



SH-IA/IC e TH-IA/IC series

Photocells

Type 2 and Type 4



features

- M18 Models 10 m (axial optic) and 5 m (radial optic) operating distance
- M30 models 60 m operating distance
- EN50100 Category 2 and Category 4 compliant
- LED indicators
- Plastic and Metal Housing
- Inputs and Outputs IEC61131-2 compliant and adaptable with any safety module
- To be used together with a Category 2 or Category 4 safety control unit to obtain a safety system EN ISO 13849 compliant

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Photocells
Type 2 and Type 4

code description (SH series)

| | SH | 2 | / | E | - | 0 | E | IA |
|-------------------|----|---|---|---|---|---|---|----|
| series | SH | M18 safety photocell | | | | | | |
| type | 2 | Type 2, 123 kHz modulation | | | | | | |
| | 4 | Type 4 123 kHz modulation | | | | | | |
| model | E | Emitter unit | | | | | | |
| | R | Receiver unit | | | | | | |
| housing | 0 | Plastic housing, axial emission | | | | | | |
| | 1 | Metal housing, axial emission | | | | | | |
| | 2 | Plastic housing, radial emission | | | | | | |
| | 3 | Metal housing, radial emission | | | | | | |
| output connection | E | M12 connector output | | | | | | |
| | K | M12 radial connector output | | | | | | |
| logic | IA | Emitter Test Input Logic L = light H = dark, Receiver Output Logic: L = light, H = dark | | | | | | |
| | IC | Emitter Test Input Logic H = light L = dark, Receiver Output Logic: H = light, L = dark | | | | | | |

code description (TH series)

| | TH | 2 | / | E | - | K | IA |
|-------------------|----|---|---|---|---|---|----|
| series | TH | M30 safety photocell | | | | | |
| type | 2 | Type 2, 123 kHz modulation | | | | | |
| | 6 | Type 4, 123 kHz modulation | | | | | |
| model | E | Emitter unit | | | | | |
| | R | Receiver unit | | | | | |
| output connection | K | M12 radial connector | | | | | |
| logic | IA | Emitter Test Input Logic L = light H = dark, Receiver Output Logic: L = light, H = dark | | | | | |
| | IC | Emitter Test Input Logic H = light L = dark, Receiver Output Logic: H = light, L = dark | | | | | |

SH-IA/IC
TH-IA/IC

available models (Type 2)

| series | diameter | emission | optic | operating distance (m) | connection | housing | unit | model | | |
|--------------|----------|----------|---------------|------------------------|------------|------------|----------|------------|------------|------------|
| SH2 | M18 | red | Type 2 axial | 10 | M12 axial | plastic | Emitter | SH2/E-0EIC | | |
| | | | | 5 | | | Receiver | SH2/R-0EIC | | |
| | | | Type 2 radial | 10 | | | metallic | Emitter | SH2/E-2EIC | |
| | | | | 5 | | | | Receiver | SH2/R-2EIC | |
| | | | Type 2 axial | 10 | | M12 radial | | plastic | Emitter | SH2/E-1EIC |
| | | | | 5 | | | | | Receiver | SH2/R-1EIC |
| | | | Type 2 radial | 10 | | | metallic | Emitter | SH2/E-3EIC | |
| | | | | 5 | | | | Receiver | SH2/R-3EIC | |
| TH2 | M30 | red | Type 2 axial | 10 | M12 radial | plastic | Emitter | SH2/E-0KIC | | |
| | | | | 60 | | | Receiver | SH2/R-0KIC | | |
| | | | Type 2 radial | 10 | | metallic | Emitter | SH2/E-1KIC | | |
| | | | | 60 | | | Receiver | SH2/R-1KIC | | |
| Type 2 axial | 10 | metallic | Emitter | TH2/E-KIC | | | | | | |
| | 60 | | Receiver | TH2/R-KIC | | | | | | |

available models (Type 4)

| series | diameter | emission | optic | operating distance (m) | connection | housing | unit | model | |
|---------------|----------|----------|---------------|------------------------|------------|----------|----------|------------|------------|
| SH4 | M18 | red | Type 4 axial | 10 | M12 axial | plastic | Emitter | SH4/E-0EIC | |
| | | | | 5 | | | Receiver | SH4/R-0EIC | |
| | | | Type 4 radial | 10 | | | metallic | Emitter | SH4/E-0EIA |
| | | | | 5 | | | | Receiver | SH4/R-0EIA |
| | | | Type 4 axial | 10 | | plastic | | Emitter | SH4/E-2EIC |
| | | | | 5 | | | | Receiver | SH4/R-2EIC |
| | | | Type 4 radial | 10 | | metallic | Emitter | SH4/E-1EIC | |
| | | | | 5 | | | Receiver | SH4/R-1EIC | |
| | | | Type 4 axial | 10 | | plastic | Emitter | SH4/E-1EIA | |
| | | | | 5 | | | Receiver | SH4/R-1EIA | |
| | | | Type 4 radial | 10 | | metallic | Emitter | SH4/E-3EIC | |
| | | | | 5 | | | Receiver | SH4/R-3EIC | |
| TH6 | M30 | red | Type 4 axial | 10 | M12 radial | plastic | Emitter | SH4/E-0KIA | |
| | | | | 60 | | | Receiver | SH4/R-0KIA | |
| | | | Type 4 radial | 10 | | metallic | Emitter | SH4/E-1KIA | |
| | | | | 60 | | | Receiver | SH4/R-1KIA | |
| Type 4 axial | 10 | metallic | Emitter | TH6/E-KIC | | | | | |
| | 60 | | Receiver | TH6/R-KIC | | | | | |
| Type 4 radial | 10 | metallic | Emitter | TH6/E-KIA | | | | | |
| | 60 | | Receiver | TH6/R-KIA | | | | | |

P.N.: If used with SBCR03 control unit, **the resulting system is of Type 2.**

| | SH axial | SH radial | TH |
|---|--|-----------|--|
| | | | |
| nominal operating distance Excess Gain = 2 | 0...16 m | 0...7 m | 0...84 m |
| nominal operating distance Excess Gain = 4 | 0...11 m | 0...5 m | 0...60 m |
| model | M18 | | M30 |
| spot diameter | 12 | | 26 |
| minimum detectable object | ø 15 mm | | ø 24 mm |
| emission | red | | |
| Effective Aperture Angle (EAA) | typical 1.8°; ± 2,5° | | no load. |
| operating voltage | 10...30 Vdc | | |
| current consumption | ≤ 25 mA (emitter); ≤ 25 mA (receiver); 22 mA (typical, light mode) | | |
| output current | 50 mA; 70 mA max | | |
| emission wavelength | 660 nm | | |
| standard modulation frequency | 123 KHz | | |
| supply voltage UB | 19.2 V...28 V | | external power supply to the devices must include a brief power failure of up to 20 ms in conformity with EN 60204. Suitable power supplies are commonly available on the market. Operation with the network short-circuit proof max. 8 A. The connections used are protected against reverse polarity. The sensors SH and TH, and the test device downstream, are connected to the same municipality and for paving ground. |
| residual ripple | ≤ 5 V | | must not exceed or fall below of UB tolerances. |
| HIGH level output | U _B - 3.2 V ... U _B - 2.5 V (typical) | | the output of the sensor is normally connected to the test device, isn't an OSSD as for IEC 61496-1. |
| LOW level output | 5 V | | |
| reaction time receiver output per transaction LIGHT / DARK | 200 µs, from front to LOW DARK models for IC , to HIGH for models IA | | |
| reaction time receiver output per transaction DARK /LIGHT | 400 µs, from front to LIGHT UP models for IC , LOW models for IA | | |
| response time of safety | it would depend on the security utility | | |
| LOW input Test projector | < 5 V IC output inactive ; model IA active issue | | |
| HIGH input Projector test | vin test >> 15 V IC output active ; model IA issue inactive | | |
| test input LOW level (Emitter) | IC models , LOW = DARK ; HIGH = LIGHT IA models , HIGH = DARK ; LOW = LIGHT | | |
| electrical protection class | III | | |
| IP mechanical protection | IP67 (EN60529) | | |
| working temperature | -20 °C... + 55 °C (typical + 20 °C) | | |
| storage temperature | -40°C... + 75°C | | |
| humidity (no condensation) | 15%...95% | | |
| weight | 30 g (plastic); 67 g (metallic) | 212 g | |
| shocks | 10 g; 16 ms; (IEC60068-2-6) | | |
| vibration | 10 Hz ... 55 Hz, 1 oct./min, 0.35 mm (IEC 60068-2-6) | | |
| materials | Lens: Glass with PBT ring; Housing: Brass nickel-plated or PBT; M12 plug:PC | | Lens: Glass, aluminium; Housing: Brass nickel plated; End cap: PC; M12 plug: PBT |

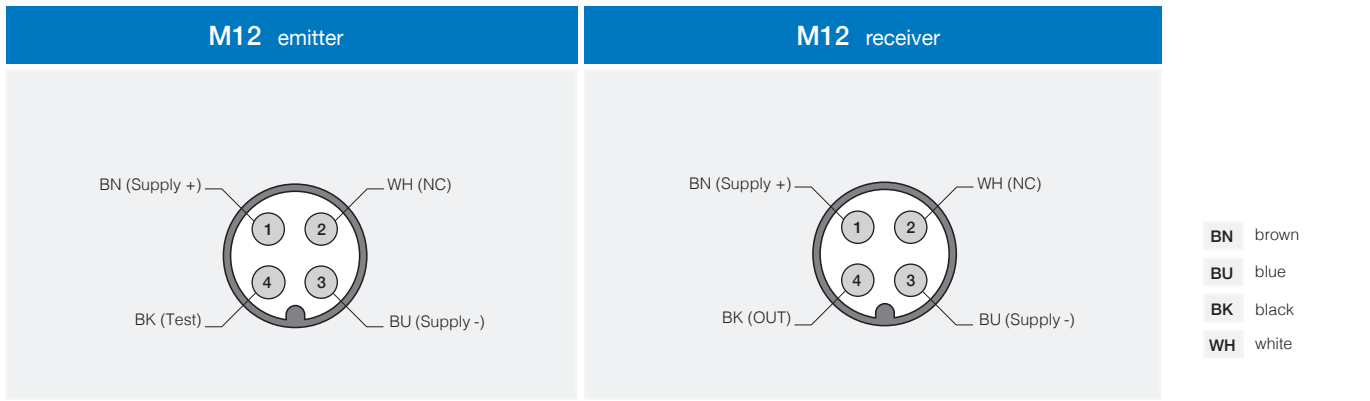
safety specifications (Machinery Directive)

Photocells
Type 2 and Type 4

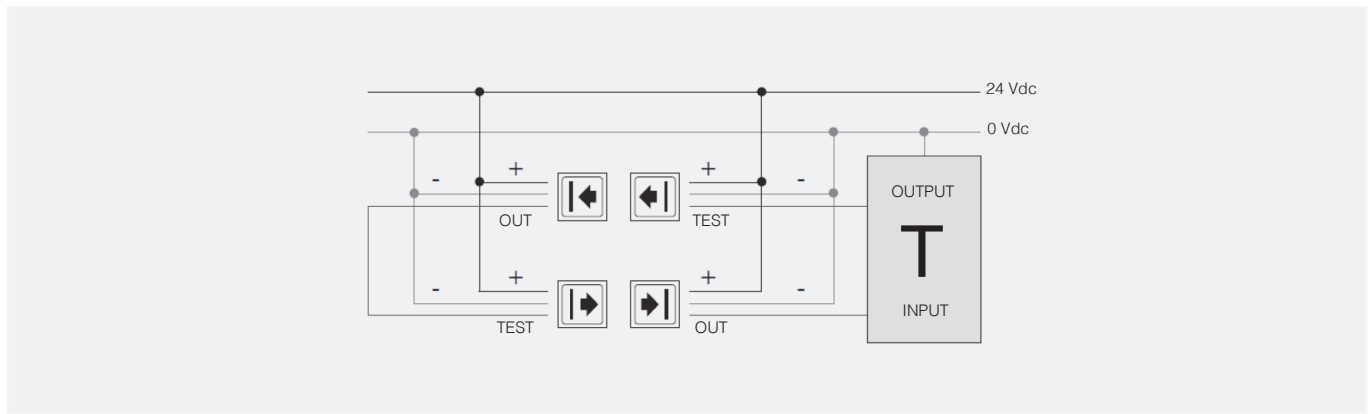
| Type 2 M18 and M30 safety photocells | | Type 4 M18 and M30 safety photocells | |
|---|--|---|--|
| Type | 2 (IEC 61496) ⁽¹⁾ | Type | 4 (IEC 61496) ⁽¹⁾ |
| safety integrity level | SIL1 (IEC 61508), SIL CL 1 (EN 62061) ⁽¹⁾ | safety integrity level | SIL3 (IEC 61508), SIL CL 3 (EN 62061) ⁽¹⁾ |
| category | 2 (EN ISO 13849) ⁽¹⁾ | category | 4 (EN ISO 13849) ⁽¹⁾ |
| self test frequency ⁽²⁾ | 100/s (EN ISO 13849) | performance level | PL e (EN ISO 13849) ⁽¹⁾ |
| maximum frequency of request ⁽³⁾ | 60/min (EN ISO 13849) | maximum frequency of request ⁽³⁾ | 60/min (EN ISO 13849) |
| performance level | PL c (EN ISO 13849) ⁽¹⁾ | PFH _d ⁽⁴⁾ | 8.1 x 10 ⁻¹⁰ |
| PFH _d ⁽⁴⁾ | 1 x 10 ⁻⁶ | TM (life time) | 20 years |
| TM (life time) | 20 years | | |

⁽¹⁾ Only in combination with suitable test device ⁽²⁾ The test rate must not be exceeded
⁽³⁾ Between two requests for a safety-related reaction from the device, at least 100 internal or external tests must be undertaken ⁽⁴⁾ Average probability of failure per hour, due to a serious error

electrical diagrams of the connections



2 sensors caascade connection example

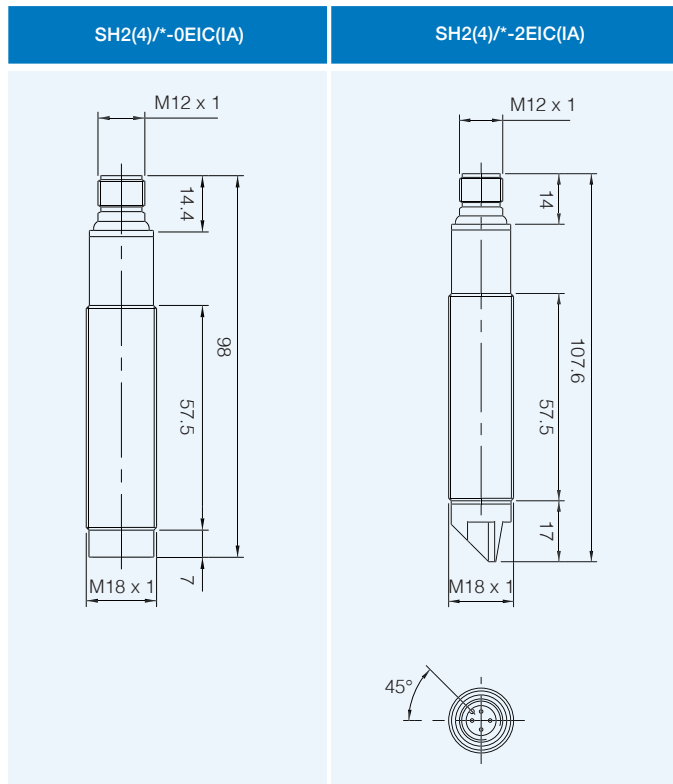


The pairs remote, comprise an emitter and a receiver connected in a chain, that are running the repeater function, must be homogeneous, that is composed of an emitter and a receiver both with the same logic of Test and Exit (both type IC or IA). Couples connected to the test unit must obviously be chosen logically compatible with that unit. It should not exceed a maximum of three pairs of sensors in the chain. If you use more than one pair of monitoring sensors connected in the chain, it must always be strictly observed that the angle of propagation / reception angle of a pair of sensors does not interfere with the other of the same chain. If you use more than one pair of monitoring sensors connected to the same unit and this unit does not use a scanning procedure of the pairs it must be strictly observed that the angle of propagation / reception angle of a pair of sensors does not interfere with the other the same unit. If it takes more units it is possible that pairs of the different units may interfere, in this case the phase of test can fail causing blockages or sporadic system. Only in this case, to avoid interference it is possible to use models with different modulation frequency.

SH/A/C
TH/A/C

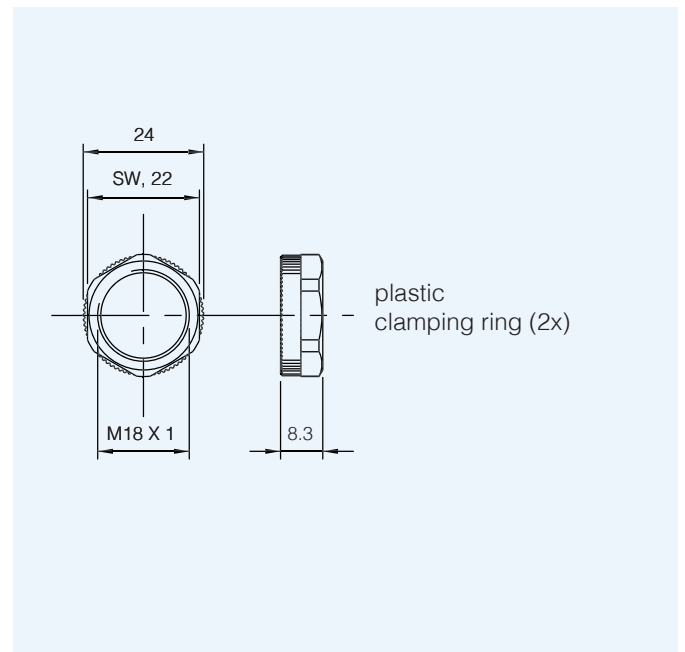
dimensions (mm)

plastic housing



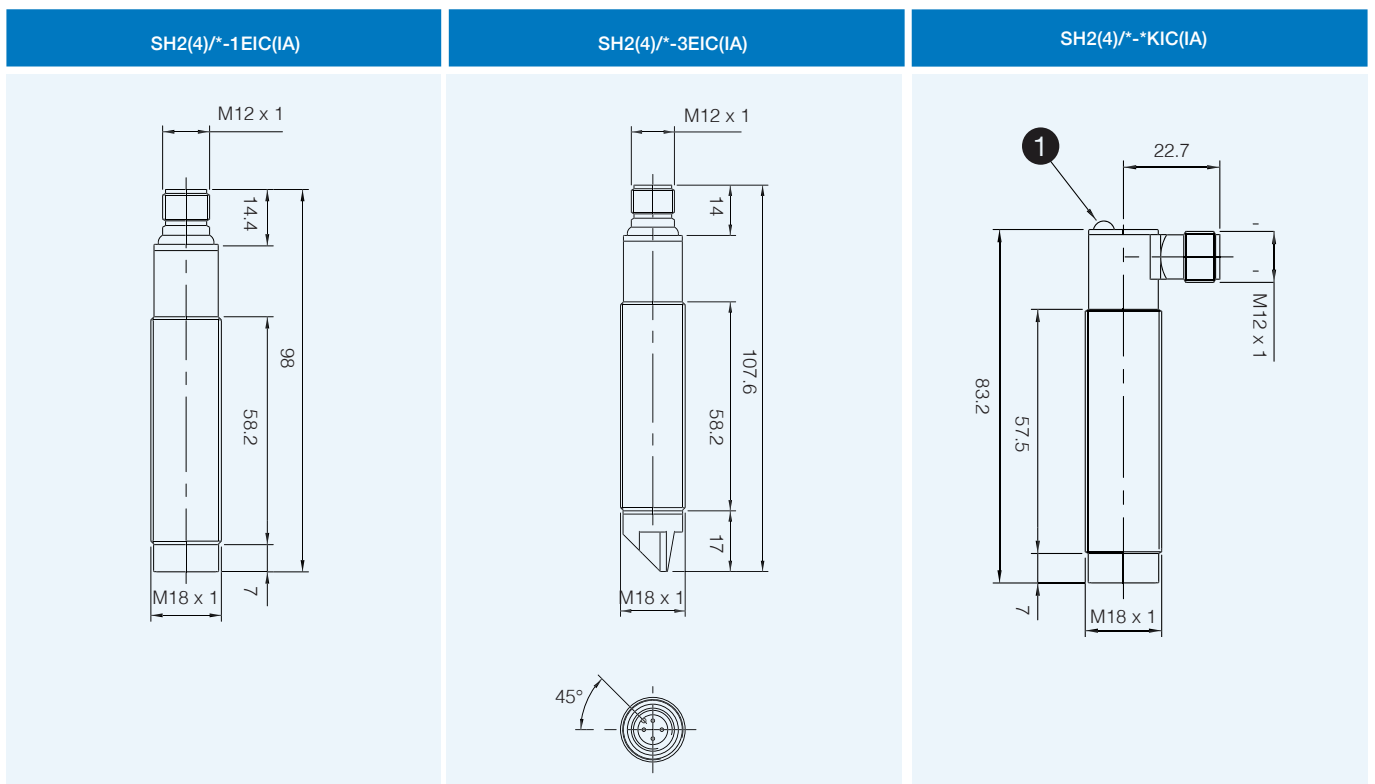
dimensions (mm)

accessories included in all plastic models



dimensions (mm)

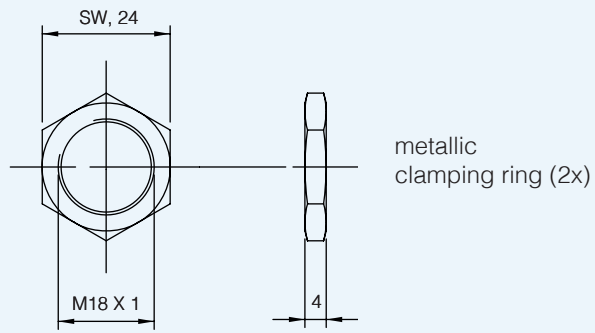
M18 metal housing



1 LED

dimensions (mm)

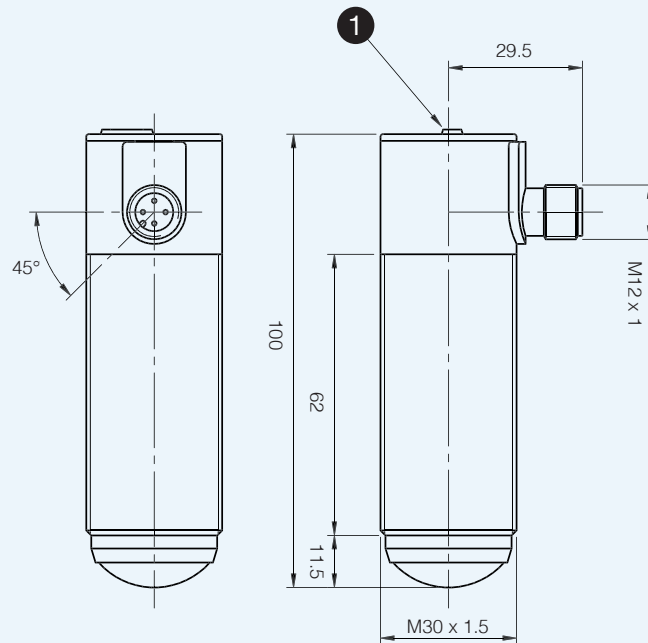
accessories included in all M18 metallic models



dimensions (mm)

M30

TH2(6)/*-1KIC (IA)



1 LED

dimensions (mm)

accessories included in all M30 models

