



WTV4FE-22161120A00

W4

PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

Type	part no.
WTV4FE-22161120A00	1105444

Other models and accessories → www.sick.com/W4

Detailed technical data

Features

Functional principle		Photoelectric proximity sensor
Functional principle detail		Background suppression, V-optics
Sensing range		
	Sensing range min.	2 mm
	Sensing range max.	50 mm
	Adjustable switching threshold for background suppression	15 mm ... 50 mm
	Reference object	Object with 90% remission factor (complies with standard white according to DIN 5033)
	Minimum distance between set sensing range and background (black 6% / white 90%)	1 mm, at a distance of 21 mm
	Recommended sensing range for the best performance	15 mm ... 30 mm
Emitted beam		
	Light source	PinPoint LED
	Type of light	Visible red light
	Shape of light spot	Rectangular
	Light spot size (distance)	0.5 mm x 1.9 mm (30 mm)
	Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.5° (at T _U = +23 °C)
Key LED figures		

Normative reference	EN 62471:2008-09 IEC 62471:2006, modified
LED risk group marking	Free group
Wave length	635 nm
Average service life	100,000 h at $T_a = +25\text{ °C}$
Smallest detectable object (MDO) typ.	
	0.1 mm, At 30 mm distance (object with 90% remission (complies with standard white according to DIN 5033))
Adjustment	
Teach-Turn adjustment	BluePilot For setting the sensing range
IO-Link	For configuring the sensor parameters and Smart Task functions
Display	
LED blue	BluePilot: sensing range indicator
LED green	Operating indicator Static on: power on Flashing: IO-Link mode
LED yellow	Status of received light beam Static on: object present Static off: object not present
Special applications	Detecting transparent objects

Safety-related parameters

MTTF_D	661 years
DC_{avg}	0 %
T_M (mission time)	20 years

Communication interface

IO-Link	✓ , IO-Link V1.1
Data transmission rate	COM2 (38,4 kBaud)
Cycle time	2.3 ms
Process data length	16 Bit
Process data structure	Bit 0 = switching signal Q _{L1} Bit 1 = switching signal Q _{L2} Bit 2 ... 15 = Current receiver level (live)
VendorID	26
DeviceID HEX	0x80024E
DeviceID DEC	8389198
Compatible master port type	A
SIO mode support	Yes

Electronics

Supply voltage U_B	10 V DC ... 30 V DC ¹⁾
Ripple	≤ 5 V _{pp}

¹⁾ Limit values.

²⁾ Signal transit time with resistive load in switching mode.

³⁾ With light/dark ratio 1:1.

⁴⁾ This switching output must not be connected to another output.

Usage category		DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
Current consumption		≤ 25 mA, without load. At $U_B = 24\text{ V}$
Protection class		III
Digital output		
	Number	2 (Complementary)
	Type	Push-pull: PNP/NPN
	Switching mode	Light/dark switching
	Signal voltage PNP HIGH/LOW	Approx. $U_B - 2.5\text{ V}$ / 0 V
	Signal voltage NPN HIGH/LOW	Approx. U_B / $< 2.5\text{ V}$
	Output current I_{\max}	≤ 100 mA
	Circuit protection outputs	Reverse polarity protected
		Overcurrent protected
		Short-circuit protected
	Response time	≤ 500 μs
	Repeatability (response time)	150 μs ²⁾
	Switching frequency	1,000 Hz ³⁾
Pin/Wire assignment		
	Function of pin 4/black (BK)	Digital output, light switching, object present → output Q_{L1} HIGH; IO-Link communication C ⁴⁾
	Function of pin 4/black (BK) – detail	The pin 4 function of the sensor can be configured Additional possible settings via IO-Link
	Function of pin 2/white (WH)	Digital output, dark switching, object present → output \bar{Q}_{L1} LOW ⁴⁾
	Function of pin 2/white (WH) – detail	The pin 2 function of the sensor can be configured Additional possible settings via IO-Link

¹⁾ Limit values.

²⁾ Signal transit time with resistive load in switching mode.

³⁾ With light/dark ratio 1:1.

⁴⁾ This switching output must not be connected to another output.

Mechanics

Housing		Rectangular
Design detail		Flat
Dimensions (W x H x D)		16 mm x 40.1 mm x 12.1 mm
Connection		Male connector M8, 4-pin
Material		
	Housing	Plastic, VISTAL®
	Front screen	Plastic, PMMA
	Male connector	Plastic, VISTAL®
Weight		Approx. 30 g
Maximum tightening torque of the fixing screws		0.4 Nm

Ambient data

Enclosure rating		IP66 (EN 60529) IP67 (EN 60529)
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Ambient operating temperature	-40 °C ... +60 °C
Ambient temperature, storage	-40 °C ... +75 °C
Typ. Ambient light immunity	Artificial light: ≤ 50,000 lx Sunlight: ≤ 50,000 lx
Shock resistance	30 g, 11 ms (3 positive and 3 negative shocks along X, Y, Z axes, 18 total shocks (EN60068-2-27))
Vibration resistance	10 Hz ... 1,000 Hz (Amplitude 1 mm, 3 x 30 min (EN60068-2-6))
Air humidity	35 % ... 95 %, relative humidity (no condensation)
Electromagnetic compatibility (EMC)	EN 60947-5-2
Resistance to cleaning agent	ECOLAB
UL File No.	NRKH.E181493 & NRKH7.E181493

Smart Task

Smart Task name	Base logics
Logic function	Direct AND OR
Timer function	Deactivated Switch-on delay Off delay ON and OFF delay Impulse (one shot)
Inverter	Yes
Switching frequency	SIO Logic: 900 Hz ¹⁾ IOL: 800 Hz ²⁾
Response time	SIO Logic: 550 µs ¹⁾ IOL: 600 µs ²⁾
Repeatability	SIO Logic: 200 µs ¹⁾ IOL: 250 µs ²⁾
Switching signal	
Switching signal Q _{L1}	Switching output
Switching signal Q̇ _{L1}	Switching output

¹⁾ Use of Smart Task functions without IO-Link communication (SIO mode).

²⁾ Use of Smart Task functions with IO-Link communication function.

Diagnosis

Device temperature	
Measuring range	Very cold, cold, moderate, warm, hot
Device status	Yes
Detailed device status	Yes
Operating hour counter	Yes
Operating hours counter with reset function	Yes
Quality of teach	Yes

Certificates

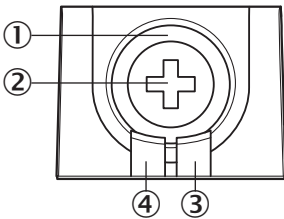
EU declaration of conformity	✓
UK declaration of conformity	✓

ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
ECOLAB certificate	✓
cULus certificate	✓
IO-Link certificate	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

Classifications

ECLASS 5.0	27270904
ECLASS 5.1.4	27270904
ECLASS 6.0	27270904
ECLASS 6.2	27270904
ECLASS 7.0	27270904
ECLASS 8.0	27270904
ECLASS 8.1	27270904
ECLASS 9.0	27270904
ECLASS 10.0	27270904
ECLASS 11.0	27270904
ECLASS 12.0	27270903
ETIM 5.0	EC002719
ETIM 6.0	EC002719
ETIM 7.0	EC002719
ETIM 8.0	EC002719
UNSPSC 16.0901	39121528

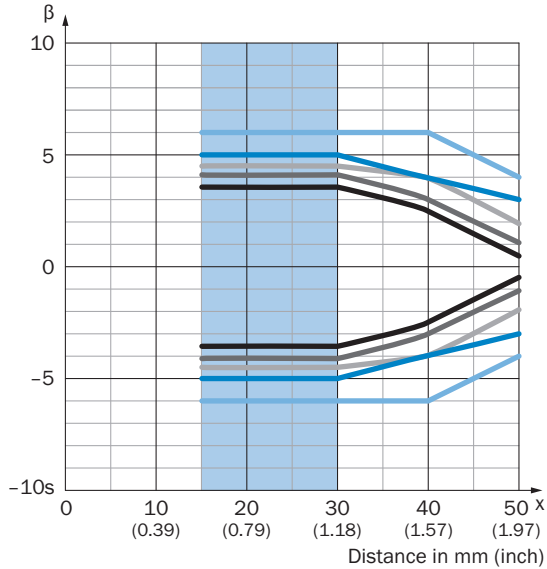
display and adjustment elements



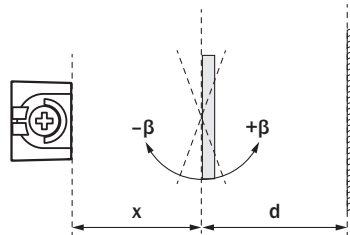
- ① LED blue
- ② Teach-Turn adjustment
- ③ LED yellow
- ④ LED green

Installation note Angle of acceptance, pane of glass in front of background, β

Transparent pane of glass in front of background
(18 % remission), angle of acceptance



- $d = 10 \text{ mm}$
- $d = 40 \text{ mm}$
- $d = 80 \text{ mm}$
- $d = 120 \text{ mm}$
- $d \geq 200 \text{ mm}$
- Recommended sensing range for the best performance



Example:

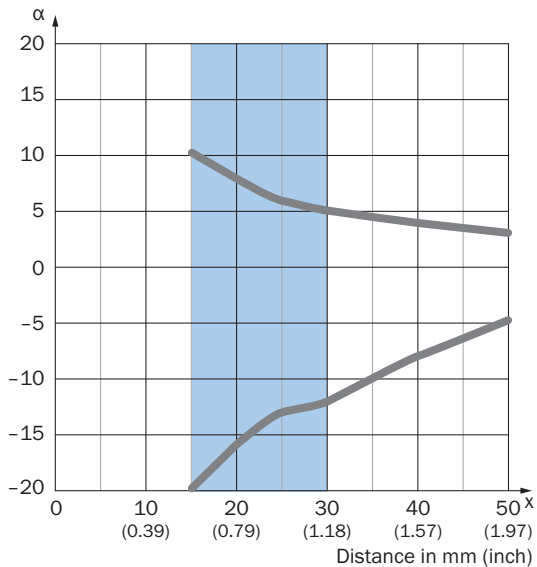
Set sensing range $x = 30 \text{ mm}$

Distance object to background $d \geq 200 \text{ mm}$

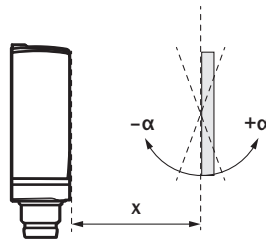
Angle of acceptance between -6° and $+6^\circ$

Installation note Angle of acceptance, on high-glossy object, α

High-glossy object, angle of acceptance



- Recommended sensing range for the best performance



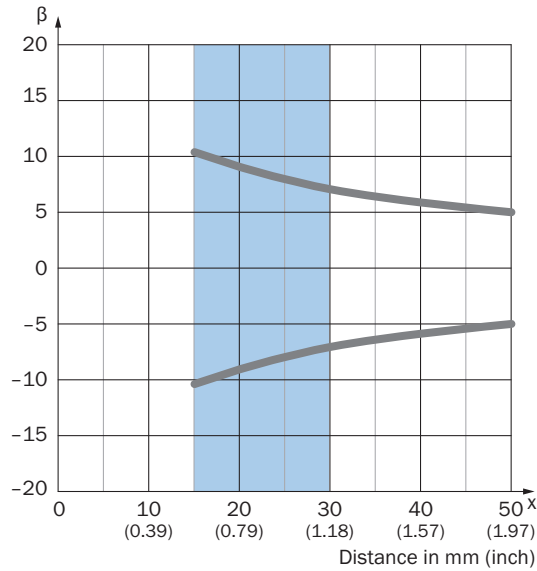
Example:

Set sensing range $x = 30 \text{ mm}$

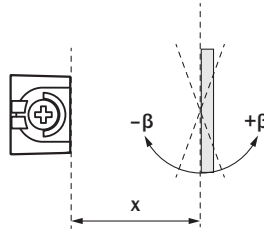
Angle of acceptance between -12° and $+5^\circ$

Installation note Angle of acceptance, on high-glossy object, β

High-glossy object, angle of acceptance



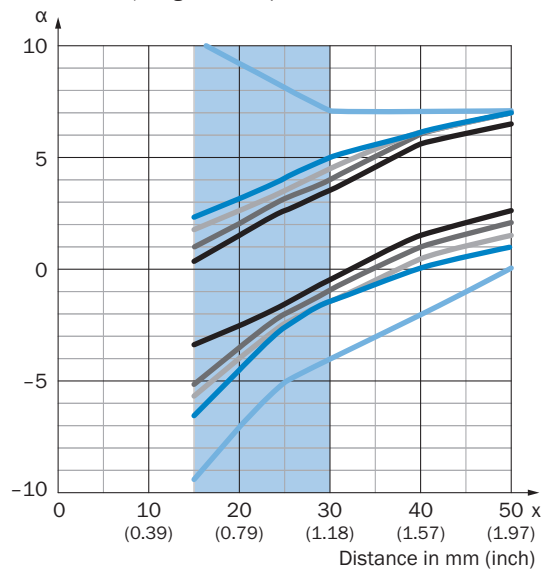
Recommended sensing range for the best performance



Example:
Set sensing range $x = 30$ mm
Angle of acceptance between -7° and $+7^\circ$

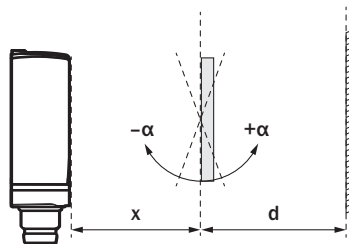
Installation note Angle of acceptance, pane of glass in front of background, α

Transparent pane of glass in front of background
(18 % remission), angle of acceptance



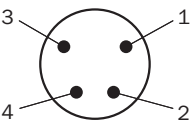
— $d = 10$ mm — $d = 120$ mm
— $d = 40$ mm — $d \geq 200$ mm
— $d = 80$ mm

Recommended sensing range for the best performance

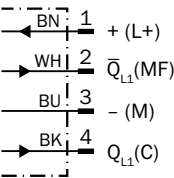


Example:
Set sensing range $x = 30$ mm
Distance object to background $d \geq 200$ mm
Angle of acceptance between -4° and $+7^\circ$

Connection type Male connector M8, 4-pin



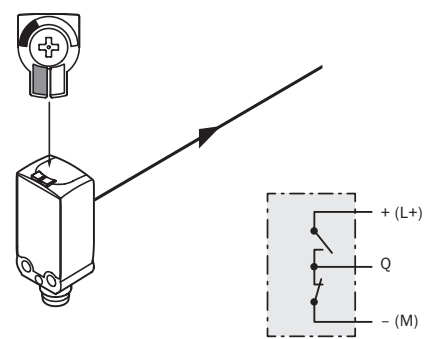
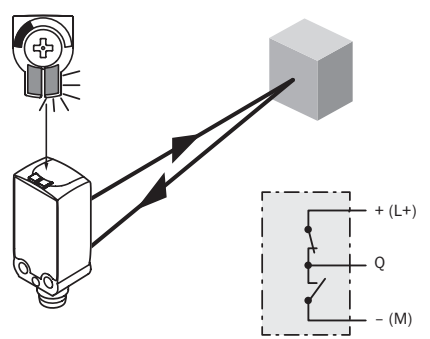
Connection diagram Cd-490



Truth table Push-pull: PNP/NPN – dark switching \bar{Q}

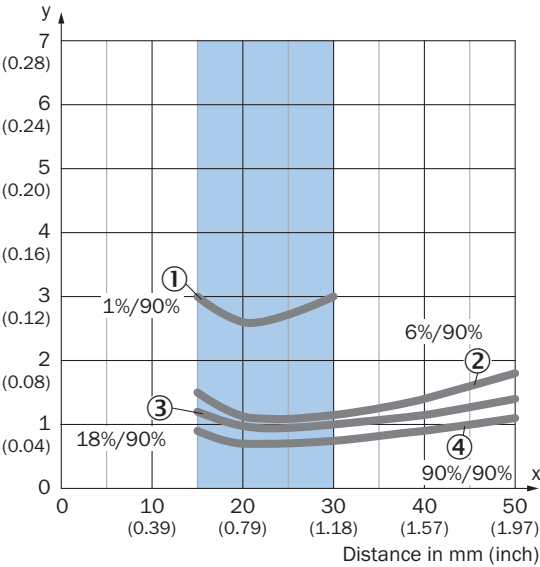
	Dark switching \bar{Q} (normally closed (upper switch), normally open (lower switch))	
	Object not present → Output HIGH	Object present → Output LOW
Light receive	✗	✓
Light receive indicator	✗	☀
Load resistance to L+	✗	⚡
Load resistance to M	⚡	✗

Truth table Push-pull: PNP/NPN - light switching Q

	Light switching Q (normally open (upper switch), normally closed (lower switch))	
	Object not present → Output LOW	Object present → Output HIGH
Light receive	✗	✓
Light receive indicator	✗	☀
Load resistance to L+	⚡	✗
Load resistance to M	✗	⚡
		

Characteristic curve

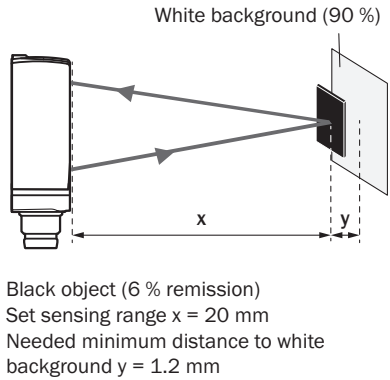
Minimum distance in mm (y) between the set sensing range and white background (90 % remission)



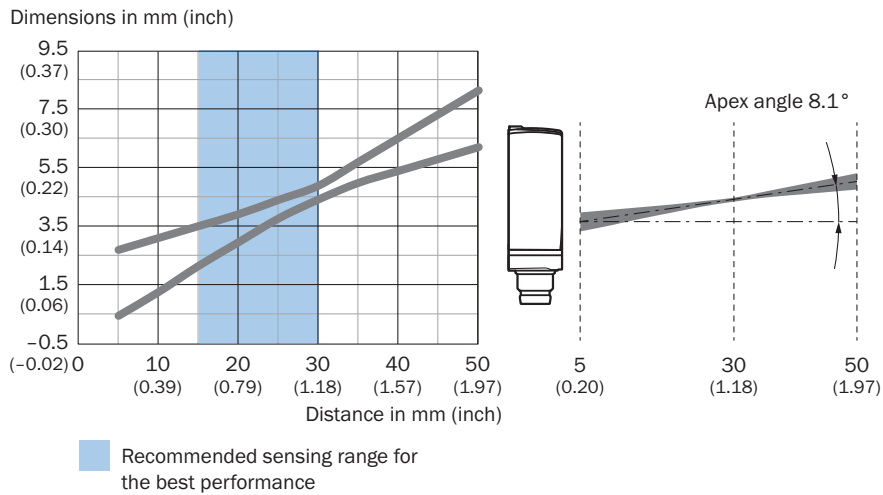
Recommended sensing range for the best performance

- ① ultra-black object, 1% remission factor
- ② Black object, 6% remission factor
- ③ Gray object, 18% remission factor
- ④ White object, 90% remission factor

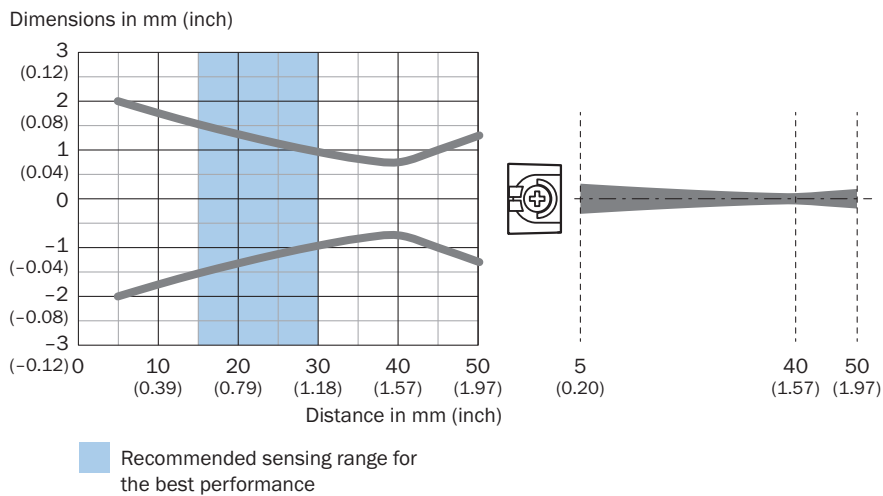
Example:
Safe suppression of the background



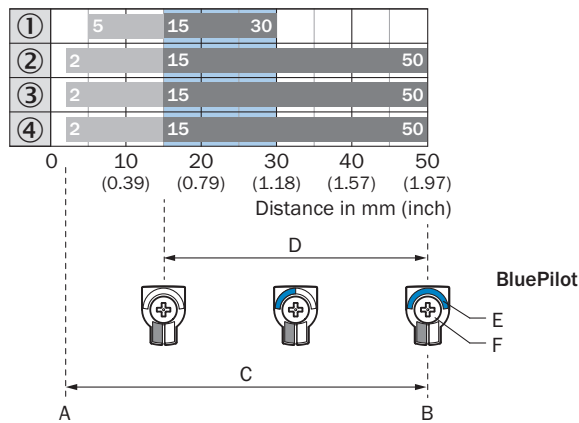
Light spot size Vertical



Light spot size Horizontal



Sensing range diagram



A = Sensing range min. in mm

B = Sensing range max. in mm

C = Viewing range

D = Adjustable switching threshold for background suppression

E = Sensing range indicator

F = Teach-Turn adjustment

Recommended sensing range for the best performance

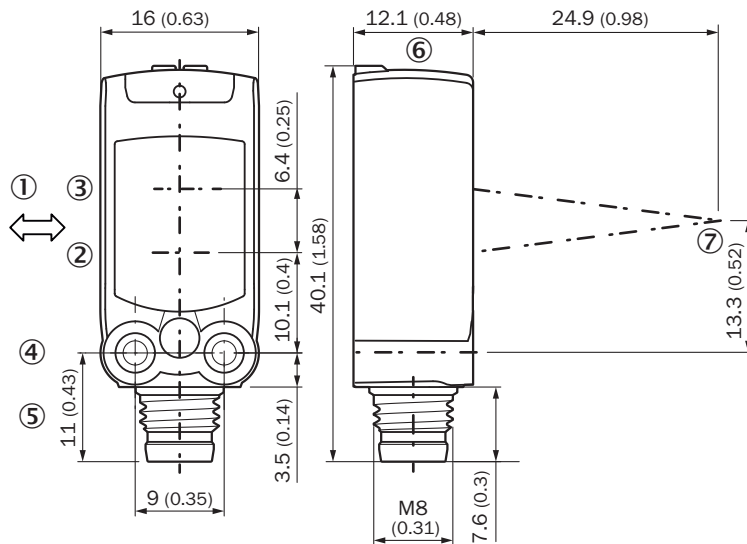
① ultra-black object, 1% remission factor

② Black object, 6% remission factor

③ Gray object, 18% remission factor

④ White object, 90% remission factor

Dimensional drawing



Dimensions in mm (inch)

① Standard direction of the material being detected

② Center of optical axis, sender

③ Center of optical axis, receiver

④ M3 mounting hole





⑤ Connection

⑥ display and adjustment elements

⑦ focus

Recommended accessories

Other models and accessories → www.sick.com/W4

	Brief description	Type	part no.
Mounting systems			
	<ul style="list-style-type: none"> Description: Mounting bracket for wall mounting Material: Stainless steel Details: Stainless steel 1.4571 Items supplied: Mounting hardware included Suitable for: W4S, W4F, W4S 	BEF-W4-A	2051628
	<ul style="list-style-type: none"> Description: Mounting bracket for floor mounting Material: Stainless steel Details: Stainless steel 1.4571 Items supplied: Mounting hardware included Suitable for: W4S, W4F, W4S 	BEF-W4-B	2051630
	<ul style="list-style-type: none"> Description: Plate N08 for universal clamp bracket Material: Steel, zinc diecast Details: Zinc plated steel (sheet), Zinc die cast (clamping bracket) Items supplied: Universal clamp (5322626), mounting hardware Usable for: W100, W150, W4S, W4F, W8, W9-3, W8G, W8 Laser, W8 Inox, G6, W100 Laser, W100-2, W10, G6 Inox, RAY10, W4SLG-3, W9, GR18, MultiPulse, Reflex Array, MultiLine, LUT3, KT5, KT8, KT10, CS8 	BEF-KHS-N08	2051607
connectors and cables			
	<ul style="list-style-type: none"> Connection type head A: Male connector, M8, 4-pin, straight, A-coded Description: Unshielded Connection systems: Screw-type terminals Permitted cross-section: 0.14 mm² ... 0.5 mm² 	STE-0804-G	6037323
	<ul style="list-style-type: none"> Connection type head A: Female connector, M8, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 5 m, 4-wire, PVC Description: Sensor/actuator cable, unshielded Application: Uncontaminated zones, Zones with chemicals 	YF8U14-050VA3XLEAX	2095889
	<ul style="list-style-type: none"> Connection type head A: Female connector, M8, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 5 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation 	YF8U14-050UA3XLEAX	2094792

SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

WORLDWIDE PRESENCE:

Contacts and other locations –www.sick.com