

V 12-2 Miniature photoelectric switches: innovations in M12 housings

	Photoelectric proximity switches
	Photoelectric reflex switches
	Through-beam photoelectric switches



The V 12-2 photoelectric switch series in round miniature housings provides more than “just” extensive scanning ranges.

V 12-2 sensors are the ideal option for standard applications where space is restricted. In addition, V 12-2 photoelectric switches are the perfect complement to inductive or capacitive sensors in M12 housings.

Special focal points are applications in:

- The packaging and printing industries,
- assembly and handling systems,
- conveyor systems, and
- the construction of special-purpose machines.

The V 12-2 optic sensors and their ranges in overview:

- VS/VE 12-2 through-beam photoelectric switch: 5 m,
- VL 12-2 photoelectric reflex switch: 2.8 m (PL 80 A), switching reliability even with reflecting objects thanks to polarization filter and red LED transmitter.
- VT 12-2 photoelectric proximity switch, energetic: two scanning ranges scr. 300 mm and scr. 100 mm (90 % remission), manual sensitivity setting per Teach-in button and electronically per control input C.

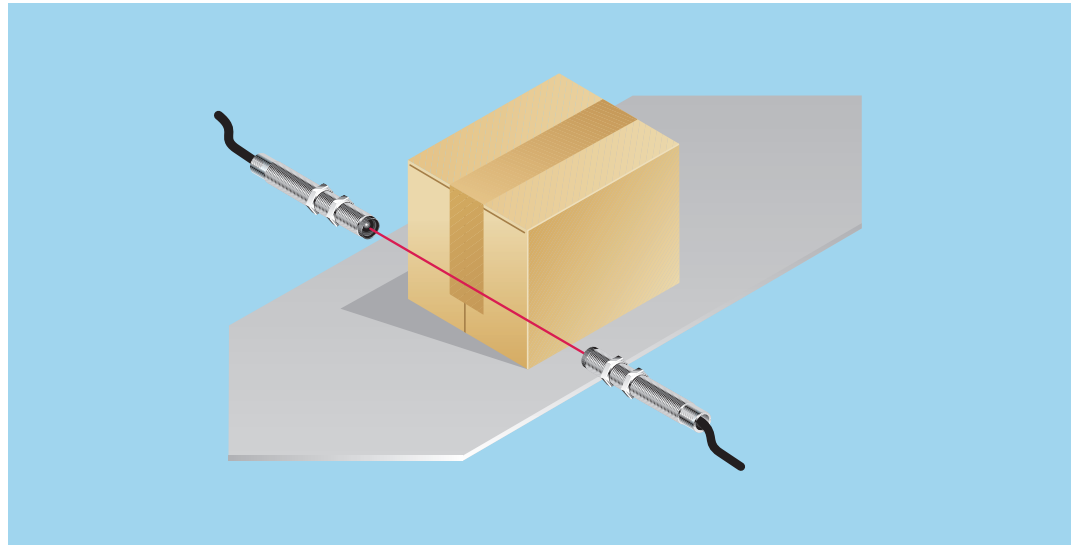
Two Teach-in modes provide simple optimization options for VT 12T-2:

- Substantial operating reserve for standard applications,
- precise switching point and small hysteresis for special tasks,
- optical display of the operating reserve (alarm display) by blinking LED indicator.

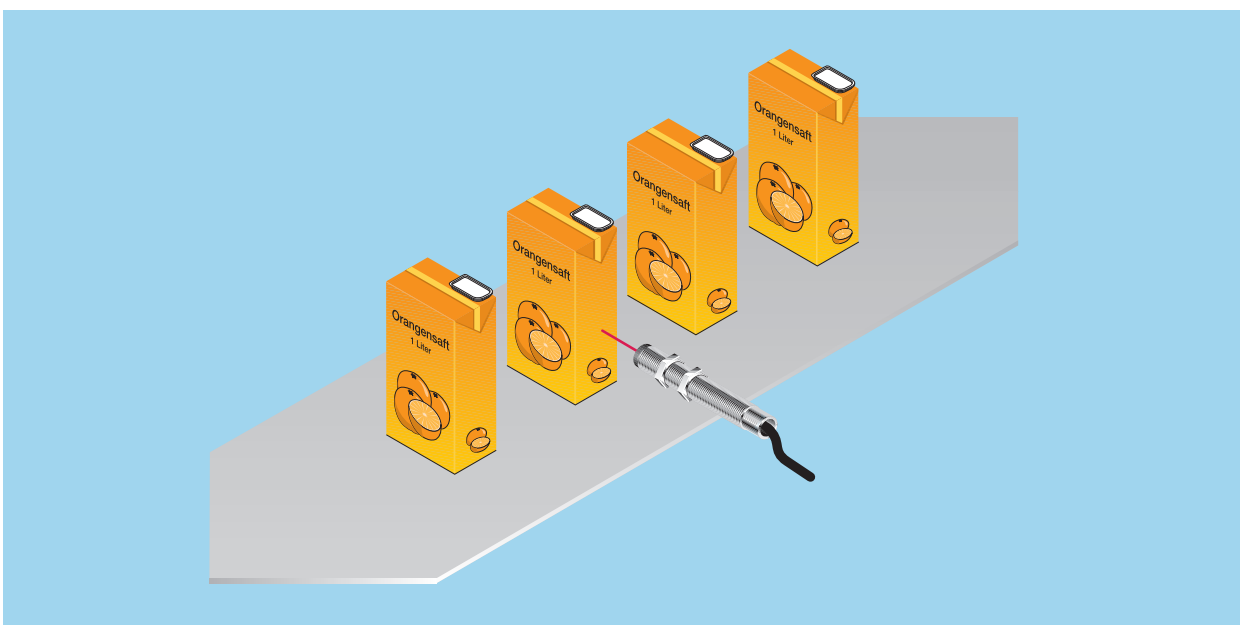
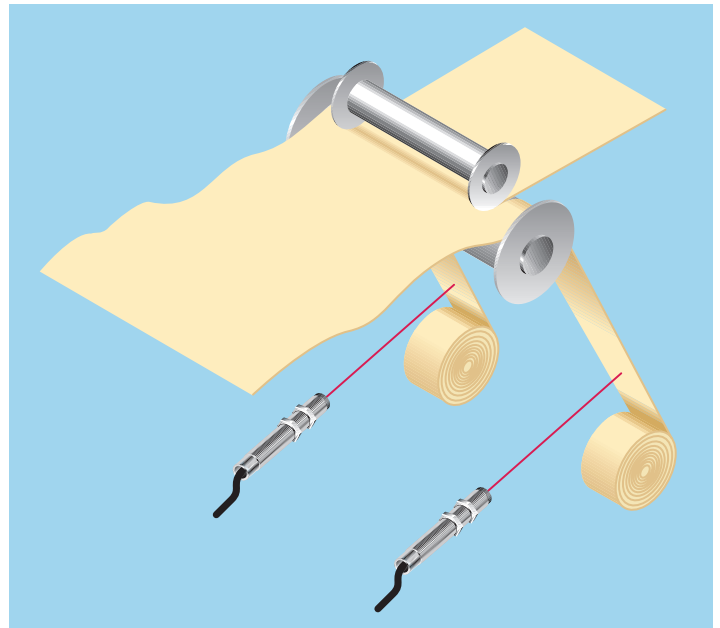
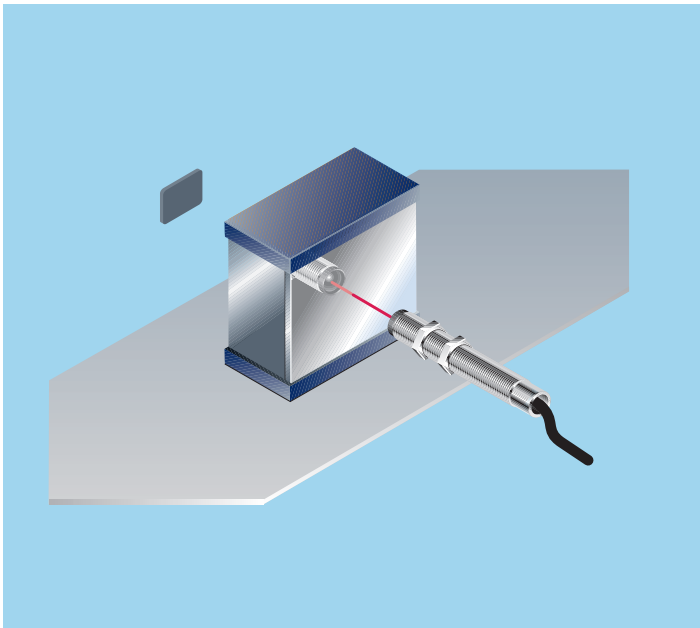
Flexible and minimum variants in spite of this: Freely selectable switching type light-switching (L.ON) or dark-switching (D.ON) per control line.

$V_S = 10 \dots 30 \text{ V DC}$; switching output Q either in PNP or NPN; M12 plug or cable, IP 67 and sturdy metal housing are additional V 12-2 system strengths.

► Detecting objects on conveyor belts using VS/VE 12-2 through-beam photoelectric switches.



▼ VL 12-2 photoelectric reflex switches can also be used for the reliable detection of reflective surfaces, for example film-wrapped cardboard boxes.



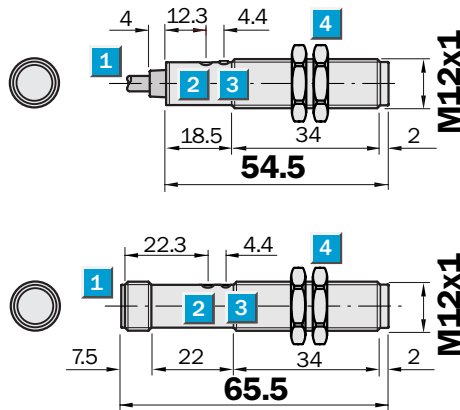
▲ VT 12-2 photoelectric proximity switches used to ensure that waste is rolled up correctly when paper and film strips are cut.

◀ Is an object present or not?
The VT 12-2 photoelectric proximity switch provides the answer.

	Scanning distance
	0 ... 115 mm
	0 ... 340 mm
Photoelectric proximity switches	

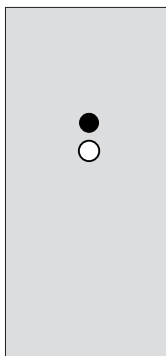
- Sensitivity (scanning range) can be set per Teach-in at the “push of a button” or per control input C
- Minimum number of variants: Switching type L.ON or D.ON selectable per control input C
- Optic pre-failure message via operating reserve display

Maßbild



Adjustments possible VT 12T-2

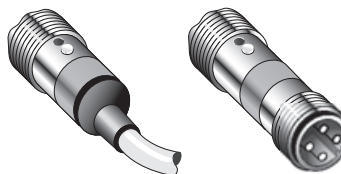
VT 12T-2P 112	VT 12T-2N 112
VT 12T-2P 410	VT 12T-2N 410
VT 12T-2P 132	VT 12T-2N 132
VT 12T-2P 430	VT 12T-2N 430



- 1 Cable or plug M12, 4-pin
- 2 Sensitivity adjustment (Teach-in button)
- 3 Yellow LED indicator:
 - lights continuously: reception signal > reserve factor 2
 - blinks: Reception signal < reserve factor 2 but > switching threshold 1
- 4 Mounting nuts (2x), SW 17, metal

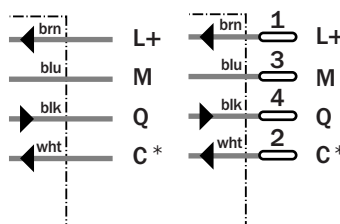
Connection types

VT 12T-2P 112	VT 12T-2P 410
VT 12T-2N 112	VT 12T-2N 410
VT 12T-2P 132	VT 12T-2P 430
VT 12T-2N 132	VT 12T-2N 430



4 x 0.14 mm²

4-pin, M12



- * Control input C, programming:
- Switching type L.ON/D.ON and
 - External Teach-in
 - C = open (not assigned) light-switching L.ON
 - C = + V_S: dark-switching D.ON
 - C = 0 V: sensitivity setting per “external Teach-in” active



See chapter Accessories

Cables and connectors

Mounting systems

Technical data		VT 12T-2	P 112	P 410	N 112	N 410	P 132	P 430	N 132	N 430		
Scanning distance , max. typical ¹⁾	0 ... 115 mm											
	0 ... 340 mm											
Operating distance ¹⁾	2 ... 100 mm											
	2 ... 300 mm											
Sensitivity setting	Manual, per Teach-in button											
	Electronic, per control input C (0 V) ²⁾											
Light source ³⁾ , light type	LED, infrared light											
Light spot diameter	Approx. 20 mm at 100 mm											
	Approx. 28 mm at 300 mm											
Angle of dispersion of sender	Approx. 11.4° (SD = max.),											
	Approx. 22.6° (SD = 1/2 max.)											
	Approx. 5.3° (SD = max.),											
	Approx. 11.2° (SD = 1/2 max.)											
Supply voltage V_S	10 ... 30 V DC ⁴⁾											
Ripple ⁵⁾	≤ 10 %											
Current consumption ⁶⁾	≤ 20 mA											
Switching outputs	Q: PNP											
	Q: NPN											
Output current I_A max.	≤ 100 mA											
Switching mode	Light-/Dark-switching selectable ²⁾											
Response time ⁷⁾	≤ 1.25 ms											
Switching frequency max. ⁸⁾	400/s											
Connection types	Cable ⁹⁾	PVC, 2 m, 4 x 0.14 mm ² , Ø 3.75 mm										
	Plug	M12, 4-pin										
VDE protection class ¹⁰⁾		□										
Circuit protection ¹¹⁾		A, B, C, D										
Enclosure rating		IP 67										
Ambient temperature T_A	Operation	– 25 °C ... + 70 °C										
	Storage	– 25 °C ... + 70 °C										
Weight	With cable	Approx. 54 g										
	With plug	Approx. 18 g										
Housing material	Housing:	Nickel-coated brass/PA										
	Optics:	PC										

¹⁾ Object to be detected with 90 % remission (relating to standard white in acc. with DIN 5033); 100 x 100 mm

²⁾ Control input C
 – L.ON/D.ON and
 – external Teach-in
 C = open: light-switching L.ON
 C = + V_S : dark-switching D.ON
 C = 0 V: Sensitivity setting per "external Teach-in" active

³⁾ Average service life 100,000 h at $T_A = + 25 °C$

⁴⁾ Limit values

⁵⁾ May not exceed or fall short of V_S tolerances

⁶⁾ Without load

⁷⁾ Signal transit time with resistive load

⁸⁾ With light/dark ratio 1:1

⁹⁾ Do not bend below 0 °C

¹⁰⁾ Reference voltage 50 V DC

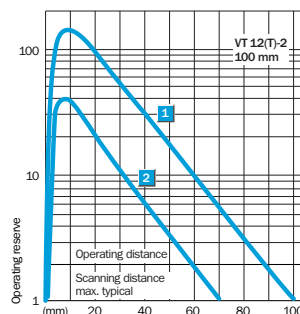
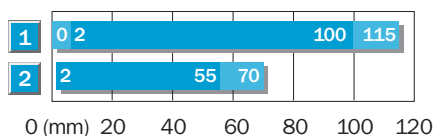
¹¹⁾ A = V_S connections reverse-polarity protected

B = Inputs and output reverse-polarity protected

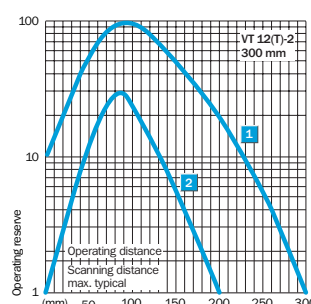
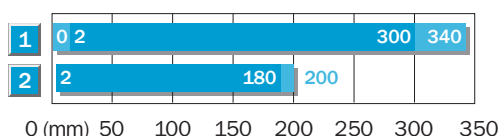
C = Interference pulse suppression

D = Outputs overload and short-circuit protected

115 mm Scanning distance



340 mm Scanning distance



■ Operating distance ■ Scanning distance, max. typical

1	Scanning distance on white, 90 % remission
2	Scanning distance on grey, 18 % remission

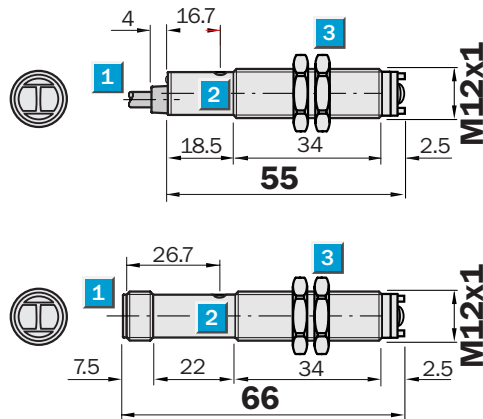
Order information

Type	Order no.
VT 12T-2P 112	6 026 211
VT 12T-2P 410	6 026 212
VT 12T-2N 112	6 026 209
VT 12T-2N 410	6 026 210
VT 12T-2P 132	6 026 215
VT 12T-2P 430	6 026 216
VT 12T-2N 132	6 026 213
VT 12T-2N 430	6 026 214

	Scanning range 0.03 ... 2.8 m
Photoelectric reflex switches	

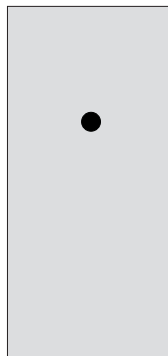
- Switching reliability even with reflecting objects thanks to polarization filter and red light
- Minimum number of variants: Switching type L.ON or D.ON selectable per control line L/D
- Optic pre-failure message via operating reserve display

Dimensional drawing



Adjustments possible

VL 12-2P 132	VL 12-2N 132
VL 12-2P 430	VL 12-2N 430

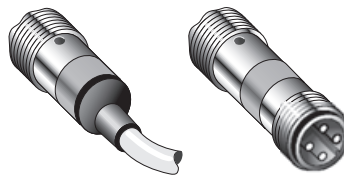


- 1 Cable or plug M12, 4-pin
- 2 Yellow LED indicator:
– lights continuously: reception signal > reserve factor 2
– blinks: Reception signal < reserve factor 2 but > switching threshold 1
- 3 Mounting nuts (2x), SW 17, metal

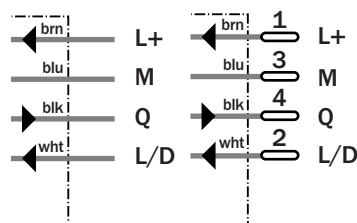


Connection types

VL 12-2P 132	VL 12-2P 430
VL 12-2N 132	VL 12-2N 430


4 x 0.14 mm²

4-pin, M12



See chapter Accessories

Cables and connectors

Mounting systems

Technical data	VL 12-2	P 132	P 430	N 132	N 430										
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Scanning range, max. typ./reflector	0.03 ... 2.8 m/PL 80 A														
Operating range	0.03 ... 2.3 m/PL 80 A														
Sensitivity setting	Not available														
Light source¹⁾, light type	LED, red light, with polarization filter														
Light spot diameter	Approx. 80 mm at 2 m														
Angle of dispersion of sender	Approx. 2.3° (SR = max.), Approx. 6.3° (SR = 1/2 max.)														
Supply voltage V_S	10 ... 30 V DC ²⁾														
Ripple ³⁾	≤ 10 %														
Current consumption ⁴⁾	≤ 20 mA														
Switching outputs	Q: PNP														
	Q: NPN														
Output current I_A max.	≤ 100 mA														
Switching mode	Light-/Dark-switching selectable ⁵⁾														
Response time ⁶⁾	≤ 1.25 ms														
Switching frequency max. ⁷⁾	400/s														
Connection types	Cable ⁸⁾	PVC, 2 m, 4 x 0.14 mm ² , Ø 3.75 mm													
	Plug	M12, 4-pin													
VDE protection class⁹⁾	□														
Circuit protection¹⁰⁾	A, B, C, D														
Enclosure rating	IP 67														
Ambient temperature T_A	Operation - 25 °C ... + 70 °C Storage - 25 °C ... + 70 °C														
Weight	With cable	Approx. 54 g													
	With plug	Approx. 18 g													
Housing material	Housing:	Nickel-coated brass/PA													
	Optics:	PC													

¹⁾ Average service life 100,000 h
at $T_A = +25\text{ °C}$

²⁾ Limit values

³⁾ May not exceed or fall short of
 V_S tolerances

⁴⁾ Without load

⁵⁾ L/D switching type control line
L/D = open (not assigned)
dark-switching D.ON
L/D = + V_S : light-switching L.ON
L/D = 0 V: dark-switching D.ON

⁶⁾ Signal transit time with resistive load

⁷⁾ With light/dark ratio 1:1

⁸⁾ Do not bend below 0 °C

⁹⁾ Reference voltage 50 V DC

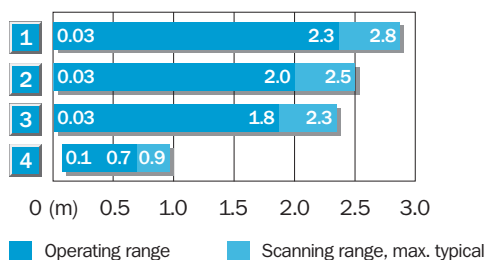
¹⁰⁾ A = V_S connections reverse-polarity
protected

B = Inputs and output reverse-polarity
protected

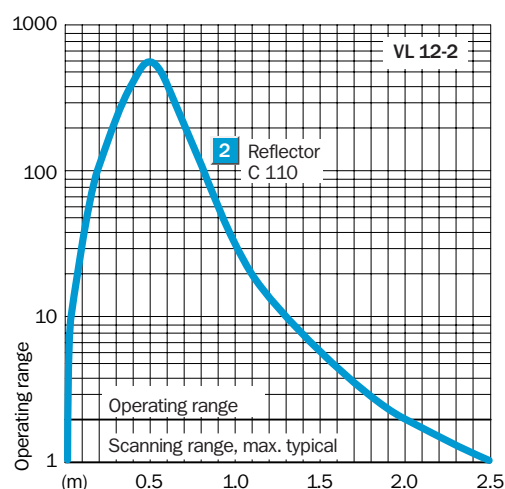
C = Interference pulse suppression

D = Outputs overload and short-circuit
protected

Scanning range and operating reserve



Reflector type	Operating range
1 PL 80 A	0.03 ... 2.3 m
2 C 110	0.03 ... 2.0 m
3 PL 50 A/PL 40 A/P 250	0.03 ... 1.8 m
4 Reflective tape Diamond Grade	0.1 ... 0.7 m



Order information

Type	Order no.
VL 12-2P 132	6 026 219
VL 12-2P 430	6 026 220
VL 12-2N 132	6 026 217
VL 12-2N 430	6 026 218

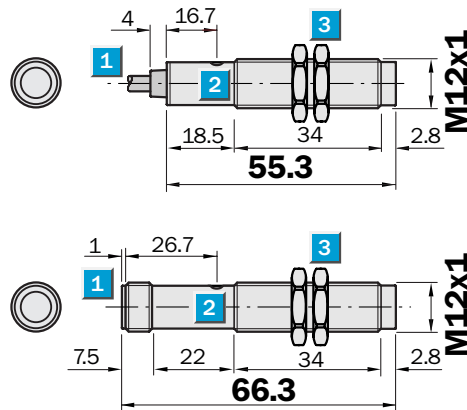


Scanning range
0 ... 5.0 m

Through-beam photoelectric switches

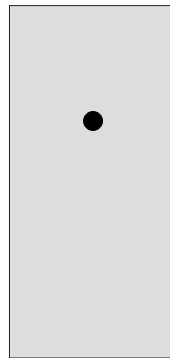
- Minimum number of variants:
Switching type L.ON or D.ON
selectable per control line L/D
- Sturdy M12 metal housing,
connection cable or M12 plug,
4-pin

Dimensional drawing



Adjustments possible

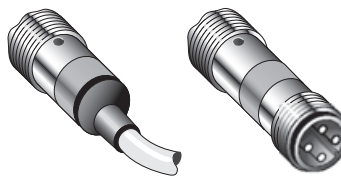
VS/VE 12-2P 132	VS/VE 12-2N 132
VS/VE 12-2P 430	VS/VE 12-2N 430



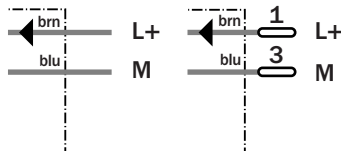
- 1 Cable or plug M12, 4-pin
- 2 Yellow LED indicator (continuously):
Sender VS 12-2:
– power on, sender active
receiver VE 12-2:
– light reception > switching threshold 1
- 3 Mounting nuts (2x), SW 17, metal

Connection types

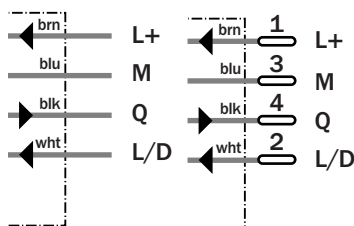
VS/VE 12-2P 132	VS/VE 12-2P 430
VS/VE 12-2N 132	VS/VE 12-2N 430



Sender	2 x 0.14 mm ²	4-pin, M12
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Receiver	4 x 0.14 mm ²	4-pin, M12
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See chapter Accessories

Cables and connectors

Mounting systems

Technical data			VS/VE 12-2	P 132	P 430	N 132	N 430						
Scanning range, max. typ.	0 ... 5.0 m												
Operating range	0 ... 4.0 m												
Sensitivity setting	Not available												
Light source¹⁾, light type	LED, infrared light												
Light spot diameter	Approx. 100 mm at 4 m												
Angle of dispersion of sender	Approx. 1.4° (SR = max.),												
Angle of dispersion of receiver	Approx. 4.5° (SR = 1/2 max.)												
Supply voltage V_S	10 ... 30 V DC ²⁾												
Ripple ³⁾	≤ 10 %												
Current consumption ⁴⁾	≤ 20 mA												
Switching outputs	Q: PNP												
	Q: NPN												
Output current I _A max.	≤ 100 mA												
Switching mode	Light-/Dark-switching selectable ⁵⁾												
Response time ⁶⁾	≤ 2.0 ms												
Switching frequency max. ⁷⁾	250/s												
Connection types													
Cable ⁸⁾ sender VS 12-2	PVC, 2 m, 2 x 0.14 mm ² , Ø 3.75 mm												
Cable ⁸⁾ receiver VE 12-2	PVC, 2 m, 4 x 0.14 mm ² , Ø 3.75 mm												
Plug	M12, 4-pin												
VDE protection class⁹⁾	□												
Circuit protection¹⁰⁾	A, B, C, D												
Enclosure rating	IP 67												
Ambient temperature T_A	Operation - 25 °C ... + 70 °C												
	Storage - 25 °C ... + 70 °C												
Weight	With cable	VS and VE each approx. 54 g											
	With plug	VS and VE each approx. 18 g											
Housing material	Housing:	Nickel-coated brass/PA											
	Optics:	PC											

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

²⁾ Limit values

³⁾ May not exceed or fall short of V_S tolerances

⁴⁾ Without load

⁵⁾ L/D switching type control line
L/D = open (not assigned)
dark-switching D.ON
L/D = + V_S: light-switching L.ON
L/D = 0 V: dark-switching D.ON

⁶⁾ Signal transit time with resistive load

⁷⁾ With light/dark ratio 1:1

⁸⁾ Do not bend below 0 °C

⁹⁾ Reference voltage 50 V DC

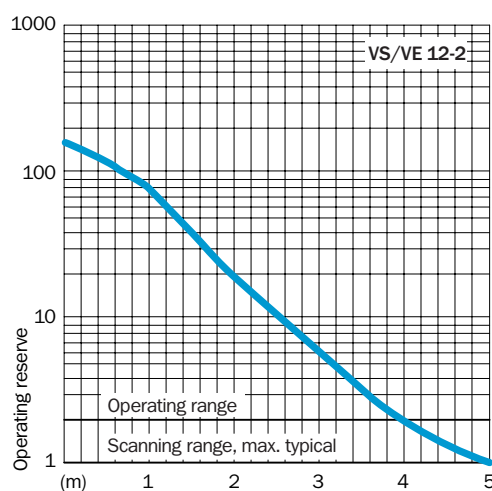
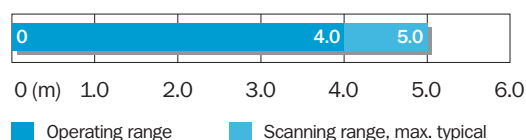
¹⁰⁾ A = V_S connections reverse-polarity protected

B = Inputs and output reverse-polarity protected

C = Interference pulse suppression

D = Outputs overload and short-circuit protected

Scanning range and operating reserve



Order information

Type ¹¹⁾	Order no. ¹¹⁾
VS/VE 12-2P 132	6 026 223
VS/VE 12-2P 430	6 026 224
VS/VE 12-2N 132	6 026 221
VS/VE 12-2N 430	6 026 222

¹¹⁾ The order no. contains transmitter and receiver (= pair).