

S+S light intensity and motion sensors valid from July 2014





SENSOR TECHNOLOGY & FIELD DEVICES





PHOTASGARD® General information on sensor elements for light intensity sensors

S+S REGELTECHNIK

Light sensor



Characteristic curve showing the sensitivity of light sensor (indoor areas) in function of the angle of incidence of light.

Light sensor (outdoor areas)

PHOTASGARD®



Characteristic curve showing the sensitivity of light sensor (outdoor areas) in function of the angle of incidence of light.



Characteristic curve showing the sensitivity of light sensor on the circuit board in respect of the wavelength of light. The broken line represents the light perception of the human eye.

The light sensor used in $\textbf{PHOT} \texttt{ASGARD}^{\texttt{®}}$ light intensity sensors was specifically adapted to the sensitivity of the human eye. Its greatest sensitivity is in the range of 350 nm to 820 nm.

Therefore with its special filter the sensor is predestined for exposure measurement of daylight and ${\rm /\,or}$ for measuring artificial light of high colour temperature (similar to sunlight).

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KINASGARD®



General information on sensor elements for motion sensors and presence detectors

Infrared motion detector



Detection range **KIN**ASGARD® 101 max. 110° **KIN**ASGARD® Principle Motion sensor ΠΠ Infrared radiation **∖ /** / Temperature Infràred difference radiation `▶ ♦ ◀ < Motion

High-end variant infrared sensor with enlarged aperture angle of 100° respectively 110° over 360 degrees circumference and 10 m of reach.

In all $\textbf{KIN} \texttt{ASGARD}^{\circledast}$ motion sensors and presence detectors, a high-end variant infrared sensor with enlarged angle of aperture is exclusively used.

Because of the patented lens system with 20 individual lenses, only very small dark areas are resulting, which even at a distance of 10 m are only a few centimeters wide, safely detecting also small motions.

The sensor recognizes changes in the infrared radiation spectrum, so in heat radiation, resulting form the movement of persons or objects. Such movements generate a temporary change of the temperature gradient in the field.

Because of the always present body (heat) radiation, this sensor is excellently suitable for the detection of persons. The temperature difference between sensor and object must be > 5 K.

Sensor recognizes the temperature difference resulting from the movement of persons or objects.

Outdoor light intensity sensors / twilight sensors with multi-range switching and active output



The light intensity sensor / twilight sensor PHOTASGARD® AHKF with six switchable measuring ranges (six devices in one) measures the luminous intensity and is used to control luminaries, lighting systems, Venetian blinds and canvas blinds, etc., to monitor lighting conditions at workplaces, in greenhouses, storage halls, workshops, corridors, in outdoor areas, in industrial halls, in offices as well as in residential and business facilities, for daylight-dependant constant light control, as lig ht intensity or twilight sensor and to control sunshade equipment avoiding unnecessary heating-up of rooms. Therefore it minimizes your variety of types and stockkeeping while covering a greater range of universal applications. The sensor used in PHOTASGARD® light intensity sensors was specifically adapted to the sensitivity of the human eye. Its greatest sensitivity is in the range of 350 nm to 820 nm. Therefore with its special filter the sensor is predestined for exposure measurement of daylight and / or for measuring artificial light of high colour temperature (similar to sunlight).

TECHNICAL DATA:

Power supply:	.at U variant: 24 V AC (±20%); 1536 V DC (±10%)
	at I variant: 1536 V DC (± 10%) depending on
	working resistance, stabilized, max ripple 0.5 Vpp
Power consumption:	.< 1 W at 24 V DC; < 2 VA at 24 V AC
Sensor:	light sensor (see beginning of this chapter)
Measuring ranges:	.multi-range switching (via DIP switches)
	with 6 switchable measuring ranges
	0500 Lux / 1 kLux / 2 kLux / 5 kLux / 20 kLux / 60 kLux (other individual ranges optional, e.g. 100 kLux)
Output:	.420mA or 0-10V
	(linearised, active, 2- or 3-wire connection)
Measuring error:	.< 5% of final value
Ambient temperature:	30+70 °C
Electrical connection:	.0.14 - 1.5 mm², via terminal screws on circuit board
Enclosure:	. plastic, material polyamide, 30% glass-globe-reinforced, with quick-locking screws (slotted / Phillips head combination), colour pure traffic white (similar RAL 9016), enclosure cover for AHKF is transparent!
Dimensions:	. 72 x 64 x 43.3 mm (Tyr 1)
Cable gland:	.M16x1.5, including strain relief, exchangeable, max. inner diameter 10.4mm
Installation:	. on-wall
Protection class:	.III (according to EN 60730)
Protection type:	.IP 65 (according to EN 60529)
Standards:	.CE conformity, electromagnetic compatibility according to EN 61 326, EMC directive 2004 / 108 / EC

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AHKF-I



 \mathbf{N} 1 <u>©</u> 2 <u>©</u> 3

> UB+ supply voltage 24V AC/DC Output light intensity 4...20mA (linearised)



PHOTASGARD® AHKF

Type / WG1	Measuring Range Light Intensity (adjustable)	Output Light Intens	ity	ltem No.	Price
AHKF					
AHKF-I	0500 Lux / 1 / 2 / 5 / 20 / 60 kLux	4 20 mA	(linearised)	1601-1112-1000-000	80,00 €
AHKF-U	0500 Lux / 1 / 2 / 5 / 20 / 60 kLux	0 - 10 V	(linearised)	1601-1111-1000-000	80,00 €
Extra charge:	Other individual measuring ranges optional, e.	g. 100 kLux		on request	

M16x15





Measuring ranges (selectable)	DIP 1	DIP 2	DIP 3	DIP 4
0500 Lux	OFF	OFF	OFF	-
0 1 kLux	ON	OFF	OFF	-
0 2 kLux	OFF	ON	OFF	-
0 5 kLux	ON	ON	OFF	-
0 20 kLux	OFF	OFF	ON	-
060 kLux	ON	OFF	ON	-

Connecting diagram

UB- GND

Connecting diagram

AHKF-U

UB+ supply voltage 24V AC/DC Output light intensity 0-10V (linearised)

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Room light intensity sensors with multi-range switching and active output

The room light intensity sensor PHOTASGARD® RHKF with four switchable measuring ranges (four devices in one) measures the luminous intensity and is used to control luminaries, lighting systems, Venetian blinds and canvas blinds, etc., to monitor lighting conditions at workplaces, in storage halls, workshops and corridors, in indoor areas, in industrial halls, in offices as well as in residential and business facilities, for daylight-dependant constant light control, as light intensity or twilight sensor and to control sunshade equipment avoiding unnecessary heating-up of rooms. Therefore it minimizes your variety of types and stockkeeping while covering a greater range of universal applications. The sensor used in PHOTASGARD® light intensity sensors was specifically adapted to the sensitivity of the human eye. Its greatest sensitivity is in the range of 350 nm to 820 nm. Therefore with its special filter the sensor is predestined for exposure measurement of daylight and / or for measuring artificial light of high colour temperature (similar to sunlight).

TECHNICAL DATA:

Power supply:	.at U variant: 24 V AC (±20%); 1536 V DC (±10%)
	at I variant: 1536 V DC (± 10%) depending on
	working resistance, stabilized, max ripple 0.5 Vpp
Power consumption:	.< 1 W at 24 V DC; < 2 VA at 24 V AC
Sensor:	light sensor (see beginning of this chapter)
Measuring ranges:	multi-range switching (via DIP switches)
5 5 5 5 5	with 4 switchable measuring ranges
	0500 Lux / 1 kLux / 5 kLux / 20 kLux
	(other individual ranges optional, e.g. 100 kLux)
Output:	.420mA or 0-10V
	(linearised, active, 2- or 3-wire connection)
Measuring error:	. < 5% of final value
Ambient temperature:	.0+ 50 °C
Electrical connection:	.0.14 - 1.5 mm², via terminal screws on circuit board
Enclosure:	plastic, material ABS, colour pure white (similar RAL 9010)
Dimensions:	.85 x 91 x 27 mm (Frija I)
Installation:	wall mounting or on in-wall flush box, Ø55mm,
	base with 4-hole for mounting on vertically or horizontally
	installed in-wall flush boxes for cable entry from the back,
	with predetermined breaking point for on-wall cable entry
	from top $/$ bottom in case of plain on-wall installation
Protection class:	.III (according to EN 60730)
Protection type:	IP 30 (according to EN 60529)
Standards:	CE conformity, electromagnetic compatibility according to

EN 61 326, EMC directive 2004 / 108 / EC



UB- GND Connecting diagram RHKF-I <u>⊗</u>1 ⊗2 UB+ supply voltage 24V AC/DC Output light intensity 4...20mA (linearised) Schematic diagram RHKF 0 \bigcirc ON UB+ 24V AC/DC Output Light Intensity in lux 2

DIP

1

ON

OFF

OFF

OFF

UB+ supply voltage 24V AC/DC Output light intensity 0-10V (linearised)

DIP

2

OFF

0 N

OFF

OFF

DIP

3

OFF

OFF

0 N

OFF

DIP

4

OFF

OFF

OFF

0 N

RHKF-U

Measuring ranges

Connecting diagram

(selectable)

0...500 Lux

0... 1 kLux

0... 5 kLux

0... 20 kLux



PHOTASGARD® RHKF

Type / WG1	Measuring Range Light Intensity (adjustable)	Output Light Intensity	ltem No.	Price
RHKF				
RHKF-I	0500 Lux / 1 kLux / 5 kLux / 20 kLux	420mA (linearised)	1601-4122-2000-000	80,00 €
RHKF-U	0500 Lux / 1 kLux / 5 kLux / 20 kLux	O-10V (linearised)	1601-4121-2000-000	80,00 €
Extra charge:	Other individual measuring ranges optional, e.g	j. 100 kLux	on request	

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RHKF

Outdoor motion sensor with switching output



The motion sensor / presence detector KINASGARD® ABWF detects the presence of persons and motions. It is used for the observation and recognition of conditions and for a motion-dependent control of room functions, e.g. as motion detector to lower temperatures in unused rooms. The motion sensor is applied in corridors, in outdoor areas, in industrial halls, in offices, residential rooms and business facilities. The sensor detects motions over an aperture angle of 110° and a perimeter of 360°. Because of the patented lens system with 20 individual lenses, only very small dark areas are resulting, which even at a distance of 10m are only a few centimeters wide, safely detecting also small motions. The sensor recognizes changes in the infrared radiation spectrum, so in heat radiation, resulting form the movement of persons or objects. Such movements generate a temporary change of the temperature gradient in the field. Because of the always present body (heat) radiation, this sensor is excellently suitable for the detection of persons. The temperature difference between sensor and object must be > 5 K.

TECHNICAL DATA:

Power supply:	.at U variant: 24 V AC (±20%); 1536 V DC (±10%)
	at I variant: 1536 V DC (± 10%) depending on
	working resistance, stabilized, max ripple 0.5 Vpp
Power consumption:	.< 1 W at 24 V DC; < 2 VA at 24 V AC
Sensor:	infrared motion sensor (see beginning of this chapter)
Detection range:	.perimeter 360°, aperture angle 90° / 110°,
	reach ca. 10 m, circular
Motion detection:	of persons and objects, necessary temperature difference between subject and ambience $\geq 5K$
Output:	.without / with motion,
	potential-free changeover contact 24V/1A
After-running time:	adjustable from 4 s to 16 min
Measuring error:	. < 5% of final value
Ambient temperature:	30+70°C
Electrical connection:	.0.14 - 1.5 mm², via terminal screws on circuit board
Enclosure:	plastic, material polyamide, 30% glass-globe-reinforced, with quick-locking screws (slotted / Phillips head combination), colour pure traffic white (similar RAL 9016)
Dimensions:	.72 x 64 x 37.8 mm (Tyr 1)
Cable gland:	.M16x1.5, including strain relief, exchangeable,
	max. inner diameter 10.4 mm
Installation:	.on-wall
Protection class:	.III (according to EN 60730)
Protection type:	.IP 65 (according to EN 60529)
Standards:	CE conformity, electromagnetic compatibility according to EN 61 326, EMC directive 2004 / 108 / EC







KINASGARD® ABWF				
Type / WG1	Detection Presence / Motion	Output Presence / Motion	ltem No.	Price
ADVVF				
ABWF-W	Yes / No	Changeover contact	1401-1110-4000-000	105,00 €
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ABWF



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Room motion sensor with switching output

RBWF

The motion sensor / presence detector KINASGARD[®] RBWF detects the presence of persons and motions and has a switching output (changeover contact). The sensor detects motions over an aperture angle of 110° and a perimeter of 360°. Because of the patented lens system with 20 individual lenses, only very small dark areas are resulting, which even at a distance of 10m are only a few centimeters wide, safely detecting also small motions. Elegant enclosure made of plastic with snap-on lid, base with 4-hole attachment for installation on vertically or horizontally installed in-wall flush boxes, with predetermined breaking point for on-wall cable entry in case of on-wall installation. The room motion sensor is used for the observation and recognition of conditions and for the motion-dependent control of room functions, e.g. for lowering temperatures in unused rooms as motion detector. This residential room motion detector is installed in corridors, in outdoor areas, in industrial halls, in offices, in residential rooms and business facilities.

TECHNICAL DATA:

Power supply:	.at U variant: 24 V AC (±20%); 1536 V DC (±10%)
	at I variant: $1536 \vee DC (\pm 10\%)$ depending on
	working resistance, stabilized, max ripple 0.5 Vpp
Power consumption:	.< 1 W at 24 V DC; < 2 VA at 24 V AC
Sensor:	infrared motion sensor (see beginning of this chapter)
Detection range:	.perimeter 360°, aperture angle 90°∕110°, reach ca.10m, circular
Motion detection:	of persons and objects, necessary temperature difference between subject and ambience $\geq 5\mathrm{K}$
Output:	.without / with motion, potential-free changeover contact (24 V)
After-running time:	adjustable von 4 s to 16 min
Measuring error:	.< 5% of final value
Ambient temperature:	.0+ 50 °C
Electrical connection:	.0.14 - 1.5 mm², via terminal screws on circuit board
Enclosure:	plastic, material ABS, colour pure white (similar RAL 9010)
Dimensions:	.85 x 91 x 27 mm (Frijal)
Mounting:	wall mounting or on in-wall flush box, Ø55mm,
	base with 4-hole for mounting on vertically or horizontally installed in-wall flush boxes for cable entry from the back, with predetermined breaking point for on-wall cable entry from top / bottom in case of plain on-wall installation
Protection class:	.III (according to EN 60730)
Protection type:	IP 30 (according to EN 60529)
Standards:	CE conformity, electromagnetic compatibility according to EN 61 326, EMC directive 2004 / 108 / EC



 Connecting diagram
 RBWF

 Image: Output of the second seco

Schematic diagram



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KINASGARD® RBWF					
Type / WG1	Detection Presence / Motion	Output Presence / Motion	ltem No.	Price	
RBWF					
RBWF-W	Yes / No	Changeover contact	1401-4120-4000-000	105,00 €	

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RBWF

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Ceiling built-in motion sensor with switching output



DBWF

The ceiling-built-in motion sensor ${\rm KINASGARD}^{\circledast}\ {\rm DBWF}$ detects the presence of persons and motions and has a switching output (changeover contact). The motion detector is used for the observation and recognition of conditions and for the motion-dependent control of room functions, e.g. for lowering temperatures in unused rooms. The ceiling motion detector is installed in suspended ceilings in corridors and offices as well as in residential rooms and business facilities. The measuring transducer is accommodated in a separate enclosure apart from the sensor. The sensor detects motions over an aperture angle of 110° and a perimeter of 360°. Because of the patented lens system with 20 individual lenses, only very small dark areas are resulting, which even at a distance of 10m are only a few centimeters wide, safely detecting also small motions.

TECHNICAL DATA:

Power supply:	24 V AC (±20%); 1536 V DC (±10%)
Power consumption:	< 1 W at 24 V DC; < 2 VA at 24 V AC
Sensor:	infrared motion sensor (see beginning of this chapter)
Detection range:	perimeter 360°, aperture angle 90° / 110°, reach ca. 10 m, circular, at an installation height of ca. 3 m the sensor covers a detection radius (r) of ca. 3.4 m
Motion detection:	of persons and objects, necessary temperature difference between subject and ambience $\geq 5K$
Output:	potential-free changeover contact 24V/1A
After-running time:	adjustable from 4 s to 16 min
Ambient temperature:	–20+ 60 °C
Installation (sensor):	in suspended ceiling, ceiling cutout d = 26 mm diameter, cover D = 30 mm diameter
Connecting head:	aluminium, colour signal white (similar RAL 9003)
Protection type (sensor):	IP 30 (according to EN 60529)
Measuring transducer:	

Enclosure:p v c	olastic, material polyamide, 30 % glass-globe-reinforced, vith quick-locking screws (slotted / Phillips head combination), colour pure traffic white (similar RAL 9016)
Enclosure dimensions:7	72 x 64 x 37.8 mm (Tyr 1)
Cable length:k	KL = 2 m (connecting cables between sensor and electronics), other lengths optional
Cable gland:N n	M16x1.5, including strain relief, exchangeable, nax. inner diameter 10.4mm
Electrical connection:C	0.14 - 1.5 mm² via terminal screws
Protection class:II	II (according to EN 60730)
Protection type (enclosure): If	P 65 (according to EN 60529)
Standards:C	CE conformity, electromagnetic compatibility according to

Connecting diagram DBWF UB+ supply voltage 24V AC/DC $\otimes 1$ **2** N/C GND **N** 3 **N**13 Normally changeover **S**11 open contact [24 V] **1**2

DBWF

Breaker





37.8

KINASGARD® DBWF				
Type / WG1	Detection Presence / Motion	Output Presence / Motion	ltem No.	Price
DBWF				
DBWF-W	Yes / No	Changeover contact	1401-6110-4000-00)0 115,00 €
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KINASGARD® DBWF-C



S+S REGELTECHNIK

Ceiling built-in motion sensor, compact form, with switching output

S 4/9

The ceiling-built-in motion sensor KINASGARD® DBWF-C detects the presence of persons and motions and has a switching output (normally open contact). The motion detector is used for the observation and recognition of conditions and for the motion-dependent control of room functions, e.g. for lowering temperatures in unused rooms. The ceiling motion detector is installed in suspended ceilings in corridors and offices as well as in residential rooms and business facilities. The measuring transducer is accommodated in a separate enclosure apart from the sensor. The sensor detects motions over an aperture angle of 110° and a perimeter of 360°. Because of the patented lens system with 20 individual lenses, only very small dark areas are resulting, which even at a distance of 10 m are only a few centimeters wide, safely detecting also small motions.

TECHNICAL DATA:

Power supply:	.24 V AC (±20%); 1536 V DC (±10%)
Power consumption:	.< 1 W at 24 V DC; < 2 VA at 24 V AC
Sensor:	infrared motion sensor (see beginning of this chapter)
Detection range:	.perimeter 360°, aperture angle 90° / 110°,
	reach ca. 10 m, circular, at an installation height of ca. 3 m the sensor covers a detection radius (r) of ca. 3.4 m
Motion detection:	of persons and objects, necessary temperature difference between subject and ambience $\geq 5\mathrm{K}$
Output:	. potential-free normally open contact, signal relay, max. $24V/0.5A$
After-running time:	adjustable from 4 s to 16 min
Ambient temperature:	20+ 60 °C
Installation (sensor):	in suspended ceiling, ceiling cutout d = 26 mm diameter, cover D = 30 mm diameter
Connecting head:	aluminium, colour signal white (similar RAL 9003)
Protection type (sensor)	IP 30 (according to EN 60529)

Measuring transducer:

Enclosure:	.plastic, material PVC, colour black
Dimensions:	.55x20x15mm (compact form)
Cable length:	.KL = 0.5 m (connecting cables between sensor and electronics)
Electrical connection:	.0.14 - 1.5 mm² via terminal screws
Protection class:	.III (according to EN 60730)
Protection type (enclosure): .	.IP 20 (according to EN 60529)
Standards:	.CE conformity, electromagnetic compatibility according to
	EN 61326, EMC directive 2004/108/EC







DBWF-C

(Compact form)

DBWF-C (Compact form)

Normally open contact (24V) $\otimes 4$ ⊗ 3 ⊗ 2 UB- GND **S**1 UB+ supply voltage 24V AC/DC

Connecting diagram

DBWF-C (Compact form)



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rooms. The motion sensor is applied in corridors, in outdoor areas,

constant light control, as light intensity or twilight sensor and to control sunshade equipment avoiding unnecessary heating-up of rooms.

Power consumption:.....< 1 W at 24 V DC; $\,<$ 2 VA at 24 V AC Sensor:infrared motion sensor and light sensor

Measuring ranges:.....multi-range switching (via DIP switches)

Electrical connection:0.14 - 1.5 mm², via terminal screws on circuit board Enclosure:.....plastic, material polyamide, 30% glass-globe-reinforced,

Cable gland: M 16 x 1.5 , including strain relief, exchangeable,

max. inner diameter 10.4 mm

Standards:CE conformity, electromagnetic compatibility according to

6

Output, motion sensor: without / with motion,

Measuring error:.....
 $< 5\,\%$ of final value Ambient temperature:-30...+70°C

Installation: on-wall

Dimensional drawing

Protection class: III (according to EN 60730)

Protection type: IP 30 (according to EN 60529)

After-running time:.....adjustable from 4s to 16 min

The room motion and light sensor KINASGARD® ABWF / LF is a combined instrument that

detects motions and light intensity as well as the presence of persons and is used to recognize conditions. ABWF / LF issues a standard signal of 0 - 10 V for light intensity and has a switching (changeover contact) output for the detection of motions. The motion sensor / presence detector detects the presence of persons and motions. It is used for the observation and recognition of conditions and for a motion-dependent control of room functions, e.g. as motion detector to lower temperatures in unused

in industrial halls, in offices, residential rooms and business facilities. The light intensity sensor /

Power supply:at U variant: 24 V AC (± 20 %); 15...36 V DC (± 10 %)

(see beginning of this chapter)

with 6 switchable measuring ranges

twilight sensor with six switchable measuring ranges (six devices in one) measures the luminous intensity and is used to control luminaries, lighting systems, Venetian blinds and canvas blinds, etc., to monitor lighting conditions at workplaces, in greenhouses, storage halls, workshops, corridors, in outdoor areas, in industrial halls, in offices as well as in residential and business facilities, for daylight-dependant

> at I variant: 15...36 V DC (±10%) depending on working resistance, stabilized, max ripple 0.5 Vpp

potential-free normally open contact 24 V / 1A

(other individual ranges optional, e.g. 100 kLux)

colour pure traffic white (similar RAL 9016)

EN 61 326, EMC directive 2004 / 108 / EC

0...500 Lux / 1 kLux / 2 kLux / 5 kLux / 20 kLux / 60 kLux

with quick-locking screws (slotted / Phillips head combination),



ABWE/IE

Measuring ranges (selectable)	DIP 1	DIP 2	DIP 3	DIP 4
0500 Lux	OFF	OFF	OFF	-
0 1 kLux	ON	OFF	OFF	-
0 2 kLux	OFF	ON	OFF	-
0 5 kLux	ON	ON	OFF	-
0 20 kLux	OFF	OFF	ON	-
060 kLux	ON	OFF	ON	-

Connecting diagram

ABWF/LF



ABWF/LF

M16x1.5

UB+ supply voltage 24V AC/DC Output light intensity 0-10V (linearised)

Normally **N**13 **S**11 open contact **S**12 Breaker

changeover [24 V]



KINASGARD® ABWF/ LI	ASGARD® ABWF/	LF
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Type / WG1	Detection, Measuring Range	Output	ltem No.	Price
ABWF-LF				
1. Presence/Motion	Yes/No	Changeover contact	1401-1111-2100-000	169,00 €
2. Light Intensity	0500 Lux / 1 / 2 / 5 / 20 / 60 kLux	O -10 V (linearised)		
Extra charge:	Other individual measuring ranges optional, e.g. 100 kLux		on request	

TECHNICAL DATA:

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Room motion sensor and light sensor, multisensors with active and switching output





RBWF/LF \bigcirc UB+ 24V AC/DC Output Light Intensity in lux UB- GND 50 Presence detector ()ffset time (⊘) (⊘) Presence Brightness after-running Normally n contact Breaker correction

KINASGARD® RBWF/LF

Type / WG1	Detection, Measuring Range	Output	ltem No.	Price
RBWF-LF				
1. Presence/Motion	Yes / No	Changeover contact	1401-4121-1100-000	169,00 €
2. Light Intensity	0500 Lux / 1 kLux / 5 kLux / 20 kLux	O -10 V (linearised)		
Extra charge:	Other individual measuring ranges optional, e.g. 100 kLux		on request	

BBWE/IE

RBWF/LF

DIP

4

OFF

OFF

OFF

0 N

ΠP

3

OFF

OFF

0 N

OFF

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Information and Impressum



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- (1) All quotations made by S+S are without engagement. A contract is concluded through the written order confirmation or the delivery of goods ordered as far as S+S does not indicate via other circumstances that the order has been accepted. As far as the customer communicates change requests after receipt of the order confirmation. S+S is

(2) Illustrations, drawings and other specifications are only committal upon written acknowledgement.

- (2) instructions, or adving a and other specifications are only committed upon written acknowledgement. The corresponding applies for advisory or informative conversations between S+S and the customer, in particular about the applicability of goods ordered.
 (3) As far as the customer cancels the contract regardless for whatever reason without S+S being
- (3) As far as the customer cancels the contract regardless for whatever reason without S+S being accountable for, S+S is entitled to the right to claim blanket damages in the amount of 10 % of the total price being agreed at the date of order cancellation unless S+S or the customer provides other evidences in the individual case.

3. Performances/dates

- Delivery terms are binding only (fixed date transaction), if S+S has expressly confirmed that in writing.
 The adherence to binding terms of delivery presupposes the clarification of all technical and other questions as well as the timely and proper performance of any of the customer's duties.
- (3) Delays in delivery for reasons beyond the sphere of influence of S+S, particularly because of unforeseeable occurrences preventing or impeding a delivery in due time, S+S cannot be held responsible for. In such cases the delivery term extends accordingly. In the case of delay of performance the customer is entitled to withdraw from the non-performed part of the contract as far as such impediment to performance continues for more than 6 weeks and a reasonable grace period for delivery has been granted. Customer's claims for damages because of extension of a delivery period or in case of S+S being exempted from its duty to perform are excluded as far as the customer had been forthwith notified of such impediment to performance.
- (4) As far as S+S is responsible for the non-compliance with binding delivery dates, S+S's liability is limited to 0.5 % of the order value for each full week of default, however up to a maximum of 5 % of the order value of the shipment concerned. Any further claims for damages the customer can only assert as far as the customer has granted S+S a reasonable grace period in writing and such delay in delivery is attributable to gross negligence or intent on part of S+S.
- (5) S+S is exempt from its duty to supply when circumstances become known during the term of the contractual relationship that give reason to rightful doubts in the solvency of the customer. In that case S+S will perform the delivery as far as the customer makes an advance payment in respect of the purchase price, or provides appropriate securities.
- (6) As far as a customer orders goods on call (in particular pre-order), the full acceptance of the purchase or the full release order respectively has to be made within 12 months from the date of contract conclusion or order respectively. Otherwise the customer is obligated to accept the goods within 10 working days as far as S+S requests to do so in writing.
- (7) In case of noncompliance with the time limit mentioned under cipher (6), the legal consequences of default of acceptance in terms of BGB will commence.
- (8) Generally no right to return goods not needed anymore by buyer or for the purpose of stock reduction does exist.

4. Delivery

- (1) Shipment of goods is effected ex principal office of S+S at the customer's risk and expense. Any transport, breakage, theft, or other insurance will be taken out by S+S only at customer's request. Any expenses resulting thereof will be charged to the customer's account.
- (2) As far as a shipment is supposed to be carried out at a later date than the practically possible date of shipment upon the customer's request, S+S is entitled to charge the costs of storage to the customer's account, starting from one month after readiness for shipment at a blanket rate of 0.5 % of the order value for each month, subject to providing other evidences. One month after notification of readiness for shipment S+S is alternatively entitled to request the customer to accept the goods and in case of non-acceptance, to dispose of the goods in any other way. Then the customer is to be supplied within a reasonably extended period of time.
- (3) Partial performances are permissible as far as that is not unreasonable to the customer
- 5. Prices/terms of payment
- (1) Prices by S+S are understood plus legal value added tax at the respective rate in effect, ex principal office of S+S plus transport / shipping and packing costs to be separately charged. For orders of less than 75.00 EUR in value we reserve the right to charge a small quantity surcharge in the amount of 8.50 EUR. For special custom-made items we charge 67.00 EUR setup costs. Existing customers from which the last payment was received more than 12 months ago as well as new customers are supplied two times against prepayment and then after a positive creditworthiness check by our Euler Hermes trade credit default insurance on basis of payment on account. Foreign
- check by our Euler Hermes trade credit default insurance on basis of payment on account. Forei customers are supplied against prepayment.
 (2) S+S is entitled to invoice partial billing in accordance with the progress of order processing.
- (3) The invoice amount is due for payment upon receipt of the invoice. As far as payment is not effected within 14 working days form the date of performance in form of goods and receipt of the invoice, the customer is in default. All payments must be made in EUR. With the reservation of providing evidence of further damages in case of default of payment the customer has to pay interest on arrears at a rate of
- further damages in case of default of payment the customer has to pay interest on arrears at a rate of 8 percentage points above the respective base rate. (4) Bills of exchange and checks are only accepted for processing and take fulfilling effect only after being
- (4) Bills or exchange and checks are only accepted for processing and take fulfilling effect only after being unconditionally credited. Eventual ancillary costs arising due to payment by bill of exchange or check are for the customer's account.

6. Warranty

(1) The customer is obligated to inspect the goods immediately after the delivery by S+S as far as that is feasible according to the proper course of business and to forthwith notify S+S of any defects. In case the customer fails to provide such notification, the goods are deemed approved unless a defect is concerned that was not recognizable in the course of inspection. If such a defect appears at a later date, notification must be made immediately after discovery; otherwise the goods are deemed approved also in view of such defect. To maintain the customer's rights the timely dispatch of the notification is sufficient. If S+S has maliciously concealed a defect, then S+S cannot refer to that clause.

- (2) Within the scope of supplementary performance S+S has a right of choice. When the first-time attempt to eliminate the defect remains unsuccessful, S+S reserves the right to deliver goods free of defects. In case the supplementary performance has failed, the customer is optionally entitled to the right of withdrawal, or to the right of curtaliment.
- (3) Excluded from any warranty are: faults caused by inapplicable or improper application and utilization, faulty mounting & installation or putting into operation, particularly in the case of non-observance of operating instructions, or because of incorrect or negligent treatment by the customer or any third-party person not being within the sphere of responsibility of S+S.
- (4) S+S assigns its warranty claims existing against the manufacturer to the customer. The customer accepts such assignment. The customer is only entitled to assertion of warranty claims against S+S as far as the seriously pursued extra-judicial assertion of claims against the manufacturer has remained unsuccessful. In that case the customer is obligated to assign those claims against the manufacturer back to S+S again.
- (5) Warranty claims prescribe within one year from the date of delivery of goods through S+S.
- (6) If the customer calls upon S+S because of warranty claims and it turns out that either no defect was existing, or the asserted defect is due to a circumstance that does not commit S+S to warranty, then the customer has to reimburse S+S for the expenses resulting thereof as far as the customer has caused such availment of S+S grossly negligent or with intent.
- (7) Eventual supplementary performances or subsequent improvements made by S+S always happen without acknowledgement of any statutory duty and on goodwill basis.
- (8) In case the customer withdraws from the sales contract or rightfully requests delivery of new goods free of defects, or compensation for damages instead of the full performance, then S+S is obligated to dismount such defective goods delivered at its own expense as far as the customer had already installed such goods and to remove them. The customer itself is allowed to dismount defective goods upon request. In that case S+S refunds the customer for the costs arising in the course of doing so, however only as far as such are the customer's primary costs not including any share of profit. As far as the customer commissions a third party contractor with demounting, expenses resulting thereof will only be reimbursed by S+S if the buyer had granted S+S reasonable respite before without success. This does not apply when additional respite is legally superfluous according to statutory regulation.

7. Liability

- (1) S+S is liable for damages due to wilfully and gross negligently caused violation of duties. S+S is furthermore liable for damages resulting from slightly negligently caused violation of material contractual obligations. Material contractual obligations in terms of this are duties where the performance of which enables the proper performance of the contract in the first place, and in the observance of which the customer regularly trusts and may rely upon. Any liability of S+S for slight negligence apart from that is excluded. The same applies to wilful or grossly negligent violation of duties and the slightly negligent violation of material contractual obligations through a legal representative or vicarious agent of S+S. Liability for personal injury remains unaffected by the aforesaid limitation of liability.
- (2) In case of slightly negligent violation of material contractual obligations, liability of S+S is limited in the amount to the contract-typical damage. Contract-typical in terms of this is a damage, when in the normal course of affairs its occurrence in consequence of the committed violation of duty was to be assumed.

8. Retention of title

- (1) Goods delivered remain the property of S+S up to the complete settlement of any and all claims by the customer. As far as the customer alienates goods under reserve without receiving the purchase price from its buyer matching payment with physical delivery or in advance, the customer also has to agree with such buyers reservation of title in accordance with this regulation.
- (2) The customer is not entitled to pledge goods under reserve or to assign such goods for security. In cases of garnishment or other third parties' interventions the customer must notify S+S forthwith in writing.
- (3) The customer is entitled to resell goods under reserve in the course of its regular business operations. The customer already now assigns to S+S all receivables in the amount of the total invoice amount (including VAT) of the claim that are accruing to the customer against is buyers in consequence of the resale, in fact irrespective of whether such goods are alienated without or after processing. The customer also remains entitled to collect the receivable even after assignment, whereas the entitlement of S+S to collect the outstanding amount itself remains thereof unaffected. S+S however undertakes towards the customer not to collect the outstanding amount as long as the customer does not fall behind with payments, or an application for institution of composition or insolvency proceedings has not been filed. If that is the case, the customer upon request by S+S is committed to disclose those assigned receivables and their debtors, to provide the necessary records, and to notify the debtors of the assignment.

9. Operating, mounting & installation instructions

The customer undertakes to adhere to operating, mounting & installation instructions being delivered together with goods where appropriate, and also to make possible third-party buyers aware of the same. The complete or partial non-observance of such instructions may cause a complete loss of buyers' rights. This does no apply to possible claims for damages according to § 7.

10. Copyright

The customer is not entitled to reproduce or copy any contents of S+S catalogues, in particular technical drawings and photographs, for its own advertising or other purposes without the express written approval by S+S. The customer is not allowed to make quotations or other entrepreneurial documents available to third parties.

11. Miscellaneous

- (1) For any disputes arising from or in connection with the contractual relationship, Nuremberg/Germany is agreed as place of jurisdiction. Place of performance is Nuremberg/Germany.
- (2) The customer can only offset against with claims that are undisputed or have been established as final and absolute. The customer is entitled to a right of retention only if its counterclaims originate from the very same contractual relationship, or such claims are undisputed or have been established as final and absolute.
- (3) Modifications of and amendments to the contract require the written form. That also applies to the alteration of this written-form requirement clause.
- (4) In case one or several provisions of these General Terms and Conditions of Sale and Delivery should be ineffective or have not been properly incorporated into the contract, the rest of the provisions of these General Terms and Conditions of Sale and Delivery remain effective.
- (5) Solely the laws of the Federal Republic of Germany are applicable while excluding the law regarding the United Nations Convention on Contracts for the International Sale of Goods (CISG) – also when the customer has its registered office abroad. 10/2013

These General Terms and Conditions of Sale and Delivery are protected by copyright. Infringements of copyright will be legally prosecuted.





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