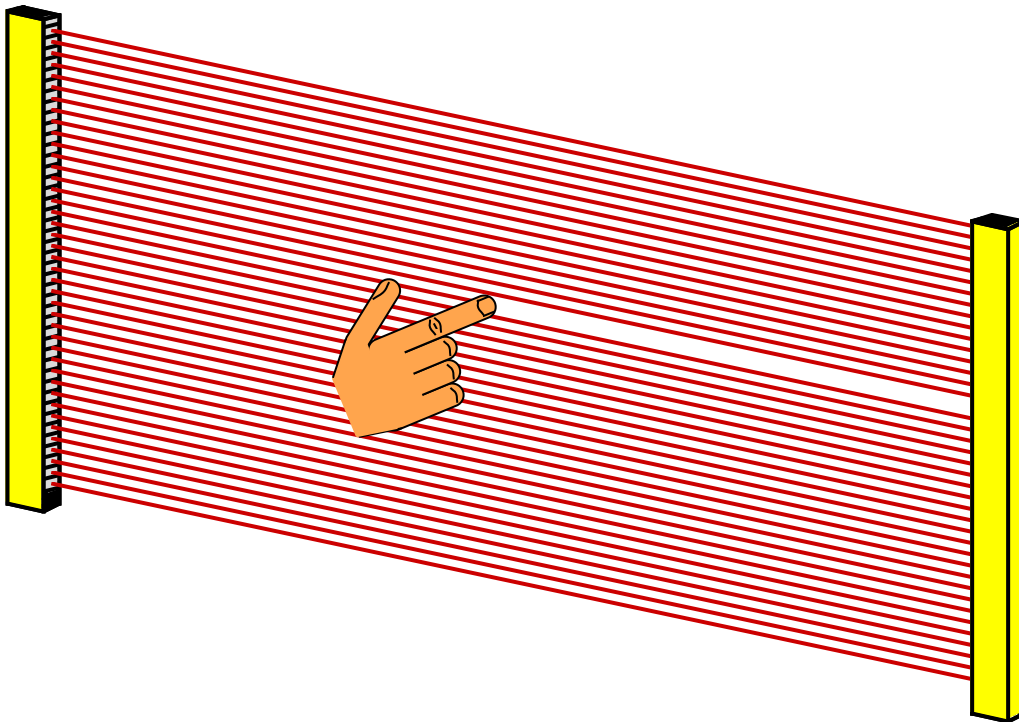


**Category 2 Safety Light Curtains****TLVT**

**reasonably priced finger and hand protection (resolution 14mm or 30mm)  
in the textile, timber, packaging and electrical engineering industry**

**user-friendly self-testing  
therefore no external test necessary**

**integrated switching unit: contactor control and restart interlock**

**very short response times**

**protection field up to 1,9 m high and 7 m / 24 m wide**

**Technical data** The safety light curtains TLVT are electro-sensitive protective devices (EPSE) and are characterized by :

- **compliance with safety category 2**, IEC 61496 parts 1 +2 i.e. EN 61496 parts 1 +2
- **user-friendly self-testing**, therefore a external test is not necessary
- **integrated switching unit**, contactor control and restart interlock activated by DIP switches
- **can be connected directly to contactors/valves**, switching capacity 0,5A/24V
- **finger protection** up to detection range of 7 m , recognition of smallest obstacles (14 mm )
- **hand protection** up to detection range of 24 m , recognition of smallest obstacles (30 mm )
- protection heights from 100 mm up to 1900 mm
- self-monitoring semiconductor outputs with line interruption monitoring, short-circuit- and side current passages check
- built-in **self-diagnosis** with error display
- minimum safety distance due to short response times, between 5 ms and 25 ms, depending on constructional length
- protective system IP 65

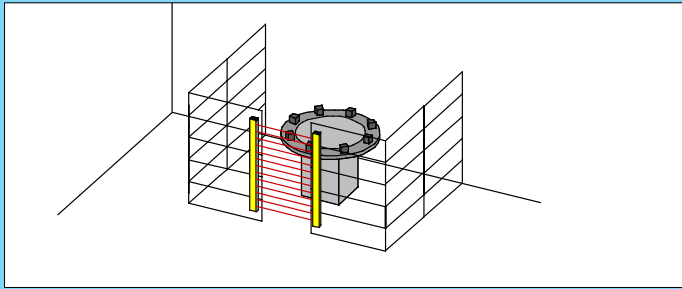
**Application** The safety light curtains TLVT are designed especially for their use as **protection devices at hazardous sites and areas**, as well as **pedestrian access**.

Prevention of bodily injuries of fingers, hands and limbs, e.g. when working at:

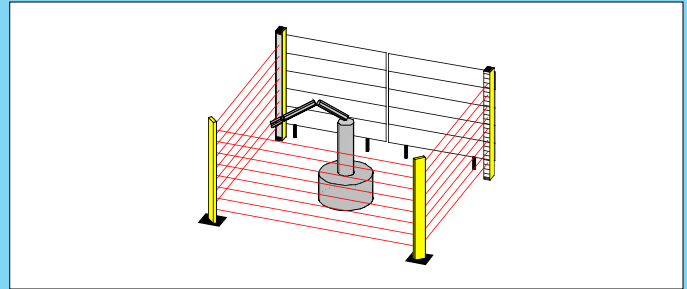
- wood working machines
- packaging machines
- textile machines
- storing and materials-handling technology
- insertion machines
- revolving machines
- palletizers

By diverting mirrors the detecting beams can be diverted around a hazardous area so that a polygonal protected area is created.

Muting and fixed-cycle operation are realizable with optional safety switching units.



Protection of dangerous sites, hazardous and accessible areas



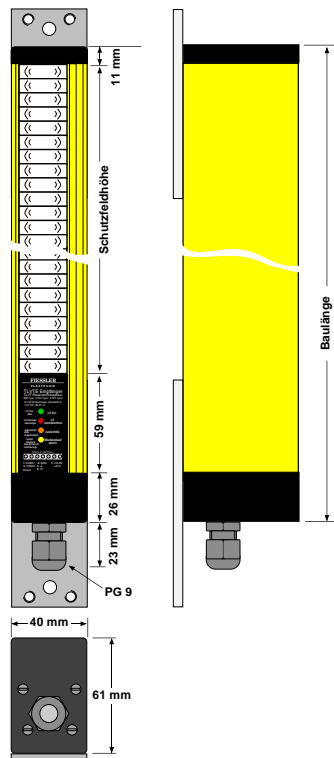
Pedestrian access with diversion mirrors

**Design** The safety light curtains TLVT consist of two components: transmitter and receiver. Their detection range and height are defined by the distance between both transmitter and receiver and by their constructional height.

Protective heights from 100 mm through 1900 mm are available because of their modular design. On demand, construction of special dimensions units for intermediate-sized applications is possible.

**Function** The transmitter generates infra-red light beams which are continuously flashing at high speed. The parallel light beams are evaluated in the receiver in synchronous action with the transmitter. Because of the closeness of the beams a resolution of 14 mm /30 mm is achieved.

If an obstacle with a diameter of  $\geq 14\text{mm}$  / 30 mm is placed into the protective field, i.e. at least one light beam is interrupted, the outputs of the receiver stop the hazardous motion of the machine, resp. prevent a new start.



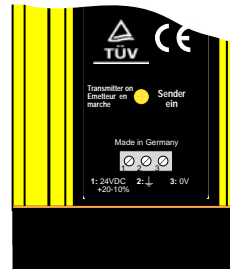
protective height (mm)	Baugröße (mm) BL	order code resolution 14 mm	response time (ms) 14mm	order code resolution 30 mm	response time (ms) 30mm
SH					
100	196	TLVT100 / 13	6	TLVT100 / 7	5
200	296	TLVT200 / 26	7	TLVT200 / 14	6
300	396	TLVT300 / 39	8	TLVT300 / 21	6
400	496	TLVT400 / 52	9	TLVT400 / 28	7
500	596	TLVT500 / 65	10	TLVT500 / 35	7
600	696	TLVT600 / 78	11	TLVT600 / 42	8
700	796	TLVT700 / 91	12	TLVT700 / 47	9
800	896	TLVT800 / 104	13	TLVT800 / 56	9
900	996	TLVT900 / 117	14	TLVT900 / 63	10
1000	1096	TLVT1000 / 130	15	TLVT1000 / 70	10
1100	1196	TLVT1100 / 143	17	TLVT1100 / 77	11
1200	1296	TLVT1200 / 156	18	TLVT1200 / 84	12
1300	1396	TLVT1300 / 169	19	TLVT1300 / 91	12
1400	1496	TLVT1400 / 182	20	TLVT1400 / 98	13
1500	1596	TLVT1500 / 195	21	TLVT1500 / 105	13
1600	1696	TLVT1600 / 208	22	TLVT1600 / 112	14
1700	1796	TLVT1700 / 221	23	TLVT1700 / 119	15
1800	1896	TLVT1800 / 234	24	TLVT1800 / 126	15
1900	1996	TLVT1900 / 247	25	TLVT1900 / 133	16

**User-friendly self-testing** The customary testable category 2 light curtains required an external cyclic system test. With TLVT light curtains this is no longer necessary, because a continuous internal self-testing is active.

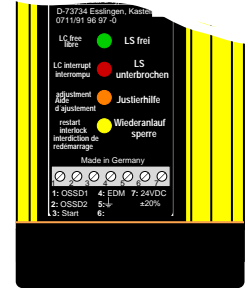
**LED display** The respective operational mode is indicated by several LEDs on the receiver front plate. If the system detects an internal or external error, the machine will be stopped immediately. This error alarm is visually indicated by a flashing in the transmitter or receiver display.

**Self-diagnosis system** If the self-testing of the system detects an internal or external error, the machine will be switched off immediately and the LED in the transmitter resp. in the receiver shows the user the error by flashing.

For trained service personnel, an error diagnostic appliance is available, which enables an exact locating of the error on the spot. If an error occurs, it will be detected and displayed by an optical code by the flashing LED and will be indicated on the error diagnostic appliance.



transmitter-LED	
yellow on	transmitter active
yellow out	transmitter out
yellow flashing	error

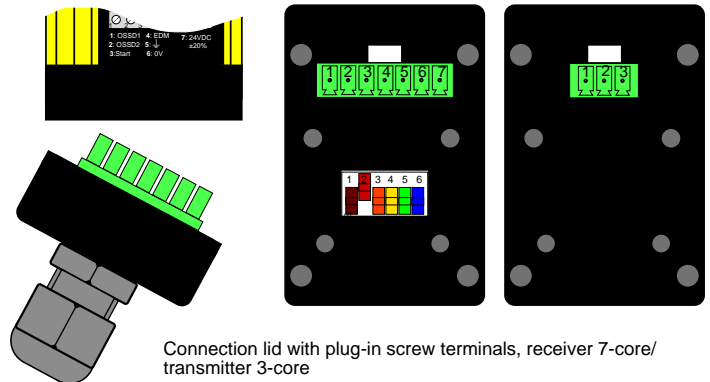


receiver-LED	
green on	LC free
red on	LC interrupted
orange on	dirty (no reserve)
yellow on	start request
orange flashing	error
gelb flashing	error

**Connections** The standard equipment of the product series TLVT includes an extra flat plug-in connection located in the connection lid. This lid may be removed **without** disconnecting the cable. The housing itself remains **sealed**.

Several custom-made connection plugs are available as options.

The transmitter is connected via a 3-core cable, the receiver is connected via a 5 to 7-core cable (according to the mode of operation)



Connection lid with plug-in screw terminals, receiver 7-core/ transmitter 3-core

### Operational modes

Various operational modes can be selected via dip-switches.

<p><b>without contactor control</b></p>	<p><b>with contactor control</b></p>	<p>The operational mode <b>with contactor control</b> serves for monitoring of the triggered secondary contactors. After each interruption of the beams and before each release of the outputs, it is verified whether the secondary contactors have fallen. Only then another release is possible. If there is no reaction by contactors within 300 ms, the light curtain switches off the outputs and turns into interruption/locked mode.</p>
<p><b>without restart interlock</b></p>	<p><b>with restart interlock</b></p>	<p>If the operational mode with restart interlock is selected, a push-button must be installed at the start button input in order to release the start of the working movement.</p> <p>With free protective field, the yellow receiver LED lights up, requesting operation start. Only after pushing the start button both outputs of the TLVT are activated.</p>
<p><b>equivalent outputs</b></p>	<p><b>antivalent outputs</b></p>	<p>During the operational mode <b>equivalent outputs</b> both PNP-outputs are safety outputs and provide short-circuit- and side-current passages monitoring.</p> <p>With free optical path both outputs are high (+24V). During the operational mode antivalent outputs, output No. 1 is high (+24V) and output No.2 low (0V), with free optical path.</p>

Rating	TLVTS... / TLVTE...	
Safety category	TYPE 2 according to EN 954-1 and IEC 61496 i.e. EN 61496	
Height of protective field	100 mm ... 1900 mm (according to number of beams)	
Width of protective field (range)	0,3... 7 m / 0,3... 24 m	
Constructional height	196 mm ... 1996 mm (according to number of beams)	
Resolution	Detection of smallest obstacles (14 mm / 30 mm)	
Number of beams	7... 247 beams	
Mode of operation	<b>Selection via dip-switches:</b> - with / without restart interlock - with /without contactor control - outputs synchronizing / outputs antivalent	
<b>Mechanical data</b>		
Housing style	aluminium profile, plastic-laminated RAL 1020 yellow, end pieces consist of acidproof synthetic (Polyamid) reinforced by glass globes. Light emerging and admission plexiglass, optional solventproof silikate glass.	
Fastening	Adjustable fixing link on the back of the housing	
Weight	Transmitter: 0,45 kg to 4,5 kg according to constructional height Receiver: 0,5 kg to 5,0 kg according to constructional height	
<b>Operational data</b>		
Protective system	IP 65	
Protective class	III	
Temperature of operational area	-10 to 55 °C	
Storing temperature	-25 to 70 °C	
<b>Electrical data</b>	<b>Transmitter TLVTS</b>	<b>Receiver TLVTE</b>
Voltage	24 V DC SELV, + 20 % - 10 %,	24 V DC SELV, ±20%,
Power consumption	max. 250 mA	max. 250 mA (at no charge)
Outputs (Receiver)	-	OSSD 1and 2: safety PNP-outputs, max. 0,5 A short-circuit- and side-current passages monitoring (in operation mode <i>antivalent outputs</i> output No.2 is not fail-safe, max. 20 mA)
Inputs	-	Inputs contactor control and start button : 0 V up to 24 V DC ±20% / 10mA
Electrical connection	integrated plug-in connector with PG9 as traction relief alternative: custom-made connection plugs	integrated plug-in connection with PG9 as traction relief alternative: custom-made connection plugs
Cables	3-pol. max. 1,5 mm <sup>2</sup>	5 to 7-pol. (depending on the op. mode) max. 1,5 mm <sup>2</sup>

### Additional functions

The safety control units USLG and LSUW N1-Muting K are available as options for application in order to achieve additional functions such as **potential-free output contacts** or **Muting** .

