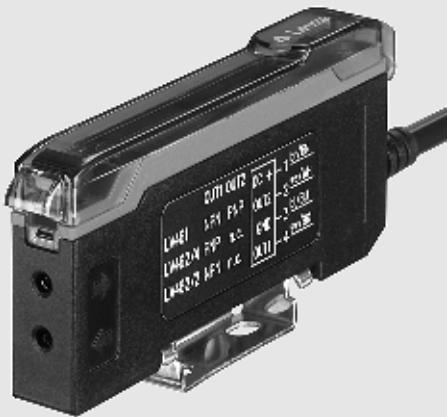


LV463.XR

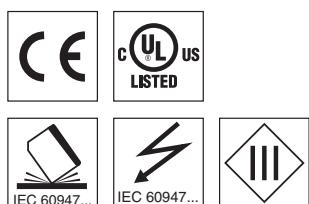
Long Range amplifier with 2 switching outputs for fiber optics



Up to 5000mm Up to 1350mm

10 - 30 V DC Ø 2.2mm

- Extra large operating ranges
- Two, large, easy-to-read displays for the simultaneous display of the signal value and the switching threshold
- Simple operation and easy-to-understand menu functions for optimum configuration
- Internal multiplex operation of up to six units
- Line teach or external transmitter activation
- Three different teach modes for fast sensor adjustment
- 2 switching outputs (PNP or NPN)
- One indicator diode for each of the two outputs
- Connection via cable or cable with M12 connector



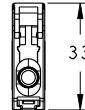
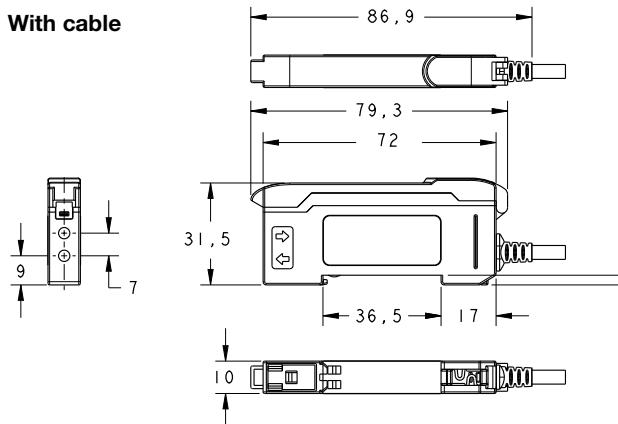
Accessories:

(available separately)

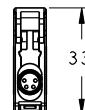
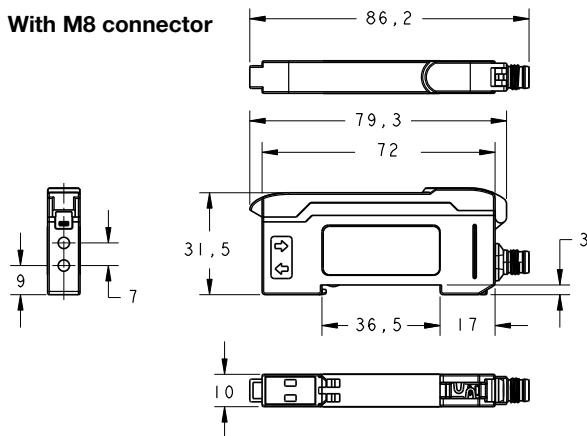
- Plastic fiber optics (KF, KFX)
- Glass fiber optics (GF)
- Ready-made cables (KD ...)
- Mounting device (BTU LV463)

Dimensioned drawing

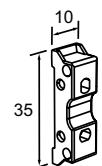
With cable



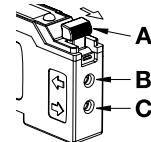
With M8 connector



Mounting accessories



BTU LV463
Part no. 50120869



A Clamping lever for fiber optic cable (unlock in direction of arrow)
B Connection for fiber optics receiver
C Connection for fiber optics transmitter

Electrical connection

5-pin connector

12-24V DC +	1	BR/BN
multi funct	2	WS/WH
GND	3	BL/BU
OUT 1	4	SW/BK
OUT 2	5	GR/GY

5-wire cable

12-24V DC +	BR/BN
multi funct	WS/WH
GND	BL/BU
OUT 1	SW/BK
OUT 2	GR/GY

multi funct: - OFF
- Line teach
- Activation input
- Multiplex operation

Details → *Description of the subfunctions*

NOTE: Open lead wires must be connected to a terminal box.

Technical data

Optical data

	Throughbeam principle		Scanning principle		
Operating range/scanning range ¹⁾	Up to 5000 mm			Up to 1350 mm	
Light source	LED (modulated light)				
Wavelength	LV463.XR... LV463I.XR...	660 nm (visible red light) 880 nm (infrared light)			

Timing

Readiness delay	$\leq 500\text{ms}$
Internal cycle time	100\mu s

	Signal range	Extra Long Range (XLR)	Long Range (LR)	Standard (STD)	Speed (S)	High Speed (HS)
Response time		24 ms	8 ms	2 ms	1000 μs	500 μs
Switching frequency ²⁾		21 Hz	62.5 Hz	250 Hz	500 Hz	1000 Hz
Display area (digits)		0 ... 9999	0 ... 9999	0 ... 9999	0 ... 9999	0 ... 9999
Repeatability		180 μs	180 μs	180 μs	150 μs	100 μs
Increased protection against optical crosstalk	Yes	Yes	Yes	Yes	Yes	No
Increased protection against ambient light through energy-saving lamps	Yes	Yes	Yes	No	No	No

Electrical data

Operating voltage U_B ³⁾	12 ... 24 VDC $\pm 10\%$
Residual ripple	$\leq 10\%$ of U_B
Open-circuit current	$\leq 40\text{mA}$ @ 24 VDC
Switching output	See part number code
Switching output time functions	Switch-on/-off delay, passing contact (on actuation or fall-back), (combinations are limited) → <i>Combinations of timing functions</i>
Adjustable times (time functions)	0 ... 9999 ms
Signal voltage high/low	$\geq (U_B - 2.5\text{V})/2.5\text{V}$
Output current	$\leq 100\text{mA}$
Switching threshold	Adjustable using the teach function or +/- buttons

Indicators

Yellow LEDs	1/2 switching output active
Display	2 x 7-segment LED, 4-digit, Red: signal strength, Green: switching threshold

Mechanical data

Housing	ABS/PC black/red, transparent PC cover
Weight	63 g with 2000 mm cable
Connection type	70 g with 150 mm cable and M12 connector
Fiber optic connection	Cable 2000 mm, 5 x 0.25 mm ² , or
	Cable 150 mm with M12 connector, 5-pin
	Clamp-mounting, 2 x Ø 2.2 mm

Environmental data

Ambient temp. (operation/storage)	-10°C ... +55°C/-20°C ... +85°C
Protective circuit ⁴⁾	2, 3
Degree of protection	IP 50, NEMA 1
Standards applied	EN 60947-5-2
Certifications	UL 508, C22.2 No.14-13 ³⁾ ⁵⁾

Additional functions

Sensor adjustment	Menu-driven using display and rocker push button
-------------------	--

1) Range/scanning range depending on the fiber optics used

2) With a duty cycle of 1:1

3) For UL applications: use is permitted exclusively in Class 2 circuits according to NEC

4) 2=polarity reversal protection, 3=short circuit protection for all outputs

5) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.24A min, in the field installation, or equivalent (categories: CYJV/CYJV7 or PVVA/PVVA7)

Notes



NOTE

Detailed specifications on the range/scanning range are enclosed in the data sheets of our fiber optics type KF, KFX or GF.

Explanation of the signal ranges

Extra Long Range (XLR):

Extra long operating range, longest response time, display area 0 ... 9999

Long Range (LR):

Long operating range with good response time; display area: 0 ... 9999

Standard (STD):

Medium operating range and medium response time; display area: 0 ... 9999

Speed (S):

Short operating range and short response time; display area: 0 ... 9999

High Speed (HS):

Short operating range, very short response time; display area: 0 ... 9999

Observe intended use!

↳ This product is not a safety sensor and is not intended as personnel protection.

↳ The product may only be put into operation by competent persons.

↳ Only use the product in accordance with its intended use.

LV463.XR

Long Range amplifier with 2 switching outputs for fiber optics

Part number code

L | V | 4 | 6 | 3 | I | . | X | R | 7 | / | 4 | T | 4 | - | 1 | 5 | 0 | - | M | 1 | 2

Operating principle

LV Fiber optic amplifiers

Series

463 463 series

Light source

Not specified Red light

I Infrared light

Design

Not specified Standard design

XV High-speed version

XR Long-range version

Setting

7 Adjustment by means of control panel
(7-segment red/green LED displays, slide switch, rocker push button)

Pin assignment of connector pin 4 / black cable wire (OUT1)

- 4 PNP transistor switching output, light switching
- 2 NPN transistor switching output, light switching
- P PNP transistor switching output, dark switching
- N NPN transistor switching output, dark switching
- L IO-Link
- X Not assigned (n. c.)

Pin assignment of connector pin 2 / white cable wire (multi funct)

T Multifunction input (teach, activation or multiplex operation)

Pin assignment of connector pin 5 / gray cable wire (OUT2)

- 4 PNP transistor switching output, light switching
- 2 NPN transistor switching output, light switching

Connection technology

Not specified Connection cable, standard length 2000 mm, 4/5-wire ¹⁾M8 M8 connector, 4-pin ²⁾150-M8 Cable, length 150 mm, with M8 connector, 4-pin ²⁾150-M12 Cable, length 150 mm, with M12 connector, 4/5-pin ¹⁾

1) Devices with 1 x OUT and multifunction input: 4-wire or 4-pin.

Devices with 2 x OUT and multifunction input: 5-wire or 5-pin.

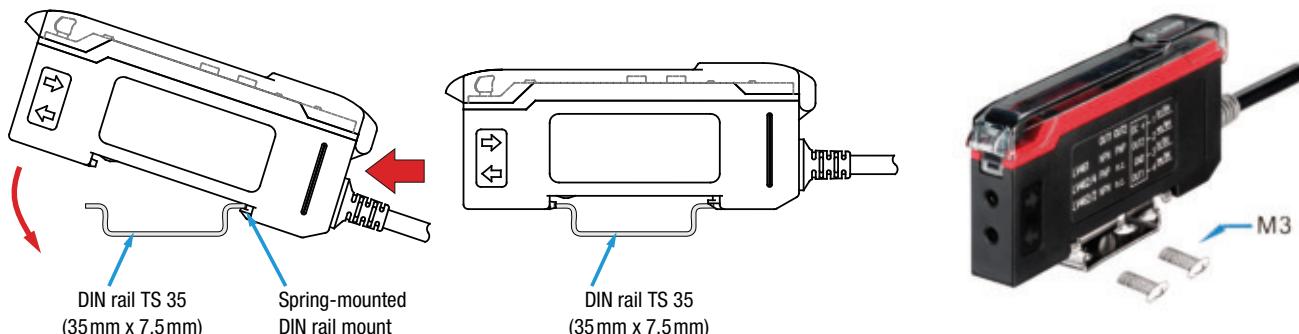
2) Not possible for devices with 2 x OUT and multifunction input.

Order guide

The sensors listed here are preferred types; current information at www.leuze.com

With 2 PNP switching outputs			With 2 NPN switching outputs		
Features	Order code	Part no.	Features	Order code	Part no.
Red light, 2 PNP switching outputs	LV463.XR7/4T4-150-M12	50133981	Red light, 2 NPN switching outputs	LV463.XR7/2T2-150-M12	50133983
Red light, 2 PNP switching outputs	LV463.XR7/4T4	50133980	Red light, 2 NPN switching outputs	LV463.XR7/2T2	50133982
Infrared light, 2 PNP switching outputs	LV463I.XR7/4T4-150-M12	50133999			
Infrared light, 2 PNP switching outputs	LV463I.XR7/4T4	50133998			

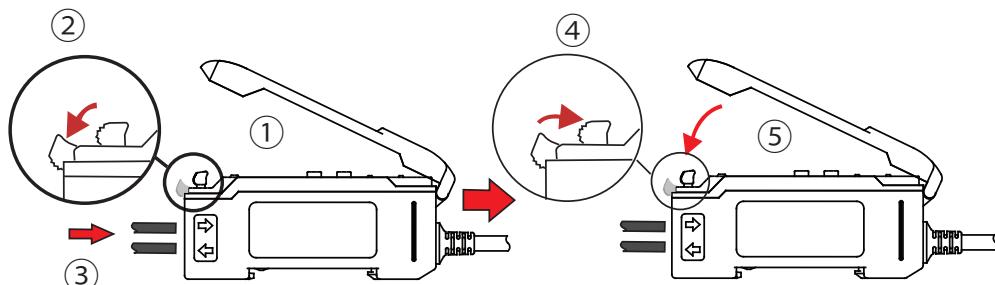
Mounting the amplifier



The amplifier is mounted as shown on a TS 35 DIN rail while disconnected from voltage.

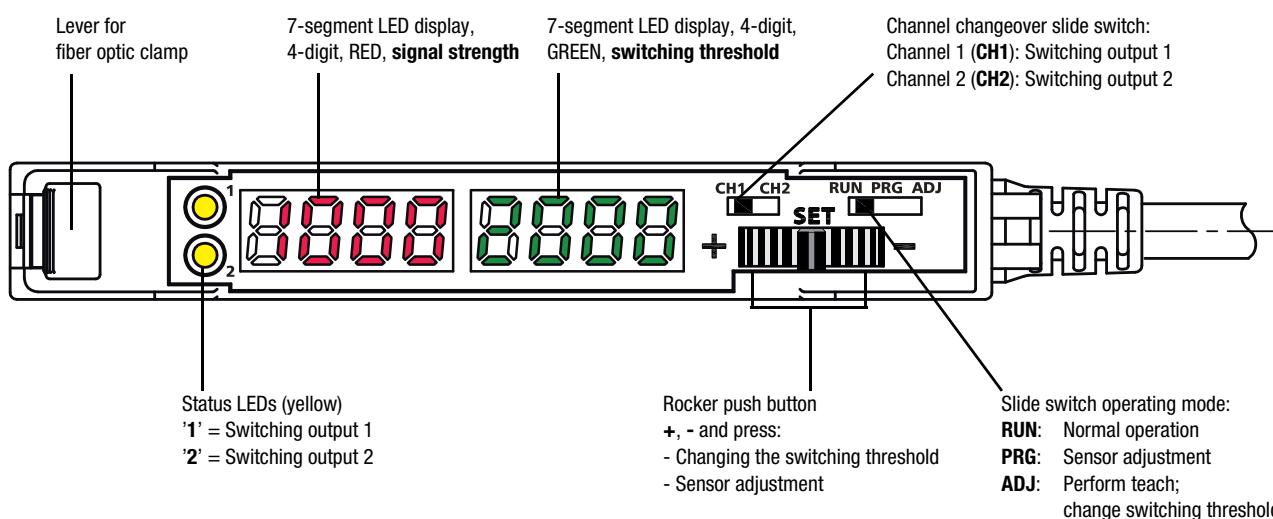
Alternatively, the amplifier can also be mounted without a DIN rail using the mounting accessory and M3 screws.

Installing the fiber optics



- ① Open the transparent protective cover.
- ② Push down the lever of the fiber optic clamp to open.
- ③ Lead the **KF/KFX/GF** type fiber optics in completely as far as they will go (ca. 12 mm deep) into the fiber optic intake. **When doing so, observe the transmitter/receiver assignment** on the amplifier (transmitter at bottom / receiver on top).
- ④ Pull up the lever of the fiber optic clamp to close.
- Check if the clamp is secure by pulling lightly on the fiber optics.
- ⑤ Close the transparent protective cover.

Operating and display elements



	Operating mode	RUN: ADJ: PRG:	Normal operation - no settings possible Press rocker push button: the set teach is executed. Rock to left - right: change the switching threshold, left = + and right = -. Menu-driven device setting via display and rocker push button
	Channel switching	CH1: CH2:	Display values and settings refer to switching output 1. Display values and settings refer to switching output 2.
	- Set switching threshold - Navigation in menu	Rock +, -: Button:	The rocker push button can be rocked to the right and to the left and pressed in the middle position. In the ADJ operating mode, the switching threshold can be increased (+) or decreased (-) by rocking. In the PRG operating mode, rock to navigate in the menu. Press the rocker push button in the middle position to accept a setting made in the PRG operating mode.
	Signal strength		In the RUN and ADJ operating modes, the display shows the current signal value. In the PRG operating mode, information on menu navigation appears on the display.
	Switch position CH1 : Indicator Switching threshold switching output 1		In the RUN and ADJ operating modes, the display shows the currently set switching threshold for each switching output. In the PRG operating mode, information on menu navigation appears on the display.
	Switch position CH2 : Indicator Switching threshold switching output 2		
	1 - State of switching output 1 2 - State of switching output 2	LED ON LED OFF	1: switching output 1 active, 2: switching output 2 active. 1: switching output 1 not active, 2: switching output 2 not active.

RUN operating mode - normal operation

The **RUN** operating mode is the standard operating mode in which the sensor detects objects; it signals this according to the set functions. If the selector switch for the operating mode is in the **RUN** position, no changes to the device can be made via the operational controls. This setting is thus suitable for protection against unintended operation and changes to device settings.



The **multi funct** multifunction input always takes precedence over the **Operating mode** selector switch.

This means that the amplifier can be taught via the multifunction input (remote teach) or configured (remote configuration) in the **RUN** operating mode as well.

PRG operating mode - sensor adjustment channel 1/2 (CH1/CH2)

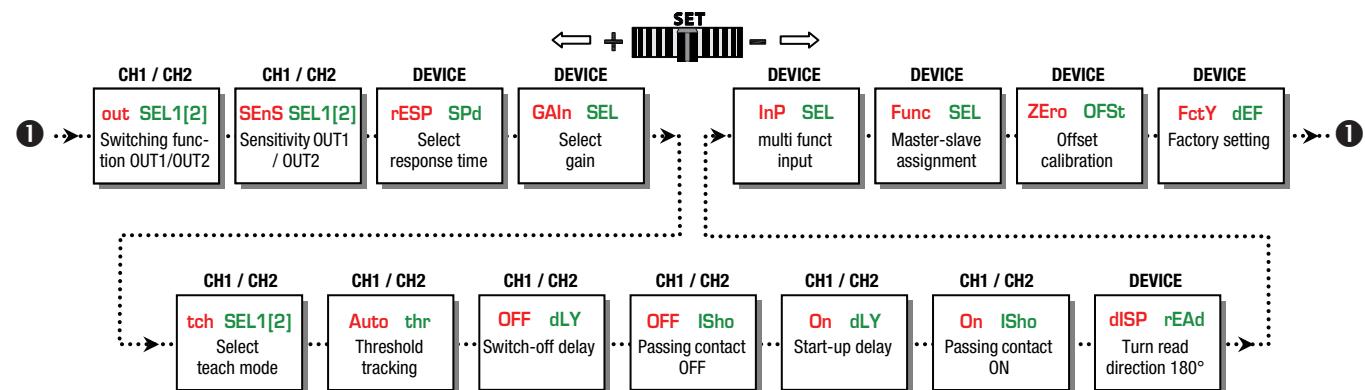


The LV463 is equipped with two switching outputs, both of which can be adjusted to meet customer requirements with a simple menu-driven system.

Some parameters for channel **CH1** apply for the entire device, i.e., for channel **CH2** as well.

Switching-output-specific parameters (switching function, sensitivity, teach mode, threshold tracking, time functions and offset) can be set for each switching output individually.

To make the setting, please select the desired channel on the channel selector switch **CH1** (switching output 1) or **CH2** (switching output 2) and set the selector switch for the operating mode to position **PRG**. Rock to right or left with the rocker pressure switch to freely navigate through the subfunctions.



NOTE

The settings for functions **rESP SPd** and **GAIn SEL** act on **both** switching outputs.

Selecting a subfunction and changing the setting

1. Rock to left or right to select the desired subfunction.
2. Press rocker push button in middle position. The currently set value is displayed statically.
3. Rock to right or left to display the selectable adjustment values - these flash slowly.
4. Accept the new value by pressing the rocker push button in the middle position.
Fast flashing indicates that the new value is accepted.
5. Automatic return to the heading for the subfunction.
6. Press again to statically display the previously selected value.

Description of the subfunctions

Subfunction	Possible settings / value range	Factory setting (default)	Explanation
out SEL1 Switching function OUT1 out SEL2 Switching function OUT2	Lon don	Lon	Individual setting for CH1 and CH2 depending on switch position! Lon: Switching output light switching : If throughbeam fiber optics are installed, the switching output is active when the light path is free. If a scanning system is installed, the switching output is active when an object is detected. The status LED illuminates when the switching output is active. don: Switching output dark switching : The switching behavior is the inversion of the light switching setting.
SEnS SEL1 Sensitivity in switching point OUT1 SEnS SEL2 Sensitivity in switching point OUT2	Std hiGh Lo	Std	Individual setting for CH1 and CH2 depending on switch position! The sensitivity in the switching point is adjusted via the hysteresis. High: Small hysteresis, e.g., for exact switching during object positioning. Std: Standard hysteresis; suitable for most applications. Lo: Large hysteresis, e.g., for very reliable switching on objects. Also for applications with strong vibrations on probe.

Subfunction	Possible settings / value range	Factory setting (default)	Explanation
rESP SPd ¹⁾ Select response time	$t_{ESP} = 24 \text{ ms}$ (signal range XLR) 8 ms (signal range LR) 2 ms (signal range STD) $1000 \mu\text{s}$ (signal range S) $500 \mu\text{s}$ (signal range HS)	2 ms	Device setting - applies the same for CH1 and CH2! The response time is the max. time required by the switching output to switch to the active state following a signal change at the input. From this, the switching frequency can be calculated as follows: $f = \frac{1}{2 \cdot t_{ESP}} \text{ [Hz]}$ Notice: A change to the response time is equivalent to a change to the signal range.
GAIn SEL ¹⁾ Select gain	Gain stage $t_{ESP} = 24 \text{ ms: Gn 1 ... Gn 7}$ $8 \text{ ms: Gn 1 ... Gn 6}$ $2 \text{ ms: Gn 1 ... Gn 6}$ $1000 \mu\text{s: Gn 1 ... Gn 6}$ $500 \mu\text{s: Gn 1 ... Gn 5}$ Auto GAIn	Auto GAIn	Device setting - applies the same for CH1 and CH2! The gain stage can be set either by manually presetting the gain factor or automatically by selecting Auto GAIn . The left, red display shows the current signal value. The gain stage should be selected so that the signal value is approximately in the middle of the display area. If Auto GAIn is selected, the device automatically determines the optimum gain setting during teaching.
tch SEL1 Select teach mode OUT1 tch SEL2 Select teach mode OUT2	Teach modes 1 Pt tch (static), 2 Pt tch (static), dYn tch (dynamic)	1 Pt tch	Individual setting for CH1 and CH2 depending on switch position! Presetting a suitable teach process. To trigger the teach event, see Teaching operating mode . 1-point teach, static: during teaching, the current signal value is accepted as the new switching threshold. Actuate the rocker push button to make fine adjustments to the threshold. 2-point teach, static: the switching threshold is calculated at approximately midway between two signal values, e.g., teach to two different objects or teach to the same object at two different distances from the probe. Example: signal value 1 = 100 digits, signal value 2 = 400 digits → Switching threshold = 280 digits. Actuate the rocker push button to + or - to make fine adjustments to the threshold. Dynamic teach: suitable for processes that cannot be stopped for teaching. When the teach event is started, the sensor begins to scan the signal values. On the left, red display, the signal values are constantly displayed. At the end of the teach event, the switching threshold is calculated at approximately midway between the smallest and largest signal value.
Auto thr Threshold tracking	Tracking the switching threshold off (aus), On (ein)	off	Individual setting for CH1 and CH2 depending on switch position! The function is only available during dynamic teaching. If the function is switched on, the switching threshold is automatically and continuously optimized by the sensor in such a way that maximum functional reliability is ensured. This can be used to compensate for, e.g., soiling or process changes. Warning message: thr ALrt: The limit of threshold tracking is reached - the sensor continues to operate. Cleaning and, if necessary, alignment of the fiber optics recommended Error message: thr Err: The limit of threshold tracking is exceeded - the sensor stops operating . Cleaning and, if necessary, alignment of the fiber optics urgently necessary
OFF dLY Switch-off delay	0 (off), 1 ... 9999 ms (milliseconds)	0	Individual setting for CH1 and CH2 depending on switch position! Switch-off delay (OFF Delay): Individually adjustable from 1 ... 9999ms. Combination options → Combining timing functions
OFF ISho Passing contact OFF	0 (off), 1 ... 9999 ms (milliseconds)	0	Individual setting for CH1 and CH2 depending on switch position! Passing contact on fall-back (OFF 1-Shot): Individually adjustable from 1 ... 9999ms. Combination options → Combining timing functions
On dLY Switch-on delay	0 (off), 1 ... 9999 ms (milliseconds)	0	Individual setting for CH1 and CH2 depending on switch position! Switch-on delay (ON Delay): Individually adjustable from 1 ... 9999ms. Combination options → Combining timing functions
On ISho Passing contact ON	0 (off), 1 ... 9999 ms (milliseconds)	0	Individual setting for CH1 and CH2 depending on switch position! Passing contact on actuation (ON 1-Shot): Individually adjustable from 1 ... 9999ms. Combination options → Combining timing functions
dISP rEAd Turn read direction 180°	dISP rEAd, PAE dISP	dISP rEAd (same read direction as other texts)	Device setting - applies the same for CH1 and CH2! Changes the read direction of the two 7-segment displays by 180°.

1) The settings for functions **rESP SPd** and **GAIn SEL** act on **both** switching outputs.

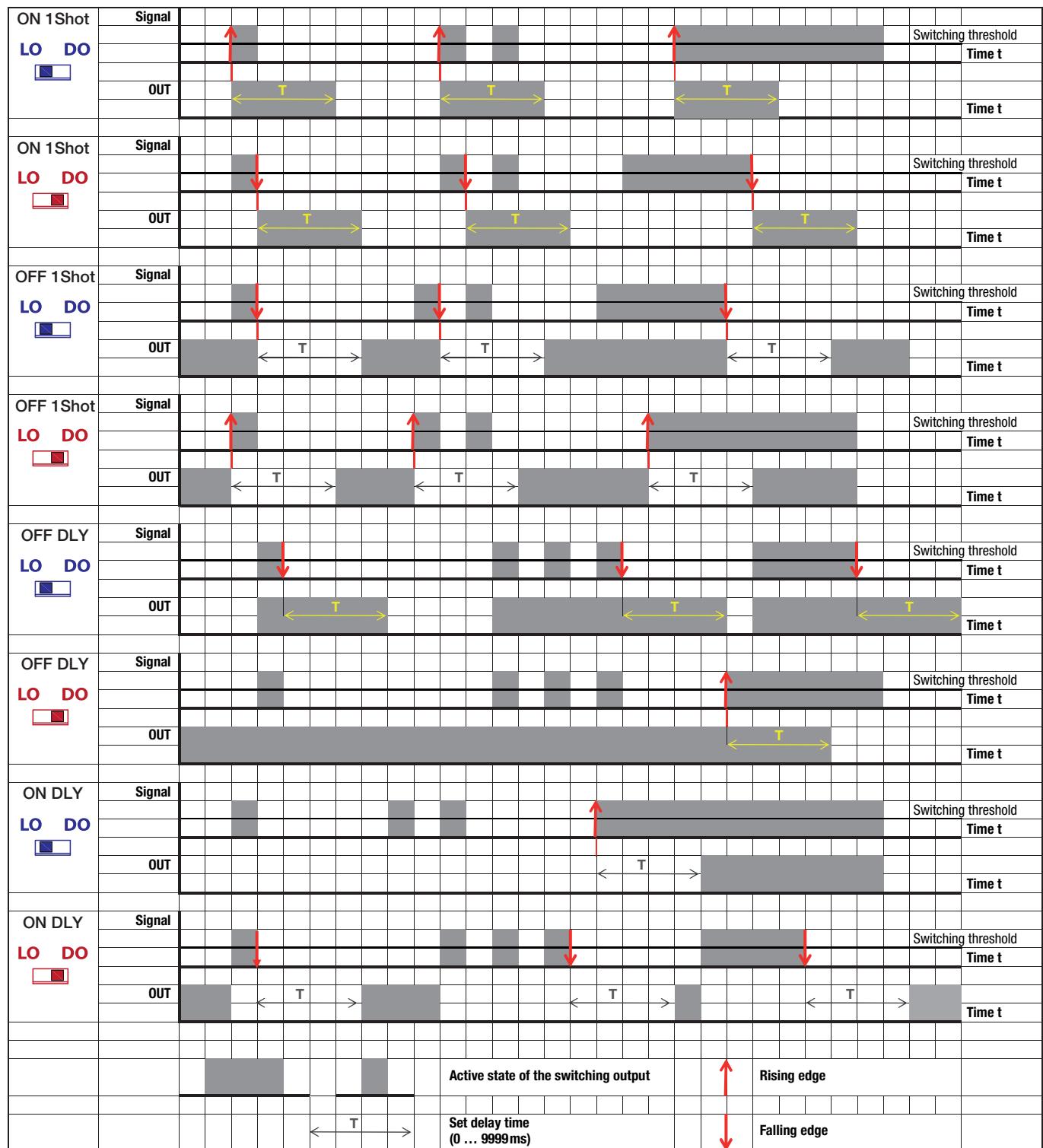
Subfunction	Possible settings / value range	Factory setting (default)	Explanation
InP SEL multi funct input	OFF, tch InP, SYnc PLC, SYnc Int	OFF	<p>Device setting - applies the same for CH1 and CH2! With the setting, you define the function of the multi funct multifunction input (pin 2/ws-WH).</p> <p>OFF: Pin/cable without function</p> <p>tch InP: Pin/cable can be used as teach input for line teach or for remote configuration. Further details on this topic → Line teach / remote teach. → Remote configuration special function.</p> <p>SYnc PLC: Pin/cable can be used as activation input. Further details on this topic → Synchronous operation of multiple amplifiers.</p> <p>SYnc Int: Setting for multiplex operation of up to 6 fiber optic amplifiers. For this purpose, all multi funct multifunction inputs (pin 2/ws-WH) are connected to one another. The master unit (defined with the next subfunction) generates a timing signal that is received by the slave units (defined with the next subfunction) via the parallel connection. In a fixed time frame, each slave successively activates its transmitter for a brief time and delivers a signal value. To avoid mutual interference, the transmitter is then deactivated again. Further details on this topic → Multiplex operation of multiple amplifiers.</p>
Func SEL Master-slave assignment	SL 1, SL 2, SL 3, SL 4, SL 5, mA 2, mA 3, mA 4, mA 5, mA 6	SL 1	<p>Device setting - applies the same for CH1 and CH2! These settings only need to be made if multiplex operation (master-slave operation) of multiple sensors is desired. A maximum of 6 sensors can be synchronized with one another in multiplex operation. Here, exactly one master and 1 ... 5 slaves are always needed.</p> <p>Settings for master: mA n (number): Defines that this unit functions as a master and a total of n sensors were wired in parallel. Value range n = 2 ... 6. Example: mA 4 means: unit is the master, a total of 4 sensors are wired to one another via the multi funct multifunction input.</p> <p>Setting for slaves: SL n (number): Defines that this unit functions as a slave and has individual address n. Value range address n = 1 ... 5. Example: SL 3 means: unit is as a slave with individual address 3.</p> <p>Further details on this topic → Multiplex operation of multiple amplifiers</p>
ZEro OFSt Offset calibration	no, YES	no	<p>Device setting - applies the same for CH1 and CH2! This subfunction is used for suppressing an offset signal that can result, e.g., from crosstalk between transmitter and receiver at the fiber optic head. To activate this function, select YES and confirm the selection by pressing the rocker push button. The current signal value is now set to 0. To perform another offset calibration, the previous calibration must first be reset. To do this, select no and confirm by pressing the rocker push button. Now again perform the offset calibration as previously described.</p> <p>Note: Resolution is lost when using offset suppression! Example: display area = 4000 digits, offset value = 550 digits → Remaining resolution = 3450 digits</p>
FctY dEF Factory setting	no, YES	no	<p>Device setting - applies the same for CH1 and CH2!</p> <p>Attention! Resets all sensor settings to factory settings. If desired, select YES and execute by pressing the rocker push button.</p>


Tip!

The maximum operating range can be achieved as follows:

- Set **rESP SPd** to **24 ms** (signal range **XLR**).
- Set **GAIn SEL** to the highest gain stage.
- The switching threshold can be set to minimum 32 digits, the amplifier detects objects up to display value **0**.

Time functions



Combining timing functions

Timing functions can only be combined to a limited extent. Impermissible combinations are suppressed from the subfunctions menu. Here is an overview of the permissible combinations (•):

	OFF dLY Switch-off delay	OFF ISho Passing contact OFF	On dLY Switch-on delay	On ISho Passing contact ON
OFF dLY Switch-off delay		•	•	
OFF ISho Passing contact OFF	•			
On dLY Switch-on delay	•			•
On ISho Passing contact ON			•	

Operating mode ADJ - teaching the switching outputs (CH1/CH2)



Switching outputs OUT1 and OUT2 can be taught individually. Set the selector switch for the channel to the desired position **CH1** (switching output OUT1) or **CH2** (switching output OUT2).

Set the selector switch for the operating mode to the **ADJ** position.

Depending on the setting of the **Select teach mode** subfunction (**tch SEL1** / **tch SEL2**), one of the following teach modes appears:

- **Static 1-point teach**
- **Static 2-point teach**
- **Dynamic teach**

Teach process

Step	Static 1-point teach	Static 2-point teach	Dynamic teach
①	Place object in light beam. The red display shows the signal value, the green display the current switching threshold.	Place object in light beam. The red display shows the signal value, the green display the current switching threshold.	Press the rocker push button. The green display shows dYn , the red display the current signal value. The amplifier now scans signal values for approx. 1 minute.
②	Press the rocker push button; the teach value is accepted.	Press the rocker push button, first teach value is accepted.	Move several objects through the light beam; to end the event, press the rocker push button again. After the scanning time elapses, the teach event ends automatically.
③	Following a successful teach, PASS appears on the green display and the signal value is displayed as the new switching threshold. In the event of a faulty teach, FAIL appears on the red display. In this case, the signal value may be too small and cannot be accepted as a teach value (→ Table with minimum teach values as a function of the setting). Check object and/or placement and repeat event.	2nd appears on the green display; the red display shows the current signal value. Place object 2 or object at distance 2 and press the rocker push button within one minute . The second teach value is accepted. If the rocker push button is not pressed within one minute, the teach event is interrupted and the previous switching threshold is retained. Following a successful teach, PASS appears on the green display. The new switching threshold now lies approximately midway between the two taught signal values. In the event of a faulty teach, FAIL appears on the red display. In this case, the minimum distance between the two teach points may be too small (→ Table with minimum teach values as a function of the setting). Try to set a larger distance between the signal values and repeat the event.	Following a successful teach, PASS appears on the green display. The new switching threshold now lies between the maximum and the minimum of the scanned signal values. In the event of a faulty teach, FAIL appears on the red display. In this case, the minimum distance between the scanned signal values may be too small (→ Table with minimum teach values as a function of the setting). Try to set a larger distance between the signal values and repeat the event.
④	The switching threshold can be freely increased or decreased at a later time by rocking the rocker push button to the left (+) and right (-). The change is accepted if both displays flash briefly several times.	The switching threshold can be freely increased or decreased at a later time by rocking the rocker push button to the left (+) and right (-). The change is accepted if both displays flash briefly several times.	The switching threshold can be freely increased or decreased at a later time by rocking the rocker push button to the left (+) and right (-). The change is accepted if both displays flash briefly several times.

Tip!

For reliable function, the difference between the signal value while an object is present and the signal value with no object should be at least 10 ... 20%. In general: the larger the difference, the more reliable the detection.

Line teach (remote teach) - channel 1 (CH1) or channel 2 (CH2)

Subfunction setting:



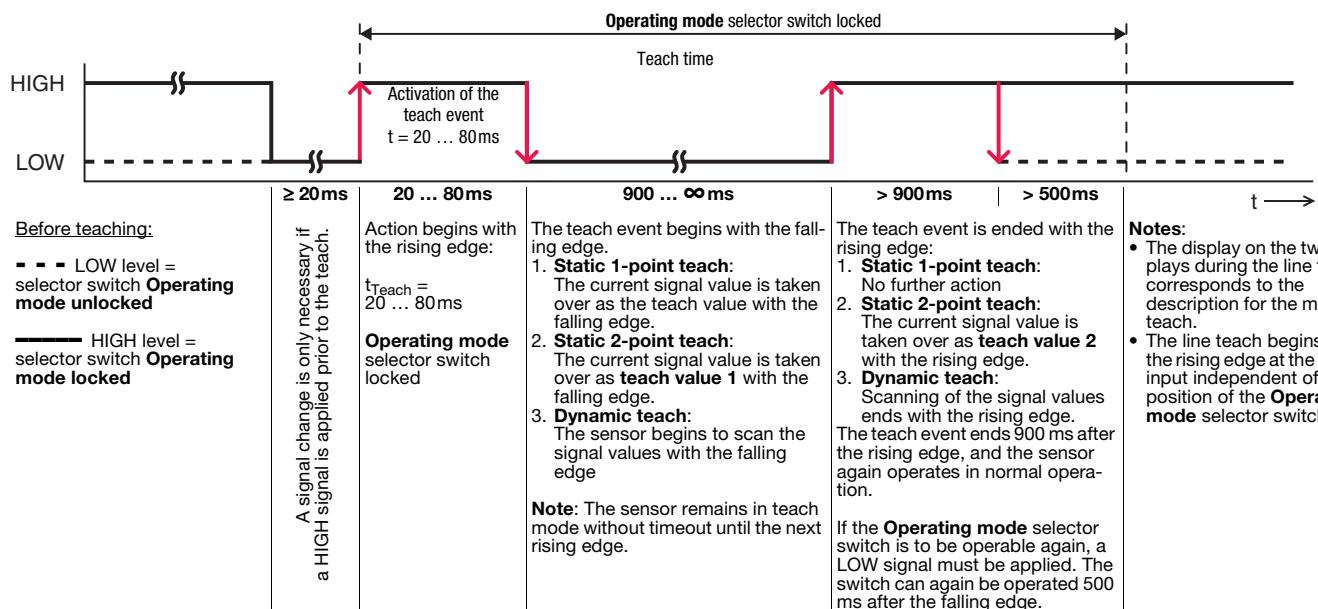
Signal level at **multi funct** teach input:

- **The following description applies to PNP switching logic!**
- **With the NPN models, the signal levels are inverted!**

Timing for the line teach

Which line teach is performed is set in the **Select teach mode tch SEL1 / tch SEL2** subfunction.

Depending on the setting, this may be a static 1-point teach, a static 2-point teach or a dynamic teach.



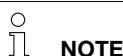
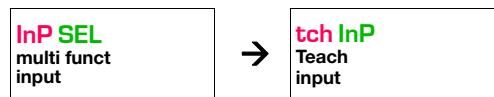
Locking the amplifier via the teach input

A static **HIGH** signal ($\geq 20\text{ms}$) on the teach input **locks the Operating mode selector switch** independent of its position. No manual configuration or adjustment can be performed (e.g., protection against erroneous operation or manipulation).

If the teach input is not connected or if a **static LOW signal** is applied, the **Operating mode selector switch is unlocked** and all functions can be accessed as described.

Special function: Remote configuration

In addition to the described line teach, a simple pulse-pause signal at the teach input can be used to perform a partial configuration of the device. To do this, make this setting in the submenu:



NOTE

For the pulse sequences described in the following for device configuration via the teach input, the following conventions apply:

- **Signal level:** The description applies for **PNP devices** (active high). For NPN devices (active low), the pulse sequences are to be inverted accordingly.
- **Pulse length T:** HIGH and LOW pulses are the same length: **0.04s < T < 0.8s**.
- **Pause length P:** The following applies for the pauses between the pulse sequences: **P > 1s**.

Settings for CH1 - switching output OUT1

	1-point teach	
Teach mode OUT1	2-point teach	
	Dynamic teach	
Switching function OUT1	Light switching	
	Dark switching	

Settings for CH2 - switching output OUT2

	1-point teach	
Teach mode OUT2	2-point teach	
	Dynamic teach	
Switching function OUT2	Light switching	
	Dark switching	

Settings for CH1 and CH2 - response time and gain

	Response time 500µs	
	Response time 1000µs	
Select response time	Response time 2ms	
	Response time 8ms	
	Response time 24ms	
	Auto GAIn	
	Gn1	
	Gn2	
Select gain	Gn3	
	Gn4	
	Gn5	
	Gn6	
	Gn7	

1) Not adjustable for response time 500 µs

2) Not adjustable for response times 500 µs, 1000µs, 2ms and 8 ms

Multiplex operation of multiple amplifiers

If multiple light axes are arranged immediately adjacent to one another, mutual interference may occur, recognizable by a strongly fluctuating display.

To avoid this undesirable behavior, **up to 6 devices can operate in multiplex operation**. To do this, it is only necessary to connect the **multi funct** multifunction input (pin 2/ws-WH) of all participating amplifiers in addition to the voltage supply and switching signal.



- For settings, see subfunctions:

CH1 CH2 RUN PRG ADJ

InP SEL multi funct input
Func SEL Master-slave assignment

→	SYnc Int Multiplex operation
→	mA n Master assignment
	SL 1 ... SL 5 Slave assignment

- Maximum 6 / minimum 2 units: 1 x master + 1 ... 5 slaves.
- Each unit can be either a master (**mA**) or slave (**SL**).
- The master also requires the information on the number of units connected in parallel ($n = 1 + \text{number of slaves}$).
- Each slave also receives an individual **address 1 ... 5** (max.)
- The master generates a timing signal on pin 2 or on cable ws/WH.
- Each slave switches on its transmitter for 1 ms depending on its address.
- In multiplex operation, the cycle time is based on the total number of units:
cycle time = number of units • 1.5ms + 0.5ms.

Synchronous operation of multiple amplifiers / operation with activation input

If may also be necessary to query multiple light axes **simultaneously** (synchronously). There are two ways to do this:

Model 1:

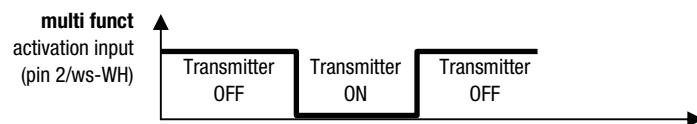
Wiring and adjustment according to section **Multiplex operation of multiple amplifiers**, but all slaves receive an **identical address from 1 ... 5**. Result: Master and slaves have a time offset of 1.5 ms; slaves with the same address operate synchronously.

Model 2:

Synchronous operation through an external activation signal at the **multi funct** input (pin 2/ws-WH). Subfunction setting:



Function:



The transmitter is **deactivated with a high signal**. The transmitter is **activated without actuation or with a low signal**.