


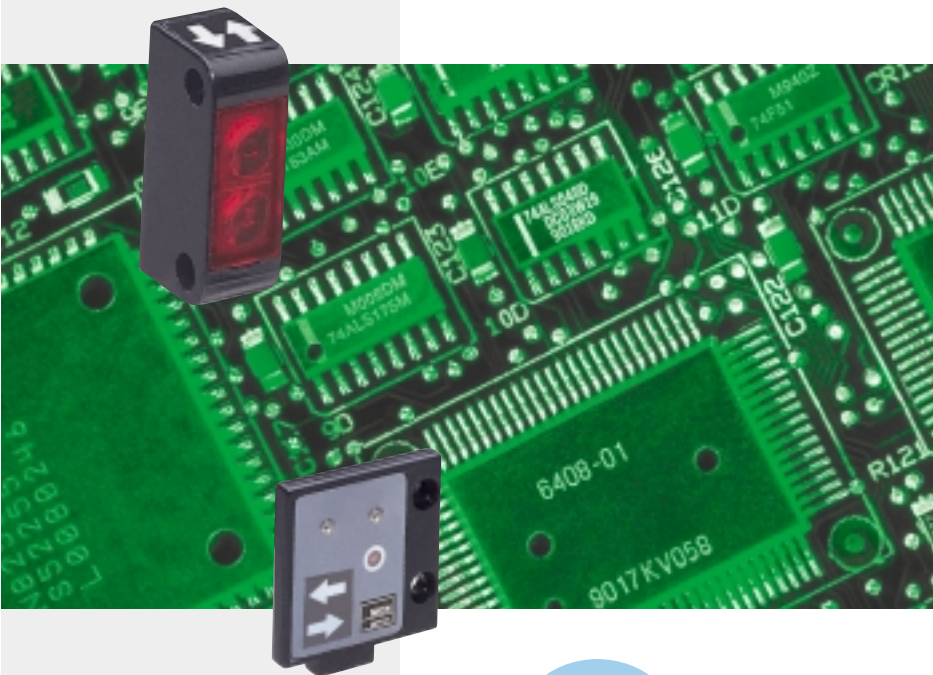


S 130: Ultra-miniature photoelectric switches for new sensing opportunities

	Photoelectric proximity switches, energetic
	Contrast scanners
	Through-beam photoelectric switches



	Photoelectric proximity switches, BGB
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S S 130 ultra-miniature photoelectric switches can provide an alternative for users of fibre-optic systems. In many cases, they represent the better choice. The S 130 offers many advantages, depending on the requirements of specific applications for compact design:

- improved performance thanks to integrated optics,
- smaller mounting depth (F-type = 3.2 mm) with greater scanning ranges,
- extremely small bending radius thanks to connection slots,
- mark sensors with high resolution (7 grey tones) thanks to focused optics and choice of red or green sender LED (S 130 mark sensor).

Typical areas of application are:

- electronic component and printed circuit board production,
- the packaging and printing industries,
- assembly and handling systems,
- the construction of special-purpose machines.

The S 130 is available in two different housing versions:

S = ultra-slim or F = ultra-flat (mounting depth only 3.2 mm).

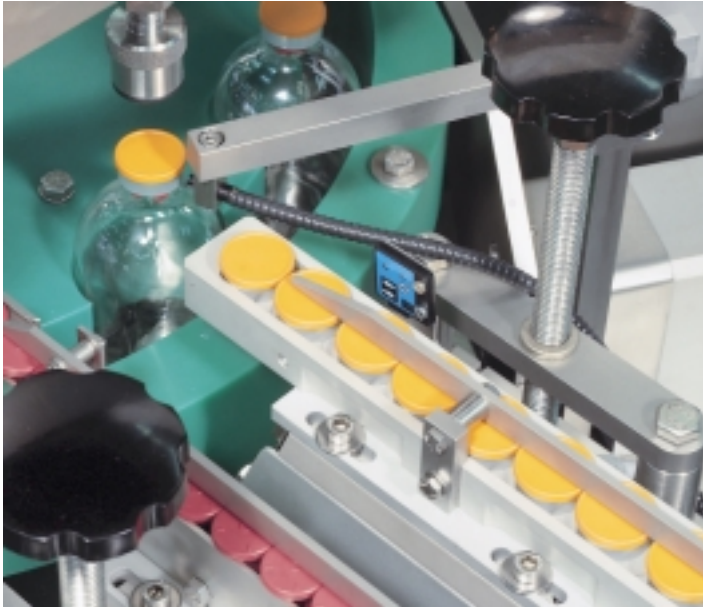
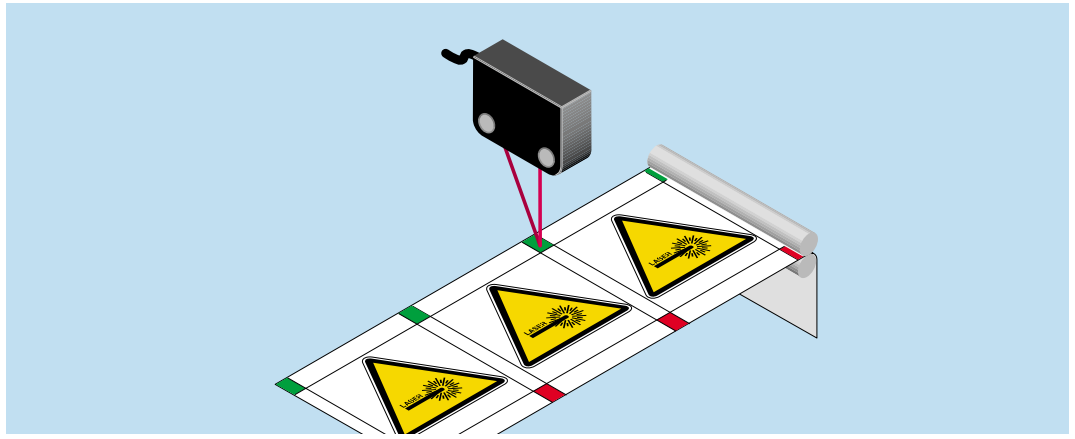
The S 130 system modules and their scanning ranges:

- SS/SE 130 through-beam photoelectric switch: 150 cm (S-type); 30 cm (F-type),
- ST 130 photoelectric proximity switch, energetic: 150 mm (S-type); 50 mm (F-type).

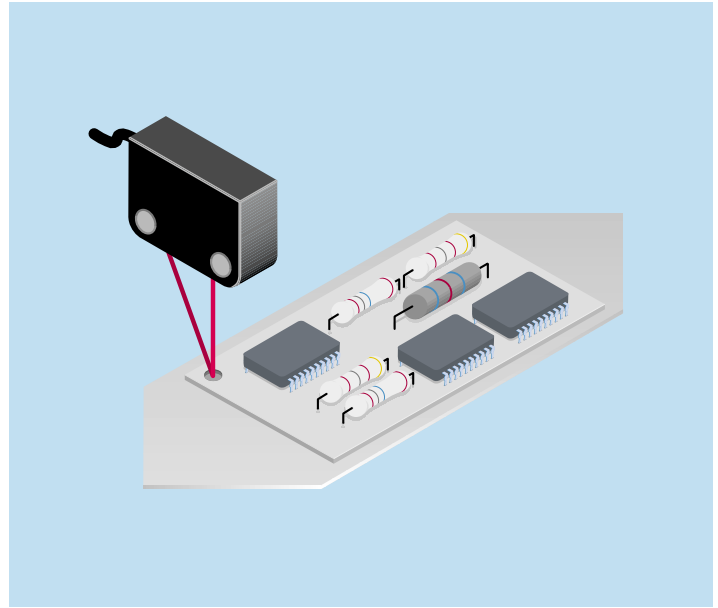
A real highlight is the S 130's optical heads with focused optics, available with a spot size of 1 x 1 mm or 1 x 4 mm at a scanning distance of 16 mm. If used in combination with the accompanying system evaluation unit SI 130, only one basic type is required for all optics heads.

All electrical and mechanical values satisfy the standard for low-voltage devices. e.g. $V_S = 10 \dots 30$ V DC, PNP or NPN switching output.

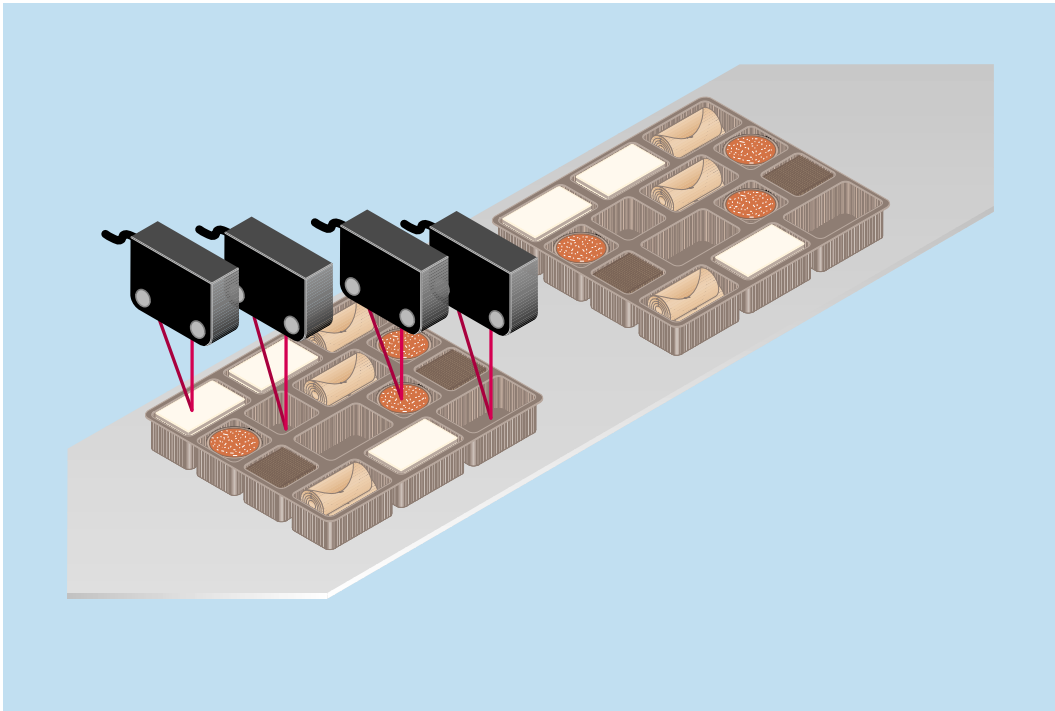
► High-resolution S 130 mark sensors with red or green sender LED used for reliable detection of print marks.



▲ Ultra-miniature photoelectric proximity switch monitoring the supply of parts to a bottle capping machine in the pharmaceutical industry.



▲ The S 130 photoelectric proximity switch detects markings and ensures that printed circuit boards are precisely positioned.

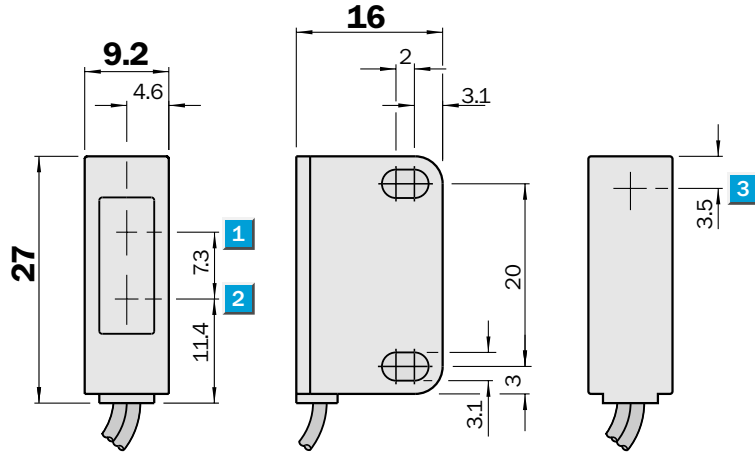


◀ The presence of biscuits in blister packs is continuously checked before the package is sealed.

	Scanning distance 5 ... 30 mm
Photoelectric proximity switches	

- Ultra-miniature housing
- Focused optics, small light spot
- Extremely flexible connection cable
- Red light and LED signal strength indicator as alignment aids

Dimensional drawing



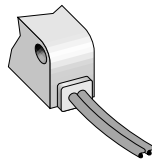
- 1** Centre of transmitter's optical axis
- 2** Centre of receiver's optical axis
- 3** LED indicator, red: light reception

Mounting bracket BEF-130-SM included.

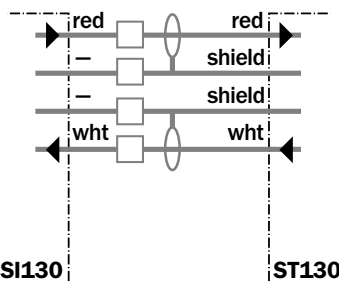


Connection type

- ST 130-S 13
- ST 130-S 23



2 x 0.8 mm² shielded



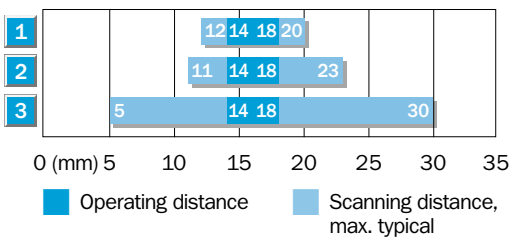
Accessories	page
Mounting brackets*	510

* included with delivery

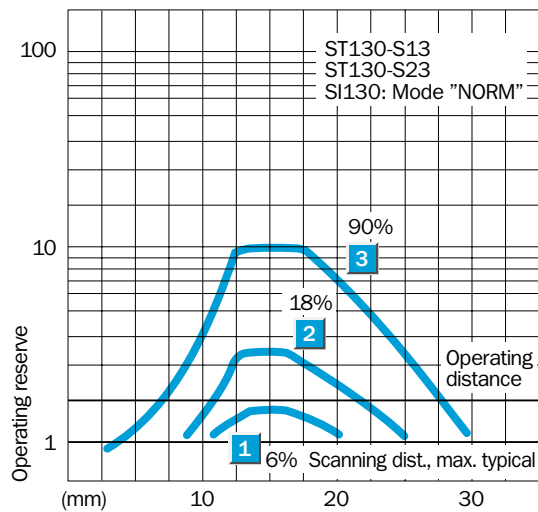
Technical data		ST 130-	S 13	S 23										
Photoelectric proximity switches	SI 130 in "NORM" mode, see page 44													
Scanning distance, max. typical	5...30 mm (object with 90 % remission)													
Operating distance	14...18 mm (object with 6 % remission)													
Background blanking	From approx. 45 mm (object with 90 % remission)													
Light source¹⁾, light type	LED, visible red light													
Light spot size	Approx. 1 x 4 mm w. focal point 16 mm Approx. 1 x 1 mm w. focal point 16 mm													
Angle of dispersion, sender	Focused, focal point 16 mm ± 0.5 mm													
Power supply and evaluation unit	ST 130 only functional in combination with separate interpreter (SI 130), see page 44													
Supply voltage V_S	See SI 130, page 44													
Switching outputs	See SI 130, page 44													
Output current I _A max.	See SI 130, page 44													
Light receiver, switching mode	See SI 130, page 44													
Response time ²⁾	See SI 130, page 44													
Max. switching frequency ³⁾	See SI 130, page 44													
Connection type	PVC cable, 2 m ⁴⁾ (screened), (cannot be extended)													
VDE protection class	⊠													
Circuit protection⁵⁾	A													
Enclosure rating	IP 65													
Ambient temperature T_A	Operation - 25 °C...+ 55 °C Storage - 40 °C...+ 70 °C													
Weight	Approx. 23 g													
Housing material	Housing: ABS/optics: PC													

- 1) Average service life 100,000 h at T_A = + 25 °C
- 2) Signal transit time with resistive load
- 3) With light/dark ratio 1:1
- 4) Do not bend below 0 °C
- 5) A = V_S connections reverse-polarity protected

Scanning distance




- 1 Scanning distance on black, 6 % remission
- 2 Scanning distance on grey, 18 % remission
- 3 Scanning distance on white, 90 % remission



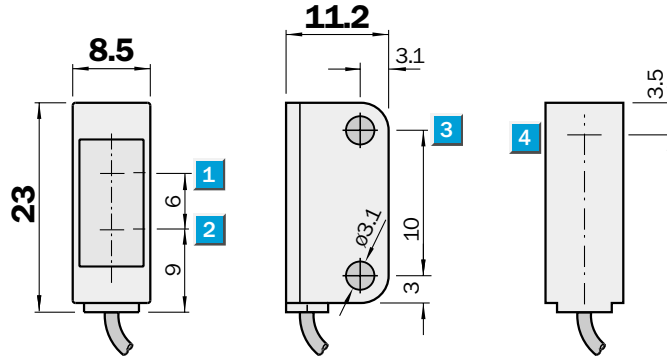
Order information

Type	Part no.
ST 130-S 13	6 011 083
ST 130-S 23	6 011 085


Scanning distance
0 ... 200 mm
Photoelectric proximity switches

- Ultra-miniature housing
- Large scanning distance
- Extremely flexible connection cable
- Red light and LED signal strength indicator as alignment aids

Dimensional drawing



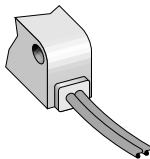
- 1** Centre of transmitter's optical axis
- 2** Centre of receiver's optical axis
- 3** Mounting hole \varnothing 3.1 mm
- 4** LED indicator, red: light reception

Mounting bracket BEF-130-SP included.



Connection type

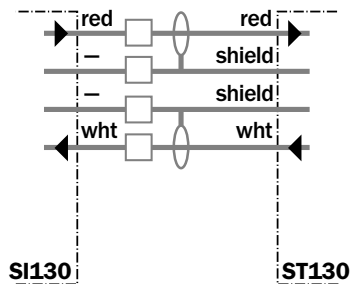
ST 130-S 13



Accessories	page
Mounting brackets*	510

* included with delivery

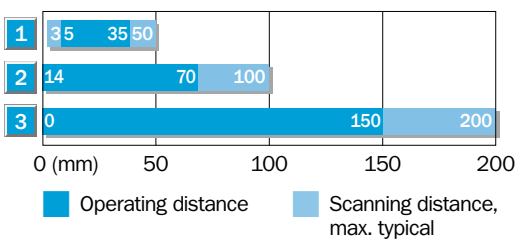
2 x 0.8 mm² shielded



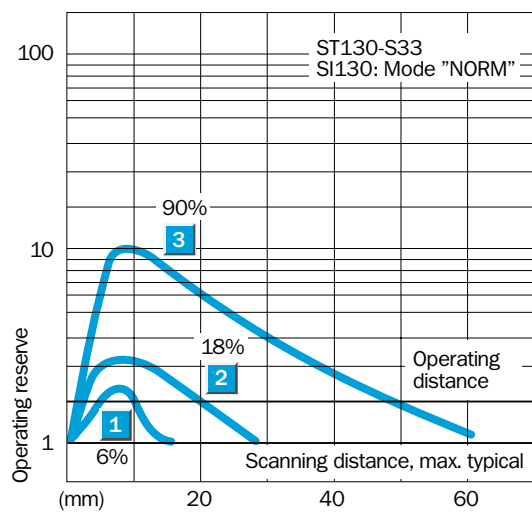
Technical data		ST 130-	S 33
Scanning distance , max. typical	0...200 mm ¹⁾		
Operating distance	0...150 mm ¹⁾		
Light source²⁾, light type	LED, visible red light		
Light spot size	Approx. 13 x 13 mm at 150 mm		
Angle of dispersion, sender	Approx. 5°		
Power supply and evaluation unit	ST 130 only functional in combination with separate interpreter (SI 130), see page 44		
Supply voltage V_S	See SI 130, page 44		
Switching outputs	See SI 130, page 44		
Output current I _A max.	See SI 130, page 44		
Light receiver, switching mode	See SI 130, page 44		
Response time ³⁾	See SI 130, page 44		
Max. switching frequency ⁴⁾	See SI 130, page 44		
Connection type	PVC cable, 2 m ⁵⁾ (screened), (cannot be extended)		
VDE protection class	Ⓓ		
Circuit protection⁶⁾	A		
Enclosure rating	IP 65		
Ambient temperature T_A	Operation - 25 °C...+ 55 °C Storage - 40 °C...+ 70 °C		
Weight with cable 2 m	ST 130-S 33: approx. 23 g ST 130-F 43: approx. 20 g		
Housing material	Housing: ABS/optics: PC		

- 1) Object with 90 % remission (based on standard white to DIN 5033) 3) Signal transit time with resistive load 6) A = V_S connections reverse-polarity protected
 2) Average service life 100,000 h at T_A = + 25 °C 4) With light/dark ratio 1:1
 5) Do not bend below 0 °C

Scanning distance




- 1 Scanning distance on black, 6 % remission
- 2 Scanning distance on grey, 18 % remission
- 3 Scanning distance on white, 90 % remission



Order information

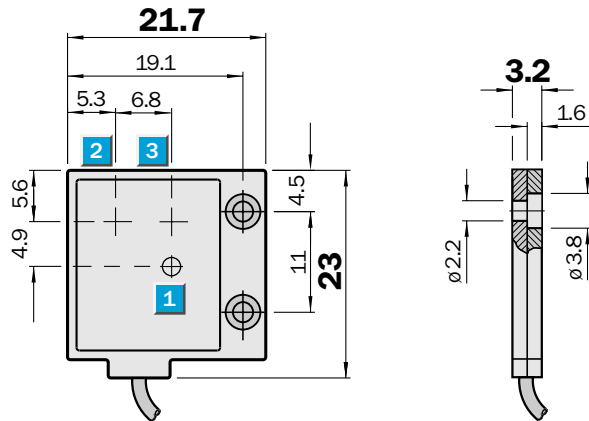
Type	Part no.
ST 130-S 33	6 011 081


Scanning distance
0 ... 60 mm

Photoelectric proximity switches

- Ultra-miniature housing, mounting depth 3.2 mm
- Large scanning distance
- Extremely flexible connection cable
- Red light and LED signal strength indicator as alignment aids

Dimensional drawing

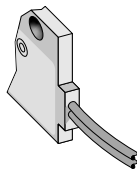


- 1 LED indicator, red: light reception
- 2 Centre of transmitter's optical axis
- 3 Centre of receiver's optical axis

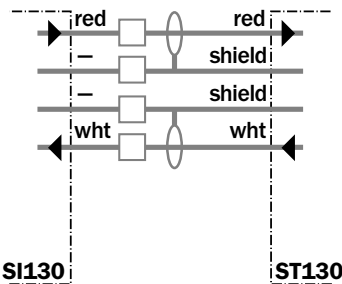


Connection type

ST 130-F 43



2 x 0.8 mm² shielded



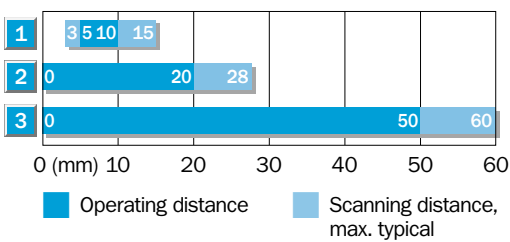
Accessories	page
Mounting brackets*	510

* included with delivery

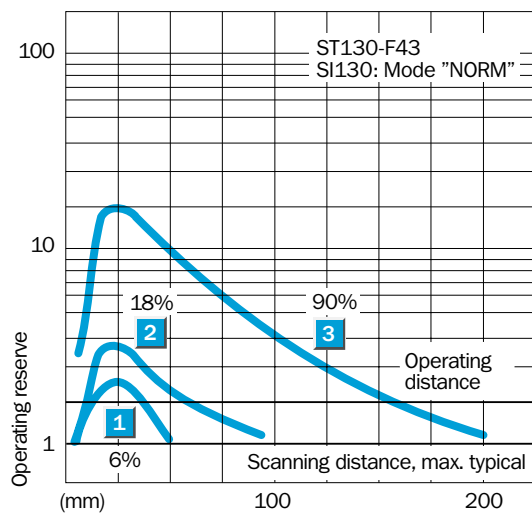
Technical data		ST 130-	F 43												
Scanning distance, max. typical	0 ... 60 mm ¹⁾														
Operating distance	0 ... 50 mm ¹⁾														
Light source²⁾, light type	LED, visible red light														
Light spot size	Approx. 35 mm at 50 mm														
Angle of dispersion, sender	Approx. 38°														
Power supply and evaluation unit	ST 130 only functional in combination with separate interpreter (SI 130), see page 44														
Supply voltage V_S	See SI 130, page 44														
Switching outputs	See SI 130, page 44														
Output current I _A max.	See SI 130, page 44														
Light receiver, switching mode	See SI 130, page 44														
Response time ³⁾	See SI 130, page 44														
Max. switching frequency ⁴⁾	See SI 130, page 44														
Connection type	PVC cable, 2 m ⁵⁾ (screened), (cannot be extended)														
VDE protection class	ⓘ														
Circuit protection⁶⁾	A														
Enclosure rating	IP 66														
Ambient temperature T_A	Operation - 25 °C...+ 55 °C Storage - 40 °C...+ 70 °C														
Weight with cable 2 m	ST 130-S 33: approx. 23 g ST 130-F 43: approx. 20 g														
Housing material	Housing: ABS/optics: PC														

- 1) Object with 90 % remission (based on standard white to DIN 5033)
- 2) Average service life 100,000 h at T_A = + 25 °C
- 3) Signal transit time with resistive load
- 4) With light/dark ratio 1:1
- 5) Do not bend below 0 °C
- 6) A = V_S connections reverse-polarity protected

Scanning distance




- 1 Scanning distance on black, 6 % remission
- 2 Scanning distance on grey, 18 % remission
- 3 Scanning distance on white, 90 % remission



Order information

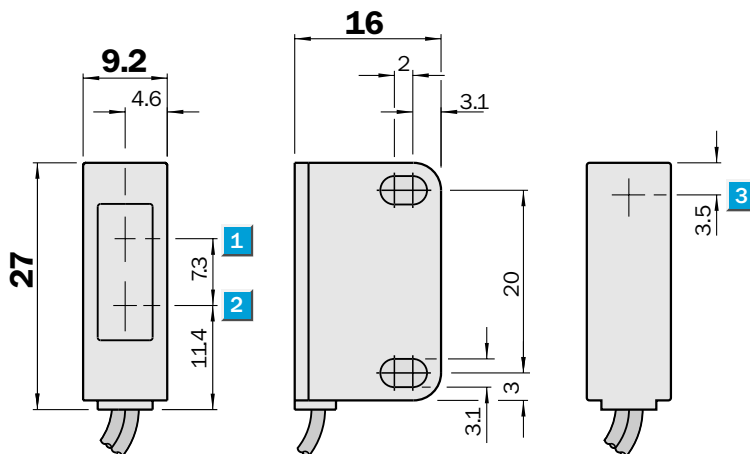
Type	Part no.
ST 130-F 43	6 011 082


Scanning distance
16 mm

Contrast scanners

- Ultra-miniature housing
- Resolution: 7 grey tones
- Red or green sender LED
- Focused optics, small light spot
- Extremely flexible connection cable

Dimensional drawing



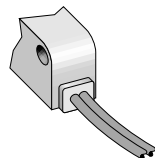
- 1 Centre of transmitter's optical axis
- 2 Centre of receiver's optical axis
- 3 LED indicator, red: light reception

Mounting bracket BEF-130-SM included.

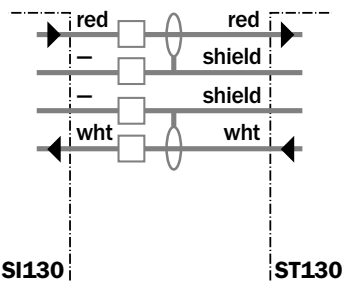


Connection type

ST 130-S 13
ST 130-S 19
ST 130-S 23
ST 130-S 29



2 x 0.8 mm² shielded



Accessories	page
Mounting brackets*	510

* included with delivery

Technical data		ST 130-	S 13	S 19	S 23	S 29					
Mark sensor	SI 130 in "MARK" mode, see page 44										
Operating distance	16 mm										
Scanning distance tolerance	± 2 mm										
Black/white resolution	7 grey tones										
Light source¹⁾, light type	LED, visible red light										
	LED, visible green light										
Light spot size	Approx. 1 x 4 mm w. focal point 16 mm										
	Approx. 1 x 1 mm w. focal point 16 mm										
Angle of dispersion, sender	Focused, focal point 16 mm ± 0.5 mm										
Power supply and evaluation unit	ST 130 only functional in combination with separate interpreter (SI 130), see page 44										
Supply voltage V_S	See SI 130, page 44										
Switching outputs	See SI 130, page 44										
Output current I _A max.	See SI 130, page 44										
Light receiver, switching mode	See SI 130, page 44										
Response time ²⁾	See SI 130, page 44										
Max. switching frequency ³⁾	See SI 130, page 44										
Connection type	PVC cable, 2 m ⁴⁾ (screened), (cannot be extended)										
VDE protection class	ⓘ										
Circuit protection⁵⁾	A										
Enclosure rating	IP 66										
Ambient temperature T_A	Operation - 25 °C...+ 55 °C										
	Storage - 40 °C...+ 70 °C										
Weight	Approx. 23 g										
Housing material	Housing: ABS/optics: PC										

1) Average service life 100,000 h
at T_A = + 25 °C

2) Signal transit time with resistive load


3) With light/dark ratio 1:1

4) Do not bend below 0 °C

5) A = V_S connections reverse-polarity
protected

Order information

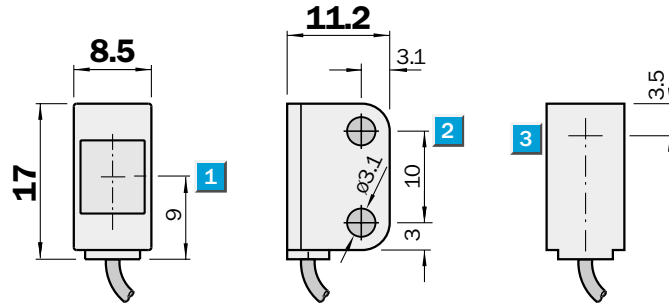
Type	Part no.
ST 130-S 13	6 011 083
ST 130-S 19	6 011 084
ST 130-S 23	6 011 085
ST 130-S 29	6 011 086

 **Scanning range**
0...2.2 m

Through-beam photoelectric switches

- Ultra-miniature housing
- Large scanning range
- Extremely flexible connection cable
- Red light and LED signal strength indicator as alignment aids

Dimensional drawing



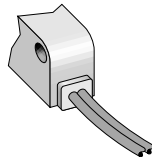
- 1** Centre of optical axis
 - 2** Mounting hole \varnothing 3.1 mm
 - 3** LED indicator, red (sender only)
- SS 130: active. Light reception by SE 130 receiver \geq switching threshold

Mounting bracket BEF-130 ST for SS/SE 130-S 33, see accessories (included).

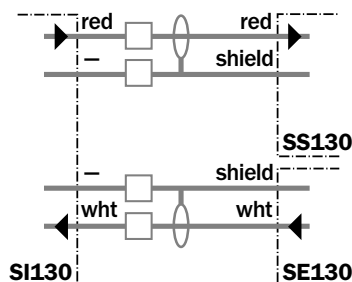


Connection type

SS/SE 130-S 33



2 x 0.8 mm² shielded



Accessories	page
Mounting brackets*	510
Slotted masks	556

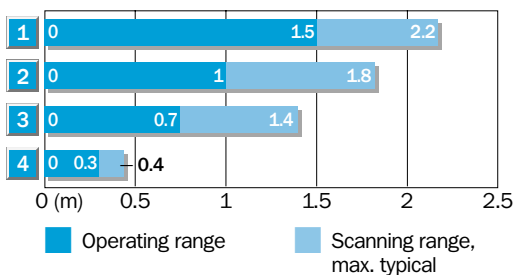
* included with delivery



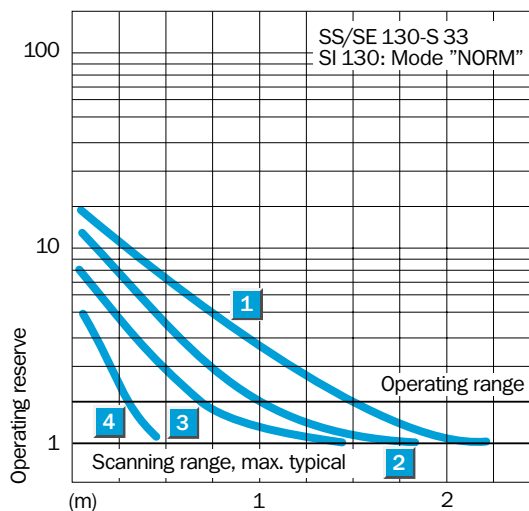
Technical data		SS/SE 130-	S 33											
"Slim" housing (S)														
Scanning range, max. typical	2.2 m													
Operating range	1.5 m													
Operating range with mask, width 2.0 mm	1.0 m													
Operating range with mask, width 1.0 mm	0.7 m													
Operating range with mask, width 0.5 mm	0.3 m													
Light source¹⁾, light type	LED, red light													
Light spot size	approx. 180 mm at 1.5 m													
Angle of dispersion, sender	approx. 7°													
Angle of dispersion, receiver	approx. 18°													
Supply voltage V_S	See SI 130, page 44													
Switching outputs	See SI 130, page 44													
Output current I _A max.	See SI 130, page 44													
Light receiver, switching mode	See SI 130, page 44													
Response time ²⁾	See SI 130, page 44													
Max. switching frequency ³⁾	See SI 130, page 44													
Connection type	PVC cable ⁴⁾ , 2 m (screened), (cannot be extended)													
VDE protection class	⊠													
Circuit protection⁵⁾	A													
Enclosure rating	IP 66													
Ambient temperature T_A	Operation - 25 °C...+ 55 °C Storage - 40 °C...+ 70 °C													
Weight with cable (2 m)	Sender: approx. 11 g Receiver: approx. 11g													
Housing material	Housing: ABS/optics: PC													

- 1) Average service life 100,000 h at T_A = + 25 °C
- 2) Signal transit time with resistive load
- 3) With light/dark ratio 1:1
- 4) Do not bend below 0 °C
- 5) A = V_S connections reverse-polarity protected

Scanning range and operating reserve



- 1 Without mask
- 2 With mask, 2 mm wide
- 3 With mask, 1 mm wide
- 4 With mask, 0.5 mm wide



Order information

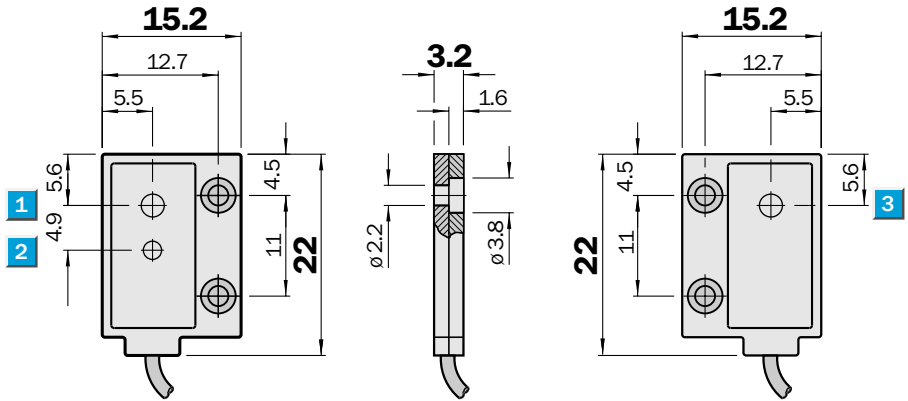
Type	Part no.
SS/SE 130-S 33	6 011 079

Scanning range
0...0.35 m

Through-beam photoelectric switches

- Ultra-miniature housing, mounting depth 3.2 mm
- Large scanning range
- Extremely flexible connection cable
- Red light and LED signal strength indicator as alignment aids

Dimensional drawing

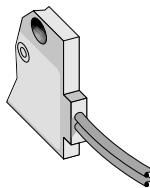


- 1 Centre of transmitter's optical axis
- 2 LED indicator, red (sender only)
SS 130: active. Light reception by SE 130 receiver \geq switching threshold
- 3 Centre of receiver's optical axis

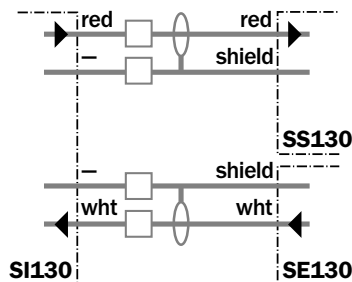


Connection type

SS/SE 130-F 33



2 x 0.8 mm² shielded



Accessories	page
Mounting brackets*	510

* included with delivery

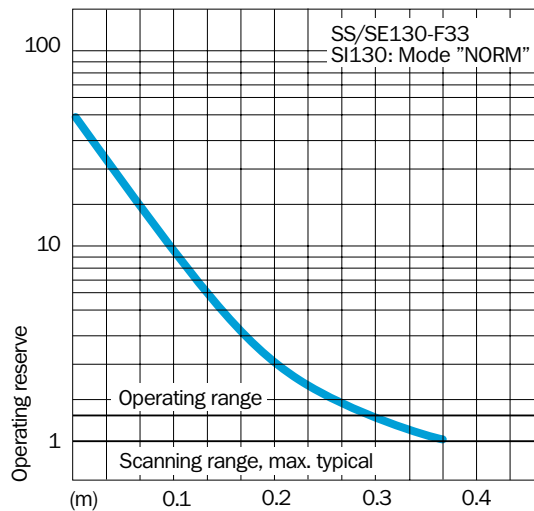
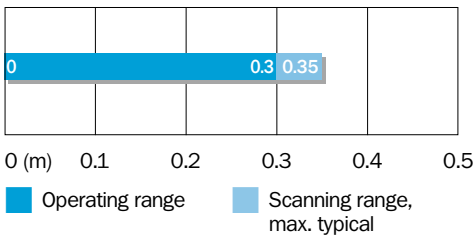


Technical data	SS/SE 130-	F 33													
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"Flat" housing (F)		
Scanning range , max. typical	0.35 m	
Operating range	0.3 m	
Light source¹⁾, light type	LED, red light	
Light spot size	Approx. 200 mm at 0.3 m	
Angle of dispersion, sender	Approx. 36°	
Angle of dispersion, receiver	Approx. 20°	
Power supply and evaluation unit		
	ST 130 only functional in combination with separate interpreter (SI 130), see page 44	
Supply voltage V_S	See SI 130, page 44	
Switching outputs	See SI 130, page 44	
Output current I_A max.	See SI 130, page 44	
Light receiver, switching mode	See SI 130, page 44	
Response time ²⁾	See SI 130, page 44	
Max. switching frequency ³⁾	See SI 130, page 44	
Connection type		
	PVC cable, 2 m ⁴⁾ (screened), (cannot be extended)	
VDE protection class	⊠	
Circuit protection⁵⁾	A	
Enclosure rating	IP 66	
Ambient temperature T_A	Operation - 25 °C...+ 55 °C Storage - 40 °C...+ 70 °C	
Weight with cable 2 m	Sender: approx. 11 g/ Receiver: approx. 11g	
Housing material	Housing: ABS/optics: PC	

- 1) Average service life 100,000 h at $T_A = + 25 °C$
- 2) Signal transit time with resistive load
- 3) With light/dark ratio 1:1
- 4) Do not bend below 0 °C
- 5) A = V_S connections reverse-polarity protected

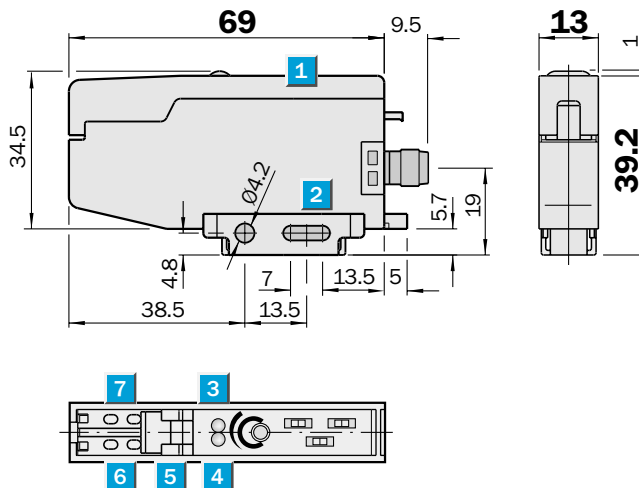
Scanning range and operating reserve



Order information	
Type	Part no.
SS/SE 130-F 33	6 011 080

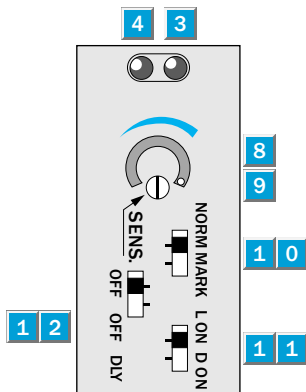
- Basic unit for all S 130 sensors
- Simple connection of sensors
- Mounted on DIN rail
- Selectable light-/dark-switching
- Selectable OFF-delay (40 ms)

Dimensional drawing



Adjustments possible

SI 130-P 12
SI 130-N 12
SI 130-P 40
SI 130-N 40

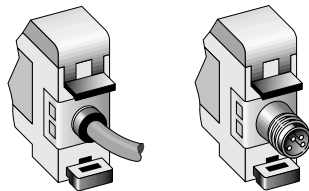


- 1** Protective hood
- 2** BF-WLL 160 mounting bracket (included)
- 3** LED signal strength indicator, red (lights up when switching threshold is exceeded)
- 4** LED signal strength indicator, green (lights up with reception reserve > 10 %)
- 5** For releasing/locking connection wires of S 130 photoelectric switches/photoelectric proximity switches
- 6** Sender terminals (red), screen (-)
- 7** Receiver terminals (white), screen (-)
- 8** Sensitivity scale (270°)
- 9** Sensitivity control (2 revolutions)
- 1 0** Selector switch for "NORM"/"MARK" detection (t = 0.5 ms/t ≤ 0.2 ms)
- 1 1** Selector switch for light- ("LON")/dark- ("D.ON") switching
- 1 2** Selector switch for OFF-delay "OFF"/"OFF DLY", 40 ms fixed

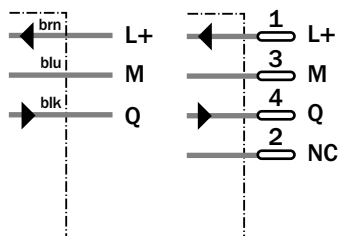


Connection types

SI 130-P 12	SI 130-P 40
SI 130-N 12	SI 130-N 40



3 x 0.2 mm² 4-pin, M 8



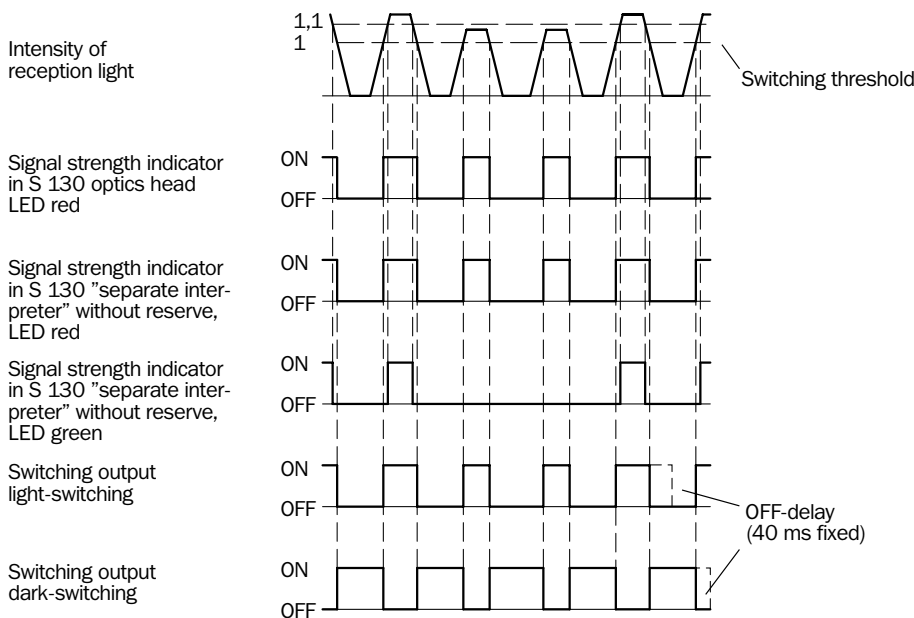
Accessories	page
Cable receptacles	496
Mounting brackets*	510

* included with delivery

Technical data		SI 130-	P 12	P 40	N 12	N 40						
Power supply and evaluation unit	S 130 photoelectric switch series in ultra-miniature housing, see pages 32 to 43											
Operating mode												
"NORM" mode	All S 130 optics heads in photoelectric switch mode											
"MARK" mode	Optics heads ST 130-S 13, ST 130-S 19, ST 130-S 23, ST 130-S 29 in contrast scanner mode											
Sensitivity, adjustable	Potentiometer, 2 turns with sensitivity scale 270°											
Time delay												
OFF-delay t_{OFF}	40 ms fixed, selectable via sliding switch											
Supply voltage V_S	10...30 V DC ¹⁾											
Ripple ²⁾	± 10 %											
Current consumption ³⁾	≤ 35 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Output current I_A max.	100 mA											
Light receiver, switching mode	Light-/dark-switching selectable via sliding switch											
Response time ^{4)/} Max. switching frequency ⁵⁾												
"NORM" mode	≤ 0.5 ms/1000/s											
"MARK" mode	≤ 0.2 ms/2500/s											
Connection types	PVC cable, 2 m ⁶⁾ Plug M 8, 4-pin											
VDE protection class	⊠											
Circuit protection⁷⁾	A, B, C, D											
Enclosure rating	IP 50											
Ambient temperature T_A	Operation - 25 °C...+ 55 °C Storage - 40 °C...+ 70 °C											
Weight with cable 2 m with plug M 8, 4-pin	Approx. 70 g Approx. 30 g											
Housing material	Housing: ABS											

- 1) Limit values
- 2) May not exceed or fall short of V_S tolerances
- 3) Without load
- 4) Signal transit time with resistive load
- 5) With light/dark ratio 1:1
- 6) Do not bend below 0 °C
- 7) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

S 130 function diagram



Order information

Type	Part no.
SI 130-P 12	6 011 089
SI 130-P 40	6 011 090
SI 130-N 12	6 011 087
SI 130-N 40	6 011 088