



PHOTOELECTRIC SENSORS WITH BACKGROUND SUPPRESSION



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OPERATING PRINCIPLE

Photoelectric sensors with background suppression function by using the angle of incidence, rather than the amount, of reflected light. The light pulse from the emitting diode leaves the optical system as a focused, almost parallel, light beam. On meeting an object in its path, part of the beam is diffusely reflected, and in turn, part of this reflected light falls on the PSD (Position-Sensitive Device) housed in the same sensor (Fig. 1). Depending on the distance of the target from the device, the light falls on a particular spot of the PSD, and a corresponding reception signal is emitted, indicating that an object is present at a certain distance from the device. The analyzing circuit compares the signal received with the preset operating distance (adjusted by means of the built-in potentiometer), and, if the distance of the object is less than, or equal to, the preset operating distance, the output is switched. Contrary to an energetic diffuse sensor, the operating distance depends only to a very small extent on the target size or color, or on the nature of its surface. The object can therefore be easily discerned, even against a light background. These devices are not suitable for objects having shiny surfaces.

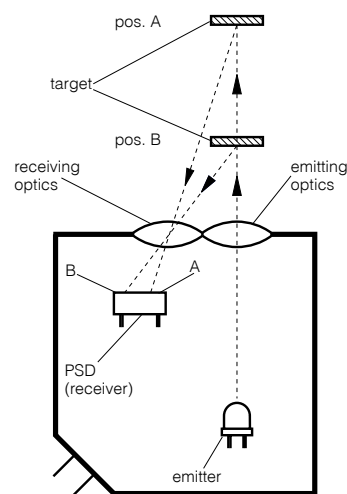


Fig. 1

AVAILABLE MODELS

The present range of photoelectric sensors with background suppression comprises cylindrical as well as rectangular models of various sizes, thus providing the user with a considerable choice.





The devices feature:

- Large setting ranges (adjustable by means of a built-in potentiometer)
- Virtually negligible blind zone
- Operating distance independent of target color, shape and surface structure
- High switching frequencies
- High degree of protection (IP 67)

DEVICES WITH ANALOG OUTPUT

The background suppression product range includes devices with analog output with excellent white-gray characteristics. These feature a large sensing range, excellent temperature stability and an outstanding repeat accuracy. The sensing range, as with classic background suppression models, is furthermore independent of the target color and surface structure. Since intermediate digitalization has been dispensed with, the resolution of these sensors is virtually unlimited.

FIBERS

The range furthermore includes synthetic fibers with background suppression for axial and lateral sensing. These fibers recognise position and thickness differences of only 0.1 mm and detect targets as small as 0.15 mm² as well as wires/threads with diameters from 0.1 mm. For suitable amplifiers, please consult our catalog "Fiber-optic solutions".

ANALOG DIFFUSE SENSOR WITH BACKGROUND SUPPRESSION

MAIN FEATURES

- Sensing range from 10 ... 100 mm
- Excellent resolution
- Excellent temperature stability
- Voltage output of 0 ... 5 V
- Operating distance independent of target color and surface structure
- Bandwidth of 100 Hz
- Glass lens, easy to clean
- High degree of protection: IP 67

TECHNICAL DATA

Housing material	Chrome-plated brass
Supply voltage range U_B	10 ... 30 VDC
Bandwidth (-3 dB)	100 Hz (at $s = 50$ mm)
Permissible ripple content	≤ 20 %
No-load supply current	≤ 25 mA
Time delay before availability	≤ 100 msec
Max. ambient light:	
halogen	5,000 Lux
sun	10,000 Lux
Ambient temperature range	0 ... +55 °C
Temperature drift % s_n	0.1 / °C
Degree of protection	IP 67
EMC protection:	
IEC 60947-5-2	1 kV
IEC 61000-4-2	Level 2
IEC 61000-4-3	Level 2
IEC 61000-4-4	Level 3
IEC 61000-4-6	Level 2
Short-circuit protection	Built-in
Polarity reversal protection	Built-in
Power-on reset	Built-in

CONNECTION

Switches with 2 m PVC cable 3 x 0.34 mm² are standard. Other cable types or lengths are available on request.

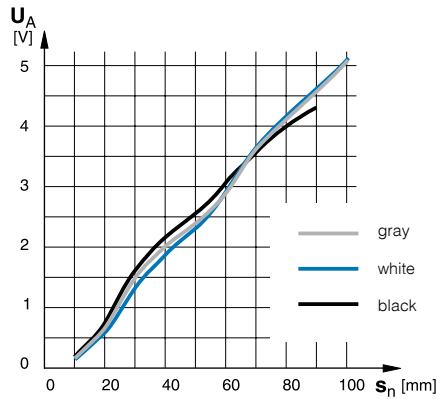
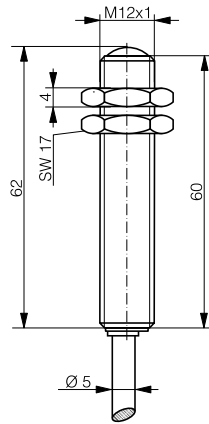
DOCUMENTATION

Detailed data sheets for these products can be found on the Contrinex website www.contrinex.com or ordered free of charge from our distributors.

Technical drawings can be downloaded as files from the Contrinex website and directly imported into your construction drawings.

SERIES 1120

10 ... 100 mm



Response curve:

TYPE SPECIFIC DATA

Housing size	M12	
Sensing range	10 ... 100 mm	
Standard target	100 x 100 mm white	
Emitter	LED red 660 nm	
Voltage output	0 ... 5 V	
Current output	---	
Weight	85 g	

PART REFERENCES

Part ref.: (bold : preferred types)		
Output 0 ... 5 V / PVC cable 2 m	LAK-1120-309	
Wiring (page 17)	Diagram 1	

DIFFUSE SENSORS WITH BACKGROUND SUPPRESSION

MAIN FEATURES

- Short housing
- Setting range from 10 ... 120 mm
- Sensitivity adjustment by means of the built-in potentiometer
- Very small blind zone of < 1 mm
- Operating distance independent of target color and surface structure
- High switching frequency of 500 Hz
- Glass window, easy to clean
- Excellent resistance to environmental influences thanks to polyurethane potting of the electronic module
- High degree of protection: IP 67

TECHNICAL DATA

Housing material	Chrome-plated brass
Supply voltage range U_B	10 ... 36 VDC
Permissible ripple content	≤ 20 %
No-load supply current	≤ 25 mA
Output current	≤ 200 mA
Output voltage drop	≤ 2.0 V at 200 mA
Max. switching frequency	500 Hz
Switching time (↑ and ↓)	1 msec
Time delay before availability	20 msec
Max. ambient light:	
halogen	5,000 Lux
sun	10,000 Lux
Ambient temperature range	-25 ... +55 °C
Temperature drift % s_n	0.5 / °C
Degree of protection	IP 67
EMC protection:	
IEC 60947-5-2	1 kV
IEC 61000-4-2	Level 2
IEC 61000-4-3	Level 3
IEC 61000-4-4	Level 3
Short-circuit protection	Built-in
Polarity reversal protection	Built-in
Power-on reset	Built-in

LEDS

For reliable operation the green LED (reception indication) must light up. The yellow LED indicates the output state.

CONNECTION

Switches with 2 m PVC cable 3 x 0.34 mm² or 4-pole S12 connector are standard. Other cable types or lengths are available on request.

DOCUMENTATION

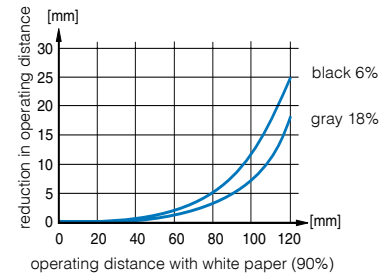
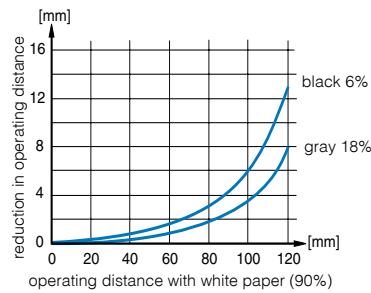
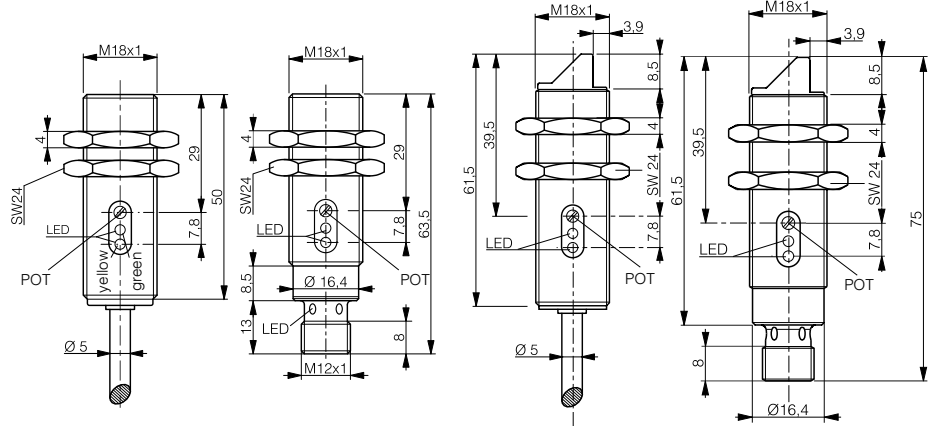
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SERIES 1180 / 1180W

10 ... 120 mm

10 ... 120 mm



Response curves:

TYPE SPECIFIC DATA

Housing size
Setting range
Standard target
Emitter
Weight (cable / connector model)

STANDARD

M18
10 ... 120 mm
100 x 100 mm white
LED red 660 nm
121 g / 53 g

LATERAL SENSING

M18
10 ... 120 mm
100 x 100 mm white
LED red 660 nm
124 g / 57 g

PART REFERENCES

Part ref.: (bold : preferred types)
NPN light-ON / PVC cable 2 m
NPN dark-ON / PVC cable 2 m
NPN light-ON / Connector S12 4-pole
NPN dark-ON / Connector S12 4-pole
PNP light-ON / PVC cable 2 m
PNP dark-ON / PVC cable 2 m
PNP light-ON / Connector S12 4-pole
PNP dark-ON / Connector S12 4-pole
Wiring (page 17)

LHK-1180-301
LHK-1180-302
LHS-1180-301
LHS-1180-302
LHK-1180-303
LHK-1180-304
LHS-1180-303
LHS-1180-304
Diagram 3

LHK-1180W-301
LHK-1180W-302
LHS-1180W-301
LHS-1180W-302
LHK-1180W-303
LHK-1180W-304
LHS-1180W-303
LHS-1180W-304
Diagram 3

DIFFUSE SENSORS WITH BACKGROUND SUPPRESSION

MAIN FEATURES

- Small, but robust
- Setting range from 15 ... 150 mm (3030) / 15 ... 200 mm (3131)
- Sensitivity adjustment by means of the built-in 12-turn potentiometer
- Very small blind zone of < 1 mm
- Operating distance independent of target color and surface structure
- High switching frequency of 500 Hz
- Glass window, easy to clean
- Extremely resistant and fully-potted PBTP (Crastin) housing
- High degree of protection: IP 67

TECHNICAL DATA

Housing material	Glass-fiber reinforced PBTP (Crastin)
Supply voltage range U_b	10 ... 36 VDC
Permissible ripple content	≤ 20 %
No-load supply current	≤ 25 mA
Output current	≤ 200 mA
Output voltage drop	≤ 2.0 V at 200 mA
Max. switching frequency	500 Hz
Switching time (↑ and ↓)	1 msec
Time delay before availability	100 msec
Max. ambient light:	
halogen	5,000 Lux
sun	10,000 Lux
Ambient temperature range	-25 ... +55 °C
Temperature drift % s_n	0.3 / °C
Degree of protection	IP 67
EMC protection:	
IEC 60947-5-2	5 kV
IEC 61000-4-2	Level 2 (3030) / Level 3 (3131)
IEC 61000-4-3	Level 3
IEC 61000-4-4	Level 3
IEC 61000-4-6	Level 2 (3131)
Short-circuit protection	Built-in
Polarity reversal protection	Built-in
Power-on reset	Built-in

LEDS

For reliable operation the green LED (reception indication) must light up. The yellow LED indicates the output state.

CONNECTION

Devices with 3 m PVC cable 4 x 0.14 mm² (3030) or 2 m PVC cable 3 x 0.14 mm² (3131) and 4-pole S8 (3030) or 3-pole S8 (3131) connector are standard. Other cable types or lengths are available on request.

DOCUMENTATION

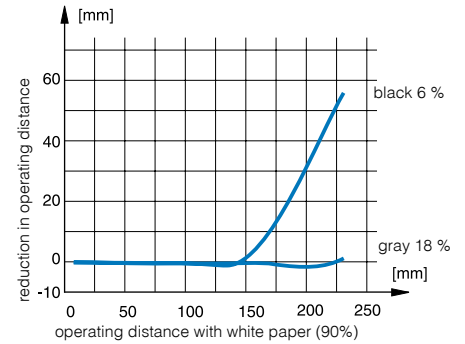
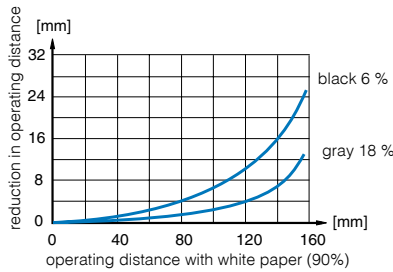
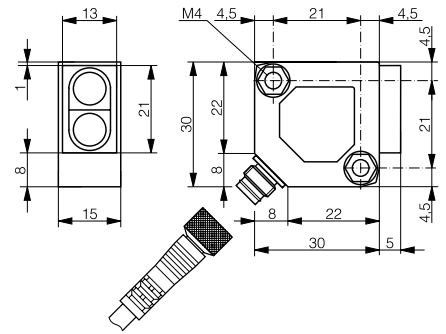
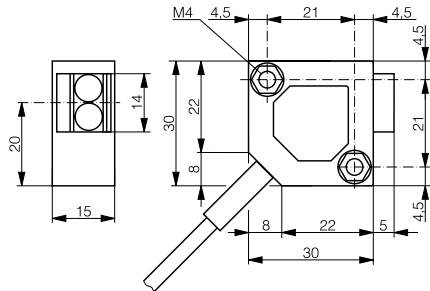
Detailed data sheets for these products can be found on the Contrinex website www.contrinex.com or ordered free of charge from our distributors.

Technical drawings can be downloaded as files from the Contrinex website and directly imported into your construction drawings.

SERIES 3030 / 3131

15 ... 150 mm

15 ... 200 mm



Response curves:

TYPE SPECIFIC DATA	
Housing size	
Setting range	15 ... 150 mm
Standard target	100 x 100 mm white
Emitter	LED red 660 nm
Weight (cable / connector model)	75 g / 17 g

4-WIRE	
Housing size	30 x 30 x 15
Setting range	15 ... 150 mm
Standard target	100 x 100 mm white
Emitter	LED red 660 nm
Weight (cable / connector model)	75 g / 17 g

TYPE SPECIFIC DATA	
Housing size	
Setting range	15 ... 200 mm
Standard target	100 x 100 mm white
Emitter	LED red 660 nm
Weight (cable / connector model)	75 g / 17 g

3-WIRE	
Housing size	30 x 30 x 15
Setting range	15 ... 200 mm
Standard target	100 x 100 mm white
Emitter	LED red 660 nm
Weight (cable / connector model)	75 g / 17 g

PART REFERENCES

Part ref.: (bold : preferred types)
NPN changeover / PVC cable 3 m
NPN light-ON + recept. / PVC cable 3m
NPN changeover / S8 4-pole
NPN light-ON + reception / S8 4-pole
PNP changeover / PVC cable 3 m
PNP light-ON + recept. / PVC cable 3m
PNP changeover / S8 4-pole
PNP light-ON + reception / S8 4-pole
Wiring (page 17)

LHK-3030-101
LHK-3030-102
LHS-3030-101
LHS-3030-102
LHK-3030-103
LHK-3030-104
LHS-3030-103
LHS-3030-104
Diagram 4

Part ref.: (bold : preferred types)
NPN light-ON / PVC cable 2 m
NPN dark-ON / PVC cable 2 m
NPN light-ON / Connector S8 3-pole
NPN dark-ON / Connector S8 3-pole
PNP light-ON / PVC cable 2 m
PNP dark-ON / PVC cable 2 m
PNP light-ON / Connector S8 3-pole
PNP dark-ON / Connector S8 3-pole
Wiring (page 17)

LHK-3131-301
LHK-3131-302
LHS-3131-301
LHS-3131-302
LHK-3131-303
LHK-3131-304
LHS-3131-303
LHS-3131-304
Diagram 3

ANALOG DIFFUSE SENSORS WITH BACKGROUND SUPPRESSION

MAIN FEATURES

- Sensing range from 10 ... 100 mm
- Excellent resolution (no digitalization)
- Excellent temperature stability
- Voltage as well as current outputs in the same device
- Operating distance independent of target color and surface structure
- Bandwidth of 500 Hz
- Glass window, easy to clean
- Extremely resistant and fully-potted PBTP (Crastin) housing
- High degree of protection: IP 67

TECHNICAL DATA

Housing material	Glass-fiber reinforced PBTP (Crastin)
Supply voltage range U_s	10 ... 36 VDC / 15 ... 36 VDC (LA#-3130-119)
Bandwidth (-3 dB)	500 Hz (at s = 50 mm)
Permissible ripple content	≤ 20 %
No-load supply current	≤ 25 mA
Time delay before availability	≤ 100 msec
Max. ambient light:	
halogen	5,000 Lux
sun	10,000 Lux
Ambient temperature range	-25 ... +55 °C
Temperature drift % s_n	0.1 / °C
Degree of protection	IP 67
EMC protection:	
IEC 60947-5-2	5 kV
IEC 61000-4-2	Level 3
IEC 61000-4-3	Level 3
IEC 61000-4-4	Level 3
IEC 61000-4-6	Level 2
Short-circuit protection	Built-in
Polarity reversal protection	Built-in
Power-on reset	Built-in

CONNECTION

Switches with 2 m PVC cable 4 x 0.14 mm² or 4-pole S8 connector are standard. Other cable types or lengths are available on request.

DOCUMENTATION

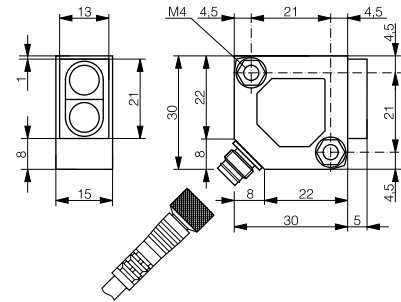
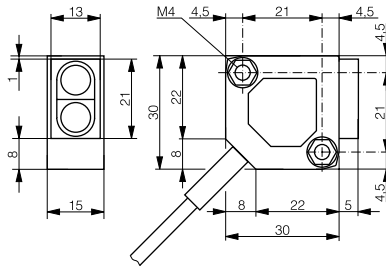
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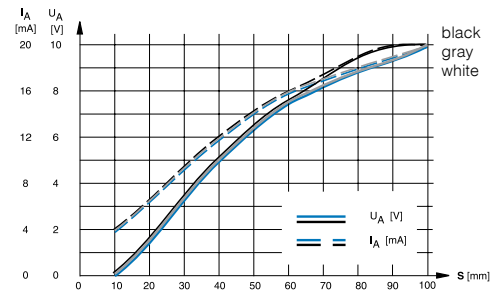
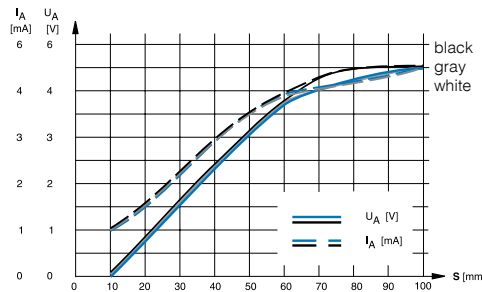
SERIES 3130

10 ... 100 mm

10 ... 100 mm



Response curves:



TYPE SPECIFIC DATA

Housing size	□ 30 x 30 x 15	□ 30 x 30 x 15
Sensing range	10 ... 100 mm	10 ... 100 mm
Standard target	100 x 100 mm white	100 x 100 mm white
Emitter	LED red 660 nm	LED red 660 nm
Voltage output	0 ... 5 V	0 ... 10 V
Current output	1 ... 5 mA	4 ... 20 mA
Weight (cable / connector model)	75 g / 17 g	75 g / 17 g

PART REFERENCES

Part ref.: (bold : preferred types)		
Voltage and current outputs / PVC cable 2 m	LAK-3130-109	LAK-3130-119
Voltage and current outputs / Connector S8 4-pole	LAS-3130-109	LAS-3130-119
Wiring (page 17)	Diagram 2	Diagram 2

DIFFUSE SENSOR WITH BACKGROUND SUPPRESSION

MAIN FEATURES

- Large setting range from 20 ... 500 mm
- Distance setting by means of the built-in 3-turn potentiometer with position indication
- Very small blind zone of < 1 mm
- Operating distance independent of target color and surface structure
- High switching frequency of 500 Hz
- Glass window, easy to clean
- Extremely resistant and fully-potted PBTP (Crastin) housing
- High degree of protection: IP 67

TECHNICAL DATA

Housing material	Glass-fiber reinforced PBTP (Crastin)
Supply voltage range U_b	10 ... 36 VDC
Permissible ripple content	≤ 20 %
No-load supply current	≤ 30 mA
Output current	≤ 200 mA
Output voltage drop	≤ 2.0 V at 200 mA
Max. switching frequency	500 Hz
Switching time (↑ and ↓)	1 msec
Time delay before availability	100 msec
Max. ambient light:	
halogen	5,000 Lux
sun	10,000 Lux
Ambient temperature range	-25 ... +55 °C
Temperature drift % s_n	0.2 / °C
Degree of protection	IP 67
EMC protection	
IEC 60947-5-2	5 kV
IEC 61000-4-2	Level 3
IEC 61000-4-3	Level 3
IEC 61000-4-4	Level 3
IEC 61000-4-6	Level 2
Short-circuit protection	Built-in
Polarity reversal protection	Built-in
Power-on reset	Built-in

LED

For reliable operation the LED (reception indication) must light up green. A yellow LED indicates the output state.

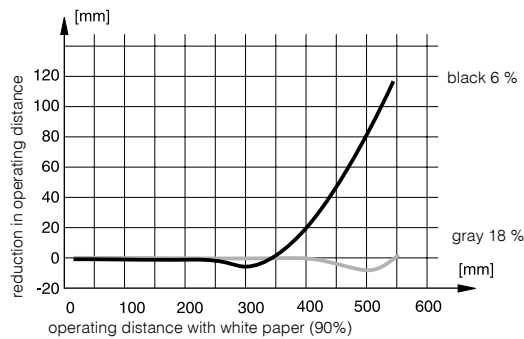
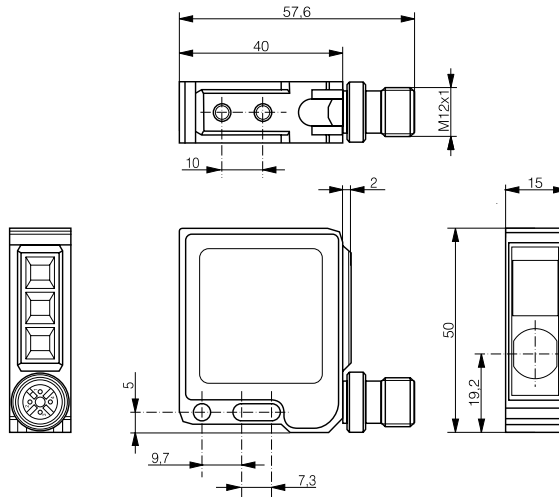
CONNECTION

Devices with 2 m PVC cable 4 x 0.25 mm² or 4-pole S12 connector are standard. Other cable types or lengths are available on request.

DOCUMENTATION

Detailed data sheets for these products can be found on the Contrinex website www.contrinex.com or ordered free of charge from our distributors.

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Response curve:

TYPE SPECIFIC DATA	STANDARD	
Housing size	<input type="checkbox"/> 40 x 50 x 15	
Setting range	20 ... 500 mm	
Standard target	100 x 100 mm white	
Emitter	LED red 660 nm	
Weight (cable / connector model)	75 g / 17 g	

PART REFERENCES		
Part ref.: (bold : preferred types)		
NPN changeover / PVC cable 2 m	LHK-4050-101	
NPN light-ON + reception / PVC cable 2 m	LHK-4050-102	
NPN changeover / Connector S12 4-pole	LHS-4050-101	
NPN light-ON + reception / S12 4-pole	LHS-4050-102	
PNP changeover / PVC cable 2 m	LHK-4050-103	
PNP light-ON + reception / PVC cable 2 m	LHK-4050-104	
PNP changeover / Connector S12 4-pole	LHS-4050-103	
PNP light-ON + reception / S12 4-pole	LHS-4050-104	
Wiring (page 17)	Diagram 4	

DIFFUSE SENSORS WITH BACKGROUND SUPPRESSION

MAIN FEATURES

- Robust universal devices
- Large setting range from 50 to 1,000 mm
- Sensitivity adjustment by means of a built-in potentiometer with calibration scale and reduction gearbox
- Very small blind zone of < 1 mm
- Operating distance independent of target color and surface structure
- High switching frequency: 250 Hz
- Glass window, easy to clean
- Extremely resistant PBTP (Crastin) housing
- High degree of protection: IP 67

TECHNICAL DATA

Housing material	Glass-fiber reinforced PBTP (Crastin)
DC supply voltage range U_b	10 ... 36 VDC
UC supply voltage range U_b	20 ... 265 VAC / 20 ... 320 VDC
Permissible ripple content *	≤ 20 %
No-load supply current DC *	≤ 50 mA
No-load supply voltage UC **	< 2 VA
Output current *	≤ 200 mA
Output voltage drop *	≤ 2.0 V at 200 mA
Max. switching frequency	250 Hz
Switching time (↑ and ↓) *	2 msec
Time delay before availability	20 msec (DC) / 200 msec (UC)
Max. ambient light:	
halogen	5,000 Lux
sun	10,000 Lux
Ambient temperature range	-5 ... +55 °C
Temperature drift % s_n	0.3 / °C
Degree of protection	IP 67
EMC protection	
IEC 60947-5-2	1 kV
IEC 61000-4-2	Level 3
IEC 61000-4-3	Level 3
IEC 61000-4-4	Level 3
Short-circuit protection	Built-in
Polarity reversal protection	Built-in
Power-on reset	Built-in

* DC models (UC see data sheet)

** UC models

LEDS

For reliable operation the green LED (reception indication) must light up. The yellow LED indicates the output state.

CONNECTION

Devices with 4-pole or 5-pole S12 connector or screw terminal are standard.

DOCUMENTATION

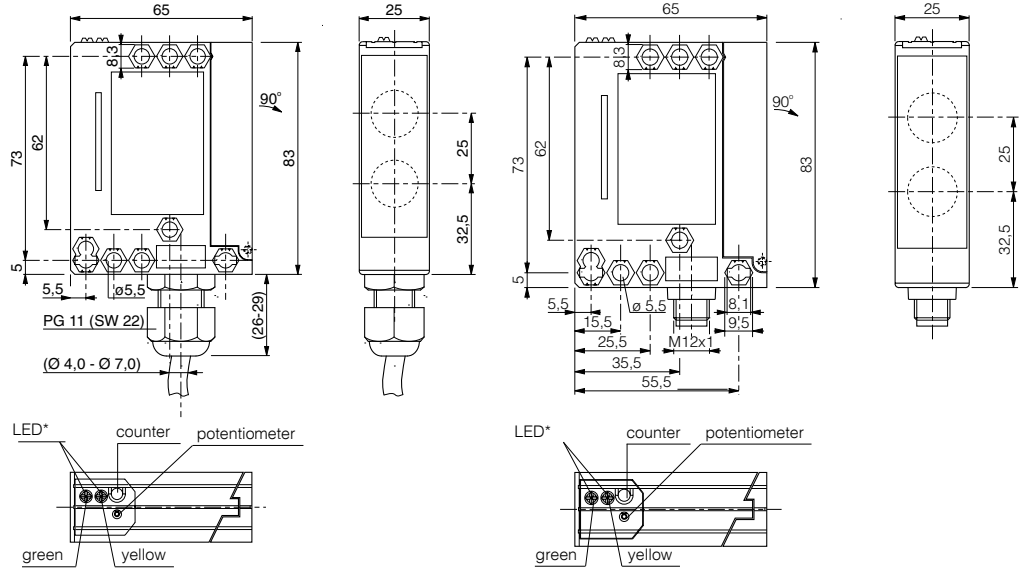
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SERIES 6080

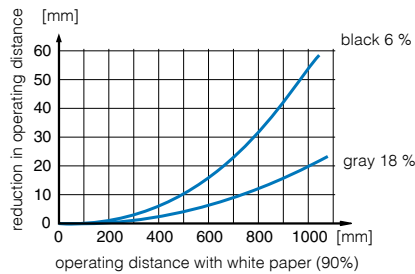
50 ... 1,000 mm

50 ... 1,000 mm



* receiver only

Response curve:



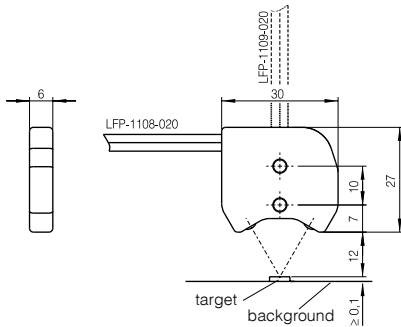
TYPE SPECIFIC DATA	DC	TYPE SPECIFIC DATA	UC (AC / DC)
Housing size	<input type="checkbox"/> 65 x 83 x 25	Housing size	<input type="checkbox"/> 65 x 83 x 25
Setting range	50 ... 1,000 mm	Setting range	50 ... 1,000 mm
Standard target	200 x 200 mm white	Standard target	200 x 200 mm white
Emitter	IR LED 880 nm	Emitter	IR LED 880 nm
Weight	100 g	Weight	100 g

PART REFERENCES			
Part ref.: (bold: preferred types)		Part ref.: (bold: preferred types)	
DC NPN / Connector S12 4-pole	LHS-6080-101*	UC relay / Connector S12 5-pole	LHS-6080-115
DC NPN / Screw terminal	LHT-6080-101		
DC NPN timer** / S12 5-pole	LHS-6080-151	UC relay / Screw terminal	LHT-6080-115
DC NPN timer** / Screw terminal	LHT-6080-151		
DC PNP / Connector S12 4-pole	LHS-6080-103*	UC relay / timer** / S12 5-pole	LHS-6080-165
DC PNP / Screw terminal	LHT-6080-103		
DC PNP timer** / S12 5-pole	LHS-6080-153	UC relay / timer** / Screw terminal	LHT-6080-165
DC PNP timer** / Screw terminal	LHT-6080-153		
Wiring (page 17)	Diagram 4* / 5	Wiring (page 17)	Diagram 6

** light-ON/dark-ON switchable

SYNTHETIC FIBERS WITH BACKGROUND SUPPRESSION

Part reference (**bold**: preferred types)



MAIN FEATURES

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

Housing size: <input type="checkbox"/> 27 x 30	Background suppression / flexible / 90°
Part reference	LFP-1108-020
Operating distance	Fixed 12 mm
Outside fiber	2 separate fibers, Ø 2.2 mm
Inner fiber	151 x Ø 75 µm
Special characteristics	Lateral sensing
	Detectable height difference: 0.1 mm
	Minimum detectable target size: 0.15 mm ²
	Minimum detectable wire diameter: 0.1 mm

Housing size: <input type="checkbox"/> 27 x 30	Background suppression / flexible
Part reference	LFP-1109-020
Operating distance	Fixed 12 mm
Outside fiber	2 separate fibers, Ø 2.2 mm
Inner fiber	151 x Ø 75 µm
Special characteristics	Detectable height difference: 0.1 mm
	Minimum detectable target size: 0.15 mm ²
	Minimum detectable wire diameter: 0.1 mm



WIRING DIAGRAMS

Analog output

Diagram 1

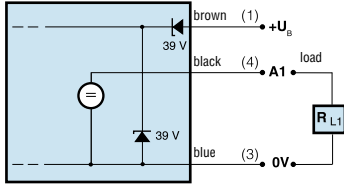
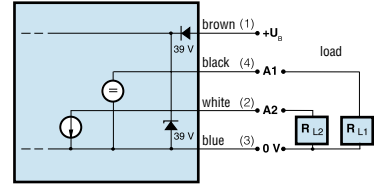
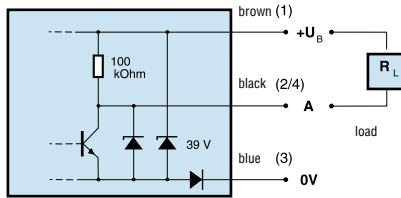


Diagram 2



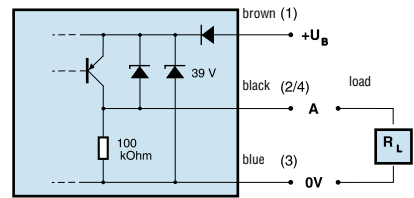
NPN light-ON / dark-ON output

Diagram 3



(2) N.C. / (4) N.O. and S8

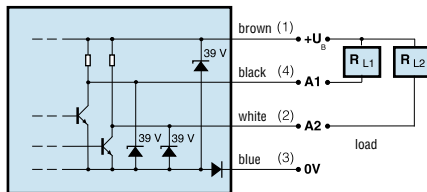
PNP light-ON / dark-ON output



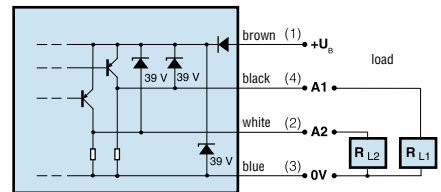
(2) N.C. / (4) N.O. and S8

NPN changeover outputs
NPN light-ON + reception outputs

Diagram 4

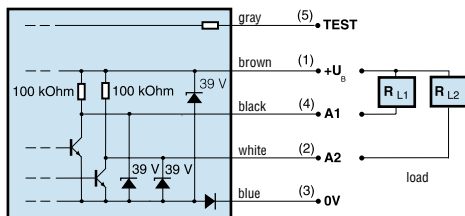


PNP changeover outputs
PNP light-ON+ reception outputs

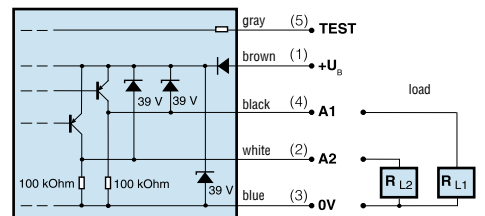


NPN with test input

Diagram 5

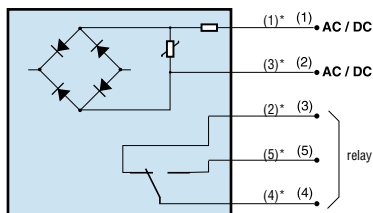


PNP with test input



UC with relay output

Diagram 6



* for connector models