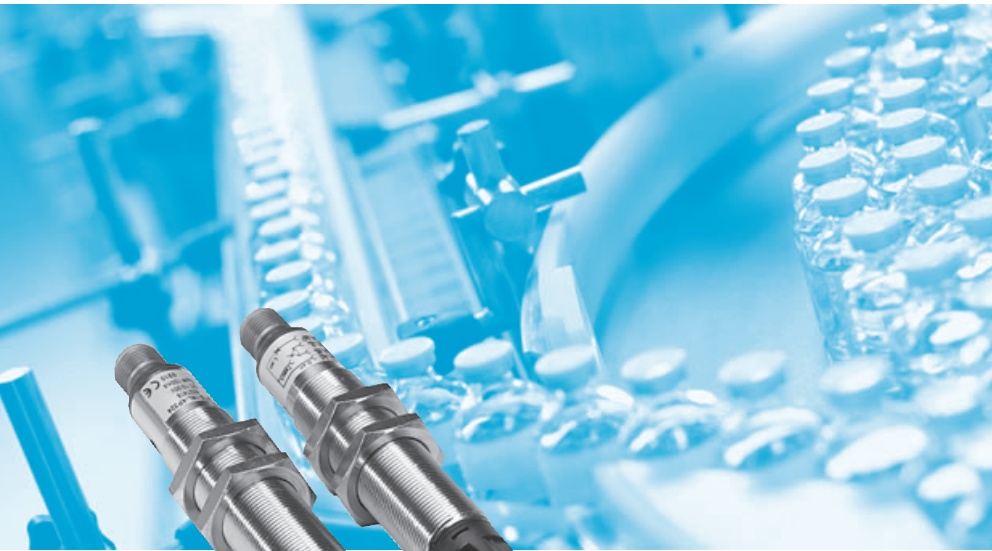


V 18 Laser – No frills performance: long ranges, high speeds with precision



- VTE 18 L photoelectric proximity switches: energetic type, scr. 400 mm (90 % remission).

Additional standard features: very short response time $f = 800/s$ (1,000/s); manual sensitivity adjustment (VSE 18 L), or Teach-in (VL 18 L and VTE 18 L). The Teach-in provides easy handling and additional flexibility. Select:

- substantial operating reserve for standard applications,
- precise switching point and small hysteresis for special tasks.

High flexibility and functionality is available from a small number of variants as a result of: programmable switching type L.ON or D.ON by control line. $V_s = 10 \dots 30$ V DC; switching output Q either in PNP or NPN; M12 plug connector, IP 67 and sturdy metal housing (straight or 90 degree body styles) ...

Yellow and green LED indicators provide support during installation, operation startup, alignment and maintenance.

Whilst the V 18 L is suitable for any general purpose application, it will be of particular interest for applications in mechanical handling and logistics engineering, special mechanical engineering tasks, the packaging industry and conveyor engineering.

T

The photoelectric switch series V 18 L utilising the latest technology laser diodes, allies many years of sensor and applications know-how, with customer oriented features.

The strengths of our V 18 Laser:

- Laser class 1 (IEC 60825-1),
- extremely long ranges,
- smallest, visible light spots,
- very short response times.

The V 18 L and its ranges in overview:

- VSE 18 L through-beam photoelectric switches: 60 m;
- VL 18 L photoelectric reflex switches: 35 m (P 250 F), polarizing filter;

	Photoelectric proximity switches
	Photoelectric reflex switches
	Through-beam photoelectric switches



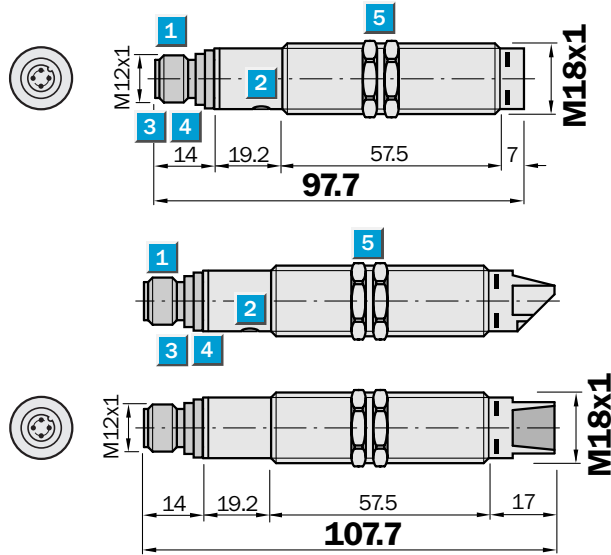
Laser class 1
(IEC 60825-1)



	Scanning distance
	0 ... 400 mm
	2 ... 250 mm
Photoelectric proximity switches	

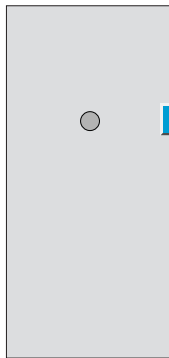
- Detects small parts and switches precisely thank to small laser spot
- Laser class 1
- Adjustable sensitivity

Dimensional drawing



Adjustments possible

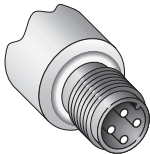
VTE 18 L-4P344	VTE 18 L-4P324
VTE 18 L-4N344	VTE 18 L-4N324



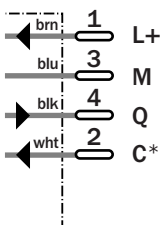
- 1 Plug M12, 4-pin
- 2 Sensitivity adjustment (Teach-in button)
- 3 Green LED indicator: V_s supply voltage feed
- 4 Yellow LED indicator:
 - lights continuously: reception signal > reserve factor 2
 - blinks: Reception signal < reserve factor 2 but > switching threshold 1
- 5 Mounting nuts (2x), SW 24, metal (included with delivery)

Connection types

VTE 18 L-4P344	VTE 18 L-4P324
VTE 18 L-4N344	VTE 18 L-4N324



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



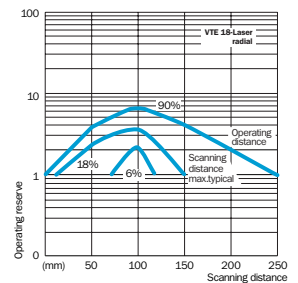
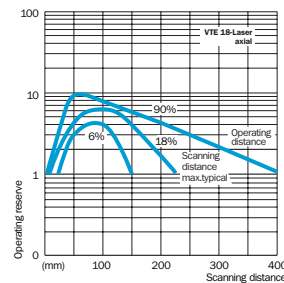
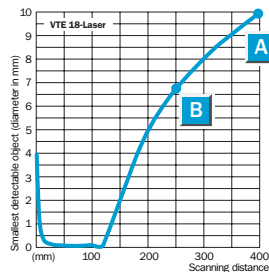
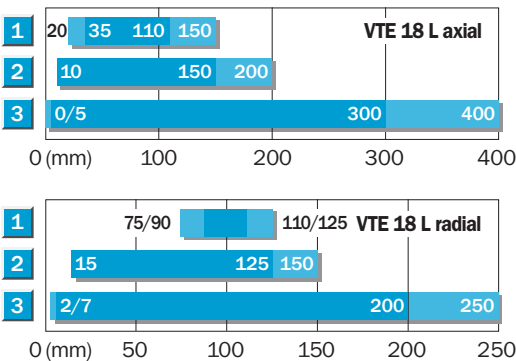
Laser class 1
(IEC 60825-1)

Accessories
Connection systems
Mounting systems

Technical data		VTE 18 L-	4P324	4P344	4N324	4N344					
Scanning distance , max. typical ¹⁾	0 ... 400 mm										
	2 ... 250 mm										
Operating distance ¹⁾	5 ... 300 mm										
	5 ... 200 mm										
Minimum object diameter ¹⁾	= Light spot diameter										
Light spot diameter	Approx. 0.1 mm in 100 mm (= Focus)										
	Approx. 5.0 mm in 200 mm										
	Approx. 8.0 mm in 300 mm (only axial)										
Angle of dispersion of sender	Focused, focus at 100 mm										
Light source ²⁾ , Light type	Red laser LED, 650 nm										
Laser class	Laser class 1 (IEC 60825-1)										
Laser sender output capacity	Max. 0.4 mW										
Housing	Axial optics										
	Radial optics										
Sensitivity setting	Manual, per Teach-in button										
	Electronic, per control input C (0 V) ³⁾										
Status indicators	Yellow LED: switching output active, reserve										
	LED green: supply voltage V _S = ON										
Supply voltage V _S	10 ... 30 V DC ⁴⁾										
Ripple ⁵⁾	≤ 10 %										
Current consumption ⁶⁾	≤ 30 mA										
Switching outputs	Q: PNP										
	Q: NPN										
Output current I _A max.	≤ 100 mA										
Switching mode	Light-/Dark-switching selectable ³⁾										
Response time ⁷⁾	≤ 0.625 ms										
Switching frequency max. ⁸⁾	800/s										
Connection types	Plug M12, 4-pin										
VDE protection class ⁹⁾	□										
Enclosure rating	IP 67										
Circuit protection ¹⁰⁾	A, B, C, D										
Ambient temperature	Operation -15 °C ... +55 °C										
	Storage -25 °C ... +70 °C										
Weight with plug	Approx. 60 g										
Housing material	Housing: Nickel-coated brass/PC										
	Optics: PC with protective glass pane										

- ¹⁾ Object to be detected with 90 % emission (relating to standard white in acc. with DIN 5033); 100 x 100 mm
- ²⁾ Average service life 100,000 h at T_A = +25 °C
- ³⁾ Control input C
 - LON/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"
- 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⁾ Reference voltage 50 V
- ¹⁰⁾ A = V_S connections reverse-polarity protected
 B = Inputs and outputs reverse-polarity protected
 C = Interference pulse suppression
 D = Outputs overload and short-circuit protected

VTE 18 L operating diagrams




1 Operating distance 2 Scanning distance, max. typ.

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

- A Axial optics
- B Radial optics

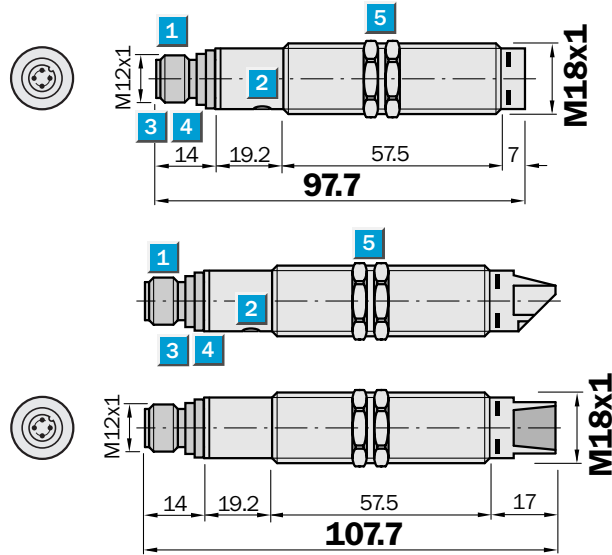
Order information	
Type	Order no.
VTE 18 L-4P324	6 027 418
VTE 18 L-4N324	6 027 420
VTE 18 L-4P344	6 027 422
VTE 18 L-4N344	6 027 424


Scanning range
 0.1 ... 35 m (P 250F)

Photoelectric reflex switches

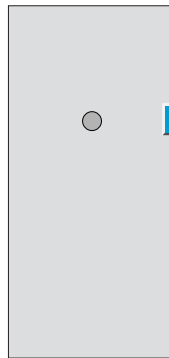
- Longest ranges
- Detects small parts and switches precisely thank to small laser spot
- Laser class 1
- A polarisation filter ensures reliable switching even with shiny objects

Dimensional drawing



Adjustments possible

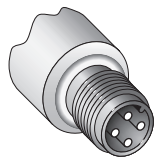
VL 18 L-4P344	VL 18 L-4P324
VL 18 L-4N344	VL 18 L-4N324



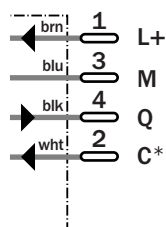
- 1 Plug M12, 4-pin
- 2 Sensitivity adjustment (Teach-in button)
- 3 Green LED indicator: V_s supply voltage feed
- 4 Yellow LED indicator:
 - lights continuously: reception signal > reserve factor 2
 - blinks: Reception signal < reserve factor 2 but > switching threshold 1
- 5 Mounting nuts (2x), SW 24, metal (included with delivery)

Connection types

VL 18 L-4P344	VL 18 L-4P324
VL 18 L-4N344	VL 18 L-4N324



4-pin, M12



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



Laser class 1
(IEC 60825-1)

Accessories

- Connection systems
- Mounting systems
- Reflectors

Technical data	VL 18 L-	4P324	4P344	4N324	4N344						
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Scanning range , max. typical/Reflector 0.1 m ... 35 m/P 250 F											
Operating range ¹⁾	0.1 m ... 30 m/P 250 F										
Smallest detectable object ¹⁾	Approx. 0.7 mm Ø at 1 m Approx. 25 mm Ø at 35 m										
Light spot diameter	Approx. 9 mm at 35 m										
Angle of dispersion of sender	Approx. 0.04° (SR = max.) Approx. 0.02° (SR = 1/2 max.)										
Light source ²⁾, Light type	Red laser light, 650 nm										
Laser class	Laser class 1 (IEC 60825-1)										
Laser sender output capacity	Max. 0.4 mW										
Housing	Axial optics Radial optics										
Sensitivity setting	Manual, per Teach-in button Electronic, per control input C (0 V) ³⁾										
Status indicators	Yellow LED: Switching output active, reserve LED green: supply voltage V _S = ON										
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 ³⁾										
Response time ⁷⁾	≤ 0.625 ms										
Switching frequency max. ⁸⁾	800/s										
Connection types	Plug M12, 4-pin										
VDE protection class ⁹⁾	□										
Enclosure rating	IP 67										
Circuit protection ¹⁰⁾	A, B, C, D										
Ambient temperature	Operation -15 °C ... +55 °C Storage -25 °C ... +70 °C										
Weight with plug	Approx. 60 g										
Housing material	Housing: Nickel-coated brass/PC Optics: PC with protective glass pane										

¹⁾ Suitable reflectors for laser photoelectric reflex switches: We recommend our "F" reflectors with micro triple structure or DG reflector tape for short distances up to 5 m and our standard reflectors for ranges > 5 m (also see the accessories; reflectors for VL 18 L)

²⁾ Average service life 100,000 h at T_A = +25 °C

³⁾ Control input C
- L.ON/D.ON and - external Teach-in
C = open: dark-switching D.ON
C = + V_S: light-switching L.ON

C = 0 V: Sensitivity setting per "external Teach-in"

⁴⁾ Limit values

⁵⁾ May not exceed or fall short of V_S tolerances

⁶⁾ Without load

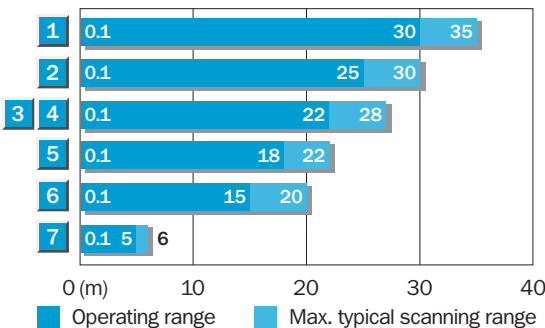
⁷⁾ Signal transit time with resistive load

⁸⁾ With light/dark ratio 1:1

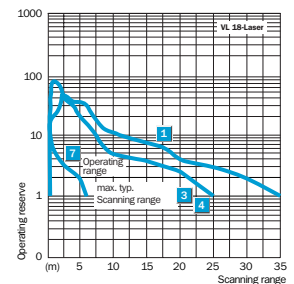
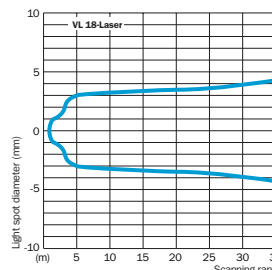
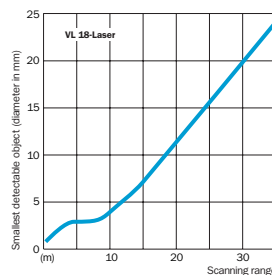
⁹⁾ Reference voltage 50 V

¹⁰⁾ A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected


Operating range and operating reserve



Reflector type	Operating range
1 P 250 F	0.1 – 30 m
2 PL 10 F	0.1 – 25 m
3 4 PL 80 A/P 250	0.1 – 22 m
5 C 110	0.1 – 18 m
6 PL 20 F	0.1 – 15 m
Reflective tape "Diamond Grade"	0.1 – 5 m



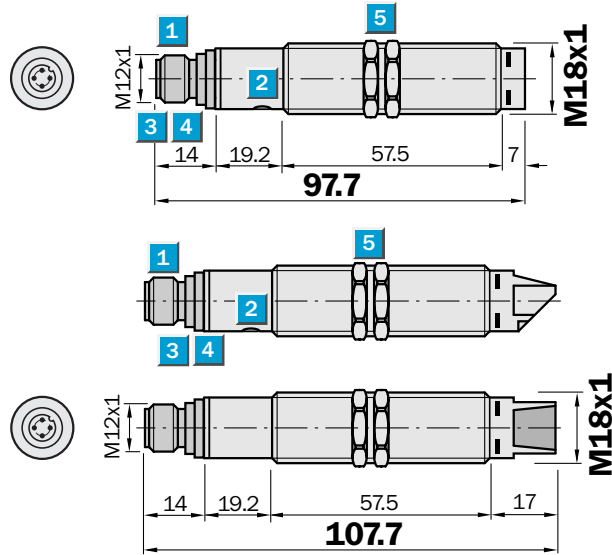
Order information	
Type	Order no.
VL 18 L-4P324	6 027 430
VL 18 L-4N324	6 027 432
VL 18 L-4P344	6 027 434
VL 18 L-4N344	6 027 436

 **Scanning range**
0 ... 60 m

Through-beam photoelectric switches

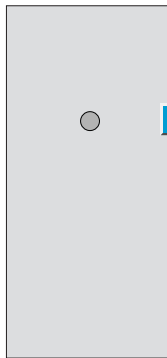
- Longest ranges
- Detects small parts and switches precisely thanks to small laser spot
- Laser class 1
- Optionally (integrated) horizontal and radial optic axes

Dimensional drawing



Adjustments possible

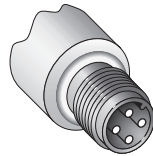
VE 18 L-4P324	VE 18 L-4P344
VE 18 L-4N324	VE 18 L-4N344



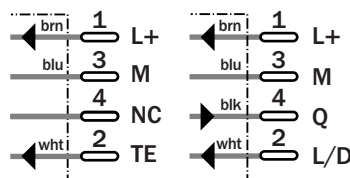
- 1 Plug M12, 4-pin
- 2 Sensitivity adjustment, trimmer 270° (only receiver VE 18 L)
- 3 Green LED indicator: V_s supply voltage feed
- 4 Yellow LED indicator (only receiver VE 18 L),
 - lights continuously: reception signal > reserve factor 2
 - blinks: Reception signal < reserve factor 2 but > switching threshold 1
 Yellow LED indicator (only sender VS 18 L),
 - lights continuously: Sender active
 - does not light: Sender off
- 5 Mounting nuts (2x), SW 24, metal (included with delivery)

Connection types

VS 18 L-0D314	VE 18 L-4P324
VS 18 L-0D334	VE 18 L-4N324
	VE 18 L-4P344
	VE 18 L-4N344



Sender VS	Receiver VE
3-pin, M12	4-pin, M12



Accessories

Connection systems
Mounting systems

Technical data		VS 18 L-VE 18 L-	OD314	OD334		4P324	4P344	4N324	4N344			
Scanning range RW, max. typical	0 ... 60 m											
Operating range RW	0 ... 50 m											
Smallest detectable object	Approx. 0.5 mm Ø at 1 m											
	Approx. 0.8 mm Ø at 2 m											
	Approx. 10 mm Ø at 50 m											
Light spot diameter	Approx. 40 mm at 50 m											
Angle of dispersion of sender	Approx. 0.06° (SR = max.)											
	Approx. 0.04° (SR = 1/2max.)											
Receiver reception angle	Approx. 0.08° (SR = max.)											
	Approx. 0.06° (SR = 1/2max.)											
Light source ¹⁾ Light type	Red laser light, 650 nm											
Laser class	Laser class 1 (IEC 60825-1)											
Laser sender output capacity	Max. 0.4 mW											
Housing	Axial optics											
	Radial optics											
Sensitivity setting	Trimmer 270° (only receiver VE 18 L)											
Status indicators	Yellow LED:											
	Switching output/sender active											
	LED green: supply voltage V _S = ON											
Supply voltage V _S	10 ... 30 V DC ²⁾											
Ripple ³⁾	≤ 10 %											
Current consumption ⁴⁾	≤ 25 mA											
Switching outputs	Q: PNP											
	Q: NPN											
Output current I _A max.	≤ 100 mA											
Switching mode	Light-/Dark-switching selectable ⁵⁾											
Response time ⁶⁾	≤ 0.5 ms											
Switching frequency max. ⁷⁾	1000/s											
Test input »TE«	0 V = Sender not active											
Connection types	Plug M12											
VDE protection class ⁹⁾	□											
Enclosure rating	IP 67											
Circuit protection ¹⁰⁾	A, B, C, D											
Ambient temperature	Operation -15 °C ... +55 °C											
	Storage -25 °C ... +70 °C											
Weight with plug	Approx. 60 g											
Housing material	Housing: Nickel-coated brass/PC											
	Optics: PC with protective glass pane											

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⁾ Reference voltage 50 V

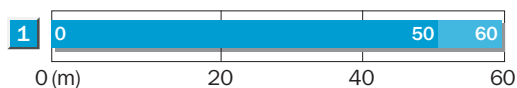
⁹⁾ A = V_S connections reverse-polarity protected

B = Inputs and output reverse-polarity protected

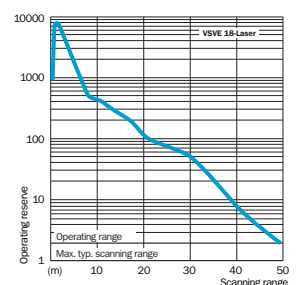
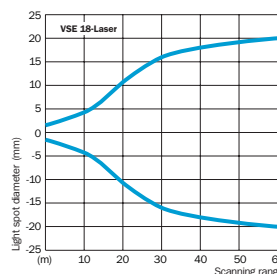
C = Interference pulse suppression

D = Outputs overload and short-circuit protected

Operating range and operating reserve



■ Operating range ■ Max. typical scanning range



Order information (packaging unit VSE 18 L = VS 18 L + VE 18 L)

Type	Order no.	Type	Order no.
VSE 18 L-4P324	6 027 931	VSE 18 L-4P344	6 027 935
VSE 18 L-4N324	6 027 933	VSE 18 L-4N344	6 027 937

Notes about sensitivity adjustment per Teach-in: for laser photoelectric switches VTE 18 L and VL 18 L

- **Programming optionally**
 - manually per Teach-in button or
 - electronically per control input C
- **Very simple programming:**
 - Press the Teach-in button 1 x or activate control input C (0 V) 1 x:
Sensitivity setting has been completed.
 - Feedback: yellow LED indicator.
- **Permanent storage of the “taught-in switching threshold and hysteresis”, even if power is interrupted for longer times.**

Sensitivity setting

- **VTE 18 L photoelectric proximity switches:**
Also position object, align VTE 18 L directly to the object to be detected (max. light reception).
- **VL 18 L photoelectric reflex switches:**
Also remove object, align VTE 18 L directly to the reflector (max. light reception).

Programming types

- **Two programming types for optimum sensitivity adjustment to your application**
 - Two easy-to-operate Teach-in modes are available to let you adjust sensitivity optimally.

Sensitivity setting 1, applications: substantial operating reserve

- **For all standard applications:**
 - **Large operating reserve, factor > 2 above switching threshold:**
Short “Teach-in time” > 2 s ... < 7 s.
Press the Teach-in button or activate control input C (0 V)
=> 2 s ... < 7 s.
- Yellow LED indicator → goes off → lights after > 2 s again → deactivate Teach-in signal → **sensitivity setting completed** → check application.
Yellow LED indicator lights after Teach-in process has been completed.

Sensitivity setting 2, applications: precise switching point

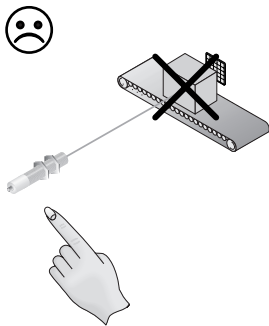
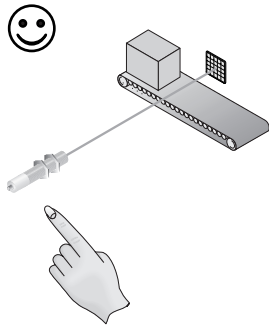
- **For slight differences between scanning object and background (VTE 18 L)**
- **For simple contrast detection (VTE 18 L)**
- **For positioning tasks (VTE 18 L und VL 18 L)**
- **For detecting transparent objects (VL 18 L)**
- **Small switching hysteresis, smaller operating reserve, factor > 1 < 2 above switching threshold:**
 - **long “Teach-in time” > 8 s.**
Press the Teach-in button or activate control input C (0 V)
=> 8 s

Yellow LED indicator → goes off → lights after > 2 s again → blinks after > 8 s → deactivate Teach-in signal → **sensitivity setting completed** → check application.
Yellow LED indicator blinks permanently after Teach-in process has been completed.

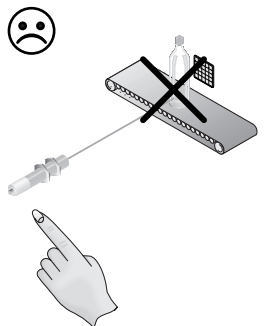
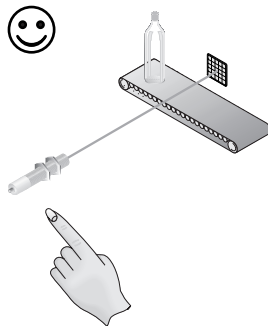
Applications of VL 18 L photoelectric proximity switches

Applications of VTE 18 L photoelectric reflex switches

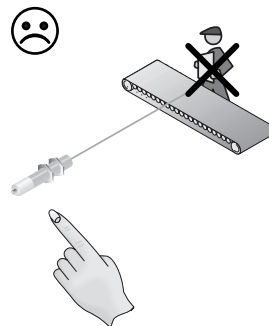
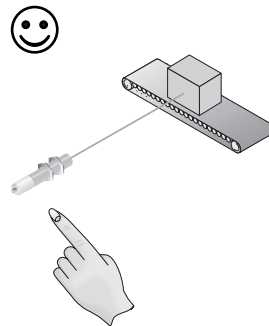
■ **Large operating reserve**
short "Teach-in time"
> 2 s ... < 7 s.



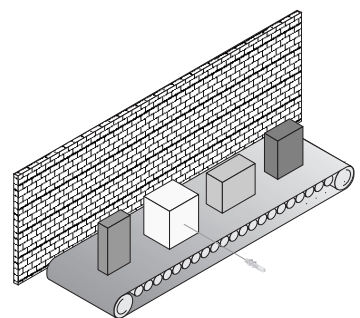
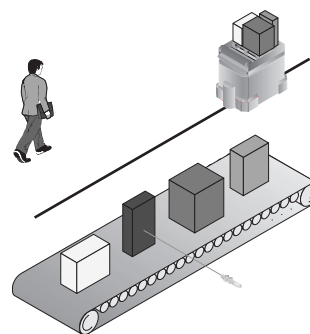
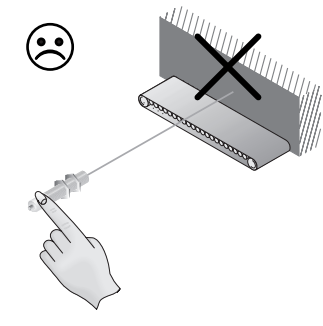
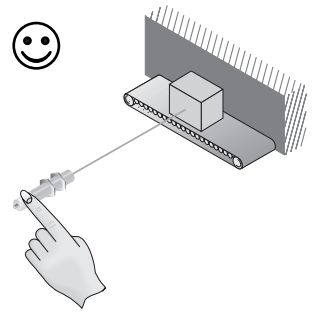
■ **Precise switching point**
long "Teach-in time"
> 8 s.



■ **Large operating reserve**
short "Teach-in time"
> 2 s ... < 7 s.



■ **Precise switching point**
long "Teach-in time"
> 8 s.



Dimensional drawings and order informations

SENSICK screw-in system M12, 4-pin, enclosure rating IP 67

Female connector M12, 4-pin, straight

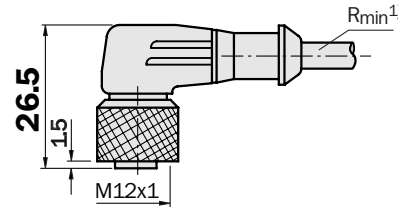
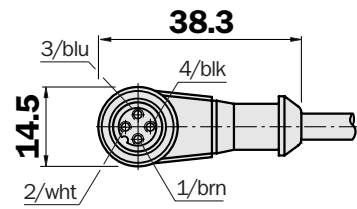
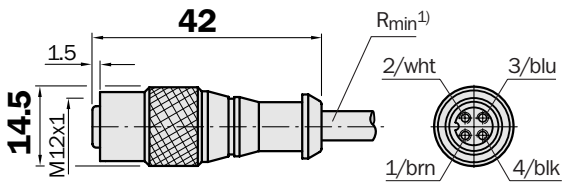
Cable diameter 5 mm, 4 x 0.25 mm², sheath PVC

Type	Order no.	Contacts	Cable length
DOL-1204-G02M	6 009 382	4	2 m
DOL-1204-G05M	6 009 866	4	5 m
DOL-1204-G10M	6 010 543	4	10 m
DOL-1204-G15M	6 010 753	4	15 m

Female connector M12, 4-pin, right angle

Cable diameter 5 mm, 4 x 0.25 mm², sheath PVC

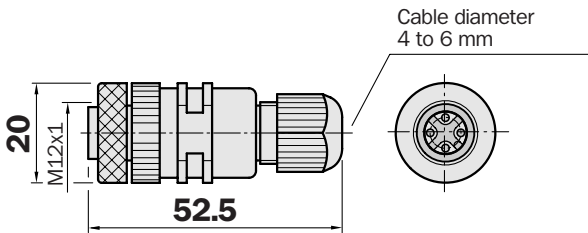
Type	Order no.	Contacts	Cable length
DOL-1204-W02M	6 009 383	4	2 m
DOL-1204-W05M	6 009 867	4	5 m
DOL-1204-W10M	6 010 541	4	10 m



¹⁾ Minimum bend radius in dynamic use
 $R_{min} = 20 \times \text{cable diameter}$

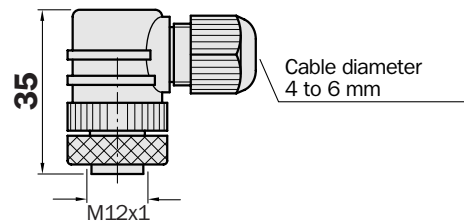
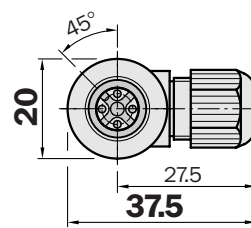
Female connector M12, 4-pin, straight

Type	Order no.	Contacts	Can be adapted for cables Ø 4.5 to 6.5 mm
DOS-1204-G	6 007 302	4	



Female connector M12, 4-pin, right angle

Type	Order no.	Contacts	Can be adapted for cables Ø 4.5 to 6.5 mm
DOS-1204-W	6 007 303	4	



Dimensional drawings and order informations

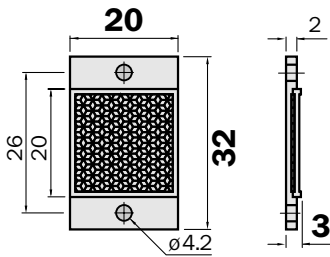
Reflectors for VL 18 L

VL 18 L laser photoelectric switches are distinguished by their very small light spot diameter. Please note that we strongly recommend our "F" reflectors with micro structure or "Diamond Grade" reflector tape for applications with ranges up to 5 m.

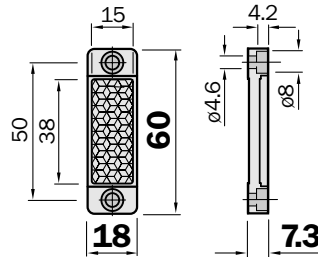
Thanks to their very small reflector prisms, these reflectors ensure flawless functioning even for short distances with SICK laser photoelectric reflex switches. Our standard reflectors can also be used for rangers greater than 5 m.

Plastic design for temperatures up to 65 °C

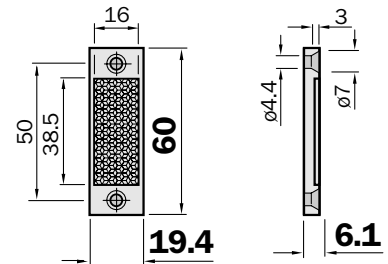
Reflector, micro triple, 20 x 20 mm ²	
Type	Order no.
PL 10 F	5 311 210



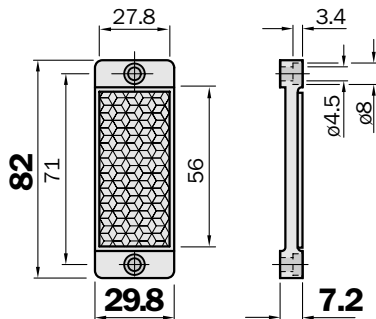
Reflector 15 x 38 mm ²	
Type	Order no.
PL 20 A	1 012 719



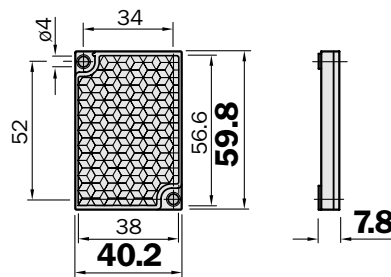
Reflector 16 x 38 mm ² micro triple, 2 hole mounting	
Type	Order no.
PL 20 F	5 308 844



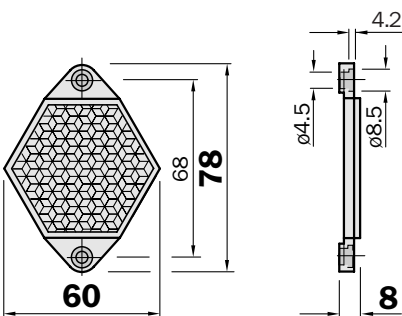
Reflector 28 x 56 mm ²	
Type	Order no.
PL 30 A	1 002 314



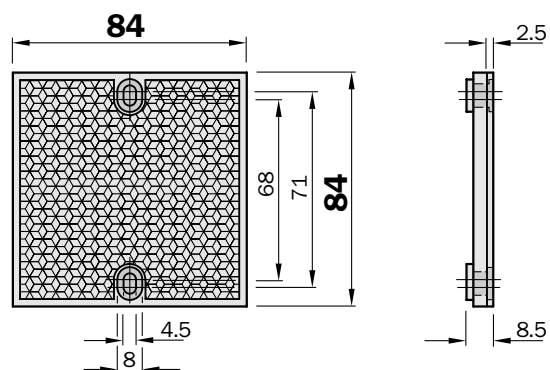
Reflector 38 x 56 mm ²	
Type	Order no.
PL 40 A	1 012 720



Reflector, 6-sided, width across flats 48 mm	
Type	Order no.
PL 50 A	1 000 132



Reflector 80 x 80 mm ²	
Type	Order no.
PL 80 A	1 003 865



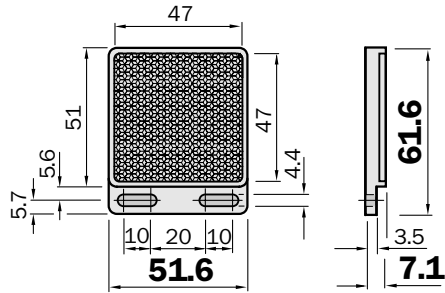
Also available in heatable model:
 Permanent heating: PL 50 HK, Order no. 1 001 545
 Controlled heating: PL 50 HS, Order no. 1 009 871

Dimensional drawings and order informations

Plastic design for temperatures up to 65 °C

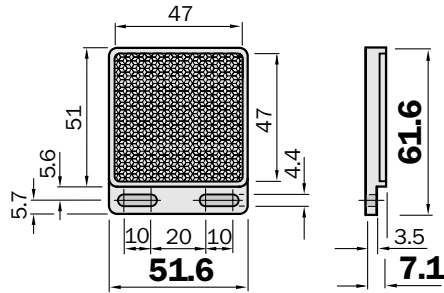
Reflector 47 x 47 mm²

Type	Order no.
P 250	5 304 812



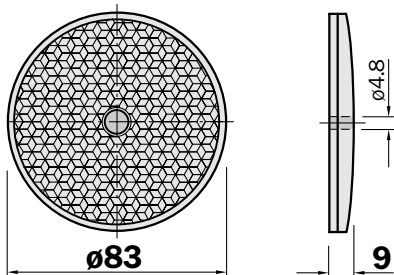
Reflector 47 x 47 mm², micro triple, 2 hole mounting

Type	Order no.
P 250 F	5 308 843



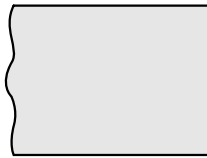
Reflector, diameter 83 mm, centre hole mounting

Type	Order no.
C 110	5 304 549



Reflective tape "Diamond Grade"

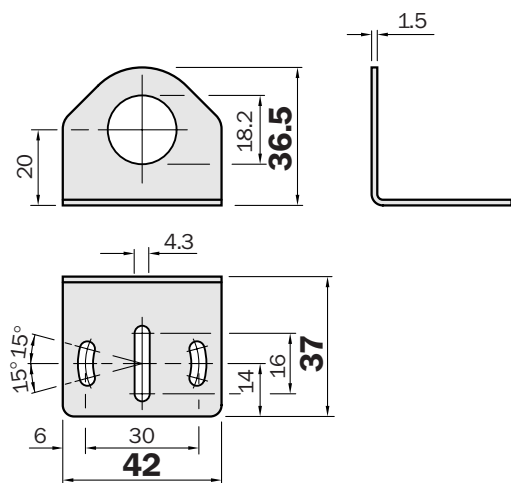
Type	Order no.	
REF-DG-K	4 019 634	cut to size
REF-DG	5 304 334	sheet 749 x 914 mm ²



Dimensional drawings and order informations

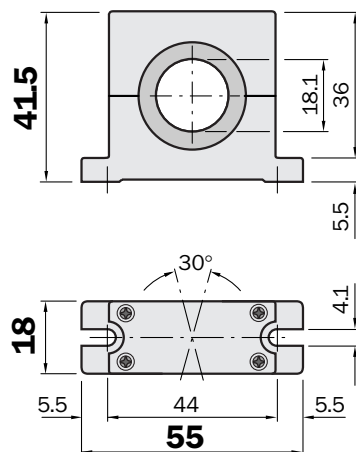
Mounting bracket

Type	Order no.
BEF-WN-M18	5 308 446



Mounting bracket with ball joint

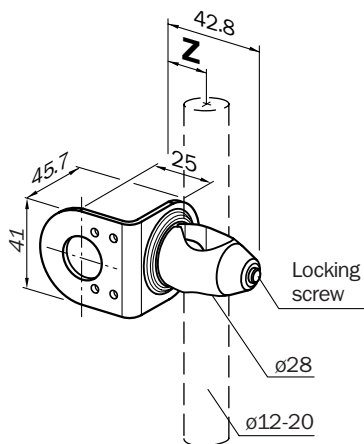
Type	Order no.
BEF-WN-M18-ST02	5 312 973



Universal bar clamps for sensors

Distance Z: Bar center – innerplate surface

Type	Order no. *)	Bar- ϕ (mm)	Distance Z (mm)
BEF-KHS-H01	2 022 465	12	15.0
		14	16.4
		15	17.1
		18	19.2
		20	20.7



*) Order no. includes bar support with mounting plate and mounting material