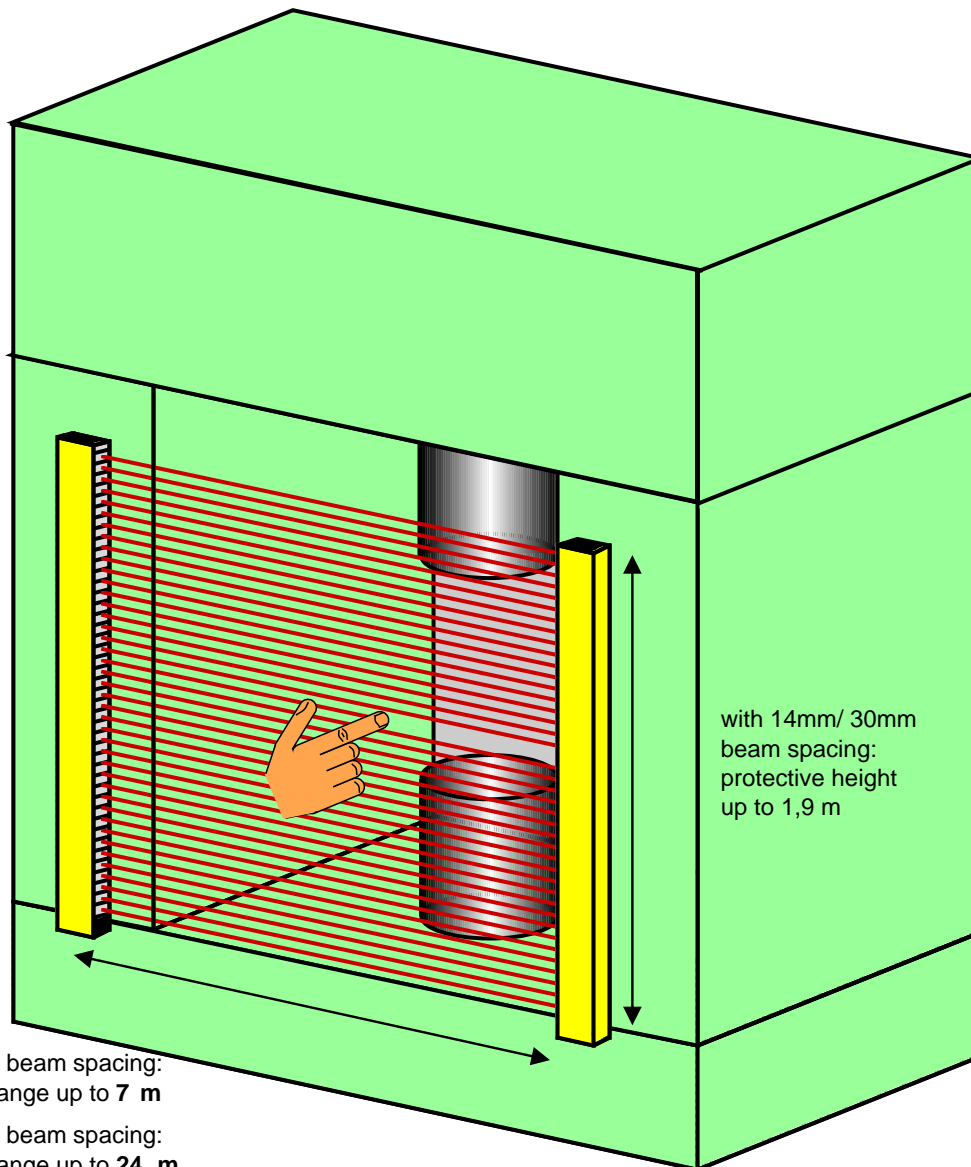


### Category 4 Safety Light Curtains

### ULVT



- Safety category 4 according to EN 954-1 and IEC 61496, i.e. EN 61496
- with 14 mm/30 mm beam spacing, detection range until 7m/24m, protective height up until 1,9m
- can be connected directly to contactors, switching capacity 0,5A
- integrated control unit, contactor control and restart interlock controlled via dip-switches
- shortest safety distances due to short response times between 5 ms and 25 ms, depending on total length
- between 7 and 247 beams with protective heights from 100 to 1900 mm



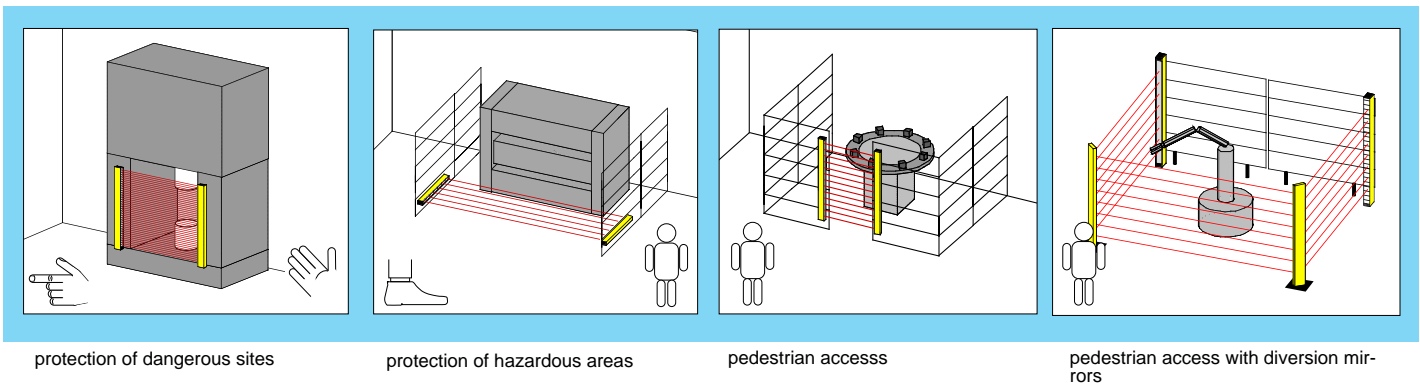
**Technical data** The safety light curtains ULVT are electro-sensitive protective devices (EPSE) and are characterized by:

- compliance with Safety category 4, EN 954-1 and IEC 61496, parts 1 and 2, i.e. EN 61496
- integrated switching unit, contactor control and restart interlock activated by DIP switches
- can be connected directly to contactors/valves, switching capacity 0,5A/24V
- minimum safety distance due to short response times, between 5 ms and 25 ms, depending on constructional length
- detection of smallest obstacles (14 mm / 30 mm) inside a detection range of 7 meters / 24 meters
- between 7 and 247 beams with protective heights from 100 up until 1900 mm
- micro-processor controlled safety functions
- self-monitoring semiconductor outputs with line interruption monitoring, short-circuit- and side current passages check
- built-in self-diagnosis with error display
- Muting and fixed cycle operation with optional control unit
- protective system IP 65 (waterproof sealed)

**Application** The safety light curtains ULVT 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:
- raw material converting presses operated in the metal, wood, plastic, rubber, leather, glass industries
- filter presses
- folding and bending machines
- die-casting machines
- processing lines and welding presses
- insertion machines
- robots
- palletizers

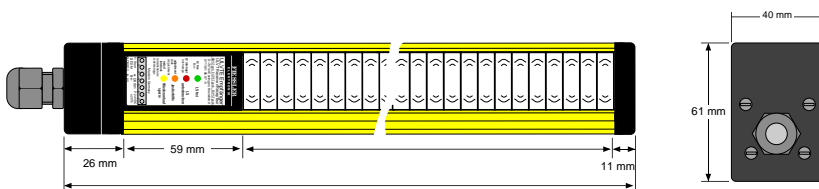
By diverting mirrors the detecting beams can be diverted around a hazardous area so that a polygonal protected area is created.



**Design** The safety light curtains ULVT consist of two components: transmitter and receiver. Their detection range is defined by the distance between both transmitter and receiver; their protective height depends on their individual constructional height (overall height).

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

Both transmitter and receiver operate in synchronous action, i.e. only one detecting beam and one corresponding receiver element are operating at the same time. Synchronization is realized by the first beam and the first corresponding receiver element. Therefore no electrical connection between transmitter and receiver is needed.

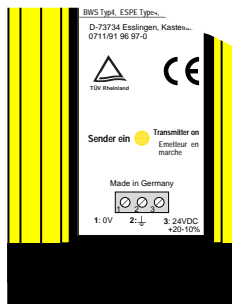


protective height (mm)	Construction length (mm) BL	order code	response time (ms)	order code	response time (ms)
		resolution 14 mm	14mm	resolution 30 mm	30mm
100	196	ULVT100 / 13	6	ULVT100 / 7	5
200	296	ULVT200 / 26	7	ULVT200 / 14	6
300	396	ULVT300 / 39	8	ULVT300 / 21	6
400	496	ULVT400 / 52	9	ULVT400 / 28	7
500	596	ULVT500 / 65	10	ULVT500 / 35	7
600	696	ULVT600 / 78	11	ULVT600 / 42	8
700	796	ULVT700 / 91	12	ULVT700 / 47	9
800	896	ULVT800 / 104	13	ULVT800 / 56	9
900	996	ULVT900 / 117	14	ULVT900 / 63	10
1000	1096	ULVT1000 / 130	15	ULVT1000 / 70	10
1100	1196	ULVT1100 / 143	17	ULVT1100 / 77	11
1200	1296	ULVT1200 / 156	18	ULVT1200 / 84	12
1300	1396	ULVT1300 / 169	19	ULVT1300 / 91	12
1400	1496	ULVT1400 / 182	20	ULVT1400 / 98	13
1500	1596	ULVT1500 / 195	21	ULVT1500 / 105	13
1600	1696	ULVT1600 / 208	22	ULVT1600 / 112	14
1700	1796	ULVT1700 / 221	23	ULVT1700 / 119	15
1800	1896	ULVT1800 / 234	24	ULVT1800 / 126	15
1900	1996	ULVT1900 / 247	25	ULVT1900 / 133	16

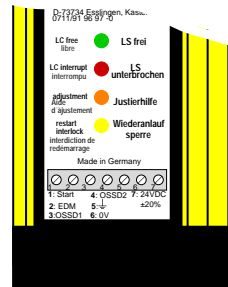
**Function** The transmitter generates infra-red light beams which are continuously flashing at high speed. The parallel light beams are monitored by two single-chip microcontrollers. Because of the closeness of the beams a resolution of 14 mm/ 30mm is achieved.

The receiver evaluates all dates coming from the transmitter by two single-chip microcontrollers in synchronous action with the beams from the transmitter. If an obstacle is placed into the protective field, i.e. at least one light beam is interrupted, the hazardous motion of the machine is stopped, i.e. the machine start gets interrupted by both receiver outputs. A new start of the machine is only possible in the operating mode with restart interlock when the start button is pushed and the protective field is uninterrupted.

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 LED in the transmitter or receiver display.



transmitter	
yellow on	transmitter active
yellow out	transmitter out
yellow flashing	error



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

By means of the LEDs, the operational status or an error status is displayed. There is a special error-detecting device available for the use by accordingly trained machine operators. This device offers the exact localization of the detected error. During error status, the detected error will be displayed by the flashing LEDs by the use of a special error displaying code.

**Operational modes** Various operational modes can be selected via dip-switches.

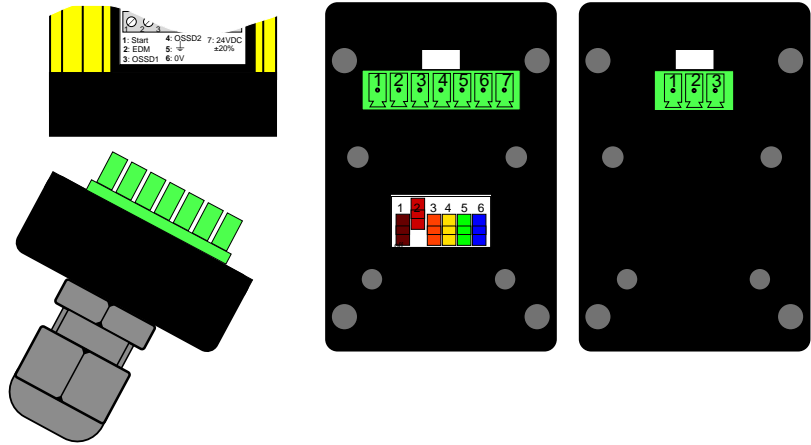
<p><b>without contactor control</b></p>	<p><b>with contactor control</b></p>	<p>The operational mode <b>with contactor control</b> serves for monitoring of the triggered secondary contactors. After each interruption of the beams and before each release of the outputs, it is verified whether the secondary 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 ULVT 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. With free optical path both outputs are high (+24V). During the operational mode <b>antivalent outputs</b>, output No. 1 is high (+24V) and output No. 2 low (0V), with free optical path. <b>During this operational mode, output 2 does not provide fail-safe results. This operational mode is only permitted if the safety control units LSUW NSR 3-1K, LSUW N1-Muting K or another safe secondary control to monitor output No. 2. are applied!</b></p>

### Connections

The standard equipment of the product series ULVT 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 7-core-cable.

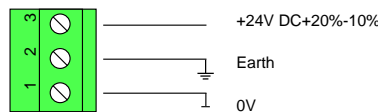


connection lid with plug-in screw terminals, receiver 7-core / transmitter 3-core

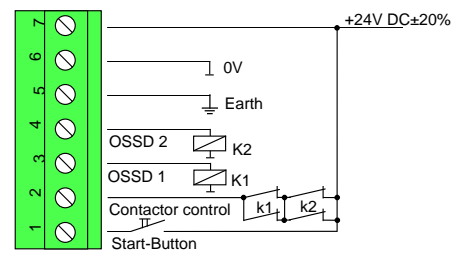
Electric data	transmitter ULVTS	Receiver ULVTE
<b>Voltage</b>	24 V DC SELV, + 20 % - 10 %	24 V DC SELV, ±20%
<b>Power consumption</b>	max. 250 mA	max. 250 mA (at no charge)
<b>outputs</b>	-	OSSD 1 and 2: safety PNP-outputs, max. 0,5 A short-circuit- and side-current passages monitoring. (in operation mode <i>antivalent outputs</i> output No. 2 is not fail-safe, max. 20 mA)
<b>inputs</b>	-	Inputs contactor control and start button: 0 V up to 24 V DC ±20%, 10mA
<b>Electrical connection</b>	integrated plug-in connecton with PG9 as traction relief alternative: custom-made connection plugs	integrated plug-in connecton with PG9 as traction relief alternative: custom-made connection plugs
<b>Cables</b>	3-core, max. 1,5 mm <sup>2</sup>	5 to 7-core (depending on the op. mode), max. 1,5 mm <sup>2</sup>

### connection diagram: with restart interlock/with contactor control

transmitter



receiver



### Additional functions

The safety control units ULSG, LSUW NSR 3-1, NSR 3-1K and LSUW N1-Muting K are available as options for application in order to achieve additional functions such as **potential-free output contacts, Stroke operation or Muting.**

