accessories

1. Reflectors
2. Mounting accessories
3. Connectors

6

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Pepperl+Fuchs has one of the largest and most extensive ranges of industrial sensors that covers a broad spectrum of applications.
With distribution and manufacturing sites at all major points on the globe, Pepperl+Fuchs supplies all regional markets and enables Plug-and-Play sensor installation on-site.
Over 4,000 employees develop, produce and distribute products for automation in more than 30 countries and ensure that these continue to meet and exceed the constantly increasing market requirements.

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An important field for sensors outside of industrial automation is automating doors, industrial gates, industrial gate systems and elevators . Automatic door systems rely on robust sensor systems to keep them working and keep them safe. From photoelectric sensors that can detect direction and differentiate between people and vehicles, light grids that monitor elevator doors and microwave motion detectors for sliding or swinging doors, to sensors that provide absolute positioning and protection against pinch points and collisions, Pepperl+Fuchs has a sensor to suit your needs. In fact, we have the largest and most diverse selection of sensor systems in the world.

Pepperl+Fuchs offers a range of innovative and marketable sensing technologies that are tailored to these applications. We've been supplying sensors to the door and elevator industry for over 25 years.

- **We provide comprehensive advice.**
- **We always come to your site.**
- **We find a solution for your application.**
- **We provide a customized solution to meet your needs.**
- **Your satisfaction is our aim!**

Trust in INVISIBLE PROTECTION.
When it has to work, you can rely on Pepperl+Fuchs' sensors.

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SENSORS FOR AUTOMATIC DOORS AND TURNSTILES

- Active infrared scanners
- Active infrared area scanners
- DIN/EN-Compliant Light Curtains
- Radar sensors
- Passive infrared scanners
- Thru-beam sensors
- Retroreflective sensors
- Thru-beam light grids
- Inductive sensors

SENSORS FOR DOORS IN PUBLIC TRANSIT

- Active infrared scanners
- DIN/EN-Compliant Light Curtains
- Thru-beam sensors
- Ultrasonic direct detection sensor

SENSORS FOR INDUSTRIAL DOORS

- Radar sensors
- Active infrared scanners
- Thru-beam sensors
- Retroreflective sensors
- Diffuse mode sensors
- Distance sensors
- Safety light grids
- Inductive sensors
- Inductive slot sensors
- Loop detectors

SENSORS FOR ELEVATORS

- Radar sensors
- Active infrared area scanners
- Passive infrared scanners
- Thru-beam sensors
- Retroreflective sensors
- Photoelectric slot sensors
- Thru-beam light grids
- Distance sensors
- Distance measurement sensors
- Safety light grids
- Position encoding system
- Data Matrix positioning system
- Inductive sensors
- Inductive slot sensors
- Absolute rotary encoders
- Incremental rotary encoders

SENSORS FOR ESCALATORS AND MOVING WALKWAYS

- Radar sensors
- Thru-beam sensors

SENSORS FOR FIRE PROTECTION DEVICES

- Thru-beam sensors
- Retroreflective sensors

SENSORS FOR COMMERCIAL AND INDUSTRIAL GATE SYSTEMS

- Distance sensors
- Active infrared scanners
- Retroreflective sensors
- Diffuse mode sensors
- Loop detectors
- Inductive sensors

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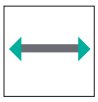
When classifying sensor functionality we differentiate between the following door types:

SLIDING DOORS



SWINGING DOORS

REVOLVING DOORS

TURNSTILES

CONVENIENT AND SECURE OPERATION OF AUTOMATIC DOORS

Convenience, as it relates to an automatic door, means that it opens independently, at the right time, every time. This falls under the responsibility of door activation sensors. They detect when someone approaches and activate the door-opening mechanism. Our motion sensors are equipped with adjustable detection areas and functions such as direction detection and cross-traffic suppression. This clearly enhances the functionality of automatic doors, preventing unnecessary opening and closing, increasing the service life of the door mechanism, and saving costs on heating and air conditioning. Our sensors are robust, tamperproof, immune to rain, vibration, and reflection, and simple to operate.

Safety is an essential concern for all forms of automation. When the automatic doors open and close, it is imperative that they do not hit anybody and cause injuries. Securing and monitoring closing door edges is a top priority. Sensors prevent the door from closing if people or animals stop in the area around the door. An automatic teach-in function continually adjusts the sensors to the ever-changing conditions of their surroundings and guarantees fault-free protection.

Optimum collision protection is particularly important with swinging and revolving doors. Here it is essential that people are detected when the doors are opened so the door can remain open if necessary. In addition to high-performance and more reliable detection, these sensors are particularly flexible and easy to operate. The detection characteristics can be individually aligned and continuously adjusted. In addition to stationary operation, they also operate when in motion, providing the option of being mounted on revolving or swinging doors.

With certification in accordance with DIN 18650 as category 2 testable, non-contact safety equipment (NCSE), Pepperl+Fuchs equipment offers maximum safety.

The product portfolio also includes sensors that fulfill the special requirements of public transit systems. They are certified and approved in accordance with rail standard EN 50155 or have E1 approval.

Should the industrial door open only for vehicles or for people as well? Our sensors can be programmed to detect vehicles or people, ensuring secure and effective automatic industrial doors. Trust in INVISIBLE PROTECTION and customise your industrial door sensing requirements.

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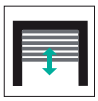
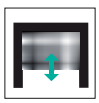
ONE-PIECE, LIFT-UP DOORS

SWING DOORS

SECTIONAL DOORS



HIGH-SPEED DOORS



MORE EFFECTIVE AND SECURE OPERATION OF AUTOMATIC INDUSTRIAL DOORS

It is important to guarantee convenient and secure operation with automatic industrial doors. Is it also important to have an effective opening and closing function that supports the operation and logistics as much as possible. Several sensor systems are available for automatic opening that are tailored to the particular requirements in this area. The compact, powerful, and extremely robust sensors are ideal for high mounting locations or long sensing distances, and they are easy to install. They come with simple setting options, hassle-free setup and low-maintenance operation. Configurable detection fields and sensing ranges enable adjustment to a vast range of door dimensions. Mounting heights of up to seven meters are no problem.

The door sensors have the ability to differentiate between pedestrians and vehicles. An optional extra is for the industrial door to open only on the approach of a vehicle not a pedestrian.

The issue of security is also extremely important with automatic doors. With any up or downward movements of the door, appropriate proper sensor system eliminates the risk of injury at the closing edges.

Also available are robust door sensors with a range of operating principles that are not affected by adverse conditions. With long sensing ranges and a variety of adjustment options, they provide automatic low-cost protection for entry routes.

This product area is rounded off with end position controls for the actuators. Pepperl+Fuchs offers a range of inductive sensor solutions in a wide variety of models.

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CONTINUOUS MONITORING AND RELIABLE POSITIONING OF ELEVATORS

Your protection is paramount in this area. When operating elevators, it is essential that the elevator door does not collide with or injure passengers when closing.

Our narrow elevator light grid enables reliable protection in relation to elevator doors, passenger monitoring and access control. The special features include dynamic beam crossing with up to 135 active beams, reliable object detection down to a distance of zero millimeters, and extremely high resistance to ambient light. These fulfill the demanding requirements of the popular glass elevators that are synonymous with modern architecture and innovative technology.

These systems continue to fulfill the most recent standards in accordance with EN81-70 and EN12016. These reliable light grid solutions not only provide convenience and protection for elevator passengers, they are also a cost-effective investment in terms of installation, setup, and maintenance. Typical fields of application include hotels, skyscrapers, shopping malls, hospitals, and retirement homes.

Single-beam sensors offer a simpler and more economic option for protecting the cab doors. The extra slim and yet robust housing enables mounting in the narrowest of gaps in door frames or other spaces. A selection of single-beam sensors in small housings or with a universal voltage supply are available.

A precise load-independent positioning of the elevator cab, soft braking, and smooth travel also add to the comfortable operation of elevators. With a broad range of sensor technologies, Pepperl+Fuchs can respond to the requirements of each individual application. The range extends from simple photoelectric slot sensors, rotary encoders, and special slot-type initiators to extremely precise distance measurement devices and positioning systems that are accurate to the millimeter - non-contact and comprehensive.

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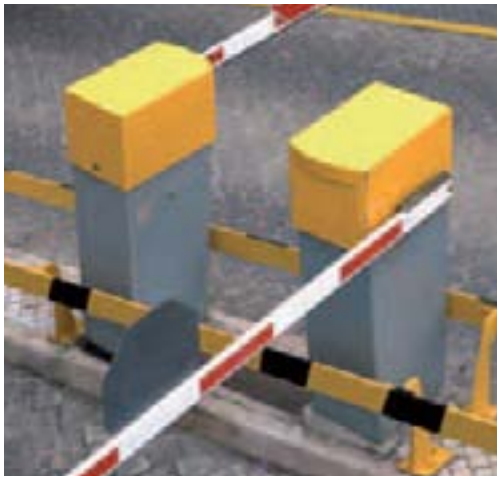
EFFICIENCY AND SERVICE FOR ESCALATORS

Escalators make our day-to-day life easier. To reduce energy costs and save on wear, it is helpful if they stop or operate at a reduced speed when not in use. They should then start operation again as soon as someone steps on them. Our small standard photoelectric or motion sensors enable the escalators to automatically start as soon as people are detected.



COMMERCIAL AND INDUSTRIAL GATE SYSTEMS

Commercial and industrial gate systems provide optimal security and guarantee efficient control of entrance and exit areas. Various sensors and systems help in this regard as activation sensors and to monitor the gate closing areas.

PROTECTION WITH FIRE DOORS: IGNORES SMOKE AND DETECTS PEOPLE

Fire barriers such as fire doors and fire dampers are designed to prevent fires and smoke from spreading along corridors, passages or chutes. This kind of barrier usually remains permanently closed, but can stay open in exceptional cases if the protected route is used very frequently. However, an automatic closing mechanism with a safety monitor is then required.
Pepperl+Fuchs' multifunctional fire protection sensors offer greater reliability and a wider range of functions for applications of this nature.
The Property Insurers Association has certified and approved these sensors in accordance with VdS test report FSA.

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Photoelectric sensors

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Photoelectric sensors

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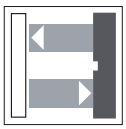
The Functional Principles at a Glance

An increasing number of automatic door and access systems have shaped the modern building. To ensure that these systems function correctly and safely, high-performance sensor systems are required to guide people safely and easily through the door and access systems.

Photoelectric sensors, frequently referred to as Thru-beam sensors, allow automation with all the benefits offered by high-speed noncontact detection systems. The wide variety of different operating principles, models, sizes, and specifications means that the best possible sensor can always be found for the relevant application and that all conditions that occur in practice can be handled.

1. Light Scanners

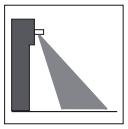
1.1 Diffuse Mode Sensors



Diffuse mode sensors detect an object as soon as they receive sensor light reflected from its surface. They operate on the same principle as a retroreflective sensor, but without the reflector. With a diffuse mode sensor, the object to be detected acts as the reflector, and the light reflected by the detected object is evaluated by the receiver. Due to the diffuse reflection (remission) by the object, the diffuse mode sensor has a smaller detection range, known here as the scanning range, than a retroreflective sensor.

The key benefit of diffuse mode sensors is that they are easy to install, as only one device has to be fitted and no reflector is required. These sensors operate primarily at close range and can detect even very small objects.

1.2 Active Infrared Scanners



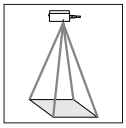
The functional principle of these scanners is based on the active infrared (AIR) principle. The sensor emits infrared light, allowing the resulting reflection to be measured. Depending on the distance to the emitter, reflected emitter light reaches the receiver from different angles, and therefore reaches different receiver elements for the short- and long-distance ranges. In this way, an active infrared scanner can detect whether the emitted light is being reflected by a person or an object inside or outside the detection range.

In background suppression mode, all objects within the defined max. detection range are detected, regardless of their material properties. The receiver consists of a long-distance and a close-up element. If the object is close to the sensor, only the „close-up sensor“ receives the reflected light beam. The farther away the object is from the sensor, the greater the proportion of the reflected light that reaches the „long-range sensor.“ As soon as more light is received by the long-range sensor than by the close-up sensor, the sensor signals that there is no object in the detection range. In this mode, the background is ignored.

In background evaluation mode, the transmitted light reflected by the background (floor) is evaluated. The background is used as the reflector in this case. If the infrared beam reflected by the background is interrupted or reflected back by an object (person or object), regardless of whether it is moving, this triggers a switching signal. This allows reflective objects to be detected and the sensor to be tested.

Active infrared scanners are used on automatic doors as a protection mechanism for closing edges and for collision prevention.

1.3 Active Infrared Area Scanners

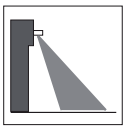


The functional principle of the active infrared area scanner is based on the active infrared (AIR) principle, whereby the objects located in a laminar detection field reflect the light transmitted by the emitter in a characteristic way.

The control unit evaluates the light reflected by the target fields and detects changes caused by people or vehicles in the individual detection ranges. It transfers opening impulses or protection signals to the door controller accordingly.

Area scanners are used for large-scale monitoring of automatic doors and gates.

1.4 Light Curtains



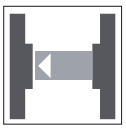
Light curtains consist of individual sensor modules that operate according to the active infrared principle. The modules are located in sensing strips that can be flexibly adapted to the door width. These sensing strips provide an almost rectangular continuous detection field on each side of the door. If a person or object interrupts one or more light beams, the integrated safety controller triggers the switching element. The light curtains are equally well suited for static and mobile operation, and scan the areas immediately in front of and behind the wings of the door, protecting people from colliding with the door.

2. Photoelectric Sensors

Photoelectric sensors are sensors that use light to detect people or objects without contact. The functional principle used to do so is simple but effective, as these sensors respond to any interruption of the beam between the light emitter and the light receiver.

Photoelectric sensors essentially consist of an emitter unit and a receiver unit. If an object or person moves into the beam path, the receiver responds within milliseconds to the change in the amount of light received, and converts it into an electric switching signal. Depending on their design, photoelectric sensors use either visible red light, invisible infrared light, or long-range laser light.

2.1 Thru-Beam Sensors



The light emitters and receivers in Thru-beam sensors are contained in individual, physically separate housings that must be installed opposite to and in alignment with one another.

Extremely long detection ranges and high functional reserves can be achieved with Thru-beam sensors, because the light transmitted from the emitter reaches the receiver directly. These sensors are capable of reliably detecting almost any object. The angle of incidence, surface characteristics, color of the object, etc. are irrelevant and do not influence the functional reliability of the sensor. Because of their high interference immunity, these photoelectric sensors are ideal for applications in the open air or in dirty environments.

2.2 Photoelectric Slot Sensors

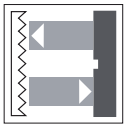
Photoelectric slot sensors are equivalent to Thru-beam sensors and have been designed for specific applications. If there is only a small physical distance to be covered between the emitter and the receiver—just a few millimeters or centimeters—the emitter and receiver are permanently mechanically connected and contained in a U-shaped housing.

Compared to standard Thru-beam sensors, photoelectric slot sensors have the advantage of easier electrical installation, as only one device has to be wired.

In addition, there is no need to adjust the optical axes, and high vibration resistance is achieved.

The field of application for photoelectric slot sensors is the reliable detection of small objects, and these sensors are mainly used for positioning purposes.

2.3 Retroreflective Sensors



In retroreflective sensors, light emitters and receivers are contained in the same housing in a way that makes them easy to install and align. The light from the emitter is returned to the receiver by a reflector. If the light beam is interrupted, the switching function is triggered. These sensors are more economical and require less installation work than Thru-beam sensors.

However, if the object has a reflective surface, it is possible that the transmitted light beam is reflected to the receiver from the object itself, meaning that the object is not detected.

In order to reliably detect these kinds of shiny objects, retroreflective sensors are fitted with polarizing filters.

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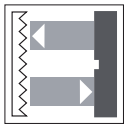
2.4 Retroreflective Sensors with Polarizing Filters



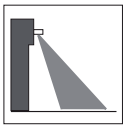
These retroreflective sensors are equipped with polarizing filters, so that even reflective objects can be reliably detected. The polarizing filters positioned in the beam path mean that only transmitted light reflected by a reflector reaches the receiver. Reflection from an object with a reflective surface is ignored.

2.5 Fire Protection Sensors

In the event of a fire in a building, the fire must not be able to spread through corridors, passageways, or shafts. Therefore, the applicable fire protection regulations stipulate the use of fire barriers. These include fire doors, gates, and dampers.

If a smoke detector close to one of these doors signals a fire risk, the responsible controller deactivates the safety device and triggers the self-closing mechanism. The technical challenge for the sensors lies in ignoring any smoke produced while at the same time reliably detecting any people and objects in the smoke. A certified fire protection sensor can perform this function. Due to their high signal strengths, special Thru-beam and retroreflective sensors are suitable for use as safety devices for hold-open devices on fire barriers. The safety functionality has been tested by VdS (German Association of Property Insurers).

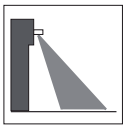
3. Passive Infrared Scanners



Passive infrared systems are optical sensors that evaluate the heat radiation emitted by the surroundings in a similar way to an infrared camera. The sensor, which is sensitive to infrared heat radiation, creates a thermal image of the defined detection range. A person moving in the detection field is reliably detected by a change in the thermal image. Zoom technology and apertures can be used to accurately adjust the shape of the monitoring field.

Due to the sensors' physical characteristics, it is recommended that PIR technology be used as an economical opening impulse sensor for traffic made up solely of pedestrians.

4. Radar Sensors

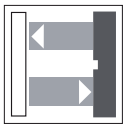


Radar sensors use microwave technology, i.e., the principle of the Doppler radar. Microwaves are transmitted and the reflected echoes are then analyzed. The most important requirement for radar detection is that the object to be detected is moving. The resulting differences between the transmitted and reflected frequency allow easy detection of people and vehicles. Today's devices feature intelligent microprocessor control. This enables them to carry out sophisticated analyses of object movements, allowing them to draw accurate conclusions about movement directions.

Radar sensors based on the latest 24 GHz technology ensure high levels of reliability under difficult operating conditions. The 24 GHz frequency, known as 'K-band,' is reserved by CETECOM for this application area worldwide.

These sensors are particularly flexible and can be adapted for the specific requirements of door controllers in locations such as supermarkets, shopping malls, retirement homes, factory gates, and garages.

5. Distance Sensors and Distance Measuring Devices



Laser distance sensors and distance measurement devices use a direct measuring method for measuring distance, namely pulse ranging technology (PRT). Sensors with PRT transmit short high-energy light pulses and measure the time span between transmission and reception of the laser pulse. The exact distance to the target object is calculated from the measured signal propagation delay and the speed of light. Compared to other measurement methods, this methods offer significant advantages, including precise and unambiguous measurements independent of any ambient and object-related conditions, and high operating ranges. In addition to binary switching information, the sensor always provides an absolute distance measurement. This makes it possible to use the sensor information directly in control circuits, such as to allow gate speeds to be continuously adjusted rather than just switched.

6. Classic Light Grid

Light grids are mainly used for reliable monitoring of as large an area as possible. They consist of an emitter and receiver unit and produce a two-dimensional detection field made up of several parallel light beams. As soon as one or more light beams (with logically linked switching outputs) are broken by a person or an object, this is detected by the evaluation electronics and a switching signal is generated at the output.

All functional units, including the power supply, evaluation electronics, switching outputs, and test input, are integrated directly in the emitter or receiver module. The number of individual beams and the distances between the beams are selected according to the specific application. Special functions such as crossover can be used to ensure that even small objects are detected.

Light grids have the immunity to environmental influences typical of Thru-beam sensors, as well as high signal strengths. In contrast to the process of installing and aligning countless individual Thru-beam sensors, a light grid is easy to assemble and install.

7. Safety Light Grids and Curtains

Safety light grids and curtains act as Thru-beam light grids and provide personal protection and hazard safeguarding at a short distance from hazardous movement.

Safety light grids and curtains are type 2 or type 4 active opto-electronic protective devices in accordance with EN ISO/IEC61496-1. They consist of a emitter unit and a receiver unit.

The protection field is formed by infrared light beams sent from the emitter unit to the receiver unit. The distance between the individual beams determines the minimum obstacle size that can be reliably detected throughout the entire protection field.

These TÜV-approved safety Thru-beam light grids have a wide range of applications in personal protection.

8. DIN 18650 / EN 16005

Wherever external energy sources are used to move mechanical parts, corresponding safety concepts are absolutely essential. Since 2006, DIN 18650 has meant that legislation is in place to ensure that a high level of risk minimization is achieved thanks to a combination of structural measures and protection by means of effective safety sensors. DIN 18650 provides a comprehensive definition of the technical requirements for different automatic door types. In addition to the fundamental product requirements, the standard focuses on the potential hazards and protection options.

The latest scanning light curtains allow the door industry to implement all of the monitoring functions required by DIN 18650. Thanks to intelligent evaluation algorithms, the devices provide enhanced safety and detection functions and are certified in accordance with the current standard. In conjunction with a correspondingly safe controller, they meet all the requirements for a testable active opto-electronic protective device (AOPD) in category 2.

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PEPPERL+FUCHS
SENSING YOUR NEEDS

Single-beam diffuse mode sensor, usable as a protection mechanism for closing edges or as an opening impulse sensor

- **Single-beam diffuse mode sensor with background suppression**
- **Can be used to secure closing edges or as an opening impulse sensor on automatic doors**
- **Can also be used as door handle monitor on revolving doors**
- **Narrow, precise long range light beam**
- **Suitable for moving or stationary mounting**
- **Not sensitive to ambient light**

CE

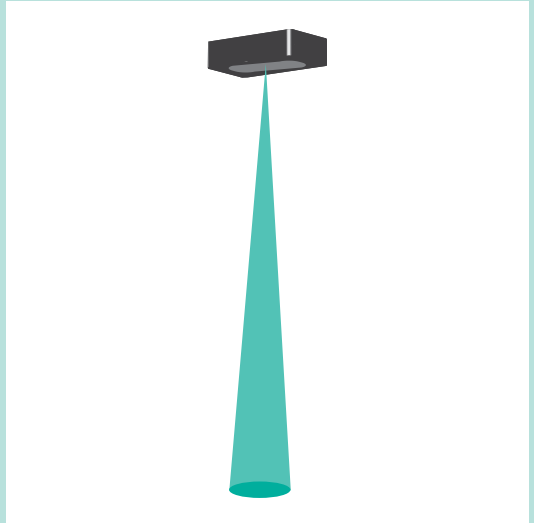
Product information

The AIR20 is an infrared diffuse mode sensor with background suppression that is specially designed for monitoring the closing edges on revolving doors. Its background suppression ensures reliable recognition of the objects to be detected. Due to its compact dimensions, the sensor can be installed in virtually all door drives.

Typical applications

- Closing edge monitoring on revolving doors
- Opening impulse sensor and closing-edge monitoring on automatic doors
- Presence check for turnstiles and safety checkpoints

Detection area



Date of issue 2012-11-12

Technical data

Model Number		AIR20-8-H-2200/25/38a
Detection range	Ex works settings: 1300 mm (adjustable)	●
Detection range min.	200 ... 1300 mm	●
Detection range max.	200 ... 2200 mm	●
Light source	IRED	●
Light type	modulated infrared light	●
Black/White difference (6 %/90 %)	≤ 400 mm at Tw 1300 mm	●
Operating mode	Background suppression	●
Diameter of the light spot	60 mm at Tw 1300 mm	●
Angle of divergence	approx. 2.6 °	●
Accessories provided	Swivel bracket, Mounting angle, Connecting cable	●
$MTTF_d$	1420 a	●
Mission Time (T_M)	20 a	●
Diagnostic Coverage (DC)	0 %	●
Function display	LED red: lights up when output is active	●
Controls	Detection range adjuster	●
Operating voltage	12 ... 30 V DC / 18 ... 28 V AC	●
No-load supply current	< 50 mA	●
Switching type	light on	●
Signal output	Relay, 1 alternator	●
Switching voltage	≤ 48 V AC / DC	●
Switching current	≤ 0.5 A AC / 1 A DC	●
Response time	approx. 50 ms	●
De-energized delay	approx. 250 ms	●
EMC Directive 2004/108/EC	EN 61000-6-2 without EN 61000-4-5, EN 61000-4-11 , EN 61000-6-3	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●
Standards	EN 60947-5-2 EN 61000-6-2 without EN 61000-4-5, EN 61000-4-11 EN 61000-6-3	●
CE conformity	yes	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●
Protection degree	IP52	●
Connection	plug-in screw terminals (5 m connecting cable in delivery package)	●
Housing	ABS	●
Optical face	PMMA	●
Mass	50 g	●

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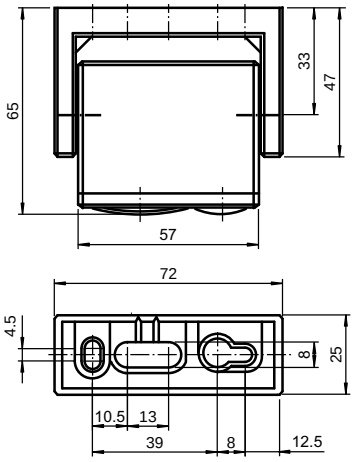
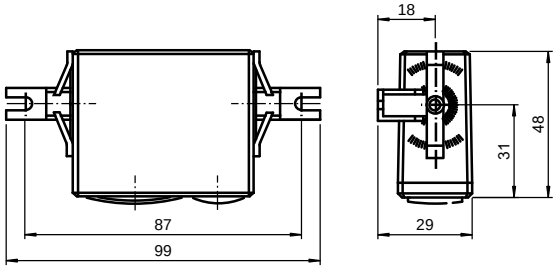
PEPPERL+FUCHS
SENSING YOUR NEEDS

Dimensions

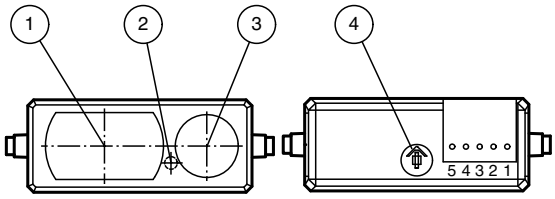
Dimension with swivel bracket



Dimensions with mounting angle



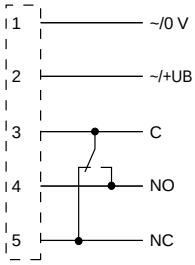
Indicators/operating means



1	Receiver
2	Indication-LED
3	Transmitter
4	Detection range adjuster

Electrical connection

Option /38a



Date of issue 2012-11-12

Notes

Operating principle

Active infrared scanners detect people and objects using short-wave infrared radiation according to the triangulation principle. A switch signal is tripped if the infrared beam emitted is reflected by an object within the specified sensing range. Where background suppression is activated, the background (e.g. ground) is detected but not evaluated.
This allows an precise detection area to be set and ensures reliable detection of people.

Accessories

Flush Mounting AIR20	Flush-mounted frame for sensors in the AIR20
AIR20/PIR20 Weather Cap	All-weather hood for AIR20 and PIR20 series sensors

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PEPPERL+FUCHS
SENSING YOUR NEEDS

Single-beam light scanners with finely bundled light beam for monitoring main and ancillary closing edges

- **Single-beam light scanner**
- **Can be used to monitor both main and ancillary closing edges**
- **Closing edge safety on revolving doors and carousel doors**
- **Accurate beam alignment thanks to finely bundled light beam**
- **Background suppression operating mode: ignores objects outside the sensing range**
- **Background evaluation operating mode: uses the background as a reference for detecting difficult objects**

CE

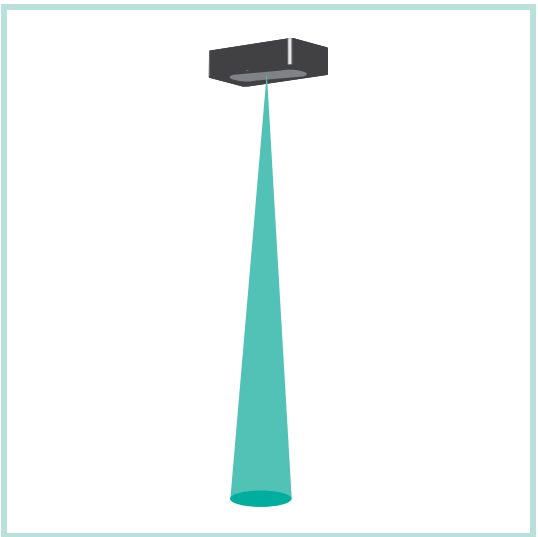
Product information

AIR30 is a series of active infrared scanners with excellent optical properties for monitoring closing edges in a wide range of door systems. The diverse range of housings and mounting options allow the devices to be adapted to suit a whole host of mounting conditions.

Typical applications

- Monitoring closing edges and crushing points on revolving doors and carousel doors
- Door monitoring system in local public transportation

Detection area



Date of issue 2012-11-12

Technical data

Model Number		AIR30-8-H-2500/32/76a	AIR30-8-H-2500/38a	AIR30-8-HW-2500/32/76a	AIR30-8-HW-2500/38a/76a
Detection range min.	100 ... 1000 mm			●	●
	550 ... 1000 mm	●	●		
Detection range max.	100 ... 2500 mm			●	●
	550 ... 2500 mm	●	●		
Light source	IRED	●	●	●	●
Light type	modulated infrared light	●	●	●	●
Black/White difference (6 %/90 %)	≤ 400 mm at a distance of 2000 mm	●	●	●	●
Transmitter frequency	1800 Hz	●	●	●	●
Operating mode	Background suppression	●	●		
	Background evaluation			●	●
Diameter of the light spot	50 mm at 2000 mm sensor range	●	●	●	●
Angle of divergence	approx. 1.4 °	●	●	●	●
Accessories provided	Swivel bracket, Mounting bracket	●	●	●	●
$MTTF_d$	1050 a	●	●	●	●
Mission Time (T_M)	20 a	●	●	●	●
Diagnostic Coverage (DC)	90 %	●	●	●	●
Function display	LED red: lights up when output is active	●	●	●	●
Controls	Detection range adjuster, light/dark switch	●	●	●	●
Operating voltage	10 ... 30 V DC	●		●	
	10 ... 48 V DC / 11 ... 38 V AC		●		●
No-load supply current	100 mA	●	●	●	●
Test input	emitter deactivation at $+U_B$	●	●	●	●
Switching type	light/dark on, switchable	●	●		
	light/dark on, switchable / Ex works settings: dark on			●	
	light/dark on, switchable / Ex works settings: light on				●
Signal output	relay, 1 NO		●		●
	1 PNP output, short-circuit protected, reverse polarity protected, open collector	●		●	
Switching voltage	≤ 55 V AC / 24 V DC		●		●
	30 V DC	●		●	
Switching current	≤ 200 mA	●		●	
	≤ 200 mA AC / 1 A DC		●		●
Response time	50 ms			●	●
	70 ms	●	●		
De-energized delay	approx. 200 ms	●	●	●	●
Standards	EN 60947-5-2 EN 61000-6-2 without EN 61000-4-5, EN 61000-4-11 EN 61000-6-3	●	●	●	●
CE conformity	yes	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●		●	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●
Protection degree	IP52	●	●	●	●
Connection	5 m fixed cable	●	●	●	●
Housing	plastic	●	●	●	●
Optical face	Luran	●	●	●	●
Mass	40 g			●	
	50 g	●	●		●

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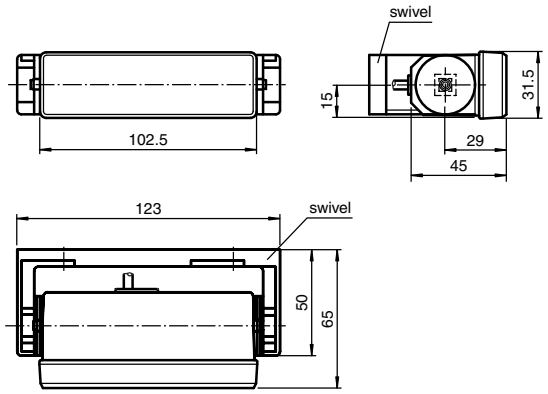
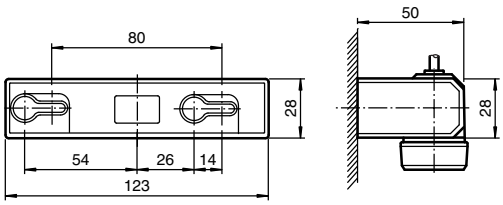
PEPPERL+FUCHS SENSING YOUR NEEDS

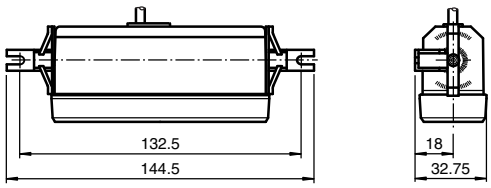
Dimensions



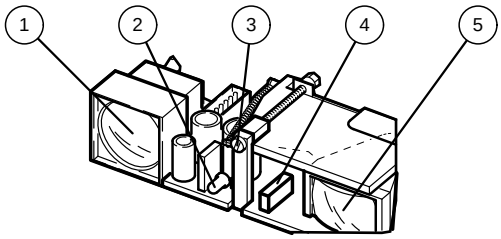
Mounting dimensions for swivel



Mounting dimensions with mounting bracket set AIR30



Indicators/operating means

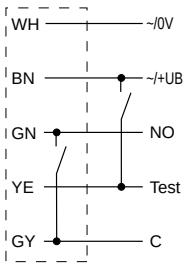


1	Transmitter
2	Indication-LED
3	Detection range adjuster
4	Light / Dark switch
5	Receiver

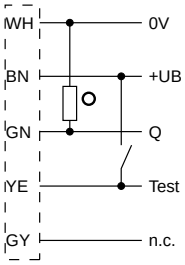
Electrical connection

❍ = Light on, ● = Dark on

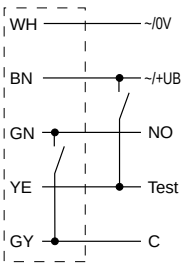
Option -HW.../38a/76a



Option /32/76a



Option -H.../38a



Note:
Test input can not be used, if sensor is supplied with AC voltage!

Note:
Test input can not be used, if sensor is supplied with AC voltage!

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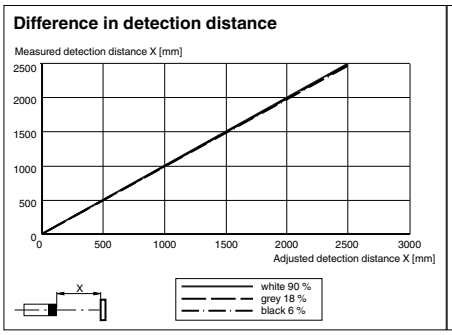
Notes

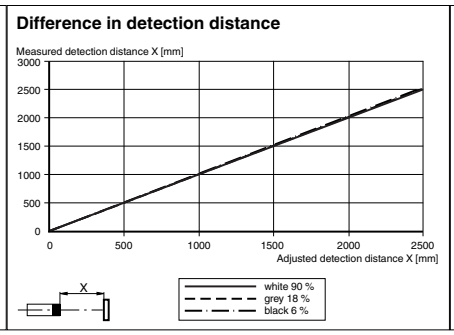
Operating principle

Active infrared scanners detect people and objects using short-wave infrared radiation according to the triangulation principle. A switch signal is tripped if the infrared beam emitted is reflected by an object within the specified sensing range. Where background suppression is activated, the background (e.g. ground) is detected but not evaluated.
This allows an extremely precise detection area to be set and ensures reliable detection of people, vehicles and other objects.

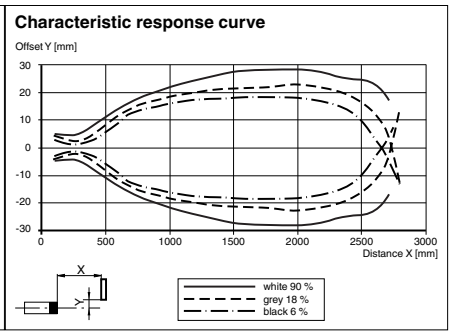
AIR30-8-H-2500/32/76a
AIR30-8-H-2500/38a



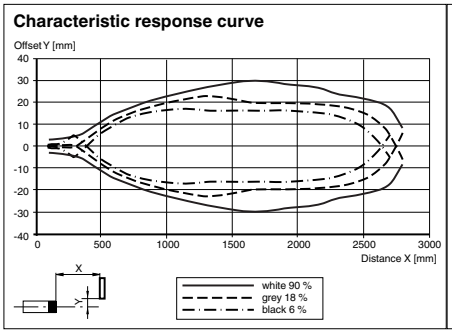
AIR30-8-HW-2500/32/76a
AIR30-8-HW-2500/38a/76a



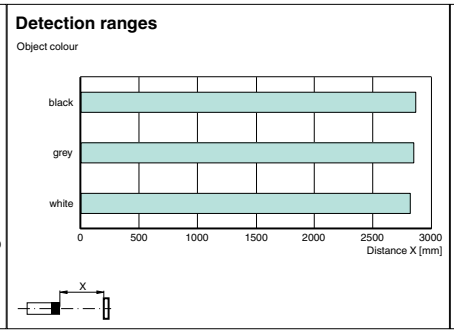
AIR30-8-HW-2500/32/76a
AIR30-8-HW-2500/38a/76a



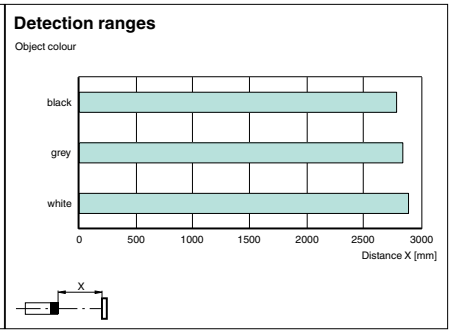
AIR30-8-H-2500/32/76a
AIR30-8-H-2500/38a



AIR30-8-HW-2500/32/76a
AIR30-8-HW-2500/38a/76a



AIR30-8-H-2500/32/76a
AIR30-8-H-2500/38a



Accessories

UP-Einbaurahmen	Mounting frame for sensors in the AIR30 and PROSCAN series
Flush Mounting AIR30	Installation cover for AIR30 series sensors
Wetterhaube AIR30	Weather hood for series AIR30

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PEPPERL+FUCHS SENSING YOUR NEEDS

Light curtain for individual protection in accordance with DIN 18650

- **Moving presence sensor for swing doors**
- **SIL2, certified in accordance with DIN 18650/ EN 16005**
- **Flexible protection field due to expanded sensing area**
- **Complete protection up to the wall without sensor shutoff**
- **Additional protection of the main and secondary closing edges**
- **Tool-free module mounting using snap-in mechanism**
- **Low power consumption and energy conservation due to standby operating mode**
- **1600 mm monitoring with only one sensor system (in accordance with DIN 18650 / EN 16005)**
- **1200 mm monitoring with only one sensor system (in accordance with DIN 18650 / EN 16005)**

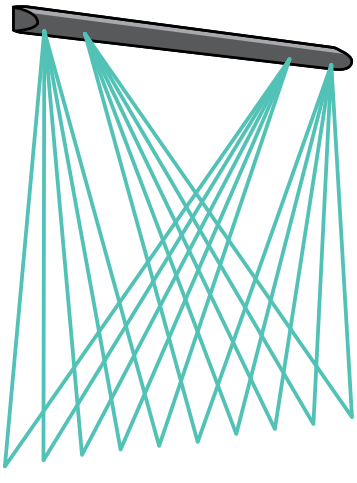
Product information

DoorScan is a presence sensor for automatic revolving doors. It uses active infrared technology to perform background analysis. The sensor is suitable for mobile or stationary mounting. Because the emitter and receiver module can be repositioned freely, the field of view can also be adjusted to fit the door width. An interface controls both sides of the door and establishes the link to the door controller. DoorScan meets the requirements of DIN 18650 and is a safety system fulfilling PL d in accordance with DIN EN ISO 13849-1 used in conjunction with a secure door controller that generates and evaluates the test signals.

Typical applications

- Protection mechanism for closing edges on automatic doors
- Anti-collision protection for people/objects in the vicinity of revolving or carousel doors.

Detection area



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Technical data

Model Number		DoorScan-DS-2P-1200/30	DoorScan-DS-4P-1600/30
Detection range min.	0 ... 1500 mm	●	●
Detection range max.	0 ... 3500 mm (Upright CA test body)	●	●
Light source	IRED	●	●
Black/White difference (6 %/90 %)	< 2 % at 2000 mm sensor range	●	●
Number of beams	10	●	
	20		●
Operating mode	Background evaluation	●	●
Diameter of the light spot	8 cm at 2000 mm sensor range	●	●
Safety Integrity Level (SIL)	SIL 2	●	●
Performance level (PL)	PL d	●	●
$MTTF_d$	112.7 a	●	●
Mission Time (T_M)	10 a	●	●
Function display	Receiver: Red LED: detection, excess gain, fault code Interface: Red LED: detection, excess gain, fault code Yellow LED: teach status Green LED: blank status Green LED: DIP switch status	●	●
Controls	TEACH-IN key , DIP-switch for selection of operating modes	●	●
Operating voltage	24 V DC +/- 20 %	●	●
No-load supply current	max. 200 mA	●	
	max. 320 mA		●
Test input	High active at U = 15 V DC to 30 V DC Low active at U = < 2 V DC	●	●
Switching type	Hinge edge light on Leading edge light on/dark on, switchable	●	●
Signal output	NPN , short-circuit protected	●	●
Switching voltage	max. 30 V DC	●	●
Switching current	max. 100 mA	●	●
Response time	≤ 52 ms ≤ 200 ms in boost operating mode	●	●
EMC Directive 2004/108/EC	EN 61000-6-2, EN 61000-6-3	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●
Standards	prEN 16005:2011 BS 7036-1:1996 ; BS 7036-2:1996	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●
Housing length L	1200 mm	●	
	1600 mm		●
Mounting height	max. 3500 mm	●	●
Protection degree	IP54 (iwhen mounted)	●	●
Connection	screw terminals	●	●
Housing	aluminum / PA	●	●
Optical face	PC (Polycarbonate)	●	●
Mass	approx. 2100 g	●	
	approx. 2760 g		●

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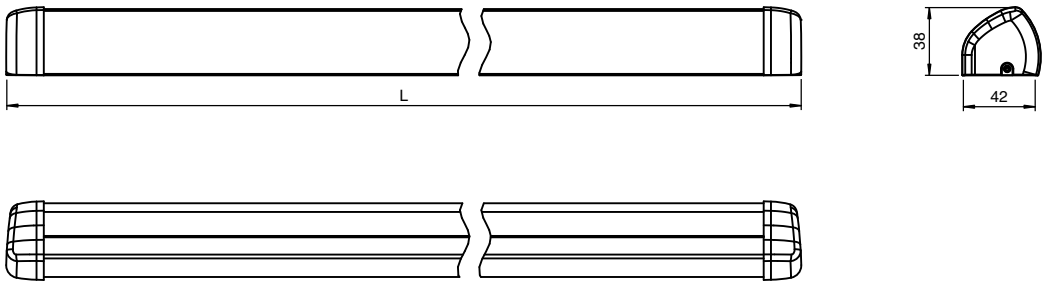
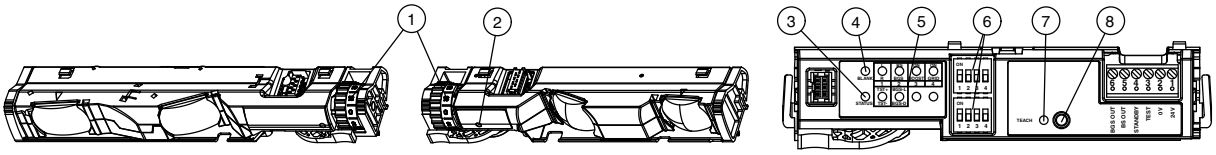
Dimensions

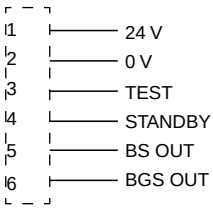


Indicators/operating means



1 Adjusting wheel for inclination angle
2 Receiver indicator LED, red
3 Status LED, red
4 Blank LED, green
5 DIP LEDs, green
6 DIP switch - rows 1 and 2
7 Teach LED, yellow
8 Teach button

Electrical connection



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Notes

Functional principle

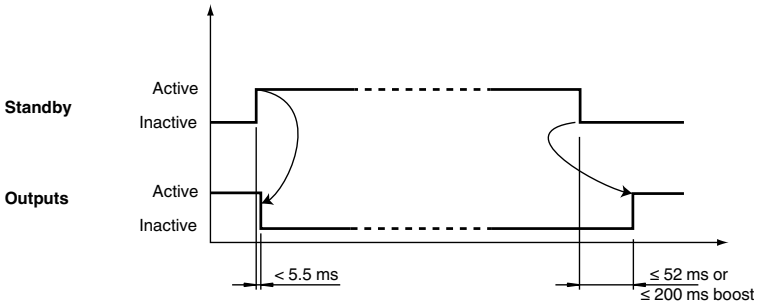
DoorScan is an active infrared triangulation sensor with background analysis.
The ground is taught in as a reference and the sensor can learn flat walls on the hinge side and door posts on the leading edge side when the door is opened. This means that person detection can be ensured throughout the entire movement of the door.

Characteristics

The DoorScan housing comprises an aluminum profile system with a plastic cover, which can be adapted to a door width of up to 1600 mm. A minimum of one and maximum of three emitter and receiver modules must be fitted on each side of the door. The interface must be installed on one side.
The modules should be arranged approx. 10 cm away from the edge of the door. If more than one emitter/receiver module is installed on each side, the modules must be overlapped (S1, S2, E1, E2).

Standby

When the supply voltage is applied, the sensor is put into standby — the energy consumption is reduced to less than 80% in this state. Once the signal is deactivated, the sensor is immediately ready for operation and enables the signal outputs within 52 ms and/or 200 ms (in boost operating mode) if the detection field is free.



Operating Modes

Boost operating mode

Activation with dark floors, even at high installation heights (increased sensitivity). In these cases, the response time of the sensor is increased from 50 ms to 200 ms. If necessary, the speed of the door must be adjusted to the response time.

Grid operating mode

Activation in the event of faults due to grating on the ground. Used where grating and shafts are present in the detection field.

Accessories

DoorScan Connection Cable 5p	Connection cable DoorScan
DoorScan Transfer Loop	DoorScan door transition cable
DoorScan Connection Caps	End cap set for sectional DoorScan sensor profile
DoorScan Cable BS/BGS	Connection cable DoorScan
DoorScan Weather Cap L1600	All-weather hood for DoorScan and TopScan series sensing strips
DoorScan-R	Replacement/extension sensor module Receiver
DoorScan-T	Replacement/extension sensor module Transmitter
DoorScan-I/30	Replacement/extension sensor module Interface
DoorScan End Caps	End cap set for DoorScan sensor profile
TopScan-S Profile L1400	Housing profile TopScan-S
TopScan-S Cover L1400	Housing cover TopScan-S
DoorScan Weather Cap L1200	All-weather hood for DoorScan and TopScan series sensing strips

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Single or multi-beam light curtain for individual protection according to DIN 18650/EN 16005

- Moving presence sensor for swing doors
- Configurable for a wide range of door leaf widths
- Category 2, tested and certified to DIN 18650
- Modular construction with master/slave modules
- Safe function even on difficult floors
- Each beam can be adjusted individually
- Easy adjustment of transmitter for hinge side/ opposite hinge side
- Single-beam version
- Double-beam version
- Three-beam version
- Four-beam version
- Six-beam version

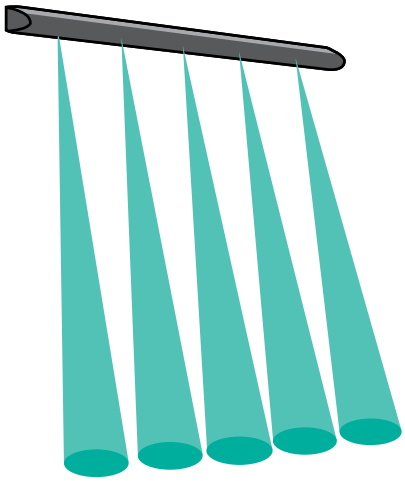
Product information

The TopScan-S is a presence sensor for automatic revolving doors that operates according to the active infrared principle in background evaluation, and can be installed for mobile use in addition to static use. The modular structure consisting of master and slave modules means that the systems can be configured for different door panel widths up to 1400 mm. Up to 7 individually adjustable beams can be used in one device. This ensures test object detection across the entire door width. The sensors are certified according to the current DIN 18650 standard and, in conjunction with an appropriate, safe controller, fulfill all requirements for testable active opto-electronic protective devices (AOPDs) in Category 2.

Typical applications

- Protection mechanism for closing edges on automatic doors
- Anti-collision protection for people/objects in the vicinity of revolving or carousel doors.

Detection area



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Technical data

Model Number		TopScan-S-M/L310	TopScan-S-M/L750	TopScan-S-M/L900	TopScan-S-MS/L750	TopScan-S-MS/L900	TopScan-S-MS/L1400	TopScan-S-M2S/L750	TopScan-S-M2S/L900	TopScan-S-M3S/L900	TopScan-S-M5S/L1400
Detection range min.	0 ... 1500 mm	●	●	●	●	●	●	●	●	●	●
Detection range max.	0 ... 2500 mm	●	●	●	●	●	●	●	●	●	●
Light source	IRED	●	●	●	●	●	●	●	●	●	●
Black/White difference (6 %/90 %)	< 2 % at 2000 mm sensor range	●	●	●	●	●	●	●	●	●	●
Number of beams	(number of built-in sensor modules AIR)	1	1	1	2	2	2	3	3	4	6
Operating mode	Background evaluation	●	●	●	●	●	●	●	●	●	●
Diameter of the light spot	3 cm x 8 cm at 2000 mm sensor range	●	●	●	●	●	●	●	●	●	●
Safety Integrity Level (SIL)	SIL 1	●	●	●	●	●	●	●	●	●	●
Performance level (PL)	PL c	●	●	●	●	●	●	●	●	●	●
$MTTF_d$	880 a per module	●	●	●	●	●	●	●	●	●	●
Mission Time (T_M)	20 a	●	●	●	●	●	●	●	●	●	●
Diagnostic Coverage (DC)	90 %	●	●	●	●	●	●	●	●	●	●
Category	Cat. 2	●	●	●	●	●	●	●	●	●	●
Function display	LED red/green	●	●	●	●	●	●	●	●	●	●
Controls	Detection range adjuster ; Adjuster for edge monitoring left/right	●	●	●	●	●	●	●	●	●	●
Operating voltage	24 V DC +/- 20 %	●	●	●	●	●	●	●	●	●	●
No-load supply current		75 mA	75 mA	75 mA	140 mA	140 mA	140 mA	210 mA	210 mA	270 mA	400 mA
Test input	active at U = 11 V DC at 30 V DC inactive at U = -3 V DC at 5 V DC	●	●	●	●	●	●	●	●	●	●
Switching type	Relay de-energized at object inside the scanning range	●	●	●	●	●	●	●	●	●	●
Signal output	Relay, 1 alternator	●	●	●	●	●	●	●	●	●	●
Switching voltage	5 V ... 30 V AC/DC	●	●	●	●	●	●	●	●	●	●
Switching current	max. 300 mA	●	●	●	●	●	●	●	●	●	●
Response time	≤ 70 ms	●	●	●	●	●	●	●	●	●	●
EMC Directive 2004/108/EC	EN 61000-6-2:2005; EN 61000-6-3:2007	●	●	●	●	●	●	●	●	●	●
Standards	DIN 18650-1:2010 EN 61508:2010	●	●	●	●	●	●	●	●	●	●
CE conformity	CE	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●	●	●	●	●	●	●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)	●	●	●	●	●	●	●	●	●	●
Housing length L		310 mm	750 mm	900 mm	750 mm	900 mm	1400 mm	750 mm	900 mm	900 mm	1400 mm
Mounting height	max. 2500 mm	●	●	●	●	●	●	●	●	●	●
Protection degree	IP52 , IP54 Optional (with special seal)	●	●	●	●	●	●	●	●	●	●
Connection	screw terminals	●	●	●	●	●	●	●	●	●	●
Housing	aluminum / ABS	●	●	●	●	●	●	●	●	●	●
Optical face	PMMA	●	●	●	●	●	●	●	●	●	●

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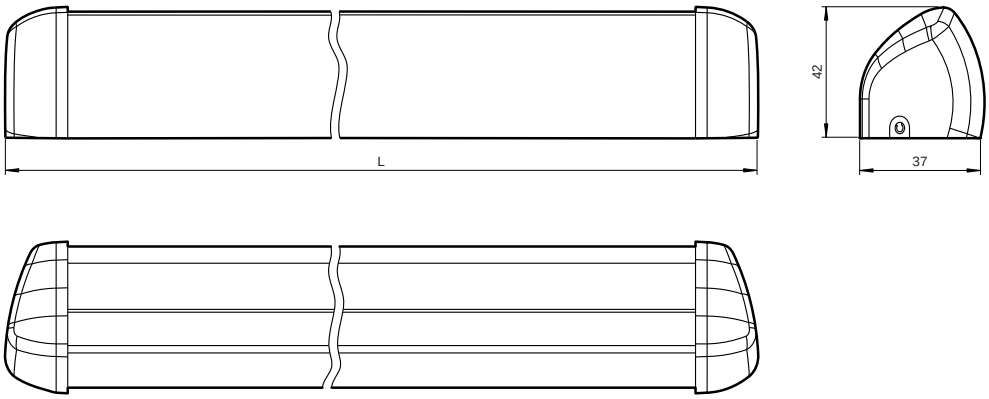
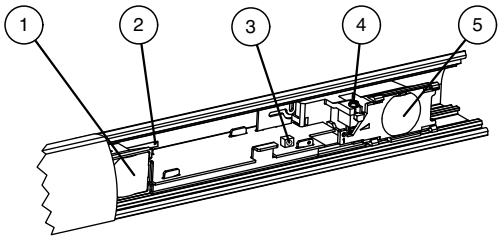
Dimensions

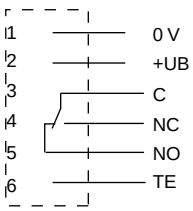


Indicators/operating means



1	Emitter
2	Changeover switch adjuster, left/right
3	Function display
4	Detection range adjuster
5	Receiver

Electrical connection



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Notes

Operating principle

The TopScan-S is an active infrared triangulation sensor.
The device operates according to the active infrared principle in background evaluation mode, and is designed for installation on door panels for mobile use, in addition to static use. This makes the TopScan-S ideal for protection of closing edges on automatic revolving door panels. A sensor mounted directly on the door panel of a revolving door provides the best protection possible, as it always monitors the immediate vicinity in front of the current door panel position.
Construction
The TopScan-S consists of an aluminum profile with front panel, and can be adapted to different door widths up to 1400 mm as required. The profile is equipped with sensor modules and constructed according to the master/slave principle. A 900 mm door would require a master and three slaves for example, while a 7-beam system with master and six slaves represents the maximum version for a 1400 mm door. Within the housing, there are multiple sensors that must be positioned according to specific application requirements.

DIN *The TopScan-S is intended for providing protection for automatic revolving doors according to DIN 18650. When used as intended, the sensor should only be able to influence the movement of the door via the door controller rather than directly, as the combination of a safe door controller and a sensor is a prerequisite for the system to be considered a protective device in category 2, PL c in accordance with EN ISO 13849-1.*

Modification of the construction/arrangement of the equipment without consulting the manufacturer could lead to hazardous situations.

Objects that enter the sensor's protection area are detected by infrared beams and cause the relay contact output to become disabled.
The light spot created on the floor by the infrared beam is approx. 3 cm x 8 cm large (at approx. 2 m installation height).
The angle of the two lens systems can be changed by means of adjustment. This allows a detection range (detection height of objects) of up to 2.50 m max. to be set. The device is equipped with test objects for setting the detection range.
The sensor reacts to objects in the detection range, largely irrespective of surface color and structure. Even reflective and extremely dark objects are detected.
Multiple sensors can be operated in a master/slave combination, in order to adapt the protection field to existing requirements.
A 6-pin screw terminal is used to connect the master module with the door controller. The slave modules are connected to the master module by means of ribbon cable, and are also powered via the master module. The master module and slave module are located in the same aluminum profile.

Accessories

DoorScan Weather Cap L1600	All-weather hood for DoorScan and TopScan series sensing strips
DoorScan Weather Cap L1200	All-weather hood for DoorScan and TopScan series sensing strips
AIR17-S Master	Replacement/extension sensor module
AIR17-S Slave	Replacement/extension sensor module
TopScan-S Profile L1400	Housing profile TopScan-S
TopScan-S Cover L1400	Housing cover TopScan-S
TopScan-S Cap Set	End cover for TopScan-S aluminum profile section
TopScan-S Gasket IP54	Housing seal TopScan-S
AIR 16 S Einclipsbar Set	Bearing block for AIR17-S sensor module for installation in TopScan-S profile section
Topscan Cable Loop Basic	Metal cable protector
TopScan-S Test Kit	Adjustment accessories TopScan-S
TopScan-S Cable 240 mm	Ribbon cable for connecting sensor modules

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Single or multi-beam light curtain for individual protection

- Moving presence sensor for swing doors
- Configurable for a wide range of door leaf widths
- Each beam can be adjusted individually
- Selectable background suppression and evaluation
- Beam adjustment to closing edge width
- Test input
- Single-beam version
- Double-beam version
- Three-beam version

CE

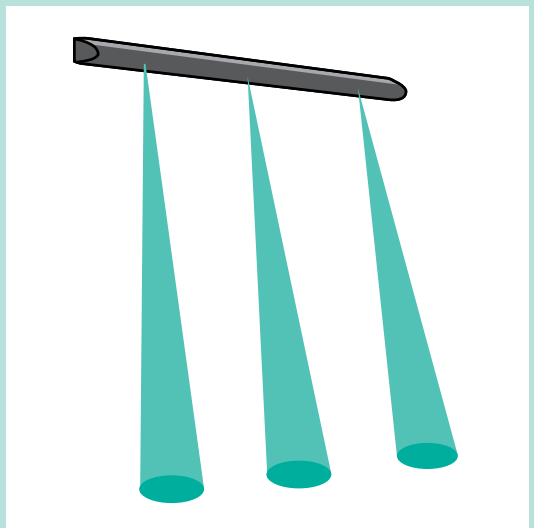
Product information

The TopScan2 series is a modular sensor system that can be used in a flexible manner for various requirements relating to the monitoring of automatic doors. The system can be mounted for either static or mobile use. The housing can be easily shortened and up to five sensor modules can be arranged side by side, whereby each beam can be configured individually. When it comes to the operating modes, there is the choice between background suppression and background evaluation. The light or dark switching modes, detection range and closing edge alignment can also be adjusted. These features make the TopScan2 active infrared scanner ideal for use with a wide range of automatic door systems.

Typical applications

- Protection mechanism for closing edges on automatic sliding doors and revolving doors
- Anti-collision protection for people/objects in the vicinity of revolving doors
- Edge and pinch protection for sliding doors
- Entry monitoring for buses and trains operated within the public transportation network

Detection area



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Technical data

Model Number		TOPSCAN2-8-HS-2500-1/L1000/38a	TOPSCAN2-8-HS-2500-1/L330/38a	TOPSCAN2-8-HS-2500-1/L900/38a	TOPSCAN2-8-HS-2500-2/L750/38a	TOPSCAN2-8-HS-2500-2/L900/38a	TOPSCAN2-8-HS-2500-3/L1200/38a	TOPSCAN2-8-HS-2500-3/L1350/38a	TOPSCAN2-8-HS-2500-3/L900/38a
Detection range min.	0 ... 1500 mm by background evaluation, 500 ... 1500 mm by background suppression	●	●	●	●	●	●	●	●
Detection range max.	0 ... 2500 mm with background evaluation, 500 ... 2500 mm with background suppression	●	●	●	●	●	●	●	●
Light source	IRED	●	●	●	●	●	●	●	●
Black/White difference (6 %/90 %)	< 20 % at 2000 mm sensor range	●	●	●	●	●	●	●	●
Marking	CE	●	●	●	●	●	●	●	●
Number of beams	(number of built-in sensor modules AIR)	1	1	1	2		3	3	3
Operating mode	switching between background suppression/evaluation	●	●	●	●	●	●	●	●
Diameter of the light spot	75 x 75 mm by sensing range 2000 mm	●	●	●	●	●	●	●	●
Function display	LED red	●	●	●	●	●	●	●	●
Controls	Detection range adjuster, light/dark switch, changeover switch for mode of operation Background suppression / Background evaluation ; Adjuster for edge monitoring left/right	●	●	●	●	●	●	●	●
Factory setting	Background suppression	●	●	●	●	●	●	●	●
Operating voltage	17 ... 30 V DC , 18 ... 28 V AC	●	●	●	●	●	●	●	●
No-load supply current	< 100 mA	●	●	●	●	●	●	●	●
Test input	emitter deactivation with U = 17 ... 30 V DC only in background evaluation mode of operation and DC operation	●	●	●	●	●	●	●	●
Switching type	Light/Dark switch	●	●	●	●	●	●	●	●
Signal output	Relay, 1 alternator	●	●	●	●	●	●	●	●
Switching voltage	max. 24 V DC , 48 V AC	●	●	●	●	●	●	●	●
Switching current	≤ 1 A	●	●	●	●	●	●	●	●
Switching power	24 W / 55 VA	●	●	●	●	●	●	●	●
Response time	30 ms , 2 s after test	●	●	●	●	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●	●	●	●
Emitted interference	EN 61000-6-3	●	●	●	●	●	●	●	●
Standards	EN 61000-6-2 without EN 61000-4-5, EN 61000-4-11	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●	●	●	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●	●	●	●	●
Housing length L		1000 mm	330 mm	900 mm	750 mm	900 mm	1200 mm	1350 mm	900 mm
Mounting height	max. 2500	●	●	●	●	●	●	●	●
Protection degree	IP52	●	●	●	●	●	●	●	●
Connection	screw terminals	●	●	●	●	●	●	●	●
Housing	aluminum / ABS	●	●	●	●	●	●	●	●
Optical face	PC	●	●	●	●	●	●	●	●
Mass	approx. 200 g		●						
	approx. 500 g	●		●	●				
	approx. 650 g					●	●	●	●

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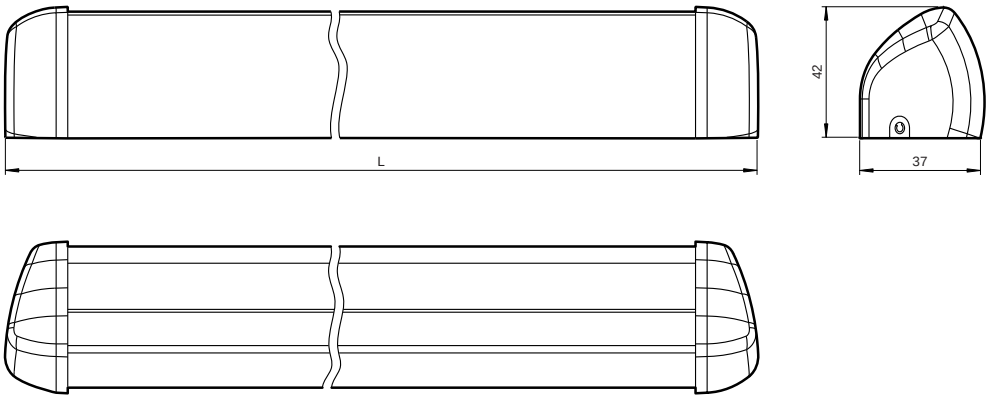
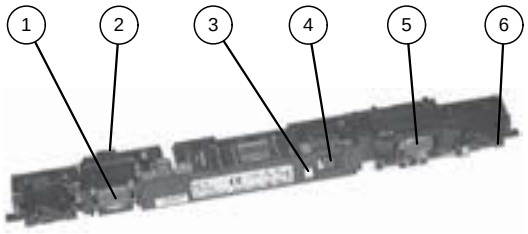
SENSING YOUR NEEDS

Dimensions

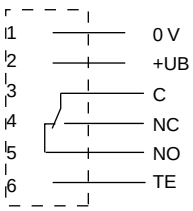


Indicators/operating means



1	Transmitter
2	Adjuster for monitoring edge
3	Functional display
4	Programming switch
5	Receiver
6	Detection range adjuster

Electrical connection



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Notes

Operating principle

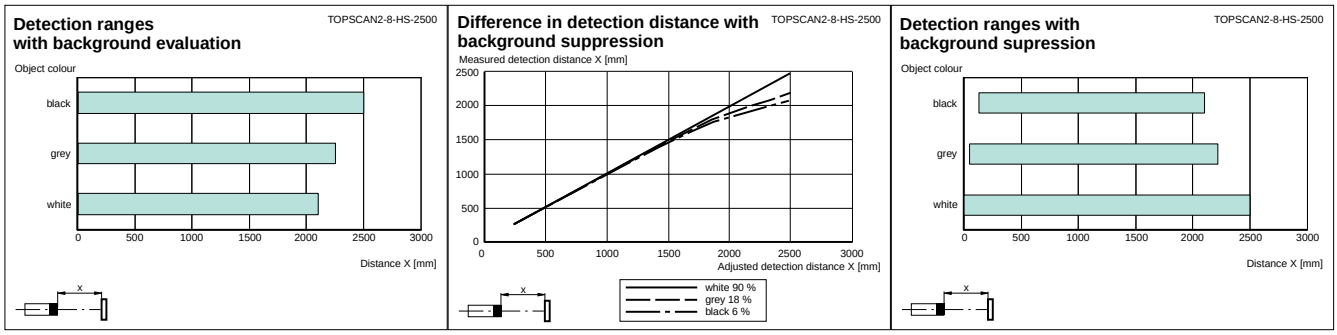
The two large-area lenses (one for the infrared transmitter and one for the two photodiode receivers with ambient light filter) have an optical center-to-center distance of approx. 150 mm, resulting in a light spot size of 75 mm x 75 mm. The angle of the two lens systems can be adjusted to each other via a precision gear according to the principle of background/foreground suppression. Such precisely defined focal lengths enable a precision detection range setting of up to 2500 mm.
The detection range can be extended up to 2500 mm and responds to any object in the detection area, with minimal effect from the surface color and structure. Reflection levels that exceed the specified maximum detection range are not detected by the sensor, even with highly reflective objects — for example corrugated aluminum plates or marble floors (with background suppression). The detection fields of several devices can be overlapped without interference.

Background Suppression Operating Mode

In this operating mode, the background is "detected" but not actually evaluated (ignored). A reflection signal from an object within the specified detection area is required as a switching signal.

Background Evaluation Operating Mode

The TopScan2 can also be used with a test option, regardless of whether or not there is an object/person in the detection area. The receiver constantly sees the reflected light from the transmitter when the background is present. Testing is performed by disconnecting the transmitter from the supply voltage.
The background is used as a reflector. If the light beam is broken by an object, a switching signal is triggered.



Accessories

AIR16	Sensor module
LAGERBOCK AIR16	Pedestal for the sensor module AIR16
Topscan Cable Loop Basic	Metal cable protector
TopScan2 Cable 300 mm	Ribbon cable for connecting sensor modules
TopScan-S Cap Set	End cover for TopScan-S aluminum profile section
TopScan-S Gasket IP54	Housing seal TopScan-S
TopScan-S Profile L1400	Housing profile TopScan-S
Topscan2 Cover L1400	TopScan2 housing cover
DoorScan Weather Cap L1200	All-weather hood for DoorScan and TopScan series sensing strips

Date of issue 2012-11-12

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PEPPERL+FUCHS SENSING YOUR NEEDS

Precision sensor for extremely long detection ranges up to 6 m

- **Mode selectable: background suppression or evaluation**
- **Mechanical adjustable detection range**
- **Adjustable timer functions**
- **DC voltage version**
- **Version with test input**

CE

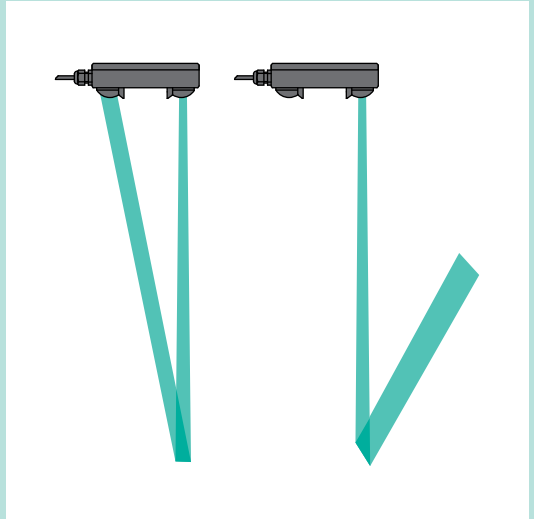
Product information

Diffuse mode sensors LT(K)2 are used when people, objects, or vehicles are to be detected in a precisely defined area. The devices are extremely sturdy and resistant to mechanical strain. In background evaluation operating mode, the sensors can be used with any background. In background suppression operating mode, the background serves as a reference area. This enables highly reflective objects to be reliably detected as well. In addition, this operating mode offers an option for testing.

Typical applications

- Opening impulse sensor and protection mechanism for closing edges on automatic doors and industrial doors
- Opening impulse sensor for automatic doors
- Vehicle detection in traffic technology (e.g., individual parking space monitoring)
- Height measurement at entrances
- Anti-collision protection on automated guided systems

Detection area



Date of issue 2012-11-12

Technical data

Model Number		LT2-8-HS-6000/47/105	LT2-8-HS-6000/49/105	LT2-8-HS-6000/47/115	LT2-8-HS-6000/49/115	LT2-8-HS-2000/47/105	LT2-8-HS-2000/49/105	LT2-8-HS-2000/47/115	LT2-8-HS-2000/49/115
Detection range min.	0 ... 500 mm by background evaluation, 350 ... 500 mm by background suppression	●	●	●	●	●	●	●	●
Detection range max.	0 ... 2000 mm by background evaluation, 350 ... 2500 mm by background suppression					●	●	●	●
	0 ... 6000 mm by background evaluation, 200 ... 6000 mm by background suppression	●	●	●	●				
Light source	IRED	●	●	●	●	●	●	●	●
Light type	modulated infrared light	●	●	●	●	●	●	●	●
Operating mode	switching between background suppression/evaluation	●	●	●	●	●	●	●	●
Diameter of the light spot	150 mm at 6000 mm sensor range	●	●	●	●				
	50 mm at 2000 mm sensor range					●	●	●	●
$MTTF_d$	730 a	●	●	●	●	●	●	●	●
Mission Time (T_M)	20 a	●	●	●	●	●	●	●	●
Diagnostic Coverage (DC)	60 %	●	●	●	●	●	●	●	●
Function display	LED green: power on LED yellow: object detection	●	●	●	●	●	●	●	●
Controls	Detection range setting, programming switch for time functions, time setting	●	●	●	●	●	●	●	●
Operating voltage	15 ... 35 V DC	●	●	●	●	●	●	●	●
No-load supply current	100 mA	●	●	●	●	●	●	●	●
Test input	emitter deactivation with +Ub	●	●	●	●	●	●	●	●
Switching type	light/dark on selectable programmable , Factory setting: light on	●	●	●	●	●	●	●	●
Signal output	1 NPN, 1 PNP, short-circuit protected, open collectors		●		●		●		●
	2 PNP, complementary, short-circuit protected, open collectors	●		●		●		●	
Switching voltage	35 V DC	●	●	●	●	●	●	●	●
Switching current	200 mA	●	●	●	●	●	●	●	●
Response time	100 ms	●	●	●	●				
	50 ms					●	●	●	●
De-energized delay	100 ms					●	●	●	●
	400 ms	●	●	●	●				
Directive conformity	EMC Directive 2004/108/EC	●	●	●	●	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●	●	●	●
Emitted interference	EN 61000-6-3	●	●	●	●	●	●	●	●
Standards	EN 61000-6-2 without EN 61000-4-5, EN 61000-4-11	●	●	●	●	●	●	●	●
CE conformity	yes	●	●	●	●	●	●	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●	●	●	●	●
Protection degree	IP65	●	●	●	●	●	●	●	●
Connection	5 m fixed cable			●	●			●	●
	5-pin plastic M12 connector without cable	●	●			●	●		
Housing	Makrolon GV30	●	●	●	●	●	●	●	●
Optical face	hardened plastic lens	●	●	●	●	●	●	●	●
Mass	320 g	●	●	●	●	●	●	●	●

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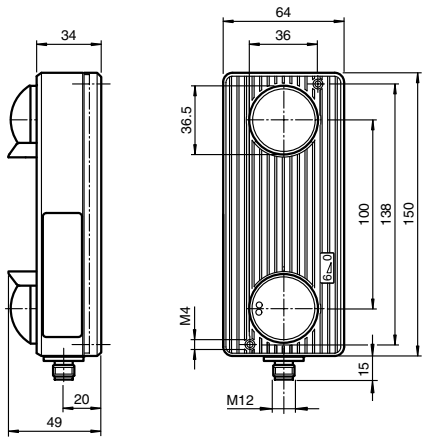
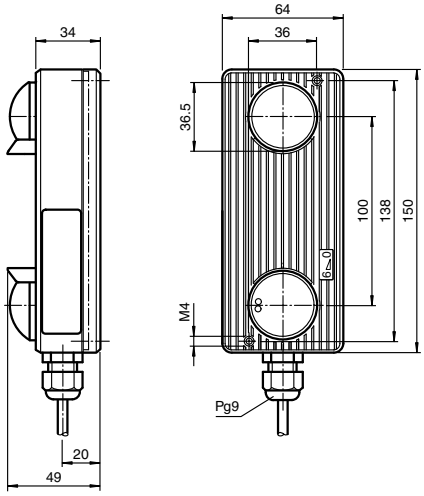
Dimensions

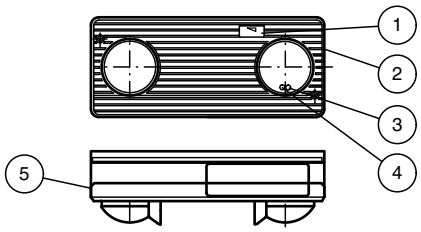
Option /105



Option /115



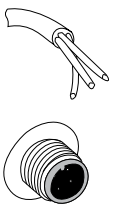
Indicators/operating means



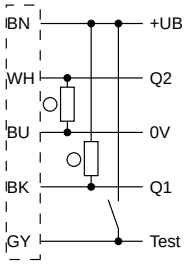
1	Detection range indicator	
2	Detection range adjuster	
3	Operation display	Green
4	Function display	Yellow
5	Programming switch under cover	

Electrical connection

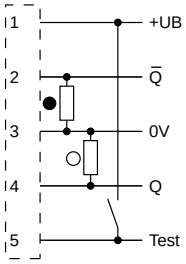
❍ = Light on, ● = Dark on



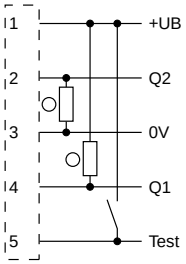
Option 49/115



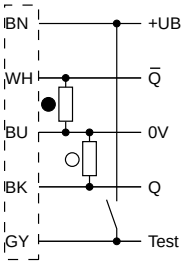
Option 47/105

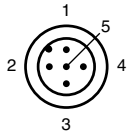


Option 49/105



Option 47/115





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 2012-11-12

Notes

Functional principle

The active infrared scanners of the LT2 and LTK2 series function with the background suppression and background evaluation operating modes. The emitter and receiver are aligned at a certain angle in relation to one another. This angle can be changed and is used to determine the maximum detection range. The LT2 series operates with dc voltage and features transistor outputs; the LTK2 series operates with ac/dc voltage and features a relay output.
The devices are delivered with background suppression as the default mode.

Background Suppression Operating Mode

The sensor switches state when an object moves into or out of the detection range and is detected by the light beam. The background and/or base is ignored during this process. The sensitivity of the sensor can be adjusted so that objects beyond a certain distance are ignored. Sensors that feature this operating mode can be mounted for mobile use.

Background Evaluation Operating Mode

The sensor switches state when an object moves into or out of the detection range and is detected by the light beam. However, where background evaluation is used, some form of background (such as the floor or a wall) must be present as a point of reference.
The sensor continues to switch even if no light is received from the background. Sensors with background evaluation do not have foreground suppression. This means that they can also detect objects directly in front of the lens (detection range = 0), making them particularly suited for detecting objects that are difficult to detect, especially highly reflective objects.

Additional information

Alignment/Setting Instructions

Always use the object with the lowest reflection value (darkest color) for alignment purposes.

1. Align the sensor to the target objects
   Turn the detection range controller all the way to the right end stop (-)
   (**CAUTION!** The controller is not protected from overturning—handle with care)
   Turn the detection range controller to the left (+) until the yellow LED starts to light up
2. Remove the target objects; the LED goes out (note background influences).
   If the background (floor, wall) is permanently or occasionally reflective and shiny, due to moisture for example, the device must be installed in such a manner that it is rotated through > 5° along its longitudinal axis to prevent a mirror effect.

Selecting the appropriate operating mode

The devices are supplied in background suppression operating mode.
The background evaluation mode should be used if:

- Objects close to the optics are detected (detection range = 0 mm)
- Reflective, shiny objects must be detected (e.g. vehicles)
- A device function test is performed by means of test input

CAUTION! When in background evaluation operating mode, the sensor must always be aligned with a background that remains as constant as possible. Where this is not guaranteed, background suppression operating mode must be used. The background must be located within the stipulated maximum detection range.

Accessories

Montageplatte LT	Mounting plate for sensors in the LT and FLT series
V1-W-5M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-G-5M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-G	4-pin, M12 female field-attachable connector
V1-W	4-pin, M12 female field-attachable connector

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PEPPERL+FUCHS SENSING YOUR NEEDS

Precision sensor for extremely long detection ranges up to 6 m

- **Mode selectable: background suppression or evaluation**
- **Mechanical adjustable detection range**
- **Adjustable timer functions**
- **Version for universal voltages**
- **Relay output**

CE

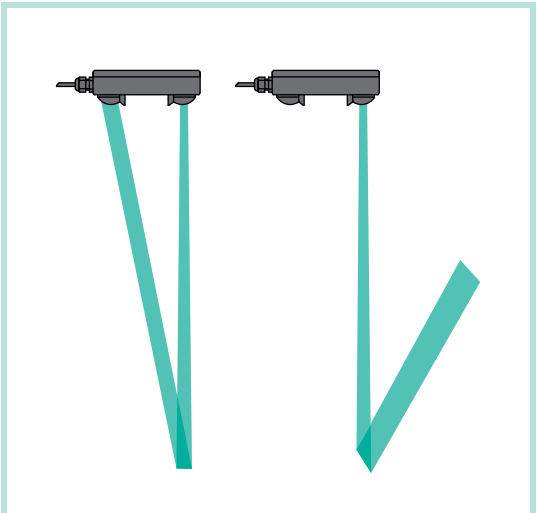
Product information

Diffuse mode sensors LT(K)2 are used when people, objects, or vehicles are to be detected in a precisely defined area. The devices are extremely sturdy and resistant to mechanical strain. In background evaluation operating mode, the sensors can be used with any background. In background suppression operating mode, the background serves as a reference area. This enables highly reflective objects to be reliably detected as well. In addition, this operating mode offers an option for testing.

Typical applications

- Opening impulse sensor and protection mechanism for closing edges on automatic doors and industrial doors
- Opening impulse sensor for automatic doors
- Vehicle detection in traffic technology (e.g., individual parking space monitoring)
- Height measurement at entrances
- Anti-collision protection on automated guided systems

Detection area



Date of issue 2012-11-12

Technical data

Model Number		LTK2-8-HS-6000/31/105	LTK2-8-HS-6000/31/115	LTK2-8-HS-2000/31/105	LTK2-8-HS-2000/31/115
Detection range min.	0 ... 500 mm by background evaluation, 350 ... 500 mm by background suppression	●	●	●	●
Detection range max.	0 ... 2000 mm by background evaluation, 350 ... 2500 mm by background suppression			●	●
	0 ... 6000 mm by background evaluation, 200 ... 6000 mm by background suppression	●	●		
Light source	IRED	●	●	●	●
Light type	modulated infrared light	●	●	●	●
Operating mode	switching between background suppression/evaluation	●	●	●	●
Diameter of the light spot	150 mm at 6000 mm sensor range	●	●		
	50 mm at 2000 mm sensor range			●	●
$MTTF_d$	730 a	●	●	●	●
Mission Time (T_M)	20 a	●	●	●	●
Diagnostic Coverage (DC)	60 %	●	●	●	●
Function display	LED green: power on LED yellow: object detection	●	●	●	●
Controls	Detection range setting, programming switch for time functions, time setting	●	●	●	●
Operating voltage	11 ... 48 V DC / 12 ... 24 V AC	●	●	●	●
No-load supply current	100 mA	●	●	●	●
Switching type	light/dark on selectable programmable , Factory setting: light on	●	●	●	●
Signal output	Relay, 1 alternator	●	●	●	●
Switching voltage	240 V AC/DC	●	●	●	●
Switching current	2 A	●	●	●	●
Response time	100 ms	●	●		
	50 ms			●	●
De-energized delay	1200 ms	●	●		
	150 ms			●	●
Directive conformity	EMC Directive 2004/108/EC	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●
Emitted interference	EN 61000-6-3	●	●	●	●
Standards	EN 61000-6-2 without EN 61000-4-5, EN 61000-4-11	●	●	●	●
CE conformity	yes	●	●	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●
Protection degree	IP65	●	●	●	●
Connection	5 m fixed cable		●		●
	5-pin plastic M12 connector without cable	●		●	
Housing	Makrolon GV30	●	●	●	●
Optical face	hardened plastic lens	●	●	●	●
Mass	320 g	●	●	●	●

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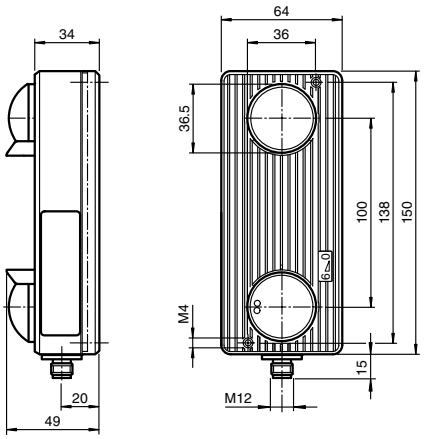
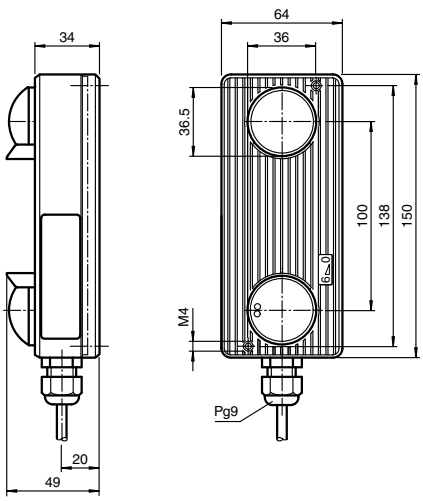
Dimensions

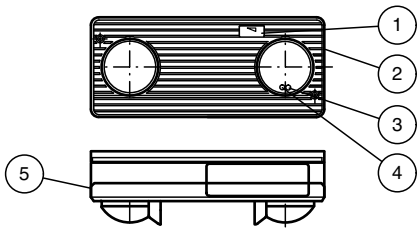
Option /105



Option /115

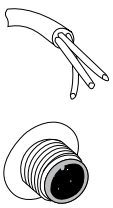


Indicators/operating means

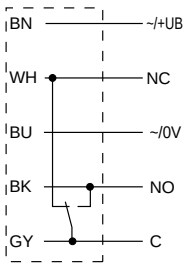


1	Detection range indicator	
2	Detection range adjuster	
3	Operation display	Green
4	Function display	Yellow
5	Programming switch under cover	

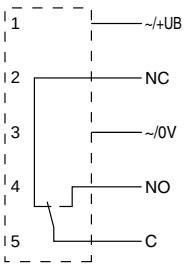
Electrical connection

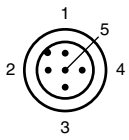


Option 31/115



Option 31/105





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 2012-11-12

Notes

Functional principle

The active infrared scanners of the LT2 and LTK2 series function with the background suppression and background evaluation operating modes. The emitter and receiver are aligned at a certain angle in relation to one another. This angle can be changed and is used to determine the maximum detection range. The LT2 series operates with dc voltage and features transistor outputs; the LTK2 series operates with ac/dc voltage and features a relay output.
The devices are delivered with background suppression as the default mode.

Background Suppression Operating Mode

The sensor switches state when an object moves into or out of the detection range and is detected by the light beam. The background and/or base is ignored during this process. The sensitivity of the sensor can be adjusted so that objects beyond a certain distance are ignored. Sensors that feature this operating mode can be mounted for mobile use.

Background Evaluation Operating Mode

The sensor switches state when an object moves into or out of the detection range and is detected by the light beam. However, where background evaluation is used, some form of background (such as the floor or a wall) must be present as a point of reference.
The sensor continues to switch even if no light is received from the background. Sensors with background evaluation do not have foreground suppression. This means that they can also detect objects directly in front of the lens (detection range = 0), making them particularly suited for detecting objects that are difficult to detect, especially highly reflective objects.

Additional information

Alignment/Setting Instructions

Always use the object with the lowest reflection value (darkest color) for alignment purposes.

1. Align the sensor to the target objects
   Turn the detection range controller all the way to the right end stop (-)
   (**CAUTION!** The controller is not protected from overturning—handle with care)
   Turn the detection range controller to the left (+) until the yellow LED starts to light up
2. Remove the target objects; the LED goes out (note background influences).
   If the background (floor, wall) is permanently or occasionally reflective and shiny, due to moisture for example, the device must be installed in such a manner that it is rotated through > 5° along its longitudinal axis to prevent a mirror effect.

Selecting the appropriate operating mode

The devices are supplied in background suppression operating mode.
The background evaluation mode should be used if:

- Objects close to the optics are detected (detection range = 0 mm)
- Reflective, shiny objects must be detected (e.g. vehicles)
- A device function test is performed by means of test input

CAUTION! When in background evaluation operating mode, the sensor must always be aligned with a background that remains as constant as possible. Where this is not guaranteed, background suppression operating mode must be used. The background must be located within the stipulated maximum detection range.

Accessories

Montageplatte LT	Mounting plate for sensors in the LT and FLT series
V1-W-5M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-G-5M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-G	4-pin, M12 female field-attachable connector
V1-W	4-pin, M12 female field-attachable connector

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PEPPERL+FUCHS SENSING YOUR NEEDS

Multi-beam sensor with self-programming function for monitoring automatic doors

- Fan-shaped detection field with up to 12 beams
- Adjustable detection fields for different door widths
- Automatic drift compensation
- Closing safety monitoring over the complete door width
- Version with test input
- Version with E1 approval
- Version with increased sensitivity in midfield
- Version with a single automatic teach

CE e 1

Product information

The compact ProScan energetic light scanner operates using an integrated source of infrared light and creates a fan-shaped detection field consisting of a maximum of 12 independent light beams. Since the beam intensifies toward the center of the fan, the area around the closing edges in particular is monitored virtually seamlessly. The sensors are self-programming and automatically adapt to any environment, learn the environment, and even automatically adapt to subsequent changes. Other notable features include the high level of sensitivity, ambient light immunity and compensation of long-term drift. This function guarantees reliable long-term use, even in dirty, rainy or snowy conditions.

Typical applications

- Closing edge protection on automatic sliding doors, for example sliding doors in shopping centers, public buildings and office buildings
- Version T with e1 approval: Closing edge protection on automatic doors on public transport vehicles, such as buses and trains
- Threshold monitoring on revolving doors

Detection area

Date of issue: 2012-11-12

Technical data

Model Number		PROSCAN/32	PROSCAN/38a	PROSCAN-2597/38a/76a	PROSCAN-T/32/76a
Detection field	total field: 2300 mm x 80 mm left/right field: 1150 mm x 80 mm center field: 1000 mm x 80 mm II (installation height: 2 m)	●	●	●	●
Light source	12 x IRED	●	●	●	●
Light type	modulated infrared light	●	●	●	●
Teach-in time	approx. 4 s	●	●	●	●
Open time	3 min/10 s, programmable	●	●		
	3 s /10 s, programmable				●
$MTTF_d$	630 a				●
	780 a	●	●	●	
Mission Time (T_M)	20 a	●	●	●	●
Diagnostic Coverage (DC)	60 %	●	●	●	●
Function display	LED red: on for object detection, flashes during teaching phase	●	●	●	●
Controls	Programmble switch for switching type, open time, detection field	●	●		●
	Programmble switch for switching type and detection field			●	
Operating voltage	12 ... 38 V DC	●		●	●
	12 ... 38 V DC / 12 ... 28 V AC		●		
Ripple	10 %	●	●	●	●
No-load supply current	100 mA	●	●	●	●
Power consumption	3 VA		●	●	
Test input	emitter deactivation with +Ub	●		●	●
Switching type	Output active / inactive programmable	●	●	●	●
Signal output	relay, 1 NO			●	
	Relay, 1 alternator		●		
	1 PNP, short-circuit protected, reverse polarity protected, open collector	●			●
Switching voltage	38 V DC	●			●
	48 V DC		●	●	
Switching current	1 A at 24 V DC		●	●	
	200 mA	●			●
Response time	< 50 ms	●	●	●	●
De-energized delay	200 ms	●	●	●	●
EMC Directive 2004/104/EC	E1 RL72/245/EWG (RL95/54/EG)				●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●
Standards	EN 50155 ; EN 50121-3-2				●
	EN 61000-6-2 without EN 61000-4-5, EN 61000-4-11 EN 61000-6-3	●	●	●	
e1 Type approval	2006/28/EG				●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●
Storage temperature	-20 ... 70 °C (-4 ... 158 °F)	●	●	●	●
Mounting height	1000 ... 2500 mm	●	●	●	●
Protection degree	IP52	●	●	●	●
Connection	Fixed cable 3 m, halogen-free, with ferrite core				●
	5 m fixed cable	●	●	●	
Housing	ABS	●	●	●	●
Optical face	PMMA	●	●	●	●
Mass	approx. 100 g	●	●	●	●

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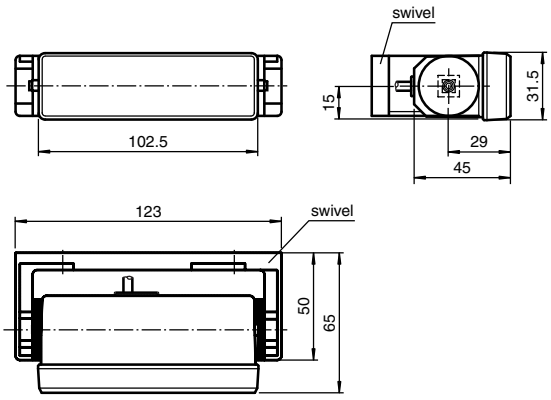
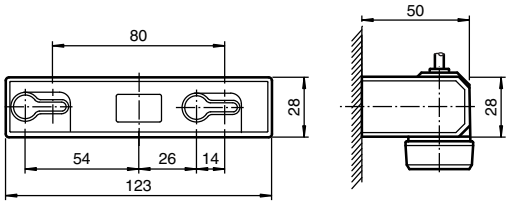
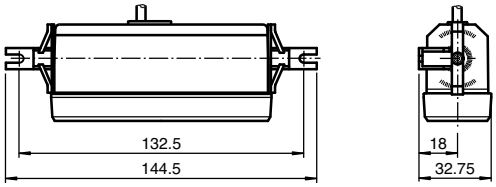
Dimensions



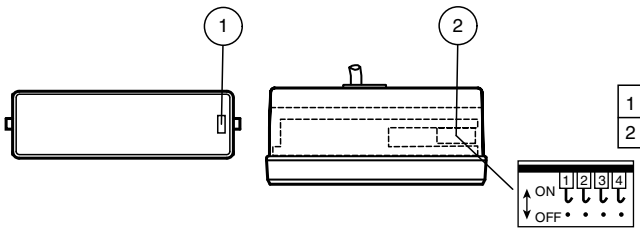
Mounting dimensions for swivel



Mounting dimensions with mounting bracket set AIR30



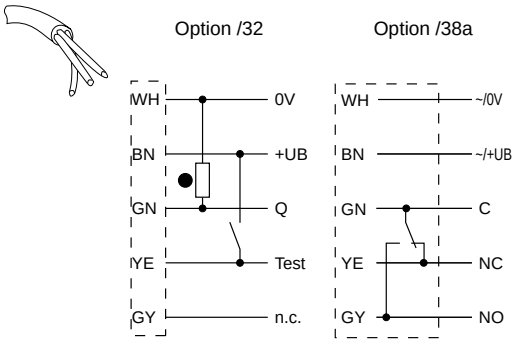
Indicators/operating means



1	Functional display	red
2	Programming switch	

Electrical connection

❍ = Light on, ● = Dark on



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Notes

Functional principle

The ProScan is a 12-beam energetic light scanner based on the principles of active infrared. The beams, which are switched independently, enable the sensor to fan out across an extremely wide and narrow detection field in the area of the door.
The clearly defined, fan-shaped detection field on the ProScan can be set manually in four areas: half fan to the right, half fan to the left, central fan and full detection field.
Immediately after being switched on for the first time, the ProScan programs the reflected pattern of the detected background as the reference signal. During this process, the ProScan automatically adapts to the relevant installation and assembly environment. Since each of the individual light beams on the ProScan independently programs its specific reception level, there is no need to manually configure complex sensitivity settings.
Once the programming phase is complete, the light reflected from each of the 12 light beams is evaluated. Each time there is a difference between the reflected value of an individual light beam and the reference signal, a switching process is initiated.

"Open Time" Function

The ProScan is a self-programming device, and automatically adjusts to changes in its environment. If the ProScan detects a stationary object that does not correspond to the programmed reference signal (for example, a suitcase), ProScan interprets this as a permanent change in the environment and initiates a new self teach-in process after a preset time (referred to as "Open Time") has elapsed. Open Time can be adjusted to meet customer application requirements.

"Suitcase" Function

After a background has been changed, the ProScan "Suitcase" function allows the reference to be adjusted back to the original background. Once a self-taught object, such as a suitcase, is removed from the detection field again, ProScan returns to the original reference. A new learning process is not required.

Compensating for long-term drifts

The ProScan is able to compensate for long-term drifts. Using this function, changes to the ground reflectance (for example, caused by rain or snow), as well as temperature fluctuations and dirt on the optical surface or ground are automatically compensated for.

Test input (optional)

Using the integrated test input, the overall function of the ProScan can be reliably checked by testing all 12 light beams simultaneously.

Accessories

UP-Einbaurahmen	Mounting frame for sensors in the AIR30 and PROSCAN series

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Combination sensor for opening and protection

- **Sensor for opening and protecting automatic doors**
- **Can be adjusted to the environment through a variety of adjustment options**
- **20 programmable monitoring fields**
- **Test body detection according to prEN12650**
- **Test input**

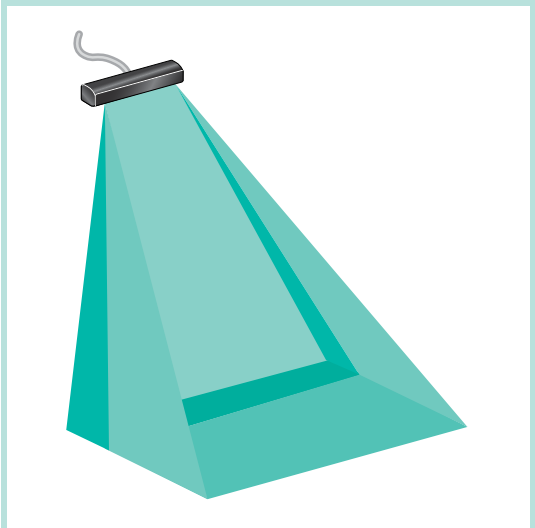
Product information

The diffuse area scanner (FLT-D) is suitable for closing edge monitoring and for use as an opening impulse sensor. In order to adapt the sensor to differing door widths and vestibule scenarios, the FLT-D offers various sensing footprints that can be programmed in a flexible manner.
As an added safety feature, the protection mechanism for closing edges is designed to allow testing. The standard child recognition requirement in accordance with international standards (EN 12650) is ensured via the FLT-D.

Typical applications

- Generates the opening impulse on automatic sliding and revolving doors
- Protection mechanism for closing edges on automatic doors and elevators
- Anti-collision protection on revolving doors

Detection area



Date of issue: 2012-11-12

Technical data

Model Number		FLT-D/38a sw
Detection field	programmable , total field: 2200 mm x 1500 mm (WxD) for a mounting height of 2200 mm	●
Light source	10 IRED 950 nm	●
Light type	modulated infrared light	●
Setting angle	-6 ... 9 ° for a mounting height of 2200 mm	●
Open time	programmable	●
Function display	LED red: on for object detection, flashes during teaching phase	●
Controls	Programmble switch for switching type, open time, detection field	●
Parameterization display	5 LED, red	●
Operating voltage	12 ... 31 V DC / 12 ... 30 V AC	●
No-load supply current	≤ 100 mA	●
Power consumption	3.5 VA	●
Test input	active with $+U_B$	●
Switching type	light/dark on selectable programmable	●
Signal output	Relay, 1 alternator	●
Switching voltage	AC : 30 V ; DC : 32 V	●
Switching current	300 mA	●
Switching power	55 VA	●
Response time	≤ 110 ms	●
EMC Directive 2004/108/EC	EN 61000-6-1 EN 61000-6-2 without EN 61000-4-5, EN 61000-4-11 , EN 61000-6-3 , EN 61000-6-4	●
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007 ANSI 156,10 (as activation sensor)	●
UL approval	UL	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●
Storage temperature	-30 ... 75 °C (-22 ... 167 °F)	●
Mounting height	max. 2200 mm	●
Protection degree	IP54 (iwhen mounted)	●
Connection	terminal strip 8-pin 1 ... 1.5 mm^2	●
Housing	PC	●
Optical face	PC	●
Covering	ASA , black	●
Mass	195 g	●

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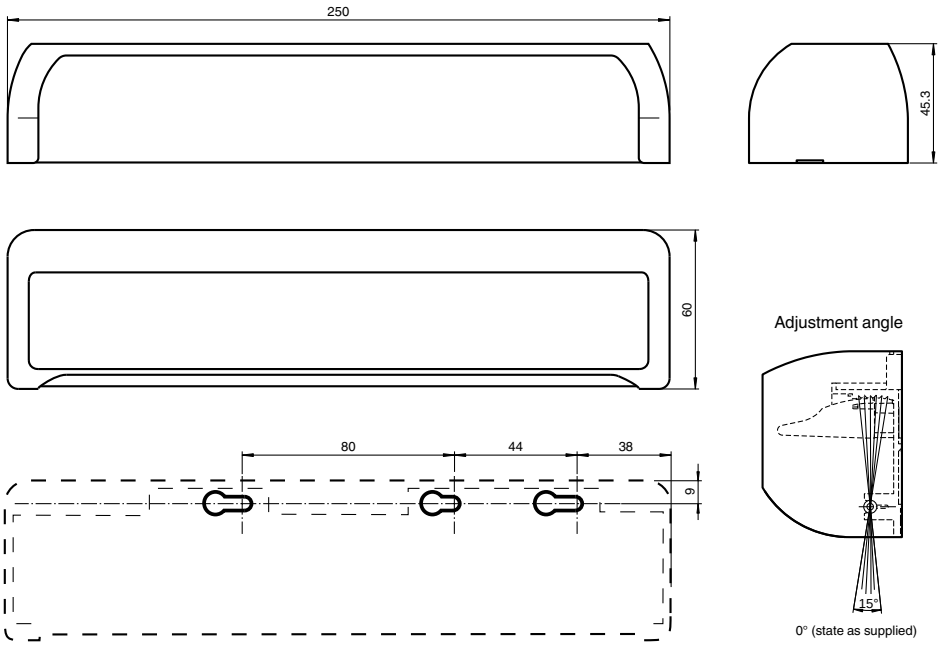
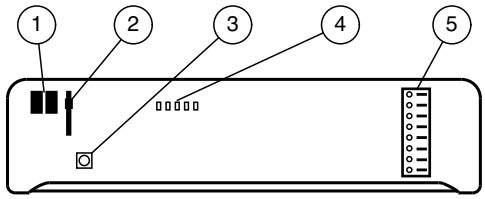
Dimensions

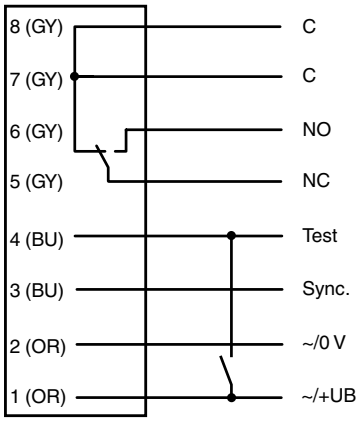


Indicators/operating means



1	Contact point for programming
2	Adjustment lever for angle of inclination
3	Functional display for detection
4	LEDs for display of programming status
5	Connection terminal

Electrical connection



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Notes

Functional principle

The FLT-D detects people or objects in a field defined via an emitter/receiver. The resulting signal is sent to the door controller via an integrated control interface. Immediately after activation, the static characteristics of the environment within the detection field are first programmed as a reference. This enables error-free monitoring, even in changing ambient conditions resulting from rain, snow or other lens contaminants. In situations where the environment is constantly changing, reprogramming occurs automatically after a defined period. Interference, such as from an object placed in the entrance to a door, is eliminated.

The FLT-D is delivered with factory default settings. The field sizes, programming time, sensitivity and switching mode can be changed or reprogrammed as required.

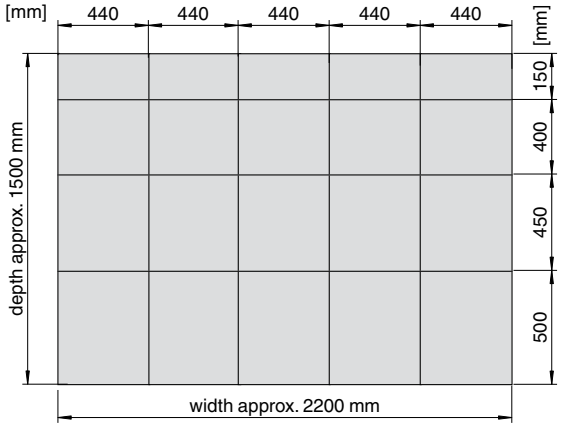
The entire functionality of the FLT-D can be tested via its test input.

As no two installation scenarios and environments are the same, there are nine different programmable sensing footprints; for example, suppressing cross-traffic along sidewalks, monitoring a narrow corridor, or only the detection line is activated for protection. This feature ensures the FLT-D can be optimally adapted to different entry ways and applications.

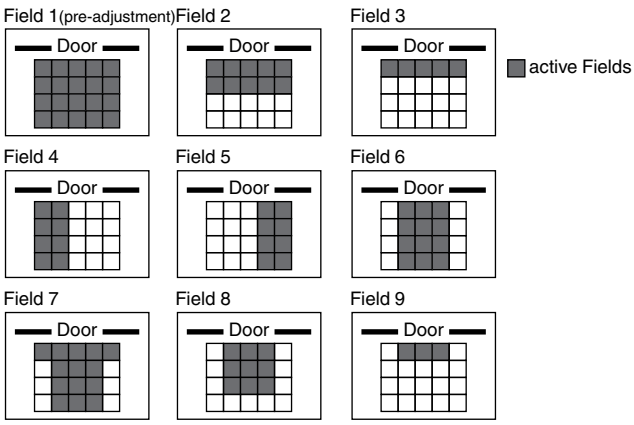
The master/slave function is designed for monitoring particularly wide doors and entry ways, and allows up to three devices to be operated in parallel without interfering with each other.

Detection field

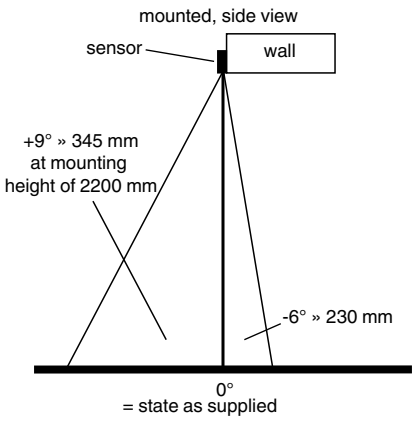
(for a mounting height of 2200 mm)



Possible field layouts



Setting angle



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Area scanner with large detection range for detecting people and objects

- Version with Background suppression
- Ignores objects outside of selected area
- Light on version
- Dark on version
- Version with detection area 50 mm x 500 mm
- Version with detection area 300 mm x 500 mm
- Version with detection area 500 mm x 500 mm

CE

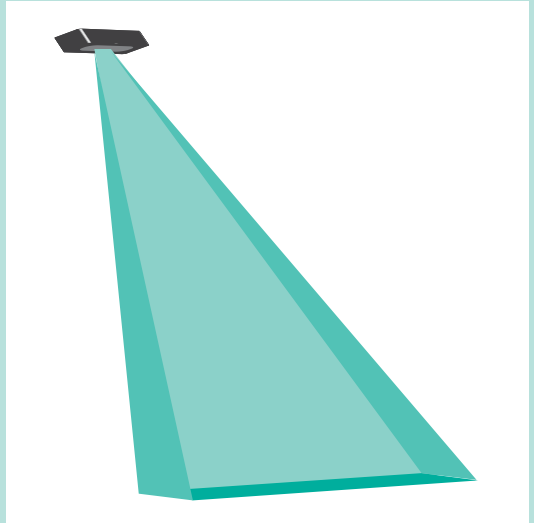
Product information

The FLT-8 series active infra-red area scanners detect people and objects located within a defined sensing field, regardless of background and whether or not they are moving. The sensors generate a clearly defined spatial sensing field, which can be mechanically adjusted. This sensing field is comprised of three or four individual light beams.

Typical applications

- Protection mechanism for closing edges on automatic doors and gates
- Monitoring hazardous areas, such as crushing or shearing edges
- Anti-collision protection on automated guided vehicles
- Presence checks for people

Detection area



Date of issue: 2012-11-12

Technical data

Model Number		FLT-8-H-2800-50/120a	FLT-8-H-2800-50/25/31	FLT-8-H-2800-300/120a	FLT-8-H-2800-300/25/31	FLT-8-H-2800-500/120a	FLT-8-H-2800-500/59/31	FLT-8-H-2800-500/59/101
Detection field	300 mm x 500 mm at 2000 mm sensor range			●	●			
	50 mm x 500 mm at 2000 mm sensor range	●	●					
	500 mm x 500 mm at 2000 mm sensor range					●	●	●
Detection range min.	100 ... 1200 mm	●	●	●	●	●	●	●
Detection range max.	100 ... 2800 mm	●	●	●	●	●	●	●
Light source	3 x IRED	●	●					
	4 x IRED			●	●	●	●	●
Light type	modulated infrared light	●	●	●	●	●	●	●
Light spot representation	43 mm x 43 mm at 2000 mm	●	●	●	●	●	●	●
Marking	CE	●	●	●	●	●	●	●
Operating mode	Background suppression	●	●	●	●	●	●	●
$MTTF_d$	470 a	●	●	●	●	●	●	●
Mission Time (T_M)	20 a	●	●	●	●	●	●	●
Diagnostic Coverage (DC)	0 %	●	●	●	●	●	●	●
Function display	LED red	●	●	●	●	●	●	●
Controls	Detection range adjuster	●	●	●	●	●	●	●
Operating voltage	15 ... 48 V AC/DC		●		●		●	
	15 ... 48 V DC	●		●		●		●
No-load supply current	100 mA	●	●	●	●	●	●	●
Power consumption	2.5 W	●	●	●	●	●	●	●
Switching type	dark on						●	●
	light/dark on	●		●		●		
	light on		●		●			
Signal output	Relay, 1 alternator		●		●		●	
	1 PNP and 1 NPN short-circuit protected, open collector, synchronized-switching							●
	2 PNP, complementary, short-circuit protected, open collectors	●		●		●		
Switching voltage	≤ 250 V AC/DC		●		●		●	
	48 V DC	●		●		●		●
Switching current	≤ 2 A		●		●		●	
	200 mA	●		●		●		●
Switching power	500 VA		●		●		●	
Response time	100 ms	●	●	●	●	●	●	●
De-energized delay	200 ms	●		●		●		●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●	●	●
Emitted interference	EN 61000-6-3	●	●	●	●	●	●	●
Standards	EN 61000-6-2 without EN 61000-4-5, EN 61000-4-11	●	●	●	●	●	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●	●	●	●
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)	●	●	●	●	●	●	●
Mounting height	max. 2800 mm	●	●	●	●	●	●	●
Protection degree	IP65	●	●	●	●	●	●	●
Connection	Connector, with 2 m cable connector	●	●	●	●	●	●	●
Housing	Makrolon GV30 black	●	●	●	●	●	●	●
Optical face	Glass, red	●	●	●	●	●	●	●
Mass	320 g	●	●	●	●	●	●	●

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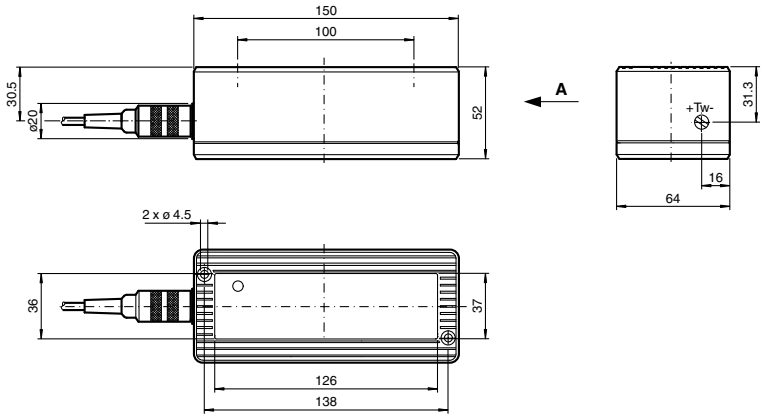
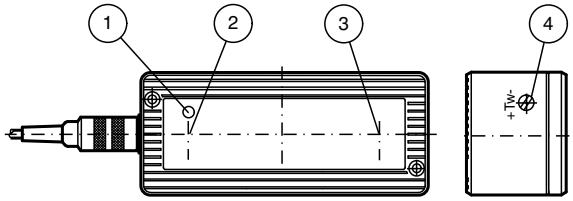
Dimensions



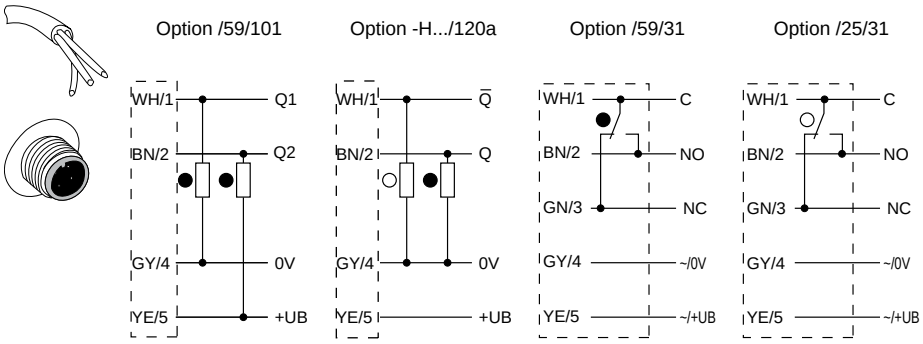
Indicators/operating means



1	Functional display	red
2	Emitter	
3	Receiver	
4	Detection range adjuster	

Electrical connection

❍ = Light on, ● = Dark on



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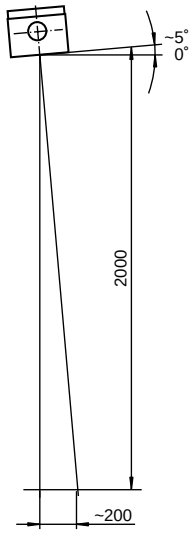
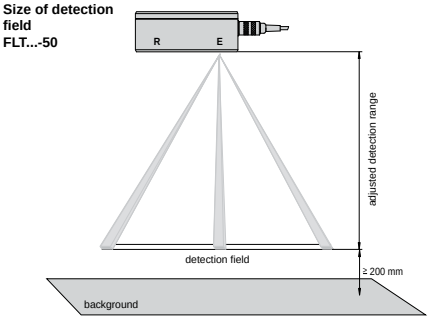
Notes

Functional specifications

The FLT-8-H serves to detect persons and objects as they enter the detection range of the device. The device responds at the moment the object to be detected is hit by at least one of the light beams. The sensor functions as a sensing device with background suppression.
In case the background (floor, wall) produces permanent or temporary sparkling reflections, e. g. due to wetness, the sensor needs to be turned by at least 5° around its longitudinal axis during installation to prevent mirror effects (fig).
Several sensors can be arranged in such a way that their scanned areas can border on each other directly or overlap without any switching error occurring.
The light scanner function is displayed by a red LED which can be observed through the front disc.



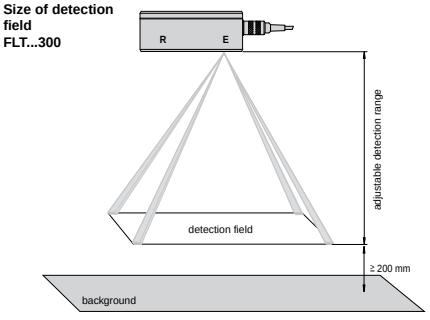
FLT-8-H-2800-50/120a



Detection field size versus adjusted detection range:

detect. field	detection field size	spot size
1500 mm	380 mm x 38 mm	30 mm x 30 mm
1800 mm	450 mm x 50 mm	35 mm x 35 mm
2000 mm	500 mm x 50 mm	43 mm x 43 mm
2500 mm	610 mm x 61 mm	57 mm x 57 mm
2800 mm	685 mm x 68 mm	64 mm x 64 mm

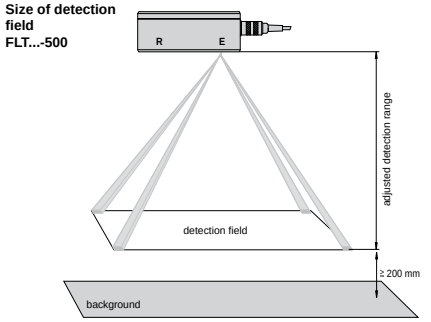
FLT-8-H-2800-300/120a



Detection field size versus adjusted detction range:

detect. range	detection field size	spot size
1500 mm	380 mm x 220 mm	30 mm x 30 mm
1800 mm	450 mm x 270 mm	35 mm x 35 mm
2000 mm	500 mm x 300 mm	43 mm x 43 mm
2500 mm	610 mm x 370 mm	57 mm x 57 mm
2800 mm	685 mm x 415 mm	64 mm x 64 mm

FLT-8-H-2800-500/120a



Detection field size versus adjusted detection range:

detect. field	detection field size	spot size
1500 mm	380 mm x 380 mm	30 mm x 30 mm
1800 mm	450 mm x 450 mm	35 mm x 35 mm
2000 mm	500 mm x 500 mm	43 mm x 43 mm
2500 mm	610 mm x 610 mm	57 mm x 57 mm
2800 mm	685 mm x 685 mm	64 mm x 64 mm

Accessories

Montageplatte FLT	Mounting plate for FLT-8 series sensors
FLT-50-AR	alignment aid for FLT...-50
FLT-500-AR	alignment aid for FLT...-500
FLT-300-AR	alignment aid for FLT...-300

Date of issue: 2012-11-12

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PEPPERL+FUCHS SENSING YOUR NEEDS

Area scanner with large detection range for detecting people and objects

- **Version with Background evaluation**
- **Reliable detection, including of difficult objects, through background evaluation**
- **Possible detection range down to 0 m**
- **Light on version**
- **Dark on version**
- **Version with detection area 50 mm x 500 mm**
- **Version with detection area 300 mm x 500 mm**
- **Version with detection area 500 mm x 500 mm**

CE

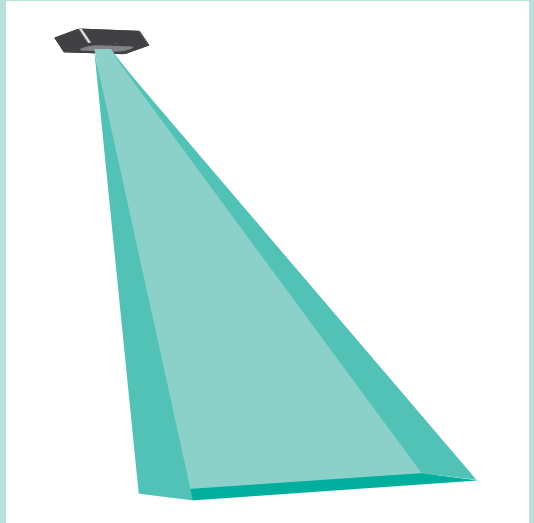
Product information

The FLT-8 series active infra-red area scanners detect people and objects located within a defined sensing field, regardless of background and whether or not they are moving. The sensors generate a clearly defined spatial sensing field, which can be mechanically adjusted. This sensing field is comprised of three or four individual light beams.

Typical applications

- Protection mechanism for closing edges on automatic doors and gates
- Monitoring hazardous areas, such as crushing or shearing edges
- Anti-collision protection on automated guided vehicles
- Presence checks for people

Detection area



Date of issue: 2012-11-12

Technical data

Model Number		FLT-8-HW-2800-50/25/31	FLT-8-HW-2800-50/31/59	FLT-8-HW-2800-300/25/31	FLT-8-HW-2800-500/25/31	FLT-8-HW-2800-500/59/101
Detection field	300 mm x 500 mm at 2000 mm sensor range			●		
	50 mm x 500 mm at 2000 mm sensor range	●	●			
	500 mm x 500 mm at 2000 mm sensor range				●	●
Detection range min.	0 ... 1200 mm	●	●	●	●	●
Detection range max.	0 ... 2800 mm	●	●	●	●	●
Light source	3 x IRED	●	●			
	4 IRED			●	●	●
Light type	modulated infrared light	●	●	●	●	●
Light spot representation	43 mm x 43 mm at 2000 mm	●	●	●	●	●
Marking	CE	●	●	●	●	●
Operating mode	Background evaluation	●	●	●	●	●
$MTTF_d$	470 a	●	●	●	●	●
Mission Time (T_M)	20 a	●	●	●	●	●
Diagnostic Coverage (DC)	0 %	●	●	●	●	●
Function display	LED red	●	●	●	●	●
Controls	Detection range adjuster	●	●	●	●	●
Operating voltage	15 ... 48 V AC/DC	●	●	●	●	
	15 ... 48 V DC					●
No-load supply current	100 mA	●	●	●	●	●
Power consumption	2.5 W	●	●	●	●	●
Switching type	dark on		●			●
	light on	●		●	●	
Signal output	Relay, 1 alternator	●	●	●	●	
	1 PNP and 1 NPN short-circuit protected, open collector, synchronized-switching					●
Switching voltage	≤ 250 V AC/DC	●	●	●	●	
	48 V DC					●
Switching current	≤ 2 A	●	●	●	●	
	200 mA					●
Switching power	500 VA	●	●	●	●	
Response time	100 ms	●	●	●	●	●
De-energized delay	200 ms					●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●
Emitted interference	EN 61000-6-3	●	●	●	●	●
Standards	EN 61000-6-2 without EN 61000-4-5, EN 61000-4-11	●	●	●	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●	●
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)	●	●	●	●	●
Mounting height	max. 2800 mm	●	●	●	●	●
Protection degree	IP65	●	●	●	●	●
Connection	Connector, with 2 m cable connector	●	●	●	●	●
Housing	Makrolon GV30 black	●	●	●	●	●
Optical face	Glass, red	●	●	●	●	●
Mass	320 g	●	●	●	●	●

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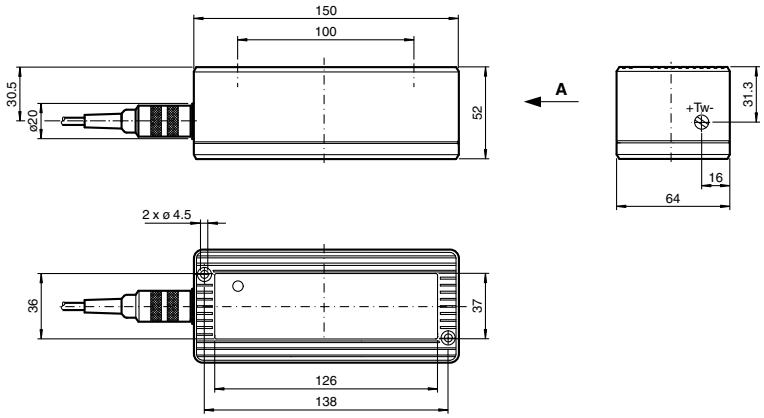
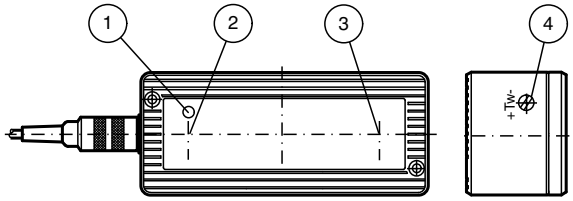
Dimensions



Indicators/operating means

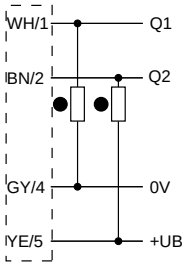


1	Functional display	red
2	Emitter	
3	Receiver	
4	Detection range adjuster	

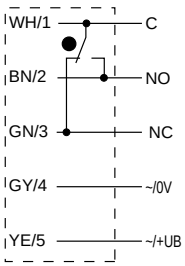
Electrical connection

❍ = Light on, ● = Dark on

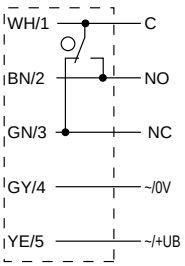
Option /59/101



Option /59/31



Option /25/31



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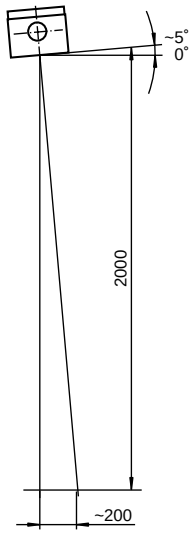
Notes

Operating principle

The FLT-8-HW serves to detect people and objects that appear in the detection range of the device. It reacts if at least one of the light beams connects with the object to be detected. The device functions as a sensor with background evaluation. In addition to the normal scenario—activation as soon as an object moves into the foreground—the sensor requires a signal from the background, which acts as a type of reflector. Compared to normal background suppression, this process offers significant advantages:

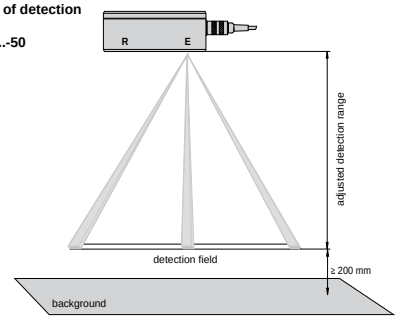
- Reliable: Even reflective objects are detected, as the sensor does not receive a signal from the background.
- Tamperproof: Partial or complete covering of the optical area is detected
  --> output is permanently set
- Fail-safe: Emitter failure message is sent if one of the emitters fails
  --> output is permanently set

When setting the detection range, ensure that the device is always aligned with a background. The detection range limit should be at least 200 mm from the background.
If the background (floor, wall) is permanently or occasionally reflective and shiny, due to moisture for example, the sensor must be mounted in such a manner that it is rotated through at least 5° along its longitudinal axis to prevent a mirror effect (figure).
Multiple sensors can be arranged in such a way that their detection fields adjoin one another or overlap, without resulting in faulty circuits.
The function of the sensor is indicated by a red LED, which is visible through the front panel.



FLT-8-HW-2800-50/25/31

Size of detection field FLT...-50

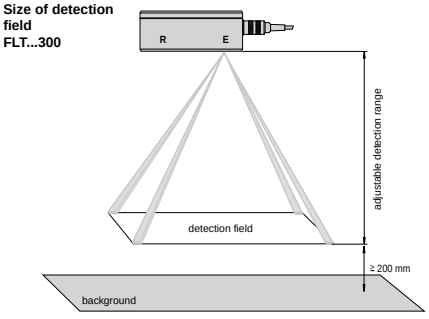


Detection field size versus adjusted detection range:

detect. field	detection field size	spot size
1500 mm	380 mm x 38 mm	30 mm x 30 mm
1800 mm	450 mm x 50 mm	35 mm x 35 mm
2000 mm	500 mm x 50 mm	43 mm x 43 mm
2500 mm	610 mm x 61 mm	57 mm x 57 mm
2800 mm	685 mm x 68 mm	64 mm x 64 mm

FLT-8-HW-2800-300/25/31

Size of detection field FLT...300

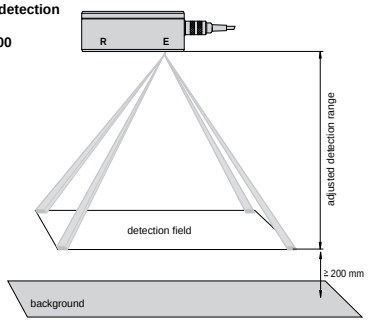


Detection field size versus adjusted detction range:

detect. range	detection field size	spot size
1500 mm	380 mm x 220 mm	30 mm x 30 mm
1800 mm	450 mm x 270 mm	35 mm x 35 mm
2000 mm	500 mm x 300 mm	43 mm x 43 mm
2500 mm	610 mm x 370 mm	57 mm x 57 mm
2800 mm	685 mm x 415 mm	64 mm x 64 mm

FLT-8-HW-2800-500/25/31

Size of detection field FLT...-500



Detection field size versus adjusted detection range:

detect. field	detection field size	spot size
1500 mm	380 mm x 380 mm	30 mm x 30 mm
1800 mm	450 mm x 450 mm	35 mm x 35 mm
2000 mm	500 mm x 500 mm	43 mm x 43 mm
2500 mm	610 mm x 610 mm	57 mm x 57 mm
2800 mm	685 mm x 685 mm	64 mm x 64 mm

Accessories

Montageplatte FLT	Mounting plate for FLT-8 series sensors
FLT-50-AR	alignment aid for FLT...-50
FLT-500-AR	alignment aid for FLT...-500
FLT-300-AR	alignment aid for FLT...-300

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SENSING YOUR NEEDS

Area scanner with counting function and direction monitoring

- **Counting function with direction monitoring**
- **Each motion direction has an output**
- **Counts approx. 3 persons per seconds**
- **Version with Background evaluation**

CE

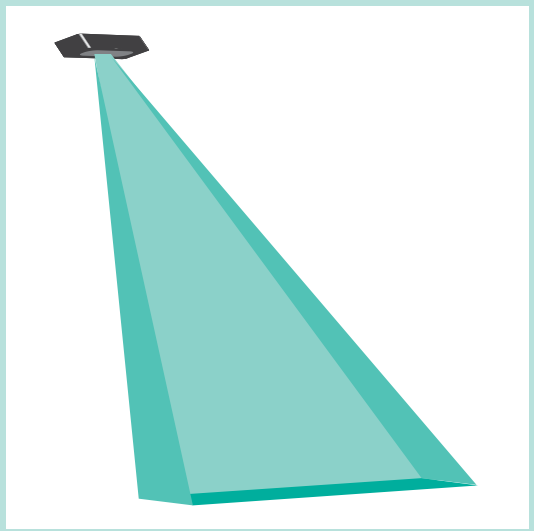
Product information

The FLT-8-CLS series active infra-red area scanners detect people and objects within their sensing field, as well as their direction of movement. The sensors emit signals, such as those required to control revolving doors, depending on the direction in which the person traveling through the door is moving. Thanks to their clearly defined sensing field, the sensors can easily count in narrow passageways where people can only pass through one at a time. In contrast to microwave sensors, the person is detected whether they are stationary or moving; however, the signal is evaluated dynamically. The benefit of this system is that it ensures people who move very slowly or remain still during the detection process can be reliably counted.

Typical applications

- Counts people in small passageway areas with a counting accuracy of up to 95%

Detection area



Date of issue: 2012-11-12

Technical data

Model Number		FLT-8-HW-2800-CLS
Detection field	500 mm x 500 mm at 2000 mm sensor range	●
Detection range min.	0 ... 1200 mm	●
Detection range max.	0 ... 2800 mm	●
Light source	4 IRED	●
Light type	modulated infrared light	●
Marking	CE	●
Operating mode	Background evaluation	●
$MTTF_d$	470 a	●
Mission Time (T_M)	20 a	●
Diagnostic Coverage (DC)	0 %	●
Function display	2 LEDs red, light up in case of detection	●
Controls	Detection range adjuster	●
Operating voltage	15 ... 48 V DC	●
Ripple	10 %	●
No-load supply current	60 mA	●
Switching type	light on	●
Signal output	2 pulse outputs PNP, short-circuit protected, open collectors	●
Switching voltage	≤ 48 V DC	●
Switching current	≤ 200 mA	●
Switching frequency	3 Hz	●
Response time	40 ms at at a remission level of 6 % 10 ms at a remission level of 18 %	●
De-energized delay	150 ms	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●
Emitted interference	EN 61000-6-3	●
Standards	EN 61000-6-2 without EN 61000-4-5, EN 61000-4-11	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)	●
Mounting height	max. 2800 mm	●
Protection degree	IP65	●
Connection	Connector, with 2 m cable connector	●
Housing	Makrolon GV30 black	●
Optical face	Glass, red	●
Mass	350 g	●

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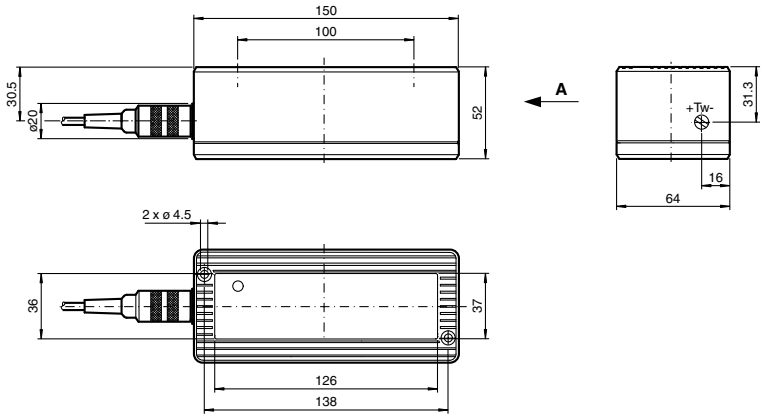
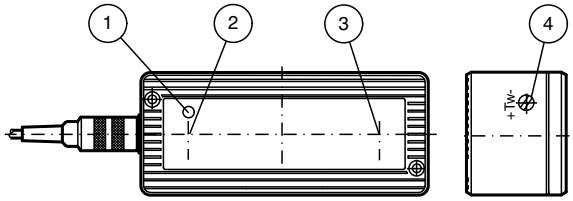
Dimensions



Indicators/operating means

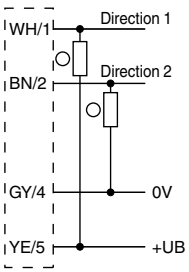


1	Functional display	red
2	Emitter	
3	Receiver	
4	Detection range adjuster	

Electrical connection

❍ = Light on, ● = Dark on

Option CLS



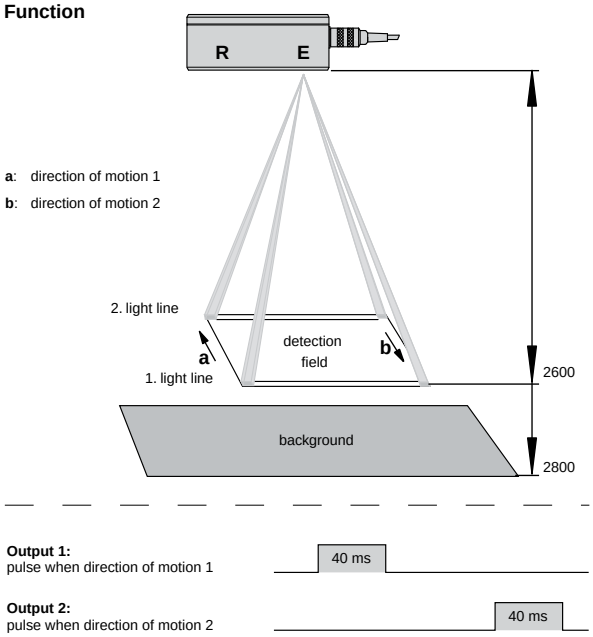
Date of issue: 2012-11-12

Notes

Functional specifications

The FLT-8-HW-2800-CLS counting sensor is able to detect persons and objects and their direction of motion within its scanning area. On the scanned level which can be set by the operator and should be optimal at 20 cm above ground, it generates a clearly defined three-dimensional scanning area. For this, the light is focused from four transmitter diodes into the scanned level. Two light bundles each are united to form one light line. At the moment a person enters the scanning area, one or two of a total of four light bundles are first reflected by the person. Before leaving the scanning area, the person reflects again at least on light bundle. The motion signal is determined from the order in which the person cuts the light lines. So in contrast to radar motion detectors, the persons are captured statically; the signal evaluation, however, is effected dynamically. Only in case both light lines are cut, one counting operation is completed and a 40 ms pulse is issued. This method offers the advantage that even persons who move very slowly or stop during the detection are counted safely. Depending on the direction of motion, the counts are issued at two PNP outputs.
The scanner function is displayed by two red LED which can be observed through the front disc. Each of the LED is assigned to one light line.

Function



Accessories

Montageplatte FLT	Mounting plate for FLT-8 series sensors

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PEPPERL+FUCHS SENSING YOUR NEEDS

Presence detector based on infrared heat emission for detecting people

- **Door activation sensor**
- **One of the smallest sensors for person detection**
- **Reliable detection through change in the thermal image from +/- 0.5 °C**
- **Accurate and seamless field adjustment through aperture and zoom function**
- **Function only in case of movement**

CE

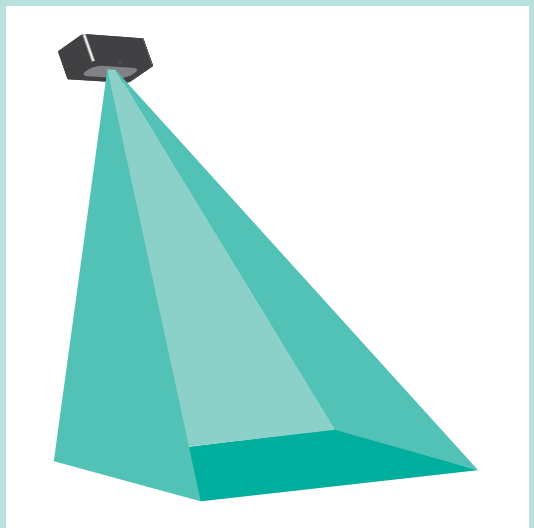
Product information

The PIR20 passive infrared scanner enables problem-free detection of people. It detects movement as soon as the temperature differential between an object and its environment is greater than ± 0.5°C. The detection range can be accurately set by means of zoom adjustment and lens apertures.
The PIR20 detects people approaching as a door.

Typical applications

- Detection of movement by people
- Opening impulse sensor for people at automatic doors
- Elevator entrance area monitoring

Detection area



Date of issue: 2012-11-12

Technical data

Model Number		PIR20/31 sw
Effective detection range	max. 12 m (frontal)	●
Detection field	max. 1800 mm x 2600 mm for a mounting height of 2500 mm	●
Operating display	LED green	●
Function display	LED red: illuminates upon detection	●
Controls	Zoom screw for adjusting the detection field , sensitivity adjustment , changeover switch, active/passive	●
Operating voltage	12 ... 24 V AC / 12 ... 30 V DC	●
No-load supply current	approx. 15 mA	●
Power consumption	approx. 350 mW at 24 V	●
Switching type	Output active/passive, programmable	●
Signal output	Relay, 1 alternator	●
Switching voltage	48 V AC/DC	●
Switching current	1 A	●
Switching power	max. 30 W / 60 VA	●
De-energized delay	0.5 s (preset)	●
Standards	89/336 EWG	●
CE conformity	yes	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●
Mounting height	recommended: max. 3.5 m	●
Protection degree	IP52	●
Connection	screw terminals, removable	●
Housing	black ABS	●
Optical face	plastic lens	●
Mass	approx. 40 g	●

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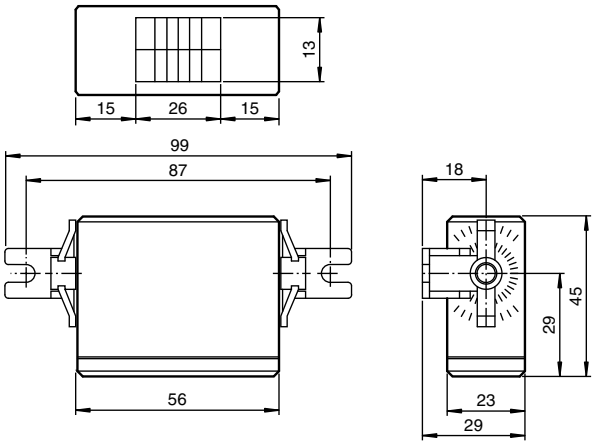
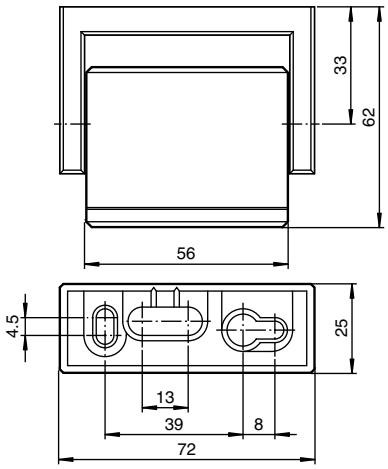
Dimensions

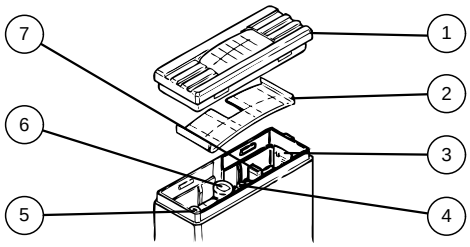
Mounting dimensions with mounting bracket



Mounting dimensions for swivel



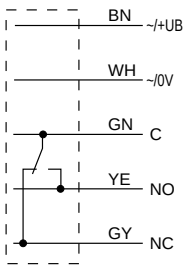
Indicators/operating means



1	Housing cover
2	Lens cover
3	Zooming scale
4	Zooming screw
5	Sensitivity adjuster
6	LED
7	Switch active/passive

Electrical connection

Option /31



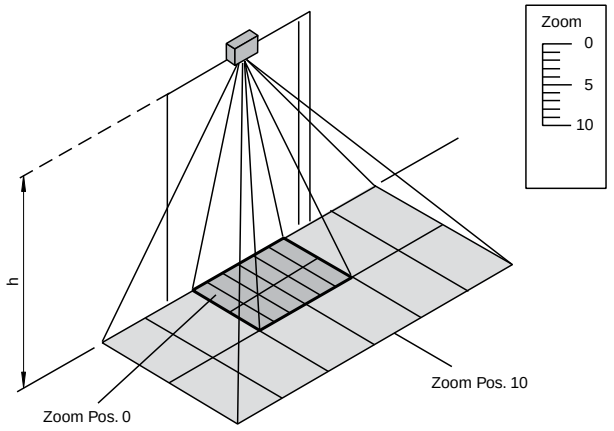
Date of issue: 2012-11-12

Notes

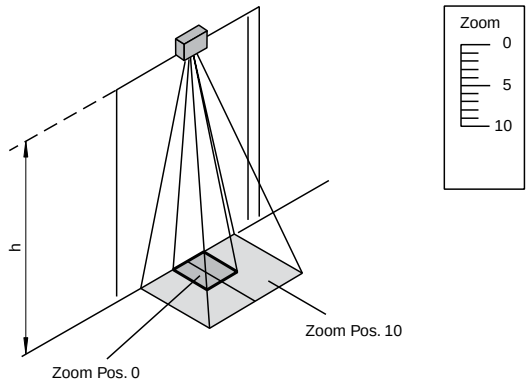
Operating principle

The passive infrared scanner functions differently to most optical sensors — as a passive device. A passive device is not equipped with a transmitter element, but does feature a receiver element. The receiver reacts to heat emission in the form of infrared light transmitted by the human body. This infrared light is detected by a multi-part lens system (fresnel lens), which means that the intended detection range can be fully covered by the receiver. Within 20 seconds of switching on the sensor, the receiver measures and stores the infrared image identified. A switching signal is transmitted when two conditions have been met:
1.The temperature of the object to be detected deviates from the ambient temperature by at least ± 0.5ºC.
2.The object to be detected moves at a speed of at least 100 mm/sec.

Field dimension max.



Field dimension min.



Accessories

Wetterschutzhaube PIR 20	Weather hood for series PIR20
Flush Mounting PIR20	Flush-mounted frame for sensors in the PIR20
AIR20/PIR20 Weather Cap	All-weather hood for AIR20 and PIR20 series sensors

Date of issue: 2012-11-12

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PEPPERL+FUCHS SENSING YOUR NEEDS

Standard microwave motion sensor with basic functionality

- **Reliable detection of people and vehicles**
- **Simplest adjustement of the sensing range**
- **Wide range of sensitivity adjustment**
- **Wall and ceiling mountable**

CE

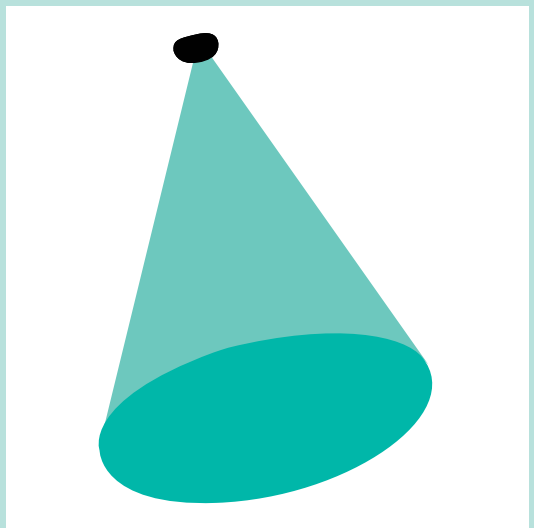
Product information

The RaDec series are affordable microwave motion sensors that combine all the key requirements of door manufacturers in a compact, stylish device that is both user-friendly and easy to install. An integrated microprocessor with 24 GHz microwave technology ensures high reliability even under difficult conditions. The sensor also offers two adjustable sensing areas, different operating modes, an installation height of 4 m, and operates in a temperature range of -20°C to +60°C.

Typical applications

- Opening impulse sensors for automatic doors and industrial doors
- Monitoring approach areas to elevators
- Motion sensors for people and objects
- Impulse sensors for escalators

Detection area



Date of issue: 2012-11-12

Technical data

Model Number		RaDec-M	RaDec-M Silver
Sensing range	broad: 2000x 4500 mm (DxW) at 2200 mm mounting height and 30° tilt angle narrow: 4500x 2000 mm (DxW) at 2200 mm mounting height and 30° tilt angle	●	●
Function principle	Microwave module	●	●
Detection speed	min. 0.1 m/s	●	●
Setting angle	0 ... 90 ° in 5 ° increments	●	●
Operating frequency	24.15 ... 24.25 GHz K-Band	●	●
Operating mode	Radar motion sensor	●	●
Transmitter radiated power (EIRP)	< 20 dBm	●	●
$MTTF_d$	970 a	●	●
Mission Time (T_M)	20 a	●	●
Diagnostic Coverage (DC)	0 %	●	●
Function display	LED red	●	●
Controls	potentiometer	●	●
Controls	sensitivity adjustment	●	●
Operating voltage	12 ... 36 V DC , 12 ... 28 V AC	●	●
No-load supply current	≤ 50 mA at 24 V DC	●	●
Power consumption	≤ 1.7 W	●	●
Switching type	NO/NC	●	●
Signal output	relay	●	●
Switching voltage	max. 48 V AC / 48 V DC	●	●
Switching current	max. 0.5 A AC / 1 A DC	●	●
Switching power	max. 24 W / 60 VA	●	●
De-energized delay	0.5 s	●	●
R&TTE Directive 1995/5/EC	This device can be used in all countries within the European Union. Use in North America is not permitted. In other countries, all applicable national regulations must be observed.	●	●
Standard conformity	EN 62311, EN 60950-1, EN 301 489-1, EN 301 489-3, EN 300 440-2	●	●
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●
Mounting height	max. 4000 mm	●	●
Protection degree	IP54	●	●
Connection	Connecting cable 2.5 m included with delivery	●	●
Housing	black polycarbonate (PC)	●	
	Polycarbonate (PC), silver painted		●
Mass	130 g	●	●
Dimensions	101 mm x 60 mm x 59 mm	●	●

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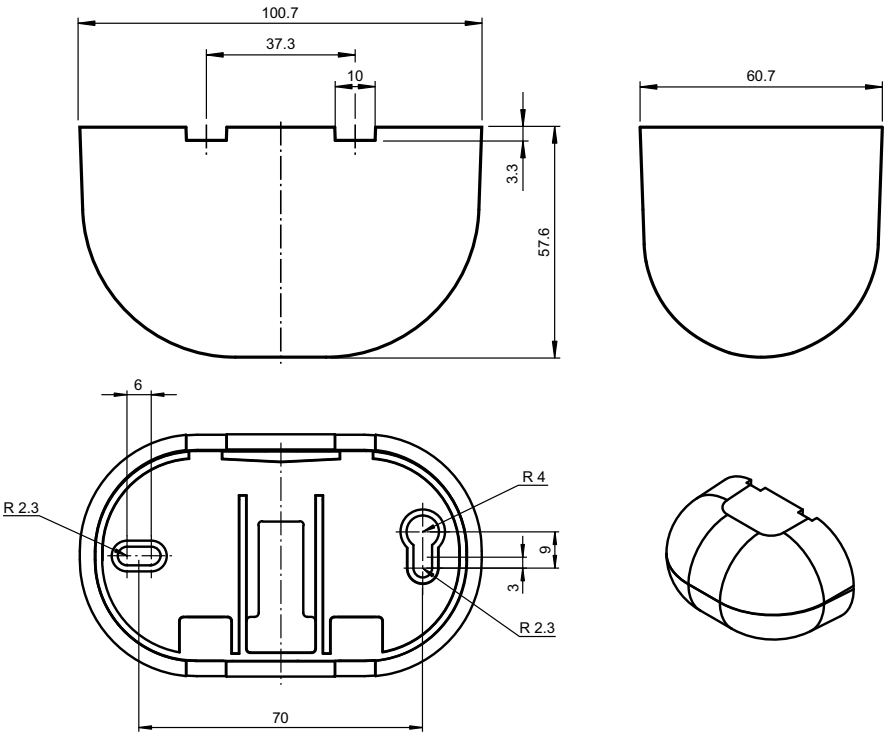
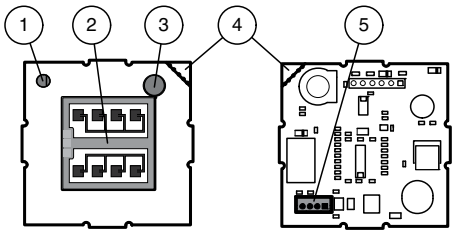
Dimensions

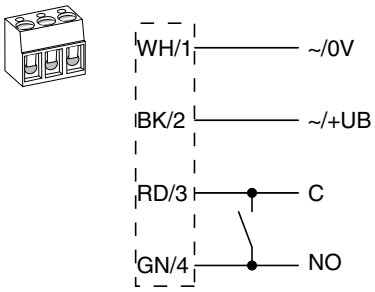


Indicators/operating means



1	LED red
2	Antenna
3	Potentiometer
4	Predetermined breakaway tab (Relay switching mode)
5	Connector

Electrical connection



Date of issue: 2012-11-12

Notes

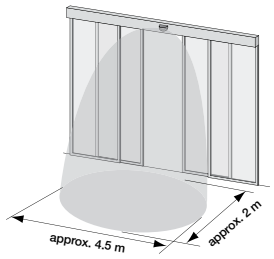
Functional principle

Microwave sensors are microwave scanners that use the principle of the Doppler radar. The most important requirement for microwave detection is that the object to be detected is moving. Some applications include controlling automatic and industrial doors.
The microwave sensors emit microwaves of a defined frequency in order to detect people and large objects moving at speeds between 100 mm/sec and 5 m/sec. Stationary people or objects are not detected. Based on the latest 24 GHz technology with integrated microprocessor control, these sensors provide a high degree of reliability even in difficult operating conditions. The 24 GHz frequency, known as the 'K-band,' is reserved by CETECOM for this application area worldwide.

Sensing range

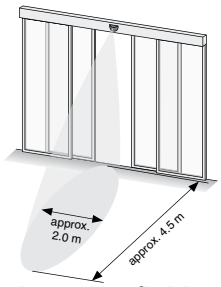
A narrower or wider sensing area can be achieved with turning the plug-in antenna.

Wide:



Mounting height 2200 mm / tilt angle 30°
Antenna position:

Narrow:



Mounting height 2200 mm / tilt angle 30°
Antenna position:

The detection field can be swivelled in 10 steps from 0° to 90°.

Accessories

RaDec Weather Cap Silver	Weather hood for radar sensors series RaDec
RaDec Weather Cap	Weather hood for radar sensors series RaDec

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Microwave motion sensor with intelligent functions

- **Reliable detection of people and vehicles**
- **Simplest adjustement of the sensing range**
- **Wall and ceiling mountable**
- **Version with direction detection and cross-traffic suppression**

CE

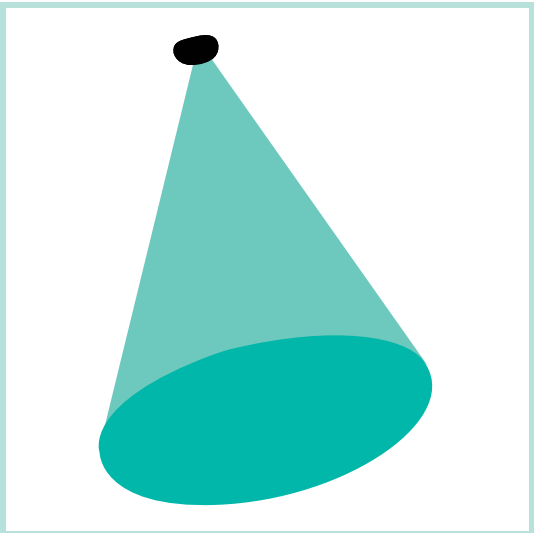
Product information

The RaDec series consists of affordable radar motion sensors that not only combine all the key requirements of door manufacturers in a compact, stylish device, but are also user friendly and easy to install. An integrated microprocessor with 24 GHz microwave technology ensures a high level of reliability, even in difficult conditions. What's more, the sensor offers two adjustable detection areas, different operating modes, and an installation height of up to 4 m, and operates in a temperature range of -20 °C ... +60 °C. The -D version features rotation direction monitoring; a cross-traffic suppression system can also be connected to this version.

Typical applications

- Opening impulse sensors for automatic doors and industrial doors
- Monitoring approach areas to elevators
- Motion sensors for people and objects
- Impulse sensors for escalators

Detection area



Date of issue: 2012-11-12

Technical data

Model Number		RaDec-D	RaDec-D Silver
Sensing range	broad: 2000x 4500 mm (DxW) at 2200 mm mounting height and 30° tilt angle narrow: 4500x 2000 mm (DxW) at 2200 mm mounting height and 30° tilt angle	●	●
Function principle	Microwave module	●	●
Detection speed	min. 0.1 m/s	●	●
Setting angle	0 ... 90 ° in 5 ° increments	●	●
Operating frequency	24.15 ... 24.25 GHz K-Band	●	●
Operating mode	Radar motion sensor	●	●
Transmitter radiated power (EIRP)	< 20 dBm	●	●
$MTTF_d$	300 a	●	●
Mission Time (T_M)	20 a	●	●
Diagnostic Coverage (DC)	0 %	●	●
Function display	LED red	●	●
Controls	potentiometer , DIP-switch for selection of operating modes	●	●
Controls	sensitivity adjustment	●	●
Operating voltage	12 ... 36 V DC , 12 ... 28 V AC	●	●
No-load supply current	≤ 50 mA at 24 V DC	●	●
Power consumption	≤ 1.7 W	●	●
Switching type	NO/NC	●	●
Signal output	relay	●	●
Switching voltage	max. 48 V AC / 48 V DC	●	●
Switching current	max. 0.5 A AC / 1 A DC	●	●
Switching power	max. 24 W / 60 VA	●	●
De-energized delay	1 s	●	●
R&TTE Directive 1995/5/EC	This device can be used in all countries within the European Union. Use in North America is not permitted. In other countries, all applicable national regulations must be observed.	●	●
Standard conformity	EN 62311, EN 60950-1, EN 301 489-1, EN 301 489-3, EN 300 440-2	●	●
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●
Mounting height	max. 4000 mm	●	●
Protection degree	IP54	●	●
Connection	Connecting cable 2.5 m included with delivery	●	●
Housing	black polycarbonate (PC)	●	
	Polycarbonate (PC), silver painted		●
Mass	130 g	●	●
Dimensions	101 mm x 60 mm x 59 mm	●	●

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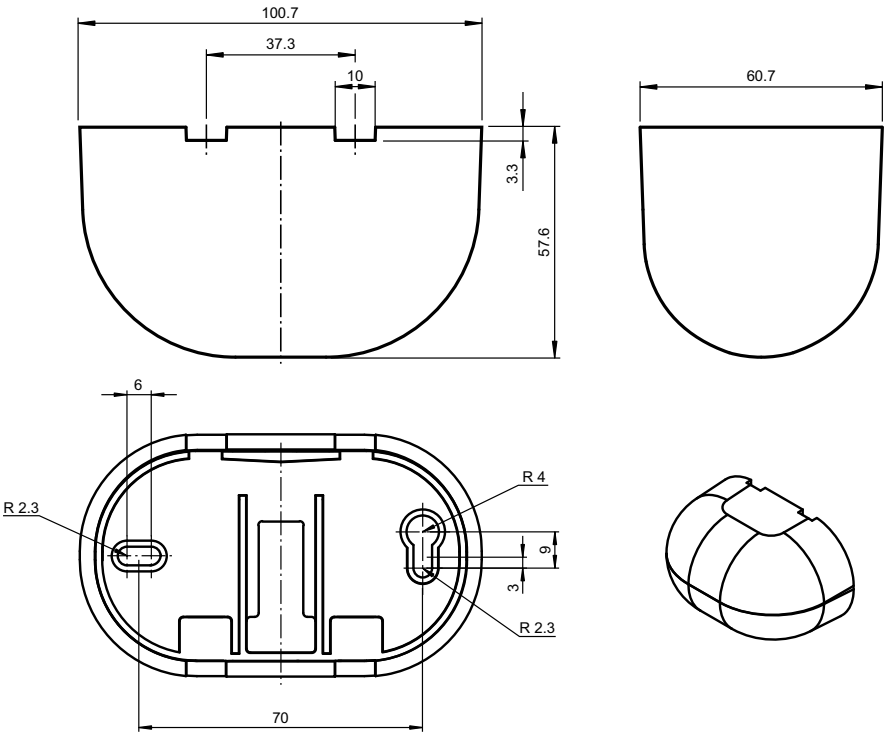
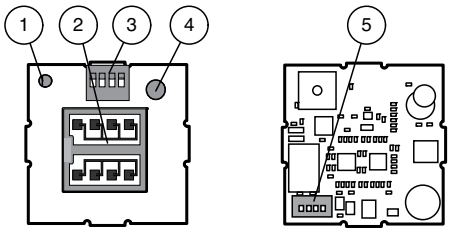
Dimensions

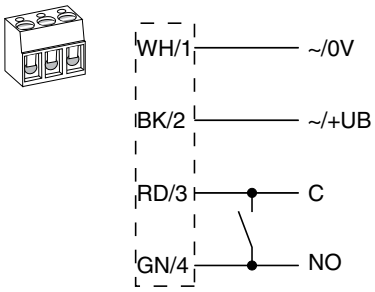


Indicators/operating means



1	LED red
2	Antenna
3	DIP switch
4	Potentiometer
5	Connector

Electrical connection



Date of issue: 2012-11-12

Notes

Functional principle

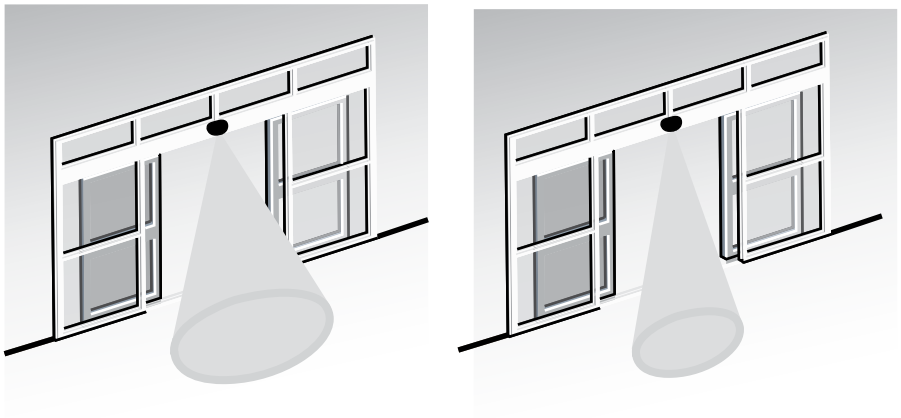
Radar sensors are microwave sensors that adopt the principle of Doppler radar. The most important requirement for microwave detection is that the object to be detected is moving. Applications include controlling automatic doors and gates.
The sensor emits microwaves of a defined frequency in order to detect people and large objects moving at speeds between 100 mm/sec. and 5 m/sec. Stationary people or objects are not detected. Based on the latest 24 GHz technology with integrated microprocessor control, these sensors provide a high level of reliability, even in difficult operating conditions. The 24 GHz frequency, known as the 'K-band,' is reserved by CETECOM for this application area worldwide.
The direction detection function makes it possible to distinguish whether persons are moving towards the door or away from it. It is necessary to trigger the opening impulse if people are approaching the door. The sensor ignores objects that are moving away. Cross-traffic suppression serves a similar purpose. Automatic doors are often opened when a pedestrian walks too close to a shop window or a building facade. The cross-traffic suppression function can avoid this, because microwave technology combined with the microprocessor evaluation unit accurately detects these directions of motion. Both functions noticeably quiet the door area, increase the lifetime of the door mechanism, and in doing so help save energy.

Function

Detection area

A wide or narrow detection area can be set by turning the PCB.

Detection area wide (Standard) Detection area narrow



The size of the detection area can be changed using the potentiometer.

Accessories

RaDec Weather Cap Silver	Weather hood for radar sensors series RaDec
RaDec Weather Cap	Weather hood for radar sensors series RaDec

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SENSING YOUR NEEDS

Microwave motion sensor with basic functionality

- **Reliable detection of people and vehicles**
- **Simplest adjustement of the sensing range**
- **Easily programmable**
- **Programmable by remote control**

CE

Product information

An effective opening of doors or industrial doors can be achieved very flexibly with the RMS microwave motion sensor series. The RC versions offer remote-controlled adjustment of parameters. Ultramodern microcontroller evaluation technology guarantees a variety of field sizes and universal use even in difficult conditions. An integrated microprocessor with 24 GHz-microwave technology ensures high reliability even under difficult usage conditions. The sensor also offers two adjustable detection areas and different operating modes, an installation height up to 4 m and operates in a temperature range of -20 ... +60 °C.

Typical applications

- Opening impulse sensor for automatic and industrial doors
- Monitoring approach areas to automatic doors and elevators
- Motion sensor for people and objects
- Impulse sensor for escalators
- Opening impulse sensor for entry doors

Detection area

Date of issue: 2012-11-12

Technical data

Model Number		RMS-M	RMS-M-RC
Sensing range	broad: 2000x 4500 mm (DxW) at 2200 mm mounting height and 30° tilt angle narrow: 4500x 2000 mm (DxW) at 2200 mm mounting height and 30° tilt angle	●	●
Function principle	Microwave module	●	●
Detection speed	min. 0.1 m/s	●	●
Setting angle	0 ... 40 ° in 5 ° increments	●	●
Operating frequency	24.15 ... 24.25 GHz K-Band	●	●
Operating mode	Radar motion sensor	●	●
Transmitter radiated power (EIRP)	< 20 dBm	●	●
$MTTF_d$	850 a	●	●
Mission Time (T_M)	20 a	●	●
Diagnostic Coverage (DC)	0 %	●	●
Function display	LED red/green	●	●
Controls	Potentiometer and programming button for setting: Method of connection, dropout time, response time, Interference behavior	●	●
Controls	sensitivity adjustment	●	●
Controls	Programming via menu driven remote control possible (Accessories ordered separately)		●
Operating voltage	12 ... 30 V DC , 12 ... 24 V AC	●	●
No-load supply current	≤ 50 mA at 24 V DC	●	●
Power consumption	≤ 1 W	●	●
Switching type	NO/NC	●	●
Signal output	relay	●	●
Switching voltage	max. 48 V AC / 48 V DC	●	●
Switching current	max. 0.5 A AC / 1 A DC	●	●
Switching power	max. 24 W / 60 VA	●	●
De-energized delay	0.2 ... 10 s adjustable (1 sec factory setting)	●	●
R&TTE Directive 1995/5/EC	This device can be used in all countries within the European Union. Use in North America is not permitted. In other countries, all applicable national regulations must be observed.	●	●
Standards	EN 62311, EN 60950-1, EN 301 489-1, EN 301 489-3, EN 300 440-2	●	●
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●
Mounting height	max. 4000 mm	●	●
Protection degree	IP54	●	●
Connection	plug-in screw terminals 4-pin , 5 m connecting cable included with delivery	●	●
Housing	ABS, anthracite	●	●
Mass	120 g	●	●
Dimensions	123 mm x 65 mm x 57 mm	●	●

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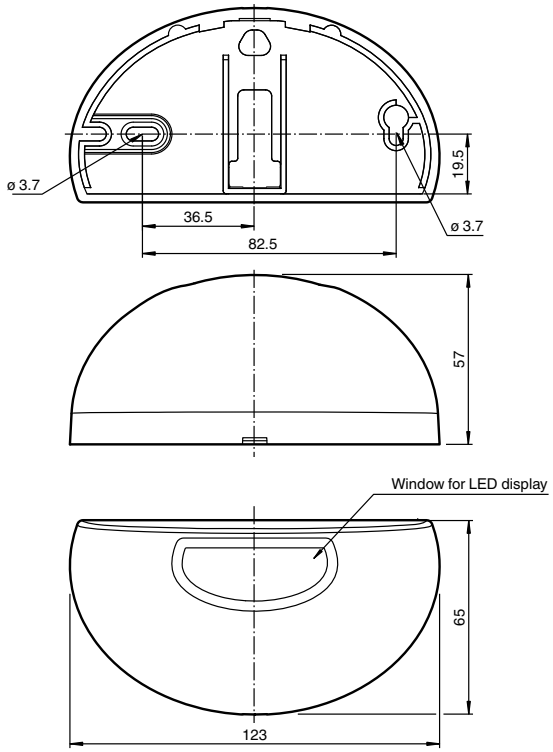
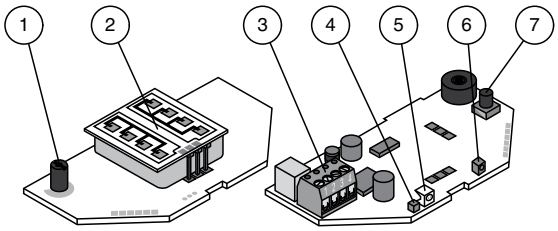
Dimensions

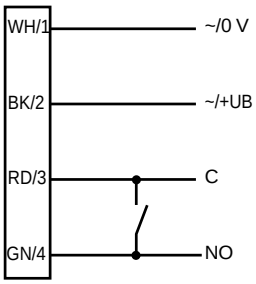


Indicators/operating means



1	Potentiometer
2	Antenna
3	Terminal
4	IR-transmitter (RC version only)
5	LED (red/green)
6	IR-receiver (RC version only)
7	Programming button

Electrical connection



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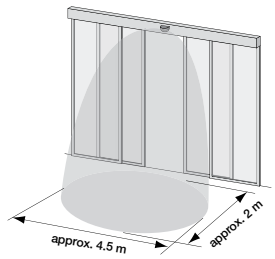
Notes

Operating principle

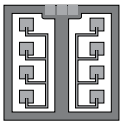
Microwave sensors are microwave scanners that use the principle of the Doppler radar. The most important requirement for microwave detection is that the object to be detected is moving.
The microwave sensors emit microwaves of a defined frequency in order to detect people and large objects moving at speeds between 100 mm/sec and 5 m/sec.
The microwaves emitted by the emitter are reflected back from the ground or other surfaces to the receiver. If there is no motion in the monitored zone, the emitted and reflected frequencies are identical. Nothing is detected. If people, animals or objects are moving in the monitored zone, the reflected frequency changes and therefore triggers a detection.
Microprocessor-controlled motion sensors based on the latest 24 GHz technology provide a high degree of reliability even under difficult operating conditions. The 24 GHz frequency, known as 'K-band,' is reserved by CETECOM for this application area worldwide.

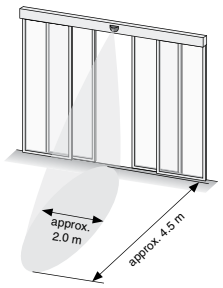
Detection range

Installation instructions

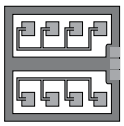


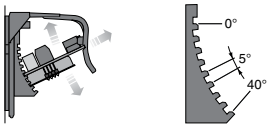
Installation height 2200 mm / angle of detection field 30°
Antenna position:





Installation height 2200 mm / angle of detection field 30°
Antenna position:





The detection field can be swivelled in 5 steps from 0 to 40°. The guide plate can be inserted on a slant.

Accessories

RMS Weather cap	All-weather hood for RMS series microwave sensors, for ceiling and wall installation
RMS Remote Control	infrared remote control for series RMS

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Microwave motion sensor with intelligent functions

- **Reliable detection of people and vehicles**
- **Direction detection**
- **Cross traffic suppression**
- **"Slow motion" for extremely slow motions**
- **Simplest adjustement of the sensing range**
- **Programmable by remote control**
- **Version with extra-wide detection area**

CE

Product information

An effective opening of doors or industrial doors can be achieved very flexibly with the RMS microwave motion sensor series. The RC versions offer remote-controlled adjustment of parameters. Ultramodern microcontroller evaluation technology guarantees a variety of field sizes and universal use even in difficult conditions. The 24 GHz microwave technology enables a diverse range of operating modes such as direction detection. The cross-traffic suppression function only opens the door if people approach the door from the front, but not if they are walking past it. Thanks to the slow-motion mode, even extremely slow movements are detected, which increases convenience in senior citizens' residences, for example.

Typical applications

- Opening impulse sensor for automatic and industrial doors
- Monitoring approach areas to automatic doors and elevators
- Motion sensor for people and objects
- Impulse sensor for escalators
- Opening impulse sensor for entry doors

Detection area

Date of issue: 2012-11-12

Technical data

Model Number		RMS-D	RMS-D BROAD	RMS-D-RC	RMS-D-RC broad
Sensing range	2000 x 4000 mm (DxW) with 2200 mm installation height and 30° tilt angle		●		●
	3000x 2500 mm (DxW) at 2200 mm mounting height and 30° tilt angle	●		●	
Function principle	Microwave module	●	●	●	●
Detection speed	min. 0.1 m/s	●	●	●	●
Setting angle	0 ... 40 ° in 5 ° increments	●	●	●	●
Operating frequency	24.15 ... 24.25 GHz K-Band	●	●	●	●
Operating mode	Radar motion sensor	●	●	●	●
Transmitter radiated power (EIRP)	< 20 dBm	●	●	●	●
$MTTF_d$	640 a	●	●	●	●
Mission Time (T_M)	20 a	●	●	●	●
Diagnostic Coverage (DC)	0 %	●	●	●	●
Function display	LED red/green	●	●	●	●
Controls	DIP-switch for selection of operating modes : Direction detection , Cross traffic suppression , Slow-motion , Switching type	●	●	●	●
Controls	sensitivity adjustment	●	●	●	●
Controls	Adjustment for off delay	●	●	●	●
Operating voltage	12 ... 36 V DC , 12 ... 28 V AC	●	●	●	●
No-load supply current	≤ 50 mA at 24 V DC	●	●	●	●
Power consumption	≤ 1 W	●	●	●	●
Switching type	NO/NC	●	●	●	●
Signal output	relay, 1 NO	●	●	●	●
Switching voltage	max. 48 V AC / 48 V DC	●	●	●	●
Switching current	max. 0.5 A AC / 1 A DC	●	●	●	●
Switching power	max. 24 W / 60 VA	●	●	●	●
De-energized delay	0.2 ... 5 s adjustable (1 sec factory setting)	●	●	●	●
R&TTE Directive 1995/5/EC	This device can be used in all countries within the European Union. Use in North America is not permitted. In other countries, all applicable national regulations must be observed.	●	●	●	●
Standards	EN 62311, EN 60950-1, EN 301 489-1, EN 301 489-3, EN 300 440-2	●	●	●	●
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●
Mounting height	max. 4000 mm	●	●	●	●
Protection degree	IP54	●	●	●	●
Connection	plug-in screw terminals 4-pin , 5 m connecting cable included with delivery	●	●	●	●
Housing	ABS, anthracite	●	●	●	●
Mass	120 g	●	●	●	●
Dimensions	123 mm x 65 mm x 57 mm	●	●	●	●

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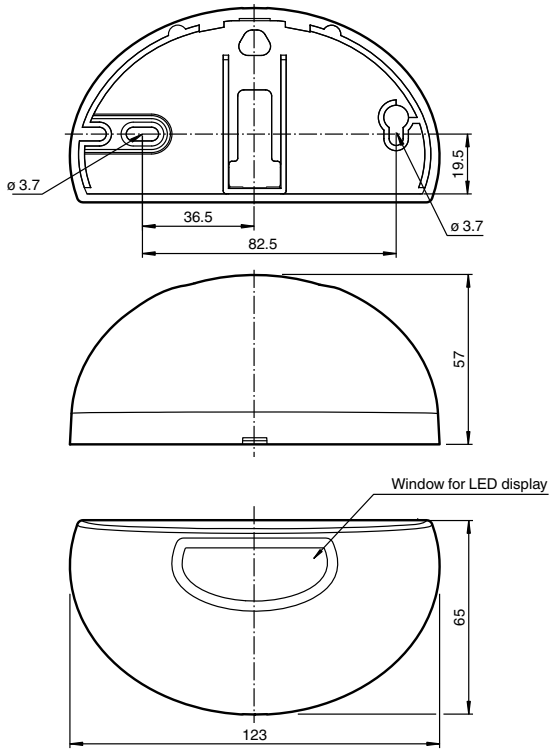
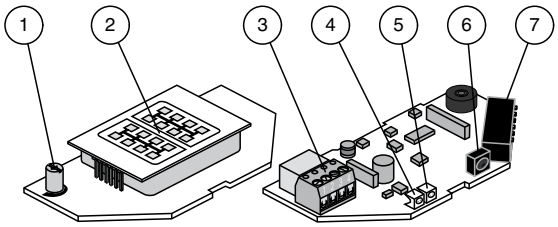
SENSING YOUR NEEDS

Dimensions

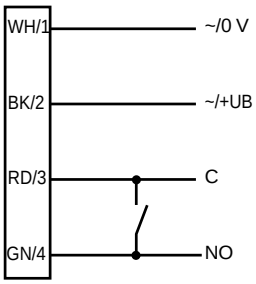


Indicators/operating means



1	Potentiometer
2	Antenna
3	Terminal
4	IR transmitter (RC version only)
5	LED (red/green)
6	IR receiver (RC version only)
7	DIP switches

Electrical connection



Date of issue: 2012-11-12

Notes

Functional principle

Microwave sensors are microwave scanners that use the principle of the Doppler radar. The most important requirement for microwave detection is that the object to be detected is moving.
The microwave sensors emit microwaves of a defined frequency in order to detect people and large objects moving at speeds between 100 mm/sec and 5 m/sec.
The microwaves emitted by the emitter are reflected back from the ground or other surfaces to the receiver. If there is no motion in the monitored zone, the emitted and reflected frequencies are identical. Nothing is detected. If people, animals or objects are moving in the monitored zone, the reflected frequency changes and therefore triggers a detection.
Based on the latest 24 GHz technology with integrated microprocessor control, these sensors provide a high degree of reliability even in difficult operating conditions. The 24 GHz frequency, known as the 'K-band,' is reserved by CETECOM for this application area worldwide.
The RMS-D series of sensors are equipped with intelligent functions to enable them to be used in a wide variety of applications. The cross-traffic suppression function is particularly effective in narrow shopping streets and shopping arcades. The system can be configured so that the door opens only when a person approaches it, while ignoring passing pedestrians.
With direction detection, the opening impulse can be triggered based on the direction of motion. Depending on the setting, only movements towards or away from the sensor are detected. The "slow-motion mode" provides a tangible increase in comfort for senior citizens homes or hospitals. This mode allows detection of extremely slow movements in the direct vicinity of the closing area and can be selectively configured for an open door or a closed door. In the first case, the door is held open when there are slow movements. In the second case, the closed door opens even if a person is approaching so slowly that he would not be recognized by normal motion detection devices.

Size of the sensing area / sensitivity

The sensitivity potentiometer adjusts the size of the sensing area.

Positioning the sensing area

To adjust the position of the sensor, hold the printed circuit board by its edge, gently pull it forward, then place it in the desired position.
The sensor's position can be adjusted in 5° increments from 0° to 40°.
The default setting from the factory is 15°. Notches can be broken off.
The sensor's printed circuit board can also be inserted at a slant.
Do not angle the board by more than 3 notches from the opposite side!

Accessories

RMS Weather cap	All-weather hood for RMS series microwave sensors, for ceiling and wall installation
RMS Remote Control	infrared remote control for series RMS
RMS Antenna broad	Radar antenna for wide sensing range

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PEPPERL+FUCHS SENSING YOUR NEEDS

Industrial gate opener with the ability to differentiate between people and vehicles

- **Extra-wide detection area and long detection range**
- **Easily programmable**
- **Direction detection**
- **Programmable by remote control**
- **Version HS for vehicle detection up to 60 km/h**

CE

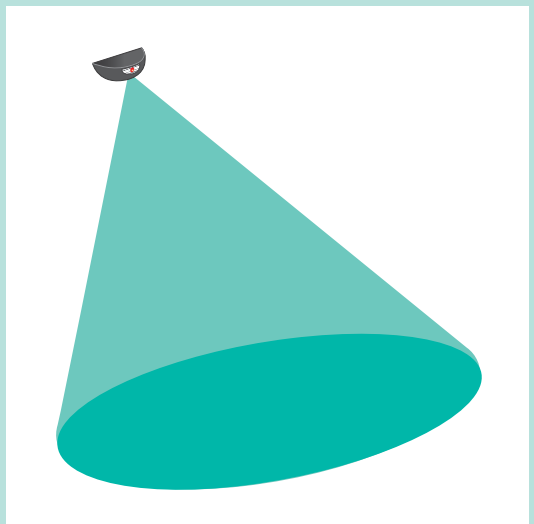
Product information

The microprocessor-controlled microwave motion sensors based on the latest 24 GHz technology provide a high degree of reliability even in difficult operating conditions and can be used with all automatic (industrial) doors up to a height of 7 m. The RMS-G sensors are equipped with intelligent functions, such as vehicle detection, to enable them to be used in a wide variety of applications. The special industrial door microwave sensor can be configured so that the industrial door only opens when a vehicle approaches it, while passing pedestrians are ignored. The sensor differentiates between people and vehicles.

Typical applications

- Opening impulse sensor for industrial doors
- Motion sensor for people and objects
- Activation sensors for detecting vehicles traveling at a maximum of 60 km/h (RMS-G-RC-HS)

Detection area



Date of issue: 2012-11-12

Technical data

Model Number		RMS-G-RC	RMS-G-RC-HS
Sensing range	7000x 6000 mm (DxW) at 5000 mm mounting height and 30° tilt angle 8000x 5000 mm (DxW) at 7000 mm mounting height and 30° tilt angle	●	●
Function principle	Microwave module	●	●
Detection speed	min. 0.1 m/s	●	
	min. 0.1 m/s , max. 60 km/h		●
Setting angle	0 ... 40 ° in 5 ° increments	●	●
Operating frequency	24.05 ... 24.25 GHz K-Band		●
	24.15 ... 24.25 GHz K-Band	●	
Operating mode	Radar motion sensor	●	●
Transmitter radiated power (EIRP)	< 20 dBm	●	●
$MTTF_d$	620 a	●	
Mission Time (T_M)	20 a	●	
Diagnostic Coverage (DC)	0 %	●	
Function display	LED red/green	●	●
Controls	Programming push-button for selection of operating modes : Direction detection , Cross traffic suppression , Vehicle detection , Switching type	●	●
Controls	Adjustment for off delay	●	●
Controls	Programming via 2 keys , alternative via remote control (Accessories ordered separately)	●	●
Operating voltage	12 ... 36 V DC , 12 ... 28 V AC	●	●
No-load supply current	≤ 50 mA at 24 V DC	●	●
Power consumption	≤ 1 W	●	●
Switching type	NO/NC	●	●
Signal output	2 relay outputs	●	●
Switching voltage	max. 48 V AC / 48 V DC	●	●
Switching current	max. 0.5 A AC / 1 A DC	●	●
Switching power	max. 24 W / 60 VA	●	●
De-energized delay	0.2 ... 5 s adjustable	●	●
R&TTE Directive 1995/5/EC	This device can be used in all countries within the European Union. Use in North America is not permitted. In other countries, all applicable national regulations must be observed.	●	
	EN 300440-1 V1.3.1 (2001-09); EN 300440-2 V1.1.1 (2001-09); VDE 0848-1 (2000-08); VDE 0848-2 (1991-01); ICNIRP Guidelines (1998-04); designation CE0682!		●
Electromagnetic compatibility	EN 61000-6-1:2007; EN 61000-6-2:2005		●
Emitted interference	EN 61000-6-3:2001; EN 61000-6-4:2001		●
Standards	EN 60947-5-2:2007		●
	EN 62311, EN 60950-1, EN 301 489-1, EN 301 489-3, EN 300 440-2	●	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●
Mounting height	max. 7000 mm	●	●
Protection degree	IP54	●	●
Connection	plug-in screw terminals 4-pin and 2 pin , 8 m connecting cable included with delivery	●	●
Housing	ABS, anthracite	●	●
Mass	120 g	●	●
Dimensions	123 mm x 65 mm x 57 mm	●	●

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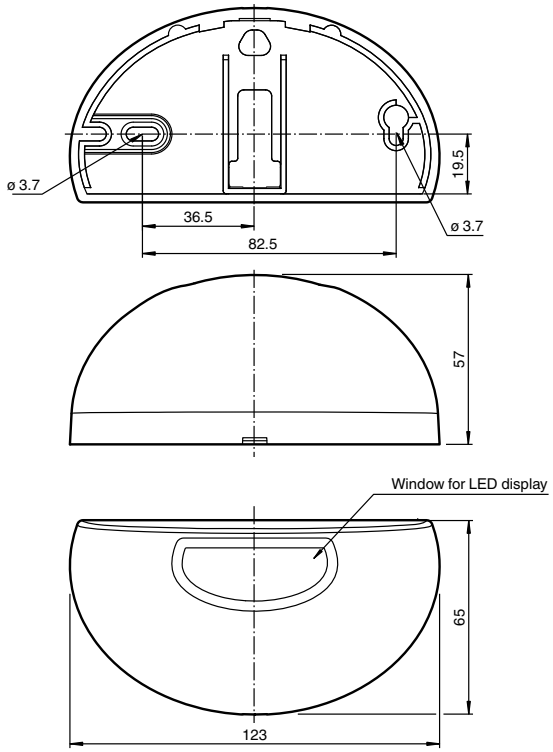
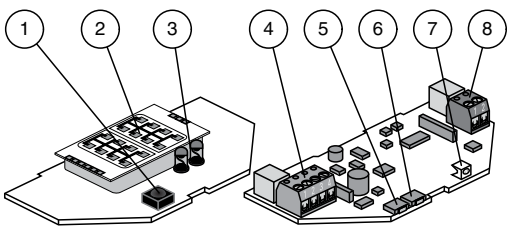
Dimensions



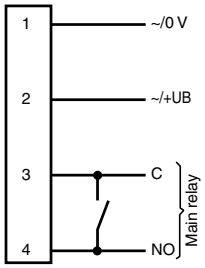
Indicators/operating means



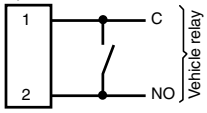
1	IR receiver
2	Antenna
3	IR-transmitter
4	Terminals (power supply/main relay)
5	Pushbutton / Menu
6	Pushbutton / Value
7	LED (red/green)
8	Terminals (vehicle relay)

Electrical connection

4-pin terminal



2-pin terminal



Date of issue: 2012-11-12

Notes

Functional principle

Microwave sensors are microwave scanners that use the principle of the Doppler radar. The most important requirement for microwave detection is that the object to be detected is moving.
The microwave sensors emit microwaves of a defined frequency in order to detect people and large objects moving at speeds between 100 mm/sec. and 5 m/sec.
The microwaves emitted by the emitter are reflected back from the ground or other surfaces to the receiver. If there is no motion in the monitored zone, the emitted and reflected frequencies are identical. Nothing is detected. If people, animals or objects are moving in the monitored zone, the reflected frequency changes and therefore triggers a detection.
Based on the latest 24 GHz technology with integrated microprocessor control, these sensors provide a high degree of reliability even in difficult operating conditions. The 24 GHz frequency, known as the 'K-band,' is reserved by CETECOM for this application area worldwide.
The RMS-G series of sensors are equipped with intelligent functions to enable them to be used in a wide variety of applications. The cross-traffic suppression system can be configured so that the door only opens when vehicles or people approach it, while passing pedestrians are ignored.
With direction detection, the opening impulse can be triggered based on the direction of motion. Depending on the setting, only movements towards or away from the sensor are detected.

Settings

The sensor RMS-G-RC-HS is adjusted in programming mode directly on the device via two keys.
The flash sequence of the LED indicates the respective settings.
By means of the RMS remote control, which is available as an accessory, the sensor can be easily and quickly programmed from the ground in an optimum manner. The bidirectional infrared remote control with LDC display and self-explanatory menu navigation has a range of 10 m. Thus, also sensors with high mounting heights can be precisely and conveniently adjusted.

Accessories

RMS Weather cap	All-weather hood for RMS series microwave sensors, for ceiling and wall installation
RMS Remote Control	infrared remote control for series RMS
RMS Antenna broad	Radar antenna for wide sensing range

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PEPPERL+FUCHS SENSING YOUR NEEDS

Microwave motion sensor with integrated self-monitoring for escape and emergency routes

- **Approved in accordance with AutSchR (German directive governing automatic sliding doors for rescue routes)**
- **Direction detection**
- **Cross traffic suppression**
- **Easily programmable**
- **Programmable by remote control**
- **Version with frequency output**
- **Version with relay output**
- **Version with voltage output**

CE 0682 Φ

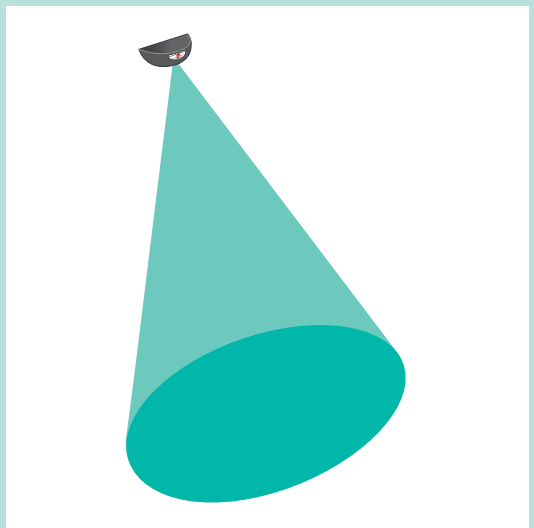
Product information

The RMS-FRW radar motion sensors for escape and emergency routes have been tested and certified by TÜV Nord; the sensors are self-monitoring and fulfill the AutSchR and the requirements specified in EN ISO 13849-1 Category 3, as well as SIL 2 specified in EN 61508. The sensors have TÜV Nord approval for use along exit and emergency routes. Ultramodern 24 GHz technology guarantees a variety of detection field sizes and a wide range of applications, even in difficult conditions. The microcontroller evaluation provides the sensor with intelligent functions such as rotation direction monitoring and cross-traffic suppression. Three different versions with various output signals allow use with all common door controllers and door drives.

Typical applications

- Opening impulse sensor for automatic doors and industrial doors in escape and emergency routes
- Motion sensor for people and objects

Detection area



Date of issue: 2012-11-12

Technical data

Model Number		RMS-FRW/31	RMS-FRW/163	RMS-FRW/164
Sensing range	2500 x 3500 mm (D x W) at 2200 mm mounting height and 0° tilt angle	●	●	●
Function principle	Microwave module	●	●	●
Detection speed	min. 0.1 m/s	●	●	●
Setting angle	0 ... 10 ° in 5 ° increments	●	●	●
Operating frequency	24.05 ... 24.25 GHz K-Band	●	●	●
Operating mode	Radar motion sensor	●	●	●
Transmitter radiated power (EIRP)	< 20 dBm	●	●	●
Performance level (PL)	PL d	●	●	●
Category	Cat. 3	●	●	●
$MTTF_d$	850 a	●	●	●
PFH_d	6.46 E-8	●	●	●
Diagnostic Coverage (DC)	60 %	●	●	●
Function display	LED red/green , LED Row green	●	●	●
Controls	Navigation key or Programming via menu driven remote control	●	●	●
Factory setting	sensitivity adjustment : 7 Cross traffic suppression : 1 Immunity : 2	●	●	●
Operating voltage	12 ... 36 V DC	●	●	●
No-load supply current	< 200 mA at 24 V DC	●	●	●
Power consumption	< 3 W	●	●	●
Inrush current	900 mA	●	●	●
Switching type	NO/NC	●	●	●
Signal output	Frequency output			●
	Relay output	●		
	voltage output		●	
Output type	Relay output	●		
Switching voltage	48 V DC / AC	●		
Switching current	max. 1 A DC; 0.5 A AC	●		
Switch power	30 W DC / 60 VA AC	●		
Output type	voltage output		●	
Output rated operating current	max. 10 mA at 3.2 V DC		●	
Output type	Frequency output			●
Output rated operating current	max. 50 mA			●
Residual voltage	≤ 2 V DC			●
Pulse/Pause ratio	1:1 , deviation max. 10 %			●
Output frequency	100 Hz			●
R&TTE Directive 1995/5/EC	This device can be used in all countries within the European Union with the exception of Great Britain and France. In other countries, all applicable national regulations must be observed.	●	●	●
Standards	1999/5/EG; EN 62311, EN 60950-1, EN 301 489-1, EN 301 489-3, EN 300 440-2 Additionally: EN 61508; EN 13849-1; DIN EN 18650-1; DIN EN 18650-2; AutSchR 1997/12	●	●	●
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●
Mounting height	max. 3000 mm	●	●	●
Protection degree	IP54	●	●	●
Connection	8-pin strip connector with cable 3 m connecting cable included with delivery	●	●	●
Housing	ABS, anthracite	●	●	●
Mass	140 g	●	●	●

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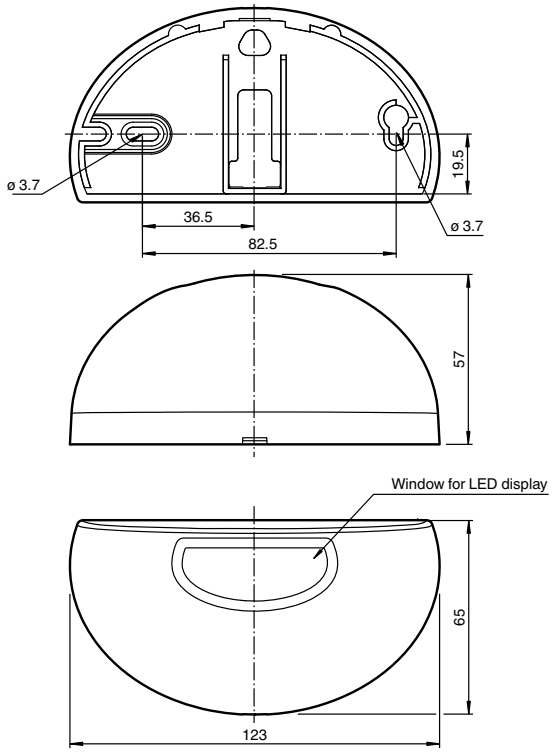
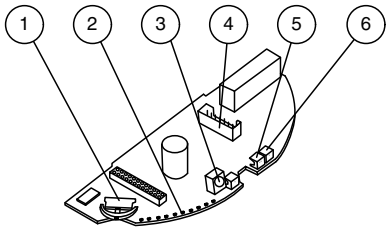
Dimensions



Indicators/operating means



1	Navigation button
2	Bar graph with 10 LEDs
3	IR receiver
4	Connecting plug
5	LED (red/green)
6	IR transmitter

Electrical connection

Option /163 Voltage output

Pin	Signal	Color
1	+12 ... 36 V DC	white
2	GND	brown
3	Uout +	green
4	Uout -	yellow
5	No Connection	grey
6	No Connection	pink
7	Test Input	blue
8	Presence output	red

Option /164 Frequency output

Pin	Signal	Color
1	+12 ... 36 V DC	white
2	GND	brown
3	Fout +	green
4	Uin -	yellow
5	Uin +	grey
6	No Connection	pink
7	Test Input	blue
8	Presence output	red

Option /31 Relay output

Pin	Signal	Color
1	+12 ... 36 V DC	white
2	GND	brown
3	Relay 1	green
4	Relay 1	yellow
5	Relay 2	grey
6	Relay 2	pink
7	Test Input	blue
8	Presence output	red

Date of issue: 2012-11-12

Notes

Functional principle

Radar sensors are microwave scanners that adopt the principle of the Doppler radar. The most important requirement for microwave detection is that the object to be detected is moving.
The radar sensors emit microwaves of a defined frequency in order to detect people and large objects moving at speeds between 100 mm/sec. and 5 m/sec.
The microwaves emitted by the emitter are reflected back from the ground or other surfaces to the receiver. If there is no motion in the monitored zone, the emitted and reflected frequencies are identical. Nothing is detected. If people, animals, or vehicles are moving in the monitored zone, the reflected frequency changes and triggers a detection.
Based on the latest 24 GHz technology with integrated microprocessor control, these sensors provide a high level of reliability, even in difficult operating conditions. The 24 GHz frequency, known as the 'K-band,' is reserved by CETECOM for this application area worldwide.

Accessories

RMS Weather cap	All-weather hood for RMS series microwave sensors, for ceiling and wall installation
RMS Remote Control	infrared remote control for series RMS

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SENSING YOUR NEEDS

Optical laser distance sensors for long sensing ranges, can be used in difficult ambient conditions

- **Distance measurement using object**
- **Measuring method PRT (Pulse Ranging Technology)**
- **Accurate, clear, and reproducible measuring results, regardless of ambient conditions and object**
- **Minimal black/white difference**
- **Red laser as the light emitter**
- **Version with laser class 1 or class 2**
- **Version with IO-Link interface**
- **Version with analog output**

IO-Link

Product information

The VDM28 distance measurement device employs Pulse Ranging Technology (PRT).
It has a repeat accuracy of 5 mm with an operating range of 0.2 ... 15 m and an absolute accuracy of 25 mm.
The sensor is highly resistant to ambient conditions. The compact housing of the Series 28 photoelectric sensors, with dimensions of 88 mm (height), 26 mm (width) and 54 mm (depth), make it the smallest device available in its class.

Typical applications

- Object identification or classification
- Positioning
- Level measurement
- Collision avoidance/distance measurement
- Compartment occupied checks
- Rack fine positioning
- Stack height control
- Coil measurement
- Dip monitoring
- Lift height checks
- Opening impulse sensor and closing edge monitoring on automatic doors, industrial gates and barrier systems
- Vehicle detection for traffic engineering purposes (e.g. monitoring of individual parking spaces)
- Height measurement in tunnels and entranceways

Detection area

Date of issue 2012-11-12

Technische Daten

Model Number		VDM28-8-L/73c/136	VDM28-8-L/115/136	VDM28-8-L-IO/73c/110/122	VDM28-8-L-IO/115b/136	VDM28-8-L1-IO/73c/110/122	VDM28-15-L-IO/73c/110/122
Measurement range	0.2 ... 15 m						●
	0.2 ... 8 m	●	●	●	●	●	
Reference target	Kodak white (90%)	●	●	●	●	●	●
Light source	laser diode typ. service life 85,000 h at Ta = +25 °C	●	●	●	●	●	●
Light type	modulated visible red light	●	●	●	●	●	●
Laser class	1					●	
	2	●	●	●	●		●
Wave length	660 nm	●	●	●	●	●	●
Angle deviation	max. ± 2°	●	●	●	●	●	●
Measuring method	Pulse Ranging Technology (PRT)	●	●	●	●	●	●
Diameter of the light spot	< 10 mm at a distance of 8 m at 20 °C	●	●	●	●	●	
	< 15 mm at a distance of 15 m at 20 °C						●
Ambient light limit	50000 Lux	●	●	●	●	●	●
Temperature influence	typ. ≤ 0.25 mm/K	●	●	●	●	●	●
$MTTF_d$	200 a	●	●	●	●	●	●
Mission Time (T_M)	10 a	●	●	●	●	●	●
Diagnostic Coverage (DC)	0 %	●	●	●	●	●	●
Operating display	LED green	●	●	●	●	●	●
Function display	2 LEDs yellow for switching state	●	●	●	●	●	●
TEACH-IN indication	TEACH-IN: LED green/yellow equiphase flashing; 2.5 Hz Teach Error:LED green/yellow non equiphase flashing; 8.0 Hz	●	●	●	●	●	●
Controls	5-step rotary switch for operating modes selection (threshold setting and operating modes)	●	●	●	●	●	●
Controls	Switch for setting the threshold values	●	●	●	●	●	●
Operating voltage	10 ... 30 V DC / when operating in IO-Link mode: 18 ... 30 V			●	●	●	●
	10 ... 30 V DC , class 2	●	●				
Ripple	10 % within the supply tolerance	●	●	●	●	●	●
No-load supply current	≤ 125 mA / 24 V DC	●	●				
	≤ 70 mA / 24 V DC			●	●	●	●
Time delay before availability	1.5 s	●	●	●	●	●	●
Interface type	IO-Link			●	●	●	●
Protocol	IO link V1.0			●	●	●	●
Cycle time	min. 2.3 ms			●	●	●	●
Mode	COM 2 (38.4 kBaud)			●	●	●	●
Process data witdh	16 bit			●	●	●	●
SIO mode support	yes			●	●	●	●
Signal output	Push-pull output, short-circuit protected, reverse polarity protected			●		●	●
	2 push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected	●	●		●		
Switching voltage	max. 30 V DC	●	●	●	●	●	●
Switching current	max. 100 mA	●	●	●	●	●	●
Measurement output	1 analog output 4 ... 20 mA, short-circuit/overload protected			●		●	●
Switching frequency	50 Hz	●	●	●	●	●	●
Response time	10 ms	●	●	●	●	●	●
Absolute accuracy	± 25 mm	●	●	●	●	●	●
Repeat accuracy	< 5 mm	●	●	●	●	●	●
Directive conformity	EMC Directive 2004/108/EC	●	●	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●	●
Laser class	IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007	●	●	●	●	●	●
Protection class	II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1	●	●	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●	●	●
Ambient temperature	-30 ... 50 °C (-22 ... 122 °F)	●	●	●	●	●	●
Storage temperature	-30 ... 70 °C (-22 ... 158 °F)	●	●	●	●	●	●
Protection degree	IP65	●	●	●	●	●	●
Connection	2 m fixed cable		●				
	300 mm fixed cable with M12 x 1, 4-pin connector				●		
	connector M12 x 1, 4-pin	●		●		●	●
Housing	Plastic ABS	●	●	●	●	●	●
Optical face	Plastic pane	●	●	●	●	●	●
Mass	90 g	●	●	●	●	●	●

Date of issue 2012-11-12

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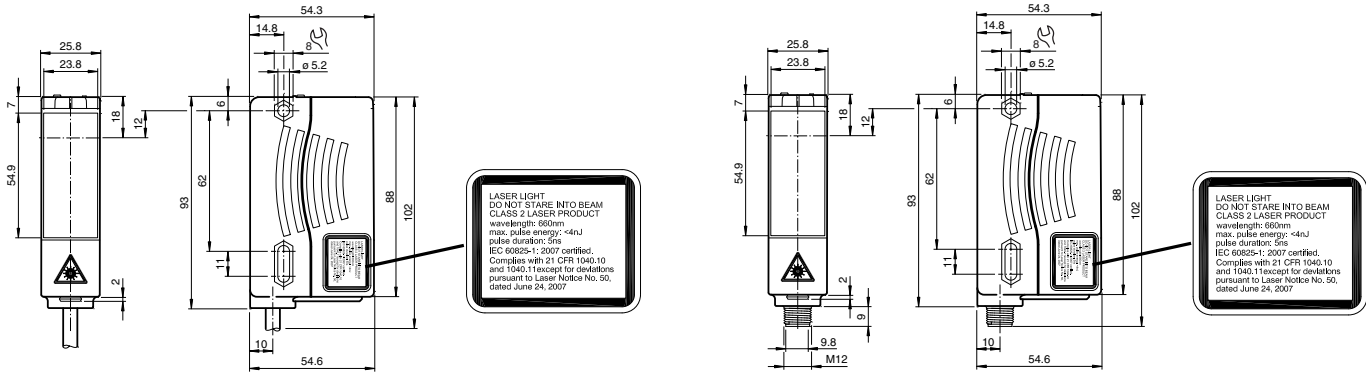
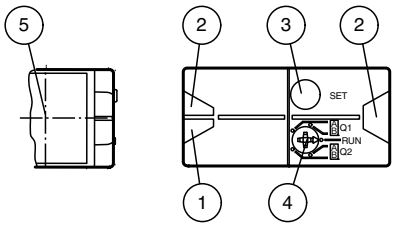
PEPPERL+FUCHS SENSING YOUR NEEDS

Dimensions



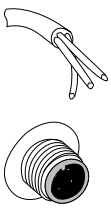
Indicators/operating means



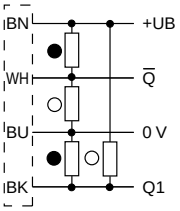
1	Operating display	green
2	Signal display	yellow
3	TEACH-IN button	
4	Mode rotary switch	
5	Laser output	

Electrical connection

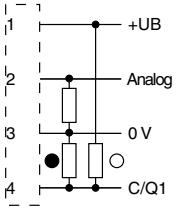
❍ = Light on, ● = Dark on



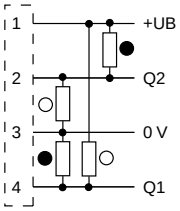
Option 115/136



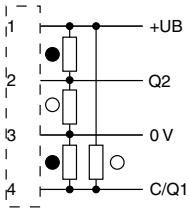
Option /110/122

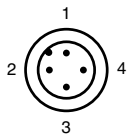


Option /73c/136



Option /136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2012-11-12

Notes

Adjustment

Teach-in

With the rotary switch, you can select output Q1 or Q2 and the relevant switching threshold A or B.
The yellow LEDs indicate the current state of the selected output.

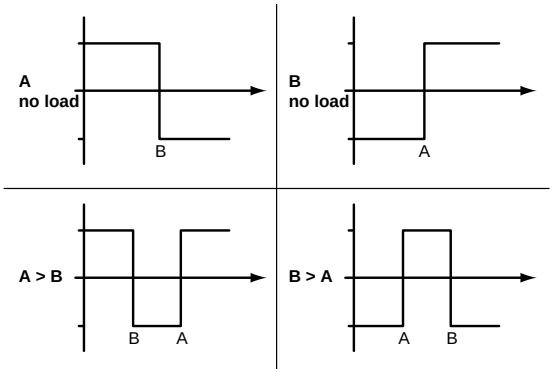
To store the switching threshold (distance value) press the "SET" button until the LEDs flash in phase (approx. 2 s). Teach-in starts when the "SET" button is released.
Successful teach-in is indicated by alternating flashing (2.5 Hz) of the yellow and green LEDs.

Unsuccessful teach-in is indicated by alternating flashing (8 Hz).

After successful teach-in, the output and LED change their status.
After unsuccessful teach-in, the sensor continues to operate with the previous valid setting after the relevant error message is issued.

This procedure can be repeated for all switching points.

Different switching modes can be selected by choosing different switching points.



Every taught-in value can be re-taught (overwritten) by pressing the SET button again.

By pressing the "SET" button for > 5 s, the taught-in value is deleted. This procedure is indicated when the LEDs go out simultaneously.

Default setting

In general, no switching points are set at the factory. The outputs are switched to low.

Reset to default settings

- Set the rotary switch to the "RUN" position.
- Press the "SET" button until the in-phase flashing of the LEDs stops (approx. 10 s)
- If the green LED lights up, the procedure is complete.

Accessories

IO-Link-Master-USB DTM	Communication DTM for use of IO-Link-Master
PACTware 4.X	Software
VDM28-IO-Link DTM	Device DTM for communication with VDM28-IO-Link sensors
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
IO-Link-Master01-USB	IO-Link Master
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-RLK29	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-K01	dove tail mounting clamp
OMH-K03	dove tail mounting clamp
OMH-VDM28-01	Metal enclosure for inserting protective panes or apertures

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PEPPERL+FUCHS SENSING YOUR NEEDS

Retroreflective laser distance sensor with 50 m detection range

- **Retroreflective laser distance sensor**
- **Measuring method PRT (Pulse Ranging Technology)**
- **Accurate, clear, and reproducible measuring results, regardless of ambient conditions and object**
- **Red laser as the light emitter**
- **Version with laser class 1 or class 2**
- **Version with IO-Link interface**
- **Version with analog output**

Product information

The VDM28 distance measurement device employs Pulse Ranging Technology (PRT).
It has a repeat accuracy of 5 mm with an operating range of 0.2 ... 50 m and an absolute accuracy of 25 mm.
The sensor is highly resistant to ambient conditions. The compact housing of the Series 28 photoelectric sensors, with dimensions of 88 mm (height), 26 mm (width) and 54 mm (depth), make it the smallest device available in its class.

Typical applications

- Object identification or classification
- Positioning
- Level measurement
- Collision avoidance/distance measurement
- Compartment occupied checks
- Rack fine positioning
- Stack height control
- Coil measurement
- Dip monitoring
- Lift height checks
- Opening impulse sensor and closing edge monitoring on automatic doors, industrial gates and barrier systems
- Vehicle detection for traffic engineering purposes (e.g. monitoring of individual parking spaces)
- Height measurement in tunnels and entranceways

Detection area

Date of issue 2012-11-12

Technische Daten

Model Number		VDM28-50-R/73c/136	VDM28-50-R1-IO/73c/110/122
Measurement range	0.2 ... 50 m	●	●
Reference target	OFR-100/100	●	●
Light source	laser diode typ. service life 85,000 h at Ta = +25 °C	●	●
Light type	modulated visible red light	●	●
Laser class	1		●
	2	●	
Wave length	660 nm	●	●
Angle deviation	max. ± 2°	●	●
Measuring method	Pulse Ranging Technology (PRT)	●	●
Diameter of the light spot	< 50 mm at a distance of 50 m at 20 °C	●	●
Ambient light limit	50000 Lux	●	●
Temperature influence	typ. ≤ 0.25 mm/K	●	●
$MTTF_d$	200 a	●	●
Mission Time (T_M)	10 a	●	●
Diagnostic Coverage (DC)	0 %	●	●
Operating display	LED green	●	●
Function display	2 LEDs yellow for switching state	●	●
TEACH-IN indication	TEACH-IN: LED green/yellow equiphase flashing; 2.5 Hz Teach Error:LED green/yellow non equiphase flashing; 8.0 Hz	●	●
Controls	5-step rotary switch for operating modes selection (threshold setting and operating modes)	●	●
Controls	Switch for setting the threshold values	●	●
Operating voltage	10 ... 30 V DC / when operating in IO-Link mode: 18 ... 30 V		●
	10 ... 30 V DC , class 2	●	
Ripple	10 % within the supply tolerance	●	●
No-load supply current	≤ 70 mA / 24 V DC	●	●
Time delay before availability	1.5 s	●	●
Interface type	IO-Link		●
Protocol	IO link V1.0		●
Cycle time	min. 2.3 ms		●
Mode	COM 2 (38.4 kBaud)		●
Process data witdh	16 bit		●
SIO mode support	yes		●
Signal output	Push-pull output, short-circuit protected, reverse polarity protected		●
	2 push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected	●	
Switching voltage	max. 30 V DC	●	●
Switching current	max. 100 mA	●	●
Measurement output	1 analog output 4 ... 20 mA, short-circuit/overload protected		●
Switching frequency	50 Hz	●	●
Response time	10 ms	●	●
Absolute accuracy	± 25 mm	●	●
Repeat accuracy	< 5 mm	●	●
Directive conformity	EMC Directive 2004/108/EC	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●
Laser class	IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007	●	●
Protection class	II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●
Ambient temperature	-30 ... 50 °C (-22 ... 122 °F)	●	●
Storage temperature	-30 ... 70 °C (-22 ... 158 °F)	●	●
Protection degree	IP65	●	●
Connection	connector M12 x 1, 4-pin	●	●
Housing	Plastic ABS	●	●
Optical face	Plastic pane	●	●
Mass	90 g	●	●

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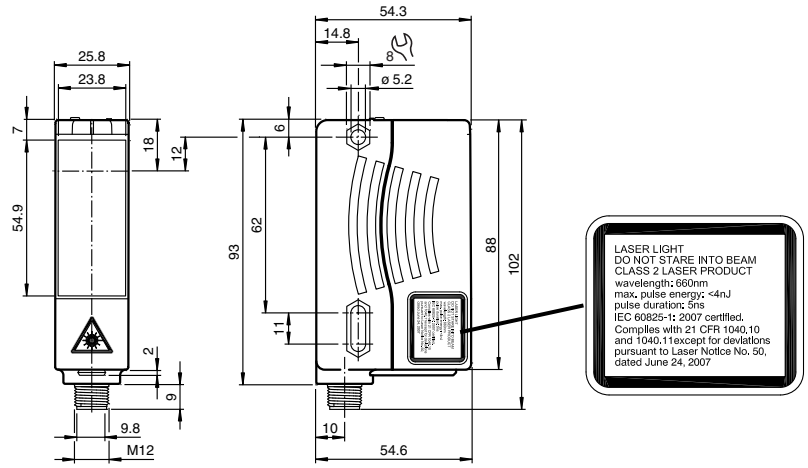
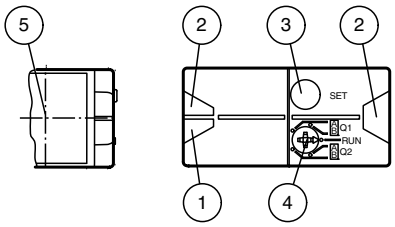
SENSING YOUR NEEDS

Dimensions



Indicators/operating means

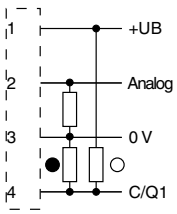


1	Operating display	green
2	Signal display	yellow
3	TEACH-IN button	
4	Mode rotary switch	
5	Laser output	

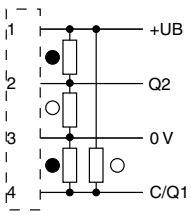
Electrical connection

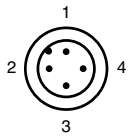
❍ = Light on, ● = Dark on

Option /110/122



Option /136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2012-11-12

Notes

Adjustment

Teach-in

With the rotary switch, you can select output Q1 or Q2 and the relevant switching threshold A or B.
The yellow LEDs indicate the current state of the selected output.

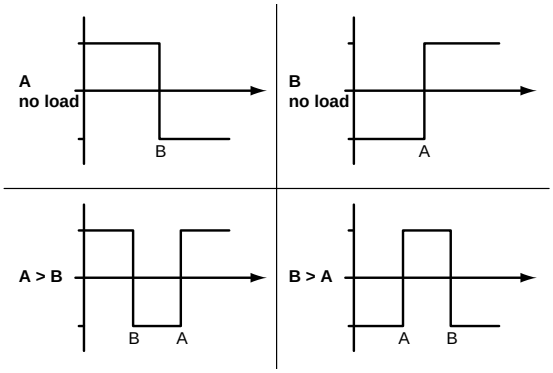
To store the switching threshold (distance value) press the "SET" button until the LEDs flash in phase (approx. 2 s). Teach-in starts when the "SET" button is released.
Successful teach-in is indicated by alternating flashing (2.5 Hz) of the yellow and green LEDs.

Unsuccessful teach-in is indicated by alternating flashing (8 Hz).

After successful teach-in, the output and LED change their status.
After unsuccessful teach-in, the sensor continues to operate with the previous valid setting after the relevant error message is issued.

This procedure can be repeated for all switching points.

Different switching modes can be selected by choosing different switching points.



Every taught-in value can be re-taught (overwritten) by pressing the SET button again.

By pressing the "SET" button for > 5 s, the taught-in value is deleted. This procedure is indicated when the LEDs go out simultaneously.

Default setting

In general, no switching points are set at the factory. The outputs are switched to low.

Reset to default settings

- Set the rotary switch to the "RUN" position.
- Press the "SET" button until the in-phase flashing of the LEDs stops (approx. 10 s)
- If the green LED lights up, the procedure is complete.

Accessories

IO-Link-Master-USB DTM	Communication DTM for use of IO-Link-Master
PACTware 4.X	Software
VDM28-IO-Link DTM	Device DTM for communication with VDM28-IO-Link sensors
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OMH-21	Mounting bracket
OMH-22	Mounting bracket
IO-Link-Master01-USB	IO-Link Master
OMH-RLK29	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-K01	dove tail mounting clamp
OMH-K03	dove tail mounting clamp
OMH-VDM28-01	Metal enclosure for inserting protective panes or apertures

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PEPPERL+FUCHS SENSING YOUR NEEDS

Optical laser distance measurement devices for long sensing ranges for accurate positioning of elevator car

- **Measuring method PRT (Pulse Ranging Technology)**
- **Active dynamic control**
- **Non-contact precision measurement**
- **Ultra-fast data acquisition**
- **Modern lightweight design, extremely robust**
- **Simple programming with 4 keys and luminous display**

Product information

Series VDM 100 laser distance measurement devices are designed for high distances. They have a repeat accuracy of 0.5 mm. SSI and fieldbusses are used as value interfaces.
These devices are used for precise positioning of rack operating units, gantry cranes, rail-bound vehicles, elevators and other linear movable units.

Typical applications

- Stock feeders
- Moving vehicles
- Gantry cranes and lifts

Detection area

Date of issue 2012-11-12

Technische Daten

Model Number		VDM100-50-SSI	VDM100-150-SSI	VDM100-300-SSI
Measurement range	0.3 ... 150 m		●	
	0.3 ... 300 m			●
	0.3 ... 50 m	●		
Reference target	Foil reflector 500 mm x 500 mm	●	●	
	Reflector VDM01			●
Light source	laser diode	●	●	●
Laser class	Measurement laser: 1 Alignment laser: 2	●	●	●
Wave length	Measurement laser: 905 nm Alignment laser: 660 nm	●	●	●
Measuring method	Pulse Ranging Technology (PRT)	●	●	●
Max. Motion velocity	15 m/s	●	●	●
Alignment aid	Laserpointer		●	
	Laserpointer Laser class 2	●		●
Diameter of the light spot	< 15 cm at 50 m	●		
	< 35 cm at 150 m		●	
	< 70 cm at 300 m			●
Ambient light limit	> 100000 Lux	●	●	●
Resolution	0.1 mm , adjustable	●	●	●
Temperature influence	0.03 mm/K	●	●	●
$MTTF_d$	120 a	●	●	●
Mission Time (T_M)	20 a	●	●	●
Diagnostic Coverage (DC)	0 %	●	●	●
Function display	4 LEDs	●	●	●
Controls	Control panel (4 membrane keys) for setting parameters	●	●	●
Parameterization display	Illuminated display for displaying measured values and parameterization	●	●	●
Operating voltage	18 ... 30 V DC	●	●	●
No-load supply current	250 mA (18 V) ... 150 mA (30 V)	●	●	●
Protection class	III (operating voltage 50 V)	●	●	●
Time delay before availability	< 10 s	●	●	●
Interface type	SSI	●	●	●
Read out rate	4000/s Clock frequency: 100 kHz ... 1 MHz	●	●	●
Input/output type	2 PNP inputs/outputs, independent configuration, short-circuit protected, reverse polarity protected	●	●	●
Switching threshold	low: Ue < 6 V, high: Ue > 16 V	●	●	●
Switching threshold	low: Ua < 1 V, high: Ua > Ub - 1 V	●	●	●
Switching current	200 mA per output	●	●	●
Measured value output	1 ms	●	●	●
Average data age	3 ms , 6 ms , 12 ms , 25 ms , 50 ms , adjustable	●	●	●
Offset	max. 2 mm (between two devices)	●	●	●
Absolute accuracy	± 2.5 mm (> 3 m); ± 3.5 mm (0.3 m to 3 m)	●	●	●
Repeat accuracy	< 0.5 mm	●	●	●
Directive conformity	EMC Directive 2004/108/EC	●	●	●
Product standard	EN 61326-1:2006	●	●	●
Laser class	IEC 60825-1:2007	●	●	●
UL approval	cULus Listed	●	●	●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)	●	●	●
Storage temperature	-20 ... 70 °C (-4 ... 158 °F)	●	●	●
Relative humidity	95 % , no moisture condensation	●	●	●
Protection degree	IP65	●	●	●
Connection	4-pin, M12x1 connector, standard (supply) , 5-pin, M12 x 1 connector, B-coded (SSI) , 8-pin M12x1 connector, service	●	●	●
Housing	ABS / PC	●	●	●
Optical face	PMMA , hard coated	●	●	●
Mass	approx. 700 g	●	●	●

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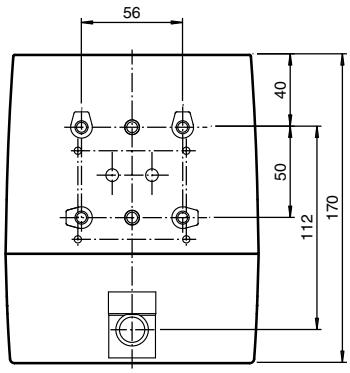
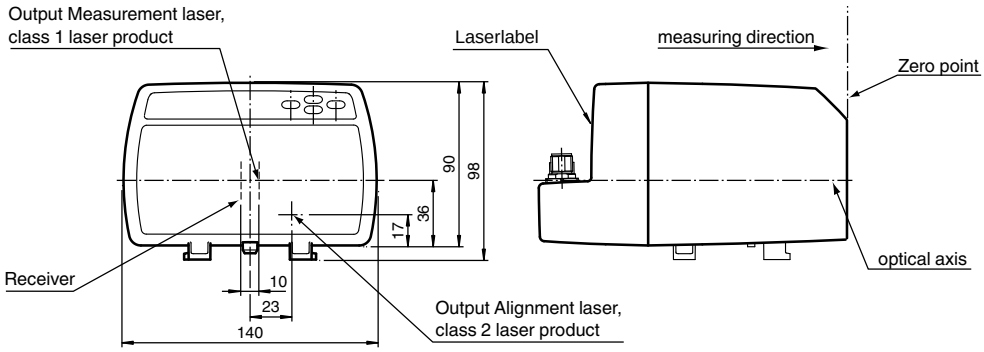
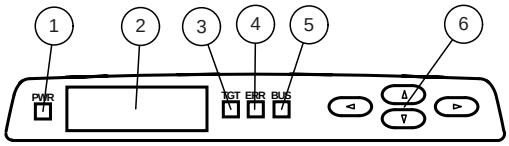
Dimensions



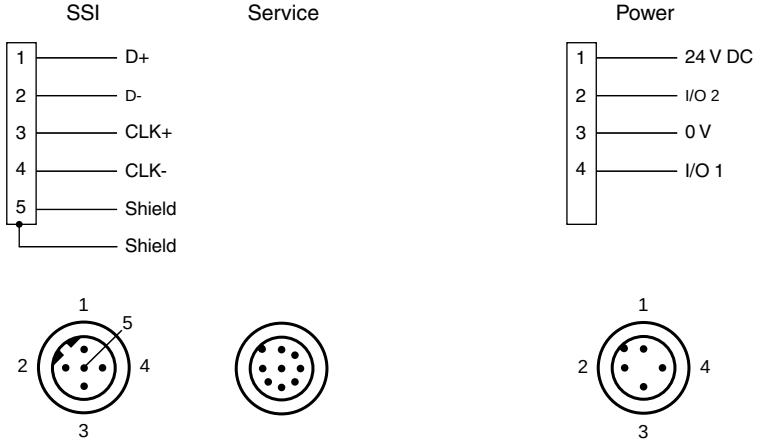


Indicators/operating means



1	Power-LED	green
2	Display	
3	TARGET-LED	green
4	ERROR-LED	red
5	BUS-LED	green
6	Control keys	

Electrical connection

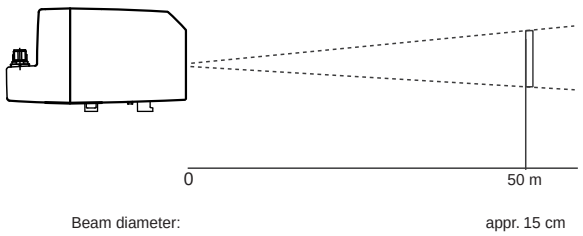


Date of issue 2012-11-12

Notes

VDM100-50-SSI

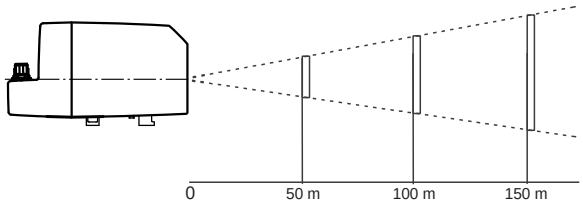
Beam divergence VDM100



Beam diameter: appr. 15 cm

VDM100-150-SSI

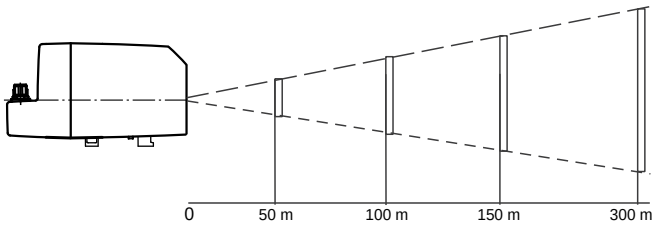
Beam divergence VDM100



Beam diameter: appr. 15 cm appr. 25 cm appr. 35 cm

VDM100-300-SSI

Beam divergence VDM100



Beam diameter: appr. 15 cm appr. 25 cm appr. 35 cm appr. 65 cm

VDM100-50-SSI
VDM100-150-SSI
VDM100-300-SSI

Reflector arrangement VDM100

Accessories

OMH-LS610-05	Mounting bracket for optical data coupler and distance measurement devices
V15-G-PG9	Cable socket, M12, 5-pin, ready for assembly
V15-W-PG9	Cable socket, M12, 5-pin, ready for assembly
V15B-G	Cable socket, M12, for PROFIBUS, adjustable
V15SB-G	Cable connector, M12, for PROFIBUS, adjustable
V1-W	4-pin, M12 female field-attachable connector
V1-G	4-pin, M12 female field-attachable connector
V15-G-15M-LIHCH-TP	SSI bus cable, B-coded M12, 5-pin cable
Schutzkappe LS610 Zubehoer	M12 protective cap set (connector + socket) for series LS610 / LS611
Funktionserdung LS610/VDM100 Zubehoer	Function grounding for LS610 / LS611 / VDM100 series
OMH-VDM100-01	Mounting bracket with deviation mirror for distance measurement devices
OMH-LS610-01	Mounting bracket for optical data coupler

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PEPPERL+FUCHS
SENSING YOUR NEEDS

Miniature photoelectric Plug-In sensor, ideal for installation in doors and turnstiles

- **Single-beam miniature photoelectric sensor, ideal for installing in frames or contours**
- **Integrated circuit**
- **Plug-in style housing for 13 mm hole**
- **Narrow opening angle, suitable for mounting in pairs**
- **Various frequencies for avoiding mutual interference (cross-talk immunity)**
- **Version with test input**
- **Light on version**
- **Dark on version**

CE

Product information

There is no simpler way of installing a sensor: drill the hole, clip in the sensor and you're done. What's more, the BB10 plug-in sensors for doors and turnstiles offer top performance at an extremely attractive price. The switching mechanism is integrated in the compact, self-contained and temperature-stable housing, making the BB10 suitable even for extremely cold regions with temperatures as low as -40°C.

Typical applications

- Monitoring function for turnstiles
- Activation function for restarting escalators
- Monitoring of industrial gates
- Person detection for automatic doors and gates

Detection area

Date of issue 2012-11-12

Technical data

Model Number		BB10-P/25/33/76b/102/115-7m	BB10-P/25/33/76b/103/115-7m	BB10-P/33/59/76b/102/115-7m	BB10-P/33/59/76b/103/115-7m	BB10-P-F1/33/35/59/102/115-7m	BB10-P-F1/33/35/59/103/115-7m	BB10-P-F1/25/33/35/102/115-7m	BB10-P-F1/25/33/35/103/115-7m	BB10-P-F2/33/35/59/102/115-7m	BB10-P-F2/33/35/59/103/115-7m	BB10-P-F2/25/33/35/102/115-7m	BB10-P-F2/25/33/35/103/115-7m	BB10-P/25/33/76b/102/115e	BB10-P/25/33/76b/103/115e
Effective detection range	0 ... 3 m					●	●	●	●	●	●	●	●		
	0 ... 6 m	●	●	●	●									●	●
Threshold detection range	4 m					●	●	●	●	●	●	●	●		
	8 m	●	●	●	●									●	●
Light source	IRED	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Light type	modulated infrared light , 880 nm	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Diameter of the light spot	approx. 1300 mm at a distance of 6 m	●	●	●	●									●	●
	approx. 250 mm at a distance of 1 m					●	●	●	●	●	●	●	●		
Angle of divergence	Emitter: +/- 3 ° Receiver: +/- 10 °					●	●	●	●	●	●	●	●		
	Emitter: +/- 8 ° Receiver: +/- 10 °	●	●	●	●									●	●
Optical face	frontal	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ambient light limit	halogen light 100000 Lux ; according to EN 60947-5-2:2007	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Accessories provided	7 m PVC cable with 3-pin JST connector													●	●
$MTTF_d$	795 a	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Mission Time (T_M)	20 a	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Diagnostic Coverage (DC)	0 %	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Function display	LED red: lights up when receiving the light beam ; flashes when falling short of the stability control; OFF when light beam is interrupted	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Operating voltage	10 ... 30 V DC	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Test input	emitter deactivation at 0 V	●	●	●	●									●	●
Switching type	dark on			●	●	●	●			●	●				
	light on	●	●					●	●			●	●	●	●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●		●		●		●		●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●		●		●		●		●		●
Switching voltage	max. 30 V DC	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Switching current	max. 100 mA	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Voltage drop	≤ 1.5 V DC	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Switching frequency	100 Hz					●	●	●	●	●	●	●	●		
	62.5 Hz	●	●	●	●									●	●
Response time	5 ms					●	●	●	●	●	●	●	●		
	8 ms	●	●	●	●									●	●
EMC Directive 2004/108/EC	EN 60947-5-2	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Protection degree	IEC 60529:2001	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F) , fixed -20 ... 60 °C (-4 ... 140 °F) , movable	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Protection degree	IP67	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Connection	7 m fixed cable Receiver: grey ; Emitter: black	●	●	●	●	●	●	●	●	●	●	●	●		
	0.15 m cable with 3-pin JST connector Receiver: grey ; Emitter: black													●	●
Housing	PC , black	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Optical face	Plastic pane	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Mass	approx. 100 g per device	●	●	●	●	●	●	●	●	●	●	●	●		
	approx. 25 g per device													●	●

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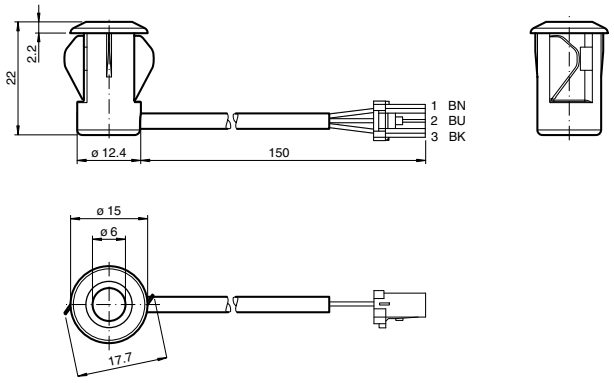
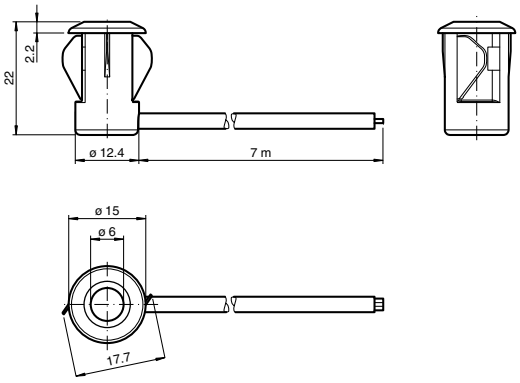
PEPPERL+FUCHS
SENSING YOUR NEEDS

Dimensions

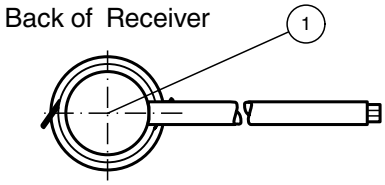
Option /115e



Option /115

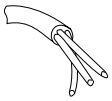


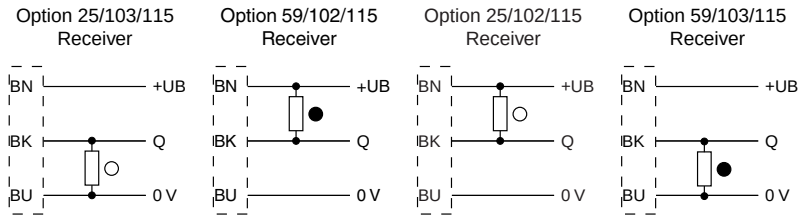
Indicators/operating means

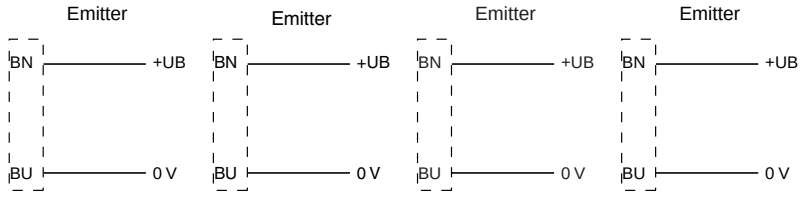


1	Signal display	red

Electrical connection







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Notes

Operating principle

The thru-beam sensor requires two devices for operation; a light source and a light receiver. The light source and receiver must be optically aligned with one another in a single line. The infrared light emitted from the source is recorded by the receiver and evaluated.
The sensor detects both people and objects for as long as an object interrupts the detection beam, regardless of movement and surface structure.

Function

Static detection:
The sensor detects both people and objects for as long as an object interrupts the detection beam, regardless of movement and surface structure.

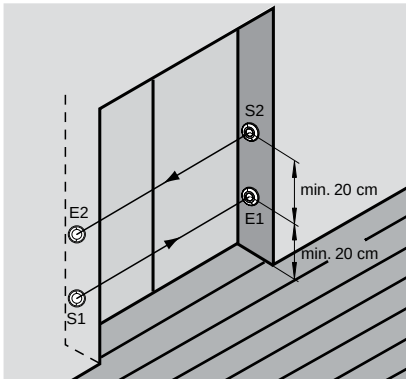
		Electronic output
Light ON /25	Person located within beam	Inactive
	No people located within beam	Active
Dark ON /59	Person located within beam	Active
	No people located within beam	Inactive

Optics:
The relatively wide opening angles allow the sensors to be mounted quickly without any alignment issues. Function is maintained even if mounting profiles are slightly distorted.
Mounting:
Thanks to its compact dimensions, the sensor fits in U profiles or behind any covers.

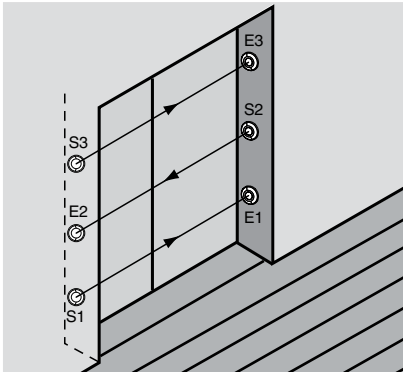
	Hole diameter [mm]	
Sheet thickness [mm]	13	13.5
1	OK	X
2	OK	OK
3	OK	OK

X = mounting not possible
OK = mounting possible

Mounting for dual-beam protection:
For dual-beam versions, two light sources and receivers are required.
When using thru-beam sensors with two different transmission frequencies (F1 and F2), it is not necessary to observe a minimum beam distance between the thru-beam sensors.
When using thru-beam sensors with the same transmission frequency: Ensure that the minimum beam distance is 20 cm and that the transmitter and receiver are arranged in a cross formation.



Mounting for three-beam protection:
For a three-beam arrangement, three light sources and three receivers with differing transmission frequencies (F1, F2, and F3) are required.
When using thru-beam sensors with three different transmission frequencies (F1, F2, and F3), it is not necessary to observe a minimum beam distance between the thru-beam sensors where one thru-beam sensor is arranged in a cross formation.



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PEPPERL+FUCHS SENSING YOUR NEEDS

Single-beam miniature sensor, ideal for installing in frames or door profiles

- **Single-beam monitoring with extremely narrow sensor**
- **Integrated circuit**
- **Test**
- **Simple installation - Plug & Play**
- **Ideal for installation in door profiles or frames**
- **Light on version**
- **Dark on version**

CE

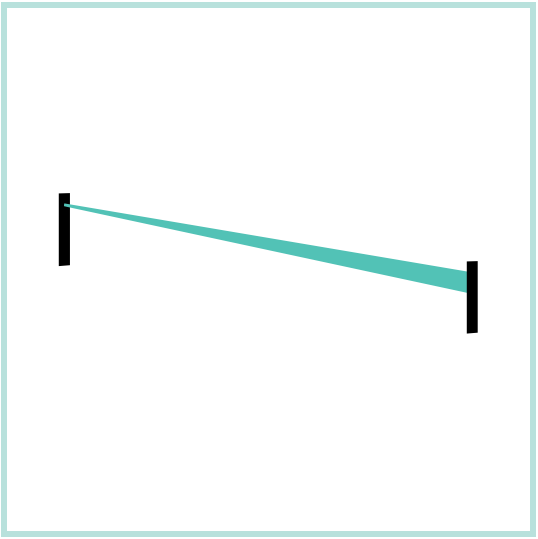
Product information

The narrow miniature thru-beam sensors are a small and cost-effective solution, fitting in virtually any door frame. The ML29 and ML30 series offer fast, reliable detection at a distance of up to 8.5 m. The sensors are easy to mount on the profile, either using adhesive strips or a screw. A large opening angle ensures problem-free alignment. Several sensors can be mounted in a cross formation to offer multi-beam protection.

Typical applications

- Person detection for automatic doors and gates
- Closing edge protection on sliding and revolving doors
- Threshold monitoring for elevator doors
- Step monitoring for doors on public transport vehicles
- Trigger function for restarting escalators

Detection area



Date of issue 2012-11-12

Technical data

Model Number		ML29-P/25/102/115	ML29-P/25/102/143	ML29-P/25/103/115	ML29-P/25/103/143	ML29-P/59/102/115	ML29-P/59/102/143	ML29-P/59/103/115	ML29-P/59/103/143
Effective detection range	0 ... 6 m	●	●	●	●	●	●	●	●
Threshold detection range	8.5 m	●	●	●	●	●	●	●	●
Light source	IRED	●	●	●	●	●	●	●	●
Light type	modulated infrared light	●	●	●	●	●	●	●	●
Angle of divergence	+/- 8 °	●	●	●	●	●	●	●	●
Optical face	lateral	●	●	●	●	●	●	●	●
Ambient light limit	40000 Lux	●	●	●	●	●	●	●	●
$MTTF_d$	880 a	●	●	●	●	●	●	●	●
Mission Time (T_M)	20 a	●	●	●	●	●	●	●	●
Diagnostic Coverage (DC)	0 %	●	●	●	●	●	●	●	●
Function display	LED red in receiver : lights up when receiving the light beam	●	●	●	●	●	●	●	●
Operating voltage	11 ... 30 V DC	●	●	●	●	●	●	●	●
Test input	Test: Transmitter switches off at +UB ≤ 5 V DC	●	●	●	●	●	●	●	●
Switching type	dark on					●	●	●	●
	light on	●	●	●	●				
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●	●			●	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	●			●	●
Switching voltage	max. 30 V DC	●	●	●	●	●	●	●	●
Switching current	max. 0.1 A	●	●	●	●	●	●	●	●
Switching frequency	100 Hz	●	●	●	●	●	●	●	●
Response time	5 ms	●	●	●	●	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●	●	●	●
Standards	EN 61000-6-2, EN 61000-6-3	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●	●	●	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●	●	●	●	●
Protection degree	IP65	●	●	●	●	●	●	●	●
Connection	6 m fixed cable	●		●		●		●	
	4-pin plastic connector, 6.5 mm diameter		●		●		●		●
Housing	PMMA , black	●	●	●	●	●	●	●	●
Optical face	Plastic pane	●	●	●	●	●	●	●	●
Mass	per device 120 g	●	●	●	●	●	●	●	●

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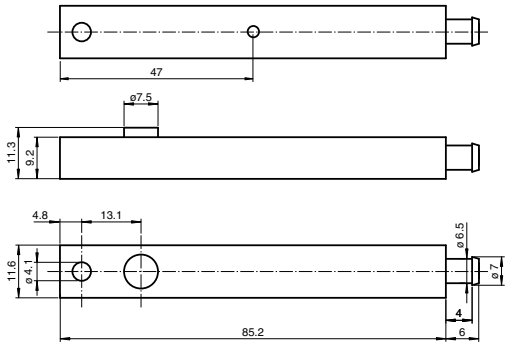
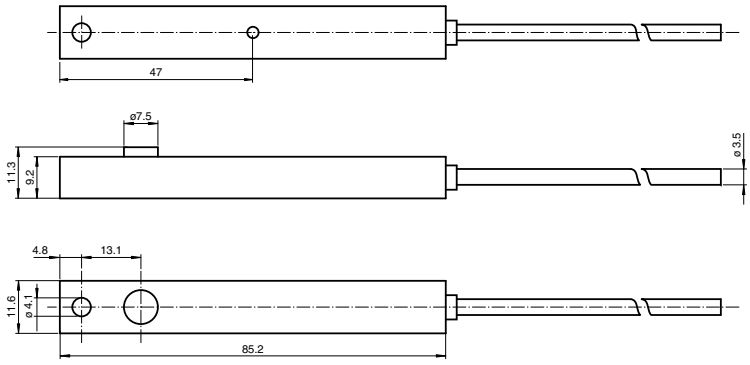
PEPPERL+FUCHS
SENSING YOUR NEEDS

Dimensions

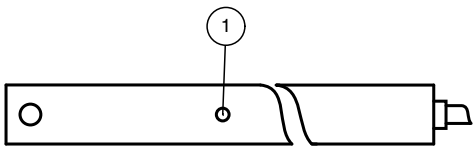
Option /143



Option /115



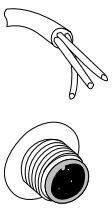
Indicators/operating means

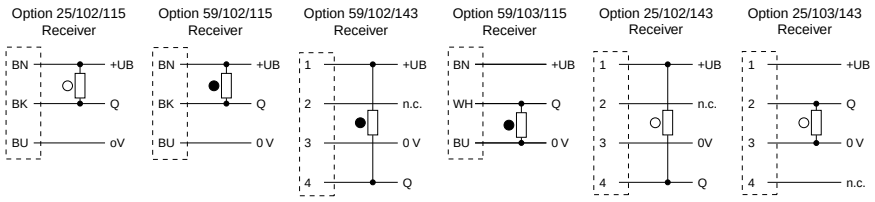


1	Functional display	red	only Receiver

Electrical connection

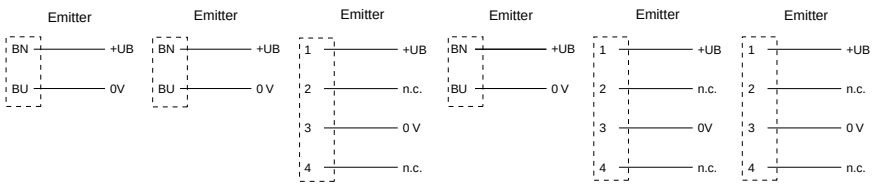
❍ = Light on, ● = Dark on





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)



Date of issue 2012-11-12

Notes

Function principle

The thru-beam sensor requires a pair of devices for operation, comprising a light transmitter and a light receiver. The emitter and receiver must be arranged in optical alignment with each other. The infrared light from the emitter is detected by the receiver and evaluated.

Function

Static detection:

The thru-beam sensor detects persons and objects independently of movement and surface structure for as long as the object breaks the detection beam.

		Electronic output
Light detection /25	Person in the beam	Inactive
	No person in the beam	Active
Dark detection /59	Person in the beam	Active
	No person in the beam	Inactive

Optics:

The relatively wide opening angles enable the light beam switches to be installed quickly, without alignment problems. Even if there is a light distortion of the installation profiles the function is retained.

Testing:

Testing is used to check the function of the light beam switch.

With supply voltage $+U_B < 5$ V the emitter device is switched off. This simulates a light beam interruption. By means of this, the function of the light barrier can be tested easily without using a separate test input.

Installation:

Thanks to its small dimensions, the light beam can be fitted in a U-profile or behind a face panel.The hole diameter for both the emitter and the receiver is 8 mm.

Even fixing by means of the adhesive tape contained in the delivery package can be considered.

Installation of twin-beam arrangement:

A twin-beam version requires 2 emitters and receivers. Care should be taken that the beam separation is not less than 20 cm. The transmitters and receivers must be arranged in the form of a cross.

Accessories

ML29 Kupplungsdose 3m 4polig	Female cordset with 3 m cable for ML29 series sensors
ML29 Kupplungsdose 6m 4polig	Female cordset with 6 m cable for ML29 series sensors
ML29 Front Plate	Front plate for thru-beam sensors in series ML29

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PEPPERL+FUCHS SENSING YOUR NEEDS

Single-beam miniature photoelectric sensor, ideal for installation in door frames, with certification in accordance with the EN 51155 railroad standard

- **Single-beam monitoring with extremely narrow sensor**
- **Integrated circuit**
- **Test**
- **Simple installation - Plug & Play**
- **Ideal for installation in door profiles or frames**
- **Dual-beam version master/slave for dual-beam protection of closing edges**
- **Compact housing version with 2 mounting options**
- **Version with Certification in accordance with railway standard EN 50155**

CE

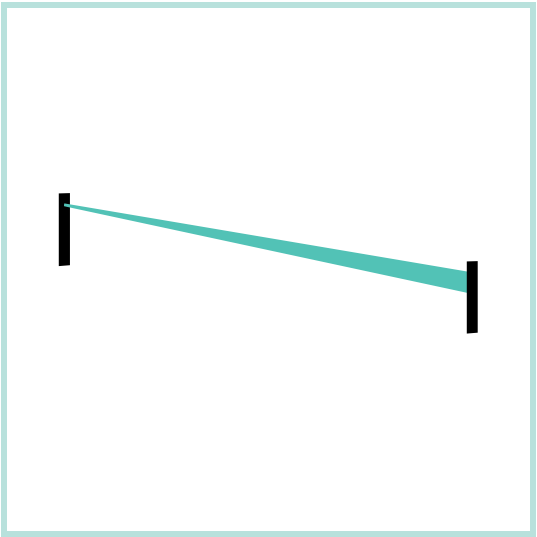
Product information

The narrow miniature thru-beam sensors are a small and cost-effective solution, fitting in virtually any door frame. The ML29 and ML30 series offer fast, reliable detection at a distance of up to 8.5 m. The sensors are easy to mount on the profile, either using adhesive strips or a screw. A large opening angle ensures problem-free alignment. Several sensors can be mounted in a cross formation to offer multi-beam protection.

Typical applications

- Person detection for automatic doors and gates
- Closing edge protection on sliding and revolving doors
- Threshold monitoring for elevator doors
- Step monitoring for doors on public transport vehicles
- Trigger function for restarting escalators

Detection area



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Technical data

Model Number		ML29T-P/32/59/115 100mm	ML30-P/25/102/115	ML29-2P/25/103/143
Effective detection range	0 ... 2.5 m	●		
	0 ... 5 m			●
	0 ... 6 m		●	
Threshold detection range	3.5 m	●		
	7 m			●
	8.5 m		●	
Light source	IRED	●	●	●
Light type	modulated infrared light	●	●	●
Angle of divergence	+/- 8 °	●	●	●
Optical face	lateral	●	●	●
Ambient light limit	40000 Lux	●	●	●
$MTTF_d$	1440 a	●		
	880 a			●
Mission Time (T_M)	20 a	●		●
Diagnostic Coverage (DC)	0 %	●		●
Function display	LED red in receiver : lights up when receiving the light beam	●	●	●
Operating voltage	10 ... 32 V DC	●	●	
	11 ... 30 V DC			●
Test input	Test: Transmitter switches off at +UB ≤ 5 V DC	●	●	
	Test: emitter deactivation at 0 V			●
Switching type	dark on	●		
	light on		●	●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector	●		●
Switching voltage	max. 30 V DC		●	●
	max. 32 V DC	●		
Switching current	max. 0.1 A		●	●
	max. 0.2 A	●		
Switching frequency	10 Hz	●		
	100 Hz		●	
	50 Hz			●
Response time	10 ms			●
	5 ms		●	
	50 ms	●		
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●
Standards	EN 50121-3-2 , EN 50155	●		
	EN 61000-6-2, EN 61000-6-3		●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		●	●
	-25 ... 60 °C (-13 ... 140 °F)	●		
Protection degree	IP65	●	●	●
Connection	100 mm fixed cable	●		
	6 m fixed cable		●	
	4-pin plastic connector, 6.5 mm diameter			●
Housing	PMMA , black	●	●	
	Transmitter: PMMA black / Receiver: red PMMA			●
Optical face	Plastic pane	●	●	●
Mass	per device 120 g	●	●	
	555 g			●

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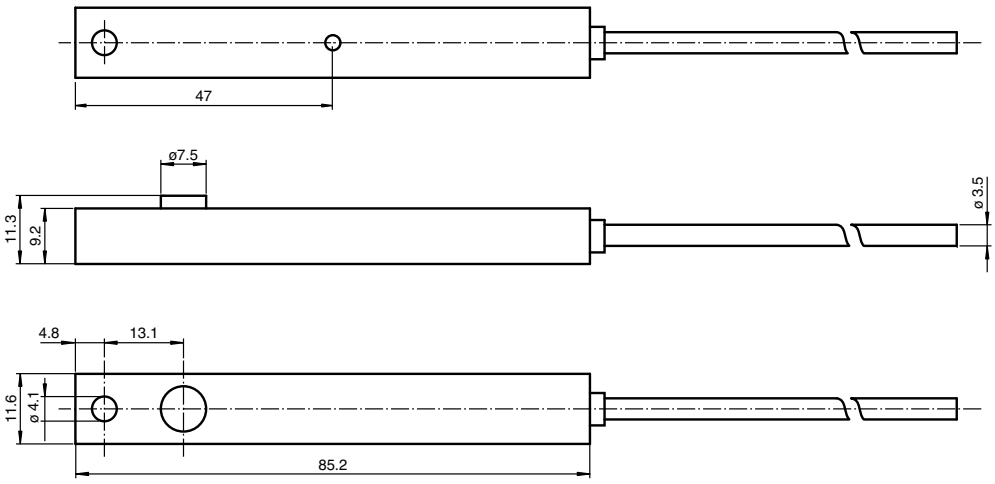
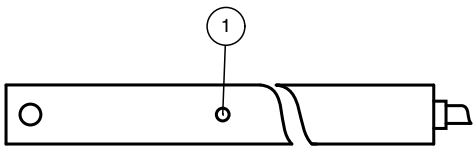
Dimensions



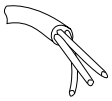
Indicators/operating means



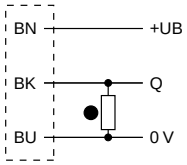
1	Functional display	red	only Receiver

Electrical connection

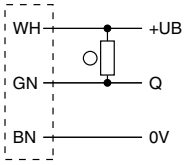
❍ = Light on, ● = Dark on



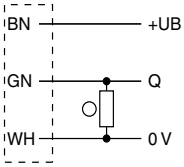
Option 32/59/115
Receiver



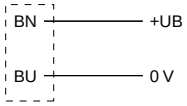
Option 25/102/115
Receiver



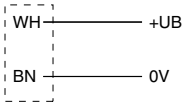
Option 25/103/115
Receiver



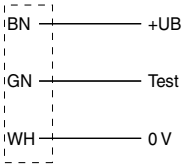
Transmitter



Transmitter



Transmitter



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Notes

Function principle

The thru-beam sensor requires a pair of devices for operation, comprising a light transmitter and a light receiver. The emitter and receiver must be arranged in optical alignment with each other. The infrared light from the emitter is detected by the receiver and evaluated.

Function

Static detection:

The light beam switch detects persons and objects independently of movement and surface structure for as long as the object breaks the detection beam.

		Electronic output
Light detection /25	Person in the beam	Inactive
	No person in the beam	Active
Dark detection /59	Person in the beam	Active
	No person in the beam	Inactive

Optics:

The relatively wide opening angles enable the light beam switches to be installed quickly, without alignment problems. Even if there is a light distortion of the installation profiles the function is retained.

Test input:

The test input is used to check the function of the light beam switch.

The test signal at the emitter switches the emitter off at $+U_B \leq 5$ V and thereby simulates a light beam interruption. It thus enables a complete check of the sensor from the optical path through to the output.

Installation:

Thanks to its small dimensions, the light beam can be fitted in a U-profile or behind a face panel.The hole diameter for both the emitter and the receiver is 8 mm.

Even fixing by means of the adhesive tape contained in the delivery package can be considered.

Installation of twin-beam arrangement:

A twin-beam version requires 2 emitters and receivers. Care should be taken that the beam separation is not less than 20 cm. The transmitters and receivers must be arranged in the form of a cross.

Accessories

ML29 Kupplungsdose 3m 4polig	Female cordset with 3 m cable for ML29 series sensors
ML29 Kupplungsdose 6m 4polig	Female cordset with 6 m cable for ML29 series sensors
ML29 Front Plate	Front plate for thru-beam sensors in series ML29

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PEPPERL+FUCHS SENSING YOUR NEEDS

Single-beam M18 threaded photoelectric sensor for detecting people, objects and vehicles

- 4 LEDs indicator for 360° visibility
- Efficient Line in a short M18 plastic housing for standard applications
- Sidelookerversion
- Version with front optical face
- DC voltage version
- Version for universal voltages
- Short design in M18 plastic housing

Product information

The GLV/GLK18 series sensors help improve the efficiency of machines and systems. The design of the M18 plastic housing, the connection technology, and sensor properties are highly standardized. Concentrating on the key sensor requirements has produced a robust and reliable product series for DC and AC/DC voltage systems without any over-engineering. The mounting set included in the scope of delivery and the optimized potentiometer design ensure fast assembly and easy configuration.

Typical applications

Packaging industry:
- Presence checks, track loading, completeness checks, stack height control

Material handling
- Presence checks, target sensor, profile checks, trigger sensor

Automatic doors, gates and access systems, elevator:
- Secure detection for automatic door and gate systems
- Monitoring function in turnstiles
- Closing edge monitoring in elevators

Detection area

Date of issue 2012-11-12

Technical data

Model Number		GA18/GK18/59/115/161	GD18/GV18/115/120	GD18/GV18/25/102/115	GA18-S/GK18-S/59/115/161	GD18-S/GV18-S/115/120	GD18-S/GV18-S/25/102/115
Effective detection range	0 ... 12 m				●	●	●
	0 ... 20 m	●	●	●			
Threshold detection range	17.5 m				●	●	●
	25 m	●	●	●			
Light source	LED	●	●	●	●	●	●
Light type	modulated visible red light , 640 nm	●	●	●	●	●	●
Diameter of the light spot	approx. 1000 mm at 25 m	●					
	approx. 1300 mm at 25 m		●	●			
	approx. 650 mm at 17.5 m				●	●	●
Angle of divergence	approx. 2 °				●	●	●
	approx. 3 °	●	●	●			
Optical face	frontal	●	●	●			
	lateral				●	●	●
Ambient light limit	30000 Lux	●	●	●	●	●	●
Accessories provided	Mounting aids	●			●		
$MTTF_d$	630 a		●	●		●	●
Mission Time (T_M)	20 a		●	●		●	●
Diagnostic Coverage (DC)	0 %		●	●		●	●
Operating display	LED green, statically lit Power on	●	●	●	●	●	●
Function display	Receiver: LED yellow, lights up when light beam is free, flashes when falling short of the stability control ; OFF when light beam is interrupted	●	●	●	●	●	●
Operating voltage	10 ... 30 V DC		●	●		●	●
	20 ... 250 V AC/DC	●			●		
Switching type	dark on	●			●		
	light/dark on		●			●	
	light on			●			●
Signal output	N-channel MOSFET, short circuit protected	●			●		
	1 NPN, short-circuit protected open collector			●			●
	2 PNP, complementary, short-circuit protected, open collectors		●			●	
Switching voltage	max. 250 V AC/DC	●			●		
	max. 30 V DC		●	●		●	●
Switching current	max. 100 mA		●	●		●	●
	max. 200 mA	●			●		
Voltage drop	≤ 1.5 V DC		●	●		●	●
	≤ 3.5 V AC/DC	●			●		
Switching frequency	50 Hz	●			●		
	500 Hz		●	●		●	●
Response time	≤ 1 ms		●	●		●	●
	≤ 10 ms	●			●		
Product standard	EN 60947-5-2:2007 ; IEC 60947-5-2:2007	●			●		
	EN 60947-5-2:2007 IEC 60947-5-2:2007		●	●		●	●
Standards	UL 508	●			●		
Protection class	II, rated insulation voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1	●	●	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●	●		●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●			●		
	-25 ... 60 °C (-13 ... 140 °F)		●	●		●	●
Protection degree	IP67	●	●	●	●	●	●
Connection	2 m fixed cable	●	●	●	●	●	●
Housing	PC	●	●	●	●	●	●
Optical face	PMMA	●	●	●	●	●	●
Mass	approx. 100 g per device	●			●		
	approx. 75 g per device		●	●		●	●

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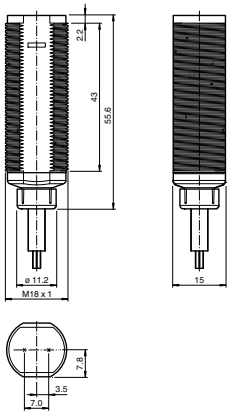
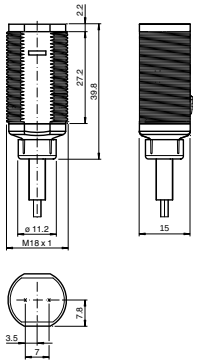
Dimensions

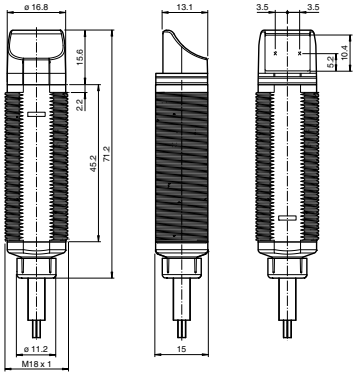
GA18/GK18



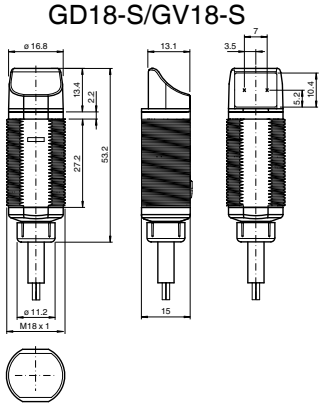
GD18/GV18



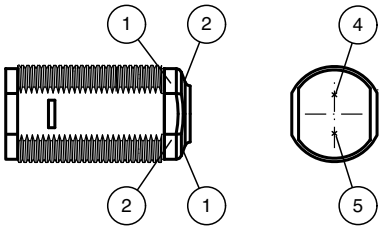
GA18-S/GK18-S



GD18-S/GV18-S



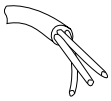
Indicators/operating means



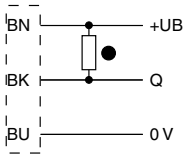
1	Operating display	green
2	Signal display	yellow
4	Emitter	
5	Receiver	

Electrical connection

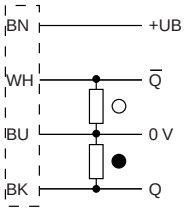
❍ = Light on, ● = Dark on



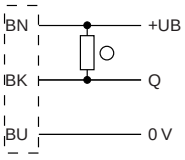
Option 59/115/161
Receiver



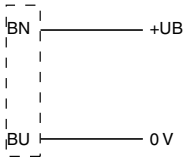
Option 115/120
Receiver



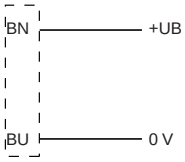
Option 25/102/115
Receiver



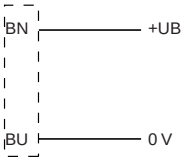
Emitter



Emitter



Emitter



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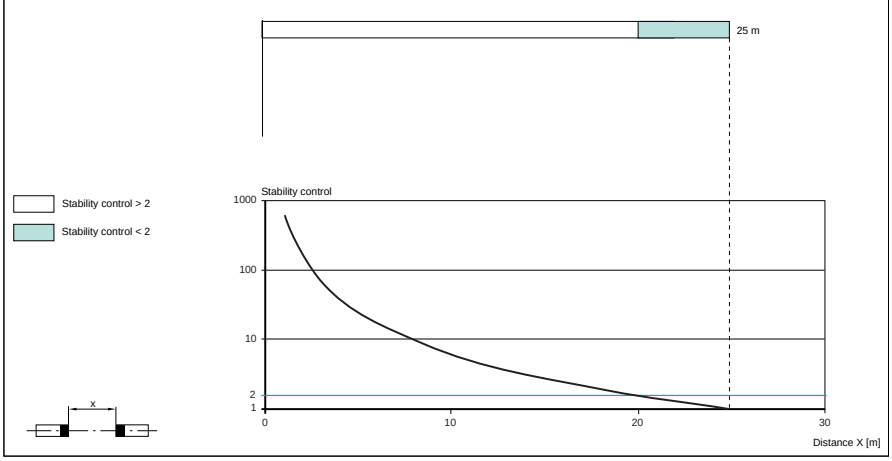
Notes

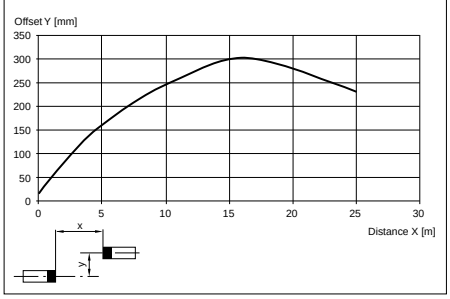
GA18/GK18/59/115/161
GD18/GV18/115/120
GD18/GV18/25/102/115

Relative received light strength



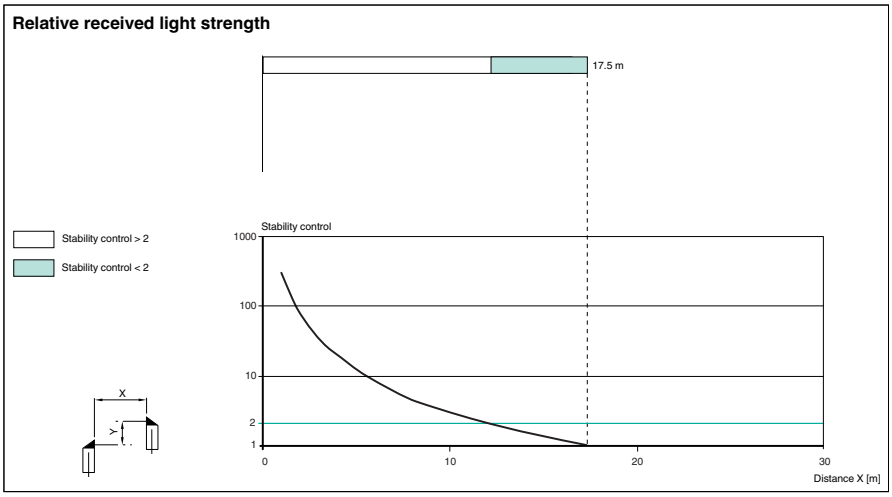
GA18/GK18/59/115/161
GD18/GV18/115/120
GD18/GV18/25/102/115

Characteristic response curve



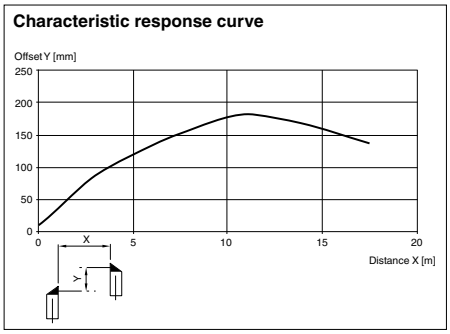
GA18-S/GK18-S/59/115/161
GD18-S/GV18-S/115/120
GD18-S/GV18-S/25/102/115

Relative received light strength



GA18-S/GK18-S/59/115/161
GD18-S/GV18-S/115/120
GD18-S/GV18-S/25/102/115

Characteristic response curve



Accessories

CPZ18B03	Mounting Bracket with swivel nut
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm

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PEPPERL+FUCHS SENSING YOUR NEEDS

Basic miniature photoelectric sensor for detecting people, objects and vehicles

- **Cost-optimized series for standard tasks**
- **Miniature design**
- **Tamper-proof, no operating controls**
- **Not sensitive to ambient light**
- **Flexible use with versatile mounting opportunities**

Product information

Small, robust and reliable, the ML8 series of miniature sensors is particularly suitable for non-contact detection of objects in confined spaces. The LED indicator is located behind the lens and provides reliable information on the sensor's operating status. The LED is always visible, even if the sensor is completely embedded. Flexible mounting options and fixed preset detection ranges simplify setup and operation.

Typical applications

Doors, gates and elevators
- Person detection for automatic doors and gates
- Protection for closing edges on sliding and revolving doors
- Threshold monitoring for elevator doors
- Activation function for restarting escalators

Container handling
- Target sensor
- Control movement on conveyors
- Stack height monitoring

General assembly applications
- Presence monitoring
- Congestion monitoring
- Track loading
- Completeness check

Detection area

Date of issue 2012-11-12

Technical data

Model Number		M8/MV8/76a/103/115b	M8/MV8/76a/103/143
Effective detection range	0 ... 3.5 m	●	●
Threshold detection range	4.5 m	●	●
Light source	LED	●	●
Light type	modulated visible red light , 660 nm	●	●
Target size	min. 7 mm	●	●
Diameter of the light spot	approx. 180 mm at a distance of 3.5 m	●	●
Angle of divergence	approx. 3 °	●	●
Ambient light limit	40000 Lux	●	●
$MTTF_d$	1090 a	●	●
Mission Time (T_M)	20 a	●	●
Diagnostic Coverage (DC)	0 %	●	●
Function display	Receiver: LED yellow, lights up when light beam is free, flashes when falling short of the stability control	●	●
Operating voltage	10 ... 30 V DC , class 2	●	●
Test input	emitter deactivation at $+U_B$	●	●
Switching type	dark on	●	●
Signal output	1 PNP output, short-circuit protected, reverse polarity protected, open collector	●	●
Switching voltage	max. 30 V DC	●	●
Switching current	max. 100 mA	●	●
Voltage drop	≤ 1.5 V DC	●	●
Switching frequency	1000 Hz	●	●
Response time	0.5 ms	●	●
Directive conformity	EMC Directive 2004/108/EC	●	●
Product standard	EN 60947-5-2:2007	●	●
Protection degree	EN 60529	●	●
Standards	EN 50178, UL 508	●	●
Protection class	II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●
Protection degree	IP67	●	●
Connection	fixed cable 300 mm with M12 connector, 4-pin	●	
	M8 x 1 connector, 4-pin		●
Housing	PC (glass-fiber-reinforced Makrolon)	●	●
Optical face	PMMA	●	●
Connector	plastic		●
Mass	approx. 100 g (emitter and receiver)	●	
	approx. 20 g (emitter and receiver)		●

Date of issue 2012-11-12

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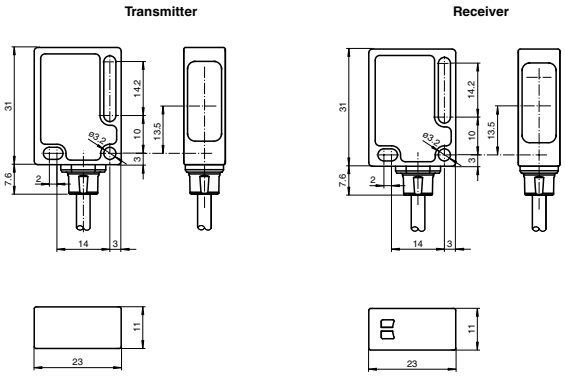
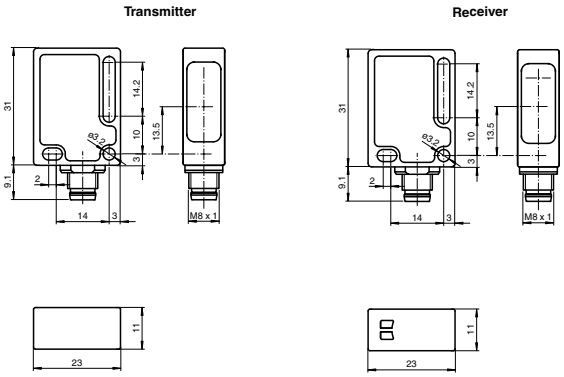
Dimensions

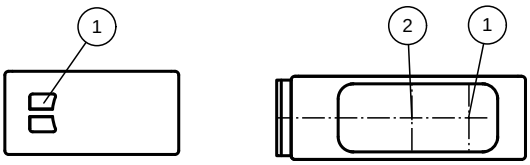
Option /115



Option /143



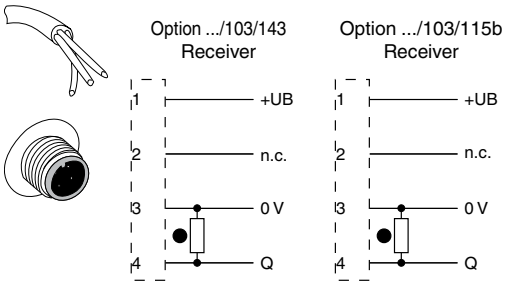
Indicators/operating means

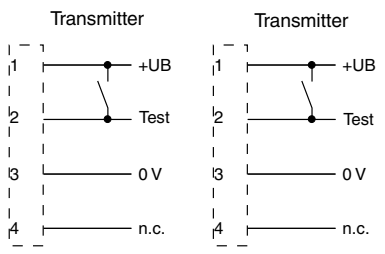


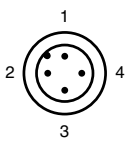
1	Functional display	yellow
2	Optical axis	

Electrical connection

❍ = Light on, ● = Dark on







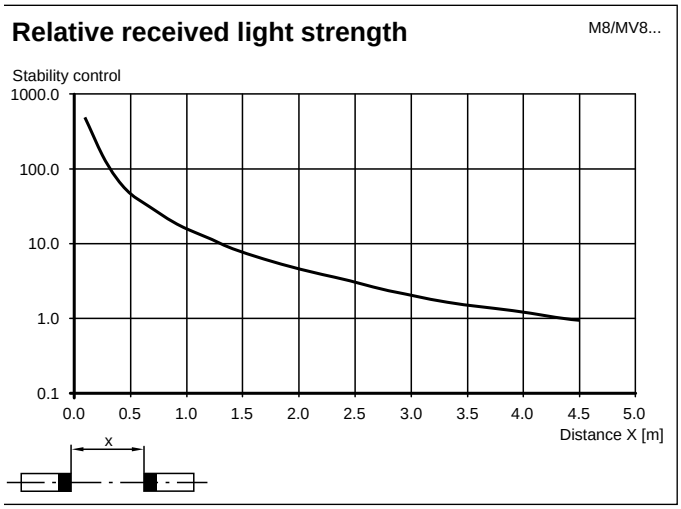
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

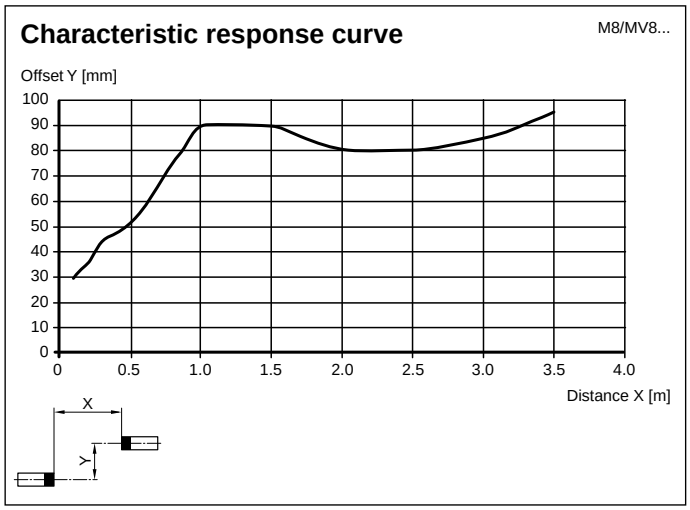
Date of issue 2012-11-12

Notes

M8/MV8/76a/103/115b
M8/MV8/76a/103/143



M8/MV8/76a/103/115b
M8/MV8/76a/103/143



Accessories

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable

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SENSING YOUR NEEDS

Basic miniature photoelectric sensor for detecting people, objects and vehicles

- **Compact series in universal housing for standard applications**
- **Miniature design**
- **Front mounting with M18-threads or side mounting holes**
- **360° high visibility LEDs**
- **Time-saving mounting with quick clamp system**

Product information

The ML17 sensor family offers diverse connection and installation options, which means that it can adapt to the most varied automation tasks. In addition to the usual fitting method using M4 screws, these sensors can also be installed by means of M18 threaded insert. All devices are equipped with a green Power On display and a yellow function display. These displays are arranged in such a way that they are clearly visible from different directions.

Typical applications

- Presence monitoring
- Target sensors
- Congestion monitoring
- Track loading
- Completeness checks
- Person detection for automatic doors and gates

Detection area

Date of issue 2012-11-12

Technical data

Model Number		MD17/MV17/115/136	MD17/MV17/115b/136	MD17/MV17/136/143
Effective detection range	0 ... 15 m	●	●	●
Threshold detection range	20 m	●	●	●
Light source	IRED	●	●	●
Light type	modulated infrared light , 950 nm	●	●	●
Ambient light limit	≤ 10000 Lux	●	●	●
Operating display	LED green	●	●	●
Function display	LED yellow, lights up with receiver lit	●	●	●
Operating voltage	10 ... 30 V DC , class 2	●	●	●
Operating current	100 mA max per output	●	●	●
Time delay before availability	≤ 200 ms	●	●	●
Switching type	light/dark on	●	●	●
Signal output	2 push-pull (4 in 1)outputs, short-circuit protected, reverse polarity protected, overvoltage protected	●	●	●
Switching voltage	max. 30 V DC	●	●	●
Switching current	max. 100 mA	●	●	●
Voltage drop	≤ 2 V DC	●	●	●
Switching frequency	150 Hz	●	●	●
Response time	≤ 3 ms	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●
Standards	EN 50178, UL 508	●	●	●
UL approval	cULus	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●
Ambient temperature	-20 ... 55 °C (-4 ... 131 °F)	●	●	●
Protection degree	IP67	●	●	●
Connection	fixed cable 150 mm with M12 x 1 male connector, 4 pin		●	
	2 m fixed cable	●		
	M8 x 1 connector, 4-pin			●
Housing	ABS	●	●	●
Optical face	Acrylic	●	●	●
Mass	approx. 17 g (emitter and receiver)			●
	approx. 46 g (emitter and receiver)		●	
	approx. 80 g (emitter and receiver)	●		

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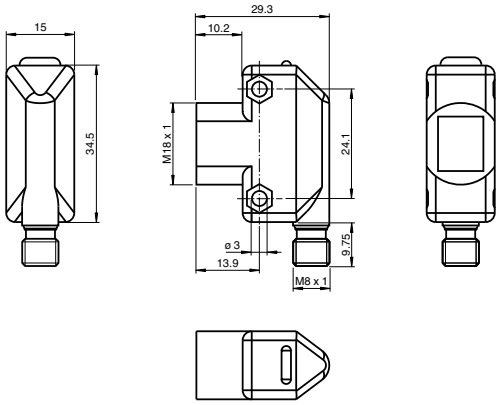
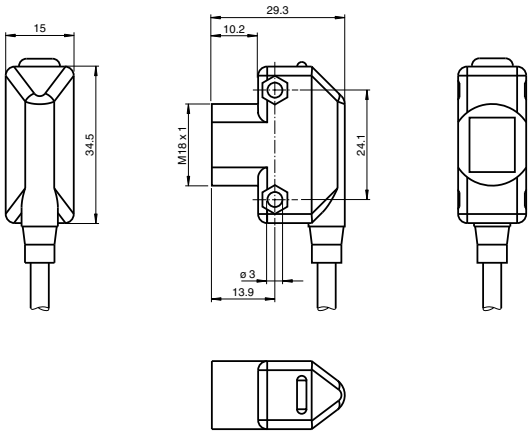
PEPPERL+FUCHS
SENSING YOUR NEEDS

Dimensions

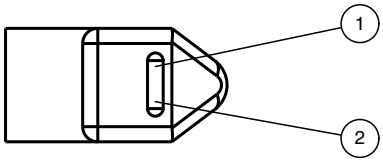
Option /115



Option /143



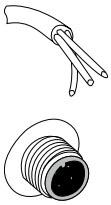
Indicators/operating means



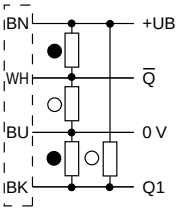
1	Signal display	yellow
2	Operating display	green

Electrical connection

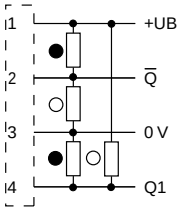
❍ = Light on, ● = Dark on



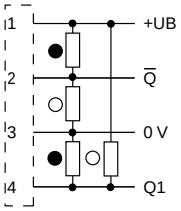
Option 115/136

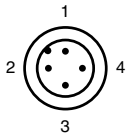


Option 115b/136



Option 136/143





Wire colors in accordance with EN 60947-5-2

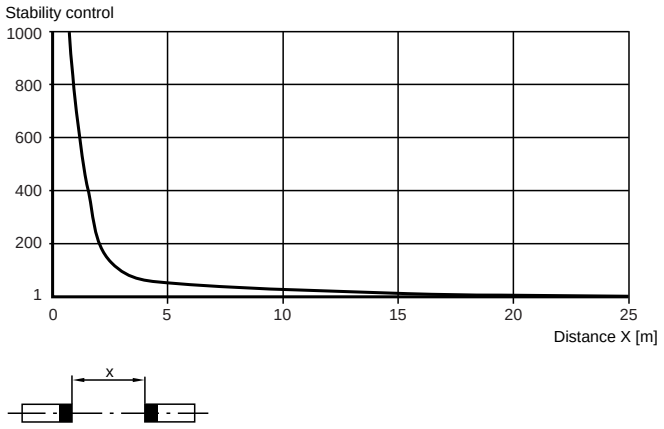
1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2012-11-12

Notes

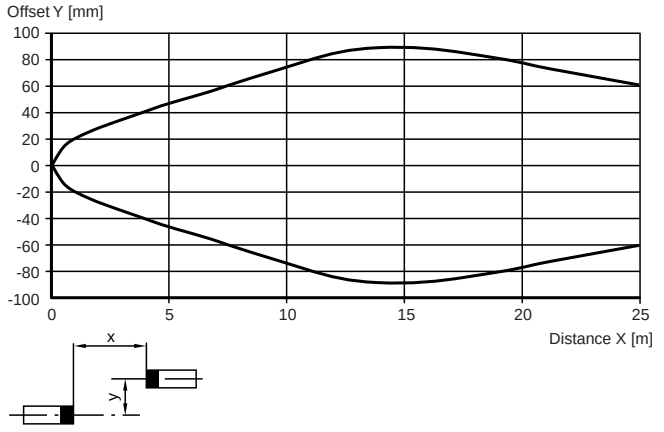
MD17/MV17/115/136
MD17/MV17/136/143
MD17/MV17/115b/136

Relative received light strength



MD17/MV17/115/136
MD17/MV17/136/143
MD17/MV17/115b/136

Characteristic response curve



Accessories

OMH-ML17-EZ	Mounting bracket
OMH-ML17	Mounting bracket
OMH-ML17-1	Mounting bracket
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

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PEPPERL+FUCHS
SENSING YOUR NEEDS

Basic photoelectric sensor for detecting people, objects and vehicles

- Cost-optimized series for standard tasks
- Large construction with small housing
- Highly visible LED
- Version for universal voltages
- Not sensitive to ambient light
- Relay output
- Wide range of mounting options
- Version with accessories in scope of delivery

Product information

Series 31 is a range of cost-effective and, most importantly, reliable photoelectric sensors for standard applications in the fields of material handling and logistics, and for monitoring industrial doors, elevators, and automatic gates. The ultrasonic-welded plastic housing provides a high degree of protection, making these sensors ideal for tasks in harsh outdoor conditions. These sensors are currently the most compact "wide range power supply sensors" that can work with any DC and AC voltage between 24 V and 240 V. In addition to the robust technology, the sensors offer numerous product details that help the user with assembly, connection and operation.

Typical applications

- Monitoring closing edges of automatic industrial doors and elevators
- Monitoring the swing range of automatic gates
- Detecting and tracking objects in material handling

Detection area

Date of issue 2012-11-12

Technical data

Model Number		LA31/LK31/25/31/115	LA31/LK31/25/31/115 SET	LA31/LK31/25/31/115 SET2	LA31/LK31/31/115
Effective detection range	0 ... 30 m	●	●	●	●
Threshold detection range	43 m	●	●	●	●
Light source	LED	●	●	●	●
Light type	modulated visible red light , 630 nm	●	●	●	●
Alignment aid	LED yellow: 1. LED illuminates: Sufficient light signal received, emitter and receiver alignment is correct 2. LED flashes: Reaching switching point 3. LED off: Light beam is interrupted or the alignment is out	●	●	●	●
Diameter of the light spot	approx. 800 mm at a distance of 30 m	●	●	●	●
Angle of divergence	Emitter: 0.5 ° , Receiver: 1.5 °	●	●	●	●
Ambient light limit	50000 Lux		●	●	
	50000 Lux ; according EN 60947-5-2	●			●
Accessories provided	2 x Mounting bracket OMH-RL31-01 and mounting materials		●		
	2 x Mounting bracket OMH-RL31-05 and mounting materials			●	
$MTTF_d$	620 a	●			●
	790 a		●	●	
Mission Time (T_M)	20 a	●	●	●	●
Diagnostic Coverage (DC)	0 %	●	●	●	●
Operating display	LED green: power on	●	●	●	●
Function display	LED yellow: 1. LED lit constantly: signal > 2 x switching point (function reserve) 2. LED flashes: signal between 1 x switching point and 2 x switching point 3. LED off: signal < switching point	●	●	●	●
Operating voltage	24 ... 240 V AC 12 ... 240 V DC	●	●	●	●
Power consumption	Emitter: ≤ 1 VA Receiver: ≤ 1 VA	●	●	●	●
Switching type	dark on				●
	light on	●	●	●	
Signal output	Relay, 1 alternator	●	●	●	●
Switching voltage	max. 250 V AC/DC	●	●	●	●
Switching current	max. 3 A	●	●	●	●
Switching power	DC: max. 150 W AC: max. 750 VA	●	●	●	●
Switching frequency	≤ 20 Hz	●	●	●	●
Response time	≤ 25 ms	●	●	●	●
Directive conformity	EMC Directive 2004/108/EC	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●
Standards	EN 62103	●	●	●	●
Protection class	II , rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1 Output circuit basis insulation of input circuit according to EN 50178, rated insulation voltage 240 V AC	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)	●	●	●	●
Protection degree	IP67	●	●	●	●
Connection	Emitter: 2 m fixed cable , 2-wire Receiver: 2 m fixed cable , 5-wire	●	●	●	●
Housing	Polycarbonate	●	●	●	●
Optical face	PMMA	●	●	●	●
Mass	Emitter: 116 g Receiver: 131 g	●	●	●	●

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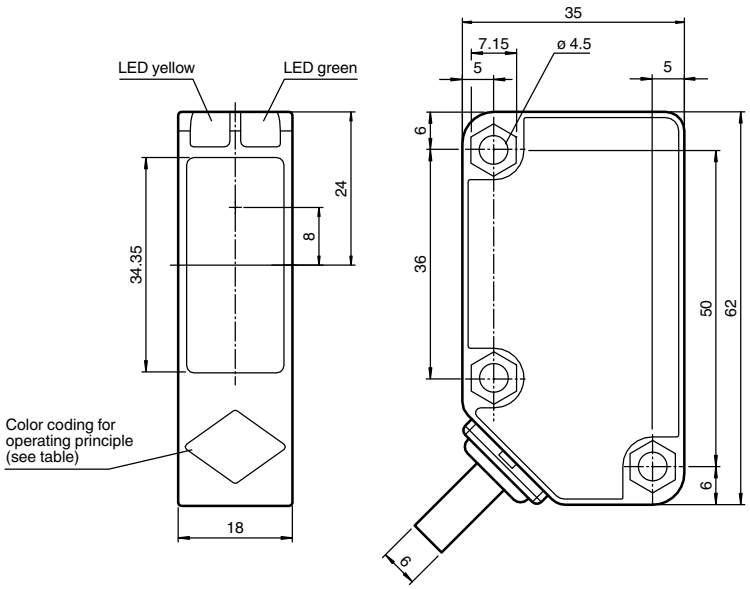
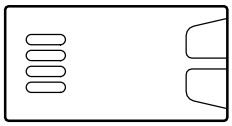
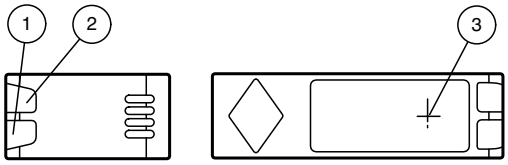
Dimensions



Operating principle	color
Retroreflective sensor with polarisation filter	green
Retroreflective sensor	blue
Diffusive mode sensor	white
Thru-beam sensor	grey
Diffusive mode sensor with background suppression	red

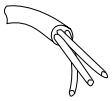


Indicators/operating means

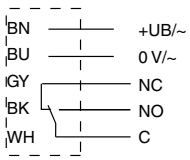


1	Operating display	green
2	Signal display	yellow
3	Emitter or receiver	

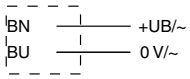
Electrical connection



Option /31/115
Receiver



Transmitter



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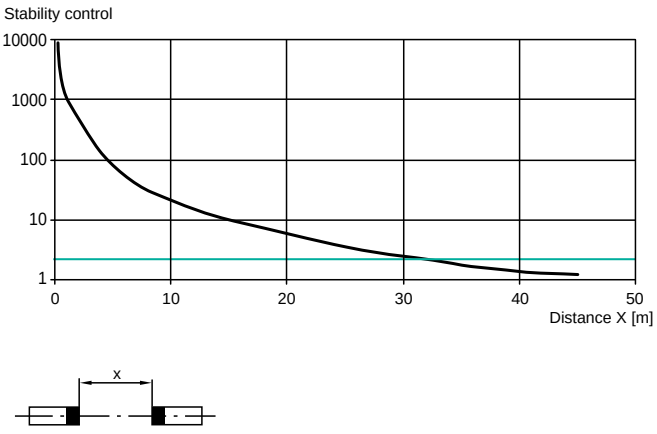
Notes

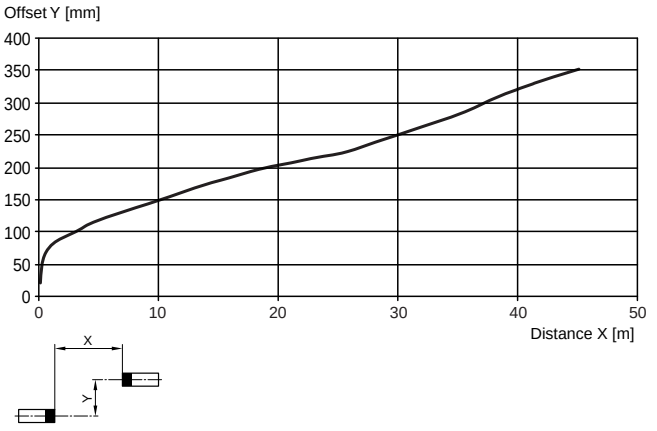
Relative received light strength

LD31/LV31...
LA31/LK31...



Characteristic response curve

LA31/LK31/...



Accessories

OMH-RL31-01	Mounting bracket
OMH-RL31-02	Mounting bracket narrow
OMH-RL31-03	Mounting bracket narrow
OMH-RL31-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-RL31-05	Mounting bracket with M10 threaded rod
OMH-RL31-06	Stainless steel mounting bracket with adjustable half clamp on the side

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PEPPERL+FUCHS
SENSING YOUR NEEDS

Compact photoelectric sensor for detecting people, objects and vehicles

- **Universal series with highly versatile fields of use**
- **Resistant against noise: reliable operation under all conditions**
- **Version for universal voltages**
- **Highly visible LED as alignment aid in receiver optics**
- **Programmable time function GAN, GAB, IAB as well as GAN-IAB and GAN-GAB as double function**
- **Laser version for long ranges**
- **Version with red light**
- **Version with relay output**

Product information

The series 28 family of sensors can be universally used. It has a large range of models that allows it to be integrated into any automation environment. The sensors are contained in sturdy water resistant plastic housings with multiple fastening options and scratch resistant optical cover. Features such as a timer function, and functions including a light/dark switch, sensitivity adjuster and highly visible status LEDs make for less effort on the part of the user and streamline installation, setup and operation. Just about any task associated with positioning, moving, conveying and monitoring can be accomplished with these sensors.

Typical applications

- Object tracking in material handling, and the packaging sector
- Material flow monitoring
- Bin occupancy check in storage technology
- Fine positioning in high-bay warehouses
- Presence and height monitoring on pallet conveyors
- Single-beam protection for automatic industrial gates and elevator doors
- Protection at automatic gates

Detection area

Date of issue 2012-11-12

Technical data

Model Number		LA28/LK28-Z-F1/31/116	LA28/LK28-Z-F2/31/116	LA28/LK28-LAS-F1-Z/31/116
Effective detection range	0 ... 300 m			●
	0 ... 65 m	●	●	
Threshold detection range	400 m			●
	90 m	●	●	
Light source	laser diode			●
	LED	●	●	
Light type	modulated visible red light	●	●	●
Alignment aid	LED red (in receiver lens) illuminated constantly: beam is interrupted, flashes: reaching switching point, off: sufficient stability control	●	●	●
Transmitter frequency	F1 = 25 kHz	●		
	F2 = 30 kHz		●	
Diameter of the light spot	approx. 1.3 m at 65 m	●	●	
	approx. 6 mm at 5 m, approx. 75 x 300 mm at 300 m vertical to housing axis			●
Angle of divergence	Emitter: 0.06 ° Receiver: 5 °			●
	Emitter 1.2°, Receiver 5°	●	●	
Ambient light limit	50000 Lux	●	●	●
Laser class	2			●
Wave length	650 nm			●
$MTTF_d$	440 a			●
	490 a	●	●	
Mission Time (T_M)	20 a	●	●	●
Diagnostic Coverage (DC)	0 %	●	●	●
Operating display	LED green	●	●	●
Function display	LED yellow: 1. LED lit constantly: signal > 2 x switching point (function reserve) 2. LED flashes: signal between 1 x switching point and 2 x switching point 3. LED off: signal < switching point	●	●	●
Controls	sensitivity adjustment (Adjustment to < 25% of the effective operating range) , Light/Dark switch	●	●	●
Operating voltage	12 ... 240 V AC/DC	●	●	●
Power consumption	≤ 3.5 VA	●	●	●
Switching type	light/dark on, switchable . (selectable, light/dark switching is only activated if the receiver has 'dark on' selected.)	●	●	●
Signal output	Relay, 1 alternator	●	●	●
Switching voltage	max. 250 V AC/DC	●	●	●
Switching current	max. 2 A	●	●	●
Switching power	DC: max. 50 W AC: max. 500 VA	●	●	●
Switching frequency	25 Hz	●	●	●
Response time	20 ms	●	●	●
Timer function	ON delay (GAN), OFF delay (GAB), one shot (IAB), ON delay-OFF delay (GAN-GAB), programmable adjustment range 0.1 ...10 s	●	●	●
Directive conformity	Low Voltage Directive 2006/95/EC EMC Directive 2004/108/EC	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●
Protection class	II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1 Output circuit basis insulation of input circuit according to EN 50178, rated insulation voltage 230 V AC Caution! The protection class 2 is only valid when the terminal compartment is closed.	●	●	●
UL approval	cULus Listed , Class 2 power source	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)			●
	-40 ... 60 °C (-40 ... 140 °F)	●	●	
Protection degree	IP67	●	●	●
Connection	terminal compartment with 8 spring-loaded terminals for wire cross section 0.5 ... 1.5 mm^2 , Insulation stripping 7.5 ... 8.5 mm , M16 x 1.5 cable gland	●	●	●
Housing	Plastic ABS	●	●	●
Optical face	Plastic pane	●	●	●
Mass	200 g (emitter and receiver)	●	●	●

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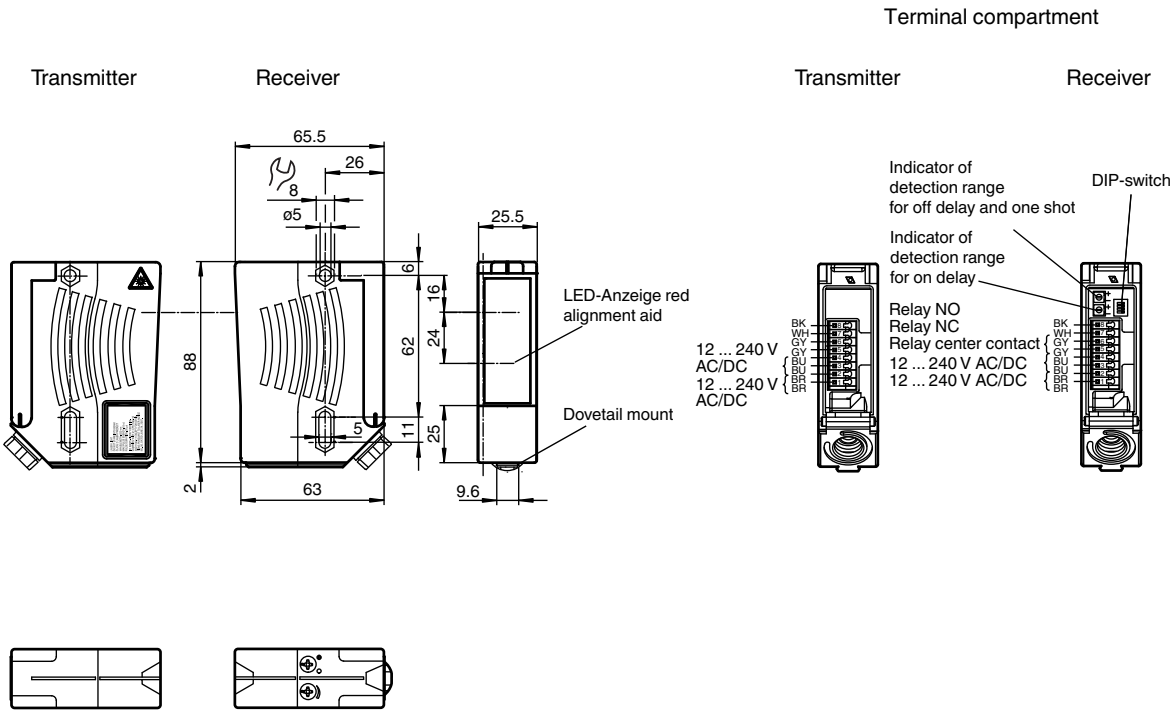
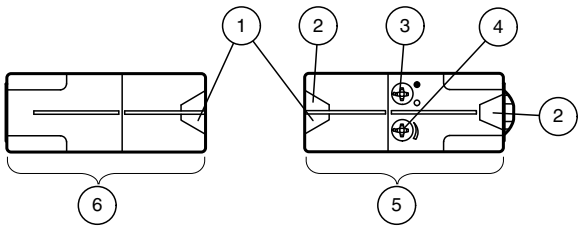
Dimensions



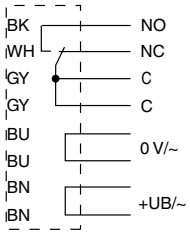
Indicators/operating means



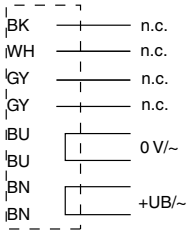
1	Operating display green
2	Switch state yellow
3	Bright/dark switch
4	Sensitivity adjustment
5	Receiver
6	Transmitter

Electrical connection

Option /31/116
Receiver



Transmitter



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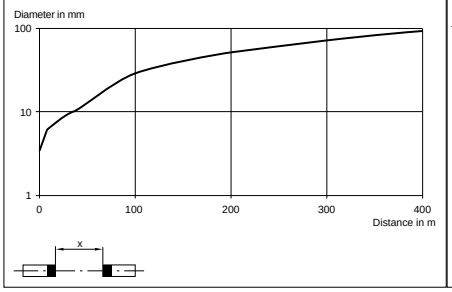
Notes

LA28/LK28-LAS-F1-Z/31/116

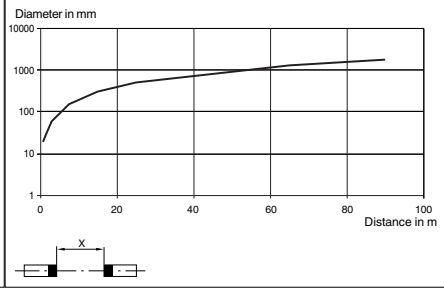
Light spot diameter = f (Distance)

LD28/LV28-LAS; LA28/LK28-LAS



LA28/LK28-Z-F1/31/116
LA28/LK28-Z-F2/31/116

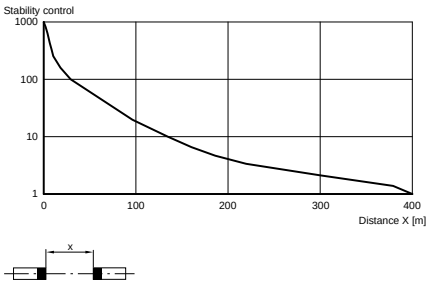
Light spot diameter = f (Distance)



LA28/LK28-LAS-F1-Z/31/116

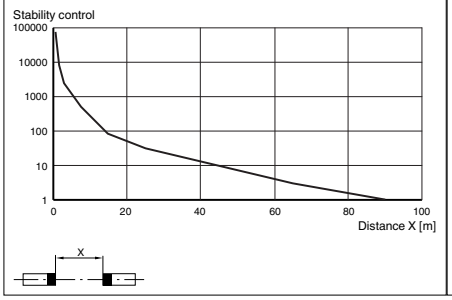
Relative received light strength

LD28/LV28-LAS; LA28/LK28-LAS



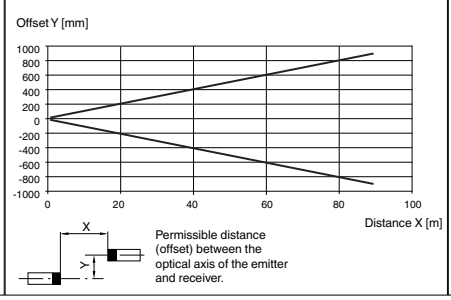
LA28/LK28-Z-F1/31/116
LA28/LK28-Z-F2/31/116

Relative received light strength



LA28/LK28-Z-F1/31/116
LA28/LK28-Z-F2/31/116

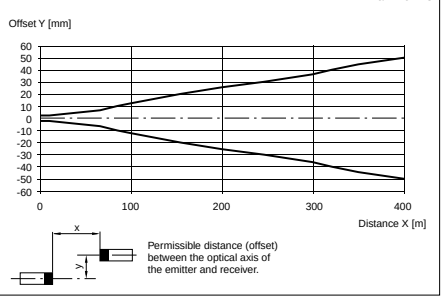
Characteristic response curve



LA28/LK28-LAS-F1-Z/31/116

Characteristic response curve

LD28/LV28-LAS; LA28/LK28-LAS



Accessories

OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-RLK29	Mounting bracket
OMH-MLV11-K	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting

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Compact photoelectric sensor for detecting people, objects and vehicles

- **Universal series with highly versatile fields of use**
- **Resistant against noise: reliable operation under all conditions**
- **DC voltage version**
- **Highly visible LED as alignment aid in receiver optics**
- **Emitter with test input**
- **Version with red light**
- **Programmable time function GAN, GAB, IAB as well as GAN-IAB and GAN-GAB as double function**

Product information

The series 28 family of sensors can be universally used. It has a large range of models that allows it to be integrated into any automation environment. The sensors are contained in sturdy water resistant plastic housings with multiple fastening options and scratch resistant optical cover. Features such as a timer function, and functions including a light/dark switch, sensitivity adjuster and highly visible status LEDs make for less effort on the part of the user and streamline installation, setup and operation. Just about any task associated with positioning, moving, conveying and monitoring can be accomplished with these sensors.

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- Object tracking in material handling, and the packaging sector
- Material flow monitoring
- Bin occupancy check in storage technology
- Fine positioning in high-bay warehouses
- Presence and height monitoring on pallet conveyors
- Single-beam protection for automatic industrial gates and elevator doors
- Protection at automatic gates

Detection area

Date of issue 2012-11-12

Technical data

Model Number		LD28/LV28-F1/76a/82b/110/115	LD28/LV28-Z-F1/76a/82b/110/116	LD28/LV28-F1/76a/82b/105/110	LD28/LV28-Z-F1/47/76a/82b/116
Effective detection range	0 ... 30 m	●	●	●	●
Threshold detection range	40 m	●	●	●	●
Light source	LED	●	●	●	●
Light type	modulated visible red light , 660 nm	●	●	●	●
Alignment aid	LED red (in receiver lens) illuminated constantly: beam is interrupted, flashes: reaching switching point, off: sufficient stability control	●	●	●	●
Transmitter frequency	F1 = 25 kHz	●	●	●	●
Diameter of the light spot	approx. 0.6 m at 30 m	●	●	●	●
Angle of divergence	Emitter 1.2°, Receiver 5°	●	●	●	●
Ambient light limit	50000 Lux	●	●	●	●
$MTTF_d$	620 a	●	●	●	●
Mission Time (T_M)	20 a	●	●	●	●
Diagnostic Coverage (DC)	90 %	●	●	●	●
Operating display	LED green	●	●	●	●
Function display	LED yellow: 1. LED lit constantly: signal > 2 x switching point (function reserve) 2. LED flashes: signal between 1 x switching point and 2 x switching point 3. LED off: signal < switching point	●	●	●	●
Controls	sensitivity adjustment (Adjustment to < 25% of the effective operating range) , Light/Dark switch	●	●	●	●
Operating voltage	10 ... 30 V DC	●	●	●	●
Test input	emitter deactivation at $+U_B$ ($I_{max.}$ < 3 mA at 30 V DC)	●	●	●	●
Pre-fault indication output	1 PNP transistor, short-circuit protected, protected from reverse polarity, open collector, Umax = 30 V DC, Imax = 0.2 A The output becomes inactive if the signal level has fallen below the function reserve for approx. 10 s (yellow and red LEDs flash). If the light beam is interrupted four times during this period, the output immediately becomes inactive.	●	●	●	●
Switching type	light/dark on, switchable	●	●	●	●
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected	●	●	●	
	2 PNP, complementary, short-circuit protected, reverse polarity protected , open collectors				●
Switching voltage	max. 30 V DC	●	●	●	●
Switching current	max. 100 mA	●		●	
	max. 200 mA		●		●
Switching frequency	1000 Hz	●	●	●	●
Response time	0.5 ms	●	●	●	●
Timer function	ON delay (GAN), OFF delay (GAB), one shot (IAB), ON delay-one shot (GAN-IAB), ON delay-OFF delay (GAN-GAB), programmable adjustment interval 0.02 s ... 1 s		●		●
Directive conformity	EMC Directive 2004/108/EC	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●
Protection class	II, rated insulation voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1 Output circuit basis insulation of input circuit according to EN 50178, rated insulation voltage 250 V AC Caution! The protection class 2 is only valid when the terminal compartment is closed.		●		●
	II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1	●		●	
UL approval	cULus Listed , Class 2 power source	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)	●	●	●	●
Protection degree	IP67	●	●	●	●
Connection	2.5 m, 5-wire, fixed cable, Euronorm	●			
	terminal compartment with 8 spring-loaded terminals for wire cross section 0.5 ... 1.5 mm^2 , Insulation stripping 7.5 ... 8.5 mm , M16 x 1.5 cable gland		●		●
	5-pin, M12 x 1 plastic connector			●	
Housing	Plastic ABS	●	●	●	●
Optical face	Plastic pane	●	●	●	●
Mass	140 g (emitter and receiver)	●		●	
	200 g (emitter and receiver)		●		●

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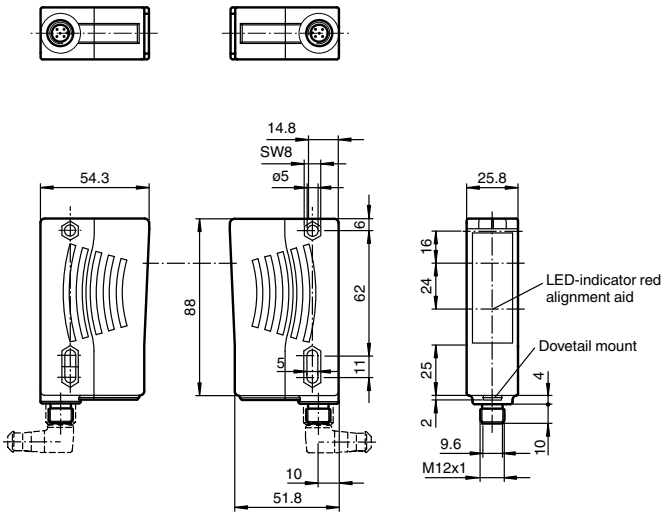
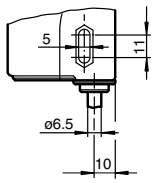
Dimensions

Connection option 105

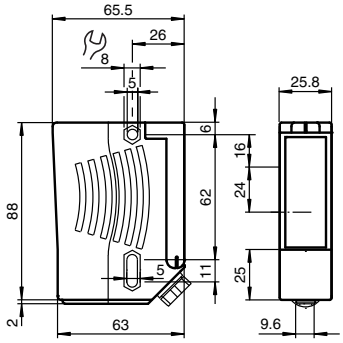
Transmitter Receiver



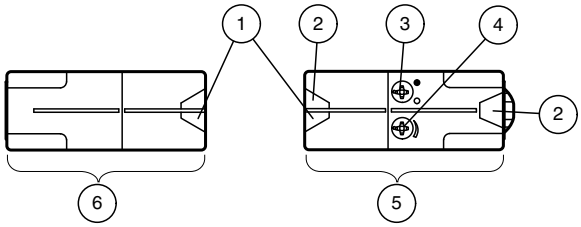
Connection option 115



Connection option 116



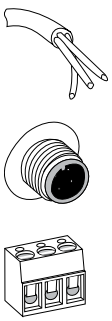
Indicators/operating means



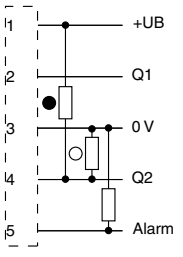
1	Operating display green
2	Switch state yellow
3	Bright/dark switch
4	Sensitivity adjustment
5	Receiver
6	Transmitter

Electrical connection

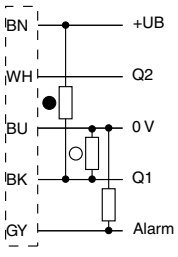
❍ = Light on, ● = Dark on



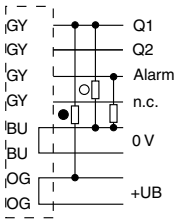
Option 76a/82b/105/110 Receiver



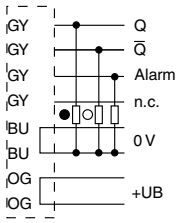
Option /76a/82b/110/115 Receiver



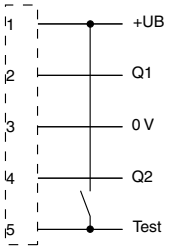
Option /76a/82b/110/116 Receiver



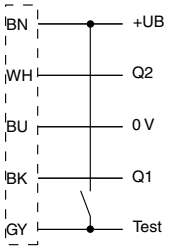
Option /47/76a/82b/116 Receiver



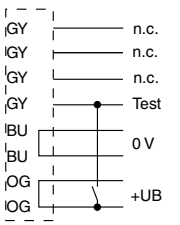
Transmitter



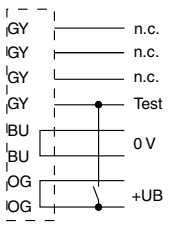
Transmitter

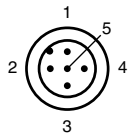


Transmitter



Transmitter





Wire colors in accordance with EN 60947-5-2

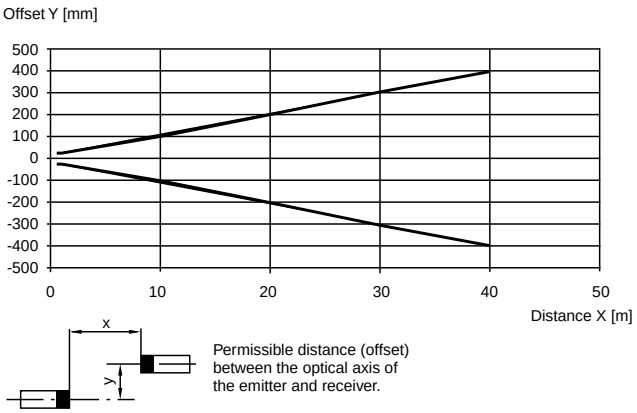
1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 2012-11-12

Notes

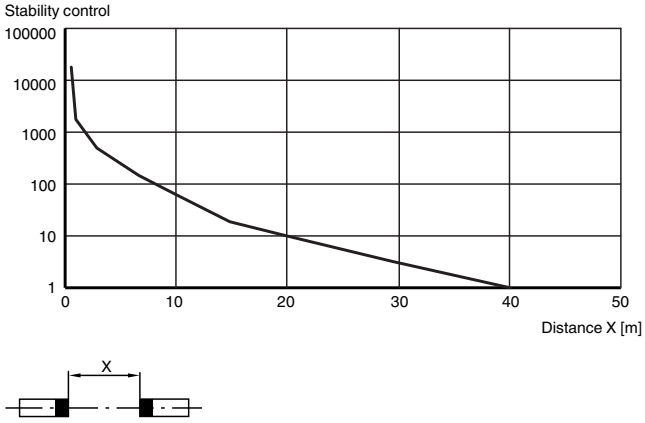
Characteristic response curve

LD28/LV2; LA28/LK28



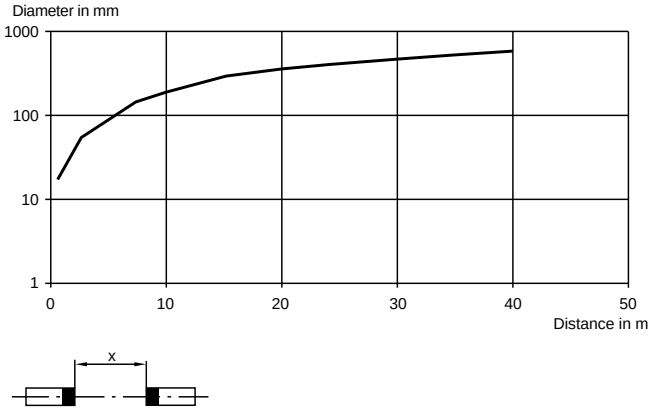
Permissible distance (offset) between the optical axis of the emitter and receiver.

Relative received light strength



Light spot diameter = f (Distance)

LD28/LV28; LA28/LK28



Accessories

OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-RLK29	Mounting bracket
OMH-MLV11-K	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting

Date of issue 2012-11-12

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PEPPERL+FUCHS SENSING YOUR NEEDS

Compact photoelectric sensor for detecting people, objects and vehicles

- **Robust, compact photoelectric sensor for single-beam gate protection**
- **Very high detection range**
- **Version for universal voltages**
- **No measurable emitted interference on all frequencies**
- **Not sensitive to ambient light, even with energy saving lamps**
- **Adjustable timer functions**
- **Version with accessories in scope of delivery**

Product information

Series 29 is a range of low-cost and, most importantly, reliable photoelectric sensors for monitoring industrial doors, elevators, and automatic gates. Their high degree of protection makes them the ideal solution for tasks outdoors and at thresholds, and in harsh environments. These "universal-voltage sensors" can be operated with any supply voltage from 24 V to 240 V, and with direct current or alternating current.

Typical applications

- Monitoring closing edges of automatic industrial doors and elevators
- Monitoring the swing range of automatic gates
- Detecting and tracking objects in material handling

Detection area

Date of issue 2012-11-12

Technical data

Model Number		LA29/LK29-Z-F1/31/116-SET	LA29/LK29-Z-F2/31/116-SET
Effective detection range	0 ... 65 m	●	●
Threshold detection range	90 m	●	●
Light source	LED	●	●
Light type	modulated visible red light , 660 nm	●	●
Alignment aid	LED red (in receiver lens) illuminated constantly: beam is interrupted, flashes: reaching switching point, off: sufficient stability control	●	●
Transmitter frequency	F1 = 25 kHz	●	
	F2 = 30 kHz		●
Diameter of the light spot	approx. 1.3 m at 65 m	●	●
Angle of divergence	Emitter 1.2°, Receiver 5°	●	●
Ambient light limit	50000 Lux	●	●
$MTTF_d$	490 a	●	●
Mission Time (T_M)	20 a	●	●
Diagnostic Coverage (DC)	0 %	●	●
Operating display	LED green	●	●
Function display	LED yellow: 1. LED lit constantly: signal > 2 x switching point (function reserve) 2. LED flashes: signal between 1 x switching point and 2 x switching point 3. LED off: signal < switching point	●	●
Controls	sensitivity adjustment (Adjustment to < 25% of the effective operating range) , Light/Dark switch	●	●
Operating voltage	12 ... 240 V AC/DC	●	●
Power consumption	≤ 3.5 VA	●	●
Switching type	light/dark on, switchable . (selectable, light/dark switching is only activated if the receiver has 'dark on' selected.)	●	●
Signal output	Relay, 1 alternator	●	●
Switching voltage	max. 250 V AC/DC	●	●
Switching current	max. 2 A	●	●
Switching power	DC: max. 50 W AC: max. 500 VA	●	●
Switching frequency	25 Hz	●	●
Response time	20 ms	●	●
Timer function	ON delay (GAN), OFF delay (GAB), one shot (IAB), ON delay-OFF delay (GAN-GAB), programmable adjustment range 0.1 ...10 s	●	●
Directive conformity	Low Voltage Directive 2006/95/EC EMC Directive 2004/108/EC	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●
Protection class	II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1 Output circuit basis insulation of input circuit according to EN 50178, rated insulation voltage 230 V AC Caution! The protection class 2 is only valid when the terminal compartment is closed.	●	●
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)	●	●
Protection degree	IP67	●	●
Connection	terminal compartment with 8 spring-loaded terminals for wire cross section 0.5 ... 1.5 mm^2 , Insulation stripping 7.5 ... 8.5 mm , M16 x 1.5 cable gland	●	●
Housing	Plastic ABS	●	●
Optical face	Plastic pane	●	●
Mass	200 g (emitter and receiver)	●	●

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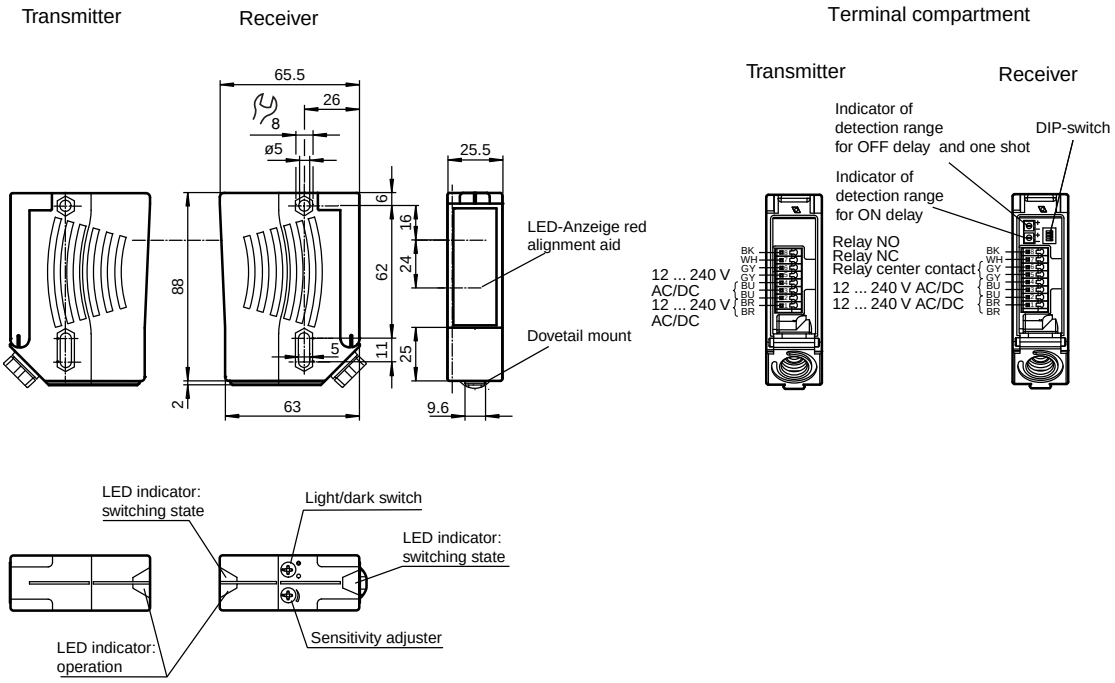
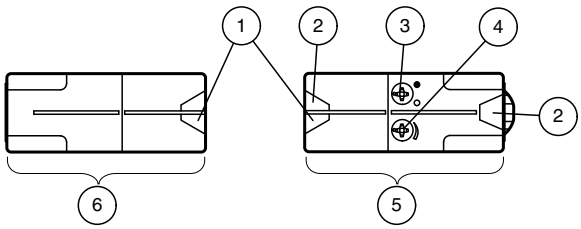
SENSING YOUR NEEDS

Dimensions



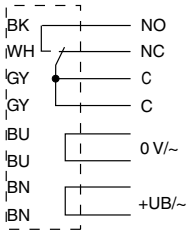
Indicators/operating means



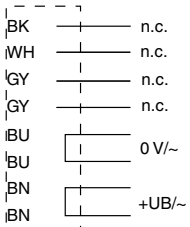
1	Operating display green
2	Switch state yellow
3	Bright/dark switch
4	Sensitivity adjustment
5	Receiver
6	Transmitter

Electrical connection

Option /31/116
Receiver



Transmitter



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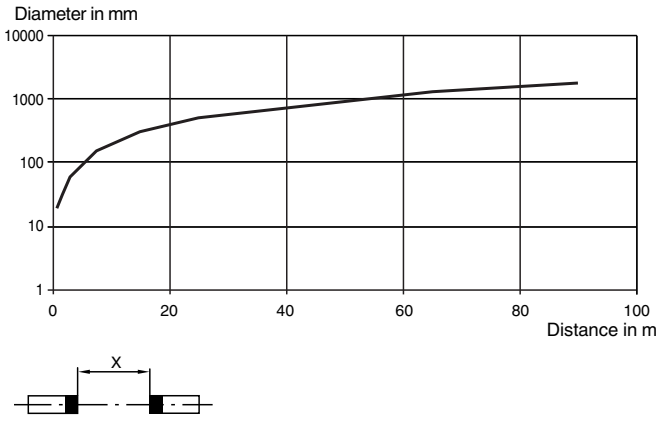
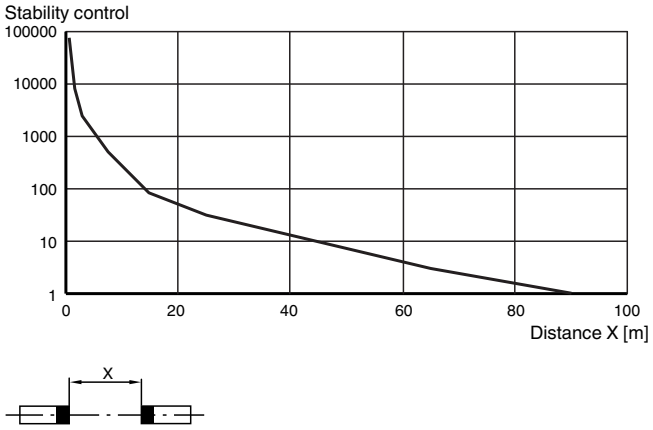
Notes

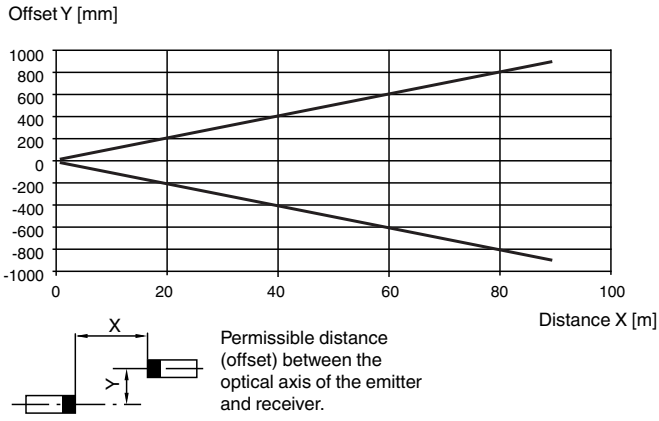
Light spot diameter = f (Distance)



Relative received light strength



Characteristic response curve



Accessories

OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-RLK29	Mounting bracket
OMH-MLV11-K	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting

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PEPPERL+FUCHS
SENSING YOUR NEEDS

Basic photoelectric sensor with universal voltage for detecting people, objects, and vehicles

- Light/dark ON, switchable
- Supplied with mounting accessory
- Version for universal voltages
- Protection degree IP67
- Timer function

Product information

Series 39 sensors are characterized by their high performance level, compact housing design, and variety of available versions. These include thru-beam sensors with a 20 m detection range, retroreflective sensors with polarization filter for a 5 m detection range, energetic diffuse mode sensors with an 800 mm and 2000 mm detection range, and a background suppression sensor with 500 mm detection range. Fitted in a robust plastic housing, this series is ideal for tough industrial applications.
The sensors are supplied with 10 V to 30 V DC, or 24 V to 240 V AC/DC. Various transistor and relay outputs are available as signal outputs. Standard features include pre-fault diagnostics and pre-fault output. The switching element function can be changed using the light/dark switch.

Typical applications

- Object tracking in material handling, and the packaging sector
- Material flow monitoring
- Bin occupancy check in storage technology
- Fine positioning in high-bay warehouses
- Presence and height monitoring on pallet conveyors
- Single-beam protection for automatic industrial gates and elevator doors
- Protection at automatic gates

Detection area

Date of issue 2012-11-12

Technical data

Model Number		LA39/LK39/31/40a/116	LA39/LK39-Z/31/40a/116
Effective detection range	0 ... 20 m	●	●
Threshold detection range	30 m	●	●
Adjustment range	800 ... 30000 mm	●	●
Reference target	receiver	●	●
Light source	IRED	●	●
Light type	modulated infrared light	●	●
Ambient light limit	10000 Lux	●	●
Operating display	LED red (emitter)	●	●
Function display	LED yellow: switching state (receiver) LED red: pre-fault indicator, flashing (receiver)	●	●
Controls	sensitivity adjustment	●	●
Controls	Light/Dark switch (receiver)	●	●
Controls	switch for timer function		●
Operating voltage	12 ... 240 V DC / 24 ... 240 V AC (50 ... 60 Hz)	●	●
Power consumption	≤ 3 VA	●	●
Time delay before availability	≤ 50 ms	●	●
Switching type	light/dark on	●	●
Signal output	1 relay output	●	●
Switching voltage	≤ 240 V AC	●	●
Switching current	max. 3 A	●	●
Switching frequency	≤ 25 Hz	●	●
Response time	≤ 20 ms	●	●
Timer function	On-/off-delay or pulse extension on choice		●
Standards	EN 60947-5-2	●	●
EMC Directive 2004/108/EC	EN 60947-5-2	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)	●	●
Protection degree	IP67	●	●
Connection	terminal compartment PG9, ≤ 2.5 mm^2	●	●
Housing	PBT	●	●
Optical face	PMMA	●	●
Mass	emitter: 90 g receiver: 100 g	●	●

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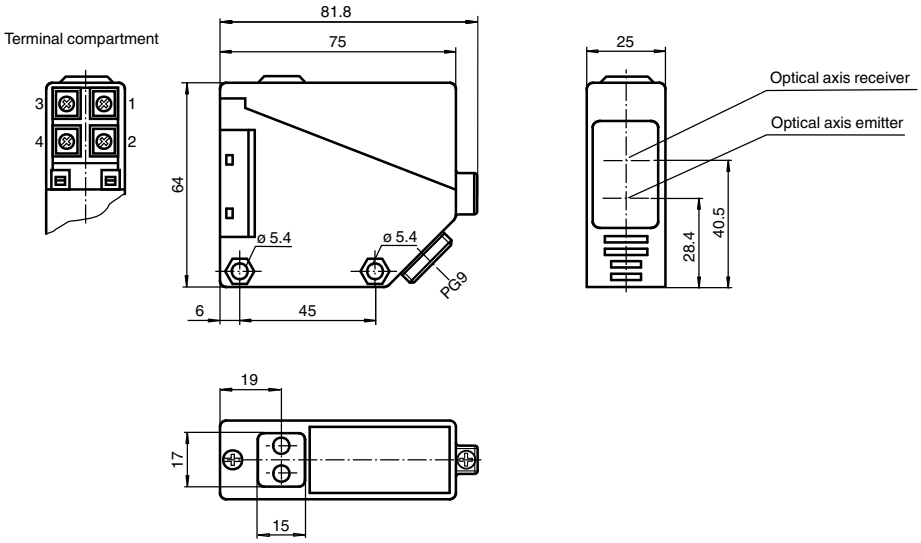
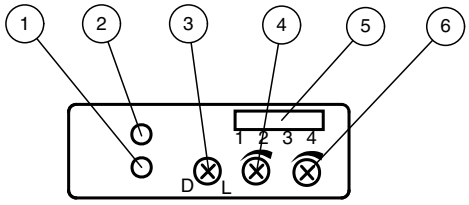
SENSING YOUR NEEDS

Dimensions



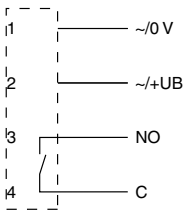
Indicators/operating means



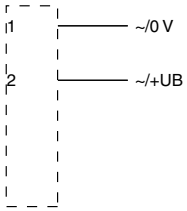
1	Operating display red (Transmitter)
1	Pre-fault indication red (Receiver)
2	Switch state yellow
3	Light/dark on switch
4	Sensitivity adjustment
5	Timer mode switch (version -Z)
6	Time adjuster (version -Z)

Electrical connection

Option 31/40a/116
Receiver



Transmitter



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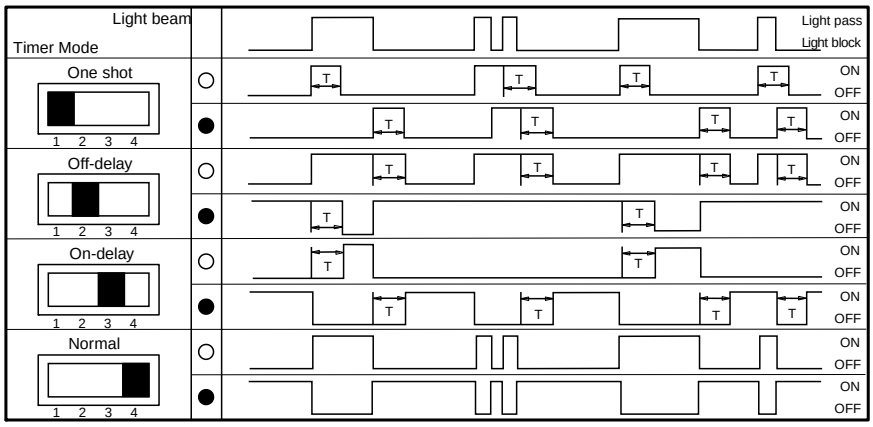
Notes

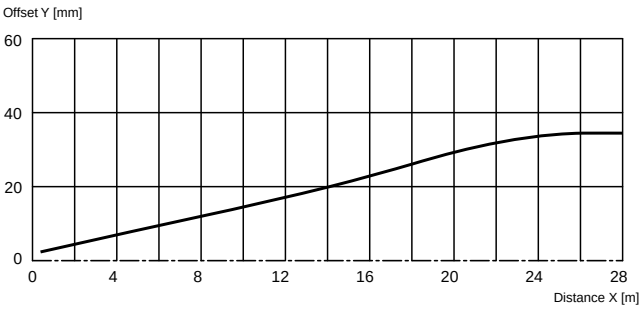
Function principle

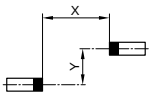
The thru-beam sensor requires a pair of devices for operation, comprising a light transmitter and a light receiver. The emitter and receiver must be arranged in optical alignment with each other. The infrared light from the emitter is detected by the receiver and evaluated.



○ Denotes Light - ON T= 0.1 .... 10 sec.
● Denotes Dark - ON

Characteristic response curve

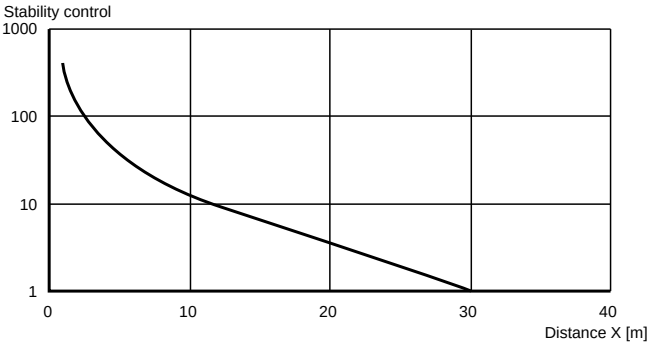


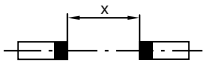


Permissible distance (offset) between the optical axis of the emitter and receiver.

Relative received light strength

L39/LV(K)39





Accessories

OMH-RL39	Mounting bracket for RL39 series Sensors

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PEPPERL+FUCHS SENSING YOUR NEEDS

Single-beam M18 cylindrical sensor for detecting people, objects, and vehicles

- **Efficient Line in a short M18 plastic housing for standard applications**
- **4 LEDs indicator for 360° visibility**
- **Optimized potentiometer design for a clear control button layout in the application**
- **Not sensitive to ambient light, even with switched energy saving lamps**
- **DC voltage version**
- **Version with front optical face**
- **Sidelookerversion**

Product information

The GLV/GLK18 series sensors help improve the efficiency of machines and systems. The design of the M18 plastic housing, the connection technology, and sensor properties are highly standardized. Concentrating on the key sensor requirements has produced a robust and reliable product series for DC and AC/DC voltage systems without any over-engineering. The mounting set included in the scope of delivery and the optimized potentiometer design ensure fast assembly and easy configuration.

Typical applications

Packaging industry:
- Presence checks, track loading, completeness checks, stack height control

Material handling
- Presence checks, target sensor, profile checks, trigger sensor

Automatic doors, gates and access systems, elevator:
- Secure detection for automatic door and gate systems
- Monitoring function in turnstiles
- Closing edge monitoring in elevators

Detection area

Date of issue 2012-11-12

Technical data

Model Number		GLV18-6/115/120	GLV18-6/25/103/115	GLV18-6-S/115/120	GLV18-55/115/120	GLV18-55/25/103/115	GLV18-55-S/115/120	GLV18-55-S/25/102/115
Effective detection range	0 ... 3.5 m						●	●
	0 ... 4 m				●	●		
	0 ... 5.5 m			●				
	0 ... 6.5 m	●	●					
Threshold detection range		8 m	8 m	6.5 m	5.5 m	5.5 m	4.5 m	4.5 m
Reference target	reflector C110-2	●	●	●	●	●	●	●
Light source	LED	●	●	●	●	●	●	●
Light type	modulated visible red light , 640 nm	●	●	●	●	●	●	●
Diameter of the light spot	approx. 160 mm at 4.5 m						●	●
	approx. 200 mm at 5.5 m				●	●		
	approx. 250 mm at 6.5 m			●				
	approx. 300 mm at 8 m	●	●					
Angle of divergence	approx. 2 °	●	●	●	●	●	●	●
Optical face	frontal	●	●		●	●		
	lateral			●			●	●
Ambient light limit	30000 Lux	●	●	●	●	●	●	●
Operating display	LED green, statically lit Power on	●	●	●	●	●	●	●
Function display	LED yellow: lights up when receiving the light beam ; flashes when falling short of the stability control; OFF when light beam is interrupted	●	●	●	●	●	●	●
Operating voltage	10 ... 30 V DC	●	●	●	●	●	●	●
No-load supply current	< 20 mA	●	●	●	●	●	●	●
Switching type	light/dark on	●		●	●		●	
	light on		●			●		●
Signal output	1 NPN, short-circuit protected open collector							●
	1 PNP, short-circuit protected, open collector		●			●		
	2 PNP, complementary, short-circuit protected, open collectors	●		●	●		●	
Switching voltage	max. 30 V DC	●	●	●	●	●	●	●
Switching current	max. 100 mA	●	●	●	●	●	●	●
Voltage drop	≤ 1.5 V DC	●	●	●	●	●	●	●
Switching frequency	500 Hz	●	●	●	●	●	●	●
Response time	≤ 1 ms	●	●	●	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●	●	●
Protection class	II, rated insulation voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1	●	●	●	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●	●	●	●
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)	●	●	●	●	●	●	●
Storage temperature	-40 ... 70 °C (-40 ... 158 °F)	●	●	●	●	●	●	●
Protection degree	IP67	●	●	●	●	●	●	●
Connection	2 m fixed cable	●	●	●	●	●	●	●
Housing	PC	●	●	●	●	●	●	●
Optical face	PMMA	●	●	●	●	●	●	●
Cable	PVC	●	●	●	●	●	●	●
Mass	approx. 75 g	●	●	●	●	●	●	●

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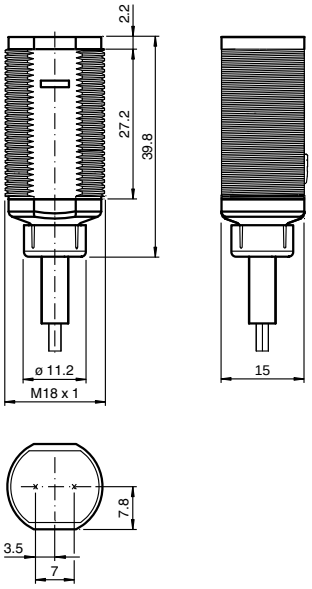
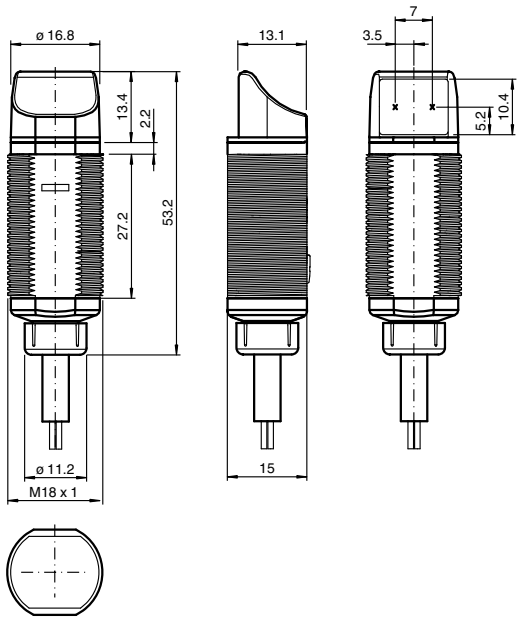
Dimensions

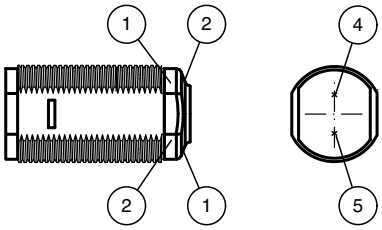
GLV18



GLV18-S



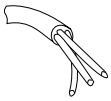
Indicators/operating means



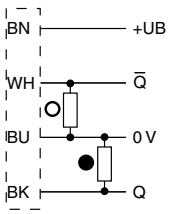
1	Operating display	green
2	Signal display	yellow
4	Emitter	
5	Receiver	

Electrical connection

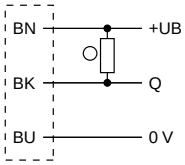
❍ = Light on, ● = Dark on



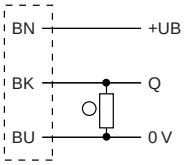
Option /115/120



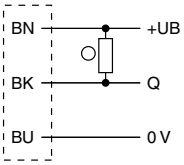
Option 25/103/115



Option 25/103/115



Option 25/102/115



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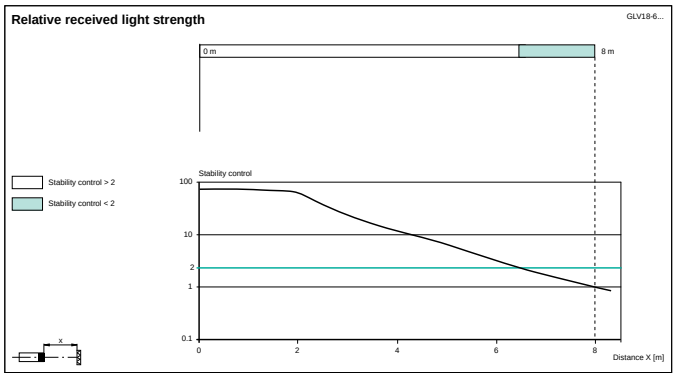
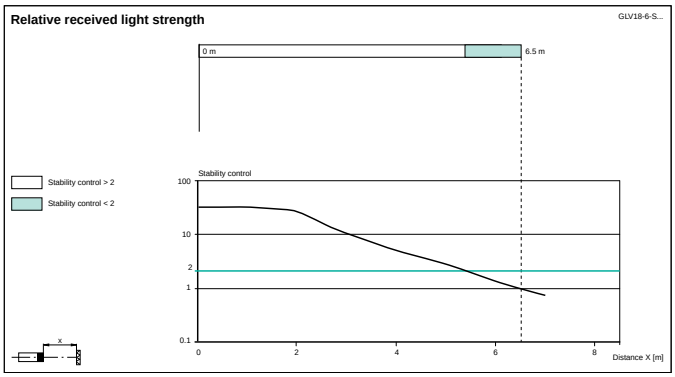
Notes

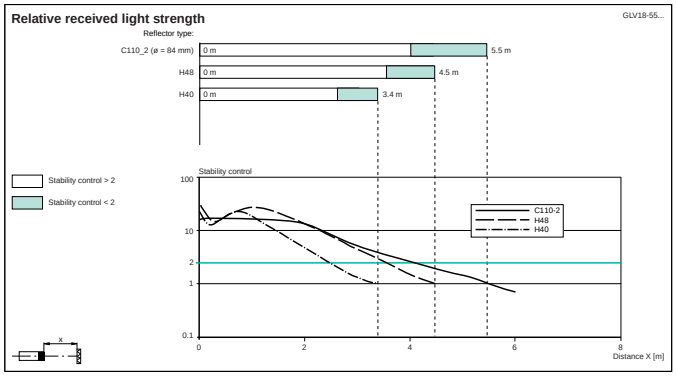
GLV18-6/115/120
GLV18-6/25/103/115



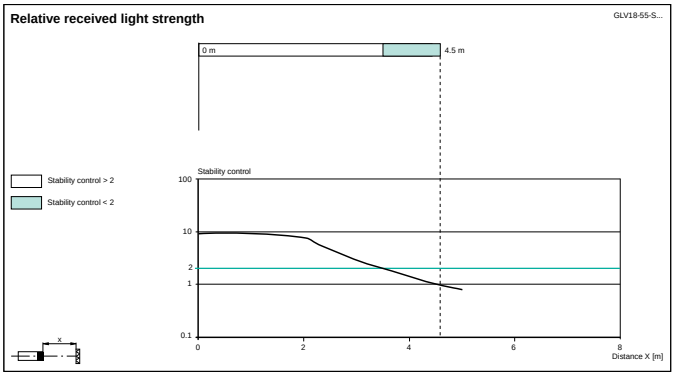
GLV18-6-S/115/120



GLV18-55/115/120
GLV18-55/25/103/115



GLV18-55-S/115/120
GLV18-55-S/25/102/115



Accessories

CPZ18B03	Mounting Bracket with swivel nut
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm

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SENSING YOUR NEEDS

Single-beam M18 threaded photoelectric sensor for detecting people, objects and vehicles

- **Efficient Line in a short M18 plastic housing for standard applications**
- **4 LEDs indicator for 360° visibility**
- **Version for universal voltages**
- **Sidelookerversion**
- **Version with front optical face**

Product information

The GLV/GLK18 series sensors help improve the efficiency of machines and systems. The design of the M18 plastic housing, the connection technology, and sensor properties are highly standardized. Concentrating on the key sensor requirements has produced a robust and reliable product series for DC and AC/DC voltage systems without any over-engineering. The mounting set included in the scope of delivery and the optimized potentiometer design ensure fast assembly and easy configuration.

Typical applications

Packaging industry:
- Presence checks, track loading, completeness checks, stack height control

Material handling
- Presence checks, target sensor, profile checks, trigger sensor

Automatic doors, gates and access systems, elevator:
- Secure detection for automatic door and gate systems
- Monitoring function in turnstiles
- Closing edge monitoring in elevators

Detection area

Date of issue 2012-11-12

Technical data

Model Number		GLK18-6/25/115/161	GLK18-6-S/25/115/161	GLK18-55/25/115/161	GLK18-55-S/25/115/161
Effective detection range	0 ... 3.5 m				●
	0 ... 4 m			●	
	0 ... 5.5 m		●		
	0 ... 6.5 m	●			
Threshold detection range		8 m	6.5 m	5.5 m	4.5 m
Reference target	reflector C110-2	●	●	●	●
Light source	LED	●	●	●	●
Light type	modulated visible red light , 640 nm	●	●	●	●
Diameter of the light spot	approx. 160 mm at 4.5 m				●
	approx. 200 mm at 5.5 m			●	
	approx. 250 mm at 6.5 m		●		
	approx. 300 mm at 8 m	●			
Angle of divergence	approx. 2 °	●	●	●	●
Optical face	frontal	●		●	
	lateral		●		●
Ambient light limit	30000 Lux	●	●	●	●
Accessories provided	Mounting aids	●	●	●	●
Operating display	LED green, statically lit Power on	●	●	●	●
Function display	LED yellow: lights up when receiving the light beam ; flashes when falling short of the stability control; OFF when light beam is interrupted	●	●	●	●
Operating voltage	20 ... 250 V AC/DC	●	●	●	●
No-load supply current	< 2.5 mA	●	●	●	●
Switching type	light on	●	●	●	●
Signal output	N-channel MOSFET, short circuit protected	●	●	●	●
Switching voltage	max. 250 V AC/DC	●	●	●	●
Switching current	max. 200 mA	●	●	●	●
Voltage drop	≤ 3.5 V AC/DC	●	●	●	●
Switching frequency	50 Hz	●	●	●	●
Response time	≤ 10 ms	●	●	●	●
Product standard	EN 60947-5-2:2007 ; IEC 60947-5-2:2007	●	●	●	●
Standards	UL 508	●	●	●	●
Protection class	II, rated insulation voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1	●	●	●	●
UL approval	cULus Listed, Type 1 enclosure	●	●	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●
Storage temperature	-40 ... 70 °C (-40 ... 158 °F)	●	●	●	●
Protection degree	IP67	●	●	●	●
Connection	2 m, 3 x 0.34 mm^2, PVC cable	●	●	●	●
Housing	PC-PBT	●	●	●	●
Optical face	PMMA	●	●	●	●
Mass	approx. 100 g	●	●	●	●

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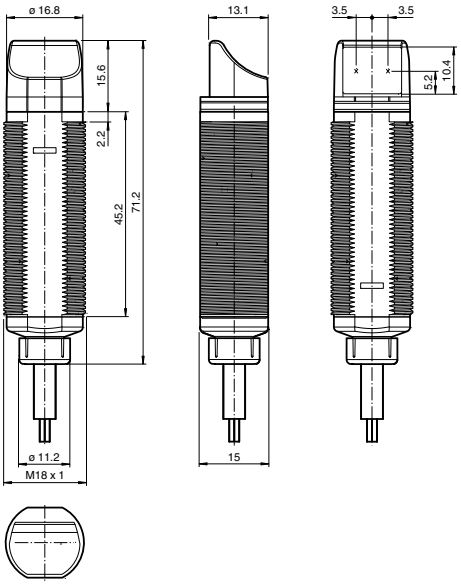
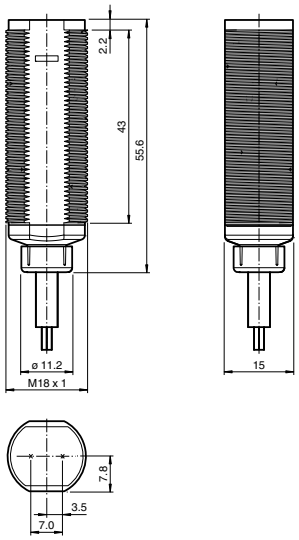
Dimensions

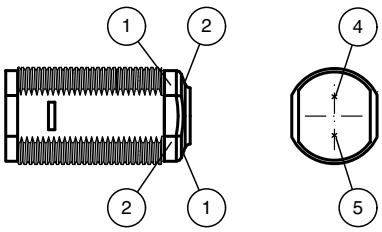
GLD18-*-S



GLD18-*



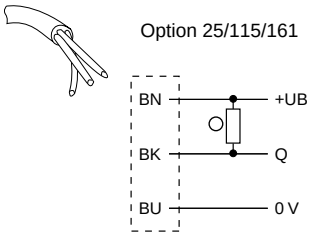
Indicators/operating means



1	Operating display	green
2	Signal display	yellow
4	Emitter	
5	Receiver	

Electrical connection

❍ = Light on, ● = Dark on



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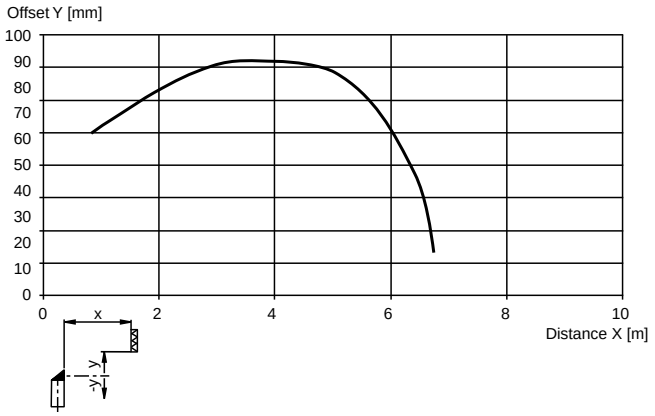
Notes

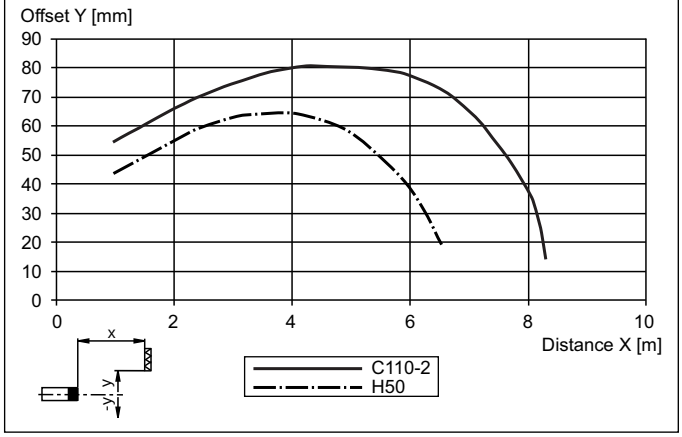
GLK18-6-S/25/115/161

Characteristic response curve



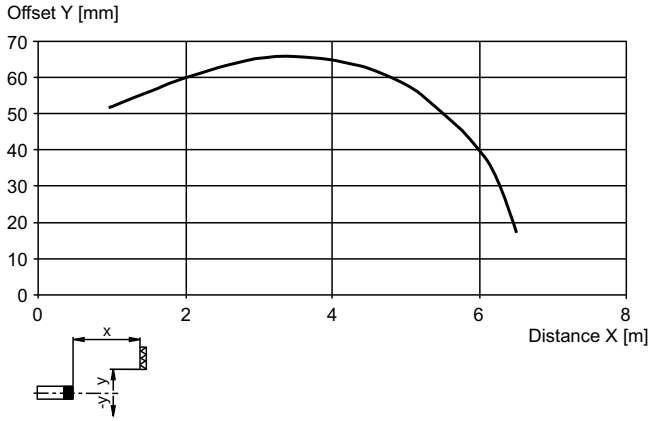
GLK18-6/25/115/161

Characteristic response curve



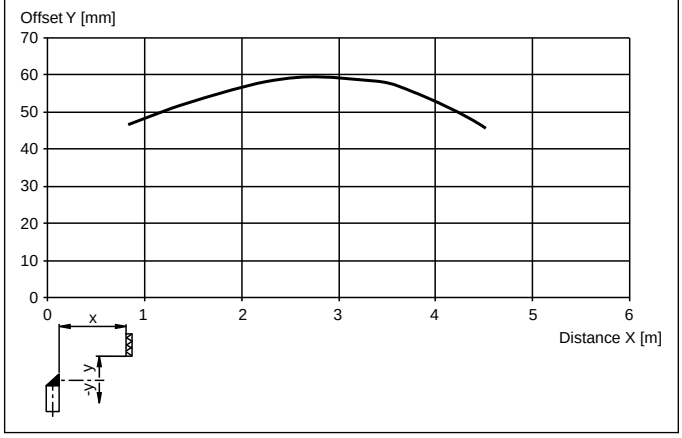
GLK18-55/25/115/161

Characteristic response curve



GLK18-55-S/25/115/161

Characteristic response curve



Accessories

CPZ18B03	Mounting Bracket with swivel nut
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm

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PEPPERL+FUCHS SENSING YOUR NEEDS

Basic miniature photoelectric sensor for detecting people, objects and vehicles

- **Cost-optimized series for standard tasks**
- **Miniature design**
- **Tamper-proof, no operating controls**
- **Flexible use with versatile mounting opportunities**
- **Yellow LED indicator behind the front panel**
- **2-way LED indicator for switch status**
- **Push-pull output**

Product information

Small, robust and reliable, the ML8 series of miniature sensors is particularly suitable for non-contact detection of objects in confined spaces. The LED indicator is located behind the lens and provides reliable information on the sensor's operating status. The LED is always visible, even if the sensor is completely embedded. Flexible mounting options and fixed preset detection ranges simplify setup and operation.

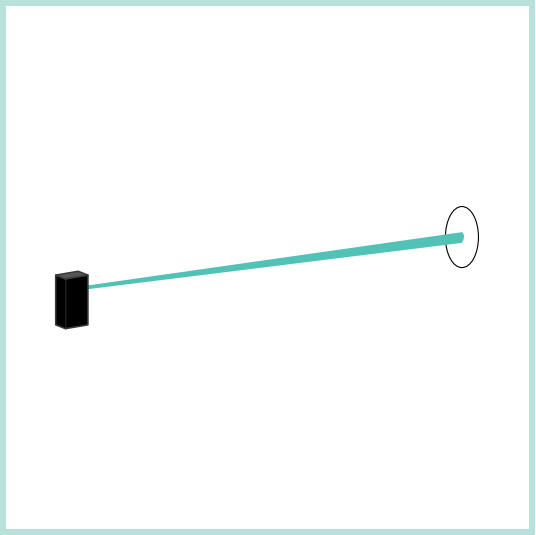
Typical applications

Doors, gates and elevators
- Monitoring of closing edges on automatic doors and elevators
- Monitoring function for turnstiles
- Activation function for restarting escalators

Container handling
- Target sensor
- Control movement on conveyors
- Stack height monitoring

General assembly applications
- Presence monitoring
- Congestion monitoring
- Track loading
- Completeness check

Detection area



Date of issue 2012-11-12

Technical data

Model Number		ML8-55/103/115	ML8-55/103/115b	ML8-55/115b/136/138	ML8-55/103/143
Effective detection range	0 ... 3 m	●	●	●	●
Threshold detection range	3.5 m	●	●	●	●
Reference target	H85-2 reflector	●	●	●	●
Light source	LED	●	●	●	●
Light type	modulated visible red light	●	●	●	●
Diameter of the light spot	approx. 180 mm at a distance of 3.5 m	●	●	●	●
Angle of divergence	approx. 3 °	●	●	●	●
Ambient light limit	40000 Lux	●	●	●	●
Function display	LED yellow: switching state	●	●	●	●
Operating voltage	10 ... 30 V DC , class 2	●	●	●	●
Ripple	max. 10 %	●	●	●	●
No-load supply current	< 12 mA	●	●		●
	< 15 mA			●	
Switching type	dark on	●	●	●	●
Signal output	1 PNP output, short-circuit protected, reverse polarity protected, open collector	●	●		●
	2 push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected			●	
Switching voltage	max. 30 V DC	●	●	●	●
Switching current	max. 100 mA	●	●	●	●
Voltage drop	≤ 1.5 V DC	●	●		●
	≤ 2.5 V DC			●	
Response time	1.8 ms	●	●	●	●
Directive conformity	EMC Directive 2004/108/EC	●	●	●	●
Product standard	EN 60947-5-2:2007	●	●	●	●
Protection degree	EN 60529	●	●	●	●
Standards	EN 50178, UL 508	●	●	●	●
Protection class	II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●
Storage temperature	-40 ... 75 °C (-40 ... 167 °F)	●	●	●	●
Protection degree	IP67	●	●	●	●
Connection	2 m fixed cable	●			
	fixed cable 300 mm with M12 x 1 connector , 4-pin		●	●	
	M8 x 1 connector, 4-pin				●
Housing	PC (glass-fiber-reinforced Makrolon)	●	●	●	●
Optical face	PMMA	●	●	●	●
Connector	plastic				●
Mass	approx. 10 g				●
	approx. 30 g			●	
	approx. 50 g	●	●		
Tightening torque, fastening screws	≤ 0.4 Nm				●

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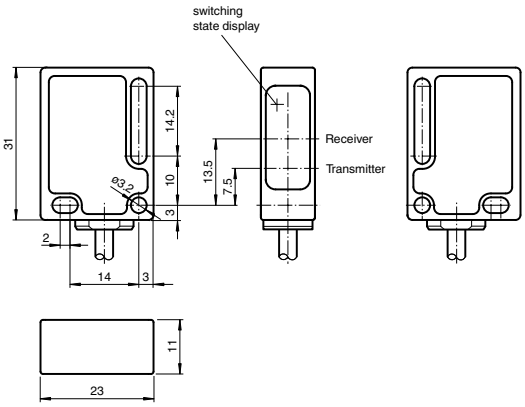
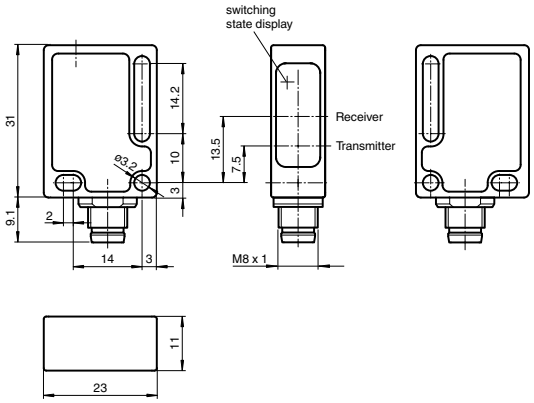
SENSING YOUR NEEDS

Dimensions

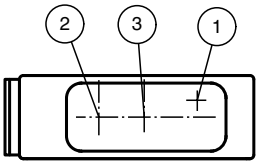
Option /115



Option /143



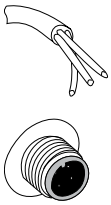
Indicators/operating means



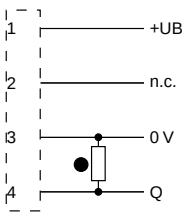
1	Switching state	yellow
2	Emitter	
3	Receiver	

Electrical connection

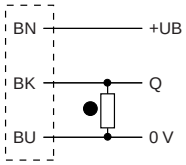
❍ = Light on, ● = Dark on



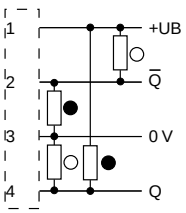
Option /59/103

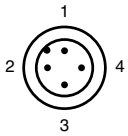


Option 59/103/115



Option 136/138





Wire colors in accordance with EN 60947-5-2

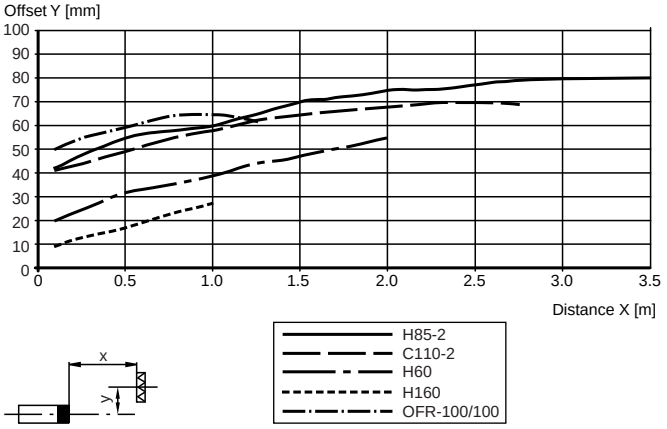
1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2012-11-12

Notes

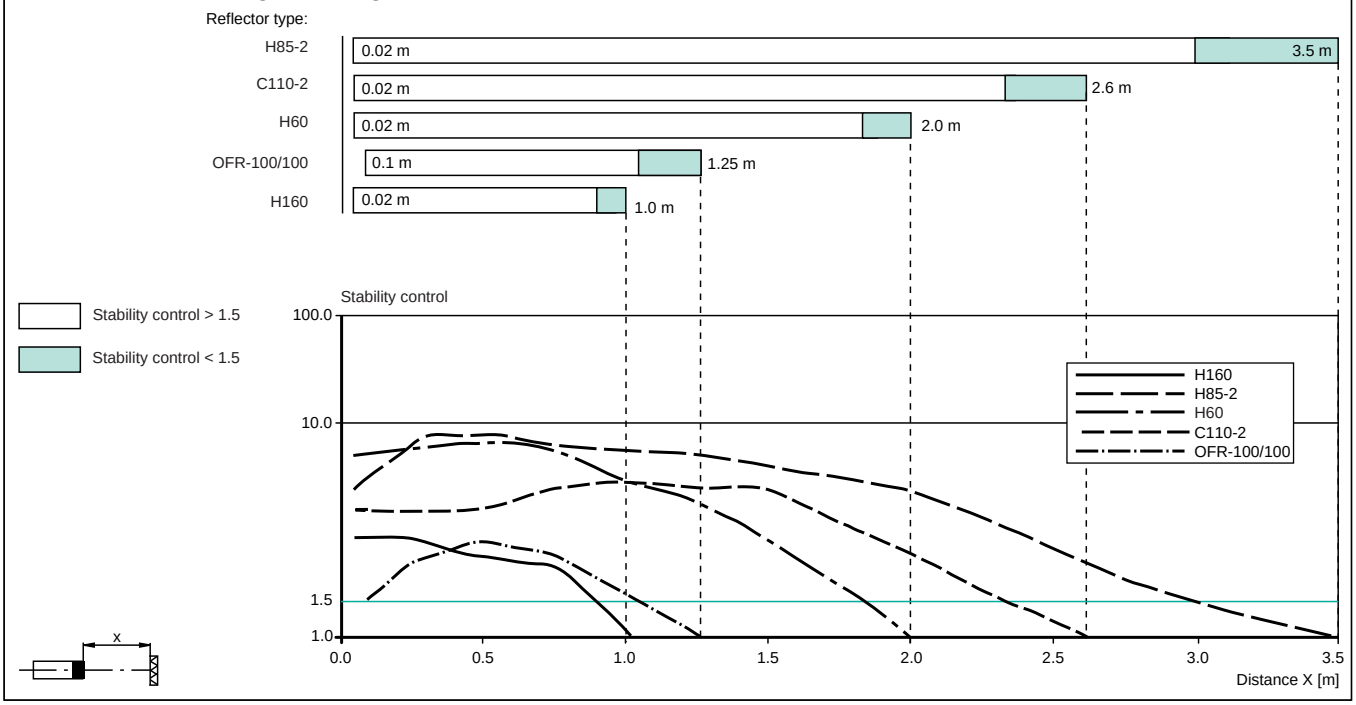
Characteristic response curve

ML8-55



Relative received light strength

ML8-55...



Accessories

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable

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PEPPERL+FUCHS SENSING YOUR NEEDS

Mid-range photoelectric sensors for detecting people, objects, and vehicles

- **Retroreflective sensor for single-beam closing edge protection**
- **Narrow housing suitable for small gaps**
- **Sturdy plastic housing**
- **Various possibilities for mounting**
- **Version with infrared light**
- **Version for supply voltage of up to 30 V DC**
- **Version with AC/DC power supply**
- **Dark on version**
- **Light on version**

Product information

Concentration on the essentials is the hallmark of the 91 series. As ac/dc supply devices, these economical, reliable and easy-to-use photoelectric sensors can be used almost universally. Their narrow design means that they can be used in any environment.
The single-beam photoelectric sensors of the 91 series are suitable for closing-edge monitoring for elevators, barriers and doors, as well as for object detection and object tracking in material handling systems.

Typical applications

- Closing-edge monitoring for elevators, barriers and industrial doors
- Detecting and tracking objects in material handling

Detection area

Date of issue 2012-11-12

Technical data

Model Number		RL91-6-IR/25/38a/115	RL91-6-IR/25/49/115	RL91-6-IR/38a/59/115	RL91-6-IR/49/59/115	RLK91-6-IR/25/31/115	RLK91-6-IR/31/59/115
Effective detection range	0 ... 6 m	●	●	●	●	●	●
Threshold detection range	9 m	●	●	●	●	●	●
Reference target	H85-2 reflector	●	●	●	●	●	●
Light source	LED	●	●	●	●	●	●
Light type	modulated infrared light	●	●	●	●	●	●
Diameter of the light spot	approx. 230 mm at a distance of 6000 mm	●	●	●	●	●	●
Angle of divergence	approx. 2.5 °	●	●	●	●	●	●
Ambient light limit	90000 Lux	●	●	●	●	●	●
Function display	LED red, flashes when falling short of the stability control	●	●	●	●	●	●
Operating voltage	12 ... 30 V DC		●		●		
	12 ... 30 V DC / 18 ... 28 V AC	●		●			
	96 ... 264 V AC					●	●
No-load supply current	< 100 mA	●	●	●	●		
Power consumption	12 VA					●	●
Switching type	dark on			●	●		●
	light on	●	●			●	
Signal output	Weak current relay, 1 alternator	●		●		●	●
	1 NPN, 1 PNP synchronized-switching, short-circuit protected, reverse polarity protected		●		●		
Switching voltage	≤ 55 V AC / 24 V DC	●		●			
	max. 240 V AC					●	●
	max. 30 V DC		●		●		
Switching current	1 A /24 V DC, 0.5 A /110 V AC	●		●			
	200 mA		●		●		
	2.5 A / 240 V AC					●	●
Switching power	max. 120 W / 600 VA					●	●
	max. 24 W / 55 VA	●		●			
Switching frequency	25 Hz	●	●	●	●	●	●
Response time	20 ms	●	●	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●	●
UL approval	cULus	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)					●	●
	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●		
Ambient temperature	-20 ... 55 °C (-4 ... 131 °F)	●	●	●	●	●	●
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)	●	●	●	●	●	●
Protection degree	IP65	●	●	●	●	●	●
Connection	5 m fixed cable	●	●	●	●	●	●
Housing	Luran	●	●	●	●	●	●
Optical face	Luran	●	●	●	●	●	●
Mass	100 g	●	●	●	●	●	●

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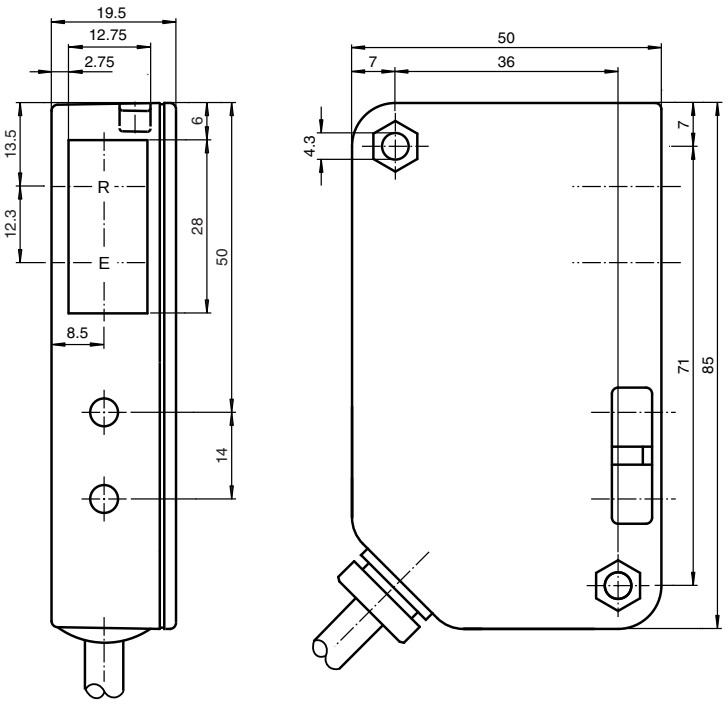
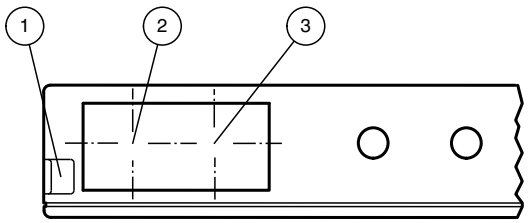
Dimensions



Indicators/operating means

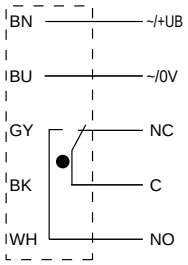


1	Functional display	red
2	Optical axis Receiver	
3	Optical axis Transmitter	

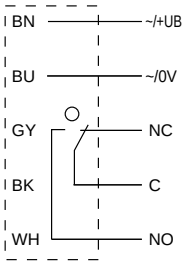
Electrical connection

❍ = Light on, ● = Dark on

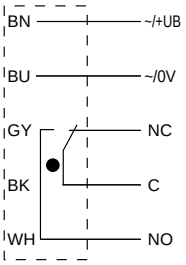
Option /38a/59/115



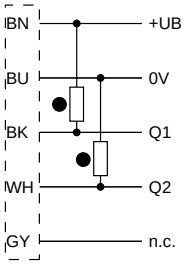
Option /25/31/115



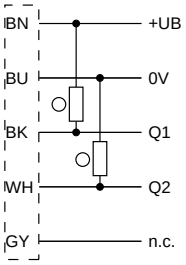
Option /31/59/115



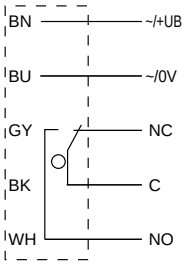
Option /49/59/115



Option /25/49/115



Option /25/38a/115



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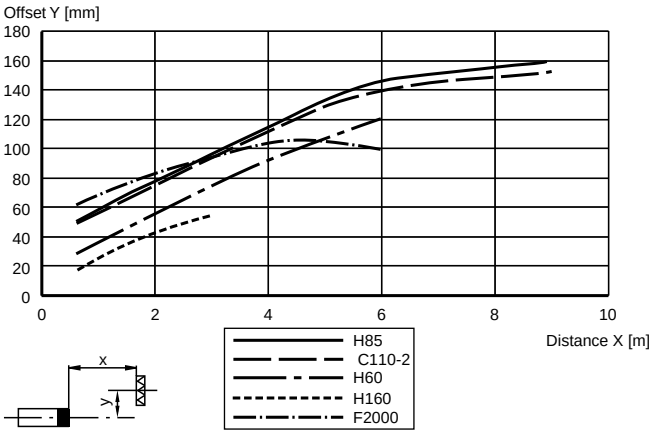
Notes

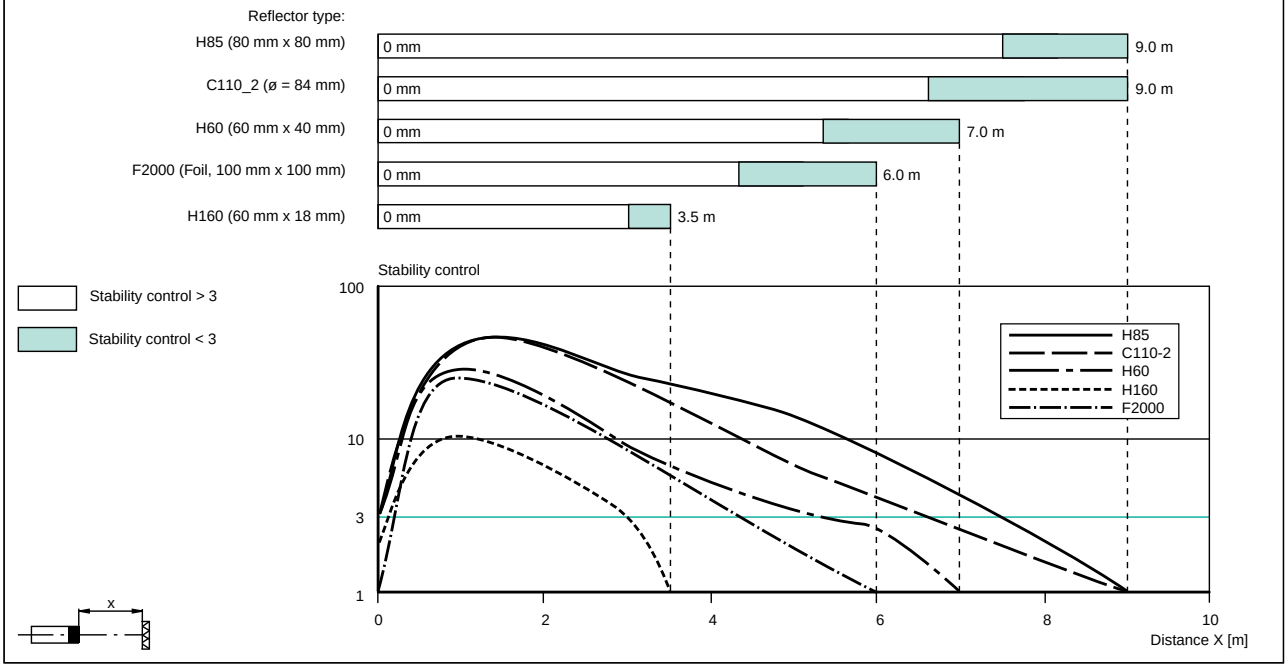
Characteristic response curve

RL(K)91-6



Relative received light strength

RL(K)91-6



Accessories

OMH-91	Mounting bracket
REF-H50	Reflector, rectangular 51 mm x 51 mm, mounting holes, fixing strap
REF-H60-2	Reflector with mounting holes
REF-H85-2	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
REF-H160	Reflector, rectangular 60 mm x 18 mm, mounting holes
REF-H180	Reflector, rectangular 180 mm x 40 mm, mounting holes
REF-C110-2	Reflector, round ø 84 mm, central mounting hole
OFR-100/100	Reflective tape 100 mm x 100 mm
Reflector Weather Cap	Weather hood for series reflector

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PEPPERL+FUCHS SENSING YOUR NEEDS

Mid-range photoelectric sensors for detecting people, objects, and vehicles

- **Retroreflective sensor for single-beam closing edge protection**
- **Narrow housing suitable for small gaps**
- **Sturdy plastic housing**
- **Various possibilities for mounting**
- **Version with red light**
- **Version for supply voltage of up to 30 V DC**
- **Dark on version**
- **Version with AC/DC power supply**

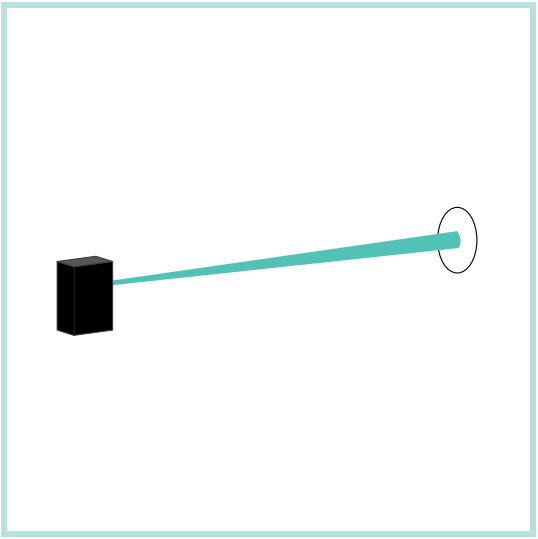
Product information

Concentration on the essentials is the hallmark of the 91 series. As ac/dc supply devices, these economical, reliable and easy-to-use photoelectric sensors can be used almost universally. Their narrow design means that they can be used in any environment.
The single-beam photoelectric sensors of the 91 series are suitable for closing-edge monitoring for elevators, barriers and doors, as well as for object detection and object tracking in material handling systems.

Typical applications

- Closing-edge monitoring for elevators, barriers and industrial doors
- Detecting and tracking objects in material handling

Detection area



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Technical data

Model Number		RL91-54-RT/25/49/115	RL91-54-RT/25/38a/73c	RL91-54-RT/49/59/115	RL91-54-RT/49/59/73c	RLK91-54-RT/31/59/115
Effective detection range	0 ... 4 m	●	●	●	●	●
Threshold detection range	8 m	●	●	●	●	●
Reference target	H85-2 reflector	●	●	●	●	●
Light source	LED	●	●	●	●	●
Light type	modulated visible red light	●	●	●	●	●
Diameter of the light spot	approx. 160 mm at a distance of 4000 mm	●	●	●	●	●
Angle of divergence	approx. 2.5 °	●	●	●	●	●
Ambient light limit	90000 Lux	●	●	●	●	●
Function display	LED red, flashes when falling short of the stability control	●	●	●	●	●
Operating voltage	12 ... 30 V DC	●		●	●	
	12 ... 30 V DC / 18 ... 28 V AC		●			
	96 ... 264 V AC					●
No-load supply current	< 100 mA	●	●	●	●	
Power consumption	12 VA					●
Switching type	dark on			●	●	●
	light on	●	●			
Signal output	Weak current relay, 1 alternator		●			●
	1 NPN, 1 PNP synchronized-switching, short-circuit protected, reverse polarity protected	●		●	●	
Switching voltage	≤ 55 V AC / 24 V DC		●			
	max. 240 V AC					●
	max. 30 V DC	●		●	●	
Switching current	1 A /24 V DC, 0.5 A /110 V AC		●			
	200 mA	●		●	●	
	2.5 A / 240 V AC					●
Switching power	max. 120 W / 600 VA					●
	max. 24 W / 55 VA		●			
Switching frequency	25 Hz	●	●	●	●	●
Response time	20 ms	●	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●
UL approval	cULus	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)					●
	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●	
Ambient temperature	-20 ... 55 °C (-4 ... 131 °F)	●	●	●	●	●
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)	●	●	●	●	●
Protection degree	IP65	●	●	●	●	●
Connection	connector M12 x 1, 4-pin		●		●	
	5 m fixed cable	●		●		●
Housing	Luran	●	●	●	●	●
Optical face	glass pane	●	●	●		●
Mass	100 g	●	●	●	●	●

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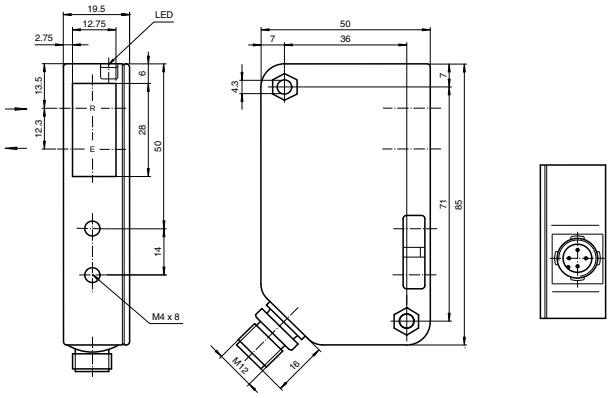
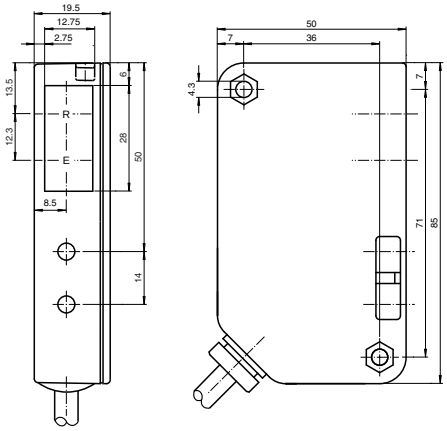
Dimensions

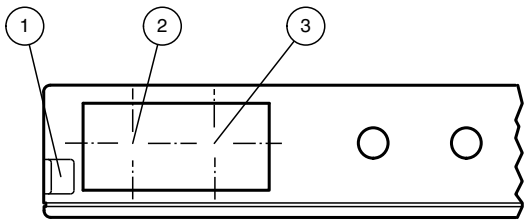
Option /73c



Option /115



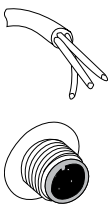
Indicators/operating means



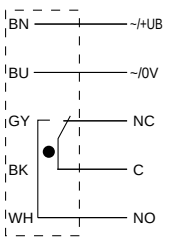
1	Functional display	red
2	Optical axis Receiver	
3	Optical axis Transmitter	

Electrical connection

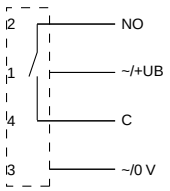
❍ = Light on, ● = Dark on



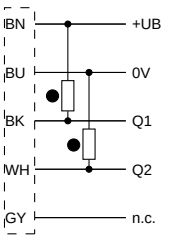
Option /31/59/115



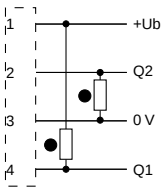
Option /38a/73c



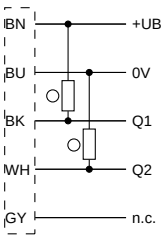
Option /49/59/115

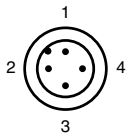


Option /49/59/73c



Option /25/49/115





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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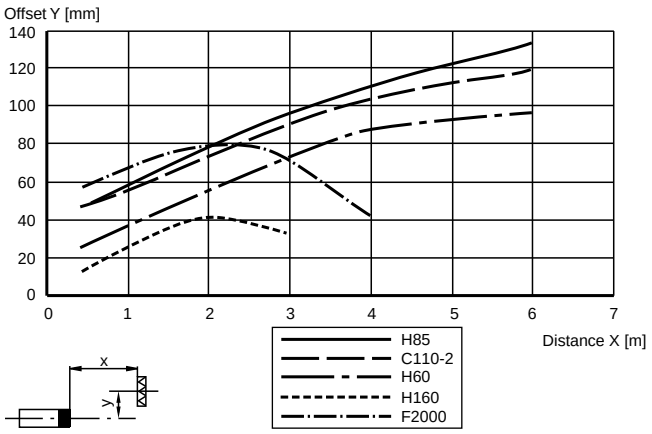
Notes

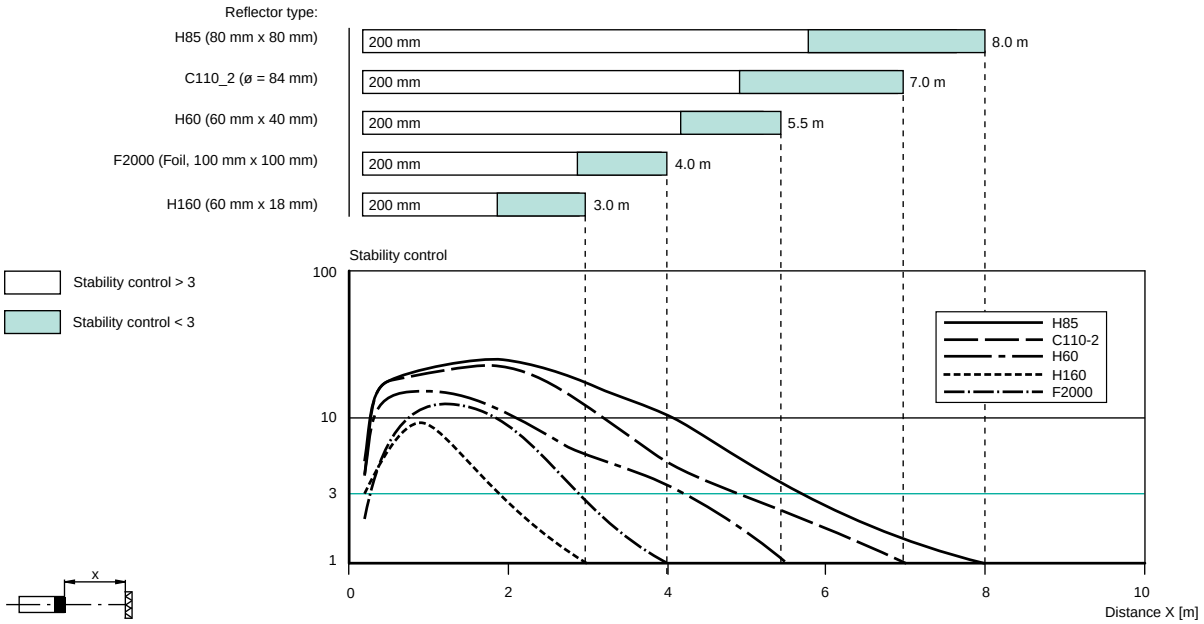
Characteristic response curve

RL(K)91-54



Relative received light strength

RL(K)91-54



Accessories

OMH-91	Mounting bracket
REF-H50	Reflector, rectangular 51 mm x 51 mm, mounting holes, fixing strap
REF-H60-2	Reflector with mounting holes
REF-H85-2	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
REF-H160	Reflector, rectangular 60 mm x 18 mm, mounting holes
REF-H180	Reflector, rectangular 180 mm x 40 mm, mounting holes
REF-C110-2	Reflector, round ø 84 mm, central mounting hole
OFR-100/100	Reflective tape 100 mm x 100 mm
Reflector Weather Cap	Weather hood for series reflector

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PEPPERL+FUCHS SENSING YOUR NEEDS

Single-beam miniature photoelectric sensor with long detection range for detecting people and objects

- **User-friendliest photoelectric sensor series for standard applications**
- **Miniature design**
- **Not sensitive to ambient light**
- **Metal-reinforced fastening holes**
- **Additional resistance 10 kOhm**
- **Version with infrared light**

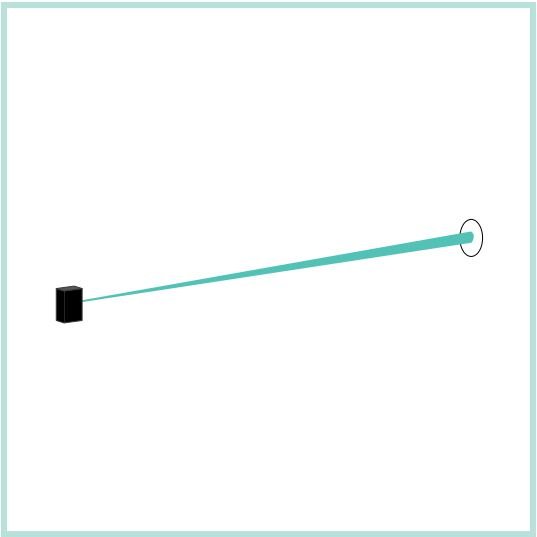
Product information

The ML100 series comprises a complete family of photoelectric sensors which are ideally suited for applications where long ranges and a high level of reliability are required. Due to their miniature design, the ML100 series sensors are also suitable for use in extremely confined areas. During operation, the ML 100 miniature sensors are characterized by a high performance Infrared-LED, extremely low power consumption and insensitivity to ambient lighting. The status LEDs, which are highly visible from all sides, provide clear information regarding reliable operation. Secure mounting is ensured by metal-reinforced fastening holes. This means that the threading is more durable and enables maximum tightening torque.

Typical applications

- Presence monitoring for general machine automation
- Congestion monitoring
- Track loading
- Completeness check
- Object tracking — solar cells/float glass/LCD detection

Detection area



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Technical data

Model Number		ML100-6-5053	ML100-6-5052
Effective detection range	0 ... 7.5 m	●	●
Threshold detection range	9 m	●	●
Reference target	H50 reflector	●	●
Light source	IRED	●	●
Light type	modulated infrared light	●	●
Diameter of the light spot	approx. 650 mm at a distance of 9 m	●	●
Angle of divergence	approx. 4 °	●	●
Optical face	frontal	●	●
Ambient light limit	EN 60947-5-2	●	●
Operating display	LED green: power on LED yellow: switching state	●	●
Controls	sensitivity adjustment	●	●
Controls	Light/Dark switch	●	●
Operating voltage	10 ... 30 V DC , class 2	●	●
Ripple	max. 10 %	●	●
No-load supply current	< 20 mA	●	●
Switching type	light/dark on, switchable	●	●
Signal output	1 PNP, short-circuit protected, with 10 kOhm pull-down-resistor ; reverse polarity protected	●	●
Switching voltage	max. 30 V DC	●	●
Switching current	max. 100 mA , resistive load	●	●
Voltage drop	≤ 1.5 V DC	●	●
Switching frequency	500 Hz	●	●
Response time	1 ms	●	●
EMC Directive 2004/108/EC	EN 60947-5-2	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●
Standards	UL 508	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)	●	●
Storage temperature	-40 ... 70 °C (-40 ... 158 °F)	●	●
Protection degree	IP67	●	●
Connection	fixed cable	●	●
Housing	PC (Polycarbonate)	●	●
Optical face	PMMA	●	●
Mass	approx. 30 g	●	●

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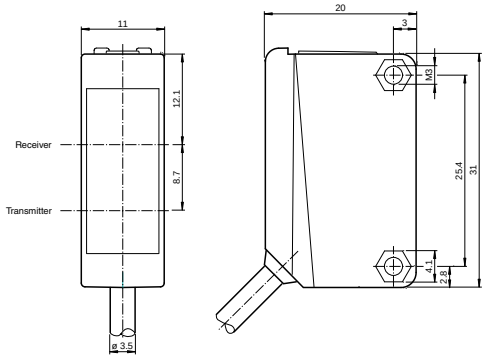
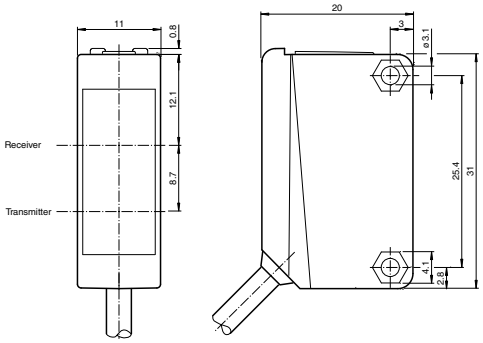
Dimensions

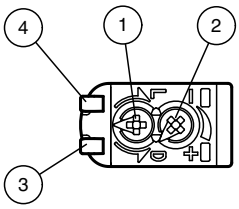
ML100-6-5052



ML100-6-5053



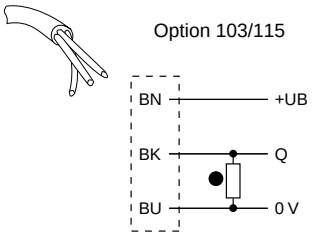
Indicators/operating means



1	Light-Dark-switching	
2	Sensitivity adjuster	
3	Signal display	yellow
4	Operating display	green

Electrical connection

❍ = Light on, ● = Dark on



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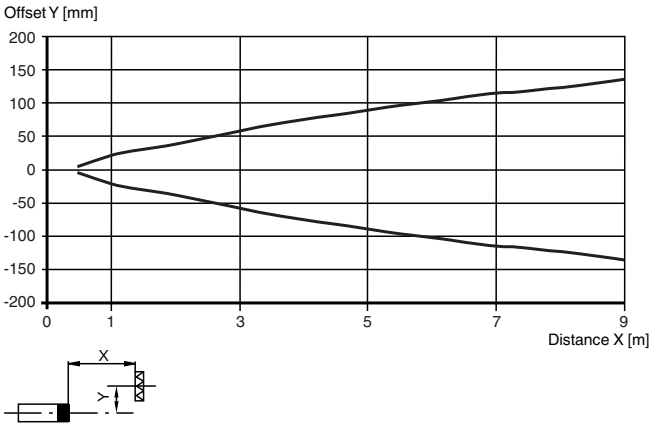
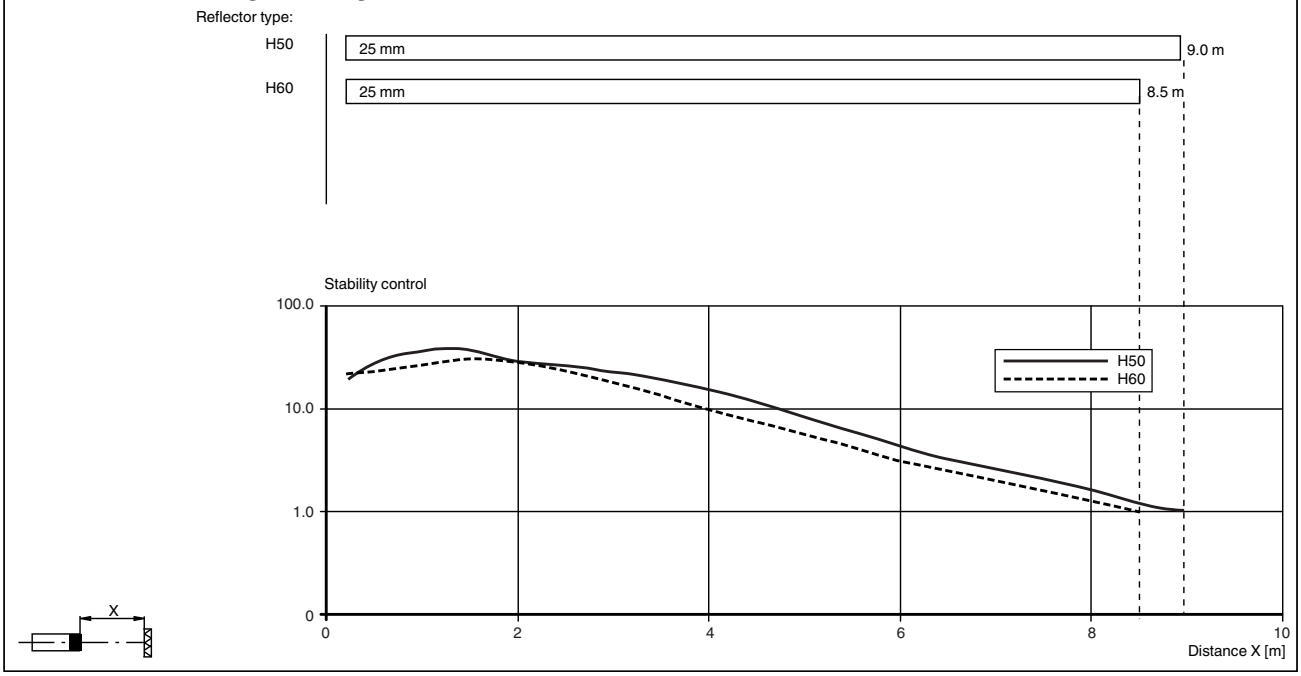
Notes

Characteristic response curve



Relative received light strength



Accessories

OMH-F10-ML100	Mounting aid for ML100 series
OMH-10	Mounting aid
OMH-ML100-01	Mounting bracket
OMH-ML100-02	Mounting bracket
OMH-ML100-03	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-ML100-04	Mounting bracket
OMH-ML100-05	Mounting bracket
REF-H33	Reflector with screw fixing

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PEPPERL+FUCHS SENSING YOUR NEEDS

Miniature photoelectric sensor for detecting people, objects and vehicles

- **Compact series in universal housing for standard applications**
- **Miniature design**
- **Front mounting with M18-threads or side mounting holes**
- **360° high visibility LEDs**
- **Time-saving mounting with quick clamp system**
- **4-in-1 output (push-pull)**
- **Long-range nonpolarized model**
- **Version with polarized filters detect shiny objects**

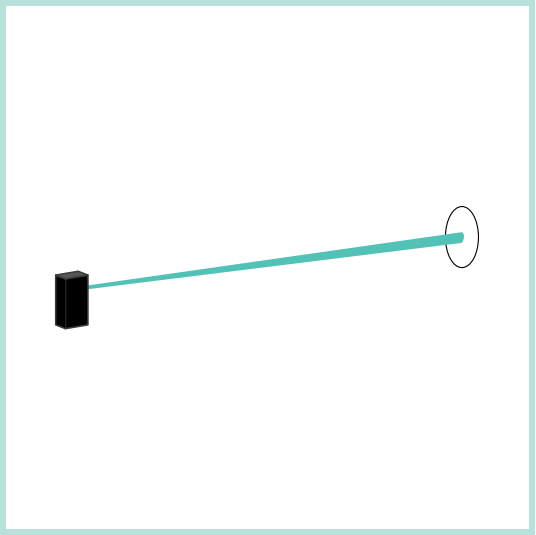
Product information

The ML17 sensor family offers diverse connection and installation options, which means that it can adapt to the most varied automation tasks. In addition to the usual fitting method using M4 screws, these sensors can also be installed by means of M18 threaded insert. All devices are equipped with a green Power On display and a yellow function display. These displays are arranged in such a way that they are clearly visible from different directions.

Typical applications

- Presence monitoring
- Target sensors
- Congestion monitoring
- Track loading
- Completeness checks

Detection area



Date of issue 2012-11-12

Technical data

Model Number		ML17-6/115/136	ML17-6/115b/136	ML17-6/136/143	ML17-54/115/136	ML17-54/115b/136	ML17-54/136/143
Effective detection range	0 ... 3.5 m				●	●	●
	0 ... 6.5 m	●	●	●			
Threshold detection range	5 m				●	●	●
Reference target	FE-RR1 reflector	●	●	●	●	●	●
Light source	LED	●	●	●	●	●	●
Light type	modulated visible red light , 626 nm	●	●	●	●	●	●
Ambient light limit	≤ 10000 Lux	●	●	●	●	●	●
Operating display	LED green	●	●	●	●	●	●
Function display	LED yellow, lights up with receiver lit	●	●	●	●	●	●
Controls	sensitivity adjustment	●	●	●	●	●	●
Operating voltage	10 ... 30 V DC , class 2	●	●	●	●	●	●
Ripple	max. 10 %	●	●	●	●	●	●
No-load supply current	< 25 mA	●	●	●	●	●	●
Operating current	100 mA max per output	●	●	●	●	●	●
Time delay before availability	≤ 200 ms	●	●	●	●	●	●
Switching type	light/dark on	●	●	●	●	●	●
Signal output	2 push-pull (4 in 1)outputs, short-circuit protected, reverse polarity protected, overvoltage protected	●	●	●	●	●	●
Switching voltage	max. 30 V DC	●	●	●	●	●	●
Switching current	max. 100 mA	●	●	●	●	●	●
Voltage drop	≤ 2 V DC	●	●	●	●	●	●
Switching frequency	500 Hz	●	●	●	●	●	●
Response time	≤ 1 ms	●	●	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●	●
UL approval	cULus	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●	●	●
Ambient temperature	-20 ... 55 °C (-4 ... 131 °F)	●	●	●	●	●	●
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)	●	●	●	●	●	●
Protection degree	IP67	●	●	●	●	●	●
Connection	fixed cable 150 mm with M12 x 1 male connector, 4 pin		●			●	
	2 m fixed cable	●			●		
	M8 x 1 connector, 4-pin			●			●
Housing	ABS	●	●	●	●	●	●
Optical face	Acrylic	●	●	●	●	●	●
Mass	approx. 23 g		●			●	
	approx. 40 g	●			●		
	approx. 8.5 g			●			●

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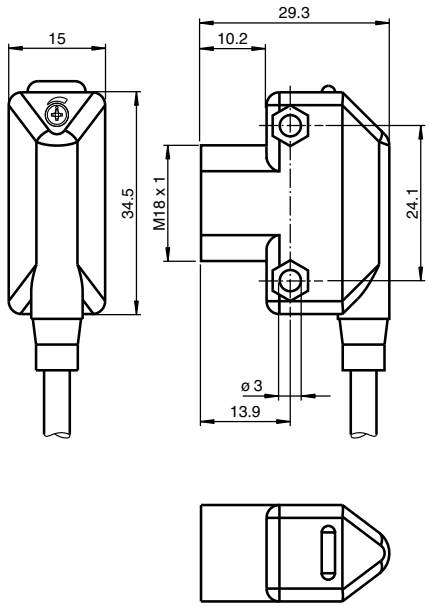
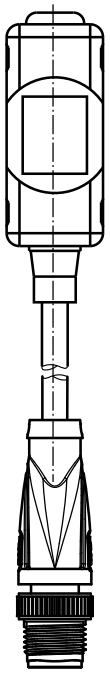
SENSING YOUR NEEDS

Dimensions

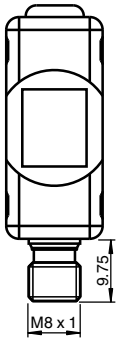
Connection option 115



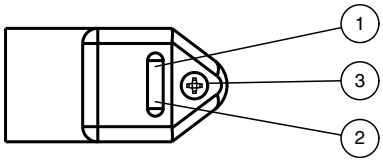
Connection option 115b



Connection option 143



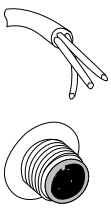
Indicators/operating means



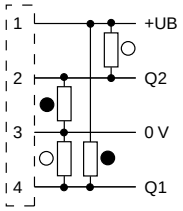
1	Signal display	yellow
2	Operating display	green
3	Sensitivity adjustment	

Electrical connection

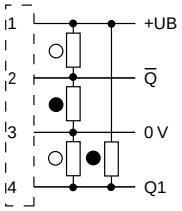
❍ = Light on, ● = Dark on



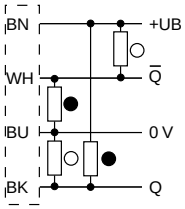
Option /115b/136



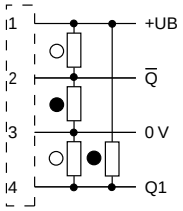
Option 136/143

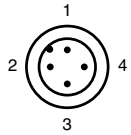


Option 115/136



Option 115b/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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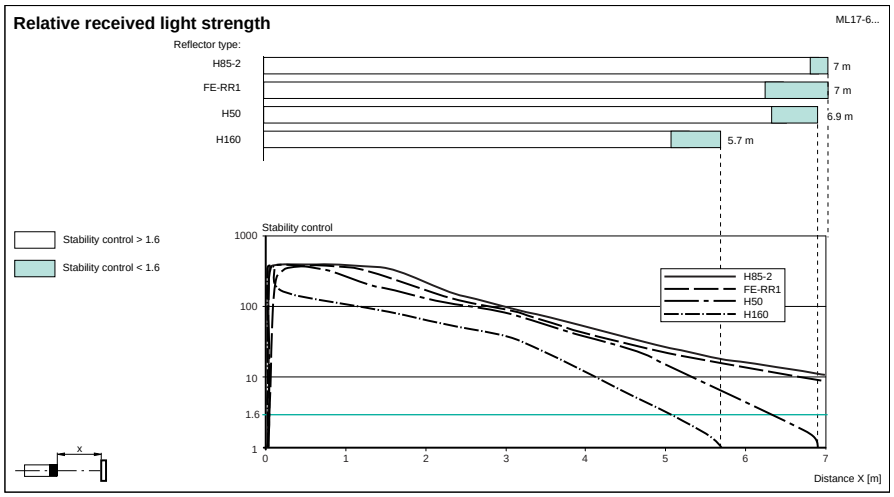
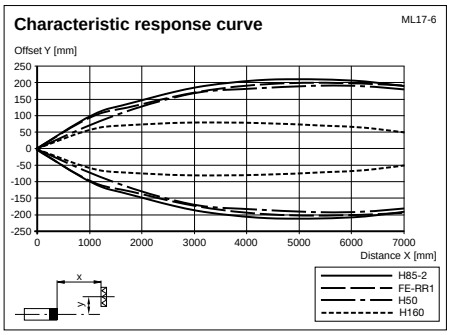
Notes

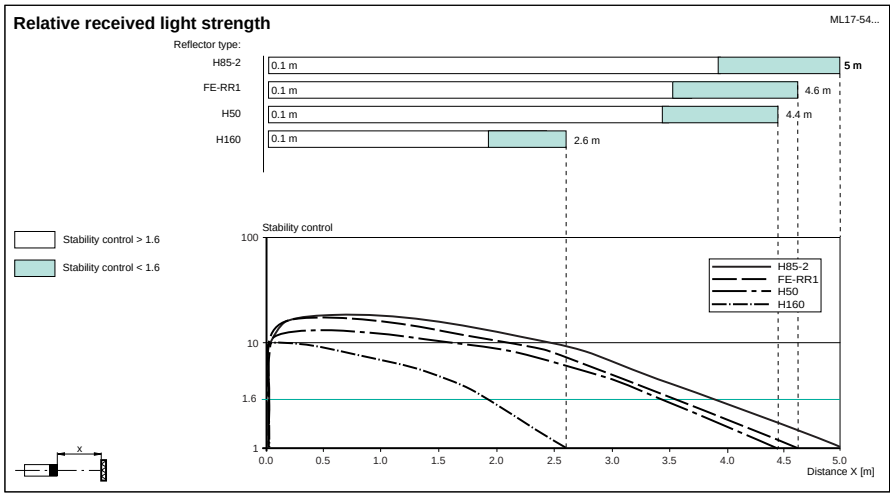
ML17-6/115/136
ML17-6/115b/136
ML17-6/136/143



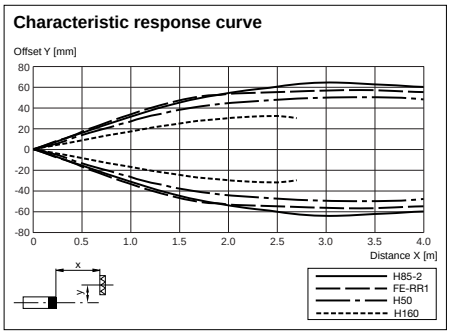
ML17-6/115/136
ML17-6/115b/136
ML17-6/136/143



ML17-54/115/136
ML17-54/115b/136
ML17-54/136/143



ML17-54/115/136
ML17-54/115b/136
ML17-54/136/143



Accessories

OMH-ML17-EZ	Mounting bracket
OMH-ML17	Mounting bracket
OMH-ML17-1	Mounting bracket
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

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PEPPERL+FUCHS SENSING YOUR NEEDS

Photoelectric sensor for detecting people, objects and vehicles

- **Cost-optimized series for standard tasks**
- **Large construction with small housing**
- **Version for universal voltages**
- **Relay output**
- **Large construction with small housing**
- **Not sensitive to ambient light**
- **Version for universal voltages**
- **Relay output**
- **Version with accessories in scope of delivery**

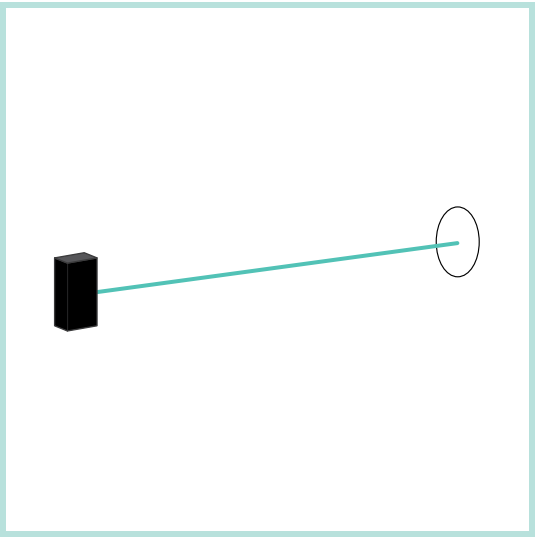
Product information

Series 31 is a range of cost-effective and, most importantly, reliable photoelectric sensors for standard applications in the fields of material handling and logistics, and for monitoring industrial doors, elevators, and automatic gates. The ultrasonic-welded plastic housing provides a high degree of protection, making these sensors ideal for tasks in harsh outdoor conditions. These sensors are currently the most compact "wide range power supply sensors" that can work with any DC and AC voltage between 24 V and 240 V. In addition to the robust technology, the sensors offer numerous product details that help the user with assembly, connection and operation.

Typical applications

- Monitoring closing edges of automatic industrial doors and elevators
- Monitoring the swing range of automatic gates
- Detecting and tracking objects in material handling

Detection area



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Technical data

Model Number		RLK31-6/31/115	RLK31-6/25/31/115	RLK31-54/31/33/115	RLK31-54/31/115	RLK31-54/25/31/115	RLK31-54/25/31/115 SET	RLK31-54/25/31/115 SET2
Effective detection range	0 ... 9000 mm			●	●	●	●	●
	14 m	●	●					
Threshold detection range	12 m			●	●	●	●	●
	16.5 m	●	●					
Reference target	reflector C110-2			●	●	●	●	●
	H85-2 reflector	●	●					
Light source	LED	●	●	●	●	●	●	●
Light type	modulated visible red light , 630 nm	●	●	●	●	●	●	●
Diameter of the light spot	approx. 200 mm at a distance of 6 m			●	●	●	●	●
	approx. 240 mm at a distance of 8 m	●	●					
Angle of divergence	3 °	●	●	●	●	●	●	●
Ambient light limit	50000 Lux	●	●	●	●	●	●	●
Accessories provided	reflector C110-2 OMH-RL31-01 mounting bracket with mounting materials						●	
	reflector C110-2 OMH-RL31-05 mounting bracket with mounting materials							●
Operating display	LED green: power on	●	●	●	●	●	●	●
Function display	LED yellow: 1. LED lit constantly: signal > 2 x switching point (function reserve) 2. LED flashes: signal between 1 x switching point and 2 x switching point 3. LED off: signal < switching point	●	●	●	●	●	●	●
Operating voltage	24 ... 240 V AC 12 ... 240 V DC	●	●	●	●	●	●	●
No-load supply current	≤ 40 mA	●	●	●	●	●	●	●
Power consumption	≤ 2 VA	●	●	●	●	●	●	●
Switching type	dark on	●		●	●			
	light on		●			●	●	●
Signal output	Relay, 1 alternator	●	●	●	●	●	●	●
Switching voltage	max. 240 V AC	●	●		●	●	●	●
	max. 250 V AC/DC			●				
Switching current	max. 3 A	●	●	●	●	●	●	●
Switching power	DC: max. 150 W AC: max. 750 VA	●	●	●	●	●	●	●
Switching frequency	20 Hz	●	●	●	●	●	●	●
Response time	≤ 25 ms	●	●	●	●	●	●	●
Directive conformity	EMC Directive 2004/108/EC	●	●	●	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●	●	●
Standards	EN 62103	●	●	●	●	●	●	●
Protection class	II , rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1 Output circuit basis insulation of input circuit according to EN 50178, rated insulation voltage 240 V AC	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●	●
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)	●	●	●	●	●	●	●
Storage temperature	-40 ... 70 °C (-40 ... 158 °F)	●	●	●	●	●	●	●
Protection degree	IP67	●	●	●	●	●	●	●
Connection	2 m fixed cable	●	●		●	●	●	●
	6 m fixed cable			●				
Housing	Polycarbonate	●	●	●	●	●	●	●
Optical face	PMMA	●	●	●	●	●	●	●
Mass	154 g	●	●	●	●	●	●	●

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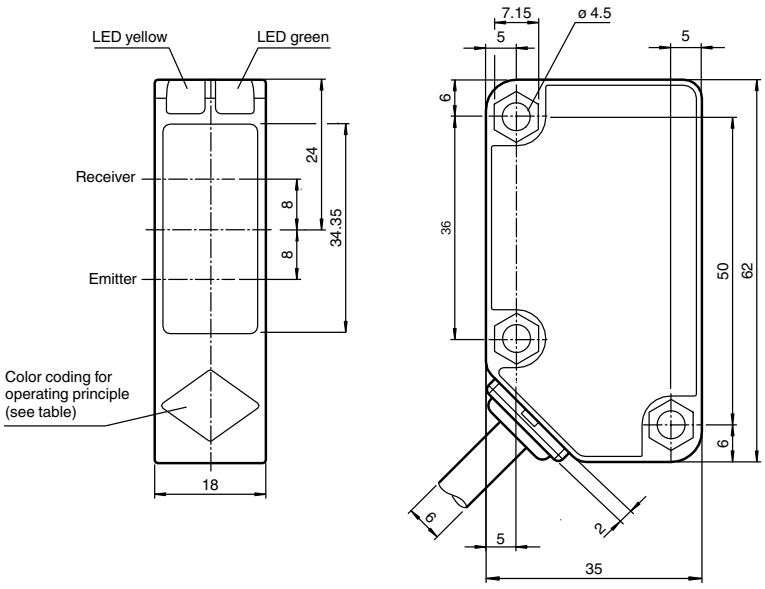
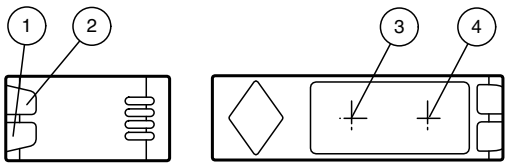
Dimensions



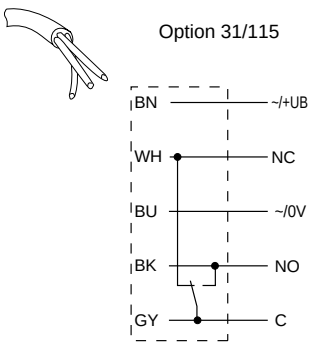
Operating principle	color
Retroreflective sensor with polarisation filter	green
Retroreflective sensor	blue
Diffusive mode sensor	white
Thru -beam sensor	grey
Diffusive mode sensor with background suppression	red

Indicators/operating means



1	Operating display	green
2	Signal display	yellow
3	Emitter	
4	Receiver	

Electrical connection



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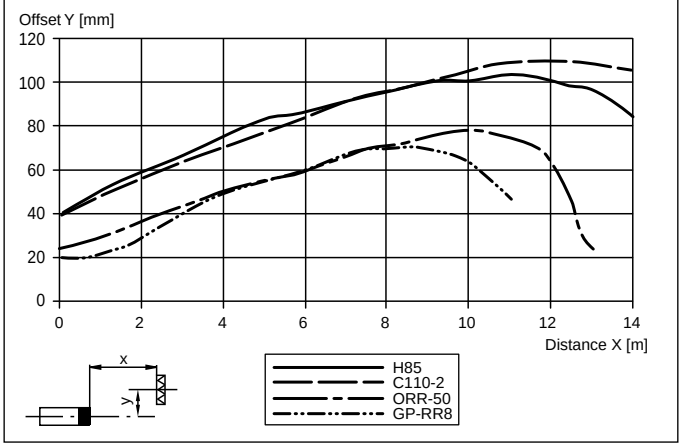
Notes

RLK31-54/25/31/115
RLK31-54/25/31/115 SET
RLK31-54/25/31/115 SET2
RLK31-54/31/115
RLK31-54/31/33/115

Characteristic response curve

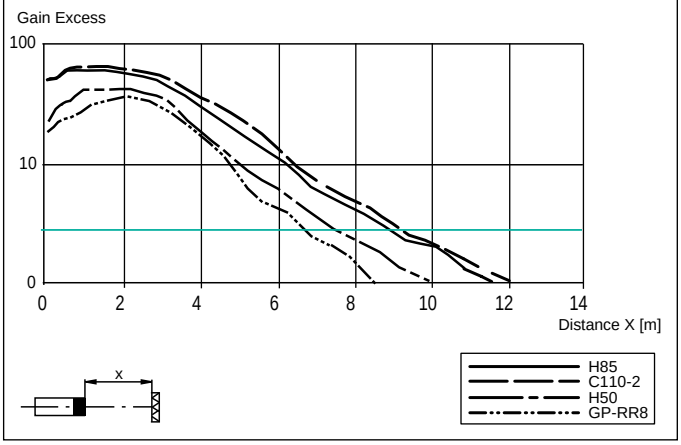
RLK31-54/...31/115



RLK31-54/25/31/115
RLK31-54/25/31/115 SET
RLK31-54/25/31/115 SET2
RLK31-54/31/115
RLK31-54/31/33/115

Relative received light strength

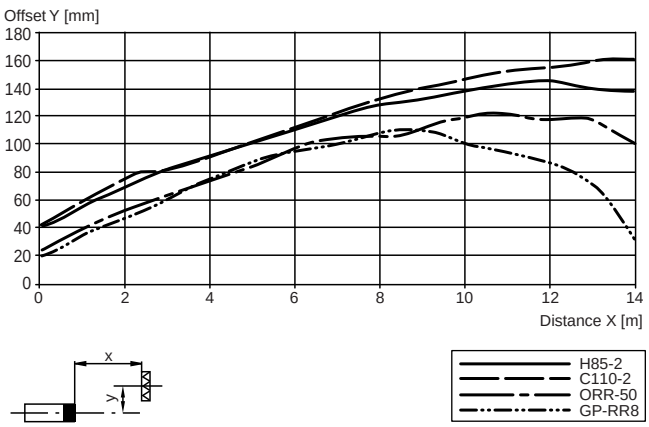
RL31-54/...
RLK31-54/...



RLK31-6/25/31/115
RLK31-6/31/115

Characteristic response curve

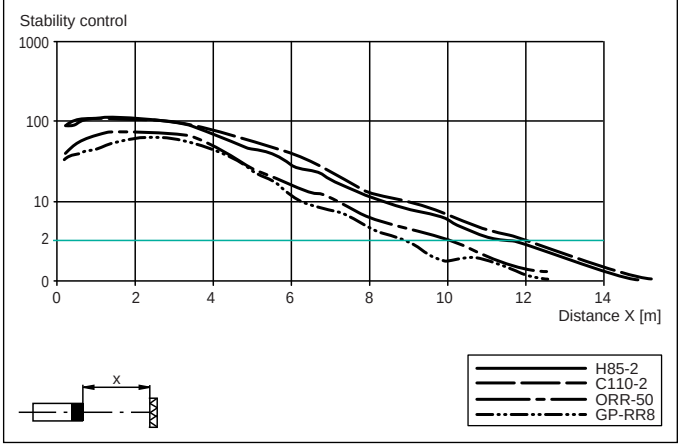
RLK31-6



RLK31-6/25/31/115
RLK31-6/31/115

Relative received light strength

RLK31-6



Accessories

OMH-RL31-01	Mounting bracket
OMH-RL31-02	Mounting bracket narrow
OMH-RL31-03	Mounting bracket narrow
OMH-RL31-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-RL31-05	Mounting bracket with M10 threaded rod
OMH-RL31-06	Stainless steel mounting bracket with adjustable half clamp on the side
REF-H50	Reflector, rectangular 51 mm x 51 mm, mounting holes, fixing strap
REF-H60-2	Reflector with mounting holes
REF-H85-2	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
REF-H160	Reflector, rectangular 60 mm x 18 mm, mounting holes
REF-H180	Reflector, rectangular 180 mm x 40 mm, mounting holes
REF-C110-2	Reflector, round ø 84 mm, central mounting hole

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PEPPERL+FUCHS SENSING YOUR NEEDS

Robust compact photoelectric sensor with long detection range for single-beam gate protection

- **Universal series with highly versatile fields of use**
- **Resistant against noise: reliable operation under all conditions**
- **Version with red light**
- **Version with relay output**
- **Programmable time function GAN, GAB, IAB, as well as GAN-GAB and GAN-IAB as double function**
- **Laser version for long ranges**
- **Version with heated front panel**

Product information

The series 28 family of sensors can be universally used. It has a large range of models that allows it to be integrated into any automation environment. The sensors are contained in sturdy water resistant plastic housings with multiple fastening options and scratch resistant optical cover. Features such as a timer function, and functions including a light/dark switch, sensitivity adjuster and highly visible status LEDs make for less effort on the part of the user and streamline installation, setup and operation. Just about any task associated with positioning, moving, conveying and monitoring can be accomplished with these sensors.

Typical applications

- Object tracking in material handling, and the packaging sector
- Material flow monitoring
- Bin occupancy check in storage technology
- Fine positioning in high-bay warehouses
- Presence and height monitoring on pallet conveyors
- Single-beam protection for automatic industrial gates and elevator doors
- Protection at automatic gates

Detection area

Date of issue 2012-11-12

Technical data

Model Number		RLK28-55/31/116	RLK28-55-Z/31/116	RLK28-55-LAS-Z/31/116	RL28-55/47/82b/105/106
Effective detection range	0 ... 17 m	●	●		●
	0 ... 30 m			●	
Threshold detection range	21 m	●	●		●
	42 m			●	
Reference target	H85-2 reflector	●	●		●
	MH82 reflector			●	
Light source	laser diode			●	
	LED	●	●		●
Light type	modulated visible red light	●	●	●	●
Note	LASER LIGHT , DO NOT STARE INTO BEAM			●	
Laser class	1			●	
Wave length	650 nm			●	
Beam divergence	< 1.5 mrad			●	
Pulse length	approx. 4.5 µs			●	
Repetition rate	approx. 6 kHz ... 20 kHz			●	
max. pulse energy	4 nJ			●	
Diameter of the light spot	approx. 290 mm at a distance of 17 m	●	●		●
	approx. 45 mm at 30 m			●	
Angle of divergence	Emitter: < 0.1 ° Receiver: < 2 °			●	
	emitter 1.2° receiver 2°	●	●		●
Ambient light limit	50000 Lux			●	
	80000 Lux	●	●		●
Operating display	LED green	●	●	●	●
Function display	2 LEDs yellow, light up when light beam is free, flash when falling short of the stability control, off when light beam is interrupted	●	●	●	●
Controls	sensitivity adjustment (Adjustment to < 25% of the effective operating range) , Light/Dark switch	●	●	●	●
Operating voltage	12 ... 240 V AC/DC	●	●	●	
	24 V DC ± 20 %				●
Ripple	10 %				●
No-load supply current	≤ 70 mA				●
Power consumption	≤ 3.5 VA	●	●	●	
Pre-fault indication output	1 PNP, inactive when falling short of the stability control for 10;s immediately inactive if 4 light beam interruptions take place				●
Switching type	light/dark on switchable	●	●	●	●
Signal output	Relay, 1 alternator	●	●	●	
	2 PNP, complementary, short-circuit protected, reverse polarity protected , open collectors				●
Switching voltage	max. 250 V AC/DC	●	●	●	
	max. 30 V DC				●
Switching current	max. 2 A	●	●	●	●
Switching power	DC: max. 50 W AC: max. 500 VA	●	●	●	
Switching frequency	1000 Hz				●
	25 Hz	●	●	●	
Response time	0.5 ms				●
	20 ms	●	●	●	
Timer function	ON delay (GAN), OFF delay (GAB), one shot (IAB), ON delay-one shot (GAN-IAB), ON delay-OFF delay (GAN-GAB), programmable adjustment interval 0.1 ... 10 s		●	●	
Laser class	IEC 60825-1:2007			●	
Protection class	II	●	●	●	●
UL approval	cULus Listed , Class 2 power source	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	
	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)			●	
	-40 ... 60 °C (-40 ... 140 °F)	●	●		●
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)			●	
	-40 ... 75 °C (-40 ... 167 °F)	●	●		●
Protection degree	IP67	●	●	●	●
Connection	M12 x 1 connector, 5-pin				●
	terminal compartment with 8 spring-loaded terminals for wire cross section 0.5 ... 1.5 mm^2 , Insulation stripping 7.5 ... 8.5 mm , M16 x 1.5 cable gland	●	●	●	
Housing	Plastic ABS	●	●	●	●
Optical face	Plastic pane	●	●	●	●
Mass	112 g	●	●	●	
	70 g				●
Version with heated front panel					●

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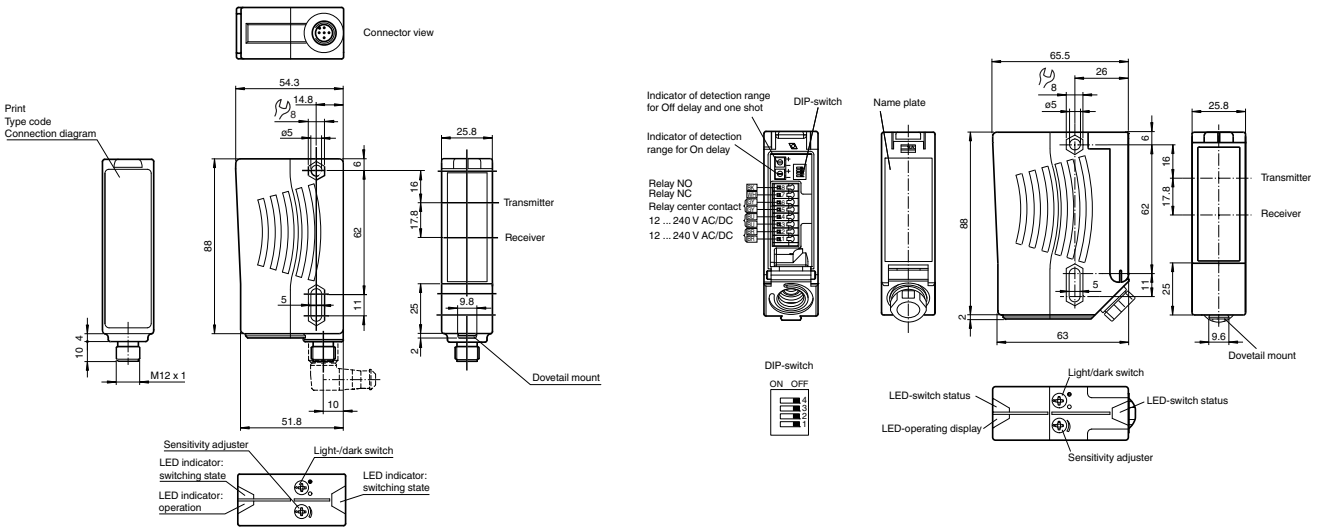
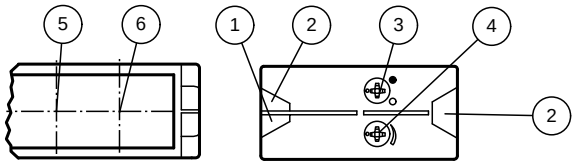
Dimensions



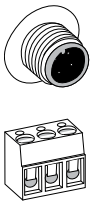
Indicators/operating means



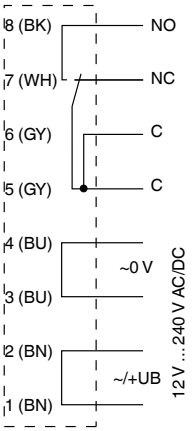
1	Operating display green
2	Switch state yellow
3	Bright/dark switch
4	Sensitivity adjustment
5	Receiver
6	Transmitter

Electrical connection

❍ = Light on, ● = Dark on

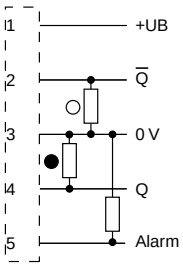


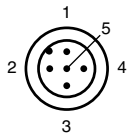
Option /31/116



The relay-functions "NC" and "NO" bear on the switching mode "Dark-ON". This complies to the default setting of the light/dark switch (factory setting).

Option /47/82b/105





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

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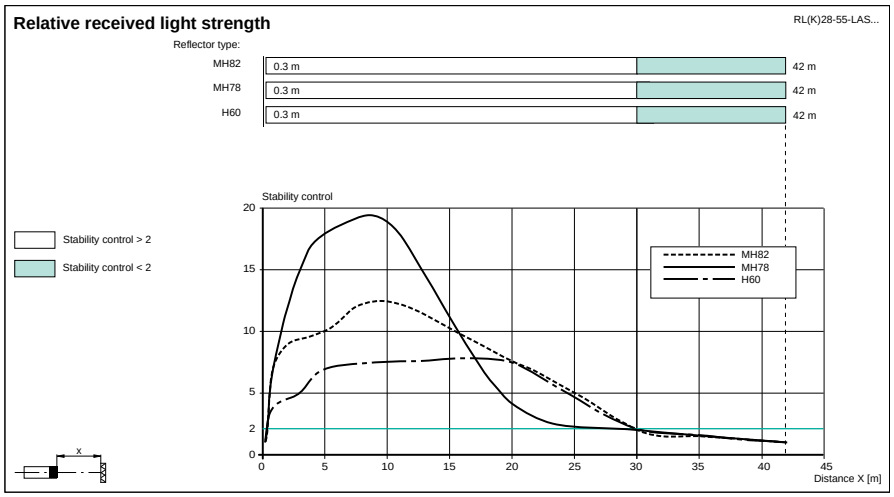
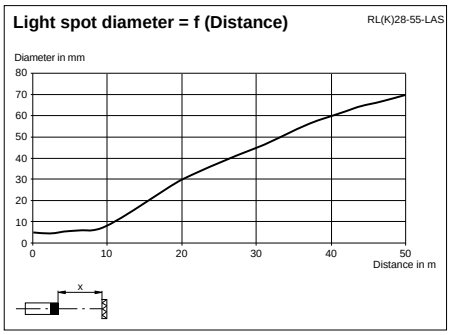
Notes

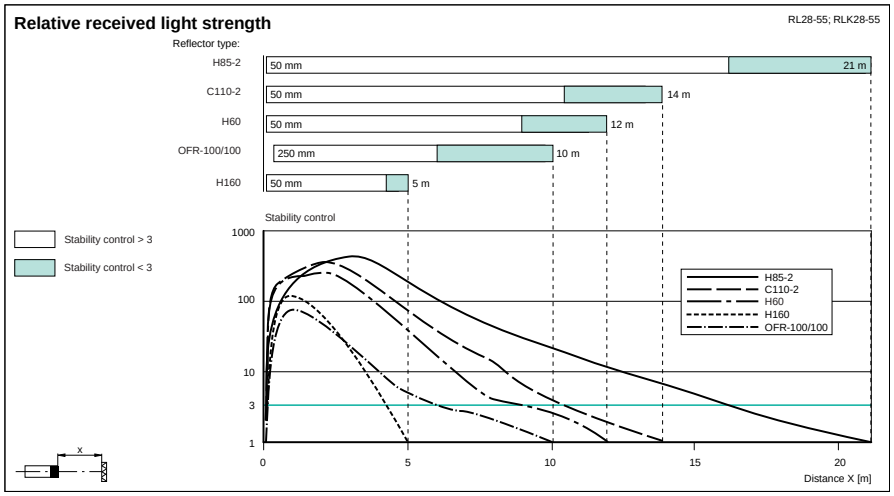
RLK28-55-LAS-Z/31/116



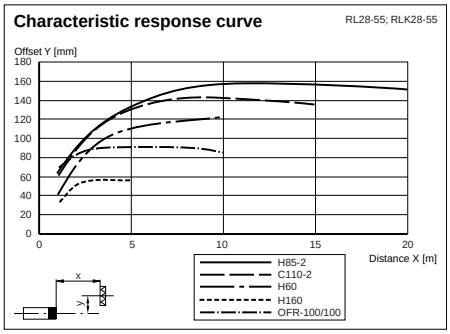
RLK28-55-LAS-Z/31/116



RL28-55/47/82b/105/106
RLK28-55/31/116
RLK28-55-Z/31/116



RL28-55/47/82b/105/106
RLK28-55/31/116
RLK28-55-Z/31/116



Accessories

OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-RLK29	Mounting bracket
OMH-MLV11-K	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting

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Robust, compact, long range photoelectric sensors for detecting people, objects and vehicles

- **Robust, compact photoelectric sensor for single-beam gate protection**
- **Not sensitive to ambient light, even with energy saving lamps**
- **Tamper-proof, no operating controls**
- **Version for universal voltages**
- **Relay output**
- **Version with accessories in scope of delivery**

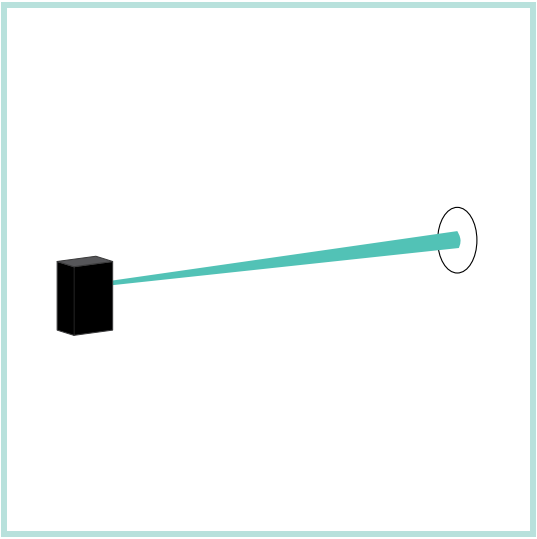
Product information

Series 29 is a range of low-cost and, most importantly, reliable photoelectric sensors for monitoring industrial doors, elevators, and automatic gates. Their high degree of protection makes them the ideal solution for tasks outdoors and at thresholds, and in harsh environments. These "universal-voltage sensors" can be operated with any supply voltage from 24 V to 240 V, and with direct current or alternating current.

Typical applications

- Monitoring closing edges of automatic industrial doors and elevators
- Monitoring the swing range of automatic gates
- Detecting and tracking objects in material handling

Detection area



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Technical data

Model Number		RLK29-55/25/116-Set	RLK29-55/59/116	RLK29-55/59/116-Set	RLK29-55/25/116
Effective detection range	0 ... 12 m	●	●	●	●
Threshold detection range	14 m	●	●	●	●
Reference target	reflector C110-2	●		●	
	H85-2 reflector		●		●
Light source	LED	●	●	●	●
Light type	modulated visible red light , 640 nm	●	●	●	●
Diameter of the light spot	approx. 35 mm at a distance of 12 m	●	●	●	●
Angle of divergence	± 1 °	●	●	●	●
Ambient light limit	90000 Lux	●	●	●	●
Accessories provided	reflector C110-2 , Mounting bracket with mounting materials	●		●	
Function display	LED red illuminates: when beam is free flashes: when level falls below function reserve off: when beam is interrupted	●	●	●	●
Operating voltage	24 ... 230 V AC/DC	●	●	●	●
Ripple	10 %	●	●	●	●
No-load supply current	≤ 8.5 mA	●	●	●	●
Power consumption	0.2 W at 24 V DC , 1.8 W at 230 V AC 3 VA	●	●	●	●
Switching type	dark on		●	●	
	light on	●			●
Signal output	Relay, 1 alternator	●	●	●	●
Switching voltage	230 V AC	●	●	●	●
Switching current	max. 2 A	●	●	●	●
Switching frequency	7 Hz	●	●	●	●
Response time	50 ms	●	●	●	●
Directive conformity	Low Voltage Directive 2006/95/EC EMC Directive 2004/108/EC	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●
UL approval	cULus	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●
Storage temperature	-30 ... 70 °C (-22 ... 158 °F)	●	●	●	●
Protection degree	IP67	●	●	●	●
Connection	terminal compartment	●	●	●	●
Housing	Plastic ABS, flame resistant	●	●	●	●
Optical face	Plastic pane	●	●	●	●
Mass	approx. 200 g	●			
	100.7 g		●	●	●

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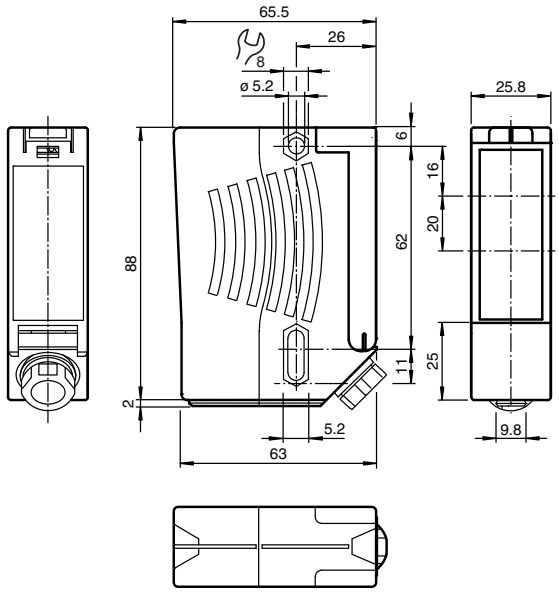
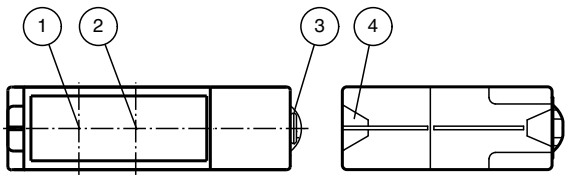
Dimensions



Indicators/operating means

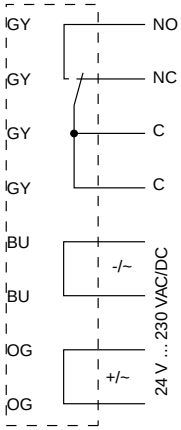


1	Emitter	
2	Receiver	
3	Dovetail mount	
4	Functional display	yellow

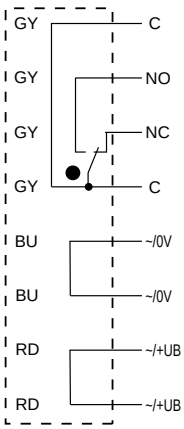
Electrical connection

❍ = Light on, ● = Dark on

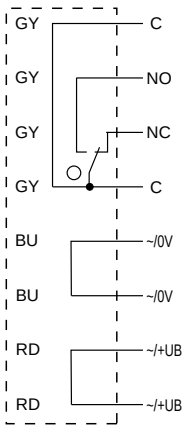
Option 55/59/116



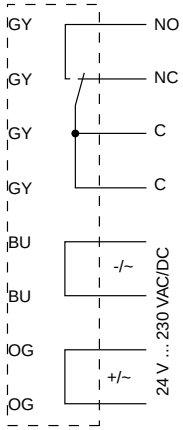
Option /59/116



Option /25/116



Option 55/25/116



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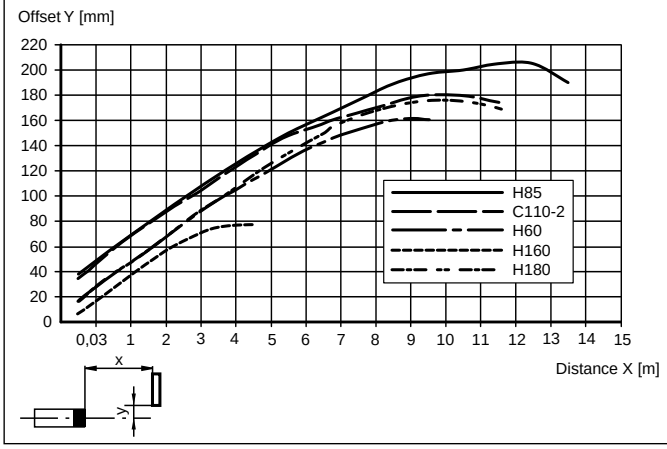
Notes

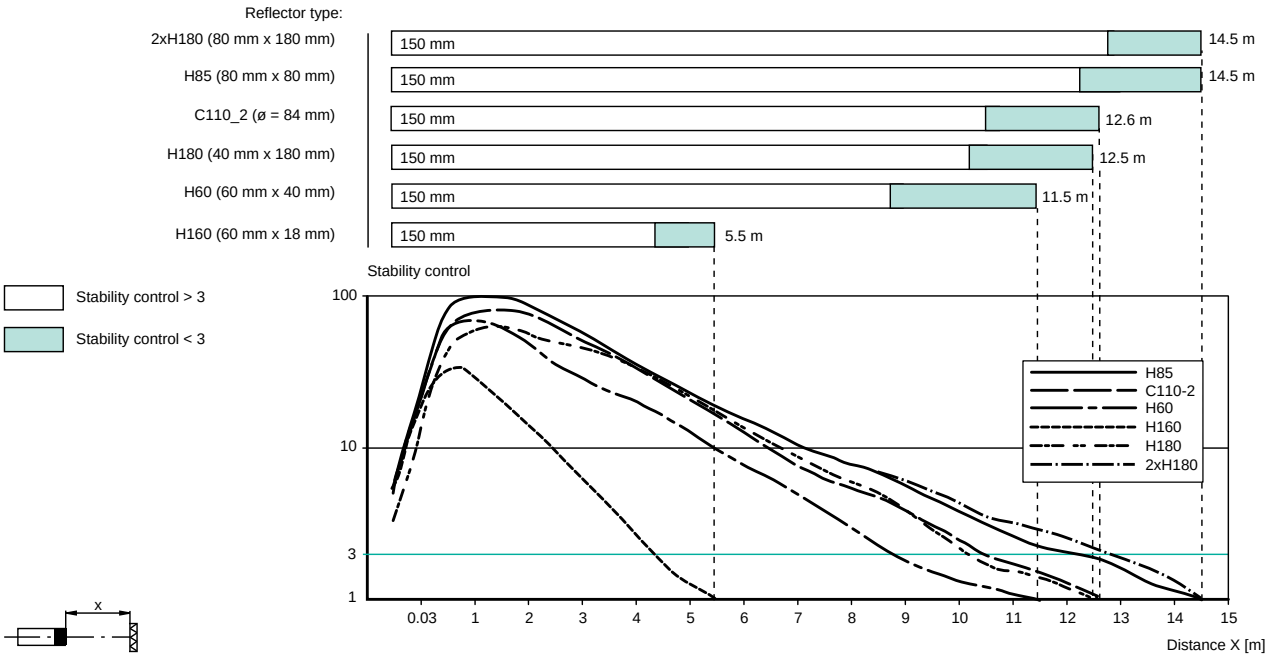
Characteristic response curve

RLK29-55...



Relative received light strength

RLK29-55...



Accessories

OMH-RLK29	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-21	Mounting bracket
OFR-100/100	Reflective tape 100 mm x 100 mm
REF-C110-2	Reflector, round ø 84 mm, central mounting hole
REF-H180	Reflector, rectangular 180 mm x 40 mm, mounting holes
REF-H160	Reflector, rectangular 60 mm x 18 mm, mounting holes
REF-H85-2	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
REF-H60-2	Reflector with mounting holes
REF-H50	Reflector, rectangular 51 mm x 51 mm, mounting holes, fixing strap

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Basic photoelectric sensor with universal voltage for detecting people, objects, and vehicles

- **Cost-optimized series for standard tasks in a special design**
- **Compact design**
- **Wide range of mounting options thanks to cubic housing design with M30 thread**
- **360° high visibility LEDs**
- **Programmable ON-delay, OFF-delay, and One-shot timers**
- **Version for universal voltages**
- **Relay output**

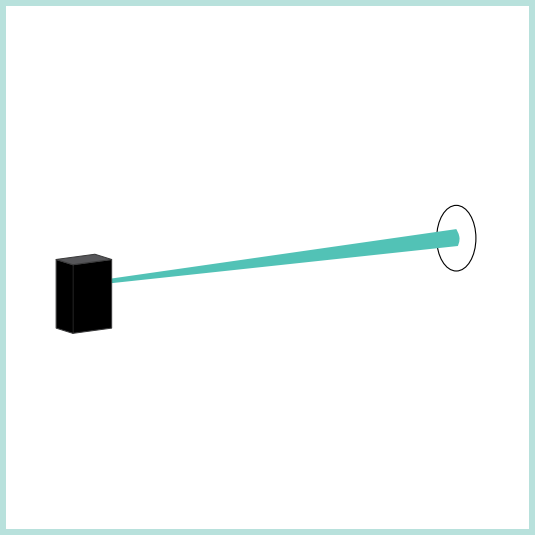
Product information

The Series 61 sensor family is a comprehensive product line, offering five sensing modes. Each sensor is equipped with four LEDs that are highly visible from all directions, indicating Power-On, target presence and marginal excess gain. The widely recognized, polycarbonate housing provides a IP67 protection degree rating. Color-coded labels are clearly printed on the housing to easily identify the sensing mode. DC models offer a 4-in-1 output while AC/DC models have a SPDT relay output rated to 3 A. All versions come standard with an integral multifunction timer, sensitivity adjustment and Light-ON/Dark-ON switch. Series 61 sensors are cross-talk protected and have a high degree of resistance to ambient lighting. Each sensor can be mounted via front and rear slots, rear dovetail guide or M30 x 1.5 mounting base. Additionally, cabled sensor models provide ½" - 14 NPT internal threads for use with flexible conduit.

Typical applications

- Object tracking in material handling, and the packaging sector
- Material flow monitoring
- Bin occupancy check in storage technology
- Fine positioning in high-bay warehouses
- Presence and height monitoring on pallet conveyors
- Single-beam protection for automatic industrial gates and elevator doors
- Protection at automatic gates

Detection area



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Technical data

Model Number		RLK61-55-Z/31/115	RLK61-55-Z/31/135
Effective detection range	0 ... 18 m	●	●
Threshold detection range	25 m	●	●
Reference target	FE-RR1 reflector	●	●
Light source	LED	●	●
Light type	modulated visible red light , 630 nm	●	●
Diameter of the light spot	approx. 350 mm at a distance of 18 m	●	●
Angle of divergence	1.1 °	●	●
Ambient light limit	5000 Lux ; according EN 60947-5-2	●	●
Operating display	2 LEDs green	●	●
Function display	2 LEDs yellow on: reflector inside the sensing range off: reflector outside the sensing range	●	●
Controls	Light/Dark switch	●	●
Controls	Detection range adjuster	●	●
Controls	Time adjuster (0 ... 10 s)	●	●
Operating voltage	24 ... 240 V AC 12 ... 240 V DC	●	●
No-load supply current	≤ 35 mA	●	●
Protection class	II , rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1 Output circuit basis insulation of input circuit according to EN 50178, rated insulation voltage 240 V AC	●	●
Power consumption	≤ 2 VA	●	●
Switching type	light/dark on, switchable	●	●
Signal output	Relay, Form C	●	●
Switching voltage	max. 250 V AC/DC	●	●
Switching current	max. 3 A	●	●
Switching power	DC: max. 150 W AC: max. 750 VA	●	●
Switching frequency	20 Hz	●	●
Response time	≤ 25 ms	●	●
Timer function	DIP-switch for selection of operating modes	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●
UL approval	cULus	●	●
Ambient temperature	-40 ... 55 °C (-40 ... 131 °F)	●	●
Storage temperature	-40 ... 70 °C (-40 ... 158 °F)	●	●
Protection degree	IP67	●	●
Connection	fixed cable	●	
	V95 quick disconnect		●
Housing	PC (Polycarbonate)	●	●
Optical face	PMMA	●	●
Mass	130 g		●
	240 g	●	

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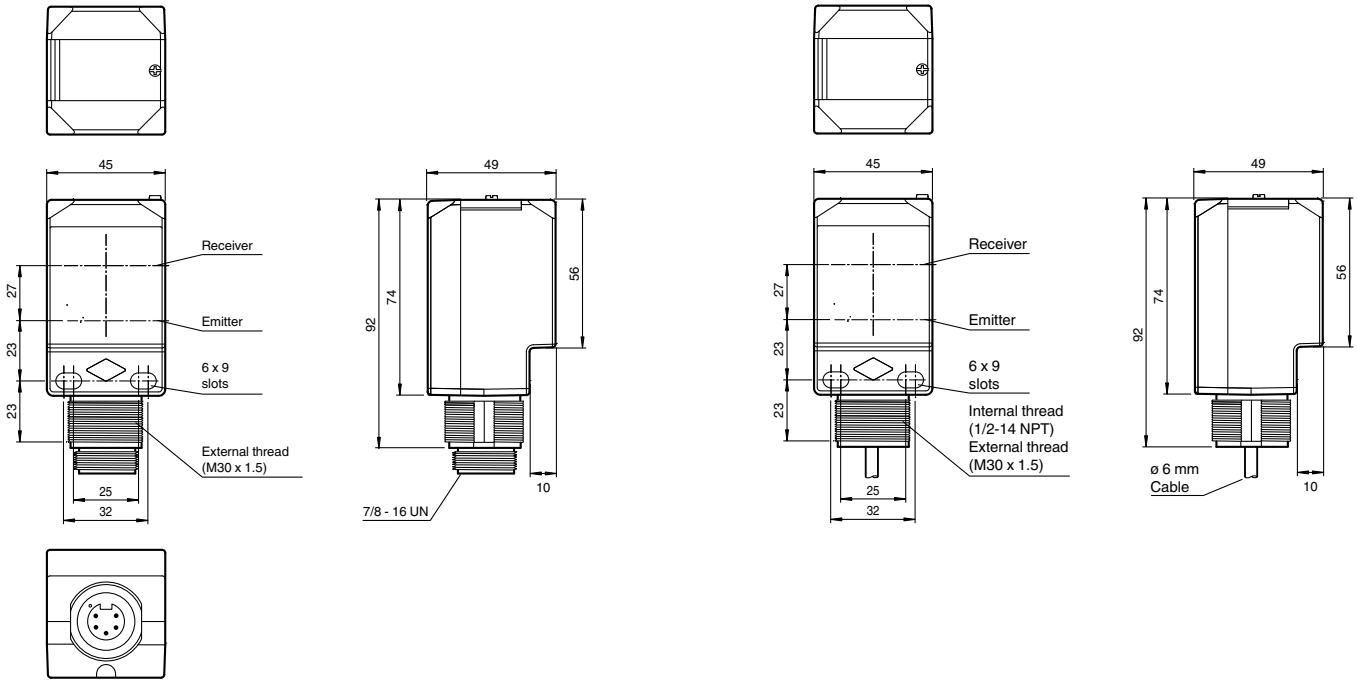
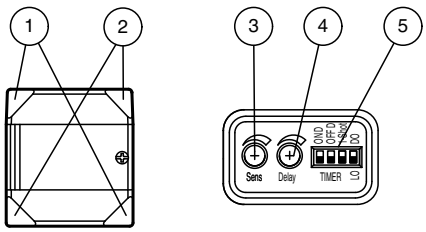
Dimensions

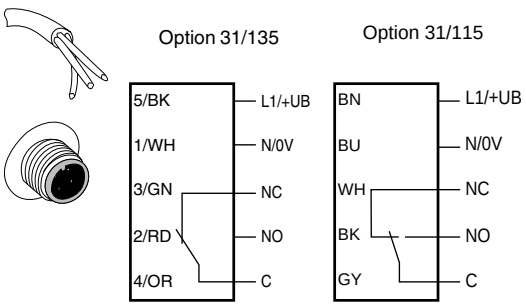


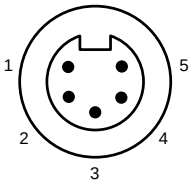
Indicators/operating means



1	Operating display	green
2	Signal display	yellow
3	Sensing range adjuster	
4	Time adjuster	
5	DIP-switches	

Electrical connection





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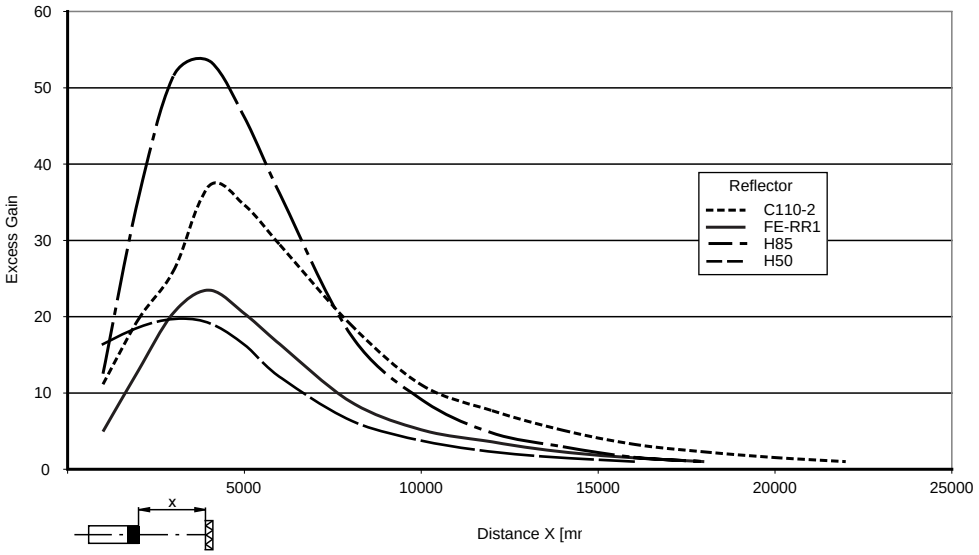
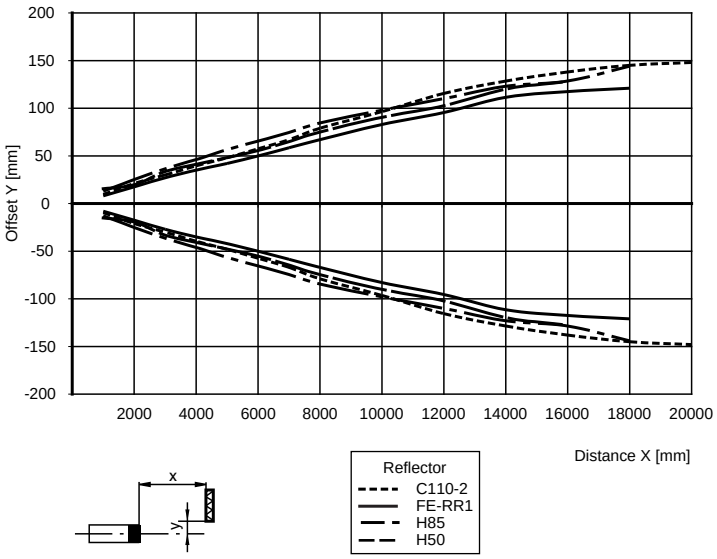
Notes

Excess Gain vs. Sensing Distance **RL(K)61-55-Z**



Movement Characteristic **RL(K)-61-55-Z**



Accessories

MPZB01	Mounting bracket with vertical slots
MPZB02	Mounting bracket with circular slots
MPZB06	Ball and Swivel Mounting Bracket
MPZB07	Ball and Swivel Vertical Mounting Plate

Date of issue 2012-11-12

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PEPPERL+FUCHS SENSING YOUR NEEDS

Robust compact photoelectric sensor with long sensing range for detecting people, objects and vehicles

- **Universal series with highly versatile fields of use**
- **Resistant against noise: reliable operation under all conditions**
- **Minimal black/white difference through the infrared transmission LED**
- **Version with heated front panel**

Product information

The series 28 family of sensors can be universally used. It has a large range of models that allows it to be integrated into any automation environment. The sensors are contained in sturdy water resistant plastic housings with multiple fastening options and scratch resistant optical cover. Features such as a timer function, and functions including a light/dark switch, sensitivity adjuster and highly visible status LEDs make for less effort on the part of the user and streamline installation, setup and operation. Just about any task associated with positioning, moving, conveying and monitoring can be accomplished with these sensors.

Typical applications

- Object tracking in material handling, and the packaging sector
- Material flow monitoring
- Bin occupancy check in storage technology
- Fine positioning in high-bay warehouses
- Presence and height monitoring on pallet conveyors
- Single-beam protection for automatic industrial gates and elevator doors
- Protection at automatic gates

Detection area

Date of issue 2012-11-12

Technical data

Model Number		RL28-8-H-2000-IR/47/105/106	RL28-8-H-700-IR/47/105/106
Detection range	20 ... 2000 mm	●	
	20 ... 700 mm		●
Detection range min.	20 ... 200 mm	●	●
Detection range max.	20 ... 2000 mm	●	
	20 ... 700 mm		●
Background suppression	max. + 10 % of the upper limit of the detection range	●	●
Light source	IRED	●	●
Light type	modulated infrared light , 880 nm	●	●
Black/White difference (6 %/90 %)	< 40 %	●	
	< 8 %		●
Diameter of the light spot	approx. 24 mm at a distance of 700 mm		●
	approx. 70 mm at a distance of 2000 mm	●	
Angle of divergence	transmitter 2° receiver 2°	●	●
Ambient light limit	50000 Lux	●	●
$MTTF_d$	1130 a	●	●
Mission Time (T_M)	20 a	●	●
Diagnostic Coverage (DC)	0 %	●	●
Operating display	LED green	●	●
Function display	2 LEDs yellow ON: object inside the scanning range OFF: object outside the scanning range	●	●
Controls	Light/Dark switch	●	●
Controls	Detection range adjuster	●	●
Operating voltage	24 V DC ± 20 %	●	●
Ripple	10 %	●	●
No-load supply current	≤ 40 mA		●
	≤ 75 mA	●	
Switching type	light/dark on switchable	●	●
Signal output	2 PNP, complementary, short-circuit protected, reverse polarity protected , open collectors	●	●
Switching voltage	max. 30 V DC	●	●
Switching current	max. 200 mA	●	●
Switching frequency	250 Hz	●	●
Response time	2 ms	●	●
Directive conformity	Low Voltage Directive 2006/95/EC EMC Directive 2004/108/EC	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●
Protection class	II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1	●	●
UL approval	cULus Listed , Class 2 power source	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)	●	●
Storage temperature	-40 ... 75 °C (-40 ... 167 °F)	●	●
Protection degree	IP67	●	●
Connection	M12 x 1 connector, 5-pin	●	●
Housing	Plastic ABS	●	●
Optical face	Plastic pane	●	●
Mass	70 g	●	●

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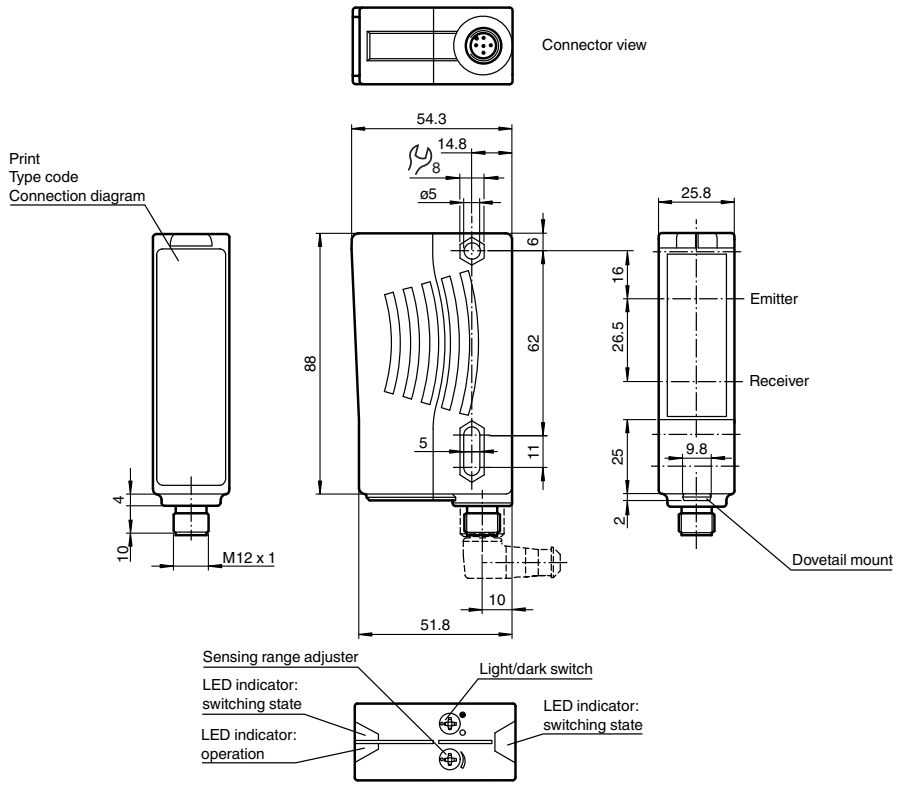
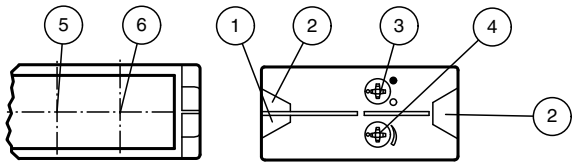
Dimensions



Indicators/operating means

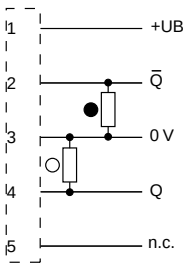


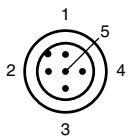
1	Operating display green
2	Switch state yellow
3	Bright/dark switch
4	Detection range adjuster
5	Receiver
6	Emitter

Electrical connection

❍ = Light on, ● = Dark on

Option /47/105





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

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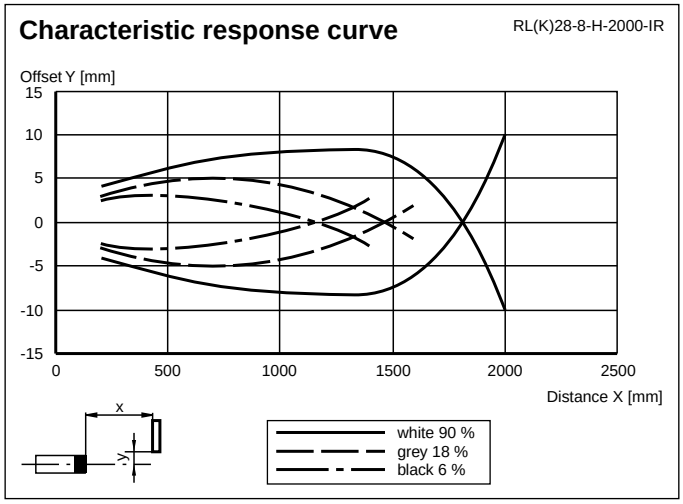
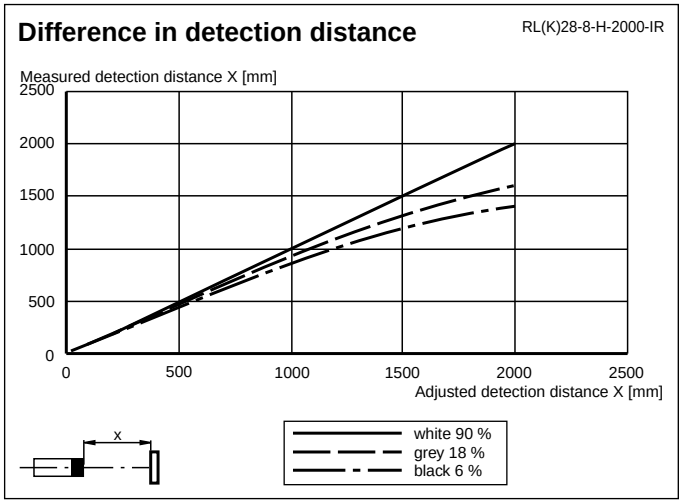
Notes

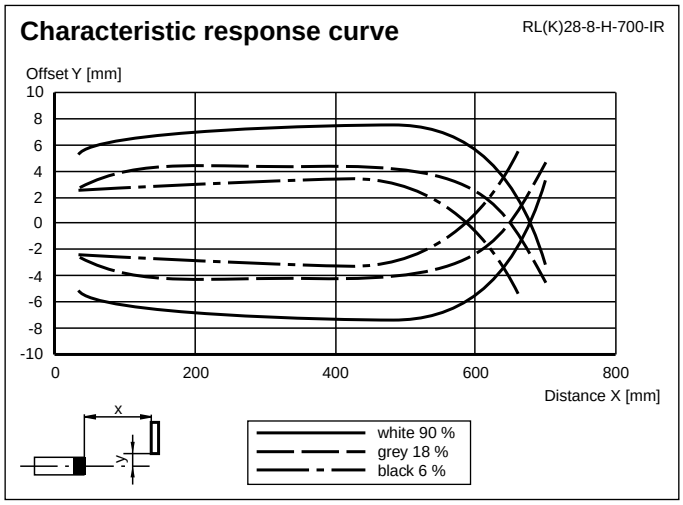
RL28-8-H-2000-IR/47/105/106



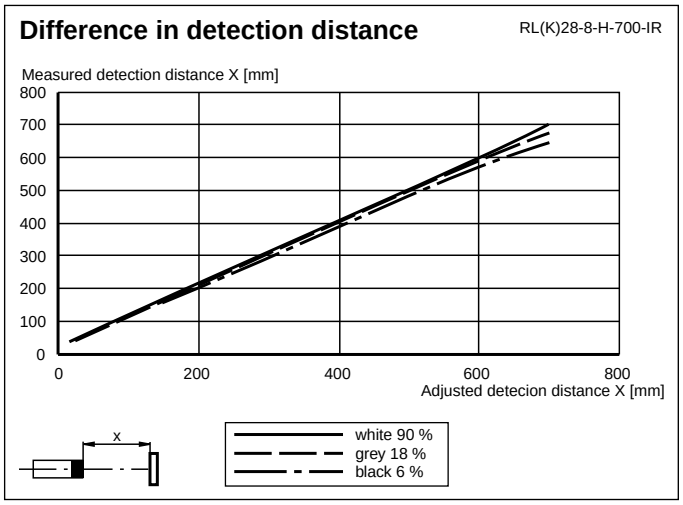
RL28-8-H-2000-IR/47/105/106



RL28-8-H-700-IR/47/105/106



RL28-8-H-700-IR/47/105/106



Accessories

OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-MLV11-K	dove tail mounting clamp
OMH-RLK29	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting

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PEPPERL+FUCHS SENSING YOUR NEEDS

Basic photoelectric sensor with universal voltage for detecting people, objects, and vehicles

- **Cost-optimized series for standard tasks in a special design**
- **Compact design**
- **Wide range of mounting options thanks to cubic housing design with M30 thread**
- **360° high visibility LEDs**
- **Programmable ON-delay, OFF-delay, and One-shot timers**
- **Version for universal voltages**
- **Relay output**

Product information

The Series 61 sensor family is a comprehensive product line, offering five sensing modes. Each sensor is equipped with four LEDs that are highly visible from all directions, indicating Power-On, target presence and marginal excess gain. The widely recognized, polycarbonate housing provides a IP67 protection degree rating. Color-coded labels are clearly printed on the housing to easily identify the sensing mode. DC models offer a 4-in-1 output while AC/DC models have a SPDT relay output rated to 3 A. All versions come standard with an integral multifunction timer, sensitivity adjustment and Light-ON/Dark-ON switch. Series 61 sensors are cross-talk protected and have a high degree of resistance to ambient lighting. Each sensor can be mounted via front and rear slots, rear dovetail guide or M30 x 1.5 mounting base. Additionally, cabled sensor models provide ½" - 14 NPT internal threads for use with flexible conduit.

Typical applications

- Object tracking in material handling, and the packaging sector
- Material flow monitoring
- Bin occupancy check in storage technology
- Fine positioning in high-bay warehouses
- Presence and height monitoring on pallet conveyors
- Single-beam protection for automatic industrial gates and elevator doors
- Protection at automatic gates

Detection area

Date of issue 2012-11-12

Technical data

Model Number		RLK61-8-1000-Z/31/135	RLK61-8-4000-Z/31/135
Detection range	0 ... 1000 mm adjustable	●	
	0 ... 4000 mm adjustable		●
Adjustment range	120 ... 1000 mm	●	
	270 ... 4000 mm		●
Reference target	standard white 200 mm x 200 mm	●	●
Light source	IRED	●	●
Light type	modulated infrared light , 850 nm	●	●
Diameter of the light spot	approx. 17 mm at a distance of 1000 mm	●	
	approx. 45 mm at a distance of 4000 mm		●
Angle of divergence	0.7 °		●
	1 °	●	
Ambient light limit	5000 Lux ; according EN 60947-5-2	●	●
Operating display	2 LEDs green	●	●
Function display	2 LEDs yellow ON: object inside the scanning range OFF: object outside the scanning range	●	●
Controls	Light/Dark switch	●	●
Controls	Detection range adjuster	●	●
Controls	Time adjuster (0 ... 10 s)	●	●
Operating voltage	24 ... 240 V AC 12 ... 240 V DC	●	●
No-load supply current	≤ 35 mA	●	●
Protection class	II , rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1 Output circuit basis insulation of input circuit according to EN 50178, rated insulation voltage 240 V AC	●	●
Power consumption	≤ 2 VA	●	●
Switching type	light/dark on, switchable	●	●
Signal output	Relay, 1 alternator	●	●
Switching voltage	max. 250 V AC/DC	●	●
Switching current	max. 3 A	●	●
Switching power	DC: max. 150 W AC: max. 750 VA	●	●
Switching frequency	20 Hz	●	●
Response time	≤ 25 ms	●	●
Timer function	DIP-switch for selection of operating modes	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●
UL approval	cULus	●	●
Ambient temperature	-40 ... 55 °C (-40 ... 131 °F)	●	●
Storage temperature	-40 ... 70 °C (-40 ... 158 °F)	●	●
Protection degree	IP67	●	●
Connection	V95 quick disconnect	●	●
Housing	PC (Polycarbonate)	●	●
Optical face	PMMA	●	●
Mass	130 g	●	●

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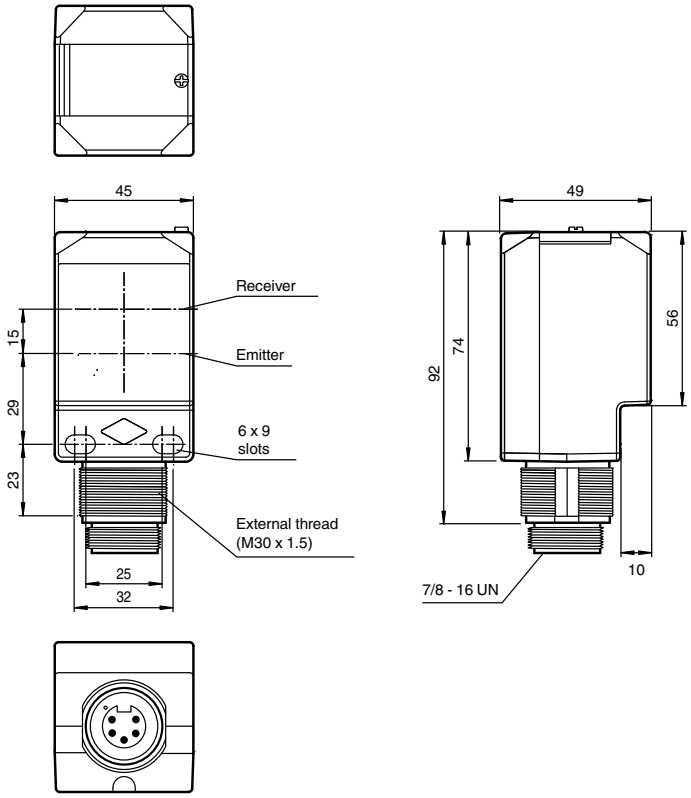
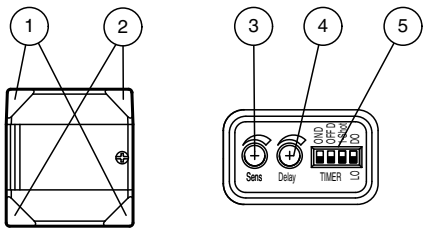
Dimensions



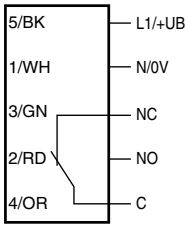
Indicators/operating means

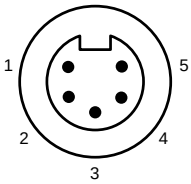


1	Operating display	green
2	Signal display	yellow
3	Sensing range adjuster	
4	Time adjuster	
5	DIP-switches	

Electrical connection

Option 31/135





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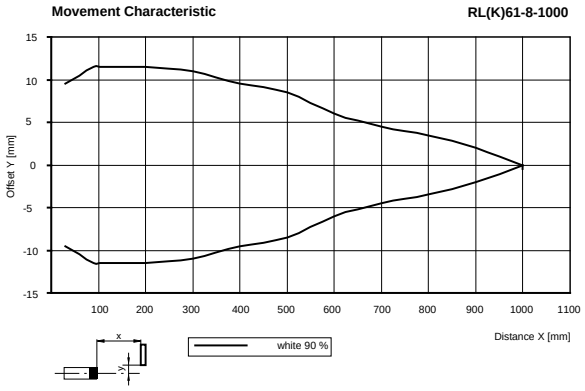
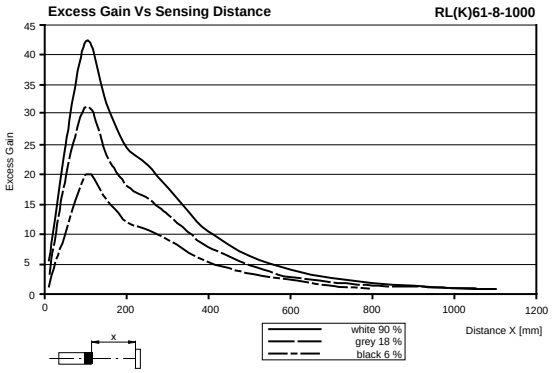
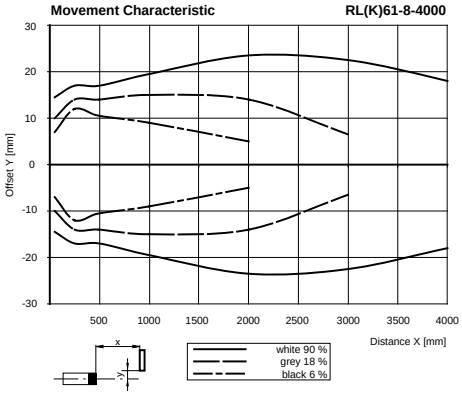
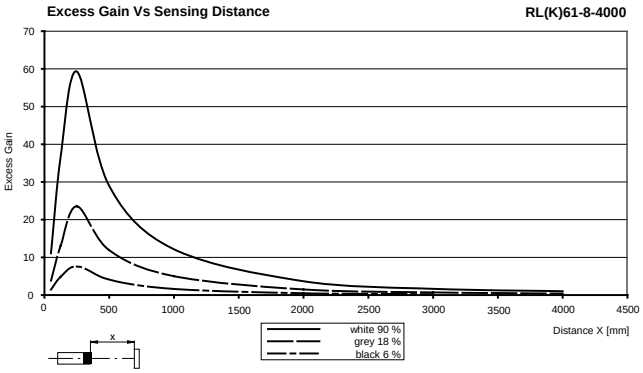
Notes









Accessories

MPZB01	Mounting bracket with vertical slots
MPZB02	Mounting bracket with circular slots
MPZB07	Ball and Swivel Vertical Mounting Plate
MPZB06	Ball and Swivel Mounting Bracket

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PEPPERL+FUCHS SENSING YOUR NEEDS

Compact fire protection photoelectric sensor

- **Compact fire protection photoelectric sensor for safety devices on fire barriers**
- **Approval in accordance with VdS Test Report FSA**
- **In the event of fire the smoke is disregarded, while persons in the smoke are detected**
- **Not sensitive to ambient light, even with switched energy saving lamps**

Product information

It is essential that fire is not allowed to spread in buildings should it break out. Fire protection regulations therefore prescribe fire barriers. These include fire doors, industrial fire doors and fire dampers, which are generally kept closed at all times. In areas where doors are left open, such as heavily traveled passage-ways and corridors, a self-closing mechanism must be automatically triggered in case of fire. However, the door must not close when persons or objects are in the closing area. Legislation consequently requires monitoring with appropriate safety devices. The technical challenge is to ignore the smoke and at the same time reliably detect people and objects in it. These certified photoelectric sensors fulfill this function.

Typical applications

- Protection of barriers that can be walked through, such as fire doors, industrial fire doors and fire dampers
- Protection of barriers in the vicinity of track-based conveyor systems
- Reliable detection of people and objects for hold-open systems on fire barriers, even in smoky conditions

Detection area

Date of issue 2012-11-12

Technical data

Model Number		LA28/LK28-FC-Z/31/116
Effective detection range	0 ... 10 m	●
Threshold detection range	10 m	●
Light source	LED, 660 nm and IRED, 880 nm	●
Light type	modulated visible red light and modulated infrared light	●
Tests	Verband der Sachversicherer e. V. report: FSA 07007	●
Alignment aid	LED red (in receiver lens) illuminated constantly: beam is interrupted, flashes: reaching switching point, off: sufficient stability control	●
Diameter of the light spot	approx. 0.2 m at 10 m	●
Angle of divergence	Emitter 1.2°, Receiver 5°	●
Ambient light limit	50000 Lux	●
Operating display	LED green	●
Function display	LED yellow: 1. LED lit constantly: signal > 2 x switching point (function reserve) 2. LED flashes: signal between 1 x switching point and 2 x switching point 3. LED off: signal < switching point	●
Controls	Light/Dark switch ; Time adjuster	●
Operating voltage	12 ... 240 V AC/DC	●
Protection class	II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1 Output circuit basis insulation of input circuit according to EN 50178, rated insulation voltage 230 V AC Caution! The protection class 2 is only valid when the terminal compartment is closed.	●
Power consumption	≤ 3.5 VA	●
Switching type	light/dark on, switchable . (selectable, light/dark switching is only activated if the receiver has 'dark on' selected.)	●
Signal output	Relay, 1 alternator	●
Switching voltage	max. 250 V AC/DC	●
Switching current	max. 2 A	●
Switching frequency	25 Hz	●
Response time	20 ms	●
Timer function	ON delay (GAN), OFF delay (GAB), one shot (IAB), ON delay-OFF delay (GAN-GAB), programmable adjustment range 0.1 ...10 s	●
Standards	EN 60947-5-2	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●
CCC approval	Certified by China Compulsory Certification (CCC)	●
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)	●
Storage temperature	-40 ... 75 °C (-40 ... 167 °F)	●
Protection degree	IP67	●
Connection	terminal compartment with 8 spring-loaded terminals for wire cross section 0.5 ... 1.5 mm^2 , Insulation stripping 7.5 ... 8.5 mm , M16 x 1.5 cable gland	●
Housing	Plastic ABS	●
Optical face	Plastic pane	●
Mass	200 g (emitter and receiver)	●

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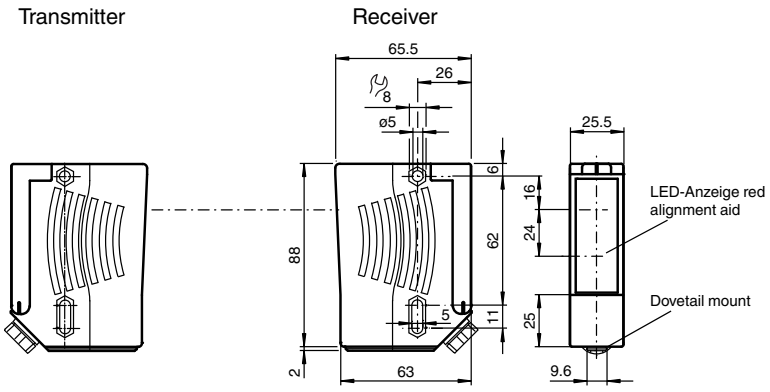
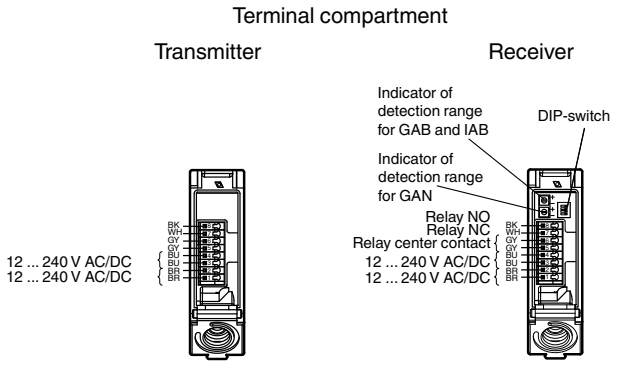
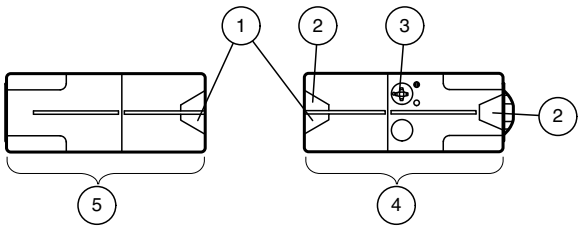
Dimensions





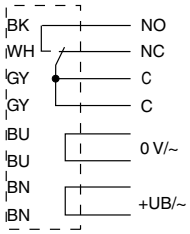
Indicators/operating means



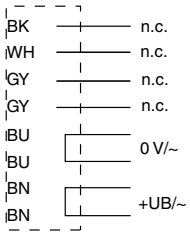
1	Operating display	green
2	Schaltanzeige	yellow
3	Bright/dark switch	
4	Receiver	
5	Transmitter	

Electrical connection

Option /31/116
Receiver



Transmitter



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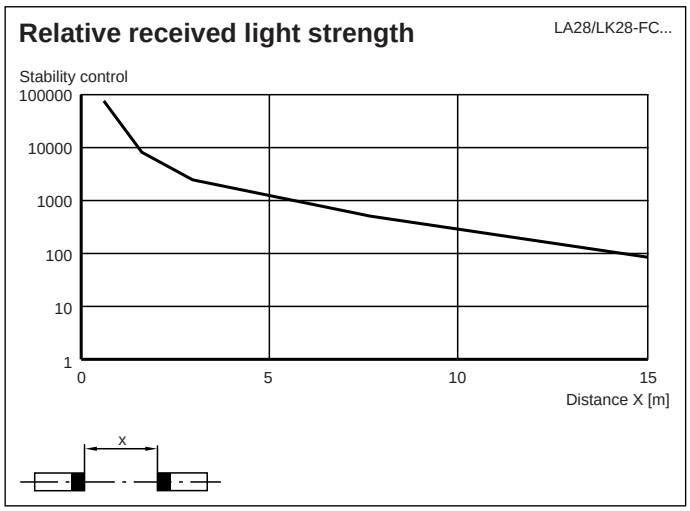
Notes

Functional principle

Fire protection photoelectric sensors are photoelectric sensor systems as safety devices for hold-open systems on fire barriers. The safety device is used to monitor the closing area of fire barriers for obstacles. The safety device ensures that the barrier is only closed if there are no obstacles in the closing area.
The LA28/LK28-FC is a thru-beam sensor with a power supply for 12 - 240 V AC/DC.
The thru-beam sensor contains an emitter and a receiver in separate housings. These components must be optically aligned with one another in a single line. The light emitted from the source is detected by the receiver and evaluated. When the light beam is interrupted, the switching function is triggered.
With its high excess gain at sensing ranges of up to 10 m, the thru-beam sensor is suitable as a safety device for hold-open devices on fire barriers. The photoelectric sensor is insensitive to reflective and shiny objects.

Setting the timer functions:

The desired timer function can be set with the DIP switches.



Accessories

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket

Date of issue 2012-11-12

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PEPPERL+FUCHS SENSING YOUR NEEDS

Compact fire protection photoelectric sensor

- **Compact fire protection photoelectric sensor for safety devices on fire barriers**
- **Approval in accordance with VdS Test Report FSA and externally monitored manufacture (Ü Symbol)**
- **In the event of fire the smoke is disregarded, while persons in the smoke are detected**
- **Not sensitive to ambient light, even with switched energy saving lamps**

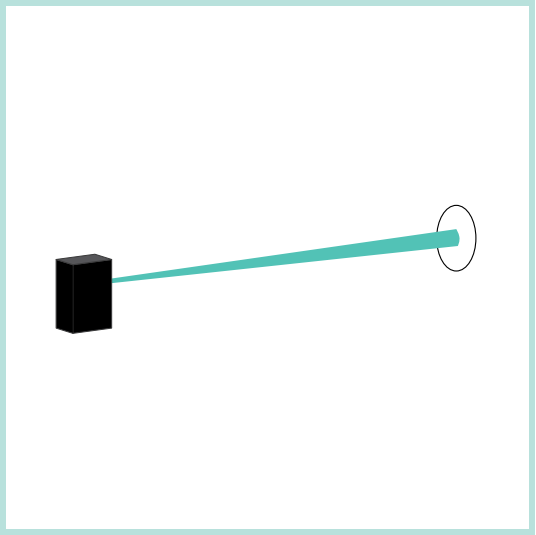
Product information

It is essential that fire is not allowed to spread in buildings should it break out. Fire protection regulations therefore prescribe fire barriers. These include fire doors, industrial fire doors and fire dampers, which are generally kept closed at all times. In areas where doors are left open, such as heavily traveled passage-ways and corridors, a self-closing mechanism must be automatically triggered in case of fire. However, the door must not close when persons or objects are in the closing area. Legislation consequently requires monitoring with appropriate safety devices. The technical challenge is to ignore the smoke and at the same time reliably detect people and objects in it. These certified photoelectric sensors fulfill this function.

Typical applications

- Protection of barriers that can be walked through, such as fire doors, industrial fire doors and fire dampers
- Protection of barriers in the vicinity of track-based conveyor systems
- Reliable detection of people and objects for hold-open systems on fire barriers, even in smoky conditions

Detection area



Date of issue 2012-11-12

Technical data

Model Number		RLK28-FC-55-Z/31/116
Effective detection range	1 ... 3 m	●
Reflector distance	1 ... 3 m	●
Threshold detection range	3 m	●
Reference target	reflector C110-2	●
Light source	LED	●
Light type	modulated visible red light , 660 nm	●
Tests	Verband der Sachversicherer e. V. report: FSA 07008	●
Diameter of the light spot	approx. 50 mm at a distance of 3 m	●
Angle of divergence	emitter 1.2° receiver 2°	●
Ambient light limit	80000 Lux	●
Accessories provided	reflector C110-2 Bracket	●
Operating display	LED green	●
Function display	2 LEDs yellow, light up when light beam is free, flash when falling short of the stability control, off when light beam is interrupted	●
Controls	Time adjuster , Light/Dark switch	●
Operating voltage	12 ... 240 V AC/DC	●
Power consumption	≤ 3.5 VA	●
Switching type	light/dark on, switchable (selectable, light/dark switching is only activated if the receiver has 'dark on' selected.)	●
Signal output	Relay, 1 alternator	●
Switching voltage	max. 250 V AC/DC	●
Switching current	max. 2 A	●
Switching frequency	25 Hz	●
Response time	20 ms	●
Timer function	ON delay (GAN), OFF delay (GAB), one shot (IAB), ON delay-one shot (GAN-IAB), ON delay-OFF delay (GAN-GAB), programmable adjustment interval 0.1 ... 10 s	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●
Protection class	II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1 Caution! The protection class 2 is only valid when the terminal compartment is closed.	●
CCC approval	Certified by China Compulsory Certification (CCC)	●
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)	●
Storage temperature	-40 ... 75 °C (-40 ... 167 °F)	●
Protection degree	IP67	●
Connection	terminal compartment with 8 spring-loaded terminals for wire cross section 0.5 ... 1.5 mm^2, insulation stripping 7.5 ... 8.5 mm, M16 x 1.5 cable gland	●
Housing	Plastic ABS	●
Optical face	Plastic pane	●
Mass	112 g	●

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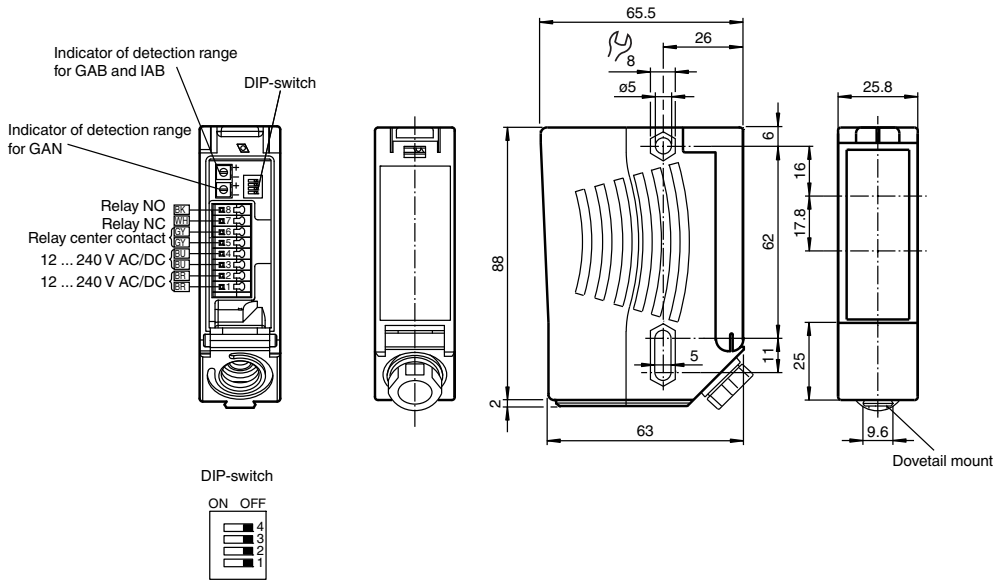
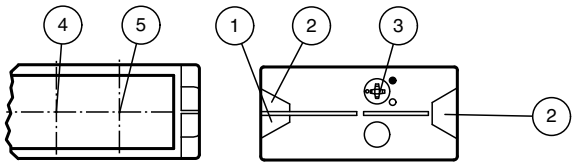
Dimensions



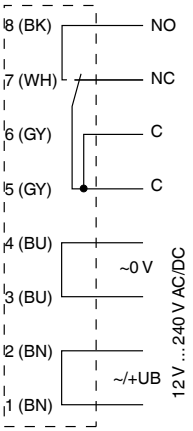
Indicators/operating means



1	Operating display	green
2	Schaltanzeige	yellow
3	Bright/dark switch	
4	Receiver	
5	Transmitter	

Electrical connection

Option /31/116



The relay-functions "NC" and "NO" bear on the switching mode "Dark-ON".
This complies to the default setting of the light/dark switch (factory setting).

Date of issue 2012-11-12

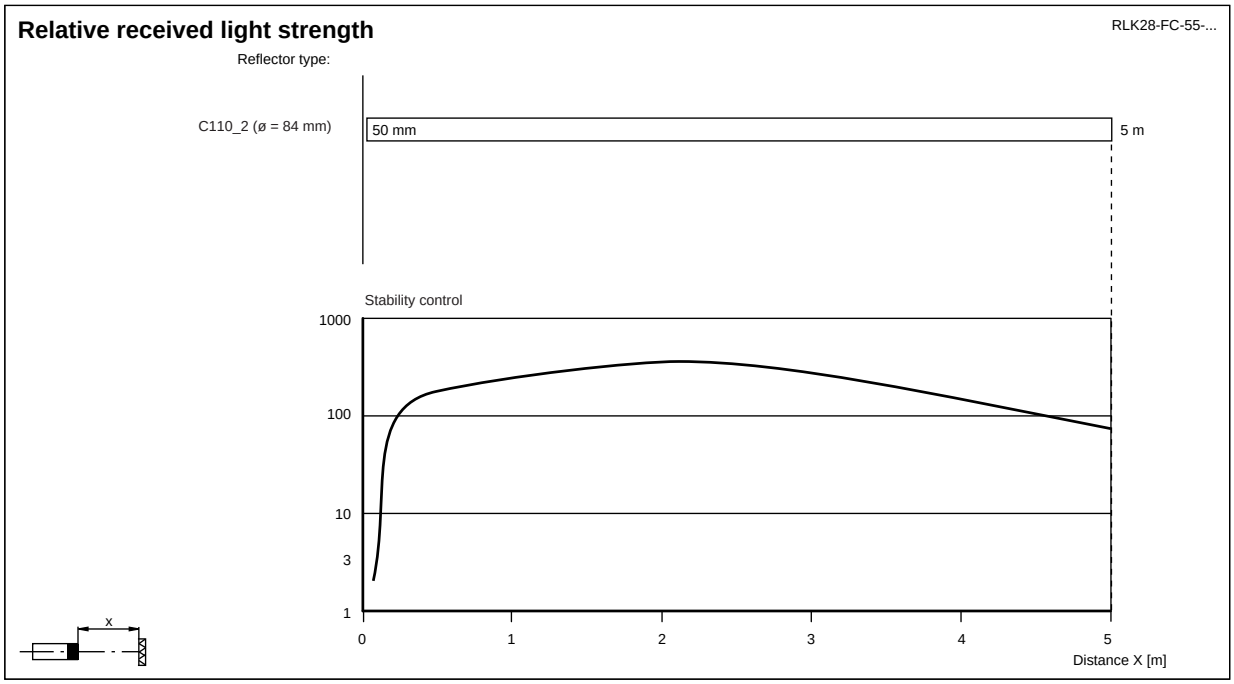
Notes

Functional principle

Fire protection photoelectric sensors are photoelectric sensor systems as safety devices for hold-open systems on fire barriers. The safety device is used to monitor the closing area of fire barriers for obstacles. The safety device ensures that the barrier is only closed if there are no obstacles in the closing area.
The RLK28-55-FC is a diffuse-mode photoelectric sensor with a polarization filter and power supply for 12 - 240 V AC/DC. The diffuse-mode photoelectric sensor is an emitter and a receiver in a single housing. The emitted light is reflected back to the receiver by a reflector. When the light beam is interrupted, the switching function is triggered.
With its relatively high excess gain at detection ranges of up to 3 m, the diffuse-mode photoelectric sensor is suitable as a safety device for hold-open devices on fire barriers. The photoelectric sensor is insensitive to reflective and shiny objects.
In accordance with the FSA test report, this photoelectric sensor can only be operated with the C110-2 reflector in an operating range (reflector distance) of 1 - 3 m.

Setting the timer functions:

The desired timer function can be set with the DIP switches



Accessories

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
REF-C110-2	Reflector, round ø 84 mm, central mounting hole

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PEPPERL+FUCHS SENSING YOUR NEEDS

Small fire protection photoelectric sensor

- **Small fire protection photoelectric sensor for safety devices on fire barriers**
- **Approval in accordance with VdS Test Report FSA and externally monitored manufacture (Ü Symbol)**
- **In the event of fire the smoke is disregarded, while persons in the smoke are detected**
- **High protection against contact**
- **Not sensitive to ambient light, even with switched energy saving lamps**

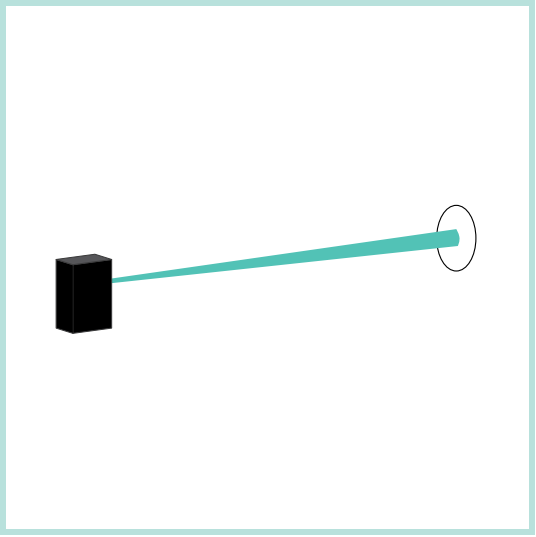
Product information

It is essential that fire is not allowed to spread in buildings should it break out. Fire protection regulations therefore prescribe fire barriers. These include fire doors, industrial fire doors and fire dampers, which are generally kept closed at all times. In areas where doors are left open, such as heavily traveled passage-ways and corridors, a self-closing mechanism must be automatically triggered in case of fire. However, the door must not close when persons or objects are in the closing area. Legislation consequently requires monitoring with appropriate safety devices. The technical challenge is to ignore the smoke and at the same time reliably detect people and objects in it. These certified photoelectric sensors fulfill this function.

Typical applications

- Protection of barriers that can be walked through, such as fire doors, industrial fire doors and fire dampers
- Protection of barriers in the vicinity of track-based conveyor systems
- Reliable detection of people and objects for hold-open systems on fire barriers, even in smoky conditions

Detection area



Date of issue 2012-11-12

Technical data

Model Number		MLV12-54-2563/49/124
Effective detection range	0 ... 2.1 m (with H60 reflector)	●
Reflector distance	0.2 ... 2.1 m	●
Reference target	H60 reflector	●
Light source	LED 645 nm	●
Light type	modulated visible red light	●
Approvals	CE	●
Diameter of the light spot	approx. 70 mm	●
Angle of divergence	1.5 °	●
Ambient light limit	50000 Lux	●
Operating display	LED green, flashes in case of short-circuit	●
Function display	2 LEDs yellow, light up when light beam is free, flash when falling short of the stability control, off when light beam is interrupted	●
Controls	rotary switch for light/dark	●
Operating voltage	10 ... 30 V DC	●
Ripple	max. 10 %	●
No-load supply current	max. 40 mA	●
Protection class	2 in acc. with VDE	●
Switching type	light/dark on switchable	●
Signal output	1 NPN and 1 PNP output, direct switching, short-circuit protected, reverse polarity protected, open collector	●
Switching voltage	max. 30 V DC	●
Switching current	max. 0.2 A	●
Voltage drop	≤ 2.5 V DC	●
Switching frequency	≤ 40 Hz	●
Response time	10 ms	●
Standards	EN 60947-5-2	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)	●
Storage temperature	-40 ... 75 °C (-40 ... 167 °F)	●
Protection degree	IP67	●
Connection	5-pin M12 x 1 connector with metal thread, 90° rotatable	●
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC	●
Optical face	Plastic pane	●
Mass	60 g	●

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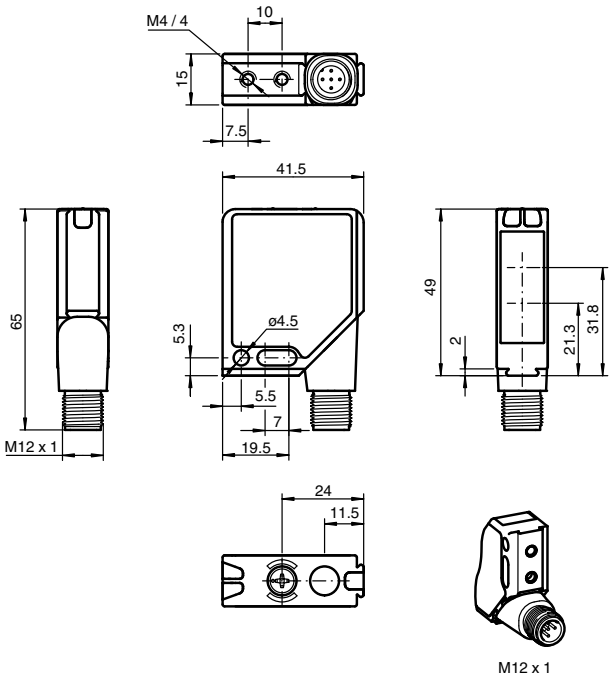
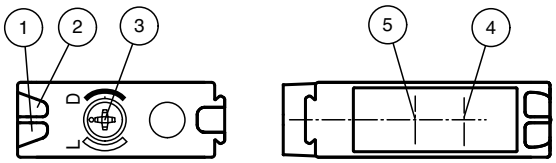
Dimensions



Indicators/operating means

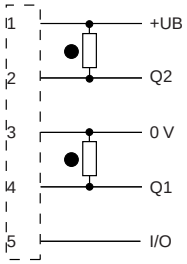


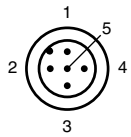
1	Operating display	green
2	Switch state	yellow
3	Light/dark switch	
4	Optical axis emitter	
5	Optical axis receiver	

Electrical connection

❍ = Light on, ● = Dark on

Option /49/124





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 2012-11-12

Notes

Functional principle

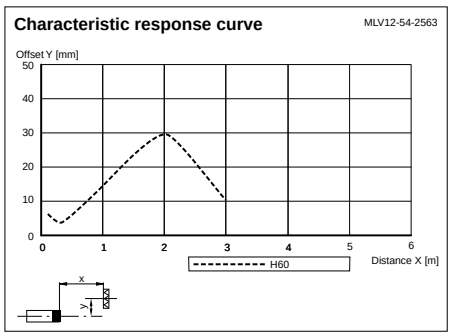
The MLV12-54-2563 is a diffuse-mode photoelectric sensor with polarization filter. The diffuse-mode photoelectric sensor is an emitter and a receiver in a single housing. The emitted light is reflected back to the receiver by a reflector. When the light beam is interrupted, the switching function is triggered.

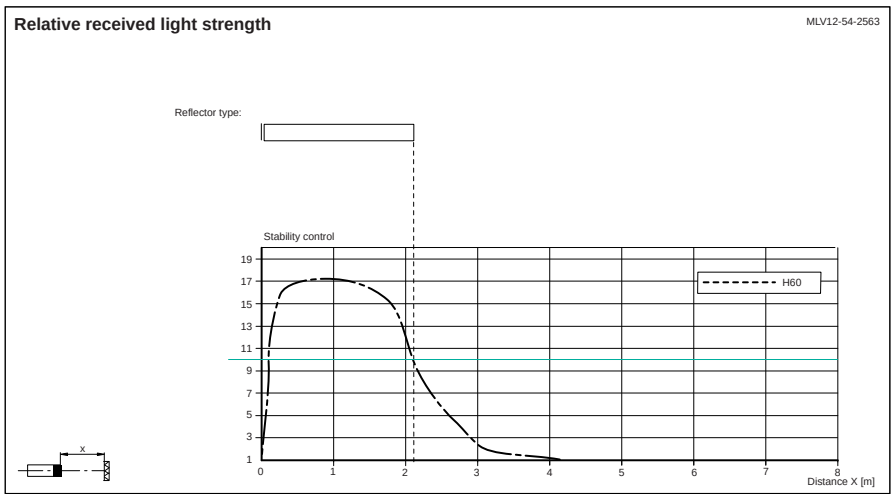
Marking

Due to its high excess gain, the MLV12-54-2563 diffuse-mode photoelectric sensor is suitable as a safety device for hold-open devices on fire barriers. The safety functionality has been tested by VdS (German Association of Property Insurers) (Test Report FSA 02009).

The MLV12-54-2563 diffuse-mode photoelectric sensor detects people or objects and is also insensitive to defined smoke levels (test fires 2 to 5).

The MLV12-54-2563 diffuse-mode photoelectric sensor is used as a safety device with a range of 0.2 m to 2.1 m onto the H60 reflector.





Accessories

REF-H60-2	Reflector with mounting holes
OMH-MLV12-HWG	Mounting bracket for series MLV12 sensors
OMH-MLV12-HWK	Mounting bracket for series MLV12 sensors
OMH-06	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-K01	dove tail mounting clamp
OMH-K02	dove tail mounting clamp
OMH-K03	dove tail mounting clamp
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-G-PG9	Cable socket, M12, 5-pin, ready for assembly

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PEPPERL+FUCHS SENSING YOUR NEEDS

Photoelectric slot sensor for non-contact and easy positioning of elevators

- **Optimized for the detection of small parts**
- **High switching frequency**
- **Sensitivity adjuster and light/dark switch as standard features of this series**
- **Multiple device installation possible, no mutual interference (no cross-talk)**
- **Infrared light**
- **Visible red light**
- **Diecast zinc housing, powder coated**
- **ATEX-approval for zone 2**

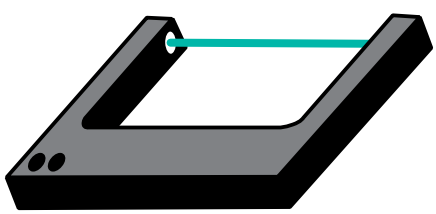
Product information

Photoelectric slot sensors offer vast installation benefits thanks to their housing design. When it comes to operation, these new generation devices boast features such as high resolution, high repeatability, automatic signal threshold adjustment, ambient light resistance, and detection of and/or light transmission through transparent objects. Cross-talk protection enables parallel installation of devices despite extremely high switching frequency. These characteristics guarantee reliable detection of small parts, from 0.3 mm, across the entire detection range, even in very fast moving applications.

Typical applications

- Small part detection, from object size 0.3 mm
- Can also be used for systems with strong vibrations
- Detection of small needles in transparent hollow needles
- Counting of small parts on conveyors
- Feed and correct separation verification
- Web edge control
- Elevator car position in elevators

Detection area



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Technical data

Model Number		GL10-IR/32/40a/98a	GL10-RT/32/40a/98a	GL20-IR/32/40a/98a	GL20-RT/32/40a/98a	GL30-IR/32/40a/98a	GL30-RT/32/40a/98a	GL30-IR-EX2/32/40a/98a
Light source	IRED	●		●		●		●
	LED		●		●		●	
Light type	modulated infrared light	●		●		●		●
	modulated visible red light		●		●		●	
Approvals	CE, cULus	●	●	●	●	●	●	
Tests	EN 60947-5-2	●	●	●	●	●	●	
Target size	0.3 mm	●	●	●	●	●	●	●
Fork width	10 mm	●	●					
	20 mm			●	●			
	30 mm					●	●	●
Ambient light limit	100000 Lux	●	●	●	●	●	●	●
$MTTF_d$	1290 a	●	●	●	●	●	●	●
Mission Time (T_M)	20 a	●	●	●	●	●	●	●
Diagnostic Coverage (DC)	0 %	●	●	●	●	●	●	●
Function display	LED red in connector	●	●	●	●	●	●	●
Controls	Sensitivity adjuster, light/dark switch	●	●	●	●	●	●	●
Operating voltage	10 ... 30 V DC							●
	10 ... 30 V DC, class 2	●	●	●	●	●	●	
Ripple	10 %	●	●	●	●	●	●	●
No-load supply current	≤ 15 mA	●	●	●	●	●	●	●
Switching type	light/dark on	●	●	●	●	●	●	●
Signal output	1 PNP, short-circuit protected, open collector	●	●	●	●	●	●	●
Switching voltage	max. 30 V DC	●	●	●	●	●	●	●
Switching current	max. 100 mA	●	●	●	●	●	●	●
Repeat accuracy	0.05 mm	●	●	●	●	●	●	●
Switching frequency	2 kHz	●		●		●		●
	3 kHz		●		●		●	
Response time	≤ 160 µs		●		●		●	
	≤ 250 µs	●		●		●		●
EMC Directive 2004/108/EC	EN 60947-5-2:2007							●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007							●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●	●	●	●
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	●	●	●	●	●	●	●
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)	●	●	●	●	●	●	●
Protection degree	IP67	●	●	●	●	●	●	●
Connection	M8 x 1 connector, 3-pin							●
	M8 connector, 3-pin	●	●	●	●	●	●	
Housing	anodized aluminium	●		●				
	black anodized aluminium		●		●			
	powder coated diecast zinc					●	●	●
Optical face	glass	●	●	●	●	●	●	●
Mass	20 g	●	●					
	25 g			●	●			
	60 g					●	●	●

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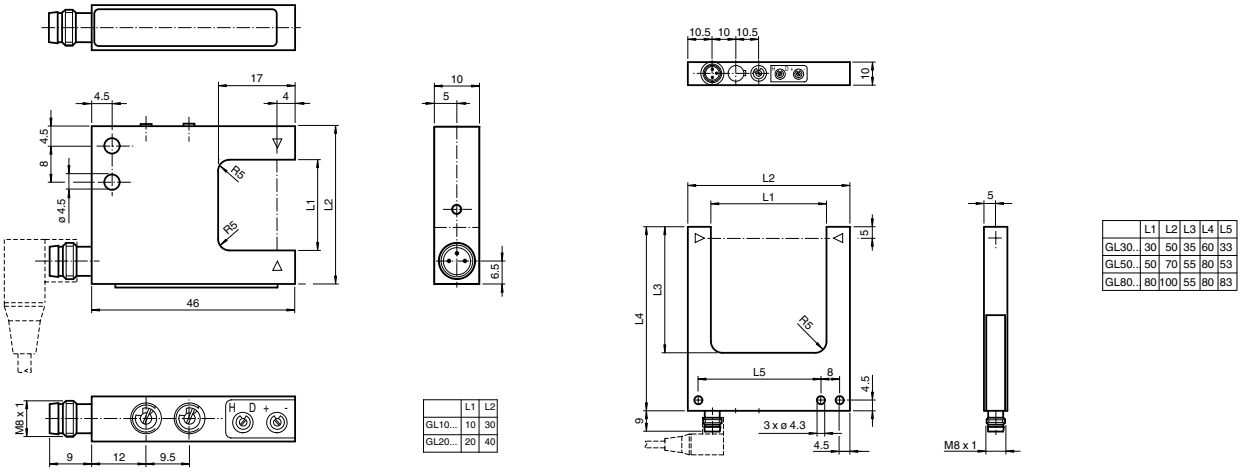
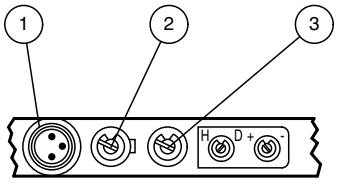
Dimensions



	L1	L2
GL10...	10	30
GL20...	20	40

	L1	L2	L3	L4	L5
GL30..	30	50	35	60	33
GL50..	50	70	55	80	53
GL80..	80	100	55	80	83

Indicators/operating means

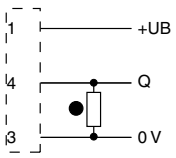


1	Functional display	red
2	Light-/dark switch	
3	Sensitivity adjuster	

Electrical connection

❍ = Light on, ● = Dark on

Option 32/40a/98a



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 2012-11-12

Notes

Operating principle

Photoelectric slot sensors are photoelectric sensors that operate according to the thru-beam sensor principle. The transmitter sends signals directly to the receiver. If an object breaks the light beam, the switching element function is triggered. The special U-shaped design means the transmitter and receiver can be accommodated in one housing, which ensures high resistance to vibrations. In contrast to standard thru-beam sensors, photoelectric slot sensors have the added advantage of not requiring complex electrical installation, as only one device needs to be connected. Also, adjustment of the optical axes is not necessary.

Accessories

V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

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SENSING YOUR NEEDS

Photoelectric slot sensor with laser for non-contact and exact positioning of elevators

- **High switching frequency**
- **High resolution**
- **Sturdy aluminum housing**
- **Light/dark switching**
- **Alignable housing**
- **Adjustable sensitivity**

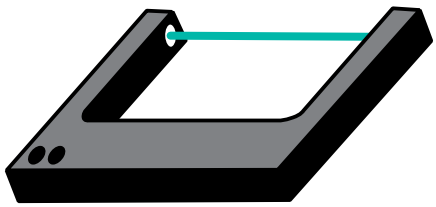
Product information

Photoelectric slot sensors with laser light can be used in applications with specific, demanding requirements and are ideal for highly precise and extremely fast applications. These eye-safe laser devices stand out through attributes that include particularly high switching frequencies of 10 kHz, maximum repeatability of 0.01 mm, automatic signal threshold adjustment, and detection of and/or light transmission through semi-transparent objects. In addition, the devices feature cross-talk protection, which enables devices to be installed adjacent to each other despite very high switching frequency.

Typical applications

- Small part detection, from object size 0.05 mm
- Positioning of robot arms
- Synchronization of rotating parts
- Inspection of microassemblies
- Counting of very small parts
- Feed control on assembly machines
- Elevator car position in elevators

Detection area



Date of issue 2012-11-12

Technical data

Model Number		GL20-LAS/32/40a/98a	GL30-LAS/32/40a/98a	GL50-LAS/32/40a/98a	GL80-LAS/32/40a/98a	GL120-LAS/32/40a/98a	GL220-LAS/32/40a/98a
Light source	laser diode	●	●	●	●	●	●
Light type	red	●	●	●	●	●	●
Note	LASER LIGHT , DO NOT STARE INTO BEAM	●	●	●	●	●	●
Laser class	2	●	●	●	●	●	●
Wave length	650 nm	●	●	●	●	●	●
Beam divergence	2.6 mrad	●	●	●	●	●	●
Maximum optical power output	< 1 mW	●	●	●	●	●	●
Target size	0.05 mm	●	●	●	●	●	●
Fork width		20 mm	30 mm	50 mm	80 mm	120 mm	220 mm
Ambient light limit	10000 Lux	●	●	●	●	●	●
Hysteresis	< 0.02 mm	●	●	●	●	●	●
Function display	LED yellow 4 x	●	●	●	●	●	●
Controls	Sensitivity adjuster, light/dark switch	●	●	●	●	●	●
Operating voltage	10 ... 30 V DC	●	●	●	●	●	●
No-load supply current	45 mA	●	●	●	●	●	●
Switching type	light/dark on	●	●	●	●	●	●
Signal output	1 PNP output, short-circuit protected, reverse polarity protected, open collector	●	●	●	●	●	●
Switching voltage	max. 30 V DC	●	●	●	●	●	●
Switching current	max. 200 mA	●	●	●	●	●	●
Voltage drop	2.5 V (200 mA)	●	●	●	●	●	●
Switching frequency	10000 Hz	●	●	●	●	●	●
Response time	50 µs	●	●	●	●	●	●
Directive conformity	EMC Directive 2004/108/EC	●	●	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●	●	●
Laser class	IEC 60825-1:2007	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●	●	●
Ambient temperature	-10 ... 60 °C (14 ... 140 °F)	●	●	●	●	●	●
Protection degree	IP65	●	●	●	●	●	●
Connection	M8 connector, 3-pin	●	●	●	●	●	●
Housing	black anodized aluminium	●	●	●	●	●	●
Optical face	glass	●	●	●	●	●	●
Installation	may be mounted in rows	●	●	●	●	●	●
Mass	30 g	●	●	●	●	●	●

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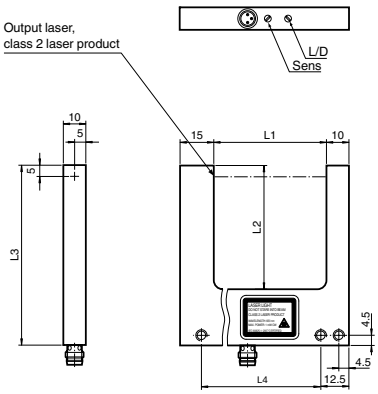
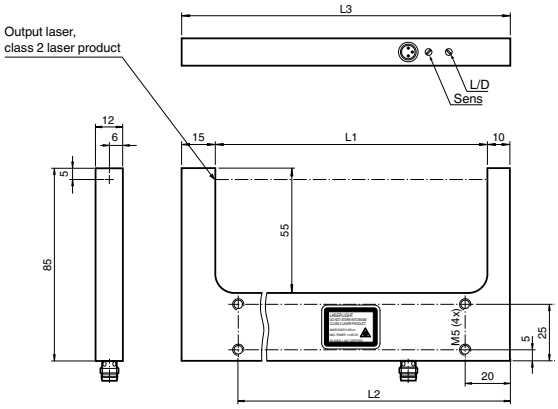
Dimensions

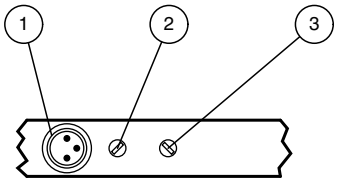


	L1	L2	L3	L4
GL30...	30	35	60	33
GL50...	50	55	80	53
GL80...	80	55	80	83



	L1	L2	L3
GL120...	120	120	145
GL220...	220	220	245

Indicators/operating means

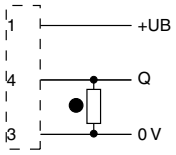


1	Functional display	yellow
2	Sensitivity adjuster	
3	Light-/dark switch	

Electrical connection

❍ = Light on, ● = Dark on

Option 32/40a/98a



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

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Notes

Operating principle

Photoelectric slot sensors are photoelectric sensors that operate according to the thru-beam sensor principle. The transmitter sends signals directly to the receiver. If an object breaks the light beam, the switching element function is triggered. The special U-shaped design means the transmitter and receiver can be accommodated in one housing, which ensures high resistance to vibrations. In contrast to standard thru-beam sensors, photoelectric slot sensors have the added advantage of not requiring complex electrical installation, as only one device needs to be connected. Also, adjustment of the optical axes is not necessary.

Accessories

V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

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Automation light grid for monitoring large areas

- **Super-fast object detection, even with 3-way beam crossover**
- **Software-free adjustment of height monitoring**
- **Object identification using integrated object recognition**
- **IO-link interface for service and process data**
- **Optional temperature range to -30 °C**
- **Optical resolution 17 mm**
- **Optical resolution 25 mm**
- **Optical resolution 50 mm**
- **Optical resolution 100 mm**

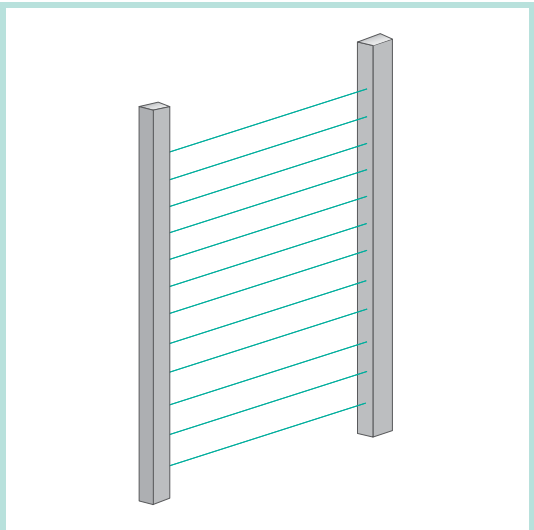
Product information

The LGS automation light grid series detects objects ranging in size from small to large. The very slender light grids have a modular design and come in different beam spacings and field heights. All signal evaluation takes place inside the unit. The lightweight systems can be integrated in their surroundings in a well-designed configuration, which means that machines and plants in temperature ranges between -30 °C ... +60 °C can be designed more compactly.

Typical applications

- Detection of objects over large areas
- Detecting and counting irregular objects
- Measuring and sorting objects of different heights (height checking)
- Presence and overhang control in material handling systems
- Web sag monitoring
- Position or shape monitoring (object identification)

Detection area



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Technical data

Model Number		LGS17 Serie	LGS25 Serie	LGS50 Serie	LGS100 Serie
Effective detection range	Standard : 0.3 ... 6 m Option /35: 0.5 ... 8 m	●	●	●	●
Threshold detection range	Standard : 7.5 m Option /35: 10 m	●	●	●	●
Light source	IRED	●	●	●	●
Light type	modulated infrared light , 850 nm	●	●	●	●
Field height	max. 3000 mm			●	●
	max. 3200 mm	●	●		
Chipping	Factory setting: 3-way, deactivateable	●	●	●	●
Tuning-out of beam	adjustable max. 2 fixed suppressible beam areas (blanking)	●	●	●	●
Beam spacing		16.67 mm	25 mm	50 mm	100 mm
Number of beams	max.	193	129	61	31
Angle of divergence	10 °	●	●	●	●
Ambient light limit	> 50000 Lux (if external light source is outside the opening angle)	●	●	●	●
Operating mode	Emitter: Emitting power adjustable in two areas	●	●	●	●
Optical resolution	without beam crossover: 100 mm with beam crossover: 50 mm with in 25% and 75% of the range				●
	without beam crossover: 17 mm with beam crossover: 8.5 mm with in 25% and 75% of the range	●			
	without beam crossover: 25 mm with beam crossover: 12.5 mm with in 25% and 75% of the range		●		
	without beam crossover: 50 mm with beam crossover: 25 mm with in 25% and 75% of the range			●	
$MTTF_d$		25 a	34 a	56 a	78 a
Mission Time (T_M)	20 a	●	●	●	●
Diagnostic Coverage (DC)	60 %	●	●	●	●
Function display	Emitter: Yellow LED, illuminates at high emitting power, off at low emitting power Receiver: Yellow LED: illuminates when an object is detected flashes when falling short of the stability control (4 Hz) Error message: Yellow LED flashes (8 Hz) in emitter and receiver	●	●	●	●
Operating display	Power on: LED green, statically lit , Undervoltage indicator: Green LED, pulsing (approx. 0.8 Hz) , short-circuit : LED green flashing (approx. 4 Hz)	●	●	●	●
Controls	Receiver: 2 pushbuttons for programming	●	●	●	●
Parameterization display	IO link communication: green LED goes out briefly (f = 1 Hz)	●	●	●	●
Operating voltage	18 ... 30 V DC	●	●	●	●
Ripple	10 %	●	●	●	●
No-load supply current	Transmitter ≤: 50 mA Receiver: ≤ 150 mA (without outputs)	●	●	●	●
Switching type	Factory setting: dark ON , Switchable to light ON mode	●	●	●	●
Signal output	Switch output (detection field C/Q) 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected on pin 4 (receiver), Height monitoring (H1, H2. H3) 3 push-pull (4 in 1) outputs, short-circuit proof, reverse polarity protected on pin 5, pin 6, pin 7 (receiver)	●	●	●	●
Switching voltage	max. 30 V DC	●	●	●	●
Switching current	max. 100 mA	●	●	●	●
Switching frequency	max. 129 Hz	●		●	
	max. 135 Hz		●		●
Response time	max.	16 ms	12 ms	8 ms	6 ms
Product standard	EN 60947-5-2:2007; IEC 60947-5-2:2007	●	●	●	●
Directive conformity	EMC Directive 2004/108/EC	●	●	●	●
UL approval	cULus Listed	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●
Protection class	III (IEC 61140)	●	●	●	●
Ambient temperature	Standard : -10 ... 60 °C (14 ... 140 °F) Option /146: -30 ... 60 °C (-22 ... 140 °F)	●	●	●	●
Storage temperature	-30 ... 70 °C (-22 ... 158 °F)	●	●	●	●
Protection degree	IP67	●	●	●	●
Connection	Emitter: 200 mm connecting cable with 4-pin, M12x1 connector Receiver: 200 mm connecting cable with 8-pin, M12 x 1 connector Cable cross section min. 0.25 mm2; Max. cable length 30 m	●	●	●	●
Housing	extruded aluminum section , Silver anodized	●	●	●	●
Optical face	Plastic pane , Polycarbonate	●	●	●	●
Mass	max. 1650 g (per profile)			●	●
	max. 1750 g (per profile)	●	●		
Housing length L	max. 3160 mm			●	●
	max. 3360 mm	●	●		
Interface type	IO-Link	●	●	●	●
Protocol	IO link V1.0	●	●	●	●
Mode	COM 2 (38.4 kBaud)	●	●	●	●
Test input	Emitter switch-off with +UB or 0 V at pin 4 (emitter)	●	●	●	●
Function input	Range input activation from 1.6 m (or 2 m in case of option /35) with +UB or 0 V on pin 2 (emitter) Teach-in input for programming on pin 8 (receiver)	●	●	●	●

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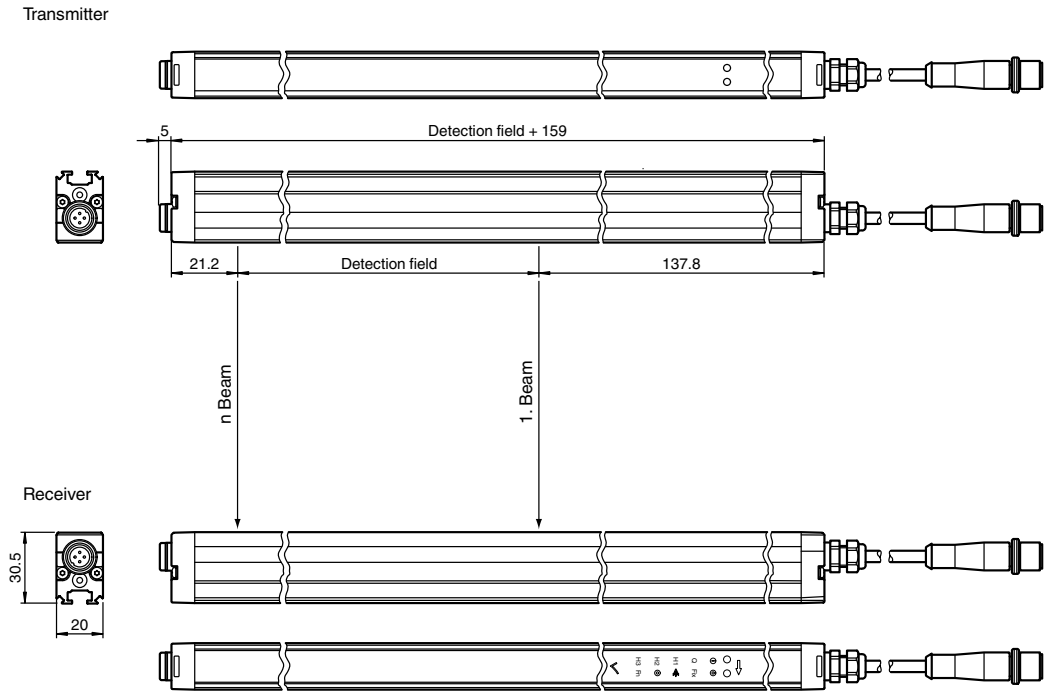
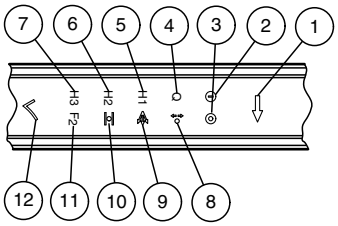
Dimensions



Indicators/operating means

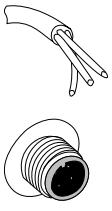


1	Menu button	yellow		7	Height checking 3	yellow
2	Operating indicator	green		8	Object floating	yellow
3	Status display	yellow		9	Crossing	yellow
4	Q object	yellow		10	Peripheral beam tolerance	yellow
5	Height checking 1	yellow		11	2nd level	yellow
6	Height checking 2	yellow		12	OK button	yellow

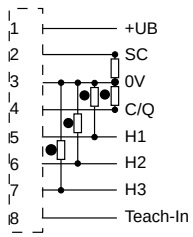
2nd level: Beam collimation, inverse mode,
light-on/dark-on switching, reset factory setting

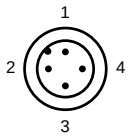
Electrical connection

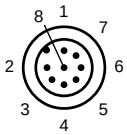
❍ = Light on, ● = Dark on



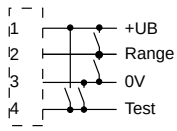
Receiver







Transmitter



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Notes

Functional principle

The light grid consists of a transmitter and a receiver, between which is the area to be monitored. The switch command is initiated by the entry or existence of a body/object in the monitoring field.
The modular system design supports a wide range of distances for the lines of light. Optimum implementation of the LGS series light grids for specific application requirements is thus possible.

The system also has 3 switch outputs for height checking. The system is programmed using the integra

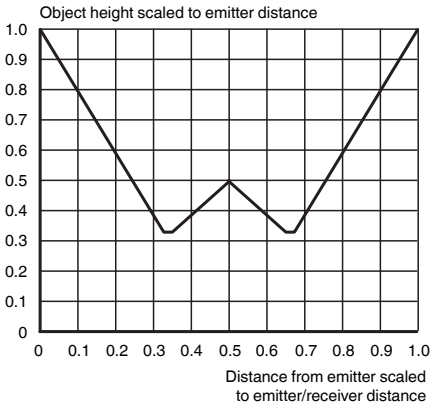
Resolution and beam clearance

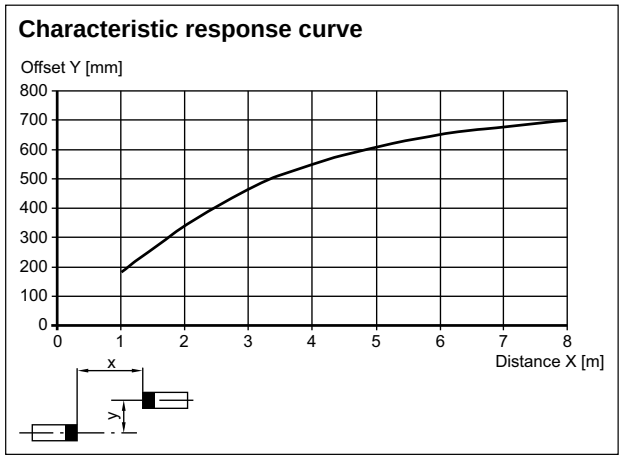
The mechanical beam clearance determines the smallest detectable object size. Crossing the light beams increases the resolution of the light grid.

The devices are delivered without programmed height checking. The beam is crossed three times.

Resolution of the crossed beam arrangement

If three-way crossing of the beams is programmed, the resolution increases. For a three-way crossing, this means that the increased resolution is offered after 25% of the transmitter range or receiver range. It must therefore be ensured that all objects pass transmitters or receivers with this clearance.





Accessories

OMH-LGS-01	Attachment aid for light grid series LGS
OMH-SLCT-01	Quick clamp and adjustment system
OMH-SLCT-03	Mounting bracket including adjustment
OMH-SLCT-04	Mounting bracket including adjustment (with loose bearing)
OMH-SLCT-05	Mounting bracket including adjustment
AA SLCT-01	Profile alignment aid
V1-G-BK2M-PUR-UL	Cable socket, M12, 4-pin, PUR cable
V1-G-BK5M-PUR-UL	Cable socket, M12, 4-pin, PUR cable
V1-G-BK10M-PUR-UL	Cable socket, M12, 4-pin, PUR cable
V1-G-BK15M-PUR-UL	Cable socket, M12, 4-pin, PUR cable
V19-G-BK10M-PUR-IEC	Cable socket, M12, 8-pin, PUR-cable
V19-G-BK2M-PUR-IEC	Cable socket, M12, 8-pin, PUR-cable
V19-G-BK5M-PUR-IEC	Cable socket, M12, 8-pin, PUR-cable

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High resolution light grid for detecting people and objects

- **Low-profile, high resolution light grid for monitoring locking edges on elevators and accesses**
- **Thru-beam light grid with integrated controller**
- **In accord with EN81-70 and EN12015/16**
- **Dense monitoring field with up to 135 beams ensures that small objects are detected**
- **Object detection up to distance of zero**
- **Automatic beam crossing and beam suppression**
- **Insensitive to reflection and ambient light**
- **Version with EC-type examination certificate for Zones 2 and 22**

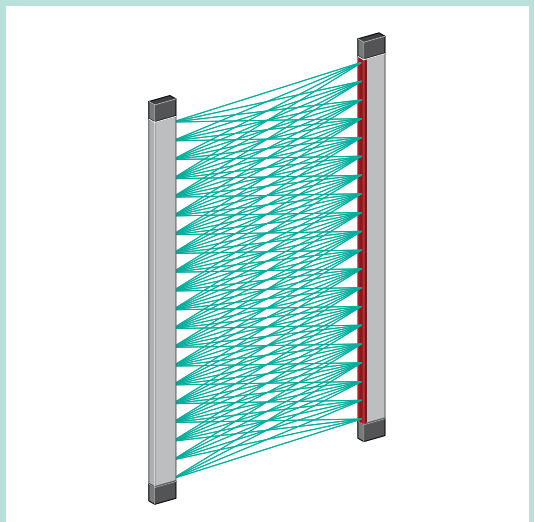
Product information

The AL2109 elevator light grid is used to protect elevator doors or for passenger monitoring and access control. Its special features include its dynamic beam crossover with up to 135 active sensors, object detection down to nearly zero millimeters and an ambient light limit greater than 100,000 Lux. The evaluation electronics and the power supply are completely integrated into the emitter and receiver element, so that no external equipment is necessary for operation. The system offers flexible mounting options and meets the newest standards in accordance with EN 81-70 and EN 12016.

Typical applications

- Secure and complete monitoring of elevator doors
- Monitoring of access systems and entrances
- Access control

Detection area



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Technical data

Model Number		AL2109-P-1820/40b/49/143	AL2109-P-1820-EX2/25/49/115/133/76a
Effective detection range	0 ... 3500 mm	●	●
Light source	IRED	●	●
Light type	modulated infrared light , 950 nm	●	●
Field height	1800 mm	●	●
Chipping	automatic, 3x/5x/7x (depending on distance between transmitter/ receiver)	●	●
Tuning-out of beam	Defective beams are faded out after 60 s. Deactivation of the light grid upon failure of 2 adjacent beams or more than 50 % of all beams	●	●
Beam spacing	90 mm	●	●
Number of beams	61 ... 135 (dynamic)	●	●
Angle of divergence	Emitter: < 20 ° , Receiver: < 6 °	●	●
Ambient light limit	> 100000 Lux	●	●
Accessories provided	Magnet		●
	nicht uebersetzt! , length 5 m (15 ft)	●	
$MTTF_d$	180 a	●	●
Mission Time (T_M)	20 a	●	●
Diagnostic Coverage (DC)	0 %	●	●
Function display	LED red (in receiver): Illuminates after connecting operating power, out when object is detected, flashes in case of permanent interruption of 2 neighbouring beams	●	●
Operating voltage	11 ... 30 V DC	●	
	11 ... 30 V DC: max.		●
Ripple	10 %	●	●
No-load supply current	< 180 mA	●	●
Switching type	light/dark on selectable programmable	●	
	light on		●
Signal output	1 PNP and 1 NPN, short-circuit protected	●	●
Switching voltage	max. 30 V DC	●	●
Switching current	100 mA	●	●
Switching frequency	< 3 Hz	●	●
Response time	< 100 ms	●	●
Product standard	EN 60947-1:2007 IEC 60947-5-2:2007		●
	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	
Standards	EN 81-70	●	●
EMC Directive 2004/108/EC	EN 12015:2004 EN 12016:2004+A1:2008	●	●
CE conformity	yes	●	
UL approval	cULus Listed	●	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●
Ambient temperature	-10 ... 55 °C (14 ... 131 °F)		●
	-10 ... 60 °C (14 ... 140 °F)	●	
Storage temperature	-20 ... 65 °C (-4 ... 149 °F)	●	●
Pollution Degree	Pollution Degree 2: Nonconductive pollution, temporary conductivity caused by condensation is possible		●
Protection degree	IP54	●	●
Connection	5 m fixed cable		●
	Male connector	●	
Housing	aluminum	●	●
Optical face	plastic	●	●
Mass	2000 g (device)	●	
	2300 g (device)		●
Use in the hazardous area	see more details for the use in hazardous areas		●
Category	3G; 3D		●

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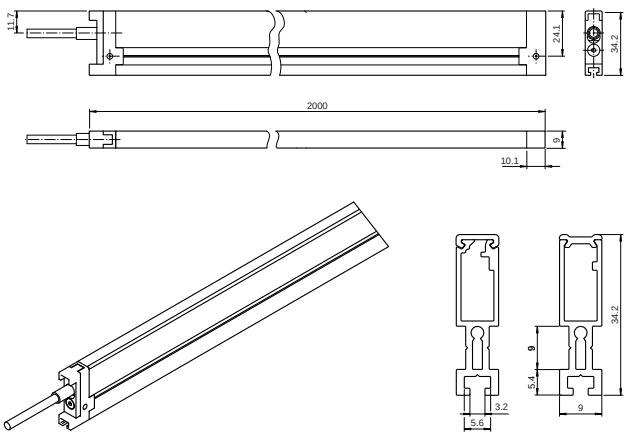
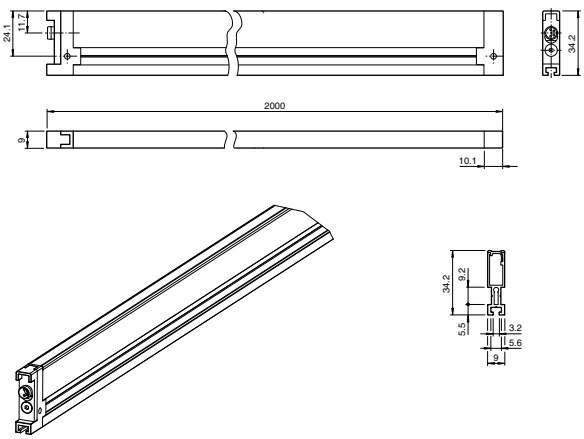
Dimensions

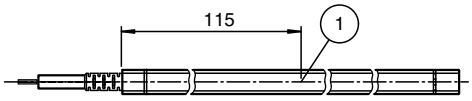
AL2109-P-1820-EX2/25/49/115/133/76a



AL2109-P-1820/40b/49/143



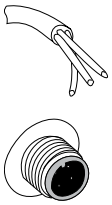
Indicators/operating means



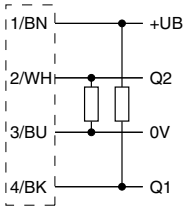
1	LED display

Electrical connection

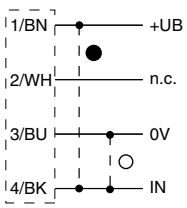
❍ = Light on, ● = Dark on



Option /40b/49/143
Receiver



Transmitter



Don't leave
input floating!

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Notes

Functional principle

The AL2109 light grid is used for access monitoring on elevators. The device consists of an emitter and receiver unit. The evaluation electronics and power supply are integrated into the devices. No additional external components are required for operation.
By default, the light grid automatically switches between 7-way, 5-way and 3-way crossovers. If the distance is more than 0.8 m between the emitter and receiver, the light grid selects the "7-way crossover" operating mode. Every receiver evaluates the beams of 7 emitters in this mode. 7-way crossover thus increases the resolution to 135 beams.

Accessories

Mounting Set AL2109 back board	Mounting aid
Mounting Set AL2109 extension	Mounting aid
Mounting Set AL2109 lateral	Mounting aid
PS1/31	Power supply/Power supply module

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Long range light grid for detecting people and objects

- Thru-beam light grid with integrated controller
- Automatic beam crossing and beam suppression
- 7-segment display for status and service functions
- Mirroring proof
- Version with 12 mm wide profile
- Version with 16 mm wide profile
- Version with 20 mm beam spacing
- Version with 40 mm beam spacing

CE

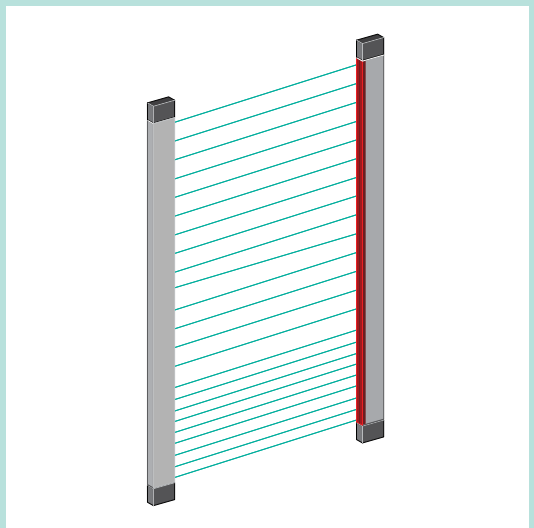
Product information

In a profile of only 12 mm or 16 mm, the AL20/AL40 light grids offer safety and convenience for elevator doors. Customized beam spacing, asymmetrical beam paths and automatic resolution adjustment ensure that even small objects are reliably detected. All functional units are directly integrated into the light grids. The special features include a 7-segment LED display activated by a magnet, which greatly facilitates installation and service work.

Typical applications

- Secure and complete monitoring of elevator doors
- Monitoring of access systems and entrances

Detection area



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Technical data

Model Number		AL4016-P-1650/49/76a	AL4012-P-1650/49/76a	AL2016-P-1650/49/76a	AL2012-P-1650/49/76a
Effective detection range	0 ... 4000 mm	●	●	●	●
Threshold detection range	5600 mm	●	●	●	●
Light source	IRED	●	●	●	●
Light type	940 nm infrared	●	●	●	●
Field height	1605 mm			●	●
	1650 mm	●	●		
Chipping	automatically 3X/5X (depending on distance between transmitter/ receiver)	●	●	●	●
Tuning-out of beam	Defective beams are faded out after 60 s. Deactivation of the light grid upon failure of 2 adjacent beams or more than 50 % of all beams	●	●	●	●
Beam spacing	lower range: 20 mm upper range: 44 mm	●	●		
	lower range: 40 mm upper range: 88 mm			●	●
Number of beams	20 ... 94 (dynamic)			●	●
	40 ... 194 (dynamically)	●	●		
Angle of divergence	Emitter: > 20 ° , Receiver: > 10 °	●	●	●	●
Ambient light limit	16000 Lux	●	●	●	●
Accessories provided	Magnet	●	●	●	●
Function display	7-segment display in receiver display function can be activated: switching status, self test and alignment aid	●	●	●	●
Operating voltage	12 ... 30 V DC	●	●	●	●
Ripple	10 %	●	●	●	●
No-load supply current	< 150 mA	●	●	●	●
Switching type	light/dark on selectable programmable	●	●	●	●
Signal output	1 PNP and 1 NPN, short-circuit protected	●	●	●	●
Switching voltage	max. 30 V DC	●	●	●	●
Switching current	200 mA	●	●	●	●
Switching frequency	> 1 Hz	●	●	●	●
Response time	< 220 ms	●	●	●	●
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●	●	●
Standards	EN 12015, EN 12016	●	●	●	●
CE conformity	yes	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●
Ambient temperature	-10 ... 60 °C (14 ... 140 °F)	●	●	●	●
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)	●	●	●	●
Protection degree	IP65	●	●	●	●
Connection	5 m fixed cable (appropriate for conveyor chains, according to UL E140404, 600 V rated insulation voltage, 90° C)	●	●	●	●
Housing	aluminum	●	●	●	●
Optical face	plastic	●	●	●	●
Mass	2000 g (device)	●	●	●	●

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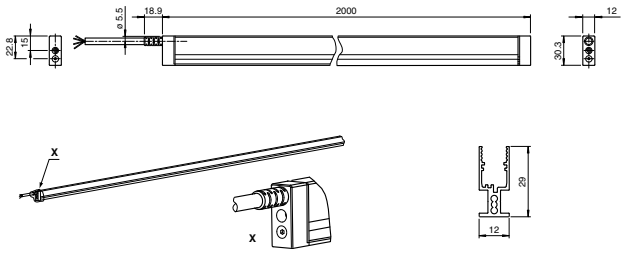
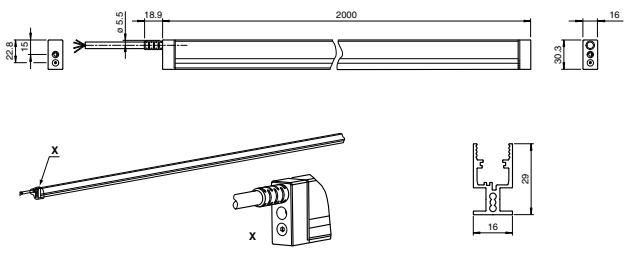
Dimensions

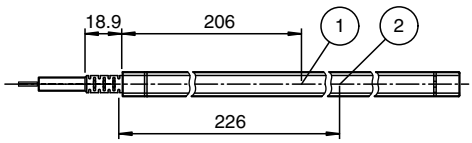
AL4012-P-1650/49/76a
AL2012-P-1650/49/76a



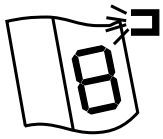
AL2016-P-1650/49/76a
AL4016-P-1650/49/76a



Indicators/operating means



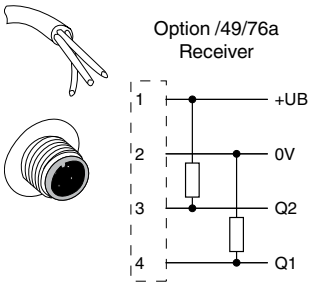
1	Reed relay/magnetic contact
2	7-segment display

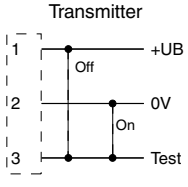


The 7-segment LED display is activated for 15 min. with the magnet. The switching mode is also selected with the magnet. The LED indicates various states and codes.

Electrical connection

❍ = Light on, ● = Dark on





Don't leave test input floating!

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Notes

Functional principle

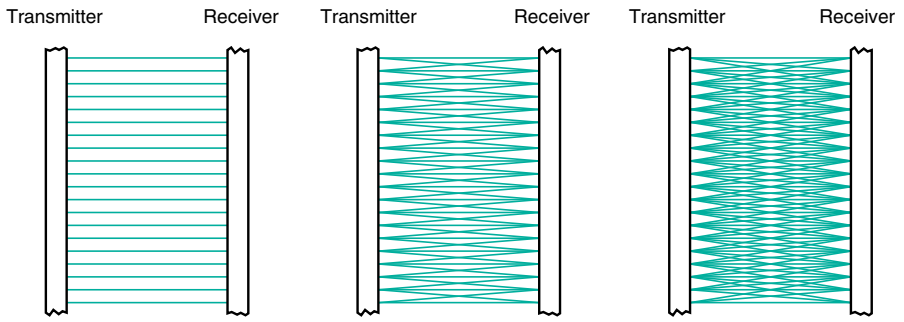
The AL20 series operates with 20 infrared light beams and the AL40 with 40 infrared light beams. With range of up to four meters, it is possible to achieve protection fields up to 1650 mm high, beginning from a height of 20 mm above ground level. The smaller beam gaps and asymmetrical beam paths near the ground ensure that even small objects, such as the tips of shoes, are securely detected

The device consists of an emitter and receiver unit. The evaluation electronics and power supply are integrated into the devices. No additional external components are required for operation.

An automatic changeover from 5-way crossover to standard operating mode is integrated as a standard feature. In the event of a distance of more than 0.7 m between the emitter and receiver, the light grid selects the "1-to-5 crossover" operating mode. Every receiver evaluates the beams of 5 emitters in this mode. The 5-way crossover increases the resolution to 194 beams for the AL40 and to 94 beams for the AL20. The result is a dense and high-quality beam network, almost like a curtain.

The elevator light grid has a beam suppression system. If the lens becomes dusty or dirty, "defective" beams are automatically suppressed after 1 minute. The light grid as a whole is only deactivated if 2 adjacent beams or more than half of all the beams fail.

Both static and mobile operation are supported. Accordingly, the emitter and the receiver can be mounted on the stationary side walls, or one of the two components can be integrated directly into the movable door panel.



Crossover	1 (standard)	3-way (1-to-3)	5-way (1-to-5)
Distance between transmitter and receiver	< 700 mm	700 - 900 mm	> 1000 mm
Max. number of beams	20 (AL20) 40 (AL40)	58 (AL20) 118 (AL40)	94 (AL20) 194 (AL40)

Accessories

OMH-PLV-PLP	Mounting bracket for light grids, for rear or side wall installation
Deckel-Zapfen	Mounting pivot for light grid AL20/AL40
PS1/31	Power supply/Power supply module

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Narrow safety light grid with TÜV approval for detecting people and vehicles

- **Protection field height up to 2400 mm**
- **Slim design, mounting on three sides**
- **Resolution 30 mm (hand protection)**
- **Resolution 90 mm**
- **Self-testing (type 2 as per IEC/EN 61496-1)**
- **Self-monitoring (type 4 according to IEC/EN 61496-1)**
- **Temperature range -30 ... 60°C (-22 ... 140 °F)**

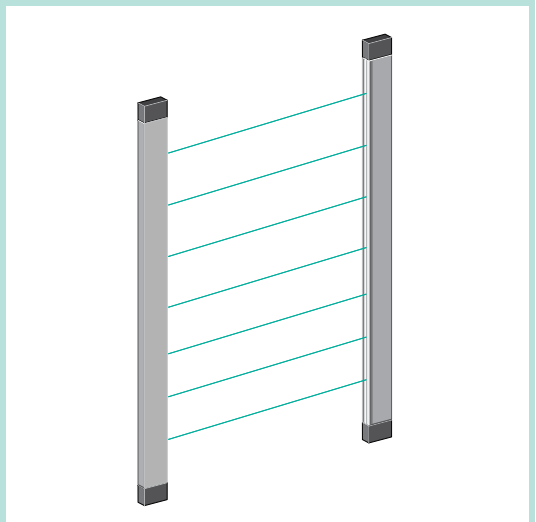
Product information

The Safety light curtain consists of a transmitter and a receiver unit. The protected area is formed by infrared light beams transmitted from the transmitter unit to the receiver unit. The spacing between the individual light beams determines the minimum obstruction size (30 mm) that can be reliably detected within the entire protected area range.

Typical applications

- Active opto-electronic protective device (AOPD) for protection of people in danger zones and high risk areas
- Hand protection from 30 mm resolution
- Finger protection from 14 mm resolution

Detection area



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Technical data

Model Number		SLCS30 Series	SLCT30 Series	SLCT90 Series
Effective detection range	0.2 ... 8 m		●	●
	0.4 ... 8 m	●		
Light source	IRED	●	●	●
Light type	modulated infrared light , 850 nm	●	●	●
Approvals	TÜV, cULus	●	●	●
Tests	EN IEC 61496, IEC 61508 part 1,2,3,4, EN ISO 13849, EN 50178, EN 60870-5-1, EN 61000-6-3	●	●	●
Safety type according to IEC/EN 61496	2		●	●
	4	●		
Safety Integrity Level (SIL)	SIL2 (IEC 61508)		●	●
	SIL3 (IEC 61508)	●		
Performance level (PL)	PL d (EN ISO 13849-1)		●	●
	PL e (EN ISO 13849-1)	●		
Marking	CE (2006/42/EG)	●	●	●
Operating mode	Startup/restart disable, deactivateable	●	●	●
Optical resolution	30 mm	●	●	
	90 mm			●
Angle of divergence	5 °	●	●	●
Ambient light limit	Not sensitive to ambient light in accordance with EN 61496-2	●	●	●
Safety Integrity Level (SIL)	SIL 2		●	●
	SIL 3	●		
Performance level (PL)	PL d		●	●
	PL e	●		
Category	Cat. 3		●	●
	Cat. 4	●		
Mission Time (T_M)	20 a	●	●	●
Type	2		●	●
	4	●		
Operating display	green: Power on	●	●	●
Function display	Green: OSSD ON , Red: OSSD OFF	●	●	●
Status indication	Emitter unit: LED yellow: Mode, test or error Receiver: LED yellow: Start readiness, function reserve or error	●	●	●
Operating voltage	24 V DC (-20%, +30%) ; Power supply with safe isolation: 24 V DC	●	●	●
No-load supply current	Emitter unit:≤ 150 mA Receiver: ≤ 150 mA (outputs open)		●	●
	Emitter unit:≤ 150 mA; Receiver: ≤ 150 mA (without outputs)	●		
Protection class	III , IEC 61140	●	●	●
Power consumption	Emitter unit: 5 W, Receiver: 15 W	●	●	●
Input type	Emitter unit test	●	●	●
Input format	Break contact	●	●	●
Switching voltage	24 V DC	●	●	●
Input current	5 mA	●	●	●
Input type	Emitter unit, mode A/B	●	●	●
Function	Beam Code A: open or 0 V, Beam Code B: 24 V DC, 5 mA	●	●	●
Input type	Receiver unit relay monitor	●	●	●
Input format	Break contact	●	●	●
Switching voltage	24 V DC	●	●	●
Input current	5 mA	●	●	●
Input type	Receiver unit, start release	●	●	●
Input format	Break contact	●	●	●
Input current	5 mA	●	●	●
Input type	Receiver unit, mode A/B (see emitter unit, mode A/B)	●	●	●
Response time	max. 17 ms			●
	max. 38 ms	●	●	
Output type	Receiver unit OSSD	●	●	●
Signal output	PNP semiconductor , monitored for short and cross circuits	●	●	●
Switching voltage	ON: U_B - 2 V; OFF: < 1 V	●	●	●
Switching current	ON: max. 0.1 A; OFF: < 5 µA	●	●	●
Output type	Receiver signal output start readiness	●	●	●
Signal output	PNP-semiconductor, short-circuit protected, 0.1A	●	●	●
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)	●	●	●
Storage temperature	-30 ... 70 °C (-22 ... 158 °F)	●	●	●
Relative humidity	max. 95 %, not condensing	●	●	●
Housing length L	see table 2	●	●	●
Protection degree	IP65 , For indoor use only	●	●	●
Connection	Emitter unit: connector M12 x 1, 4-pin, Receiver: 8-pin, M12 x 1 connector, Cable cross section min. 0.25 mm² Max. cable length 50 m	●	●	●
Housing	extruded aluminum section , gold anodized	●		
	extruded aluminum section , Silver anodized		●	●
Optical face	Plastic pane , Transparent polycarbonate	●	●	●
Mass	see table 2	●	●	●

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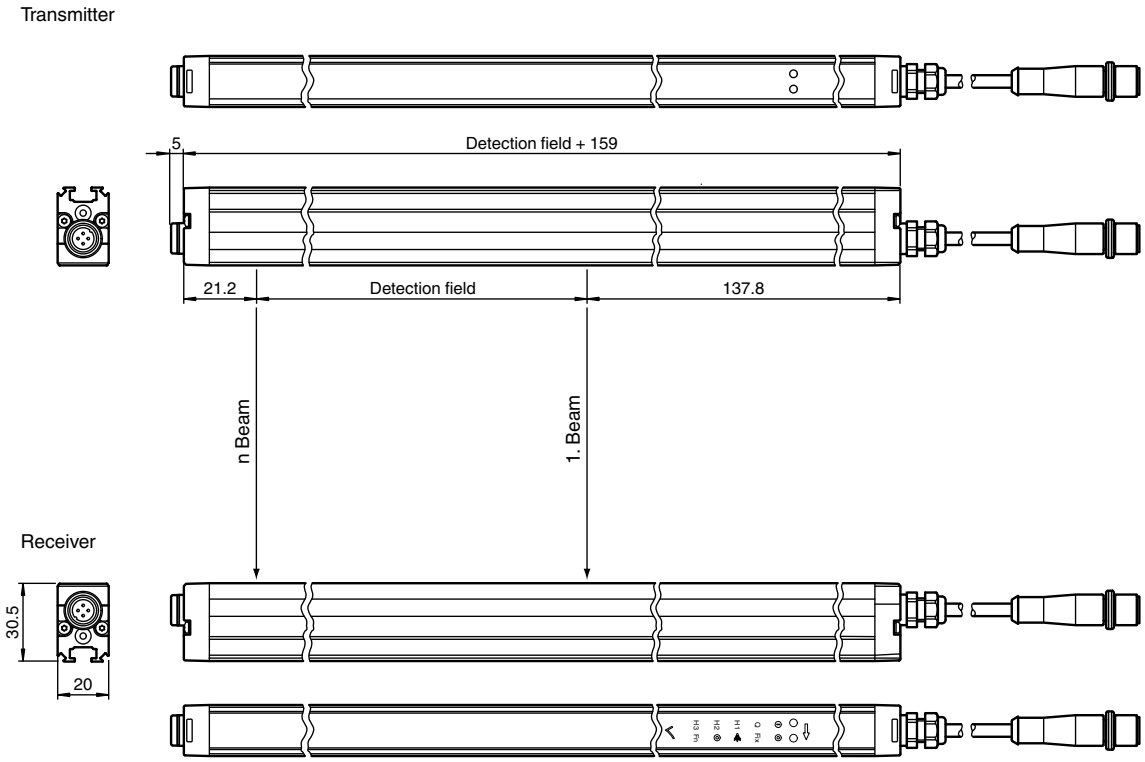
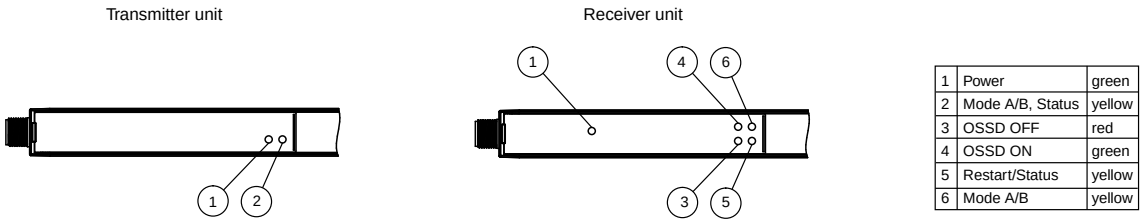
Dimensions



Indicators/operating means

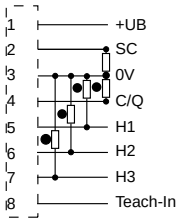


1	Power	green
2	Mode A/B, Status	yellow
3	OSSD OFF	red
4	OSSD ON	green
5	Restart/Status	yellow
6	Mode A/B	yellow

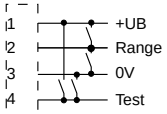
Electrical connection

❍ = Light on, ● = Dark on

Receiver



Transmitter



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Notes

Additional information

Table 2 - Total length and weight:

Height of the protected area [mm]	Total length of transmitter/receiver unit [mm]	Weight of transmitter/receiver unit [g]
300	419	250
600	719	430
900	1019	600
1200	1319	760
1500	1625	940
1800	1925	1100
2100	2225	1270
2400	2525	1440

Accessories

OMH-SLCT-01	Quick clamp and adjustment system
OMH-SLCT-02	Attachment aid for OMH-SLCT-01
OMH-SLCT-03	Mounting bracket including adjustment
OMH-SLCT-04	Mounting bracket including adjustment (with loose bearing)
OMH-SLCT-05	Mounting bracket including adjustment
TR 14/30/50/60	Test rod for safety light curtain SLCT
AA SLCT-01	Profile alignment aid

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PEPPERL+FUCHS
SENSING YOUR NEEDS

Contents

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Data section

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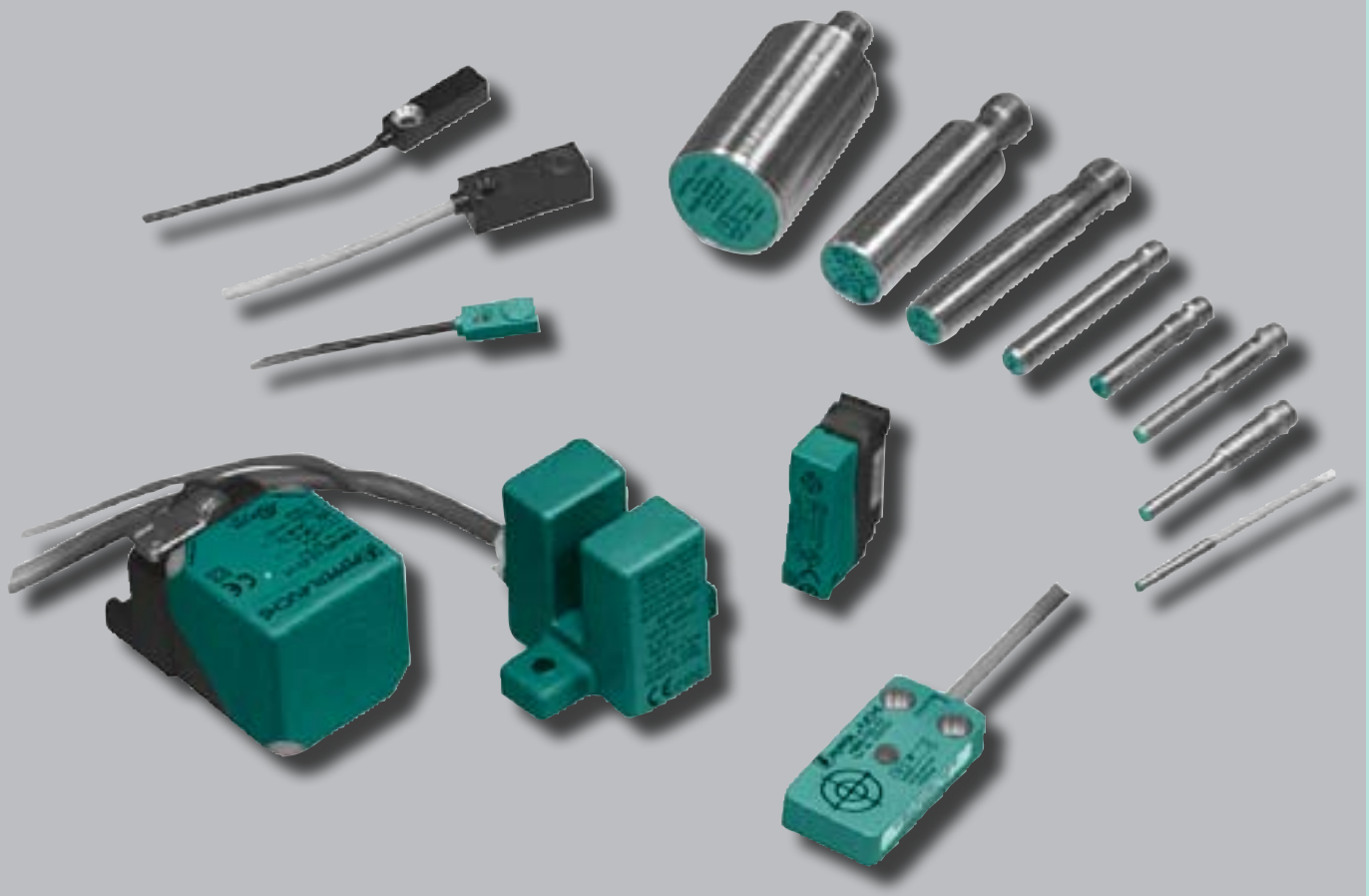

Proximity Switches

Inductive sensors are the ideal technical and economic solution for reliable noncontact detection of metallic objects up to a distance of 100 mm.

With Pepperl+Fuchs sensors, you can be sure that you are choosing quality and performance. A pioneer in this area,

Pepperl+Fuchs has been producing inductive proximity switches for industrial use since 1958.

Creativity and decades of experience are the pillars of our globally recognized expertise in this important product segment.

Millions of our inductive sensors are in use in automation technology, and the possible combinations of designs and electrical features are almost unlimited.

The operating distance is the most important characteristic of a proximity switch, and depends largely on the sensor diameter. The dimensions and material composition of the actuator and the ambient temperature also have an influence.

1. Inductive proximity switch

1.1 Cubic sensors

The cubic proximity switches from the Varikont-L series have no terminal compartment, making them extremely compact, and they can be secured using just a screwdriver. The sensor head can be rotated and pivoted without tools, and the active area can be adjusted in 15° increments over two levels, providing huge scope for adjusting the sensor area to the target. It is connected using a cable or V1 connector.

1.2 Cylindrical sensors

Their active area is on the front face in the axial direction. They are available in diameters from 3 mm (no thread) or 4 mm (with thread) to 30 mm (with thread) or 40 mm smooth (with terminal housing).

1.3 Surface mount proximity switches

These small proximity switches are mounted to the required surface. Different versions are available with the active zone aligned upwards or forwards.

2. Slot-shaped inductive proximity switches

Inductive slot sensors have a U-shaped housing and consist of two opposing coil systems. If a piece of metal is inserted into the slot between the two coils, their inductive coupling is reduced. Once a certain insertion depth is reached, the coupling falls below its critical value and the sensor is activated. Because of its design, the slot sensor is largely immune to changes in the position of the actuator towards the core axis, which means that there are no high demands on mechanical tolerances. The actuator material parameters have much less influence on the switching point than with cylindrical proximity switches.

3. Loop detectors

Loop detectors are control units that are fully functional without the need for any other auxiliary equipment once the power supply and an inductive loop have been connected. The inductive loop laid below the surface forms the inductor of a high-frequency oscillating circuit. The metal parts of a vehicle that enters or is located in this wired loop cause the frequency of the oscillation circuit to change. This frequency change is analyzed by the loop detector, and output as a switching signal via zero-potential relay contacts. The switching outputs are relay contacts with high switching power that can directly control contactors, valves, and alternating current motors.

The dimensions of the detection area can be adjusted by changing the size and shape of the inductive loops. Specific vehicle types such as motorcycles and bicycles can be omitted from sensor detection by adjusting the sensitivity settings.

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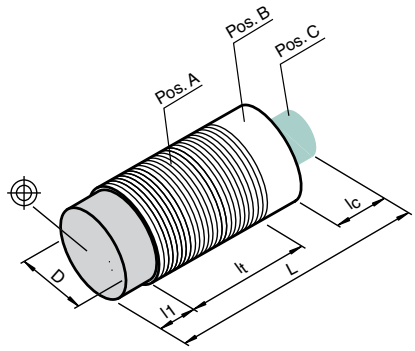
PEPPERL+FUCHS SENSING YOUR NEEDS

Non-contact detection of metal objects

- Basic series
- 0.8 mm flush
- 2 mm flush
- Increased operating distance

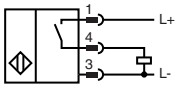
Dimensions



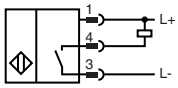
Model Number	NBB0,8-4M25-E0	NBB0,8-4M25-E0-V3	NBB0,8-4M25-E2	NBB0,8-4M25-E2-V3	NBB0,8-5GM25-E0	NBB0,8-5GM25-E0-V3	NBB0,8-5GM25-E2	NBB0,8-5GM25-E2-V3	NBB2-6,5M30-E0	NBB2-6,5M30-E2	NBB2-6,5M25-E0-V3	NBB2-6,5M25-E2-V3
Length L [mm]	25	40	25	40	25	35	25	35	30	30	29	29
Diameter D [mm]	4	4 \ 8	4	4 \ 8	5	5 \ 8	5	5 \ 8	6.5	6.5	6.5\8	6.5\8
Thread length l_t [mm]	0				25	21	25	21	0			
Cap length l_1 [mm]	0											
Connector area l_c [mm]	0	5	0	5	0	10	0	10	0	0	6	6
LED position	A	B	A	B	A	B	A	B	C	C	B	B

Electrical connection

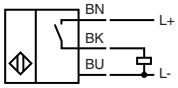
NBB0,8-4M25-E2-V3
NBB0,8-5GM25-E2-V3
NBB2-6,5M25-E2-V3



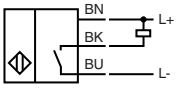
NBB0,8-4M25-E0-V3
NBB0,8-5GM25-E0-V3
NBB2-6,5M25-E0-V3



NBB0,8-4M25-E2
NBB0,8-5GM25-E2
NBB2-6,5M30-E2



NBB0,8-4M25-E0
NBB0,8-5GM25-E0
NBB2-6,5M30-E0



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 2012-11-12

Technical data

Model Number			NBB0,8-4M25-E0	NBB0,8-4M25-E0-V3	NBB0,8-4M25-E2	NBB0,8-4M25-E2-V3	NBB0,8-5GM25-E0	NBB0,8-5GM25-E0-V3	NBB0,8-5GM25-E2	NBB0,8-5GM25-E2-V3	NBB2-6,5M30-E0	NBB2-6,5M30-E2	NBB2-6,5M25-E0-V3	NBB2-6,5M25-E2-V3
Switching element function	NPN	NO	●	●			●	●			●		●	
	PNP	NO			●	●			●	●		●		●
Rated operating distance	0.8 mm		●	●	●	●	●	●	●	●				
	2 mm										●	●	●	●
Installation	flush		●	●	●	●	●	●	●	●	●	●	●	●
Output polarity	DC		●	●	●	●	●	●	●	●	●	●	●	●
Assured operating distance	0 ... 0.648 mm		●	●	●	●	●	●	●	●				
	0 ... 1.62 mm										●	●	●	●
Operating voltage	10 ... 30 V		●	●	●	●	●	●	●	●	●	●		●
	5 ... 30 V												●	
Switching frequency	0 ... 3000 Hz		●	●	●	●	●	●	●	●	●	●	●	●
Hysteresis	typ. 5%			●	●	●			●		●	●		
	5 ... 20 %		●				●	●						
Reverse polarity protection	reverse polarity protected		●	●	●	●	●	●	●	●	●	●		●
Short-circuit protection	pulsing		●	●	●	●	●	●	●	●	●	●	●	●
Voltage drop	≤ 2.5 V												●	
	≤ 3 V		●	●	●	●	●	●	●	●	●	●		●
Operating current	0 ... 100 mA		●	●		●	●				●	●	●	●
	0 ... 200 mA				●				●					
	0.1 ... 100 mA							●		●				
Off-state current	0 ... 0.1 mA							●		●				
	0 ... 0.1 mA typ. 0.1 µA at 25 °C		●	●	●	●	●		●					
	0 ... 0.5 mA typ. 0.1 µA at 25 °C										●	●	●	●
No-load supply current	≤ 10 mA				●				●					
	≤ 12 mA		●	●		●	●	●						
	≤ 15 mA									●	●	●	●	●
Indication of the switching state	LED, yellow		●	●	●	●	●	●	●	●	●	●		
	Multihole-LED, yellow												●	●
$MTTF_d$	1400 a				●				●					
	2140 a		●				●							
Mission Time (T_M)	20 a		●		●		●		●					
Diagnostic Coverage (DC)	0 %		●		●		●		●					
Standards	EN 60947-5-2:2007, IEC 60947-5-2:2007		●	●	●	●	●	●	●	●	●	●	●	●
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●	●	●	●	●	●	●	●	●	●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●	●	●	●	●	●	●	●	●
Connection type	Device connector M8 x 1 , 3-pin			●		●		●		●			●	●
	cable PVC , 2 m		●		●		●		●		●	●		
Core cross-section	0.14 mm^2		●		●		●		●		●	●		
Housing material	Stainless steel 1.4305 / AISI 303		●		●		●	●	●	●				
	brass, nickel-plated										●	●	●	●
Protection degree	IP67		●	●	●	●	●	●	●	●	●	●	●	●

Accessories

BF 6,5	Mounting flange, 6.5 mm
BF 5	Mounting flange, 5 mm
BF 4	Mounting flange, 4 mm
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

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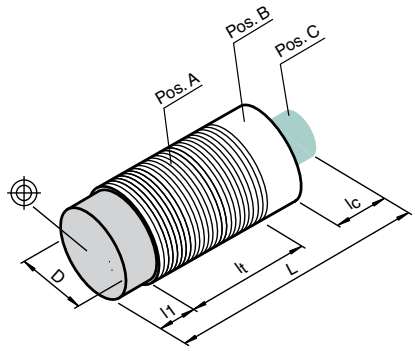
PEPPERL+FUCHS SENSING YOUR NEEDS

Non-contact detection of metal objects

- Basic series
- 1.5 mm flush
- 2 mm flush
- 2 mm non-flush
- Increased operating distance

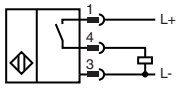
Dimensions



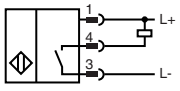
Model Number	NBB1,5-8GM40-E0-V1	NBB1,5-8GM40-E2-V1	NBB1,5-8GM50-E0	NBB1,5-8GM50-E2	NBB2-8GM25-E0-V3	NBB2-8GM25-E2-V3	NBB2-8GM30-E0	NBB2-8GM30-E2	NBN2-8GM40-E0-V1	NBN2-8GM40-E2-V1	NBN2-8GM50-E0	NBN2-8GM50-E2
Length L [mm]	65	65	50	50	29	29	30	30	65	65	50	50
Diameter D [mm]	8 \ 12				8				8 \ 12		8	
Thread length l_t [mm]	40	40	50	50	25	25	30	30	35	35	45	45
Cap length l_1 [mm]	0								4			
Connector area l_c [mm]	6		0		6		0		6		0	
LED position Pos.	C				B				C			

Electrical connection

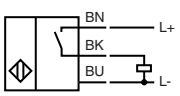
NBB1,5-8GM40-E2-V1
NBB2-8GM25-E2-V3
NBN2-8GM40-E2-V1



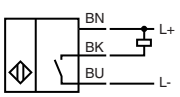
NBB1,5-8GM40-E0-V1
NBB2-8GM25-E0-V3
NBN2-8GM40-E0-V1



NBB1,5-8GM50-E2
NBB2-8GM30-E2
NBN2-8GM50-E2

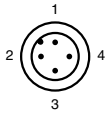


NBB1,5-8GM50-E0
NBB2-8GM30-E0
NBN2-8GM50-E0



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2012-11-12

Technical data

Model Number			NBB1,5-8GM40-E0-V1	NBB1,5-8GM40-E2-V1	NBB1,5-8GM50-E0	NBB1,5-8GM50-E2	NBB2-8GM25-E0-V3	NBB2-8GM25-E2-V3	NBB2-8GM30-E0	NBB2-8GM30-E2	NBN2-8GM40-E0-V1	NBN2-8GM40-E2-V1	NBN2-8GM50-E0	NBN2-8GM50-E2
Switching element function	NPN	NO	●		●		●		●		●		●	
	PNP	NO		●		●		●		●		●		●
Rated operating distance	1.5 mm		●	●	●	●								
	2 mm						●	●	●	●	●	●	●	●
Installation	flush		●	●	●	●	●	●	●	●				
	non-flush										●	●	●	●
Output polarity	DC		●	●	●	●	●	●	●	●	●	●	●	●
Assured operating distance	0 ... 1.215 mm		●	●	●	●								
	0 ... 1.62 mm						●	●	●	●	●	●	●	●
Operating voltage	10 ... 30 V		●	●	●	●		●	●	●	●	●	●	●
	5 ... 30 V						●							
Switching frequency	0 ... 1500 Hz		●	●	●	●					●	●	●	●
	0 ... 3000 Hz						●	●	●	●				
Hysteresis	typ. 5%							●	●	●				
Reverse polarity protection	reverse polarity protected		●	●	●	●		●	●	●	●	●	●	●
Short-circuit protection	pulsing		●	●	●	●	●	●	●	●	●	●	●	●
Voltage drop	≤ 2.5 V						●							
	≤ 3 V		●	●	●	●		●	●	●	●	●	●	●
Operating current	0 ... 100 mA		●	●	●	●	●	●	●	●	●	●	●	●
Off-state current	0 ... 0.5 mA typ. 0.1 µA at 25 °C		●	●	●	●	●	●	●	●	●	●	●	●
No-load supply current	≤ 15 mA		●	●	●	●	●	●	●	●	●	●	●	●
Indication of the switching state	LED, yellow				●	●			●	●			●	●
	Multihole-LED, yellow		●	●			●	●			●	●		
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●	●	●	●	●	●	●	●	●	●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●	●	●	●	●	●	●	●	●
Connection type	Device connector M12 x 1 , 4-pin		●	●							●	●		
	Device connector M8 x 1 , 3-pin						●	●						
	cable PVC , 2 m				●	●			●	●			●	●
Core cross-section	0.14 mm^2				●	●			●	●			●	●
Housing material	brass				●									
	brass, nickel-plated		●	●		●	●	●	●	●	●	●	●	●
Protection degree	IP67		●	●	●	●	●	●	●	●	●	●	●	●

Accessories

BF 8	Mounting flange, 8 mm
EXG-08	Quick mounting bracket with dead stop
V3-GM	Female connector, M8, 3-pin, field attachable
V1-G	4-pin, M12 female field-attachable connector
V1-W	4-pin, M12 female field-attachable connector
V3-WM	Female connector, M8, 3-pin, field attachable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

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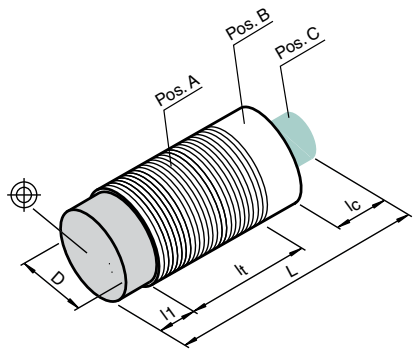
Non-contact detection of metal objects

- Basic series
- 2 mm flush
- 4 mm flush
- 4 mm non-flush
- Increased operating distance
- Extended temperature range

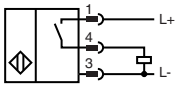
Dimensions



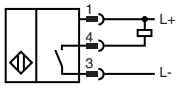
Model Number	NBB2-12GM50-E0	NBB2-12GM50-E2	NBB2-12GM50-E0-V1	NBB2-12GM50-E2-V1	NBB4-12GM50-E0	NBB4-12GM50-E2	NBB4-12GM50-E0-V1	NBB4-12GM50-E2-V1	NBN4-12GM50-E0	NBN4-12GM50-E0-V1	NBN4-12GM50-E2	NBN4-12GM50-E2-V1
Length L [mm]	50	50	65	65	50	50	65	65	50	65	50	65
Diameter D [mm]	12											
Thread length l_t [mm]	50				47	47	49	49	42	45	42	45
Cap length l_1 [mm]	0								5			
Connector area l_c [mm]	0		6		0		6		0	6	0	6
LED position Pos.	C											

Electrical connection

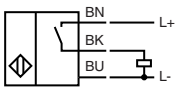
NBB2-12GM50-E2-V1
NBB4-12GM50-E2-V1
NBN4-12GM50-E2-V1



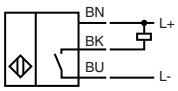
NBB2-12GM50-E0-V1
NBB4-12GM50-E0-V1
NBN4-12GM50-E0-V1

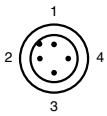


NBB2-12GM50-E2
NBB4-12GM50-E2
NBN4-12GM50-E2



NBB2-12GM50-E0
NBB4-12GM50-E0
NBN4-12GM50-E0





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2012-11-12

Technical data

Model Number			NBB2-12GM50-E0	NBB2-12GM50-E2	NBB2-12GM50-E0-V1	NBB2-12GM50-E2-V1	NBB4-12GM50-E0	NBB4-12GM50-E2	NBB4-12GM50-E0-V1	NBB4-12GM50-E2-V1	NBN4-12GM50-E0	NBN4-12GM50-E0-V1	NBN4-12GM50-E2	NBN4-12GM50-E2-V1
Switching element function	NPN	NO	●		●		●		●		●	●		
	PNP NO							●		●				
	PNP	NO		●		●							●	●
Rated operating distance	2 mm		●	●	●	●								
	4 mm						●	●	●	●	●	●	●	●
Installation	flush		●	●	●	●	●	●	●	●				
	non-flush										●	●	●	●
Output polarity	DC		●	●	●	●	●	●	●	●	●	●	●	●
Assured operating distance	0 ... 1.62 mm		●	●	●									
	0 ... 1.62 mm (-25 ... 70 °C (-13 ... 158 °F)) 0 ... 1.52 mm (-40 ... -25 °C (-40 ... -13 °F))					●								
	0 ... 3.24 mm						●	●	●		●	●	●	●
	0 ... 3.24 mm (-25 ... 70 °C (-13 ... 158 °F)) 0 ... 3.04 mm (-40 ... -25 °C (-40 ... -13 °F))									●				
Operating voltage	10 ... 30 V		●	●	●	●	●	●	●	●	●	●	●	●
Switching frequency	0 ... 1200 Hz										●	●	●	●
	0 ... 1500 Hz		●	●	●	●								
	0 ... 800 Hz						●	●	●	●				
Hysteresis	typ. 5%						●	●	●	●				
Reverse polarity protection	reverse polarity protected		●	●	●	●	●	●	●	●	●	●	●	●
Short-circuit protection	pulsing		●	●	●	●	●	●	●	●	●	●	●	●
Voltage drop	≤ 3 V		●	●	●	●	●	●	●	●	●	●	●	●
Operating current	0 ... 200 mA		●	●	●	●	●	●	●	●	●	●	●	●
Off-state current	0 ... 0.5 mA typ. 0.1 µA		●		●									
	0 ... 0.5 mA typ. 0.1 µA at 25 °C			●		●	●	●	●	●	●	●	●	●
No-load supply current	≤ 15 mA						●	●	●	●				
	≤ 17 mA		●	●	●	●					●	●	●	●
Indication of the switching state	LED, yellow		●	●			●	●			●		●	
	Multihole-LED, yellow				●	●			●	●		●		●
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●	●	●	●	●	●	●	●	●	●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●		●	●	●		●	●	●	●
	-40 ... 70 °C (-40 ... 158 °F)					●				●				
Connection type	Device connector M12 x 1 , 4-pin				●	●			●	●		●		●
	cable PVC , 2 m		●	●			●	●			●		●	
Cable version	3 x 0.14 mm²							●						
Core cross-section	0.14 mm²		●	●			●	●			●		●	
Housing material	brass, nickel-plated		●	●	●	●	●	●	●	●	●	●	●	●
Protection degree	IP67		●	●	●	●	●	●	●	●	●	●	●	●
Scope of delivery	2 self locking nuts in scope of delivery		●	●	●	●	●	●	●	●	●	●	●	●

Accessories

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop
V1-G	4-pin, M12 female field-attachable connector
V1-W	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Date of issue 2012-11-12

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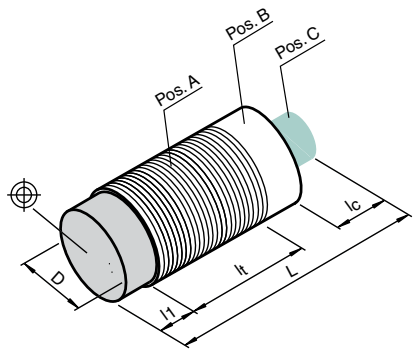
PEPPERL+FUCHS SENSING YOUR NEEDS

Non-contact detection of metal objects

- Basic series
- 5 mm flush
- 8 mm flush
- 8 mm non-flush
- Increased operating distance
- Extended temperature range

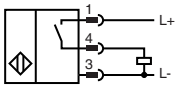
Dimensions



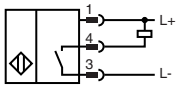
Model Number	NBB5-18GM50-E0	NBB5-18GM50-E2	NBB5-18GM50-E0-V1	NBB5-18GM50-E2-V1	NBB8-18GM50-E0	NBB8-18GM50-E2	NBB8-18GM50-E0-V1	NBB8-18GM50-E2-V1	NBN8-18GM50-E0	NBN8-18GM50-E2	NBN8-18GM50-E0-V1	NBN8-18GM50-E2-V1
Length L [mm]	50		65		50		65		50		65	
Diameter D [mm]	18											
Thread length l_t [mm]	47		50		47		50		37		40	
Cap length l_1 [mm]	0								10			
Connector area l_c [mm]	0		15		0		15		0		15	
LED position Pos.	C											

Electrical connection

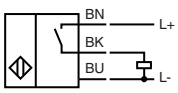
NBB5-18GM50-E2-V1
NBB8-18GM50-E2-V1
NBN8-18GM50-E2-V1



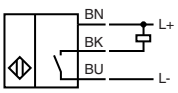
NBB5-18GM50-E0-V1
NBB8-18GM50-E0-V1
NBN8-18GM50-E0-V1

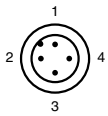


NBB5-18GM50-E2
NBB8-18GM50-E2
NBN8-18GM50-E2



NBB5-18GM50-E0
NBB8-18GM50-E0
NBN8-18GM50-E0





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2012-11-12

Technical data

Model Number			NBB5-18GM50-E0	NBB5-18GM50-E2	NBB5-18GM50-E0-V1	NBB5-18GM50-E2-V1	NBB8-18GM50-E0	NBB8-18GM50-E2	NBB8-18GM50-E0-V1	NBB8-18GM50-E2-V1	NBN8-18GM50-E0	NBN8-18GM50-E2	NBN8-18GM50-E0-V1	NBN8-18GM50-E2-V1
Switching element function	NPN	NO	●		●		●		●		●		●	
	PNP	NO		●		●		●		●		●		●
Rated operating distance	5 mm		●	●	●	●								
	8 mm						●	●	●	●	●	●	●	●
Installation	flush		●	●	●	●	●	●	●	●				
	non-flush										●	●	●	●
Output polarity	DC		●	●	●	●	●	●	●	●	●	●	●	●
Assured operating distance	0 ... 4.05 mm		●	●	●									
	0 ... 4.05 mm (-25 ... 70 °C (-13 ... 158 °F)) 0 ... 3.8 mm (-40 ... -25 °C (-40 ... -13 °F))					●								
	0 ... 6.48 mm						●	●	●		●	●	●	
	0 ... 6.48 mm (-25 ... 70 °C (-13 ... 158 °F)) 0 ... 6.08 mm (-40 ... -25 °C (-40 ... -13 °F))									●				●
Operating voltage	10 ... 30 V		●	●	●	●	●	●	●	●	●	●	●	●
Switching frequency	0 ... 500 Hz						●	●	●	●	●	●	●	●
	0 ... 800 Hz		●	●	●	●								
Hysteresis	typ. 5%			●	●	●		●	●	●	●	●	●	●
	typ. 5 %						●							
Reverse polarity protection	reverse polarity protected		●	●	●	●	●	●	●	●	●	●	●	●
Short-circuit protection	pulsing		●	●	●	●	●	●	●	●	●	●	●	●
Voltage drop	≤ 3 V		●	●	●	●	●	●	●	●	●	●	●	●
Operating current	0 ... 200 mA		●	●	●	●	●	●	●	●	●	●	●	●
Off-state current	0 ... 0.5 mA typ. 0.1 µA at 25 °C		●	●	●	●	●	●	●	●	●	●	●	●
No-load supply current	≤ 15 mA						●	●	●	●				
	≤ 18 mA										●	●	●	●
	≤ 20 mA		●	●	●	●								
Indication of the switching state	LED, yellow						●	●						
	Multihole-LED, yellow				●	●			●	●			●	●
	all direction LED, yellow		●	●							●	●		
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007		●	●	●	●	●	●	●	●	●	●	●	●
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●	●	●	●	●	●	●	●	●	●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●		●	●	●		●	●	●	
	-40 ... 70 °C (-40 ... 158 °F)					●				●				●
Connection type	Device connector M12 x 1 , 4-pin				●	●			●	●			●	●
	cable PVC , 2 m		●	●			●	●			●	●		
Core cross-section	0.34 mm^2		●	●			●				●	●	●	
Housing material	brass, nickel-plated		●	●	●	●	●	●	●	●	●	●	●	●
Protection degree	IP67		●	●	●	●	●	●	●	●	●	●	●	●

Accessories

BF 18	Mounting flange, 18 mm
V1-W	4-pin, M12 female field-attachable connector
V1-G	4-pin, M12 female field-attachable connector
EXG-18	Quick mounting bracket with dead stop
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

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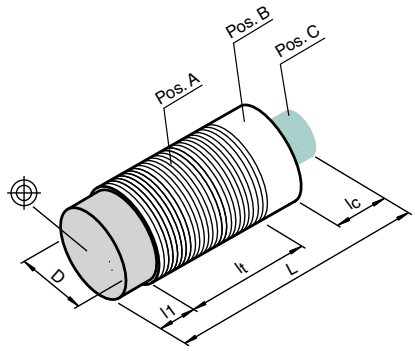
Non-contact detection of metal objects

- Basic series
- 10 mm flush
- 15 mm flush
- 15 mm non-flush
- Increased operating distance
- Extended temperature range

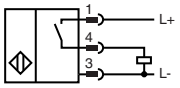
Dimensions



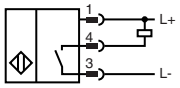
Model Number	NBB10-30GM50-E0	NBB10-30GM50-E2	NBB10-30GM50-E0-V1	NBB10-30GM50-E2-V1	NBB15-30GM50-E0	NBB15-30GM50-E2	NBB15-30GM50-E0-V1	NBB15-30GM50-E2-V1	NBN15-30GM50-E0	NBN15-30GM50-E2	NBN15-30GM50-E0-V1	NBN15-30GM50-E2-V1
Length L [mm]	50		65		50		65		50		65	
Diameter D [mm]	30											
Thread length l_t [mm]	50				47		50		32			
Cap length l_1 [mm]	0								18			
Connector area l_c [mm]	0		15		0		15		0		15	
LED position Pos.	C											

Electrical connection

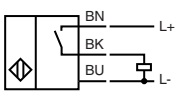
NBB10-30GM50-E2-V1
NBB15-30GM50-E2-V1
NBN15-30GM50-E2-V1



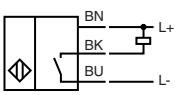
NBB10-30GM50-E0-V1
NBB15-30GM50-E0-V1
NBN15-30GM50-E0-V1

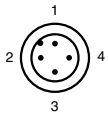


NBB10-30GM50-E2
NBB15-30GM50-E2
NBN15-30GM50-E2



NBB10-30GM50-E0
NBB15-30GM50-E0
NBN15-30GM50-E0





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2012-11-12

Technical data

Model Number			NBB10-30GM50-E0	NBB10-30GM50-E2	NBB10-30GM50-E0-V1	NBB10-30GM50-E2-V1	NBB15-30GM50-E0	NBB15-30GM50-E2	NBB15-30GM50-E0-V1	NBB15-30GM50-E2-V1	NBN15-30GM50-E0	NBN15-30GM50-E2	NBN15-30GM50-E0-V1	NBN15-30GM50-E2-V1
Switching element function	NPN	NO	●		●		●		●		●		●	
	PNP	NO		●		●		●		●		●		●
Rated operating distance	10 mm		●	●	●	●								
	15 mm						●	●	●	●	●	●	●	●
Installation	flush		●	●	●	●	●	●	●	●				
	non-flush										●	●	●	●
Output polarity	DC		●	●	●	●	●	●	●	●	●	●	●	●
Assured operating distance	0 ... 12.15 mm						●	●	●		●	●	●	
	0 ... 12.15 mm (-25 ... 70 °C (-13 ... 158 °F)) 0 ... 11.4 mm (-40 ... -25 °C (-40 ... -13 °F))									●				●
	0 ... 8.1 mm		●	●	●									
	0 ... 8.1 mm (-25 ... 70 °C (-13 ... 158 °F)) 0 ... 7.6 mm (-40 ... -25 °C (-40 ... -13 °F))					●								
Operating voltage	10 ... 30 V		●	●	●	●	●	●	●	●	●	●	●	●
Switching frequency	0 ... 200 Hz		●	●	●	●	●	●	●	●	●	●	●	●
Hysteresis	typ. 5%		●	●	●	●	●	●	●	●	●	●	●	●
Reverse polarity protection	reverse polarity protected		●	●	●	●	●	●	●	●	●	●	●	●
Short-circuit protection	pulsing		●	●	●	●	●	●	●	●	●	●	●	●
Voltage drop	≤ 3 V		●	●	●	●	●	●	●	●	●	●	●	●
Operating current	0 ... 200 mA		●	●	●	●	●	●	●	●	●	●	●	●
Off-state current	≤ 10 µA		●											
	0 ... 0.5 mA typ. 0.1 µA at 25 °C			●	●	●	●	●	●	●	●	●	●	●
No-load supply current	≤ 15 mA						●	●	●	●	●	●		
	≤ 20 mA		●	●	●	●							●	●
Indication of the switching state	Multihole-LED, yellow				●	●			●	●			●	●
	all direction LED, yellow		●	●			●	●			●	●		
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●	●	●	●	●	●	●	●	●	●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●		●	●	●		●	●	●	
	-40 ... 70 °C (-40 ... 158 °F)					●				●				●
Connection type	Device connector M12 x 1 , 4-pin				●	●			●	●			●	●
	cable PVC , 2 m		●	●			●	●			●	●		
Core cross-section	0.34 mm²		●	●			●	●			●	●		
Housing material	brass, nickel-plated		●	●	●	●	●	●	●	●	●	●	●	●
Protection degree	IP67		●	●	●	●	●	●	●	●	●	●	●	●

Accessories

BF 30	Mounting flange, 30 mm
EXG-30	Quick mounting bracket with dead stop
V1-G	4-pin, M12 female field-attachable connector
V1-W	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

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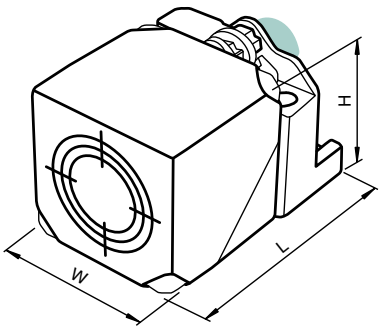
PEPPERL+FUCHS SENSING YOUR NEEDS

Inductive compact sensors for non-contact detection of metallic objects

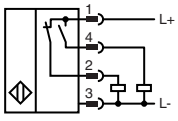
- 4-wire DC
- 4-way LED indicator
- 20 mm flush
- 40 mm non-flush

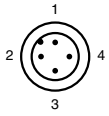
Dimensions



Model Number	NBB20-L2M-A2-V1	NBN40-L2M-A2-V1
Length L [mm]	67	
Width W [mm]	40	
Height H [mm]	40	

Electrical connection





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2012-11-12

Technical data

Model Number		NBB20-L2M-A2-V1	NBN40-L2M-A2-V1
Switching element function	PNP NO/NC	●	●
Rated operating distance	20 mm	●	
	40 mm		●
Installation	flush	●	
	non-flush		●
Output polarity	DC	●	●
Assured operating distance	0 ... 16.2 mm	●	
	0 ... 32.4 mm		●
Operating voltage	10 ... 30 V DC	●	●
Switching frequency	0 ... 100 Hz		●
	0 ... 150 Hz	●	
Hysteresis	typ. 5 %	●	●
Reverse polarity protection	reverse polarity protected	●	●
Short-circuit protection	pulsing	●	●
Voltage drop	≤ 2 V	●	●
Operating current	0 ... 200 mA	●	●
Off-state current	0 ... 0.5 mA	●	●
No-load supply current	≤ 20 mA	●	●
Operating voltage display	LED, green	●	●
Indication of the switching state	LED, yellow	●	●
$MTTF_d$	1230 a	●	●
Mission Time (T_M)	20 a	●	●
Diagnostic Coverage (DC)	0 %	●	●
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)	●	●
Connection type	Device connector M12 x 1 , 4-pin	●	●
Housing material	PA-GF35 metal base Xylan coated metal mounting flange Xylan coated.	●	●
Protection degree	IP69K	●	●
Mass	155 g	●	

Accessories

V1-G	4-pin, M12 female field-attachable connector
V1-W	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid

Date of issue 2012-11-12

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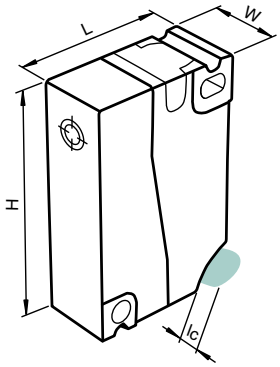
PEPPERL+FUCHS SENSING YOUR NEEDS

Non-contact detection of metal objects

- 4 mm flush
- 3-wire DC

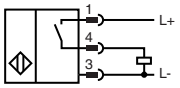
Dimensions



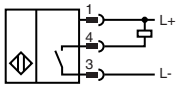
Model Number	NBB4-F1-E0	NBB4-F1-E2	NBB4-F1-E0-V3	NBB4-F1-E2-V3
Length L [mm]	26			
Width W [mm]	12			
Height H [mm]	40			
Connector area l_c [mm]	0		9	

Electrical connection

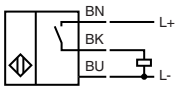
NBB4-F1-E2-V3



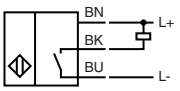
NBB4-F1-E0-V3



NBB4-F1-E2



NBB4-F1-E0



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

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Technical data

Model Number			NBB4-F1-E0	NBB4-F1-E2	NBB4-F1-E0-V3	NBB4-F1-E2-V3
Switching element function	NPN	NO	●		●	
	PNP	NO		●		●
Rated operating distance	4 mm		●	●	●	●
Installation	flush		●	●	●	●
Output polarity	DC		●	●	●	●
Assured operating distance	0 ... 3.24 mm		●	●	●	●
Operating voltage	10 ... 30 V DC		●	●	●	●
Switching frequency	0 ... 1400 Hz		●	●	●	●
Hysteresis	typ. 5%		●	●	●	●
Reverse polarity protection	reverse polarity protected		●	●	●	●
Short-circuit protection	pulsing		●	●	●	●
Voltage drop	≤ 2.5 V		●	●	●	●
Operating current	0 ... 250 mA		●	●	●	●
Off-state current	0 ... 0.01 mA typ. 0.1 µA at 25 °C		●	●	●	●
No-load supply current	≤ 15 mA		●	●	●	●
Indication of the switching state	LED, yellow		●	●	●	●
$MTTF_d$	1530 a		●		●	
	1640 a			●		●
Mission Time (T_M)	20 a		●	●	●	●
Diagnostic Coverage (DC)	0 %		●	●	●	●
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007		●	●	●	●
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●	●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●
Connection type	Device connector M8 x 1 , 3-pin				●	●
	cable PVC , 2 m		●	●		
Core cross-section	0.5 mm^2		●	●		
Housing material	PA		●	●	●	●
Protection degree	IP67		●	●	●	●

Accessories

V3-WM	Female connector, M8, 3-pin, field attachable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-GM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

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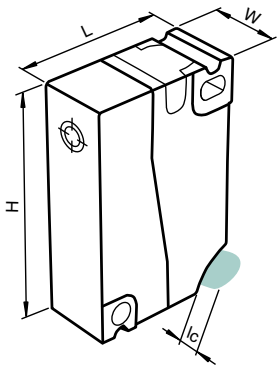
Non-contact detection of metal objects

- 8 mm non-flush
- 3-wire DC

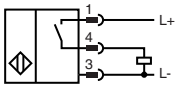
Dimensions



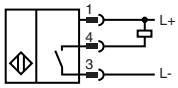
Model Number	NBN8-F1-E0	NBN8-F1-E2	NBN8-F1-E2-V3	NBN8-F1-E0-V3
Length L [mm]	26			
Width W [mm]	12			
Height H [mm]	40			
Connector area l_c [mm]	0		9	

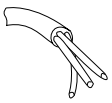
Electrical connection

NBN8-F1-E2-V3

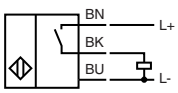


NBN8-F1-E0-V3

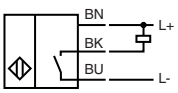




NBN8-F1-E2



NBN8-F1-E0



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

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Technical data

Model Number			NBN8-F1-E0	NBN8-F1-E2	NBN8-F1-E2-V3	NBN8-F1-E0-V3
Switching element function	NPN	NO	●			●
	PNP	NO		●	●	
Rated operating distance	8 mm		●	●	●	●
Installation	non-flush		●	●	●	●
Output polarity	DC		●	●	●	●
Assured operating distance	0 ... 6.48 mm		●	●	●	●
Operating voltage	10 ... 30 V DC		●	●	●	●
Switching frequency	0 ... 1400 Hz		●	●	●	●
Hysteresis	typ. 5%		●	●	●	●
Reverse polarity protection	reverse polarity protected		●	●	●	●
Short-circuit protection	pulsing		●	●	●	●
Voltage drop	≤ 2.5 V		●	●	●	●
Operating current	0 ... 250 mA		●	●	●	●
Off-state current	0 ... 0.01 mA typ. 0.1 µA at 25 °C		●	●	●	●
No-load supply current	≤ 15 mA		●	●	●	●
Indication of the switching state	LED, yellow		●	●	●	●
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●	●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●
Connection type	Device connector M8 x 1 , 3-pin				●	●
	cable PVC , 2 m		●	●		
Core cross-section	0.5 mm^2		●	●		
Housing material	PA		●	●	●	●
Protection degree	IP67		●	●	●	●

Accessories

V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

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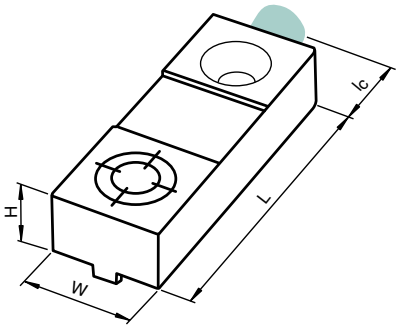
Non-contact detection of metal objects

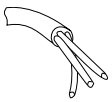
- 4 mm non-flush
- 3-wire DC

Dimensions

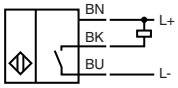


Model Number	NBN4-F29-E0	NBN4-F29-E2
Length L [mm]	27	
Width W [mm]	10	
Height H [mm]	6	
Connector area l_c [mm]	4	

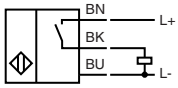
Electrical connection



NBN4-F29-E0



NBN4-F29-E2



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Technical data

Model Number			NBN4-F29-E0	NBN4-F29-E2
Switching element function	NPN	NO	●	
	PNP	NO		●
Rated operating distance	4 mm		●	●
Installation	non-flush		●	●
Output polarity	DC		●	●
Assured operating distance	0 ... 3.24 mm		●	●
Operating voltage	10 ... 30 V DC		●	●
Switching frequency	0 ... 1000 Hz		●	●
Hysteresis	typ. 5 %		●	●
Reverse polarity protection	reverse polarity protected		●	●
Short-circuit protection	pulsing		●	●
Voltage drop	≤ 3 V		●	●
Operating current	0 ... 100 mA		●	●
Off-state current	0 ... 0.5 mA typ. 0.1 µA at 25 °C		●	●
No-load supply current	≤ 10 mA		●	●
Indication of the switching state	LED, yellow		●	●
UL approval	cULus Listed, General Purpose		●	●
CSA approval	cCSAus Listed, General Purpose		●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●
Connection type	cable PVC , 2 m		●	●
Core cross-section	0.14 mm^2		●	●
Housing material	PPS		●	●
Protection degree	IP67		●	●

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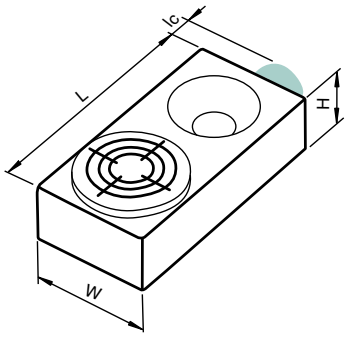
Non-contact detection of metal objects

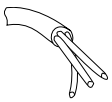
- **Basic series**
- **1.5 mm flush**
- **3-wire DC**

Dimensions

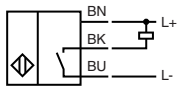


Model Number	NBB1,5-F79-E0	NBB1,5-F79-E2
Length L [mm]	16	
Width W [mm]	8	
Height H [mm]	4	
Cap length l_1 [mm]	0.7	
Connector area l_c [mm]	0	

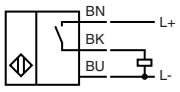
Electrical connection



NBB1,5-F79-E0



NBB1,5-F79-E2



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Technical data

Model Number			NBB1,5-F79-E0	NBB1,5-F79-E2
Switching element function	NPN	NO	●	
	PNP	NO		●
Rated operating distance	1.5 mm		●	●
Installation	flush		●	●
Output polarity	DC		●	●
Assured operating distance	0 ... 1.215 mm		●	●
Operating voltage	5 ... 30 V DC		●	●
Switching frequency	0 ... 1200 Hz		●	●
Hysteresis	typ. 5 %		●	●
Short-circuit protection	pulsing		●	●
Voltage drop	≤ 1.5 V		●	●
Operating current	0 ... 100 mA		●	●
Off-state current	≤ 10 µA		●	●
No-load supply current	≤ 15 mA		●	●
$MTTF_d$	4830 a		●	●
Mission Time (T_M)	20 a		●	●
Diagnostic Coverage (DC)	0 %		●	●
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007		●	●
UL approval	cULus Listed, General Purpose		●	●
CSA approval	cCSAus Listed, General Purpose		●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●
Connection type	flexible leads PVC , 500 mm		●	●
Core cross-section	0.08 mm^2		●	●
Housing material	PA		●	●
Protection degree	IP67		●	●

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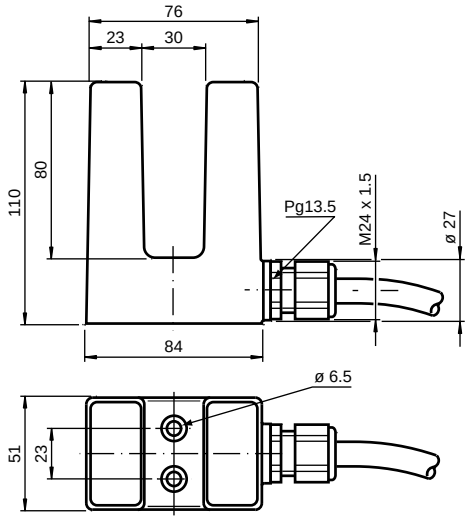
PEPPERL+FUCHS SENSING YOUR NEEDS

Slot initiators for non-contact end position control

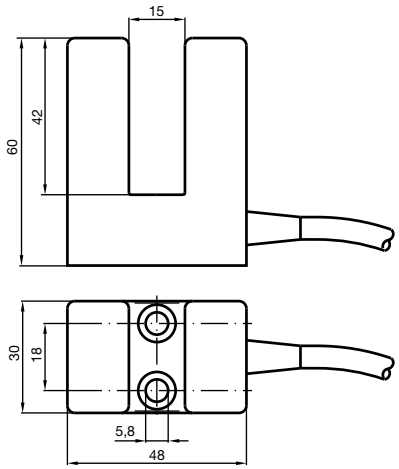
- 15 mm slot width
- 30 mm slot width
- 3-wire DC
- 4-wire DC

Dimensions

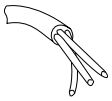
SJ30-A2



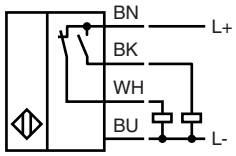
SJ15-A2



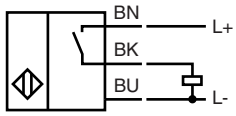
Electrical connection



SJ15-A2
SJ30-A2



SJ15-E2



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Technical data

Model Number			SJ15-E2	SJ15-A2	SJ30-A2
Switching element function	PNP	NO/NC		●	●
	PNP	NO	●		
Slot width	15 mm		●	●	
	30 mm				●
Depth of immersion (lateral)	17 ... 20 mm		●	●	
	27 ... 31 mm				●
Output polarity	DC		●	●	●
Nominal voltage	8 V			●	
Operating voltage	10 ... 30 V DC		●	●	●
Switching frequency	0 ... 150 Hz				●
	0 ... 500 Hz		●	●	
Hysteresis	typ. 5%		●		
Reverse polarity protection	reverse polarity protected		●	●	●
Short-circuit protection	pulsing		●	●	●
Voltage drop	≤ 3 V		●	●	●
Operating current	0 ... 200 mA		●	●	●
No-load supply current	≤ 20 mA		●	●	●
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007		●	●	●
UL approval	cULus Listed, General Purpose		●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●
CCC approval	Products with a maximum operating voltage of ≤ 36 V do not bear a CCC marking because they do not require approval.		●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●
Connection type	cable PVC , 2 m		●	●	●
Core cross-section	0.75 mm^2		●	●	●
Housing material	ABS				●
	PBT		●	●	
Protection degree	IP67		●	●	●

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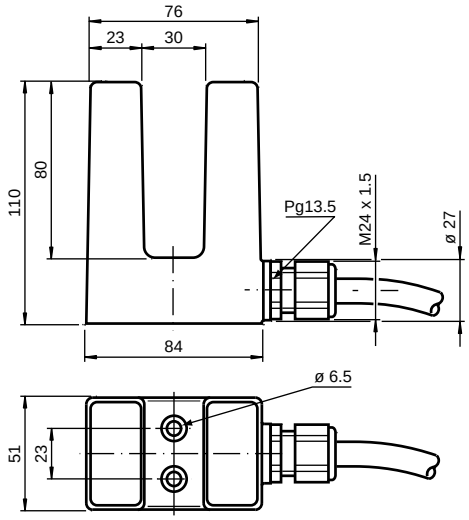
Slot initiators for non-contact end position control

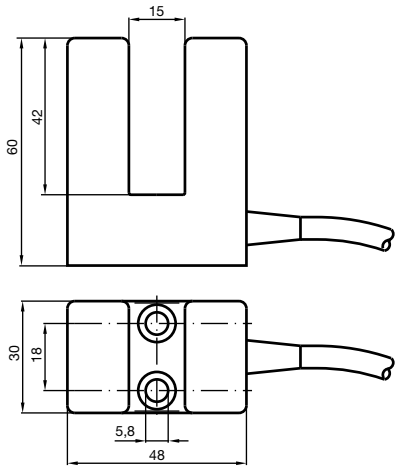
- 2-wire AC
- 15 mm slot width
- 30 mm slot width

Dimensions

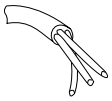
SJ30-WO



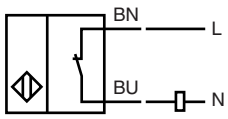
SJ15-WO



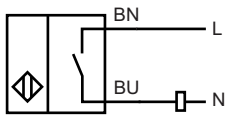
Electrical connection



SJ15-WO



SJ15-WS



Date of issue 2012-11-12

Technical data

Model Number			SJ15-WS	SJ15-WO	SJ30-WS	SJ30-WO
Switching element function	AC	NC		●		●
	AC	NO	●		●	
Slot width	15 mm		●	●		
	30 mm				●	●
Depth of immersion (lateral)	18.5 ... 20.5 mm		●	●		
	27 ... 31 mm				●	●
Output polarity	AC		●	●	●	●
Operating voltage	20 ... 253 V AC		●	●		
	20 ... 253 V AC [1]				●	●
Switching frequency	0 ... 25 Hz		●	●	●	●
Hysteresis	typ. 5%		●	●		
Voltage drop	Typ. 4 V at 40 ... 500 mA load current Typ. 5 V at 15 ... 40 mA load current Typ. 7 V at 5 ... 15 mA load current		●	●		
Momentary current[cr](20 ms, 0.1 Hz)	≤ 4000 mA		●	●		
	0 ... 4000 mA				●	●
Operating current	10 ... 500 mA				●	●
	5 ... 500 mA		●	●		
Off-state current	≤ 2 mA		●	●		
	0.8 ... 2.5 mA				●	●
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007		●	●	●	●
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●		
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●
Connection type	cable PVC , 2 m		●	●	●	●
Core cross-section	0.75 mm^2		●	●	●	●
Housing material	ABS				●	●
	PBT		●	●		
Protection degree	IP67		●	●	●	●
Mass	450 g				●	●
Note	[1] In the temperature range below 0 °C, permissible operating voltage U_b 80...253 V				●	●
	[1] In the temperature range below 0 °C, permissible operating voltage U_b 80...253 V Safety fuse ≤ 2 A (quick-blow) according to IEC 60127-2 Sheet 1 Recommendation: after a short circuit, check that the device is functioning correctly.		●	●		

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Universal sensor system for detecting vehicles

- **Complete control interface for inductive loops laid beneath the surface**
- **Reliable detection with long service life**
- **Various operating modes available**
- **Boost function for increasing sensitivity**
- **Test function**
- **Version with 1 loop channel**

CE

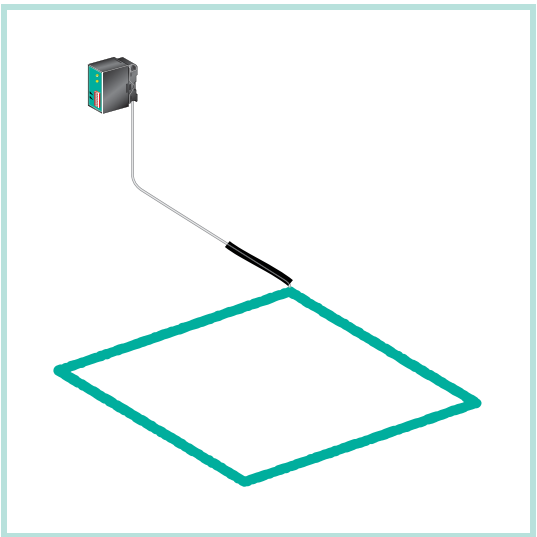
Description

Together with the inductive loops laid beneath the surface, the LC series loop detectors form a universal sensor system for detecting vehicles. People are not detected. Vehicles that enter the inductive loop change the resonant frequency. This frequency change is measured and analyzed by the microprocessor in the LC10 loop detector. The analysis is automatically and periodically adjusted to the respective loop, ensuring that any changes in the loop inductance caused by temperature, humidity or component age are automatically compensated for.

Typische Anwendungsbereiche

- Selective vehicle detection
- Opening impulse sensor for automatic gates and barrier systems
- Presence checks for vehicles
- Controlling traffic light and vehicle detection systems
- Ticket detection in parking garages
- Managing tasks in automatic conveyor systems

Detection area



Date of issue 2012-11-12

Technical data

Model Number		LC10-1-D 24 VDC	LC10-1-D 24 VAC	LC10-1-D 115 VAC	LC10-1-D 230 VAC
Marking	CE	●	●	●	●
Operating mode	Pulsed and continuous signal	●	●	●	●
Controls	DIP-switch	●	●	●	●
Switching state	LED	●	●	●	●
Operating voltage	115 V AC (galvanically isolated from loop)			●	
	230 V AC (galvanically isolated from loop)				●
	24 V AC (galvanically isolated from loop)		●		
	24 V DC (no electrical isolation)	●			
Ripple	-15 %/+10 %	●	●	●	●
Power consumption	1.6 VA	●	●	●	●
Settling time	2 s	●	●	●	●
Loop inductivity	100 ... 1000 µH	●	●	●	●
Loop frequency	20 ... 120 kHz	●	●	●	●
Number of channels	1	●	●	●	●
Output type	relay	●	●	●	●
Switching voltage	250 V AC	●	●	●	●
Switching current	6 A	●	●	●	●
Pulse length	period or 800 ms Pulse	●	●	●	●
Response time	100 ms	●	●	●	●
Ambient temperature	-20 ... 70 °C (-4 ... 158 °F)	●	●	●	●
Storage temperature	-40 ... 70 °C (-40 ... 158 °F)	●	●	●	●
Protection degree	IP30	●	●	●	●
Connection	Plug socket ; 11-pin Terminal connection ≤ 1.5 mm^2	●	●	●	●

Date of issue 2012-11-12

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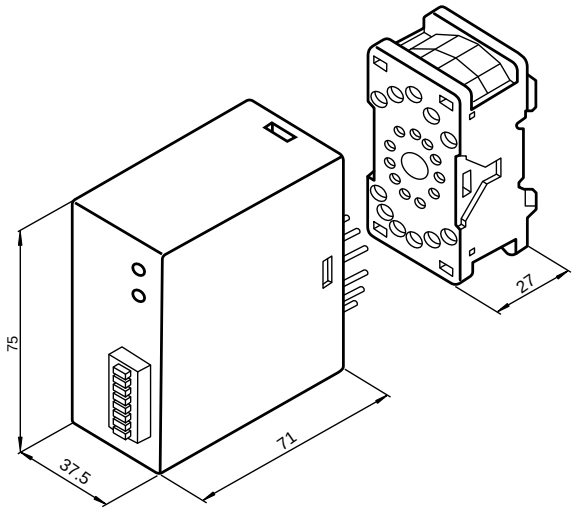
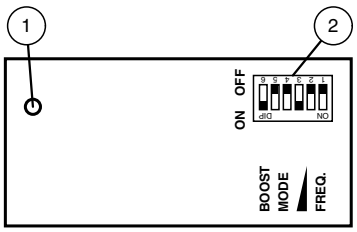
Abmessungen

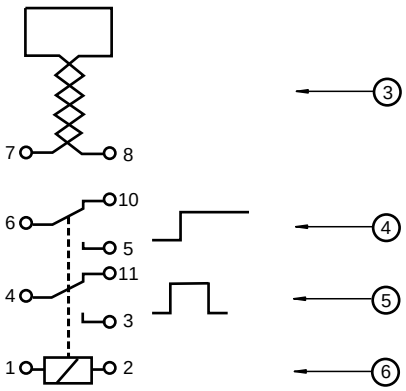


Indicators/operating means



1	LED display
2	DIP switch

Electrical connection



Number	Explanation	Connector terminals
3	Loop connection	7/8
4	Signal output, maintained contact	5/6 = NO 6/10 = NC
5	Signal output, pulse contact	3/4 = NO 4/11 = NC
6	Operating voltage	1/2

Date of issue 2012-11-12

Notes

Functional principle

The loop detectors are control units that are fully functional without the need for any other auxiliary equipment once the power supply and an inductive loop have been connected. The inductive loop laid below the surface forms the inductor of a high-frequency oscillating circuit. The metal parts of a vehicle that enters or is located in this wired loop cause the frequency of the oscillation circuit to change. This frequency change is analyzed by the loop detector, and the outputs, which are zero-potential relay contacts, can switch. The switching outputs are relay contacts with a high switching power that can directly control contactors, valves and alternating current motors.
The dimensions of the detection area can be adjusted by changing the size and shape of the inductive loops.

Settings:

Sensitivity:

The response sensitivity of the loop detector can be set in three stages by switches 3 and 4.

Switch 3	Switch 4	Sensitivity
OFF	ON	low
ON	OFF	medium
ON	ON	high

In the switch position "OFF", "OFF" the loop evaluation is switched off.

Frequency switches:

The loop frequency can be set in four stages using the switches 1 and 2.

Switch 1	Switch 2	Frequency
OFF	OFF	Basic frequency f
ON	OFF	f - 10 %
OFF	ON	f - 15 %
ON	ON	f - 20 %

After actuation of the frequency switches 1 and 2 the loop must be readjusted with switches 3 and 4 set to "OFF", "OFF".

Operating mode switches:

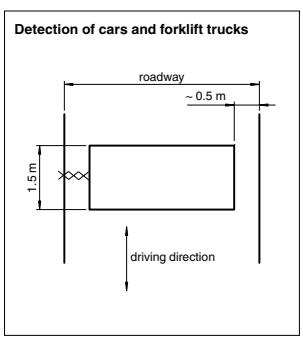
The following operating modes can be set with switches 5 and 6:

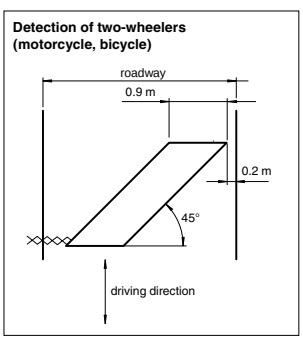
Switch 5	Switch 6	Result
OFF	-	Pulse (0.8 s) when loop is allocated
ON	-	Pulse (0.8 s) when loop is abandoned
-	ON	Increased sensitivity (Boost)

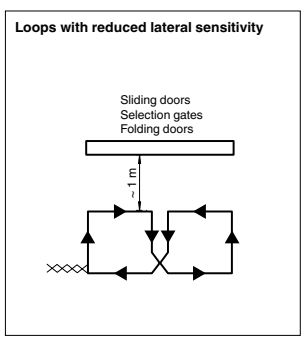
The increased sensitivity (Boost) is used for the detection of vehicles with high body assemblies, e.g. HGVs.

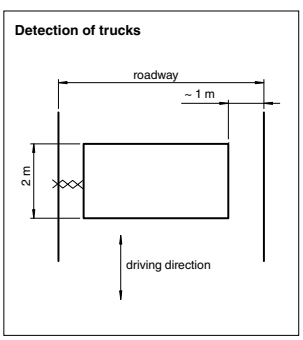
Automatic adjustment:

When the operating voltage is applied to the device automatic adjustment with the loop takes place. The output relays are switched in the switch position "Loop not allocated". The adjustment takes 2 s, the device is then ready for operation.









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Universal sensor system for detecting vehicles

- **Complete control interface for inductive loops laid beneath the surface**
- **Reliable detection with long service life**
- **Boost function for increasing sensitivity**
- **Test function**
- **Version with 2 loop channels**
- **Version with direction detection**

CE

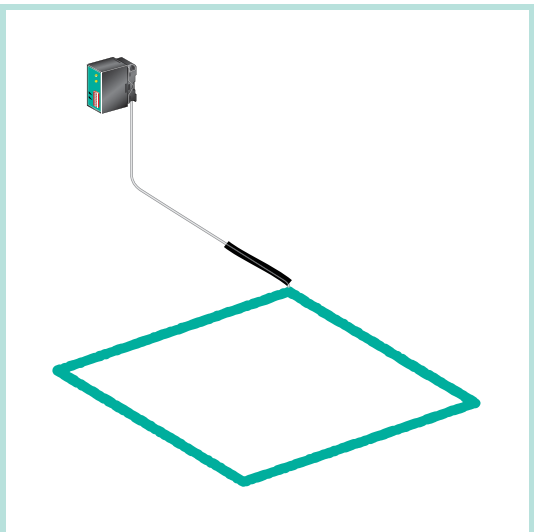
Description

Together with the inductive loops laid beneath the surface, the LC series loop detectors form a universal sensor system for detecting vehicles. People are not detected. Vehicles that enter the inductive loop change the resonant frequency. This frequency change is measured and analyzed by the microprocessor in the LC10 loop detector. The analysis is automatically and periodically adjusted to the respective loop, ensuring that any changes in the loop inductance caused by temperature, humidity or component age are automatically compensated for.

Typische Anwendungsbereiche

- Selective vehicle detection
- Opening impulse sensor for automatic gates and barrier systems
- Presence checks for vehicles
- Direction-specific vehicle checks
- Controlling traffic light and vehicle detection systems
- Ticket detection in parking garages
- Managing tasks in automatic conveyor systems

Detection area



Date of issue 2012-11-12

Technical data

Model Number		LC10-2-D 24VDC	LC10-2-D 24 VAC	LC10-2-D 115 VAC	LC10-2-D 230 VAC
Marking	CE	●	●	●	●
Operating mode	Continuous signal / Direction detection	●	●	●	●
Controls	DIP-switch	●	●	●	●
Switching state	LED	●	●	●	●
Operating voltage	115 V AC (galvanically isolated from loop)			●	
	230 V AC (galvanically isolated from loop)				●
	24 V AC (galvanically isolated from loop)		●		
	24 V DC (no electrical isolation)	●			
Ripple	-15 %/+10 %	●	●	●	●
Power consumption	2.2 VA	●	●	●	●
Settling time	2 s	●	●	●	●
Loop inductivity	100 ... 1000 µH	●	●	●	●
Loop frequency	20 ... 120 kHz	●	●	●	●
Number of channels	2	●	●	●	●
Output type	relay	●	●	●	●
Switching voltage	250 V AC	●	●	●	●
Switching current	6 A	●	●	●	●
Pulse length	period	●	●	●	●
Response time	200 ms	●	●	●	●
Ambient temperature	-20 ... 70 °C (-4 ... 158 °F)	●	●	●	●
Storage temperature	-40 ... 70 °C (-40 ... 158 °F)	●	●	●	●
Protection degree	IP30	●	●	●	●
Connection	Plug socket ; 11-pin Terminal connection ≤ 1.5 mm^2	●	●	●	●

Date of issue 2012-11-12

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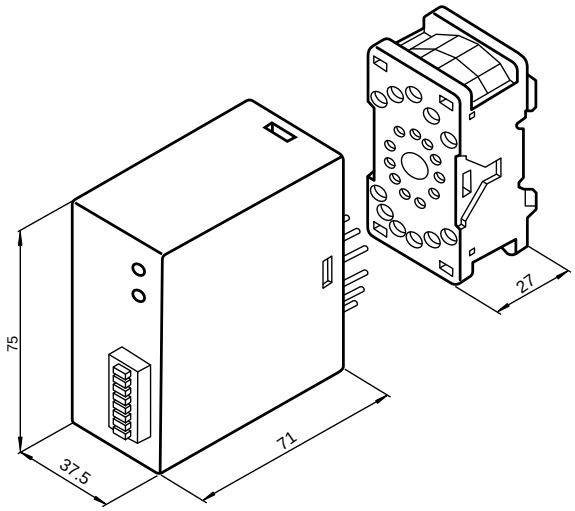
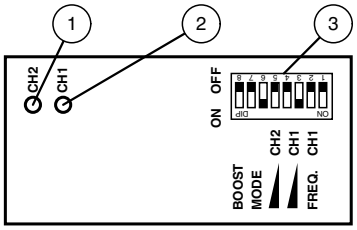
Abmessungen

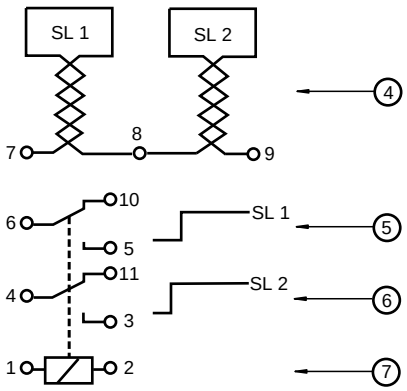


Indicators/operating means



1	LED indicator loop 2
2	LED indicator loop 1
3	DIP switch

Electrical connection



Number	Explanation	Connector terminals
4	Loop connection, Loops 1/2	7/8 = Loop 1 8/9 = Loop 2
5	Signal output, Loop 1	5/6 = NO 6/10 = NC
6	Signal output, Loop 2	3/4 = NO 4/11 = NC
7	Operating voltage	1/2

Date of issue 2012-11-12

Notes

Functional principle

The loop detectors are control units that are fully functional without the need for any other auxiliary equipment once the power supply and an inductive loop have been connected. The inductive loop laid below the surface forms the inductor of a high-frequency oscillating circuit. The metal parts of a vehicle that enters or is located in this wired loop cause the frequency of the oscillation circuit to change. This frequency change is analyzed by the loop detector, and the outputs, which are zero-potential relay contacts, can switch. The switching outputs are relay contacts with a high switching power that can directly control contactors, valves and alternating current motors.
The dimensions of the detection area can be adjusted by changing the size and shape of the inductive loops.

Settings:

Sensitivity:

The response sensitivity of the loop detector can be set in three stages using switches 3 and 4 (for loop 1) and switches 5 and 6 (for loop 2).

Switch 3 or 5	Switch 4 or 6	Sensitivity
OFF	ON	low
ON	OFF	medium
ON	ON	high

In the switch position "OFF", "OFF" the loop evaluation is switched off.

Frequency switch:

The loop frequency for loop 1 can be set in four stages using the switches 1 and 2.

Switch 1	Switch 2	Frequency
OFF	OFF	Basic frequency f
ON	OFF	f - 10 %
OFF	ON	f - 15 %
ON	ON	f - 20 %

After actuation of the frequency switches 1 and 2 the loop must be readjusted with switches 3 and 4 set to "OFF", "OFF".

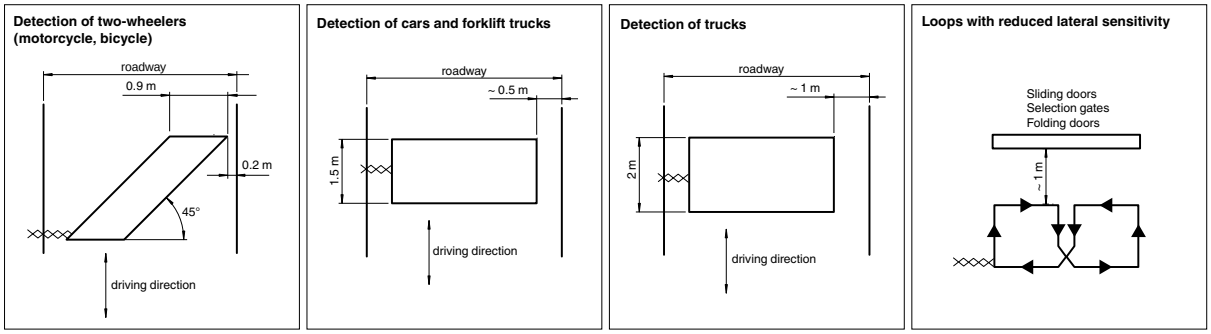
Operating mode switch:

The following operating modes can be set with switches 7 and 8:

Switch 7	Switch 8	Result
OFF	-	Output of the loop allocation status
ON	-	Direction detection*
-	ON	Increased sensitivity (Boost)

* A signal is output, depending on the allocation sequence of the loops. If loop 1 is allocated before loop 2, only one switch signal is output for loop 1. The signal output for loop 2 remains inhibited until both loops are free again. If loop 2 is allocated before 1, only one switch signal is output for loop 2. The signal output for loop 1 remains inhibited until both loops are free again.

The increased sensitivity (Boost) is used for the detection of vehicles with high body assemblies, e.g. HGVs.



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3.1 Ultrasonic Sensors 275

Ultrasonic Sensors

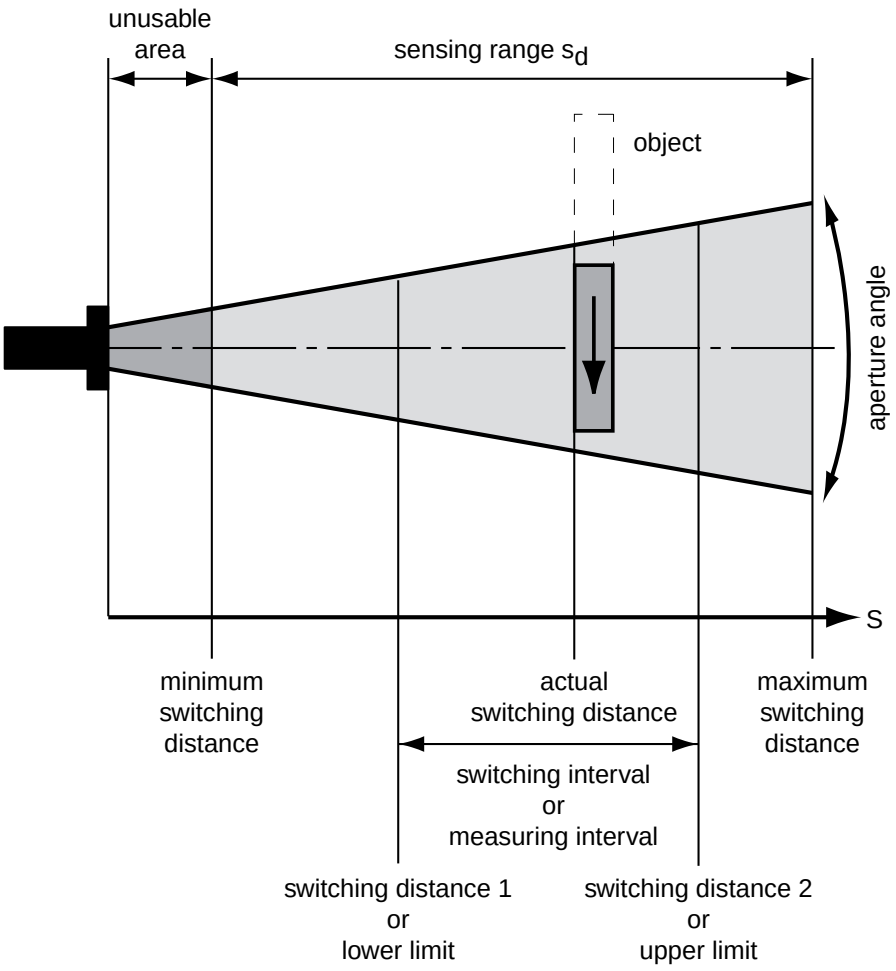
Ultrasonic sensors represent the ideal solution for carrying out non-contact position and distance measurements in all industrial areas where environmental influences such as dust, smoke or steam can have an impact on the sensors. Regardless of the surface and color, objects made from many different materials can be detected within a range accurate to the millimeter.

During this process, the sensor emits acoustic pulses at extremely high frequencies that cannot be heard by the human hear, and uses these pulses as information carriers. The time taken for the sound to pass between the sensor and the object is the measurement used to determine the distance and/or position. Pepperl+Fuchs ultrasonic sensors operate using a piezoelectric transducer as both the emitter and receiver of the acoustic signals. A patented decoupling layer in special material is used to decouple the ultrasonics to the air.

Detection range

The active area of the ultrasonic sensor is known as the detection range and is limited by the shortest and longest operating distance. The longest operating distance is included in the model number.

The ultrasonic sensor detects objects within its detection range, regardless of whether they approach axially or move sideways in the sound beam.



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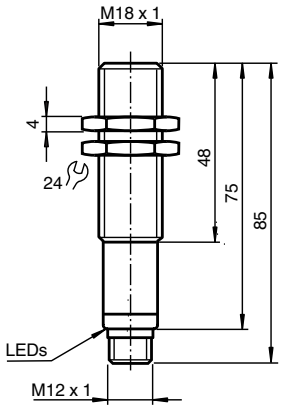
M18 ultrasonic sensor for measuring distance in entry systems for rail vehicles

- Selectable sound lobe width
- Program input
- Synchronization options
- Deactivation option
- Temperature compensation
- Very small unusable area
- Analog output 0 ... 10 V
- Switch output
- Measuring window adjustable
- 5 different output functions can be set

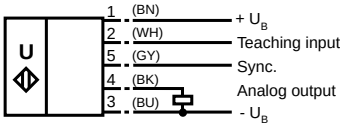
Dimensions



Electrical connection

UB500-18GM75-U-V15

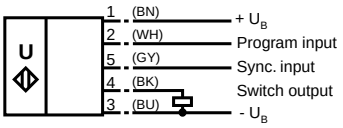
Standard symbol/Connections:
(version U)



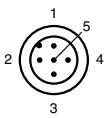
Core colours in accordance with EN 60947-5-2.

UB500-18GM75-E5-V15

Standard symbol/Connections:
(version E5, pnp)



Wire colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 2012-11-12

Technical data

Model Number		UB500-18GM75-E5-V15	UB500-18GM75-U-V15
Sensing range	30 ... 500 mm	●	●
Adjustment range	50 ... 500 mm	●	●
Unusable area	0 ... 30 mm	●	●
Standard target plate	100 mm x 100 mm	●	●
Transducer frequency	approx. 380 kHz	●	●
Response delay	approx. 50 ms	●	●
LED yellow	solid yellow: object in the evaluation range yellow, flashing: program function, object detected		●
	indication of the switching state flashing: program function object detected	●	
LED red	solid red: Error; red, flashing: program function, object not detected	●	●
Operating voltage	10 ... 30 V DC , ripple 10 $\%_{SS}$	●	
	15 ... 30 V DC , ripple 10 $\%_{SS}$		●
No-load supply current	≤ 50 mA	●	●
Synchronization	1 synchronous connection, bi-directional 0-level: -U_B...+1 V; 1-level: +4 V...+U_B input impedance: > 12 kΩ synchronization pulse: ≥ 100 µs, synchronization interpulse period: ≥ 2 ms	●	●
Common mode operation	≤ 95 Hz	●	●
Multiplex operation	≤ 95 Hz /n, n = number of sensors	●	●
Input type	1 program input, operating range 1: -U_B ... +1 V, operating range 2: +4 V ... +U_B input impedance: > 4.7 kΩ; program pulse: ≥ 1 s	●	
	1 program input lower evaluation limit A1: -U_B ... +1 V, upper evaluation limit A2: +4 V ... +U_B ; input impedance: > 4.7 kΩ, pulse duration: ≥ 1 s		●
Output type	1 analog output 0 ... 10 V		●
	1 switch output PNP Normally open/closed , programmable	●	
Rated operational current	200 mA , short-circuit/overload protected	●	
Voltage drop	≤ 3 V	●	
Resolution	0.11 mm at max. sensing range		●
Deviation of the characteristic curve	± 1 % of full-scale value		●
Repeat accuracy	≤ 1 %	●	
	± 0.1 % of full-scale value		●
Switching frequency	max. 8 Hz	●	
Range hysteresis	1 % of the set operating distance	●	
Load impedance	> 1 kOhm		●
Temperature influence	± 1.5 % of full-scale value	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)	●	●
Connection type	Device connector M12 x 1 , 5-pin	●	●
Protection degree	IP65	●	●
Housing	brass, nickel-plated	●	●
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT	●	●
Mass	60 g	●	●

Accessories

UB-PROG2	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
UVW90-K18	Ultrasonic -deflector
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

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4. Analog measuring systems / Positioning Systems

Introduction to analog measuring systems 278

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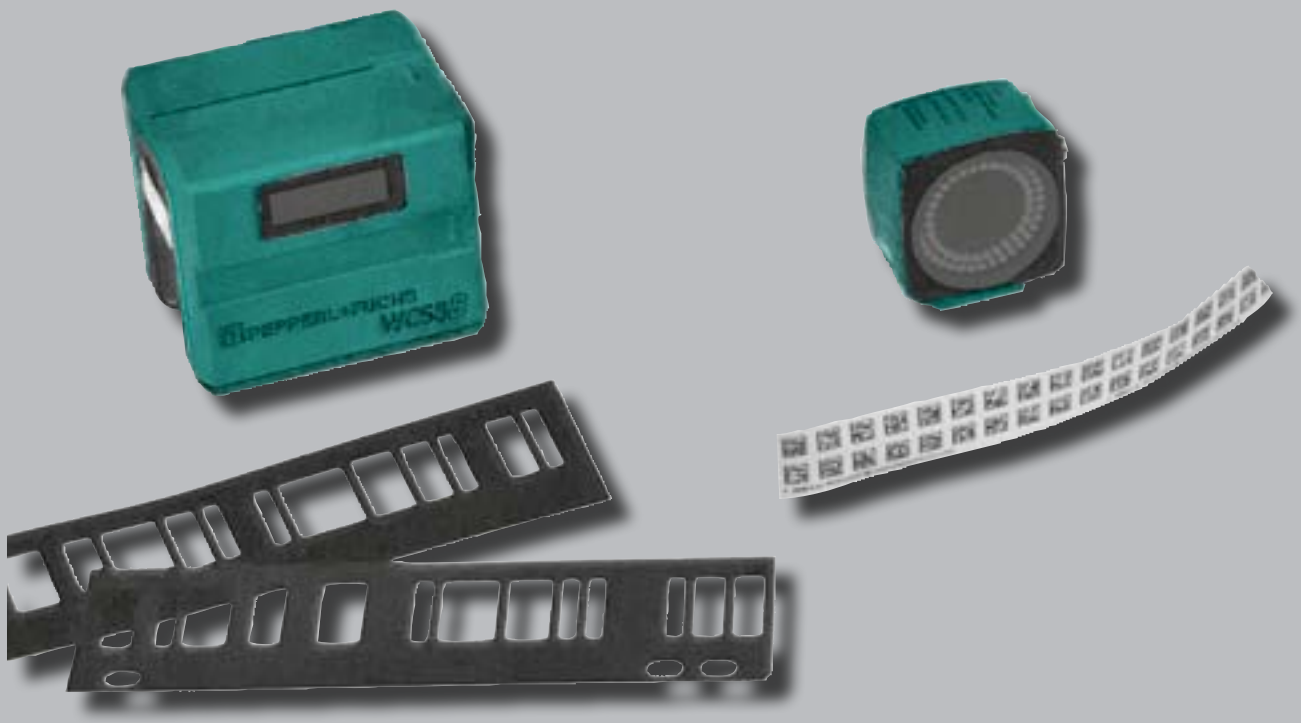
4.2 Data Matrix Positioning System PCV 281



Position encoding system WCS and PCV

Position encoding system WCS

The automation of material handling systems requires information about the moving vehicle or forklift truck that is accurate to the millimeter. The position encoding system WCS by Pepperl+Fuchs provides the operator with a reliable and proven positioning system. The WCS combines two important characteristics: noncontact technology and absolute positioning. You need just two components for positioning within your application–the read head and the code rail.

The read head

The U-shaped read head is used for noncontact optical scanning of the code rail. This enables the position encoding system to detect a new position value every 0.8 mm. Position values are determined regardless of temperature fluctuations and in real time, even at high travel speeds. The read heads have an internal light intensity regulation function. This allows the position value to be determined accurately even in harsh ambient conditions.

The mounting base is a special mechanical head support that enables the read head to be installed quickly. No adjustments are necessary.

The data is transferred directly from the read head to the control unit via a serial RS485, SSI, or CANopen interface. A wide range of interface modules are available for connecting to bus systems, such as PROFIBUS DP, PROFINET RT, MODBUS/RTU, DeviceNet, or Interbus S.

The code rail

The code rail–which carries absolute path information–is positioned parallel to the travel path and assigns a clear and exactly reproducible position at each point of the travel path. In addition to branches and curves, it is also possible to install the code rail only where positioning is required. Bracketry is available for quickly mounting the code rail, which is supplied in stainless steel or laminated plastic.

Intelligence on rails: precise, flexible, noncontact, and absolute position feedback!

Outstanding features ...

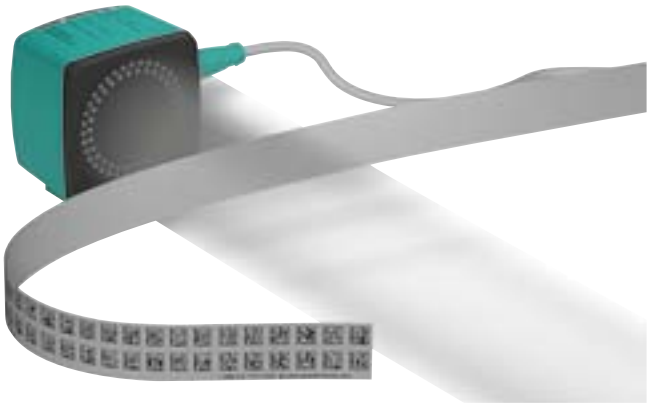
- *Absolute measuring type*
- *No reference points*
- *Variable path lengths up to 325 m*
- *Noncontact*
- *Resolution = 0.8 mm*
- *Suitable for curved paths*
- *Protected against power failure*
- *Speed up to 12 m/s*
- *Easy to maintain*

Data Matrix positioning system PCV

The Data Matrix positioning system uses individual Data Matrix codes arranged beside and above one another in the form of a code reel that serves as an information carrier. The PCV read head uses modern camera technology to detect codes two-dimensionally, which are then decoded and finally output as an exact position in an X and Y direction.

The data bits of the Data Matrix code are divided into two dimensions and provide a high degree of data density over a small surface area.

The PCV read head and the Data Matrix code reel together are suitable for a wide range of positioning tasks in all applications. The unique code reel is available in lengths of up to 10 km and is ideal for use in material handling, the automotive industry, elevator technology, and general machine construction. Several Data Matrix code lines on the reel can also be used to evaluate the vertical position. Benefit from the many years of practical experience that Pepperl+Fuchs has acquired in the area of Data Matrix technology and position detection.



Always in focus: the read head unit with power illumination and two-row Data Matrix code reel

Benefits

- *Positioning along two axes*
- *High mechanical robustness, no moving parts*
- *Long service life as no laser diodes are used*
- *Insensitive to dirt and damage to the code reel*
- *Consistent laying of the code reel*
- *Extremely narrow code reel*
- *Small read field enables the smallest curve radii and inclines*
- *Event markers for generating control signals*
- *DC output and input signals can be activated at freely selectable positions*
- *Camera parameterization using a PC or code cards*

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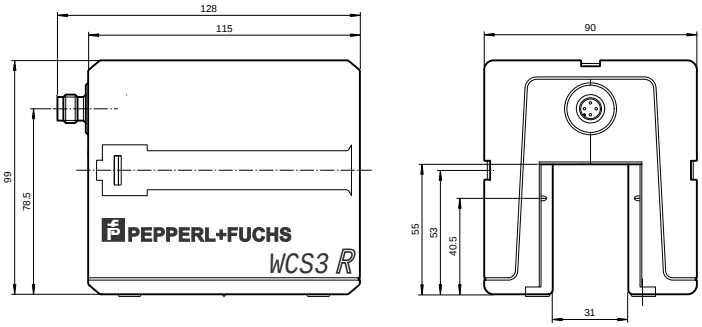
Non-contact, absolute position detection system

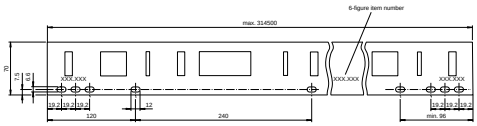
- Flexible installation by means of alu profile- or mounting bracket system
- Non-contact, absolute position encoder
- Automatic detection of dirt accumulation
- High mechanical stability
- Output of position and speed
- Suitable for applications with wide temperature variations
- Optimized for all control and elevator systems
- Slip-free system
- No reference run required
- Quick mounting
- RS 422 interface
- High resolution

Dimensions

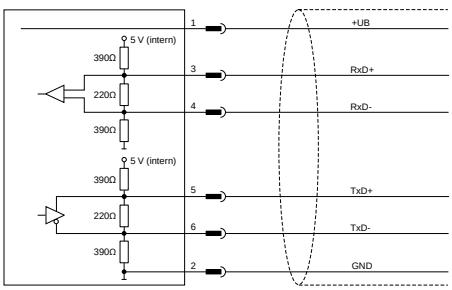
WCS3R-LS24A



WCS3-CS70-M1



Electrical connection



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Technical data

Model Number		WCS3R-LS24A	WCS3-CS70-M1
Passage speed	≤ 2.2 m/s	●	
Measuring range	max. 100 m	●	
Length	0.1 ... 314.5 m		●
Radius of bend	≥ 300 mm		●
Free tolerances to code rail	horizontal: 31 mm (± 15.5 mm) vertical: 28 mm (± 14 mm)	●	
Resolution	± 1 mm	●	
Operating display	LED green: power on	●	
Data flow display	LED yellow: data communication active	●	
Error display	LED red flashing: read head outside of code rail solid on: internal diagnostic test failed	●	
Operating voltage	10 ... 30 V DC	●	
Power consumption	2 VA	●	
Interface type	RS 422	●	
Data output code	binary code	●	
Protocol	see protocol description	●	
Transfer rate	Baud rate 19.2 kBit/s	●	
Emitted interference	DIN EN 61000-6-4 , DIN EN 12015	●	
Noise immunity	DIN EN 61000-6-2 , DIN EN 12016	●	
Shock resistance	DIN EN 60068-2-27, half sine 30 g, 18 ms	●	
Vibration resistance	DIN EN 60068-2-6, sine, 5 g, 10 - 2000 Hz, 10 cycles	●	
CSA approval	cCSAus Certified, General Purpose Class 2 power source	●	
CCC approval	Products with a maximum operating voltage of ≤ 36 V do not bear a CCC marking because they do not require approval.	●	
Operating temperature	0 ... 60 °C (32 ... 140 °F) [cr]	●	
	-40 ... 100 °C (-40 ... 212 °F)		●
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)	●	
Relative humidity	90 % , noncondensing	●	
Connection type	8-pin, M12 x 1 connector	●	
Material thickness	0.5 mm		●
Tension loading	≤ 5000 N		●
Protection degree	IP54	●	
Material	stainless steel 1.4310 / AISI 301		●
Housing	ABS , PC (Polycarbonate)	●	
Thermal expansion coefficient	1.6 x 10^{-5} / K		●
Mass	240 g / m		●
	500 g	●	
Ordering information	Mounting plate included with delivery	●	

Accessories

WCS-MT1	Tensioning device for stainless steel code rail
WCS-MB-R1	Mounting bracket
WCS-MB-R2	Guide bracket
WCS-HP-R	Read head protection
WCS-MT-R	Retainer
WCS-MP1	Mounting plate for reading heads WCS2 and WCS3

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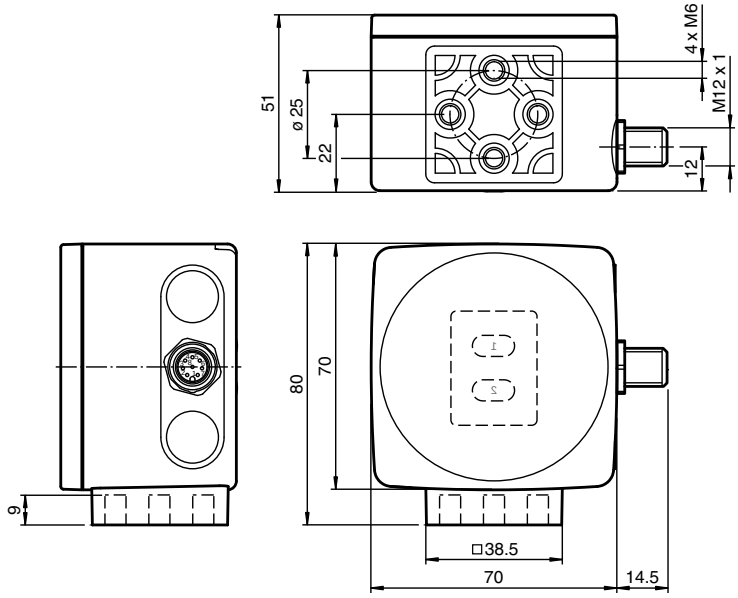
Reliable position detection system with 2D code tape and the latest camera technology

- RS 485 interface
- Non-contact positioning on Data Matrix code strip
- Travel ranges up to 10 km, in X and Y direction
- Mechanically rugged: no wearing parts, long operating life, maintenance-free
- High chemical resistance
- High resolution and precise positioning, especially for facilities with curves and switch points as well as inclines and declines.
- Low weight
- Self-adhesive mounting
- High temperature resistance
- High mechanical stability

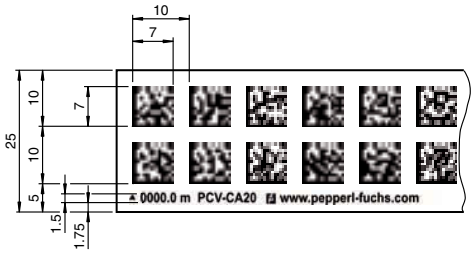
CE

Dimensions

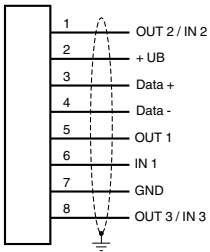
PCV80-F200-R4-V19



PCV100M-CA20-0



Electrical connection



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Technical data

Model Number		PCV80-F200-R4-V19	PCV100M-CA20-0
Passage speed	≤ 12.5 m/s	●	
Measuring range	max. 10000 m	●	
Start position	0 m		●
Length	100 m		●
External diameter	180 mm		●
Inside diameter	76 mm (role core)		●
Light type	Integrated LED lightning (red)	●	
Read distance	80 mm	●	
Depth of focus	± 15 mm	●	
Reading field	40 mm x 25 mm	●	
Ambient light limit	100000 Lux	●	
Resolution	± 0.1 mm	●	
Type	CMOS , Global shutter	●	
Clock pulse frequency	600 MHz	●	
Speed of computation	4800 MIPS	●	
LED indicator	7 LEDs (communication, alignment aid, status information)	●	
Operating voltage	15 ... 30 V DC , PELV	●	
No-load supply current	max. 200 mA	●	
Power consumption	3 W	●	
Interface type	RS 485 interface	●	
Data output code	binary code	●	
Transfer rate	38400 ... 230400 Bit/s	●	
Termination	Switchable terminal resistor	●	
Query cycle time	≥10 ms	●	
Input type	1 to 3 functional inputs , programmable	●	
Output type	1 to 3 switch outputs , PNP , programmable , short-circuit protected	●	
Switching voltage	Operating voltage	●	
Switching current	150 mA each output	●	
Operating temperature	0 ... 60 °C (32 ... 140 °F) , -20 ... 60 °C (-4 ... 140 °F) (noncondensing; prevent icing on the lens!)	●	
	-40 ... 150 °C (-40 ... 302 °F)		●
Relative humidity	90 % , noncondensing	●	
Connection type	8-pin, M12 x 1 connector	●	
Material thickness	150 µm		●
Housing width	70 mm	●	
Housing height	70 mm	●	
Housing depth	50 mm	●	
Protection degree	IP67	●	
Material	polyester laminate		●
Housing	PC/ABS	●	
Surface	polyester , matte		●
Mass	approx. 160 g	●	
	6.3 g / m		●
Tensile strength	≥ 150 N		●
Adhesive	Acrylate-based adhesive ; curing 72 h		●
Adhesive strength	Average values (FTM2) aluminum : 24 N / 25 mm'; High grade stainless steel : 25 N / 25 mm ABS : 22 N / 25 mm; PP : 18 N / 25 mm; HD-PE : 12 N / 25 mm; LD-PE : 12 N / 25 mm		●

Accessories

PCV-USB-RS485-Converter Set	USB to RS 485 interface converter
PCV-KBL-V19-STR-RS485	Cable unit with power supply for USB / RS 485 interface converter
V19-G-ABG-PG9	Cable socket, M12, 8-pin, shielded, non pre-wired
V19-G-ABG-PG9-FE	Cable socket, M12, 8-pin, shielded, non pre-wired
PCV-SC12	Grounding clip for PCV system
PCV Parameterization Tool	Configuration software for PCV Data Matrix positioning system

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SENSING YOUR NEEDS

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5.2 Absolute Rotary Encoders 303

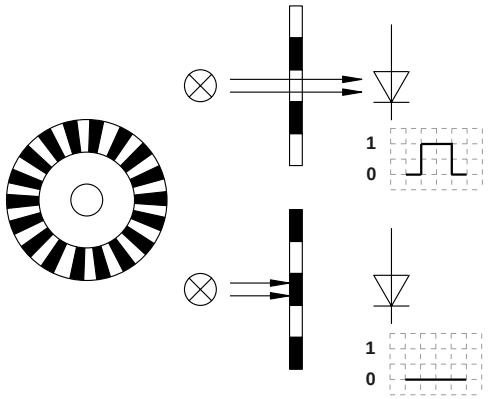
Technology and Functional Principle

Rotary encoders are used in automation technology as sensors for angles, positions, speed, and acceleration. Spindles, gear racks, measuring wheels, or cable pulls can also be used to detect linear movements.

They convert the actual value of a mechanical movement into electric signals that can be evaluated by counters, tachometers, PLCs, and industrial PCs.

Transparent and nontransparent fields are applied to a plastic or glass pane.

Placing a light source on one side of the pane and a light receiver on the other enables rotation to be detected in a noncontact manner. If the light beam hits a transparent field, the receiver circuit detects a pulse. However, if the path of the beam is interrupted by a dark field, no pulse is triggered. LEDs that emit light in the infrared range are usually used as the light source. Photo diodes or photo transistors are used as the receiver.



If no further functions are added to this principle, the device simply detects that the disk is rotating. It is not possible to specify the direction of rotation or even an absolute position.

Rotary encoders differ in terms of their functional principle, mechanical design, and mounting.

1. Different Functional Principles

1.1 Incremental rotary encoders

Incremental rotary encoders provide a defined number of pulses per shaft revolution.

The speed of a movement is determined by measuring the period duration or counting the pulses per time unit. If you add together the pulses from a reference point, the counted value represents a measurement for the angle passed or the distance traveled.

Two-channel rotary encoders–with 90° phase-shifted output signals–enable the downstream electronics to determine the direction of rotation of the shaft and thereby also enable bidirectional positioning tasks.

Three-channel incremental rotary encoders issue a zero signal once per revolution.

1.2 Absolute rotary encoders

Absolute rotary encoders output a uniquely coded numerical value at each shaft position.

For positioning applications in particular, absolute rotary encoders perform the counting tasks instead of the subsequent electronics, eliminating the need for complex and expensive input components. Furthermore, reference runs do not need to be performed when switching the machine on or if the supply voltage fails, because the current position value is available immediately.

Singleturn absolute rotary encoders divide one shaft revolution into a defined number of measuring steps. The maximum resolution is 16 bits, i.e., up to 65,536 different positions.

Multiturn absolute rotary encoders do not just detect angular positions within a revolution, they also detect the number of revolutions using a multistage gear. The resolution of the multiturn part is up to 14 bits, i.e., up to 16,384 revolutions can be identified. This results in a total resolution of 30 bits or a total of 1,073,741,824 measuring steps.

Parallel absolute rotary encoders transfer the position value to the evaluation electronics in parallel over several lines.

In the case of serial absolute rotary encoders, the output data is issued via standard interfaces and standardized protocols. Point-to-point connections were often used in the past to perform a data transfer, whereas nowadays fieldbus systems are increasingly used.

Singleturn

In the case of singleturn absolute rotary encoders, one encoder revolution (360°) is divided into a maximum of 65,536 measuring steps (16 bits). After each complete revolution, encryption commences once more at the start value. The encoder electronics do not recognize how many revolutions have been completed.

Multiturn

In addition to the encrypted disk that is used with singleturn, a gear is also integrated for multiturn absolute rotary encoders. This gear is specified and encrypted in such a way that up to 16,384 revolutions (14 bits) can be detected. The total resolution is 16 bits (singleturn resolution) in addition to 14 bits (multiturn resolution), equating to 30 bits. Due to the high number of measuring steps (over one billion), this type of encoder can also divide very long linear distances into small measuring steps.

2. Different Designs and Mounting

2.1 Rotary encoders with solid shaft

These rotary encoders are fitted with a solid shaft. The rotary encoder is connected to the drive shaft via an additional coupling. The coupling connects both shafts mechanically and compensates the axle offset.

Straps, pinions, measuring wheels, and cable pulls can also be used to connect a rotary encoder to the driving shaft.

Generally, attention must be paid to the permissible shaft load. Depending on the coupling type, there are different levels of risk of destroying the measuring device due to radial and/or axial forces that are too strong.

2.2 Hollow shaft rotary encoders

The rotary encoder shaft for this design has either a thru-hole or a blind hole (rotary encoder with recessed hollow shaft).

The rotary encoder and drive can be connected easily via the integrated shaft and hub connection.

Hollow shaft rotary encoders have an integrated or attached torque rest that compensates an axle offset of the rotary encoder and drive. Coupling is unnecessary in this case.

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Small-scale solid shaft rotary encoder for precise detection of rotational speed and positioning

- **Compact design**
- **Up to 1024 ppr**
- **4.75 V ... 30 V with short-circuit proof push-pull output**
- **RS 422 functionality at 5 V operation**
- **Loadable metal disk**
- **Tangential cable outlet**

Description

The TVI40 continues the new economical target line of Pepperl+Fuchs. With a small outside diameter of 40 mm, the unit is ideal for use in industrial areas where very little space is available.
The technology of the rotary encoder is adapted to the new requirements of the rotary encoder market. Innovative fast technology with Opto-ASIC forms the central basis of the device. The rotary encoder is available with a pulse count of up to 1024 pulses per revolution.
The rotary encoder is equipped with a metal disk that can accept a high load. It provides the ideal combination of non-sensitivity to temperature and high resolution.
The appearance of this rotary encoder is the tangential cable outlet. This ensures a buckling-free, carefully laying of the connection cable in tangential, radial or axial manner.

Order code

T	V	I	4	0	N	–	.	.	T	K	.	T	6	T	N	–	.	.	.	.	.

Pulse numbers
25, 50, 100, 200, 360, 400
500, 1000, 1024

Signal output
6 $A+B+\overline{0}$ und $\overline{A}+\overline{B}+\overline{0}$

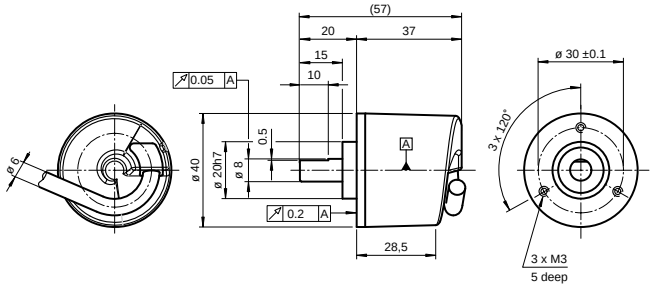
Exit position
T tangential

Connection type
K0 Cable Ø6 mm, 8 x 0.128 mm^2, 0.5 m
K2 Cable Ø6 mm, 8 x 0.128 mm^2, 2 m

Flange version
T Clamping flange

Shaft dimensions
09 Shaft Ø8 mm x 15 mm
14 Shaft Ø6 mm x 15 mm
17 Shaft Ø1/4" x 15 mm
19 Shaft Ø1/8" mm x 15 mm

Dimensions



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Technical data

Model Number		TVI40N
Detection type	photoelectric sampling	●
Pulse count	max. 1024	●
Operating voltage	4.75 ... 30 V DC 5 V DC for RS 422	●
No-load supply current	max. 55 mA	●
Output type	push-pull, incremental (RS 422, incremental)	●
Voltage drop	≤ 2.5 V (< 2.5 V)	●
Load current	max. per channel 30 mA , short-circuit protected (max. per channel 20 mA, conditionally short-circuit proof)	●
Output frequency	max. 100 kHz (max. 100 kHz)	●
Rise time	980 ns (225 ns)	●
De-energized delay	980 ns (225 ns)	●
Cable	Ø6 mm, 8 x 0.128 mm^2, 0.5 m	●
Protection degree	DIN EN 60529, IP54	●
Climatic testing	DIN EN 60068-2-3, no moisture condensation	●
Emitted interference	EN 61000-6-4:2007	●
Noise immunity	EN 61000-6-2:2005	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 6 ms	●
Vibration resistance	DIN EN 60068-2-6, 10 *g*, 10 ... 2000 Hz	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●
Nickel disk	-10 ... 70 °C (14 ... 158 °F)	●
Nickel disk	-25 ... 85 °C (-13 ... 185 °F)	●
Housing	Polycarbonate	●
Flange	3.1645 aluminum	●
Shaft	Stainless steel 1.4305 / AISI 303	●
Mass	approx. 180 g	●
Rotational speed	max. 6000 min^{-1}	●
Moment of inertia	≤ 4.3 gcm^2	●
Starting torque	≤ 0.2 Ncm	●
Axial	max. 20 N	●
Radial	max. 30 N	●
Life span	≥ 2 x 10^9 revolutions (max. shaft loading)	●
Length L [mm]	42	●
Diameter D [mm]	40	●

Accessories

9401 6*6	Spring steel coupling
9401 6*10	Spring steel coupling
9401 8*10	Spring steel coupling
9401 8*8	Spring steel coupling
9402 6*6	Spring steel coupling
9402 8*8	Spring steel coupling
9404 6*6	Spring disk coupling
9409 6*10	Bellows coupling
9409 6*6	Bellows coupling
9409 6*8	Bellows coupling
9409 8*8	Bellows coupling
9410 6*6	Precision coupling

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PEPPERL+FUCHS SENSING YOUR NEEDS

Small-scale solid shaft rotary encoder for precise detection of rotational speed and positioning

- **Sturdy and compact design**
- **Up to 1024 ppr**
- **4.75 V ... 30 V with short-circuit proof push-pull output**
- **RS 422 functionality at 5 V operation**
- **Loadable metal disk**

Description

The TVI50 is the starting point for the new economical target line of Pepperl+Fuchs. With a small outside diameter of 50 mm, the unit is ideal for use in industrial areas where little space is available.
The technology of the rotary encoder is adapted to the new requirements of the rotary encoder market. Innovative fast technology with Opto-ASIC forms the central basis of the device. The rotary encoder is available with a pulse count of up to 1024 pulses per revolution.
The rotary encoder is equipped with a metal disk that can accept a high load. It provides the ideal combination of non-sensitivity to temperature and high resolution.

Order code

TVI50N-...K...6TN-....

Pulse numbers
50, 100, 200, 360, 400, 500, 1000, 1024

Signal output
6 $\bar{A}+B+0$ and $\bar{A}+\bar{B}+\bar{0}$

Exit position
A axial
R radial

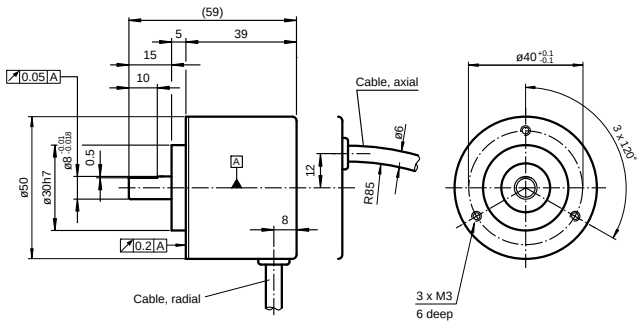
Connection type
K0 Cable Ø6 mm, 8 x 0.128 mm², 0.5 m
K2 Cable Ø6 mm, 8 x 0.128 mm², 2 m

Flange version
B Clamping flange
U Square flange 2"
W Servo flange 2" (4)
X Servo flange 2" (3)

Shaft dimensions
09 Shaft Ø8 mm x 15 mm
24 Shaft Ø1/4" x 19 mm
25 Shaft Ø1/8" x 19 mm
26 Shaft Ø3/8" x 19 mm

Housing material
N Aluminum, IP40
T Aluminum, IP54

Dimensions



Clamping flange

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Technical data

Model Number		TVI50N-09BK0**T
Detection type	photoelectric sampling	●
Pulse count	max. 1024	●
Operating voltage	4.75 ... 30 V DC 5 V DC for RS 422	●
No-load supply current	max. 55 mA	●
Output type	push-pull, incremental (RS 422, incremental)	●
Voltage drop	≤ 2.5 V (< 2.5 V)	●
Load current	max. per channel 30 mA , short-circuit protected (max. per channel 20 mA, conditionally short-circuit proof)	●
Output frequency	max. 100 kHz (max. 100 kHz)	●
Rise time	980 ns (225 ns)	●
De-energized delay	980 ns (225 ns)	●
Cable	Ø6 mm, 8 x 0.128 mm^2, 0.5 m	●
Protection degree	DIN EN 60529, IP40, IP54	●
Climatic testing	DIN EN 60068-2-3, no moisture condensation	●
Emitted interference	EN 61000-6-4:2007	●
Noise immunity	EN 61000-6-2:2005	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 6 ms	●
Vibration resistance	DIN EN 60068-2-6, 10 *g*, 10 ... 2000 Hz	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●
Nickel disk	-10 ... 70 °C (14 ... 158 °F)	●
Nickel disk	-40 ... 80 °C (-40 ... 176 °F)	●
Housing	aluminium, blank	●
Flange	3.1645 aluminum	●
Shaft	Stainless steel 1.4305 / AISI 303	●
Mass	approx. 220 g	●
Rotational speed	max. 6000 min^{-1}	●
Moment of inertia	≤ 5 gcm^2	●
Starting torque	≤ 0.5 Ncm	●
Axial	20 N	●
Radial	40 N	●
Length L [mm]	44	●
Diameter D [mm]	50	●

Accessories

9401 8*10	Spring steel coupling
9401 8*8	Spring steel coupling
9402 8*8	Spring steel coupling
9409 8*8	Bellows coupling
KW-8/10	Helical coupling
KW-8/8	Helical coupling
9101, 8	Measurement wheel
9102, 8	Measurement wheel
9103, 8	Measurement wheel
9108, 8	Measurement wheel
9109, 8	Measurement wheel
9110, 8	Measurement wheel

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PEPPERL+FUCHS SENSING YOUR NEEDS

Recessed hollow shaft rotary encoder for high-quality rotational speed control and precise positioning

- Up to 5000 ppr
- Industrial standard housing Ø58 mm
- Servo or clamping flange
- 10 V ... 30 V with short-circuit proof push-pull output
- 5 V with RS-422 interface
- 10 V ... 30 V with RS 422 interface

Description

Compatibility says it all for this incremental rotary encoder.
All six output channels are fitted for this incremental rotary encoder. It can thus be used universally in many different applications.
Focussing on the designs that are most often required has allowed us to offer rapid availability at an attractive price.
The pulse disk is designed in plastic up to 1500 pulses. Beyond that, glass is used.
This incremental rotary encoder is available either in clamping flange design with a shaft 10 mm in diameter x 20 mm or in servo flange design with a shaft 6 mm in diameter x 10 mm.
The electrical connection is made by a 12-pin round plug connector. It is also possible to obtain a version with a cable connector.

Order code

RVI58N-.....6...-....

Pulse numbers
1024, 2048, 2500, 4096, 5000, 8192, 10000, 20000, 50000

Option
N normal
T extended temperature range, -40 °C

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

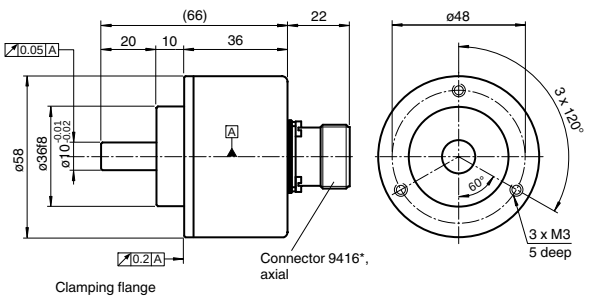
Signal output
6 $A + B + 0$ and $\overline{A} + \overline{B} + \overline{0}$

Exit position
A axial
R radial

Connection type
AA Connector type 9416, 12-pin
AB Connector type 9416L, 12-pin
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm², 1 m

Shaft dimensions/flange versio
011 Shaft Ø10 mm x 20 mm with clamping flange
032 Shaft Ø6 mm x 10 mm with servo flange
044 Shaft Ø10 mm x 20 mm (flattening 1 mm x 20 mm) with clamping flange

Dimensions



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Technical data

Model Number		RVI58N-*******1	RVI58N-*******6	RVI58N-*******X
Detection type	photoelectric sampling	●	●	●
Pulse count	max. 5000	●	●	●
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
No-load supply current	max. 50 mA			●
	max. 60 mA	●		
	max. 70 mA		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Voltage drop	< 3 V	●		
Load current	max. per channel 20 mA , conditionally short-circuit proof		●	
	max. per channel 20 mA , conditionally short-circuit proof (not with U_b), reverse polarity protected			●
	max. per channel 40 mA , short-circuit protected, reverse polarity protected	●		
Output frequency	max. 200 kHz	●	●	●
Rise time	100 ns		●	●
	400 ns	●		
Connector	type 9416, 12-pin, type 9416L, 12-pin	●	●	●
Cable	Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m	●	●	●
Protection degree	DIN EN 60529, IP65	●	●	●
Climatic testing	DIN EN 60068-2-78 , no moisture condensation	●	●	●
Emitted interference	EN 61000-6-4:2007	●	●	●
Noise immunity	EN 61000-6-2:2005	●	●	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 3 ms	●	●	●
Vibration resistance	DIN EN 60068-2-6, 10 *g*, 10 ... 2000 Hz	●	●	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Glass disk	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F) , fixed cable	●	●	●
Plastic disk	-5 ... 60 °C (23 ... 140 °F) , movable cable -20 ... 60 °C (-4 ... 140 °F) , fixed cable	●	●	●
Glass disk	-40 ... 85 °C (-40 ... 185 °F)	●	●	●
Plastic disk	-40 ... 70 °C (-40 ... 158 °F)	●	●	●
Housing	powder coated aluminum	●	●	●
Flange	3.1645 aluminum	●	●	●
Shaft	Stainless steel 1.4305 / AISI 303	●	●	●
Mass	approx. 350 g	●	●	●
Rotational speed	max. 12000 min^{-1}	●	●	●
Moment of inertia	≤ 25 gcm^2	●	●	●
Starting torque	≤ 1.5 Ncm	●	●	●
Axial	40 N at max. 6000 min^{-1} 10 N at max. 12000 min^{-1}	●	●	●
Radial	60 N at max. 6000 min^{-1} 20 N at max. 12000 min^{-1}	●	●	●
Length L [mm]	depending on the version: 46 ... 56	●	●	●
Diameter D [mm]	58	●	●	●

Accessories

9203	Angled flange
9213	Mounting bracket, spring-loaded for clamping flange
9310-3	Synchro clamping element
9416	Cable connector
9416L	Cable connector
9300	Mounting bracket for servo flange
KW-10/10	Helical coupling
KW-6/10	Helical coupling
KW-6/6	Helical coupling
KW-6/8	Helical coupling
9401 10*10	Spring steel coupling
9401 10*12	Spring steel coupling

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Recessed hollow shaft rotary encoder for high-quality rotational speed control and precise positioning

- Up to 50,000 ppr
- Extended temperature range
- Industrial standard housing Ø58 mm
- Servo or clamping flange
- 10 V ... 30 V with short-circuit proof push-pull output
- 5 V with RS-422 interface
- 10 V ... 30 V with RS 422 interface

Description

High performance are key words for this rotary encoder. The outstanding features of this encoder include a high angle resolution and an optional extended temperature range.
Usually all six output channels of this incremental rotary encoder are assigned to ensure flexible use of the encoder in a wide range of applications.
This incremental rotary encoder is available as a clamping flange version with a Ø10 mm x 20 mm shaft or a servo flange version with a Ø6 mm x 10 mm shaft.
The electrical connection is made via a 12-pin round connector. A version with a cable co-nnection is also available.

Order code

RVI58N-.....6.N-....

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500, 3600, 4096, 5000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

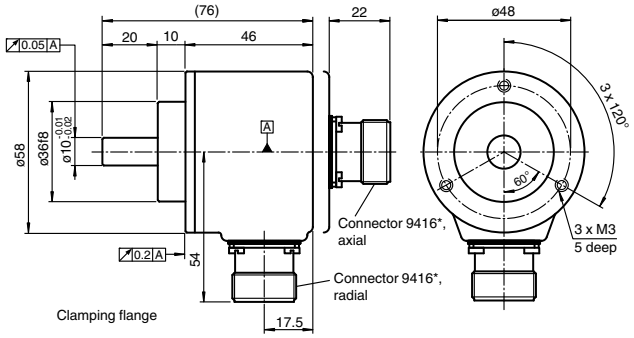
Signal output
6 $A + B + 0$ and $\overline{A} + \overline{B} + \overline{0}$

Exit position
A axial
R radial

Connection type
AA Connector type 9416, 12-pin
AB Connector type 9416L, 12-pin
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1m

Shaft dimensions/flange versio
011 Shaft Ø10 mm x 20 mm with clamping flange
032 Shaft Ø6 mm x 10 mm with servo flange
044 Shaft Ø10 mm x 20 mm (flattening 1 mm x 20 mm) with clamping flange

Dimensions



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Technical data

Model Number		RVI58N-*******1	RVI58N-*******6	RVI58N-*******X
Detection type	photoelectric sampling	●	●	●
Pulse count	max. 50000	●	●	●
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
No-load supply current	max. 50 mA			●
	max. 60 mA	●		
	max. 70 mA		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Voltage drop	< 3 V	●		
Load current	max. per channel 20 mA , conditionally short-circuit proof		●	
	max. per channel 20 mA , conditionally short-circuit proof (not with U_b), reverse polarity protected			●
	max. per channel 40 mA , short-circuit protected, reverse polarity protected	●		
Output frequency	max. 200 kHz	●	●	●
Rise time	100 ns		●	●
	400 ns	●		
Connector	type 9416, 12-pin, type 9416L, 12-pin	●	●	●
Cable	Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m	●	●	●
Protection degree	DIN EN 60529, IP65	●	●	●
Climatic testing	DIN EN 60068-2-78 , no moisture condensation	●	●	●
Emitted interference	EN 61000-6-4:2007	●	●	●
Noise immunity	EN 61000-6-2:2005	●	●	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 3 ms	●	●	●
Vibration resistance	DIN EN 60068-2-6, 10 *g*, 10 ... 2000 Hz	●	●	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Operating temperature	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F) , fixed cable -40 ... 80 °C (-40 ... 176 °F) with Option T , fixed cable	●	●	●
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)	●	●	●
Housing	powder coated aluminum	●	●	●
Flange	3.1645 aluminum	●	●	●
Shaft	Stainless steel 1.4305 / AISI 303	●	●	●
Mass	approx. 350 g	●	●	●
Rotational speed	max. 12000 min^{-1}	●	●	●
Moment of inertia	≤ 25 gcm^2	●	●	●
Starting torque	≤ 1.5 Ncm	●	●	●
Axial	40 N at max. 6000 min^{-1} 10 N at max. 12000 min^{-1}	●	●	●
Radial	60 N at max. 6000 min^{-1} 20 N at max. 12000 min^{-1}	●	●	●
Length L [mm]	depending on the version: 50 ... 56	●	●	●
Diameter D [mm]	58	●	●	●

Accessories

9203	Angled flange
9213	Mounting bracket, spring-loaded for clamping flange
9310-3	Synchro clamping element
9416	Cable connector
9416L	Cable connector
9300	Mounting bracket for servo flange
KW-10/10	Helical coupling
KW-6/10	Helical coupling
KW-6/6	Helical coupling
KW-6/8	Helical coupling
9401 10*10	Spring steel coupling
9401 10*12	Spring steel coupling

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Recessed hollow shaft rotary encoder for high-quality rotational speed control and precise positioning

- **Industrial standard housing Ø58 mm**
- **Up to 5000 ppr**
- **Recessed hollow shaft**
- **10 V ... 30 V with RS 422 interface**
- **10 V ... 30 V with short-circuit proof push-pull output**
- **5 V with RS-422 interface**

Description

Compatibility says it all for this incremental rotary encoder.
All six output channels are fitted for this incremental rotary encoder. It can thus be used universally in many different applications.
Focussing on the designs that are most often required has allowed us to offer rapid availability at an attractive price.
The pulse disk is designed in plastic up to 1500 pulses. Beyond that, glass is used.
This incremental rotary encoder is available in recessed hollow shaft design with a shaft 10 mm in diameter x 20 mm or with a shaft 12 mm in diameter x 20 mm. The rotary encoder is held in place by an included torque rest.
The electrical connection is made by a 12-pin round plug connector. It is also possible to obtain a version with a cable connector.

Order code

RSI58N-...A...6.N-.....

Pulse numbers
1024, 2048, 2500, 4096, 5000, 8192, 10000, 20000, 50000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

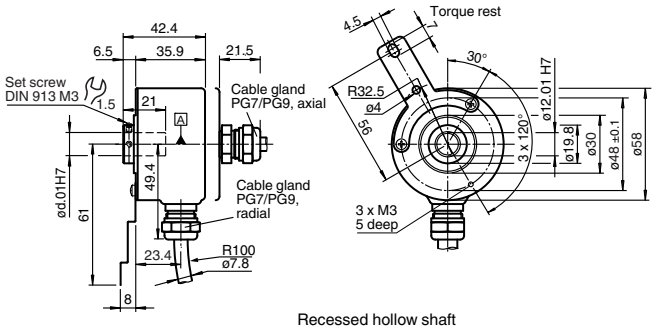
Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
A axial
R radial

Connection type
AA Connector type 9416, 12-pin
AB Connector type 9416L, 12-pin
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m

Shaft dimensions/flange version
01 Recessed hollow shaft Ø10 mm x 20 mm
02 Recessed hollow shaft Ø12 mm x 20 mm

Dimensions



Recessed hollow shaft

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Technical data

Model Number		RSI58N-*******1	RSI58N-*******6	RSI58N-*******X
Detection type	photoelectric sampling	●	●	●
Pulse count	max. 5000	●	●	●
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
No-load supply current	max. 50 mA			●
	max. 60 mA	●		
	max. 70 mA		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Voltage drop	< 3 V	●		
Load current	max. per channel 20 mA , conditionally short-circuit proof (not with U_b)		●	
	max. per channel 20 mA , conditionally short-circuit proof (not with U_b), reverse polarity protected			●
	max. per channel 40 mA , short-circuit prtected (not with U_b), reverse polarity protected	●		
Output frequency	max. 200 kHz	●	●	●
Rise time	100 ns		●	●
	400 ns	●		
Connector	type 9416, 12-pin	●	●	●
Cable	Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m	●	●	●
Protection degree	DIN EN 60529, IP54	●	●	●
Climatic testing	DIN EN 60068-2-3, no moisture condensation	●	●	●
Emitted interference	EN 61000-6-4:2007	●	●	●
Noise immunity	EN 61000-6-2:2005	●	●	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 3 ms	●	●	●
Vibration resistance	DIN EN 60068-2-6, 10 *g*, 10 ... 2000 Hz	●	●	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Glass disk	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F), fixed cable	●	●	●
Plastic disk	-5 ... 60 °C (23 ... 140 °F) , movable cable -20 ... 60 °C (-4 ... 140 °F), fixed cable	●	●	●
Glass disk	-40 ... 100 °C (-40 ... 212 °F)	●	●	●
Plastic disk	-40 ... 70 °C (-40 ... 158 °F)	●	●	●
Housing	powder coated aluminum	●	●	●
Flange	3.1645 aluminum	●	●	●
Shaft	Stainless steel 1.4305 / AISI 303	●	●	●
Mass	approx. 280 g	●	●	●
Rotational speed	max. 12000 min^{-1}	●	●	●
Moment of inertia	≤ 35 gcm^2	●	●	●
Starting torque	≤ 1 Ncm	●	●	●
Angle offset	1 °	●	●	●
Axial offset	max. 1 mm	●	●	●
Length L [mm]	depending on the version: 42.4 ... 50	●	●	●
Diameter D [mm]	58	●	●	●

Accessories

9416	Cable connector
9416L	Cable connector

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- Industrial standard housing Ø58 mm
- Up to 50,000 ppr
- Recessed hollow shaft
- 10 V ... 30 V with RS 422 interface
- 10 V ... 30 V with short-circuit proof push-pull output
- 5 V with RS-422 interface

Description

High performance are key words for this rotary encoder. Its outstanding feature is the-high resolution angle. Usually all six output channels of this incremental rotary encoder are assigned to ensure flexible use of the encoder in a wide range of applications.
This incremental rotary encoder is available in a recessed hollow shaft version with a Ø10 mm x 20 mm shaft or a Ø12 mm x 20 mm shaft. The rotary encoder must be mounted using a torque support. The torque support supplied with the unit or provided by the customer can be used.
The electrical connection is made via a 12-pin round connector. A version with a cable co-nnection is also available.

Order code

R S I 5 8 N - . . A . . . 6 . N - . . . . .

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500, 3600, 4096, 5000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

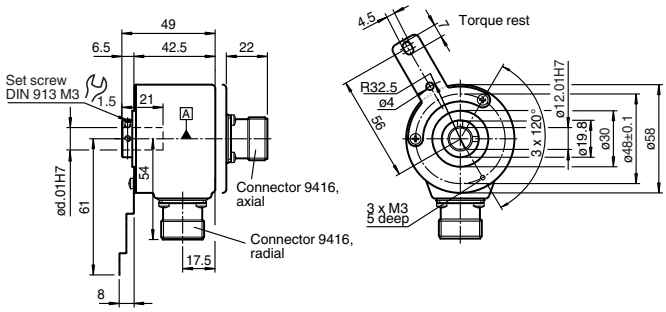
Exit position
A axial
R radial

Connection type
AA Connector type 9416, 12-pin
AB Connector type 9416L, 12-pin
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m

Flange version
A Hollow shaft

Shaft dimensions
01 Recessed hollow shaft Ø10 mm x 20 mm
02 Recessed hollow shaft Ø12 mm x 20 mm

Dimensions



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Technical data

Model Number		RSI58N-*******1	RSI58N-*******6	RSI58N-*******X
Detection type	photoelectric sampling	●	●	●
Pulse count	max. 50000	●	●	●
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
No-load supply current	max. 50 mA			●
	max. 60 mA	●		
	max. 70 mA		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Voltage drop	< 3 V	●		
Load current	max. per channel 20 mA , conditionally short-circuit proof (not with U_b)		●	
	max. per channel 20 mA , conditionally short-circuit proof (not with U_b), reverse polarity protected			●
	max. per channel 40 mA , short-circuit prtected (not with U_b), reverse polarity protected	●		
Output frequency	max. 200 kHz	●	●	●
Rise time	100 ns		●	●
	400 ns	●		
Connector	type 9416, 12-pin	●	●	●
Cable	Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m	●	●	●
Protection degree	DIN EN 60529, IP54	●	●	●
Climatic testing	DIN EN 60068-2-78 , no moisture condensation	●	●	●
Emitted interference	EN 61000-6-4:2007	●	●	●
Noise immunity	EN 61000-6-2:2005	●	●	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 3 ms	●	●	●
Vibration resistance	DIN EN 60068-2-6, 10 *g*, 10 ... 2000 Hz	●	●	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Operating temperature	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F), fixed cable	●	●	●
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)	●	●	●
Housing	powder coated aluminum	●	●	●
Flange	3.1645 aluminum	●	●	●
Shaft	Stainless steel 1.4305 / AISI 303	●	●	●
Mass	approx. 280 g	●	●	●
Rotational speed	max. 12000 min^{-1}	●	●	●
Moment of inertia	≤ 35 gcm^2	●	●	●
Starting torque	≤ 1 Ncm	●	●	●
Angle offset	1 °	●	●	●
Axial offset	max. 1 mm	●	●	●
Length L [mm]	depending on the version: 44 ... 50	●	●	●
Diameter D [mm]	58	●	●	●

Accessories

9416	Cable connector
9416L	Cable connector

Date of issue 2012-11-12

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PEPPERL+FUCHS SENSING YOUR NEEDS

Basic hollow shaft rotary encoder for high-quality rotational speed control and precise positioning

- **Industrial standard housing Ø58 mm**
- **Up to 5000 ppr**
- **Hollow shaft**
- **10 V ... 30 V with RS 422 interface**
- **5 V with RS-422 interface**
- **10 V ... 30 V with short-circuit proof push-pull output**

Description

Compatibility says it all for this incremental rotary encoder.
All six output channels are fitted for this incremental rotary encoder. It can thus be used universally in many different applications.
Focussing on the designs that are most often required has allowed us to offer rapid availability at an attractive price.
Usually the pulse disk is designed in plastic up to 1500 pulses. Beyond that, glass is used.
This incremental rotary encoder is available as hollow shaft design with a shaft Ø10 mm or Ø12 mm.
The rotary encoder is held in place by an included torque rest.
The electrical connection is made with a cable connector.

Order code

RHI58N- . . A K1 R6 . N- . . . . .

Pulse numbers
1024, 2048, 2500, 4096, 5000, 8192, 10000, 20000, 50000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

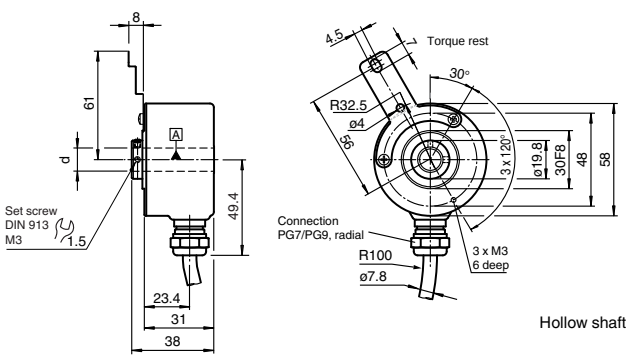
Signal output
6 $A + B + 0$ and $\overline{A} + \overline{B} + \overline{0}$

Exit position
R radial

Connection type
K1 Cable Ø6.5 mm, 4 x 2 x 0.14 mm², 1 m

Shaft dimensions
2A Hollow shaft d = 10 mm, clamps on both sides
2B Hollow shaft d = 12 mm, clamps on both sides
2T Hollow shaft d = 15 mm, clamps on both sides

Dimensions



Hollow shaft

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Technical data

Model Number		RHI58N-*******1	RHI58N-*******6	RHI58N-*******X
Detection type	photoelectric sampling	●	●	●
Pulse count	max. 5000	●	●	●
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
No-load supply current	max. 50 mA			●
	max. 60 mA	●		
	max. 70 mA		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Voltage drop	< 3 V	●		
Load current	max. per channel 20 mA , conditionally short-circuit proof (not with U_b)		●	
	max. per channel 20 mA , conditionally short-circuit proof (not with U_b), reverse polarity protected			●
	max. per channel 40 mA , short-circuit protected, reverse polarity protected	●		
Output frequency	max. 200 kHz	●	●	●
Rise time	100 ns		●	●
	400 ns	●		
Cable	Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m	●	●	●
Protection degree	DIN EN 60529, IP54	●	●	●
Climatic testing	DIN EN 60068-2-78 , no moisture condensation	●	●	●
Emitted interference	EN 61000-6-4:2007	●	●	●
Noise immunity	EN 61000-6-2:2005	●	●	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 3 ms	●	●	●
Vibration resistance	DIN EN 60068-2-6, 10 *g*, 10 ... 2000 Hz	●	●	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Glass disk	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F), fixed cable	●	●	●
Plastic disk	-5 ... 60 °C (23 ... 140 °F) , movable cable -20 ... 60 °C (-4 ... 140 °F), fixed cable	●	●	●
Glass disk	-40 ... 85 °C (-40 ... 185 °F)	●	●	●
Plastic disk	-40 ... 70 °C (-40 ... 158 °F)	●	●	●
Housing	powder coated aluminum	●	●	●
Flange	3.1645 aluminum	●	●	●
Shaft	Stainless steel 1.4305 / AISI 303	●	●	●
Mass	approx. 290 g	●	●	●
Rotational speed	max. 6000 min^{-1}	●	●	●
Moment of inertia	≤ 40 gcm^2	●	●	●
Starting torque	≤ 1.5 Ncm	●	●	●
Angle offset	1 °	●	●	●
Axial offset	max. 1 mm	●	●	●
Length L [mm]	38	●	●	●
Diameter D [mm]	58	●	●	●

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PEPPERL+FUCHS SENSING YOUR NEEDS

Basic hollow shaft rotary encoder for high-quality rotational speed control and precise positioning

- **Industrial standard housing Ø58 mm**
- **Up to 50,000 ppr**
- **Hollow shaft**
- **10 V ... 30 V with RS 422 interface**
- **5 V with RS-422 interface**
- **Up to 5000 ppr**
- **10 V ... 30 V with short-circuit proof push-pull output**

Description

High performance are key words for this rotary encoder. Its outstanding feature is the-high resolution angle. Usually all six output channels of this incremental rotary encoder are assigned to ensure flexible use of the encoder in a wide range of applications.
This incremental rotary encoder is available as hollow shaft design with a shaft Ø10 mm, Ø12 mm or Ø15 mm.
The rotary encoder is held in place by an included torque rest.
The electrical connection is made with a cable connector.

Order code

RHI58N- . . A K 1 R 6 . N- . . . . .

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500, 3600, 4096, 5000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

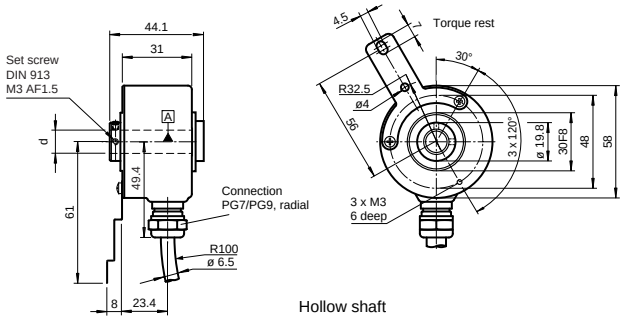
Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
R radial

Connection type
K1 Cable, 1 m

Shaft dimensions
0A Hollow shaft d = 10 mm
0B Hollow shaft d = 12 mm

Dimensions



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Technical data

Model Number		RHI58N-*******1	RHI58N-*******6	RHI58N-*******X
Detection type	photoelectric sampling	●	●	●
Pulse count	max. 50000	●	●	
	max. 50000			●
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
No-load supply current	max. 50 mA			●
	max. 60 mA	●		
	max. 70 mA		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Voltage drop	< 3 V	●		
Load current	max. per channel 20 mA , conditionally short-circuit proof (not with U_b)		●	
	max. per channel 20 mA , conditionally short-circuit proof (not with U_b), reverse polarity protected			●
	max. per channel 40 mA , short-circuit protected, reverse polarity protected	●		
Output frequency	max. 200 kHz	●	●	●
Rise time	100 ns		●	●
	400 ns	●		
Cable	Ø6.5 mm, 4 x 2 x 0.14 mm^2, 1 m	●	●	●
Protection degree	DIN EN 60529, IP54	●	●	●
Climatic testing	DIN EN 60068-2-78 , no moisture condensation	●	●	●
Emitted interference	EN 61000-6-4:2007	●	●	●
Noise immunity	EN 61000-6-2:2005	●	●	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 3 ms	●	●	●
Vibration resistance	DIN EN 60068-2-6, 10 *g*, 10 ... 2000 Hz	●	●	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Operating temperature	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F), fixed cable	●	●	●
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)	●	●	●
Housing	powder coated aluminum	●	●	●
Flange	3.1645 aluminum	●	●	●
Shaft	Stainless steel 1.4305 / AISI 303	●	●	●
Mass	approx. 290 g	●	●	●
Rotational speed	max. 6000 min^{-1}	●	●	●
Moment of inertia	≤ 40 gcm^2	●	●	●
Starting torque	≤ 1.5 Ncm	●	●	●
Angle offset	1 °	●	●	●
Axial offset	max. 1 mm	●	●	●
Length L [mm]	44.1	●	●	●
Diameter D [mm]	58	●	●	●

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PEPPERL+FUCHS SENSING YOUR NEEDS

Special hollow shaft rotary encoder for high-quality rotational speed control in elevator construction

- **Compact design housing Ø90 mm**
- **Variable hollow shaft from Ø16 mm ... Ø45 mm**
- **Up to 50,000 ppr**
- **Easy shaft clamping**
- **Very high resolution and accuracy**
- **5 V with RS-422 interface**
- **10 V ... 30 V with RS 422 interface**
- **10 V ... 30 V with short-circuit proof push-pull output**

Description

The hollow shaft encoder RHI90 is a product, which has been developed specially for mechanical drive and lift engineering. It combines the advantages of modern technics and cost effective design.
The hollow shaft encoder is available with shaft diameters between Ø16 mm and Ø45 mm. Thanks to its comparatively small outside diameter it can also be used if only little mounting space is available. The shaft fastening is designed in a way that the shaft of the customer is not being damaged.

Order code

RHI90N-..A..R6.N-....

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500, 4096, 5000, 8192, 10000, 25000, 50000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

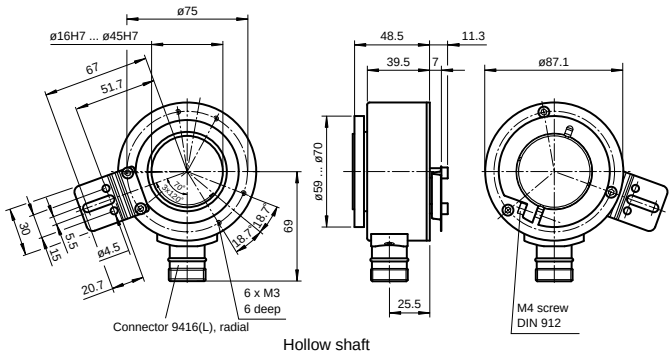
Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
R radial

Connection type
AA Connector type 9416, 12-pin
AB Connector typep 9416L, 12-pin
K1 Cable Ø6.5 mm, 4 x 2 x 0.14 mm², 1m

Shaft dimensions/flange version
0E Hollow shaft Ø16 mm
0F Hollow shaft Ø20 mm
0G Hollow shaft Ø24 mm
0H Hollow shaft Ø25 mm
0I Hollow shaft Ø30 mm
0L Hollow shaft Ø38 mm
0N Hollow shaft Ø45 mm

Dimensions



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Technical data

Model Number		RHI90N-*******1	RHI90N-*******6	RHI90N-*******X
Detection type	photoelectric sampling	●	●	●
Pulse count	max. 50000	●	●	●
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
No-load supply current	max. 70 mA	●	●	●
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Voltage drop	< 2.5 V	●		
Load current	max. per channel 20 mA , short-circuit protected		●	●
	max. per channel 40 mA , short-circuit protected, reverse polarity protected	●		
Output frequency	max. 200 kHz	●	●	●
Rise time	600 ns	●	●	●
De-energized delay	600 ns	●	●	●
Connector	type 9416, 12-pin, type 9416L, 12-pin	●	●	●
Cable	Ø6.5 mm, 4 x 2 x 0.14 mm^2, 1 m	●	●	●
Protection degree	DIN EN 60529, IP65	●	●	●
Climatic testing	DIN EN 60068-2-78	●	●	●
Emitted interference	EN 61000-6-4:2007	●	●	●
Noise immunity	EN 61000-6-2:2005	●	●	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 6 ms	●	●	●
Vibration resistance	DIN EN 60068-2-6, 10 *g*, 10 ... 2000 Hz	●	●	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Operating temperature	-5 ... 70 °C (23 ... 158 °F) , movable cable -20 ... 70 °C (-4 ... 158 °F), fixed cable	●	●	●
Storage temperature	-40 ... 80 °C (-40 ... 176 °F)	●	●	●
Housing	aluminium, blank	●	●	●
Flange	3.1645 aluminum	●	●	●
Shaft	Stainless steel 1.4305 / AISI 303	●	●	●
Mass	approx. 900 g	●	●	●
Rotational speed	max. 3500 min^{-1}	●	●	●
Starting torque	≤ 6 Ncm	●	●	●
Angle offset	1 °	●	●	●
Axial offset	max. 1 mm	●	●	●
Length L [mm]	48.5	●	●	●
Diameter D [mm]	87.1	●	●	●

Accessories

9416	Cable connector
9416L	Cable connector

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PEPPERL+FUCHS SENSING YOUR NEEDS

Absolute rotary encoder with application profile for elevator systems DSP417 (lift profile)

- **Industrial standard housing Ø58 mm**
- **Servo or clamping flange**
- **Galvanically isolated CAN interface**
- **2 limit switches**
- **8 programmable cams**
- **Velocity and acceleration output**
- **Event triggered process data transfer**
- **16 Bit singleturn**
- **30 Bit multiturn**

CE cULus CANopen

Description

Absolute encoders deliver an absolute step value for each angle setting. All these values are represented by code samples on one or more code disks which are sampled by a photoelectric array.
The absolute encoder has a maximum basic resolution of 65536 steps per revolution (16 Bits). In the multiturn design, additional up to 16384 revolutions (14 Bits) can be resolved. This results in a total maximum resolution of 1073741824 steps (30 Bits).
The encoders integrated CAN bus interface supports all CANopen functions. The following operating modes can be programmed, and can be selectively turned on or off:

- Polled mode
- Cyclic mode
- Sync mode

The device is designed for shaft assembly and is available in servo flange or clamping flange design. The bus electronics module is integrated into the removable housing cover. This makes it possible to mount or replace the encoder and the bus electronics separately during installation or service.

Order code

CV.58.-....R0BN-....

Number of bits singleturn
13 8192 (standard)
16 65536

Number of bits multiturn
12 4096 (standard)
14 16384
00 Singleturn encoder

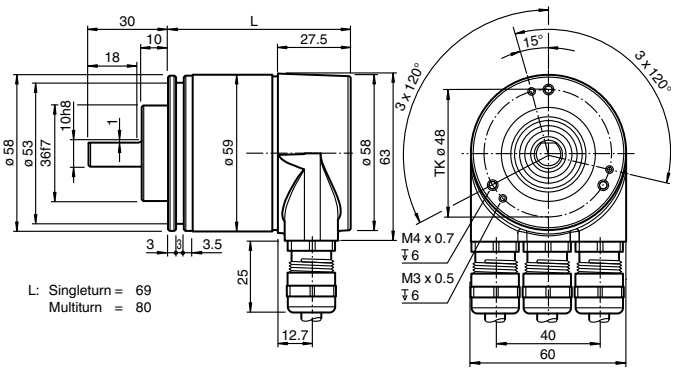
Connection type
AG removable cover with terminal compartment
AN removable cover with connectors M12 x 1

Shaft dimensions/flange version
011 Shaft ø10 mm x 20 mm, clamping flange
032 Shaft ø6 mm x 10 mm, servo flange

Housing material
N Aluminium, powder coated
I Inox
W Aluminium, powder coated with shaft seal

Function principle
S Singleturn
M Multiturn

Dimensions



L: Singleturn = 69
Multiturn = 80

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Technical data

Model Number		CVS58	CVM58
Detection type	photoelectric sampling	●	●
Operating voltage	10 ... 30 V DC	●	●
No-load supply current	max. 350 mA	●	●
Linearity	± 2 LSB at 16 Bit, ± 1 LSB at 13 Bit, ± 0,5 LSB at 12 Bit	●	●
Output code	binary code	●	●
Code course (counting direction)	cw ascending (clockwise rotation, code course ascending) cw descending (clockwise rotation, code course descending)	●	●
Interface type	CANopen	●	●
Single turn	up to 16 Bit	●	●
Multiturn	14 Bit		●
Overall resolution	up to 16 Bit	●	
	up to 30 Bit		●
Transfer rate	max. 1 MBit/s	●	●
Standard conformity	communication profile: DS 301 device profiles: DS 406 and DS 417 , programmable according to class 2	●	●
Terminal compartment	in removable housing cover	●	●
Protection degree	DIN EN 60529, IP65 IP66 (with shaft seal)	●	●
Climatic testing	DIN EN 60068-2-30 , no moisture condensation	●	●
Emitted interference	EN 61000-6-4:2007	●	●
Noise immunity	EN 61000-6-2:2005	●	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 6 ms	●	●
Vibration resistance	DIN EN 60068-2-6, 20 *g*, 10 ... 2000 Hz	●	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)	●	●
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)	●	●
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel	●	●
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel	●	●
Mass	approx. 550 g (combination 1) approx. 1100 g (combination 2)	●	
	approx. 600 g (combination 1) approx. 1200 g (combination 2)		●
Rotational speed	max. 12000 min $^{-1}$	●	●
Moment of inertia	30 gcm^2	●	●
Starting torque	≤ 3 Ncm (version without shaft seal)	●	●
Axial	40 N	●	●
Radial	110 N	●	●
Length L [mm]	depending on the version: 73 ... 79	●	
	depending on the version: 84 ... 90		●
Diameter D [mm]	58	●	●
Connector area l_c [mm]	25	●	●

Accessories

9203	Angled flange
9213	Mounting bracket, spring-loaded for clamping flange
AH 58-B1CA-2BW	
9310-3	Synchro clamping element
9300	Mounting bracket for servo flange
KW-10/10	Helical coupling
KW-6/10	Helical coupling
KW-6/6	Helical coupling
KW-6/8	Helical coupling
9401 10*10	Spring steel coupling
9401 10*12	Spring steel coupling
9401 6*10	Spring steel coupling

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Absolute rotary encoder with application profile for elevator systems DSP417 (lift profile)

- **Industrial standard housing Ø58 mm**
- **Recessed hollow shaft**
- **Galvanically isolated CAN interface**
- **2 limit switches**
- **8 programmable cams**
- **Velocity and acceleration output**
- **Event triggered process data transfer**
- **16 Bit singleturn**
- **30 Bit multiturn**

Description

Absolute encoders deliver an absolute step value for each angle setting. All these values are represented by code samples on one or more code disks which are sampled by a photoelectric array.
The absolute encoder has a maximum basic resolution of 65536 steps per revolution (16 Bits).
The encoders integrated CAN bus interface supports all CANopen functions. The following operating modes can be programmed, and can be selectively turned on or off:

- Polled mode
- Cyclic mode
- Sync mode

The absolute encoder is mounted directly onto the application shaft, without any coupling. Rotation of the encoder is prevented by a torque rest. The bus electronics module is integrated into the removable housing cover. This makes it possible to mount or replace the encoder and the bus electronics separately during installation or service.

Order code

C S . 5 8 . – . . . . . R 0 B N – . . . .

Number of bits singleturn
13 8192 (standard)
16 65536

Number of bits multiturn
12 4096 (standard)
14 16384
00 Singleturn encoder

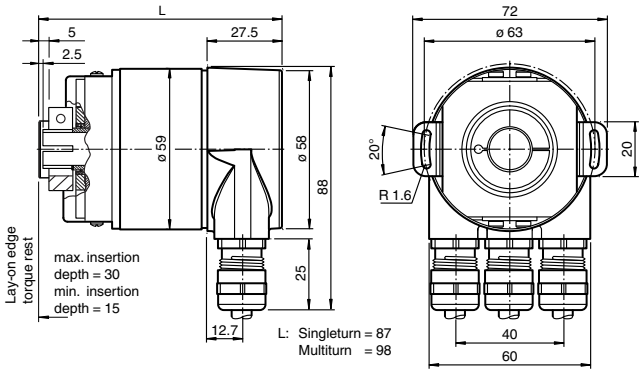
Connection type
AG removable housing cover with terminal compartment
AZ removable housing cover with connectors M12 x 1

Shaft dimensions/flange version
F1A Recessed hollow shaft ø10 mm x 30 mm
F2A Recessed hollow shaft ø12 mm x 30 mm
F3A Recessed hollow shaft ø15 mm x 30 mm

Housing material
N Aluminium, powder coated
I Inox
W Aluminium, powder coated with shaft seal

Function principle
S Singleturn
M Multiturn

Dimensions



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Technical data

Model Number		CSS58	CSM58
Detection type	photoelectric sampling	●	●
Operating voltage	10 ... 30 V DC	●	●
No-load supply current	max. 230 mA at 10 V DC max. 100 mA at 24 V DC	●	●
Linearity	± 2 LSB at 16 Bit, ± 1 LSB at 13 Bit, ± 0,5 LSB at 12 Bit	●	●
Output code	binary code	●	●
Code course (counting direction)	cw ascending (clockwise rotation, code course ascending) cw descending (clockwise rotation, code course descending)	●	●
Interface type	CANopen	●	●
Single turn	up to 16 Bit	●	●
Multiturn	14 Bit		●
Overall resolution	up to 16 Bit	●	
	up to 30 Bit		●
Transfer rate	max. 1 MBit/s	●	●
Standard conformity	communication profile: DS 301 device profiles: DS 406 and DS 417 , programmable according to class 2	●	●
Terminal compartment	in removable housing cover	●	●
Protection degree	DIN EN 60529, IP65 IP66 (with shaft seal)	●	●
Climatic testing	DIN EN 60068-2-30 , no moisture condensation	●	●
Emitted interference	EN 61000-6-4:2007	●	●
Noise immunity	EN 61000-6-2:2005	●	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 6 ms	●	●
Vibration resistance	DIN EN 60068-2-6, 20 *g*, 10 ... 2000 Hz	●	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)	●	●
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)	●	●
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel	●	●
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel	●	●
Mass	approx. 550 g (combination 1) approx. 1100 g (combination 2)	●	
	approx. 600 g (combination 1) approx. 1200 g (combination 2)		●
Rotational speed	max. 12000 min $^{-1}$	●	●
Moment of inertia	30 gcm^2	●	●
Starting torque	≤ 3 Ncm (version without shaft seal)	●	●
Tightening torque, fastening screws	max. 1.8 Nm	●	●
Angle offset	± 0.9 °	●	●
Axial offset	static: ± 0.3 mm, dynamic: ± 0.1 mm	●	●
Radial offset	static: ± 0.5 mm, dynamic: ± 0.2 mm	●	●
Length L [mm]	87	●	
	98		●
Diameter D [mm]	59	●	●
Connector area l_c [mm]	25	●	●

Accessories

AH 58-B1CA-2BW

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PEPPERL+FUCHS SENSING YOUR NEEDS

Rotational speed with integrated functional safety for safe stop and safe rotational speed in conjunction with safe control

- **Integrated functional safety with twin processor structure and dual sensing for extra security**
- **For systems up to SIL3 and PLe**
- **Industrial standard housing Ø58 mm**
- **Galvanically isolated CAN interface**
- **DSP 406/301/304, CLASS 1 and 2**
- **Servo or clamping flange**
- **2 limit switches**
- **CANopen and CANopen Safety interface**
- **16 Bit singleturn**
- **30 Bit multiturn**

Description

This absolute rotary encoder with Safety CANopen interface fulfills through its mechanical and electronical concept with twin-microcontroller structure and double sampling all safety function requirements of modern fuctional safe control systems. It is suitable for the use in machines and plants with safety categories up to:

- SIL3 acc. to EN 62061
- PLe acc. to IEC 13849
- Category 4 acc. to IEC 13849

The bus electronics is integrated in the removable housing cover. Due to this the encoder and the bus electronics can be installed or replaced separately in case of maintenance and service. This device is made for shaft mounting and comes with a clamping-flange.

Order code

C V . 5 8 S – . . . . . 0 B . – . . . .

Number of bits singleturn
13 8192
16 65536

Number of bits multiturn
14 16384
00 Singleturn encoder

Option 2
N Aluminum housing (standard)
I Stainless steel housing
W Aluminum housing with shaft seal

Output code
B Binary

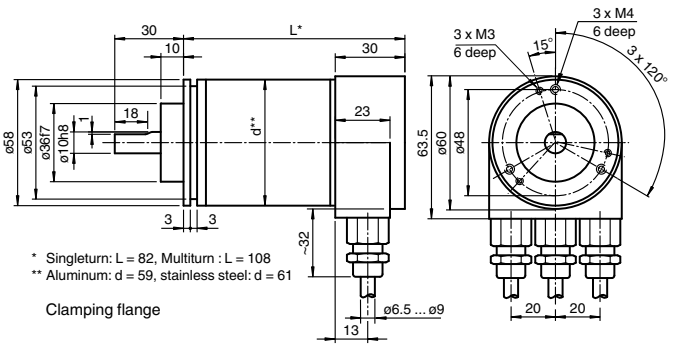
Exit position
A axial (Connection type K1, without bus cover)
R radial (Connection type AG, AN, AW)

Connection type
AG removable cover with terminal compartment
AN 1 Device connector, M12 x 1, 5-pin
AW 1 Device connector and 1 socket, M12 x 1, 5-pin
K1 Cable, 1 m long

Shaft dimensions/flange version
011 solid shaft ø10 mm x 20 mm with clamping flange
012 solid shaft ø10 mm x 20 mm with servo flange
032 solid shaft ø6 mm x 10 mm with servo flange

Function principle
S Singleturn
M Multiturn

Dimensions



* Singleturn: L = 82, Multiturn : L = 108
** Aluminum: d = 59, stainless steel: d = 61

Clamping flange

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Technical data

Model Number		CVS58S	CVM58S
Detection type	photoelectric sampling	●	●
Operating voltage	12 ... 30 V DC	●	●
No-load supply current	max. 100 mA		●
	max. 50 mA	●	
Linearity	Non Safety:; ± 4 LSB at 16 Bit, ± 0,5 LSB at 12 Bit Safety Value: 10 bit ± 0 LSB	●	●
Output code	binary code	●	●
Code course (counting direction)	cw ascending (clockwise rotation, code course ascending) cw descending (clockwise rotation, code course descending)	●	●
Interface type	CANopen / CANopen Safety	●	●
Single turn	CANopen: up to 16 Bit CANopen Safety: 10 Bit	●	●
Multiturn	14 Bit		●
Overall resolution	up to 16 Bit	●	
	up to 30 Bit		●
Transfer rate	max. 1 MBit/s	●	●
Standard conformity	DSP 406/301/304, CLASS 1 and 2	●	●
Output type	DSP 406/301/304, CLASS 1 and 2	●	●
Terminal compartment	in removable housing cover	●	●
Protection degree	DIN EN 60529, shaft side: IP64 (without shaft seal)/IP66 (with shaft seal) housing side: IP65	●	●
Climatic testing	DIN EN 60068-2-3, no moisture condensation	●	●
Emitted interference	EN 61000-6-4:2007	●	●
Noise immunity	EN 61000-6-2:2005	●	●
Shock resistance	DIN EN 60068-2-27, 100 *g*, 6 ms	●	●
Vibration resistance	DIN EN 60068-2-6, 10 g, 10 ... 1000 Hz		●
	DIN EN 60068-2-6, 10 *g*, 10 ... 2000 Hz	●	
Functional safety	IEC 62061:2005 ISO 13849-1:2006	●	●
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●
Operating temperature	-30 ... 70 °C (-22 ... 158 °F)	●	●
Storage temperature	-30 ... 70 °C (-22 ... 158 °F)	●	●
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel	●	●
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel	●	●
Mass	approx. 600 g (combination 1) approx. 1200 g (combination 2)	●	
	approx. 800 g (combination 1) approx. 1300 g (combination 2)		●
Rotational speed	max. 12000 min $^{-1}$	●	●
Moment of inertia	30 gcm^2	●	●
Starting torque	≤ 3 Ncm (version without shaft seal)	●	●
Axial	40 N	●	●
Radial	110 N	●	●
Length L [mm]	depending on the version: 54 ... 92	●	
	depending on the version: 83 ... 118		●
Diameter D [mm]	aluminum: 59 Stainless steel: 61	●	●

Accessories

9203	Angled flange
9213	Mounting bracket, spring-loaded for clamping flange
9310-3	Synchro clamping element
9300	Mounting bracket for servo flange
KW-10/10	Helical coupling
KW-6/10	Helical coupling
KW-6/6	Helical coupling
KW-6/8	Helical coupling
9401 10*10	Spring steel coupling
9401 10*12	Spring steel coupling
9401 6*10	Spring steel coupling
9401 6*6	Spring steel coupling

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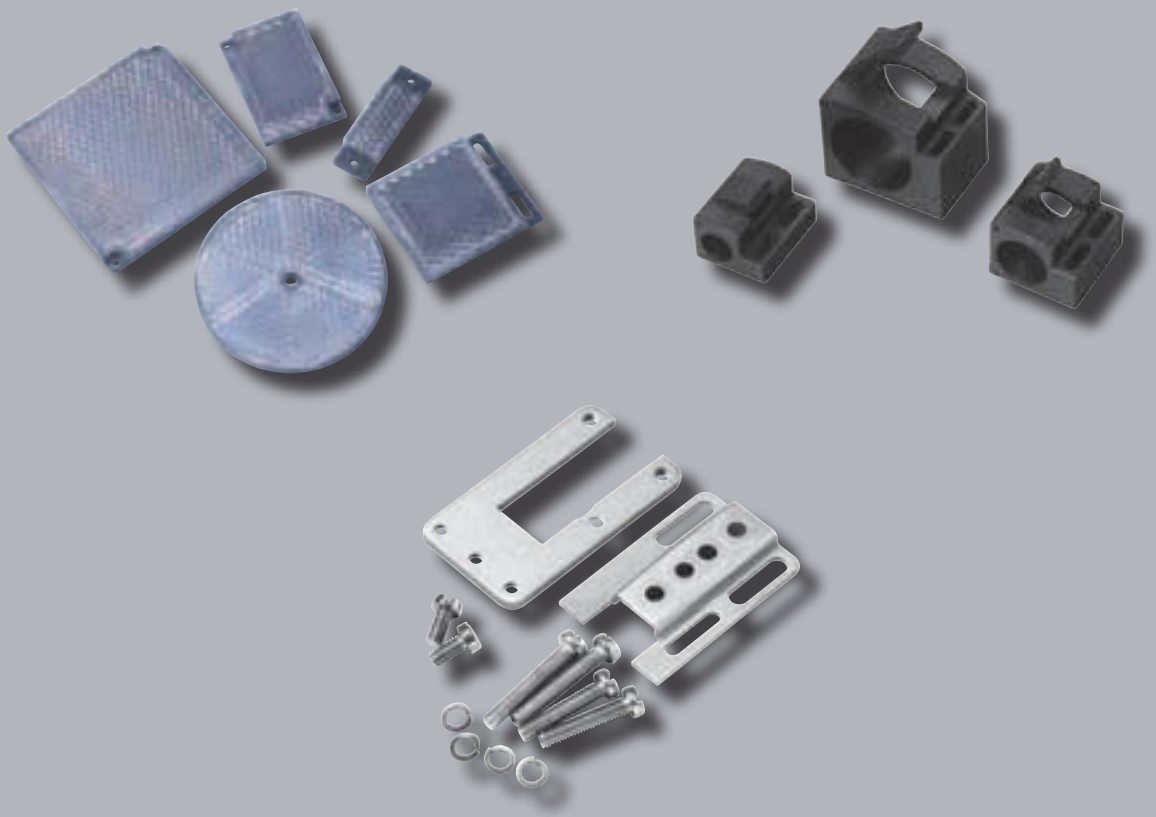

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Model Number

REF-C110-2

Reflector, round ø 84 mm, central mounting hole

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 84 mm
Mounting	mounting hole

Model Number

REF-H160

Reflector, rectangular 60 mm x 18 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	60 mm x 18 mm x 8.3 mm
Mounting	mounting holes

Model Number

REF-VR10

Reflector, rectangular 60 mm x 19 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	60 mm x 19 mm x 6 mm
Mounting	mounting holes

Model Number

REF-H50

Reflector, rectangular 51 mm x 51 mm, mounting holes, fixing strap

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	51 mm x 51 mm x 8 mm
Mounting	mounting holes

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Model Number

REF-H48

Reflector, rectangular 32.5 mm x 57 mm, mounting holes, fixing strap

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	32.5 mm x 57 mm x 8 mm
Mounting	mounting holes

Model Number

REF-H40

Reflector, rectangular 47.5 mm x 23.5 mm, mounting holes, fixing strap

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	47.5 mm x 23.5 mm x 8 mm
Mounting	mounting holes

Model Number

REF-H65

Reflector, rectangular 65 mm x 32.5 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	65 mm x 32.5 mm x 8.3 mm
Mounting	mounting holes

Model Number

REF-H60

Reflector, rectangular 40.5 mm x 60 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	60 mm x 40.5 mm x 7.5 mm
Mounting	mounting holes

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Model Number

REF-H75

Reflector, rectangular 75 mm x 34.5 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	75 mm x 34.5 mm x 7 mm
Mounting	mounting holes

Model Number

REF-H78

Reflector, hexagonal 78 mm x 61 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	78 mm x 61 mm x 7 mm
Mounting	mounting holes

Model Number

REF-H100

Reflector, rectangular 122 mm x 99.35 mm, mounting holes

Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F)
Mechanical specifications	
Material	PMMA
Dimensions	122 mm x 99.35 mm x 8.5 mm
Mounting	mounting holes

Model Number

REF-H180

Reflector, rectangular 180 mm x 40 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	180 mm x 40 mm x 7.4 mm
Mounting	mounting holes

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Model Number

REF-H85-2

Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	84.5 mm x 84.5 mm x 8.7 mm
Mounting	mounting holes

Model Number

REF-H72

Reflector, rectangular 72 mm x 19 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	72 mm x 19 mm x 8.5 mm
Mounting	mounting holes

Model Number

REF-S25

Reflector, round ø 25 mm, screw fixing M4

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 25 mm
Mounting	screw fixing

Model Number

REF-S42

Reflector, round ø 42 mm, screw fixing M5

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 42 mm
Mounting	screw fixing

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Model Number

REF-CLIP25

Reflector, round ø 25.2 mm, snap-in

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 25.2 mm
Mounting	Snap-in

Model Number

REF-CLIP42

Reflector, round ø 42 mm, snap-in

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 42 mm
Mounting	Snap-in

Model Number

REF-CLIP40

Reflector, rectangular 40 mm x 23.5 mm, snap-in

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	40 mm x 23.5 mm x 8 mm
Mounting	Snap-in

Model Number

REF-A48

Reflector, rectangular 48 mm x 32.5 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	48 mm x 32.5 mm x 8 mm
Mounting	self-adhesive

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Model Number

REF-A80

Reflector, rectangular 80 mm x 50 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	80 mm x 50 mm x 7.2 mm
Mounting	self-adhesive

Model Number

REF-A25

Reflector, round ø 25 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 25 mm
Mounting	self-adhesive

Model Number

REF-A35

Reflector, round ø 35 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 35 mm
Mounting	self-adhesive

Model Number

REF-A46

Reflector, round ø 46 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 46 mm
Mounting	self-adhesive

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Model Number

REF-A17

Reflector, round ø 20.5 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 20.5 mm
Mounting	self-adhesive

Model Number

OFR-A4

Reflective tape A4 (297 mm x 210 mm)

General specifications	
Optical elements	Micro-triple pyramids
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Material	F6000
Dimensions	297 mm x 210 mm
Mounting	self-adhesive
Storage	Store cool and dry

Model Number

OFR-100/100

Reflective tape 100 mm x 100 mm

General specifications	
Optical elements	Micro-triple pyramids
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Material	F6000
Dimensions	100 mm x 100 mm
Mounting	self-adhesive
Storage	Store cool and dry

Model Number

OFR-1000/1000

Reflective tape 1000 mm x 1000 mm

General specifications	
Optical elements	Micro-triple pyramids
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Material	F6000
Dimensions	1000 mm x 1000 mm
Mounting	self-adhesive
Storage	Store cool and dry

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Model Number

REF-HEATER120

Reflector, rectangular 120 mm x 51 mm, mounting holes, heatable 24 V DC

Electrical specifications	
Operating voltage U_B	24 V DC
Operating current	200 mA
Power consumption P_0	max. 4.8 W
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Connection	connector M12 x 1, 4-pin
Dimensions	119 mm x 51.5 mm x 27 mm
Mounting	mounting holes

Model Number

Reflector Weather Cap

Weather hood for series reflector

Mechanical specifications	
Material	plastic
Mass	approx. 60 g
Mounting	Mounting accessories included
Suitable series	
Reflector series	reflector C110-2 , H50 reflector

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Model Number

Mounting Set AL2109 back board
Mounting aid

Mechanical specifications	
Mass	approx. 30 g

Model Number

Mounting Set AL2109 extension
Mounting aid

Mechanical specifications	
Housing length L	600 mm
Material	Aluminium housing
Mass	approx. 400 g
Mounting	Mounting accessories included

Model Number

Mounting Set AL2109 lateral
Mounting aid

Mechanical specifications	
Mass	approx. 12 g

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Model Number

FLT-50-AR
alignment aid for FLT...-50

General specifications	
Light type	Red light
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)
Mechanical specifications	
Protection degree	IP65
Material	
Housing	Makrolon GV30 black
Optical face	Glass, red

Model Number

FLT-300-AR
alignment aid for FLT...-300

General specifications	
Light type	Red light
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)
Mechanical specifications	
Protection degree	IP65
Material	
Housing	Makrolon GV30 black
Optical face	Glass, red

Model Number

FLT-500-AR
alignment aid for FLT...-500

General specifications	
Light type	Red light
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)
Mechanical specifications	
Protection degree	IP65
Material	
Housing	Makrolon GV30 black
Optical face	Glass, red

Model Number

Montageplatte FLT
Mounting plate for FLT-8 series sensors

Mechanical specifications	
Material	Plastic ABS
Optical face	Clear Plexiglas
Mass	approx. 155 g

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Model Number

TopScan-S Cap Set
End cover for TopScan-S aluminum profile section

Ambient conditions	
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Mechanical specifications	
Material	plastic
Mass	approx. 4 g
General information	
Packing unit	2

Model Number

TopScan-S Cover L1400
Housing cover TopScan-S

Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Housing length L	1400 mm
Material	PMMA

Model Number

TopScan-S Gasket IP54
Housing seal TopScan-S

Ambient conditions	
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Mechanical specifications	
Material	polyurethane foam
Mass	approx. 0.4 g
General information	
Packing unit	10

Model Number

TopScan-S Profile L1400
Housing profile TopScan-S

Ambient conditions	
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Mechanical specifications	
Material	aluminum

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Accessories

Model Number

TopScan-S Test Kit
Adjustment accessories TopScan-S

Mechanical specifications	
Material	cardboard
Mass	approx. 315 g

Model Number

AIR17-S Master
Replacement/extension sensor module

General specifications	
Detection range min.	0 ... 1500 mm
Detection range max.	0 ... 2500 mm
Light source	IRED
Light type	modulated infrared light
Black/White difference (6 %/90 %)	< 2 % at 2000 mm sensor range
Operating mode	Background evaluation
Diameter of the light spot	1.1 cm x 8.3 cm at 2000 mm sensor range
Indicators/operating means	
Function display	LED red/green
Controls	Detection range adjuster

Model Number

AIR17-S Slave
Replacement/extension sensor module

General specifications	
Detection range min.	0 ... 1500 mm
Detection range max.	0 ... 2500 mm
Light source	IRED
Light type	modulated infrared light
Black/White difference (6 %/90 %)	< 2 % at 2000 mm sensor range
Operating mode	Background evaluation
Diameter of the light spot	1.1 cm x 8.3 cm at 2000 mm sensor range
Indicators/operating means	
Function display	LED red/green
Controls	Detection range adjuster

Model Number

Topscan Cable Loop Basic
Metal cable protector

Mechanical specifications	
Material	metal with PVC sheathing black
Dimensions	600 mm
General information	
Scope of delivery	Protective hose , Retainer , Screw kit

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Model Number

TopScan-S Cable 240 mm
Ribbon cable for connecting sensor modules

Model Number

AIR16
Sensor module

General specifications	
Light source	IRED
Indicators/operating means	
Function display	LED red
Electrical specifications	
Operating voltage U_B	17 ... 30 V DC , 18 ... 28 V AC
No-load supply current I_0	< 100 mA
Output	
Switching type	Light/Dark switch
Signal output	Relay, 1 alternator
Switching voltage	max. 24 V DC , 48 V AC

Model Number

AIR 16 S Einclipsbar Set
Bearing block for AIR17-S sensor module for installation in TopScan-S profile section

Mechanical specifications	
Material	Polyamide, spring steel
Mass	approx. 5 g
Mounting	Mounting accessories included
General information	
Packing unit	2 item(s)

Model Number

LAGERBOCK AIR16
Pedestal for the sensor module AIR16

Mechanical specifications	
Material	plastic
Mass	approx. 5 g

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Model Number

RMS Remote Control

infrared remote control for series RMS

General specifications	
Light type	infrared
Electrical specifications	
Operating voltage U_B	2x 1.5 V, ALKALINE LR6 / AA included with delivery
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Protection degree	IP54
Material	black ABS
Mass	100 g
Dimensions	140 mm x 63 mm x 31 mm

Model Number

RMS Weather cap

All-weather hood for RMS series microwave sensors, for ceiling and wall installation

Mechanical specifications	
Material	plastic
Mounting	Mounting accessories included

Model Number

RMS Antenna broad

Radar antenna for wide sensing range

General specifications	
Sensing range	4000 x 2000 mm (d x w) at installation height of 2200 mm and 30° angle
Function principle	Microwave module
Detection speed	min. 0.1 m/s
Operating frequency	24.15 ... 24.25 GHz K-Band
Transmitter radiated power (EIRP)	< 20 dBm
Compliance with standards and directives	
Standard conformity	
Standards	EN 62311, EN 300 440-1, EN 300 440-2
Ambient conditions	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)

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Model Number

RaDec Weather Cap

Weather hood for radar sensors series RaDec

Mechanical specifications	
Material	plastic
Mounting	Mounting accessories included

Model Number

RaDec Weather Cap Silver

Weather hood for radar sensors series RaDec

Mechanical specifications	
Material	Plastic, painted silver
Mounting	Mounting accessories included

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Model Number

Flush Mounting AIR30
Installation cover for AIR30 series sensors

Mechanical specifications	
Material	plastic
Mass	approx. 20 g

Model Number

UP-Einbaurahmen
Mounting frame for sensors in the AIR30 and PROSCAN series

Mechanical specifications	
Material	plastic
Mass	approx. 15 g

Model Number

Wetterhaube AIR30
Weather hood for series AIR30

Mechanical specifications	
Material	black ABS
Dimensions	133 mm x 95 mm x 60 mm
Mounting	Mounting accessories included

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Model Number

Flush Mounting PIR20

Flush-mounted frame for sensors in the PIR20

General specifications	
Setting angle	0 °
Mechanical specifications	
Material	black ABS
Mass	approx. 11 g
Dimensions	110 mm x 40 mm x 37 mm
Mounting	Mounting accessories included

Model Number

Wetterschutzhaube PIR 20

Weather hood for series PIR20

Mechanical specifications	
Protection degree	IP54 (iwhen mounted)
Material	black ABS
Dimensions	133 mm x 95 mm x 60 mm
Mounting	Mounting accessories included

Model Number

Flush Mounting AIR20

Flush-mounted frame for sensors in the AIR20

General specifications	
Setting angle	0 ... 15 °
Mechanical specifications	
Material	black ABS
Mass	approx. 8 g
Dimensions	110 mm x 40 mm x 37 mm
Mounting	Mounting accessories included

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Model Number

Montageplatte LT

Mounting plate for sensors in the LT and FLT series

Mechanical specifications	
Material	Plastic ABS
Optical face	Blue Plexiglas
Mass	approx. 155 g

Model Number

ML29 Front Plate

Front plate for thru-beam sensors in series ML29

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	Makrolon (IR permeable)
Mass	approx. 11 g

Model Number

Deckel-Zapfen

Mounting pivot for light grid AL20/AL40

Mechanical specifications	
Material	brass
Mass	approx. 9 g

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Model Number

PS1/31

Power supply/Power supply module

Indicators/operating means		
Function display		LED green: power on (according to safety) LED yellow: switching state, lights up for energized relay
Controls		10-fold programming switch for timer functions and switching type
Electrical specifications		
Operating voltage U_B		115 / 230 V AC
Power consumption P_0		5 VA (0.25 A miniature fuse)
Output		
Switching type		light/dark on selectable programmable
Signal output		Relay, 1 alternator
Switching voltage		240 V AC
Switching current		1 A
Switching frequency	f	20 Hz
Response time		20 ms
Timer function		ON delay (GAN), OFF delay (GAB), ON delay-OFF delay (GAN-GAB), 0.1 ... 15 s programmable
Other outputs		Sensor power supply 24 VDC, max. 180 mA
Standard conformity		
Standards		EN 60947-5-2
Ambient conditions		
Ambient temperature		0 ... 60 °C (32 ... 140 °F)
Storage temperature		-20 ... 75 °C (-4 ... 167 °F)
Mechanical specifications		
Protection degree		IP55
Connection		4 PG16 screwed connections , cage tension terminals in the terminal space
Material		
Housing		Plastic with transparent cover
Installation		screw fixing
Mass		600 g

Model Number

SC PS 120-240VAC

Power supply for evaluation devices with alternating current supply

Indicators/operating means	
Function display	LED green
Electrical specifications	
Operating voltage U_B	120 ... 230 V AC 100 ... 250 V DC
Ripple	3 %
Protection class	II
Efficiency	> 80 %
Input	
Input voltage	120 ... 230 V AC
Input current	0.2 A at 230 V AC
Output	
Switching voltage	24 V DC
Switching current	650 mA
Standard conformity	
Standards	EN 50178 EN 60950
Ambient conditions	
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	95 % at 25 °C
Shock resistance	IEC 68-2-27 30 g for 18 ms in all three room axes
Pollution Degree	2
Mechanical specifications	
Protection degree	IP20
Material	
Housing	plastic
Mass	140 g

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Model Number

BF 18

Mounting flange, 18 mm

General specifications	
Inside diameter	18 mm
Ambient conditions	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Mechanical specifications	
Material	Base: Crastin/PBT (green) Upper section: PA (transparent)
Dimensions	40 mm x 44 mm x 24 mm

Model Number

BF 18-F

Mounting flange with dead stop, 18 mm

General specifications	
Inside diameter	18 mm
Ambient conditions	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Mechanical specifications	
Material	black polycarbonate (PC)

Date of issue 2012-11-12

Model Number

MPZB01
Mounting bracket with vertical slots

Mechanical specifications	
Material	metal
Mass	approx. 115 g

Model Number

MPZB02
Mounting bracket with circular slots

Mechanical specifications	
Material	metal
Mass	approx. 150 g

Model Number

MPZB06
Ball and Swivel Mounting Bracket

Mechanical specifications	
Material	plastic
Mass	approx. 830 g

Model Number

MPZB07
Ball and Swivel Vertical Mounting Plate

Mechanical specifications	
Material	metal
Mass	approx. 230 g

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Model Number

OMH-ML17
Mounting bracket

Mechanical specifications	
Material	Stainless steel

Model Number

OMH-ML17-1
Mounting bracket

Mechanical specifications	
Material	Stainless steel
Mounting	Mounting accessories included

Date of issue 2012-11-12

Model Number

OMH-RL31-01
Mounting bracket

Mechanical specifications

Material	Metal sheet (steel), zinc-plated

Model Number

OMH-RL31-02
Mounting bracket narrow

Mechanical specifications

Material	Metal sheet (steel), zinc-plated

Model Number

OMH-RL31-03
Mounting bracket narrow

Mechanical specifications

Material	Metal sheet (steel), zinc-plated

Model Number

OMH-RL31-05
Mounting bracket with M10 threaded rod

General specifications

Accessories provided	Mounting set for one sensor

Mechanical specifications

Material	Stainless steel

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Model Number

OMH-ML7-01
Mounting bracket

Mechanical specifications	
Material	Stainless steel
Mass	approx. 15 g
Mounting	Mounting accessories included

Model Number

OMH-ML7-02
Mounting bracket

Mechanical specifications	
Material	Stainless steel
Mass	approx. 8 g
Mounting	Mounting accessories included

Model Number

OMH-ML7-03
Fixing plate

Mechanical specifications	
Material	Stainless steel
Mass	approx. 5 g

Date of issue 2012-11-12

Model Number

OMH-RLK29
Mounting bracket

Mechanical specifications	
Material	Stainless steel
Mass	approx. 85 g

Model Number

OMH-RL29-06
Mounting bracket

Mechanical specifications	
Material	Stainless steel
Mounting	Mounting accessories included

Model Number

OMH-RLK29-HW
Mounting bracket for rear wall mounting

Mechanical specifications	
Material	Stainless steel
Mass	approx. 150 g
Dimensions	136 mm x 52 mm x 3 mm
Suitable series	
Reflector series	C110-2

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Model Number

OMH-10
Mounting aid

Mechanical specifications	
Material	Stainless steel
Mass	approx. 15 g
Mounting	Mounting accessories included

Model Number

OMH-21
Mounting bracket

Mechanical specifications	
Material	Powder coated steel
Mass	approx. 175 g
Mounting	Mounting accessories included

Model Number

OMH-22
Mounting bracket

Mechanical specifications	
Material	black anodized aluminium
Mass	approx. 180 g
Suitable series	
Reflector series	reflector C110-2 H60 reflector

Model Number

OMH-91
Mounting bracket

Mechanical specifications	
Material	Metal sheet (steel), black-coated
Mass	approx. 70 g
Mounting	Mounting accessories included

Date of issue 2012-11-12

Model Number

OMH-MLV12-HWG

Mounting bracket for series MLV12 sensors

Mechanical specifications	
Material	nickel-plated steel
Mass	approx. 15 g

Model Number

OMH-MLV12-HWK

Mounting bracket for series MLV12 sensors

Mechanical specifications	
Material	nickel-plated steel
Mass	approx. 10 g

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Model Number

OMH-K01
dove tail mounting clamp

Mechanical specifications	
Material	anodized aluminium
Mass	approx. 10 g

Model Number

OMH-K02
dove tail mounting clamp

Mechanical specifications	
Material	anodized aluminium
Mass	approx. 5 g

Model Number

OMH-VL18
Mounting Bracket with swivel nut

Mechanical specifications	
Material	Metal /high-grade steel
Mass	approx. 70 g

Date of issue 2012-11-12

Model Number

PCV-USB-RS485-Converter Set
USB to RS 485 interface converter

Indicators/operating means	
Controls	DIP-switch (Operating mode)
Electrical specifications	
Operating voltage U_B	via USB
Mechanical specifications	
Dimensions	70 mm x 67 mm x 22 mm
General information	
Scope of delivery	USB connection cable 800 mm Software on CD-ROM 24 V power supply and V19 cordset

Model Number

PCV-KBL-V19-STR-RS485
Cable unit with power supply for USB / RS 485 interface converter

Electrical specifications	
Operating voltage U_B	95 ... 230 V AC, 40 ... 60 Hz
Compliance with standards and directives	
Standard conformity	
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007

Model Number

PCV-SC12
Grounding clip for PCV system

Mechanical specifications	
Material	Stainless steel
Mass	1 g

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Model Number

BF 6,5

Mounting flange, 6.5 mm

General specifications	
Inside diameter	6.5 mm
Ambient conditions	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Mechanical specifications	
Material	Base: Crastin/PBT (green) Upper section: PA (transparent)
Dimensions	20 mm x 26 mm x 13 mm

Model Number

BF 5

Mounting flange, 5 mm

General specifications	
Inside diameter	5 mm
Ambient conditions	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Mechanical specifications	
Material	Base: PBTB (green) Upper section: PC (transparent)
Dimensions	15 mm x 18 mm x 10 mm

Model Number

BF 4

Mounting flange, 4 mm

General specifications	
Inside diameter	4 mm
Ambient conditions	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Mechanical specifications	
Material	Base: PBTB (green) Upper section: PC (transparent)
Dimensions	15 mm x 18 mm x 10 mm

Model Number

BF 8

Mounting flange, 8 mm

General specifications	
Inside diameter	8 mm
Ambient conditions	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Mechanical specifications	
Material	Base: Crastin/PBT (green) Upper section: PA (transparent)
Dimensions	20 mm x 26 mm x 13 mm

Date of issue 2012-11-12

Model Number

BF 12

Mounting flange, 12 mm

General specifications	
Inside diameter	12 mm
Ambient conditions	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Mechanical specifications	
Material	Base: Crastin/PBT (green) Upper section: PA (transparent)
Dimensions	30 mm x 36 mm x 17 mm

Model Number

BF 30

Mounting flange, 30 mm

General specifications	
Inside diameter	30 mm
Ambient conditions	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Mechanical specifications	
Material	Base: Crastin/PBT (green) Upper section: PA (transparent)
Dimensions	40 mm x 56 mm x 36 mm

Model Number

MHW 01

Modular mounting bracket

Mechanical specifications	
Material	Extruded aluminum profile
Dimensions	Profile rail 1 for the installation of the mounting bracket: 155 mm Profile rail 2 for positioning the mounting bracket for the supporting profile:

Profil Typ	H [mm]	Y [mm]
MHW 01	107	35
MHW 02	116	20
MHW 06	158	60
MHW 09	139	52
MHW 10	132	47

Model Number

MH 02-L

Mounting aid

Mechanical specifications	
Material	Profile rail: aluminum socket: diecast zinc

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Model Number

EXG-08

Quick mounting bracket with dead stop

Mechanical specifications	
Material	brass, nickel-plated
Dimensions	M12 x 1 external thread

Model Number

EXG-12

Quick mounting bracket with dead stop

Mechanical specifications	
Material	brass, nickel-plated
Dimensions	M16 x 1 external thread

Model Number

EXG-18

Quick mounting bracket with dead stop

Mechanical specifications	
Material	brass, nickel-plated
Dimensions	M24 x 1.5 external thread

Model Number

EXG-30

Quick mounting bracket with dead stop

Mechanical specifications	
Material	brass, nickel-plated
Dimensions	M36 x 1.5 external thread

Date of issue 2012-11-12

Model Number

OMH-04

Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

Mechanical specifications	
Material	Metal sheet (steel), nickel-plated aluminum
Mass	approx. 60 g

Model Number

BF 5-30

Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm

Ambient conditions	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Mechanical specifications	
Note	Also suited for threaded photodetectors in series KT10, GLV12, VL18, 18GM60, CP18 and GLV30.

Model Number

UVW90-K18

Ultrasonic -deflector

Mechanical specifications	
Material	PMMA
Mass	15 g

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Model Number

WCS-HP-R
Read head protection

Ambient conditions	
Ambient temperature	-40 ... 100 °C (-40 ... 212 °F)
Mechanical specifications	
Material	Metal sheet (steel), zinc-plated
Mass	325 g

Model Number

WCS-MT-R
Retainer

Ambient conditions	
Ambient temperature	-40 ... 100 °C (-40 ... 212 °F)
Mechanical specifications	
Material	Metal sheet (steel), zinc-plated
Mass	530 g

Model Number

WCS-MP1
Mounting plate for reading heads WCS2 and WCS3

Mechanical specifications	
Material	PA 6 GF35 Grivory
Mass	35 g
Dimensions	(W x H x D) 105 mm 58 mm 9.5 mm

Date of issue 2012-11-12

Model Number

WCS-MB-R1
Mounting bracket

Ambient conditions	
Ambient temperature	-40 ... 100 °C (-40 ... 212 °F)
Mechanical specifications	
Material	Metal sheet (steel), zinc-plated
Mass	710 g

Model Number

WCS-MT1
Tensioning device for stainless steel code rail

Model Number

WCS-MB-R2
Guide bracket

Ambient conditions	
Ambient temperature	-40 ... 100 °C (-40 ... 212 °F)
Mechanical specifications	
Material	Metal sheet (steel), zinc-plated
Mass	200 g

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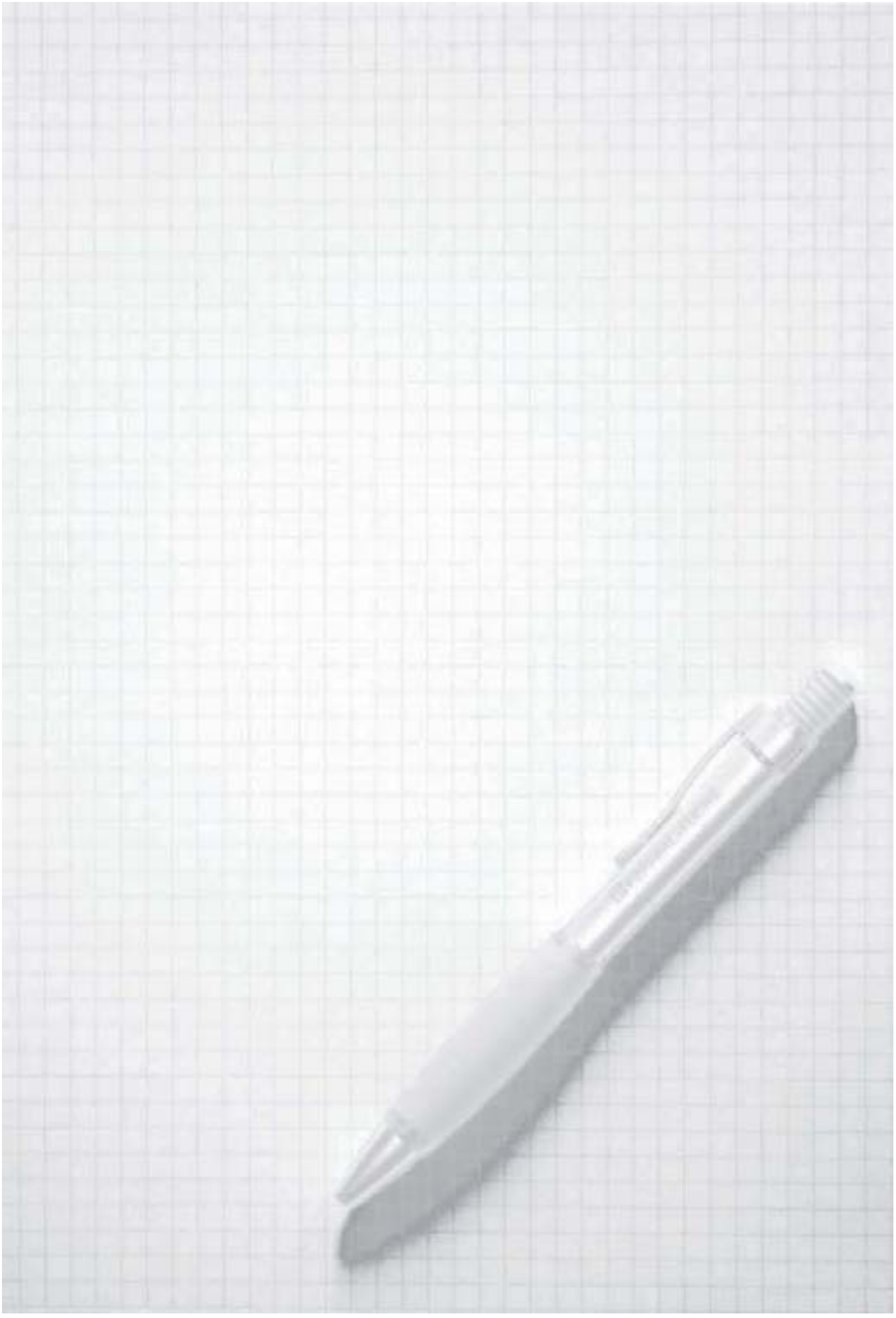


Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 976
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67 / IP68 / IP69K (IP67 only shielded version)
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, green
Coupling nut	Die-cast zinc

Properties

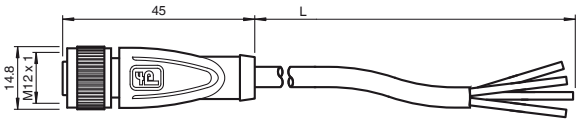
- M12 x 1 Single-ended Cordset
- Female straight and angled versions
- A-coded

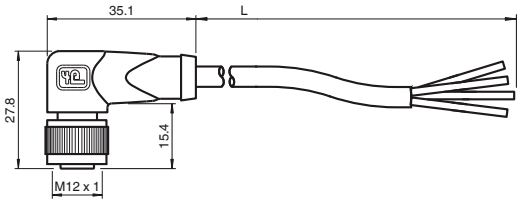
Your Benefit

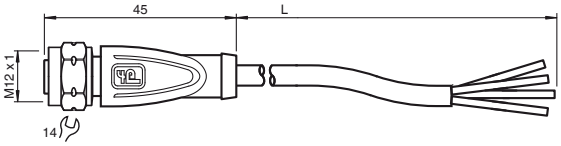
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

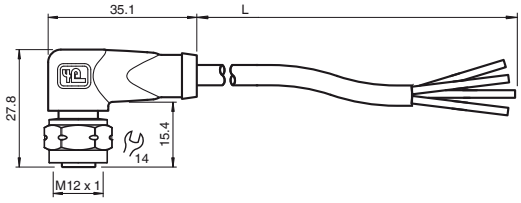
Order codes		V11-...	V1-...	V15-...	V17-...	V19-...
Number of pins	3	●				
	4		●			
	5			●		
	7 + Shield				●	
	8					●
Electrical data						
Max. operating voltage	30 V				●	●
	60 V			●		
	250 V	●	●			
Max. operating current	2 A				●	●
	4 A	●	●	●		

Dimensions









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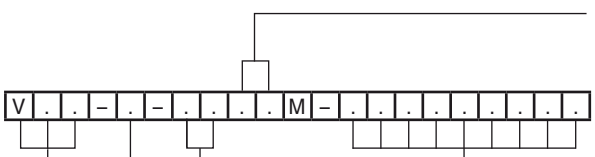
Order codes



Cable lengths in m
0.3 to 50

Cable quality

–	PVC	PVC, gray (0.34 mm²)
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)
–	PUR	PUR, halogen-free, gray (0.34 mm²)
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.25 mm²)
BK	PUR-U/0.75	PUR, halogen-free, UL-approved, black (0.75 mm²)
–	PUR H/S	PUR, halogen-free, irradiated, orange (0.34 mm²)
OR	POC	POC, welding bead resistant, orange (0.34 mm²)
		Shielded cable quality
–	PUR-ABG	PUR, halogen-free, shielded, gray (0.34 mm²)
BK	PUR-U/ABG	PUR, halogen-free, shielded, UL-approved, black (0.25mm²)

Availability

V11	V1	V15	V17	V19
◇	◇	◇	–	–
◇	◇	–	–	–
◇	◇	–	–	–
♦	♦	♦	–	–
◇	◇	–	–	–
◇	◇	–	–	–
–	–	–	–	♦
–	–	◇	–	–
–	◇	–	–	–
–	◇	–	–	–
–	♦	♦	–	–
–	–	–	♦	♦

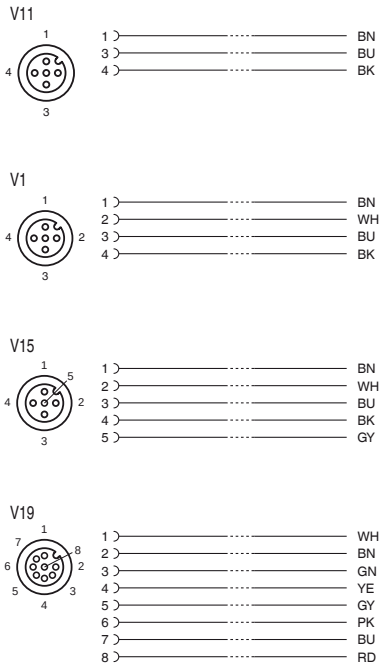
♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

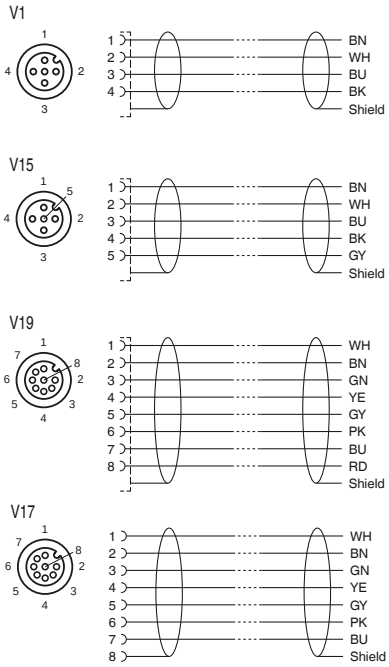
Design
G straight
W angled
For stainless steel coupling nut add V4A, e.g. **WV4A, GV4A**

Number of pins
V11 3-pin
V1 4-pin
V15 5-pin
V17 7-pin + shield
V19 8-pin

Electrical connection

Shielded





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	3 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 976
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, green
Coupling nut	Die-cast zinc

Properties

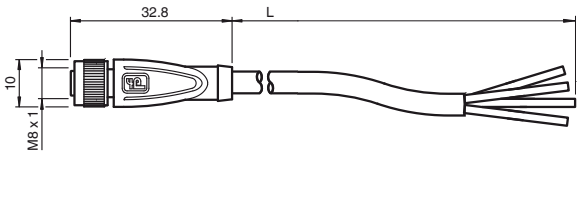
- M8 x 1 Single-ended Cordset
- Female straight and angled versions

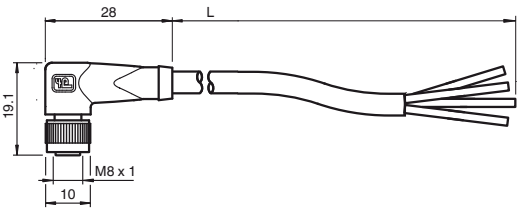
Your Benefit

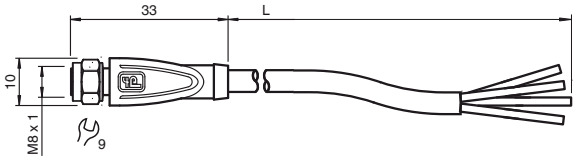
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

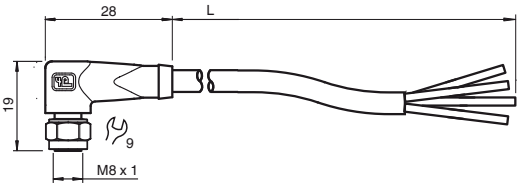
Order codes		V3-...	V31-...
Number of pins	3	●	
	4		●
Electrical data			
Max. operating voltage	30 V		●
	60 V	●	

Dimensions









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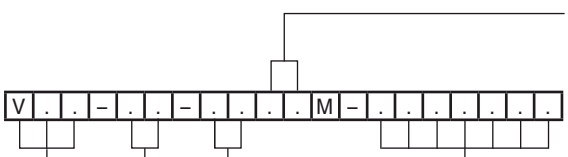
Order codes



Cable lengths in m
0.3 to 50

Cable quality

-	PVC	PVC, gray (0.25 mm²)
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)
-	PUR	PUR, halogen-free, gray (0.25 mm²)
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)

Shielded cable quality

–	PUR-ABG	PUR, halogen-free, shielded, gray (0.34 mm²)

Availability

V3	V31
◇	◇
◇	◇
◇	◇
♦	♦
◇	◇
◇	◇
◇	◇

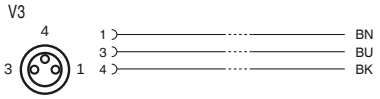
Design
GM straight
WM angled
For stainless steel coupling nut add V4A, e.g. **WMV4A, GMV4A**

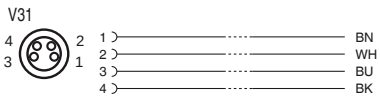
Number of pins
V3 3-pin
V31 4-pin

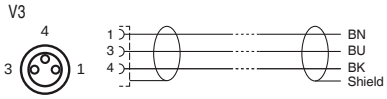
♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

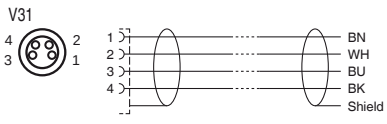
Electrical connection

Shielded









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PEPPERL+FUCHS
SENSING YOUR NEEDS

Noncontact Detection Using Sensors for the Protection and Convenience of People and Vehicles

Building automation has made huge advances in recent years, and intelligent doors, gates, and barrier systems have made an important contribution to this trend. Whether in public buildings, office complexes, shopping malls, elevators, car parks, factories, or warehouses, conveniently getting through entrances and exits without any manual operation is now taken for granted in many areas. Automatic doors—swinging, revolving, and sliding doors—open and close countless times every day. However, the typical pedestrian is unaware of the work that goes into providing this convenience. In addition to the visible opening and closing process, safety plays a critical role. As hazards caused by collisions with people and objects cannot be totally ruled out with automatic doors, the applicable safety regulations justifiably set out stringent protection requirements. Providing continuously reliable and sophisticated sensor solutions for automatic entry and vehicle access systems is the challenge we have taken on.

Invisible Protection

Escalators, automatic doors, gates, barriers, and elevators are now indispensable parts of our everyday lives. They open automatically, as if by an invisible hand, detect obstructions, and appear to respond completely automatically to approaching people and objects.
Invisible Protection describes our range of Pepperl+Fuchs noncontact sensors for automated entry and vehicle access systems. The sensors guide us conveniently and safely through our everyday lives with no contact.
Our invisible helper „Mr. Invisible“ accompanies you safely through the day. He keeps an eye on all your activities, opens and closes doors, gates, or vehicle access systems at the right time and protects people and property from collisions and damage.

General notes relating to Pepperl+Fuchs product information

1. All information and statements in the product catalog (both in printed and electronic form), in particular, but not limited to descriptions, illustrations, drawings, statements concerning quality, workmanship, service and use as well as dimensions, are current at the time the printed product catalog is issued or published in electronic media.

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5. All information, statements, and technical specifications contained therein are based on valid standards and comply with relevant standardized measuring methods.

6. Customers are always responsible for independently determining the suitability of our products for the intended application. Only customers are aware of all the boundary conditions and influencing factors associated with the intended purpose. Due to the enormous number of potential application options offered by Pepperl+Fuchs products and the subsequent range of possible external influences and a potential overlap of these influences in the application of products, Pepperl+Fuchs cannot accept liability for any aspect of the actual customer application. This applies in particular to, but not limited to, applications in safety systems and explosion hazardous areas as well as environmental influences such as chemicals, pressure, temperature fluctuations, moisture, mechanical influences, and incorrect installation.

7. Customers who intend to use Pepperl+Fuchs products in new applications or applications where they do not have adequate experience can contact Technical Sales Support (service line) and discuss the suitability of the products for the intended application with our specialists. Customers are obliged to provide realistic and complete information on all the relevant conditions associated with the application in writing to prevent misunderstandings.

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