

Technical Description

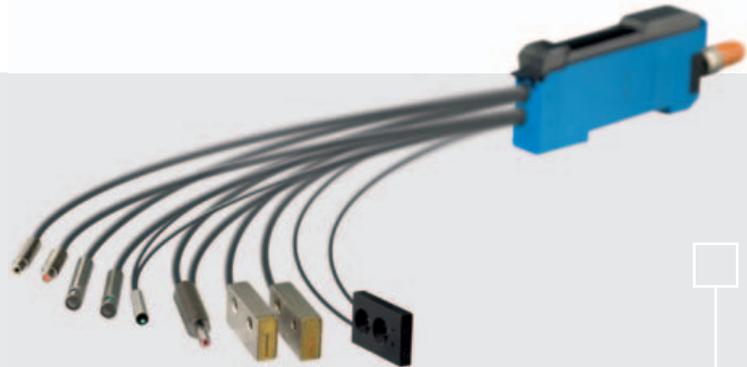
**SENSICK**  
**WLL 190T – High-End Sensor**  
**for fibre-optic cable**



## Technical description

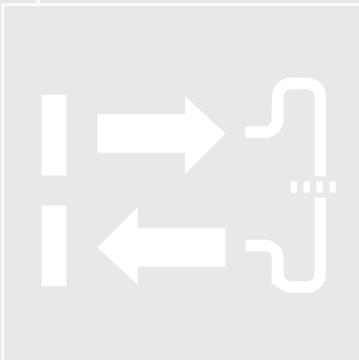
### WLL 190T – simple installation and structured functions

The WLL 190T fibre-optic photoelectric switches with fibre-optic cables of the LL 3 Series are particularly suitable in detecting very small objects, objects where there is background interference, objects which are transparent, colour marks, and for the use in positioning operations. Fibre-optic cables are ideal where installation space is at a premium. In addition, an 8-way interference suppression system prevents inter-cable interference (WLL 190T-Bus). The WLL 190T can be used as a single device or integrated as a 16-channel Bus.



### The WLL 190T fibre-optic cable photoelectric switch and the LL 3 fibre-optic cable make a powerful team.

The properties and areas of application of the WLL 190T and LL 3 complement each other. The fibre-optic cables of the LL 3 Series are available in more than 80 options, ranging from universal to special purpose versions.



### Monitoring – interaction and reaction, online

Monitoring simplifies a lot of functions: e.g. tests, programming, commissioning, maintenance and fault finding. The 4-digit display (red or green) and the 3-digit display (green) depict actual and visual feedback in the respective mode:

- in operation mode: feedback of the reception signal and the selected function modes,
- in programming mode: menu-guided selection of parameters and confirmation of activation or deactivation.



Operating mode

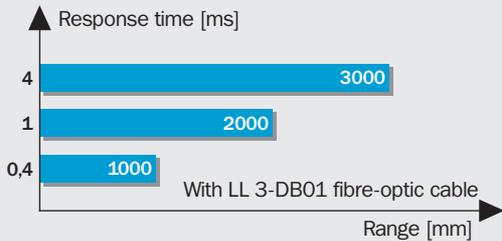


Programming mode



## High Power or High Speed

Ranges can be optimised by selectable response times (0.4 ms, 1 ms, 4 ms).



## WLL 190T – with integrated Bus technology

WLL 190T Series sensors already have integrated Bus technology. There is no need for separate Master or Slave units. Two Bus options are available: Software- and Hardware-Bus systems. The choice of options are simply coded and activated via a Bus plug (3-pin for Software-Bus systems and 5-pin for Hardware-Bus systems).

The advantages are:

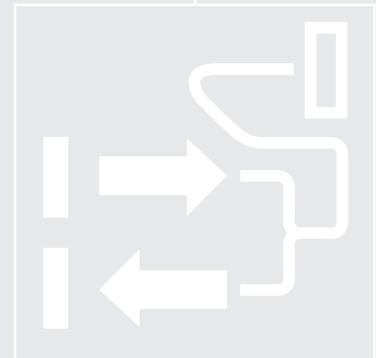
- Up to 16 WLL 190T can be cascaded together.
- 8-way interference suppression is automatically active.
- Access to all software options
- Using a Hardware-Bus system reduces the amount of wiring needed.



## Software

Securely and quickly programmed by pressing buttons and by menu guidance. The attributes of the unit and its parameters can be determined individually, directly on the sensor:

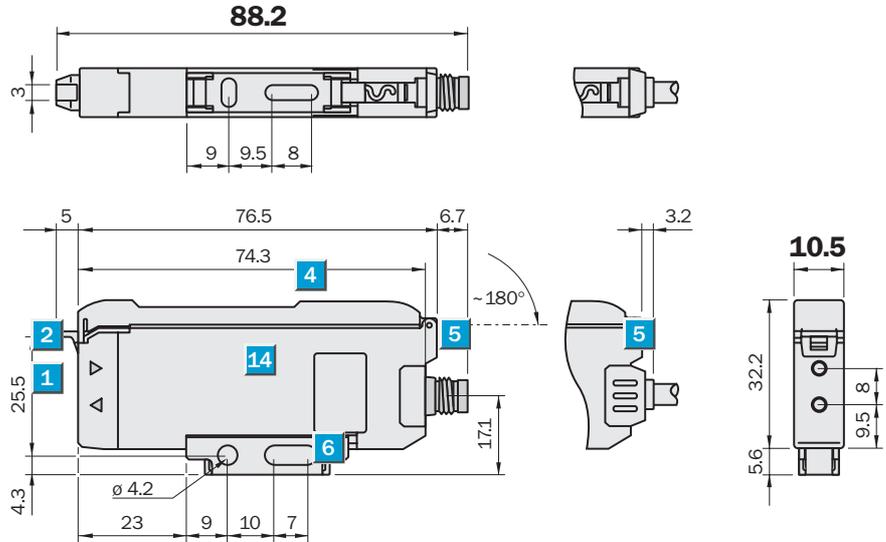
- nor** "Normal" sensitivity
- GLAS** Optimised for transparent objects, such as glass
- dyn** Dynamic switching threshold
- zone** "Zone recognition" (window technology) for detecting marks
- APC** APC – Automatic Power Control active
- cont** Numeric counter function for setting the coincidence signal
- Func** Functions: The entering of variable attributes of the unit, such as operating modes and response times
- SPEC** Special features via the Software-Bus system: e.g. copying settings, Auto-0-Level



	<b>Scanning range</b> 1300 mm (5000 mm)
<b>Through-beam system</b>	
	<b>Scanning distance</b> 300 mm
<b>Proximity system</b>	

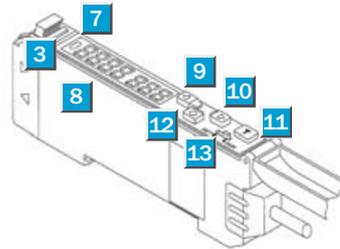
- LED red light
- Longest ranges
- Precise, stable switching point
- Numeric displays
- Interactive user prompting
- Appropriate for the LL 3 fibre-optic cable series

## Dimensional drawing



## Adjustments possible

WLL 190T-P430	WLL 190T-N430
WLL 190T-P030	WLL 190T-N030
WLL 190T-P330	WLL 190T-N330



- 1 Sender LED, installation of LL 3 fibre-optic cable (sender fibre)
- 2 Receiver LED, installation of LL 3 fibre-optic cable (receiver fibre)
- 3 Locking of fibre-optic cables
- 4 Protective hood: can be folded out approx. 180°
- 5 M8 plug fixed or 1-wire cable or 3-wire cable replaceable (cables not included with delivery)
- 6 Mounting bracket included (see Accessories)
- 7 Indicator LED, yellow: lights up when switching output is active
- 8 Numeric display: 3-digit and 4-digit  
green: current reception value, operating mode  
red: Teach-in and function parameter
- 9 Step button > (manual switching threshold: higher; or next function parameter)
- 10 Step button < (manual switching threshold: lower; or previous function parameter)
- 11 "Teach-in" pushbutton
- 12 Mode/Enter button (programming button)
- 13 Operating mode selector switch:  
"SET": active Teach-in-switching threshold  
"RUN": sensor mode and function parameter selection
- 14 Protecting cap (on both sides). For "block installation" remove, take up for Bus plug



## Connection types

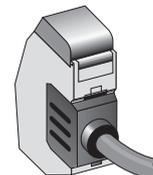
WLL 190T-P430	WLL 190T-P330	WLL 190T-P030
WLL 190T-N430	WLL 190T-N330	WLL 190T-N030



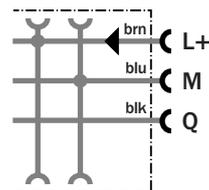
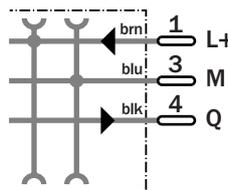
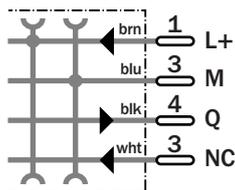
M8, 4-pin



M8, 3-pin



3-wire cable/1-wire cable



## Accessories

- Cables and connectors
- Mounting systems
- Fibre-optic cable

Technical data		WLL 190T-	P430	N430	PO30	NO30	P330	N330				
<b>Extras</b>	“One WLL 190T for EVERYTHING”: No separate master/slave device required											
<b>LCD display</b>	3-digit and 4-digit numeric display Each additionally in red and green											
<b>Interactive user-prompting</b>	System options can be selected menu-prompted Sensitivity setting per Teach-in											
<b>Power indicator</b>	Reception signal and operating mode											
<b>Automatic Power Control</b>	System sensitivity standardized ex works Constant sender power, internal control											
<b>Internal Bus</b>	Block installation 16 x WLL 190T 8 x anti-interference 16 x wire-saving Internal signal processing of two WLL 190T											
<b>Single operation</b>	All performances available											
<b>Scanning range</b>	Depending on fibre-optic cable LL 3 used											
<b>Light source <sup>1)</sup>, light type</b>	LED sender red (650 nm)											
<b>Recommended operating range</b>	0 ... 1300 mm (through-beam system) (with auxiliary lens 0 ... 5000 mm) <sup>2)</sup>											
<b>Recommended operating distance<sup>3)</sup></b>	0 ... 300 mm <sup>1)</sup> (proximity system) <sup>2)</sup>											
<b>Sensitivity setting</b>	5 optimization modes can be programmed Manual, per Teach-in button											
<b>Precise correction</b>	Step button >/< manual											
Light spot diameter LL 3	Depending on scanning range											
Dispersion angle fibre-optic cable LL 3	Approx. 65° <sup>4)</sup>											
<b>Supply voltage V<sub>S</sub></b>	10 ... 30 V DC <sup>5)</sup>											
Residual ripple <sup>6)</sup>	≤ 10 %											
Current consumption <sup>7)</sup>	≤ 40 mA											
<b>Switching outputs</b>	Q: PNP Q: NPN											
<b>Output current I<sub>A</sub> max.</b>	≤ 100 mA											
<b>Switching type</b>	Dark-/light-switching selectable											
<b>Response time <sup>8)</sup></b>	Selectable: 0.4 ms/1 ms/4 ms											
<b>Switching frequency max. <sup>9)</sup></b>	1250/s; 500/s; 125/s											
<b>Time delay</b>	Programmable 0 ms ... 9000 ms											
Time type, programmable	OFF/T <sub>OFF</sub> /T <sub>ON</sub> /ONE-SHOT											
<b>Connection type</b> System coupling	Suitable cable coupling <sup>10)</sup> ; s. Accessories											
Plug	M8, 4-pin											
Plug	M8, 3-pin											
<b>VDE protection class <sup>11)</sup></b>	□											
<b>Enclosure rating <sup>12)</sup></b>	IP 66											
<b>Circuit protection <sup>13)</sup></b>	A, B, C, D											
<b>Ambient temperature</b>	Operation -25 °C ... +55 °C Storage -25 °C ... +70 °C											
<b>Weight</b> with system coupling	Approx. 20 g											
with M8 plug, 4-pin	Approx. 25 g											
with M8 plug, 3-pin	Approx. 25 g											
<b>Housing material</b>	ABS/PC											

1) Average service life 100,000 h at T<sub>A</sub> = +25 °C  
 2) Ranges/scanning distances at response time 4 ms. Range reduction at short response time (see LL 3/WLL 190T Ranges Table)  
 3) Object with 90 % remission (based on standard white DIN 5033); 100 x 100 mm

4) Deviations see LL 3 data  
 5) Limit values  
 6) May not exceed or fall short of V<sub>S</sub> tolerances  
 7) Without load  
 8) Signal transit time with resistive load  
 9) With light/dark ratio 1:1, without time delay

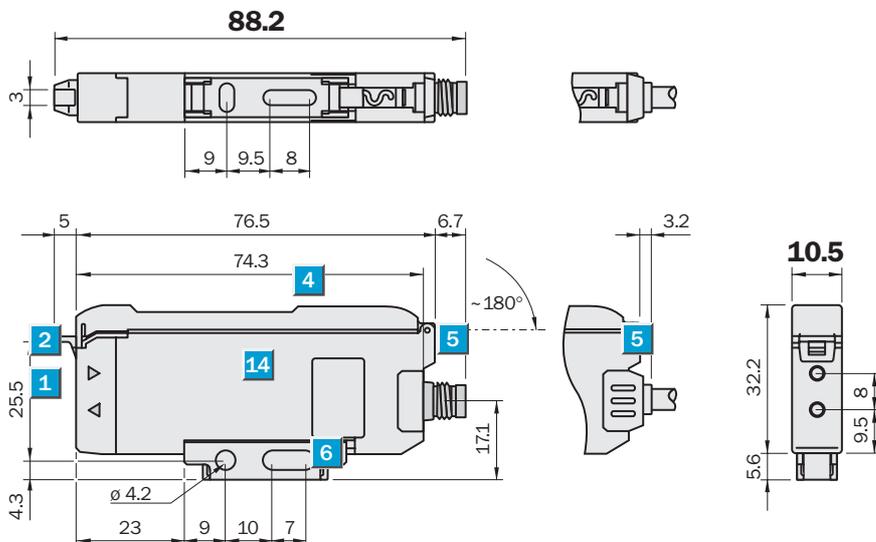
10) Do not bend cable below 0 °C  
 11) Reference voltage 50 V DC  
 12) Only with correct adaptation of the LL 3 fibre-optic cable. Single-unit operation only. Optional Bus operation with side cover removed and Bus plugs contacted: IP 50

13) A = V<sub>S</sub> connections reverse-polarity protected  
 B = Inputs/outputs reverse-polarity protected  
 C = Interference pulse suppression  
 D = Outputs overcurrent and short-circuit protected

	<b>Scanning range</b> 600 mm (3000 mm)
<b>Through-beam system</b>	
	<b>Scanning distance</b> 60 mm
<b>Proximity system</b>	

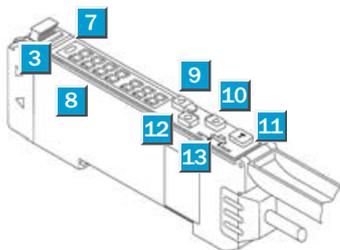
- LED green light
- For detection of marks
- Precise, stable switching point
- Numeric displays
- Interactive user prompting
- Appropriate for the LL 3 fibre-optic cable series

### Dimensional drawing



### Adjustments possible

WLL 190T-P490	WLL 190T-N490
WLL 190T-P090	WLL 190T-N090
WLL 190T-P390	WLL 190T-N390



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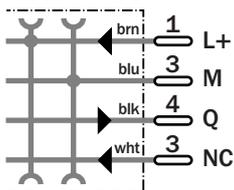


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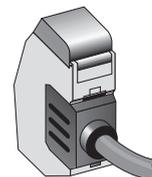
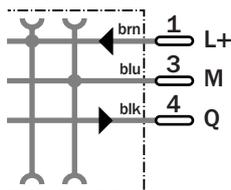
WLL 190T-P490	WLL 190T-P390	WLL 190T-P090
WLL 190T-N490	WLL 190T-N390	WLL 190T-N090



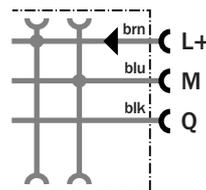
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Mounting systems
Fibre-optic cable

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 B = Inputs/outputs reverse-polarity protected  
 C = Interference pulse suppression  
 D = Outputs overcurrent and short-circuit protected

## Overview of software functions



## Operating elements

## ■ Notes on programming

“Enter” button : 

 opens the menu (i.e. the selection of the software functions) and then confirms the selected option.

  **In Programming Mode:**

Selection of software options (backwards or forwards in menu).

  **In RUN Mode “sensor operation”:**

Online, alter manually, adapt the switching threshold in single steps.

**Activate desired software function:**

Select   + confirm  = activate option.

**Teach-in button  :**

Automatic teaching-in and saving of selected Sensitivity Mode and the switching threshold at “the press of a button” . This button is only active when SET/RUN selection switch is in the SET position.

**Back to RUN Mode (Sensor Mode):**

Automatically after 10 s if no button is used, or “EXIT” each Mode with  button.

## Overview

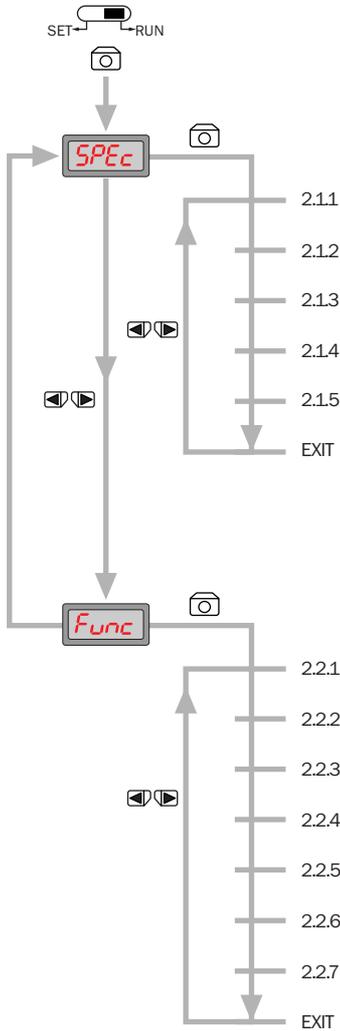
**1. Adjustment of switching thresholds by Teach-in and manual alteration of switching threshold****Mode switch in SET position:**

- 1.1. Teaching: Teach-in switching threshold only active in SET Mode   
(See 1.1 for details).

**Mode switch in RUN position:**

- 1.2. Manual alteration (adaptation) of switching threshold(s), “+” or “-” only active in RUN Mode   (See 1.2 for details).
- 1.3. Manual alteration (adaptation) of switching threshold(s). ZONE Mode (window), only active in RUN Mode   (See 1.3 for details).

Overview of software functions



**2. Selection of system functions (only active in RUN Mode)**

**Mode switch in RUN position**

**☑ Activate selection of operating modes and functions**

**2.1. Special functions (SPECials) – only active with software Bus slotted in (Bus plug)**

**Exception: 2.1.1;** (See 2.1 for details)

- 2.1.1. Counter functions (**cont**): activate and set value for sum impulse.  
**Only active with active software bus (Bus plug):**
- 2.1.2. Copier Mode (**coPy**): all programmed settings are copied 1:1 to all Bus-contacted WLL 190T.
- 2.1.3. Shift of zero-point of all receiver displays (**ALL NO**): the current value in display set to "0": now applicable from "-XXXX" ... "+XXXX".
- 2.1.4. ALL TEACH-IN (**AL t**): every Bus-contacted WLL 190T learns its individual switching threshold simultaneously.  
Only 1-point Teach-in: "hor" & "zone" & "GLASS" Mode.
- 2.1.5. Difference evaluation (**di FF**): the difference value of two neighbouring WLL 190Ts is set. Q signal on excess or fall-short of difference.

**2.2. Definition of operating modes (Functions)**

**Are separately selected and set for each WLL 190T.** (See 2.2 for details)

- 2.2.1. Response times (**rESP**): high speed (0.4 ms), standard (1 ms), long (4 ms).
- 2.2.2. Selection of switching mode (**L--d**): light-switching (L.ON) or dark-switching (D.ON).
- 2.2.3. Time increments, type and length (**t iEr**): OFF, tON, tOFF, one shot; time range from 1 ms to 9 s.
- 2.2.4. Automatic Power Control (**APC**): continuous, stabilised transmitter power for long-term stability.
- 2.2.5. Reset (**rSET**): resets all parameters to delivery state.
- 2.2.6. Selection of display format (**diSP**): numerical display, bar-display, display off.
- 2.2.7. Exit (**E it**): Back to programming loop in RUN Mode (= sensor operation).

**3. Useful supplementary functions**

(See 3.1 to 3.3 for details)

- 3.1. Shift zero-point of receiver display: current display value becomes "0" (see also 2.1.3).
- 3.2. Monitoring: display of all individual programmed device functions and options.
- 3.3. Locking/unlocking of function buttons (tamper prevention).

1. Adjustment of switching thresholds by Teach-in and manual alteration of switching threshold

1.1 Selection and use of Sensitivity Mode Teach-in



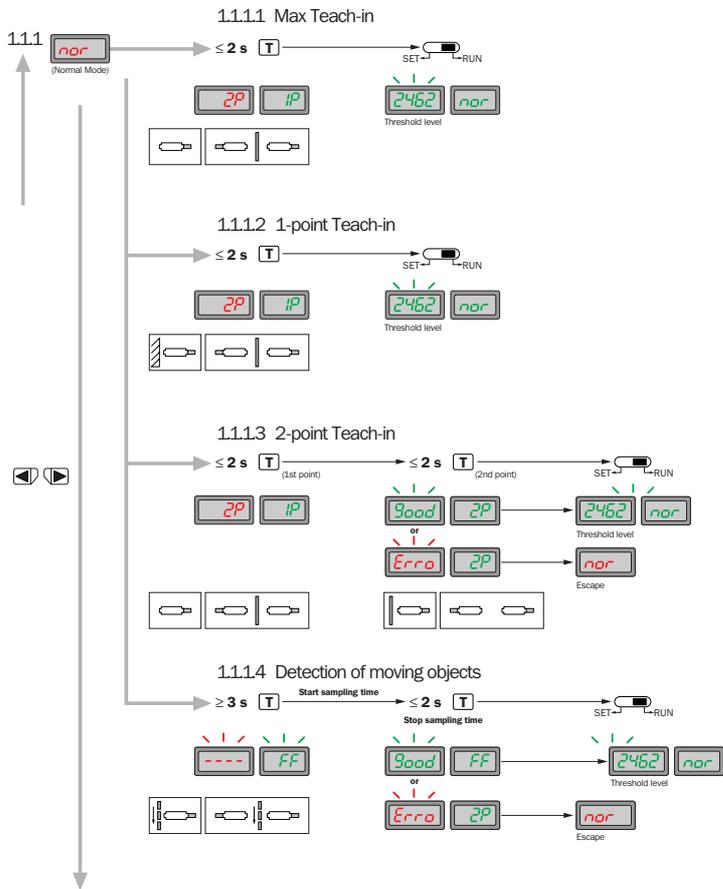
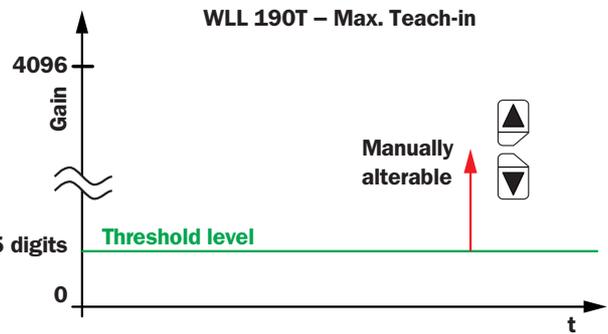
General Information

- Teach-in only active in SET Mode. Ideal protection against accidental modification.
- Manual adjustment, digit-by-digit in RUN Mode, the taught-in threshold levels can be altered manually later in single steps (DIGIT by DIGIT) with the STEP buttons Lower level, Higher level.
- ENTER button inactive in SET Mode.

1.1.1 Normal-Mode

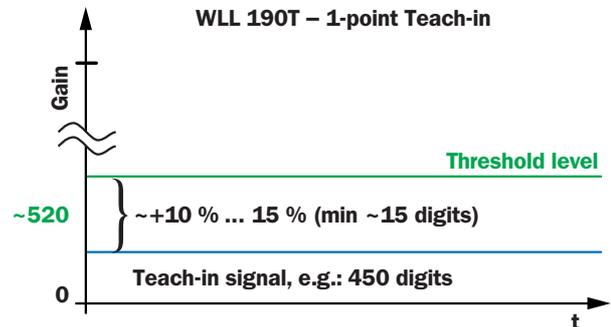
1.1.1.1 Max. Teach-in

- No ambient interference of received signal.  
Teaching frame:  
through-beam fibre = object present, not transparent;  
proximity fibre = object absent, no influences of background.  
Switching level = upwards of approx. >15 digits.  
Typical application: no ambient interference, no transparent objects, max. reserves, max. sensitivity.

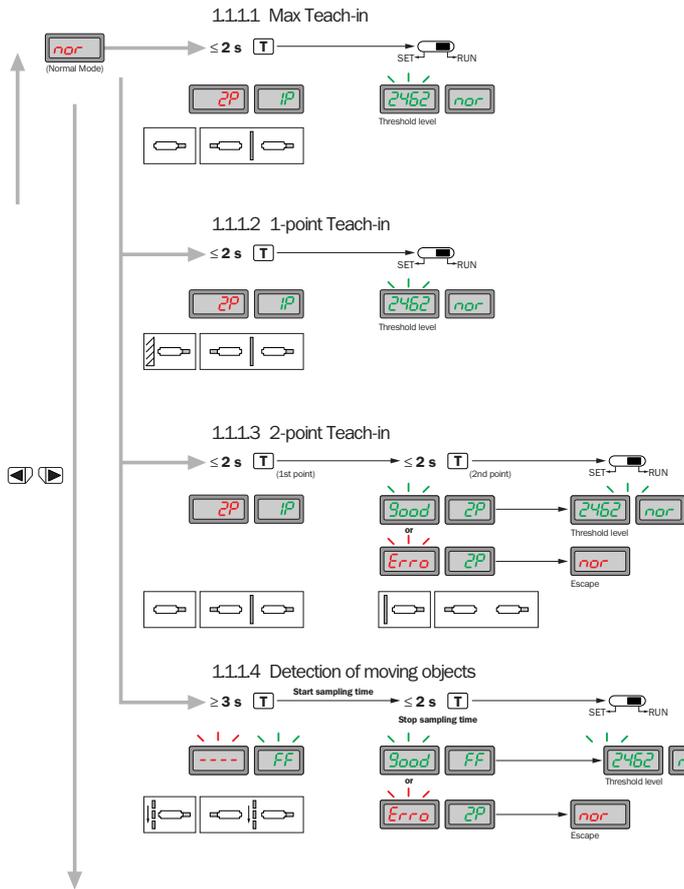


1.1.1.2 1-point Teach-in

- Switching level is adapted to interference  
Teaching frame:  
through-beam fibre = object present;  
proximity fibre = object absent.  
Switching level: object signal + approx. 10 % ... 15 % (min. 15 digits).  
Typical application: standard application, no ambient interference expected, max. reserve.

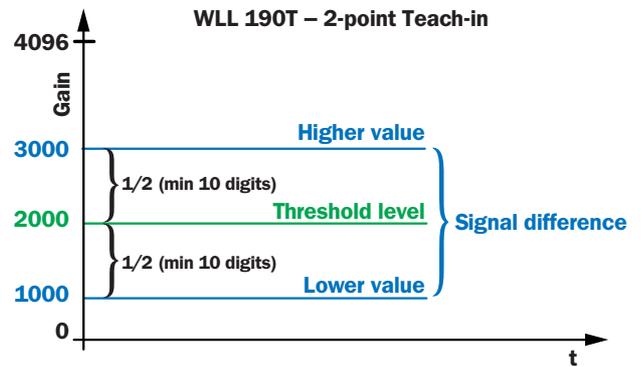


1. Adjustment of switching thresholds by Teach-in and manual alteration of switching threshold



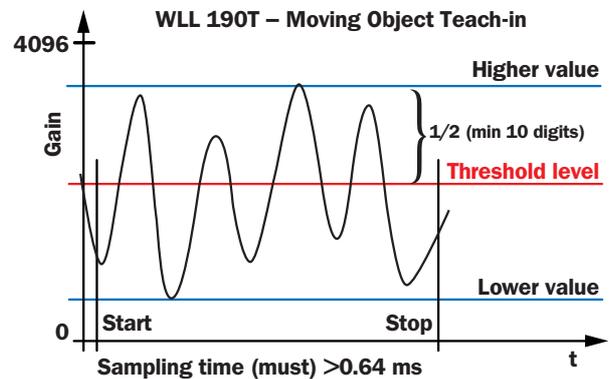
1.1.1.3 2-point Teach-in

- Exact adjusting to object present/absent. Teaching frame: both states are taught: object present/object absent, in no particular order.
  - 1st step: object must be taught-in.
  - 2nd step: no object must be taught-in.
- Switching level: switching points ON/OFF = middle of level-1 and level-2 (min. ~10 digits); hysteresis ~min. ±3% (min. ~10 digits).
- Typical application: precise adjustment, switching level between object and ambient condition; for small signal reserves. Costlier handling.



1.1.1.4 Teaching of moving objects (Teach-in if object is on the move)

- 1st Step:  $>3s$  [T]: starts this specific Teach-in mode and sampling time. Sampling time: at least  $>0.64$  ms.
- 2nd Step:  $>2s$  [T]: end of sampling time and Teach-in.
- Switching level: ON / OFF = middle of level-1 and level-2 (+ approx. ±3% hysteresis, min ~50 digits), = 2-point Teach-in.
- Typical application: teaching only possible if objects on the move (control of ejection; exact positioning and speed of objects is only possible on active process).
- Costlier handling.

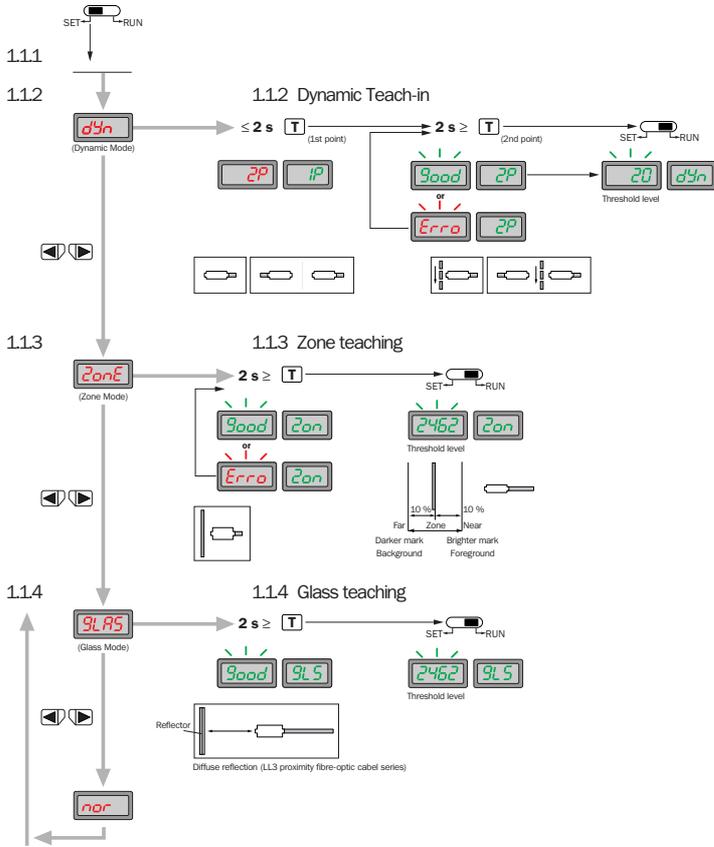


1. Adjustment of switching thresholds by Teach-in and manual alteration of switching threshold

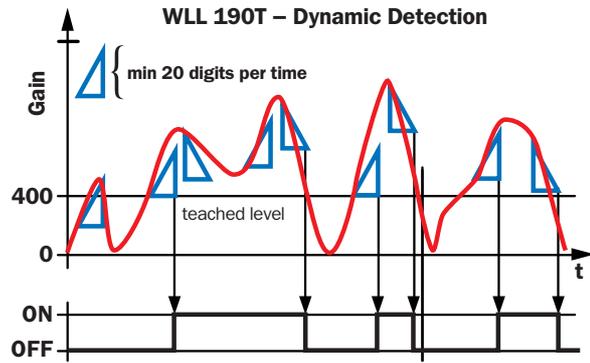


General Information

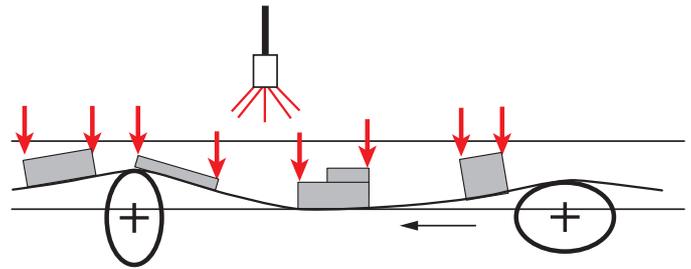
- Teach-in only active in SET Mode. Ideal protection against accidental modification.
- Manual adjustment, digit-by-digit in RUN Mode, the taught-in threshold levels can be altered manually later in single steps (DIGIT by DIGIT) with the ◀ ▶ STEP buttons ◀ Lower level, ▶ Higher level.
- ☐ ENTER button inactive in SET Mode.



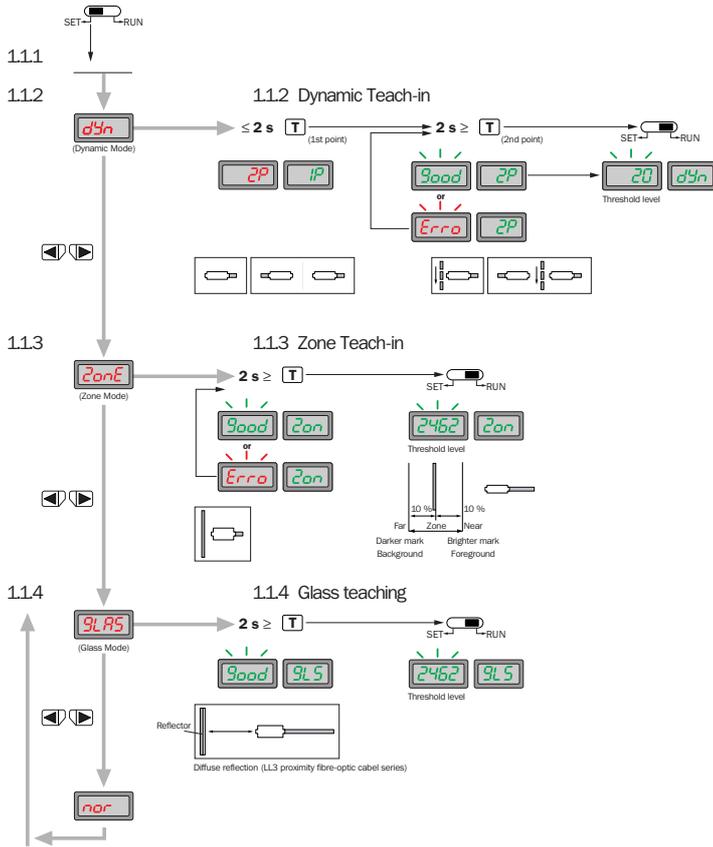
1.1.2 Dynamic Teach-in



- Setting/resetting of switching out-put (only) depending on steep positive/negative edge of an object during trigger time (detecting of edges of objects).  
**Switching level:** the output is continuously set by the first intense rising object-edge. The output is reset by the first intense decreasing object-edge.  
 Typical applications: the scanning distance of the parts are variable due to ripples, or due to unbalanced conveyor belts.



1. Adjustment of switching thresholds by Teach-in and manual alteration of switching threshold

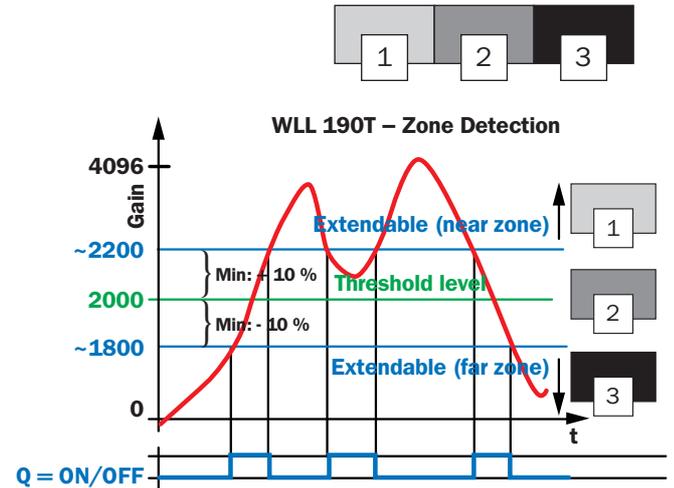


1.1.3 Zone Teach-in

The object (2) will be taught-in as switching point with a bandwidth of +/- 10 %. Lower signals and higher signals (digits) are automatically suppressed.

These fix bandwidth can be extended manually, separately for the lower level (far) and higher level (near), see 1.3: manual threshold level in Zone Mode, too.

**Ideal for mark detection**, detection of no. 2 with variable bandwidth for example, or background and foreground suppression.



1.1.4 Glass teaching

**Optimised for detection of transparent objects.**

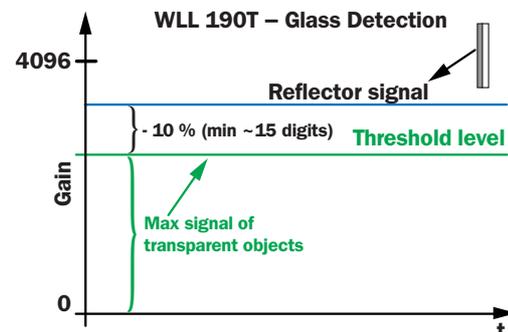
The high reception level of a reflector is taught-in. The switching level is automatically set -10 % below it.

**Essential:** the max. received value should be below 4.000 digits (saturation). Adjust reflector size, -type oder -distance.

Safeness of detection: already objects with low damping of >10 %, as transparent objects like glass or foils, or small objects will be detected. Hysteresis: 10 % of set switching level, min. 15 digits.

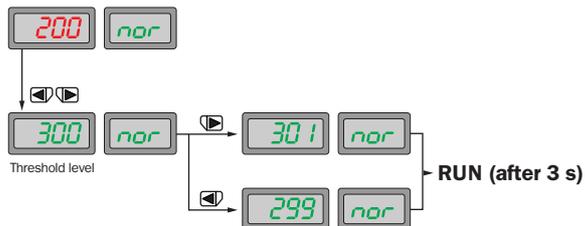
Proximity-fibres: be sure, there are no effects by direct surface reflections from the object itself at close range! Enlarge the distance eventually.

General recommendation: test and check each application for limiting conditions such as saturation by reflector, direct reflections of target, too little transmission of objects etc.

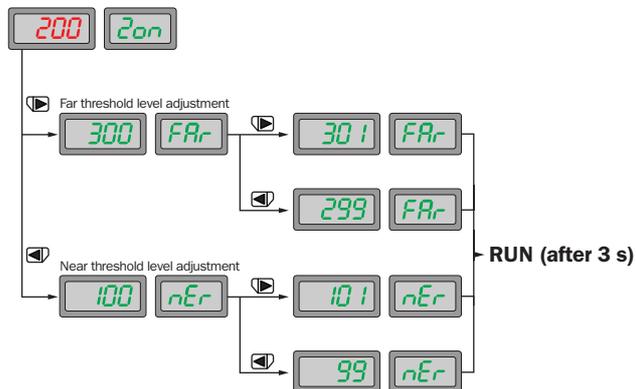


1.2 and 1.3 manual adaptation and alteration of threshold level

1.2 Manual threshold level – Normal Mode



1.3 Manual threshold level – Zone Mode



1. Taught-in switching threshold

After 1.1. Teach-in of switching thresholds:

1.2. Manual alteration of switching thresholds in normal mode, WLL 190T in RUN Mode (sensor operation), no software functions called up.

Only the function buttons ◀ ▶ are required for manual alteration (adaptation) of taught-in switching thresholds (only active in RUN Mode).

1. Taught-in switching threshold

After 1.1. Teach-in of switching thresholds:

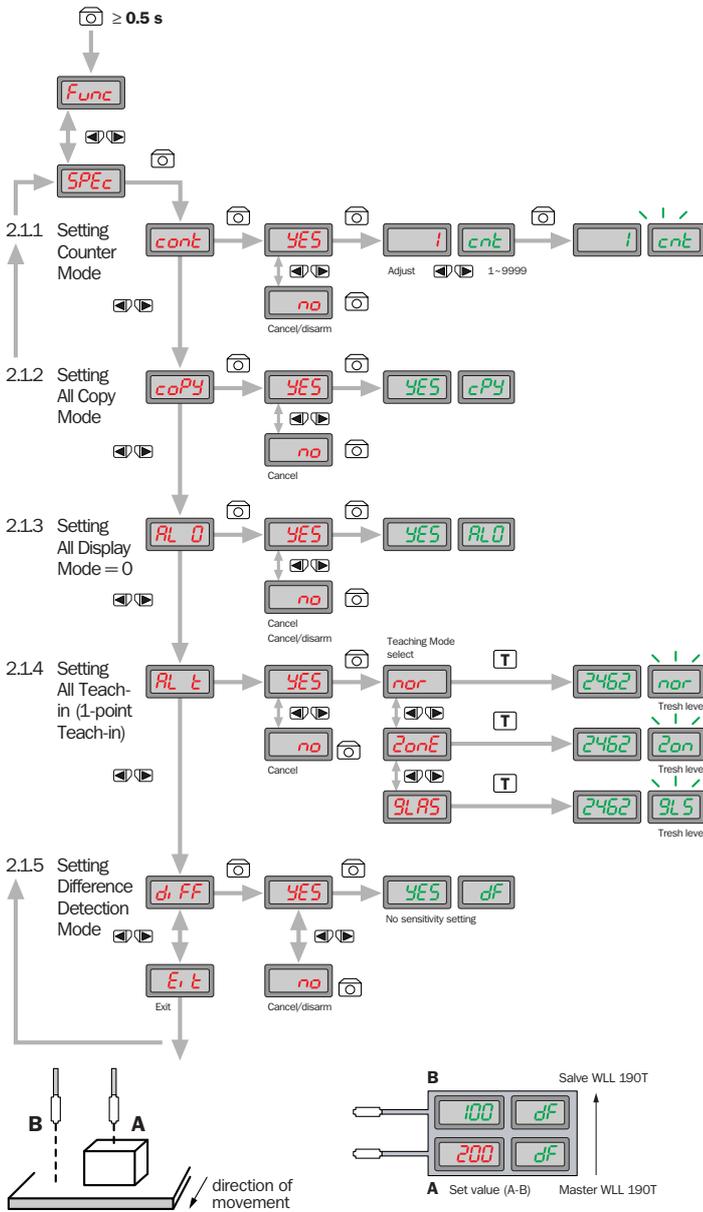
1.3. Manual alteration of switching thresholds (only for Zone Mode). WLL 190T operates in RUN Mode (sensor operation), no software functions called up.

1.3.1. Changing the upper switching threshold

Only the function buttons ◀ ▶ are required for manual alteration (adaptation) of taught-in switching thresholds (only active in RUN Mode).

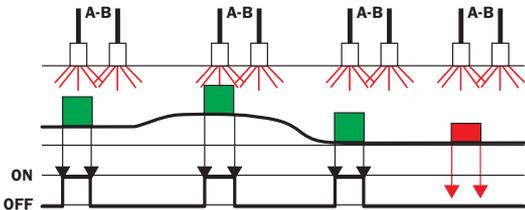
1.3.1. Changing the lower switching threshold

2. Selection of system functions

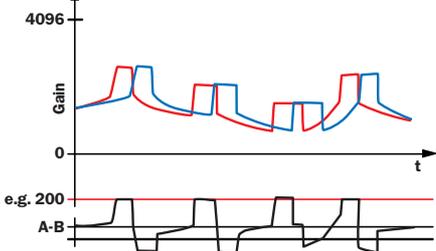


WLL 190T – Difference Detection Mode

1000-800=200 / 1100-900=200 / 900-700=200 / 800-700=100



WLL 190T – Difference Detection Mode



2.1 Special functions (SPECials)

ENTER button

Functions = operating modes

SPECials = special functions

Please note.

2.1.1 also for solo WLL 190T, no Bus necessary.

2.1.2 ... 2.1.5 only active with software Bus (Bus plug contacted).

2.1.1 Counter = pre-selection of number of impulses. Output active (impulse) when defined number is reached. Impulse counter is internally restarted again on next object. The total sums are further summed and shown in display (max. 9999).

2.1.2 to 2.1.5 Bus Software, only available with contacted Bus plug

2.1.2 coPY = Copier Mode: all programmed settings are copied 1:1 to all Bus-contacted WLL 190Ts.

2.1.3 ALL NO = all displays set to “Auto-0-value”: the currently displayed reception level is individually set to “0” for each device.

Visual display of alterations/drifts (changes in material, contamination, etc.). (See also 3.1 Solo function).

2.1.4 All Teach-in: all WLL 190T connected via INTERNAL Bus (Bus plug) learn their particular individual switching threshold simultaneously with a single Teach-in.

2.1.5 diFF Difference detection Online linking of second neighbouring WLL 190T. Calculation operation: always A - B. “A” is always the master. This is programmed. “B” is always the slave. Teaching of switching thresholds (calculated value A-B) simultaneously by A.

Activation:

1. Selection of the software function,
2. SET and teaching for A + B by [T] button on sensor A.

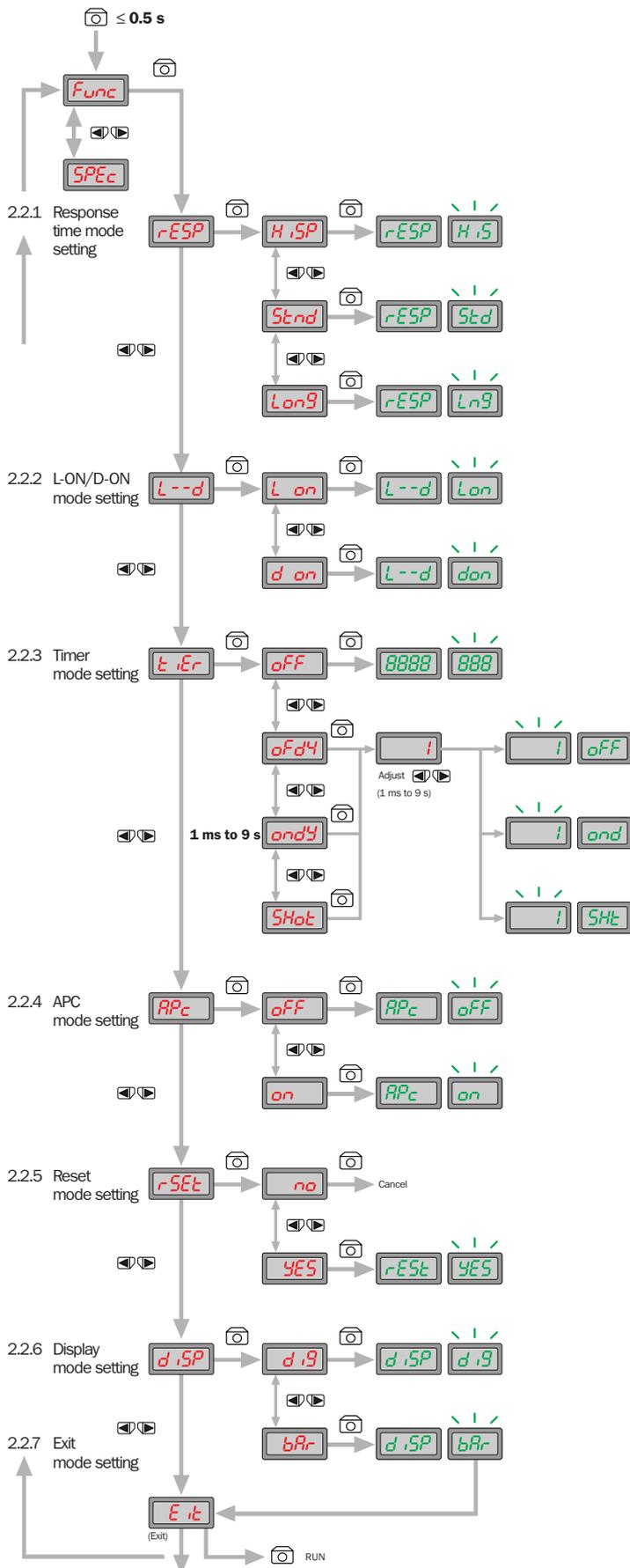
Deactivation:

1. Selection of software function diFF,
2. Confirmation no diFF by [⏏] button.

Please note, no deactivation with RESET. Applications: sorting tasks, quality checks, detection of parts even with distance fluctuations (height impact).

Exit: Switch from Programming Mode to RUN Mode (sensor operation) via [⏏] button.

2. Selection of system functions



2.2 Function Mode: Selection of operating modes

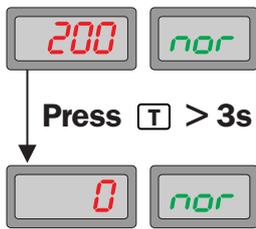
Selection, setting and saving of basic WLL 190T functions. Individually and for every device, Bus has no effect.

Info on programming:

The function is selected with ◀ ▶. The selected function MUST be confirmed with ☐.

- 2.2.1 Response time (rESP)
  - High SPeed – 1.25 kHz: shortest response time (0.4 ms), reduced ranges
  - Standard – 500/s: standard setting, response time 1 ms, standard ranges
  - long – 125/s: maximum ranges, response time 4 ms.
- 2.2.2 Switching type (L--d), Select switching type L.ON or D.ON
  - L on: light-switching (L.ON)
  - d on: dark-switching (D.ON)
- 2.2.3 Time increments (t iEr) for timer, option of various time increments, variable time range.
  - oFF (no time increment activated)
  - oFdY (OFF-Delay)
  - ondY (ON-Delay)
  - Shot (One-Shot)
  - Time range: selectable in 1 ms increments; from 1 ms ... 9 s (◀ ▶).
- 2.2.4 APC Automatic Power Control (APc)
  - Transmission power is continuously measured by an internal receiver and held at a constant level. This compensates for ageing, temperature, etc.: long-term switching point stability, ideal for applications with reduced functional reserve.
  - Please note: lifetime of transmitter LED is reduced.
- 2.2.5 Reset (rSEt)
  - All operating modes are reset to the standard setting “Ex-works delivery state”.
  - Ex-works delivery state:
    - Response time: Standard = 1 ms
    - Switching type: L.ON (hellschaltend)
    - Timer: Aus
    - APC: inactive (Automatic Power Control)
    - Display: digital display
    - Counter: Off
    - Sensitivity: max. (switch. threshold >~ 15 DIGITs)
- 2.2.6 Display type (diSP): digital display of reception signal in RUN Mode: selection from 3 types:
  - d i9: digital display
  - bAr: bar graph (bar display from I to IIII).
  - Please note: inactive in Counter Mode.
  - oFF: display inactive in RUN Mode
- 2.2.7 Exit: Change from Programming Mode to RUN Mode (sensor operation).
  - Automatic: if no programming button used for 10 s.
  - In Special Mode (2.1) or Function Mode (2.2): directly back to RUN Mode from any option, if ☐ pressed for > 3 seconds.

## 3. Useful extra functions



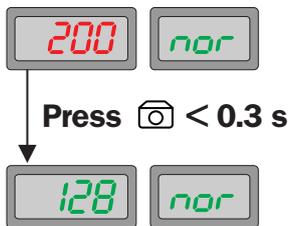
## 3.1 0-point shift of the receiver display (single device).

The current reception level (red display), here "200", is shown as the 0-reference. New display "0". From "-XXXX" ... "+XXXX". Benefits: "Reference marks" or deviations are shown visually (+ or -).

See also 2.1.3 "All zero reset".

Activation: > 3 s [T]

Inactivation: > 3 s [◀] and [T]

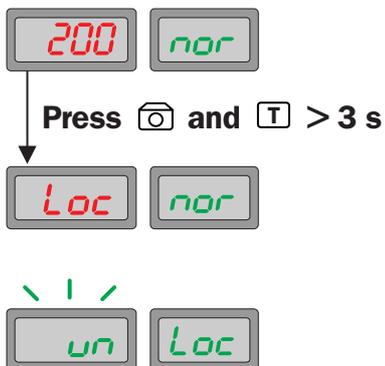


## 3.2 Monitoring

Display of all (programmed) device functions and settings.

Activation: press [⊞] < 0.3 s. All active defined settings are displayed one after another (backwards and forwards) with [◀] [▶]. Ideal for service and tests.

Back to RUN Mode: automatic when function buttons not used for > 3 s.



## 3.3 Tamper prevention

Locking user elements.

All WLL 190T user elements are simultaneously locked for tamper prevention. The user elements are released again with the same "secret combination".

Locking user elements.

Press [⊞] and [T] > 3 s.

Releasing user elements: same function.

# The WLL 190T System-bus – modules and accessories

WLL 190T already has the Bus-system integrated within it.

It is activated via a coded plug. There are no separate Master or Slave units needed, or programming tools of any kind. Two optional Bus-systems with staggered features can be chosen for each individual Bus plug.

## WLL 190T Solo – the Highlights

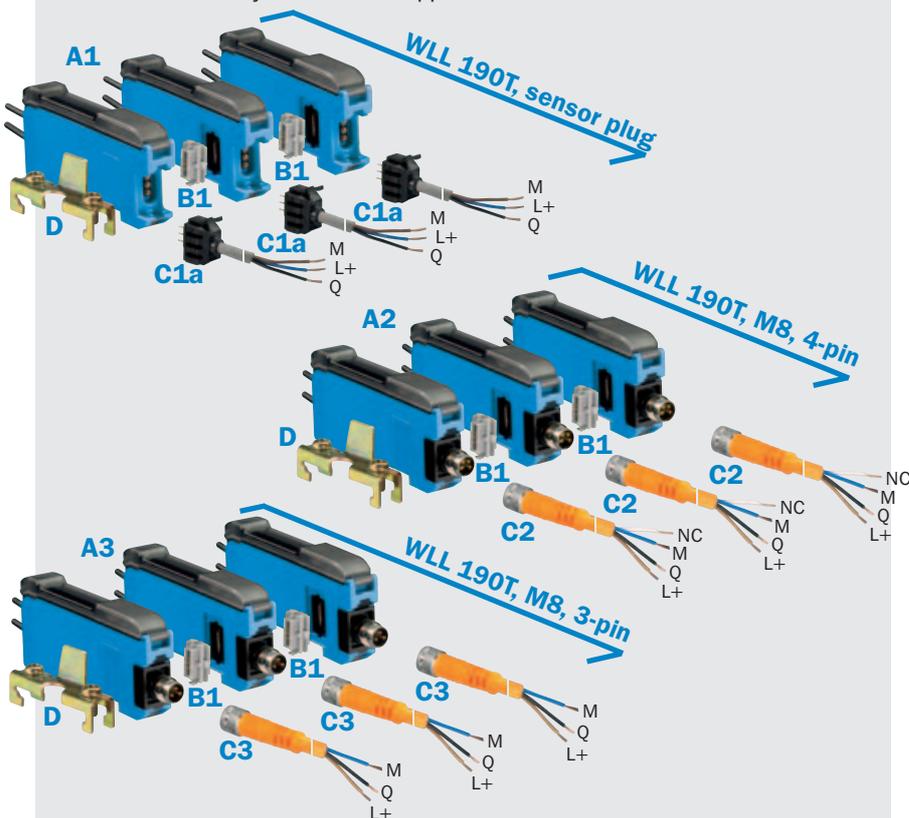
The WLL 190T “Solo Unit” already offers significantly enhanced system data:

- **Much greater ranges (~2 ... 3 x WLL 170T)**  
Proximity system max. 1,300 mm (5,000 mm); Through-beam system max. 300 mm
- **Simple, variable adjustment of the sensitivity setting**
- **ONE UNIT** for all requirements, due to freely selectable function settings
- **Monitoring**, i.e. numeric displays provide information and offer menu-guided programming
- **ONE UNIT** for all requirements, due to APC – Automatic Power Control. The constant transmission of data provides stabilised switching threshold levels
- **Enclosure rating IP 66** as a single stand-alone WLL 190T unit



## The WLL 190T Software-Bus provided by a 3-pin Bus plug

- Access to further software functions
- Automatic 8-way interference suppression



The Software-Bus components (optionally up to 16 x WLL 190T units)  
 A: Sensor A1 or A2 or A3. We recommend that A1, A2 and A3 are not mixed together in a general structured arrangement.  
 B: Bus plug, 3-pin (grey), only B1  
 C: Cable receptacle only C1, C2 or C3  
 D: End pieces, two

## Selection of WLL 190 Bus-components

### A WLL 190T Connection technology

<b>A1</b>	Sensor type WLL 190T, sensor plugs Accessories: C1a and C1b
	WLL 190T-P030, PNP, LED red, order no. 6 026 572
	WLL 190T-N030, NPN, LED red, order no. 6 026 573
	WLL 190T-P090, PNP, LED green, order no. 6 026 585
	WLL 190T-N090, NPN, LED green, order no. 6 026 586

<b>A2</b>	Sensor type WLL 190T, M8, 4-pin Accessories: C2
	WLL 190T-P430, PNP, LED red, order no. 6 026 574
	WLL 190T-N430, NPN, LED red, order no. 6 026 575
	WLL 190T-P490, PNP, LED green, order no. 6 026 587
	WLL 190T-N490, NPN, LED green, order no. 6 026 588

<b>A3</b>	Sensor type WLL 190T, M8, 3-pin Accessories: C3
	WLL 190T-P330, PNP, LED red, order no. 6 026 576
	WLL 190T-N330, NPN, LED red, order no. 6 026 577
	WLL 190T-P390, PNP, LED green, order no. 6 026 589
	WLL 190T-N390, NPN, LED green, order no. 6 026 590

### B Bus plug

<b>B1</b>	Bus plug, 3-pin, only for Software Bus
	STE-WLL190-03P order no. 6 026 581
<b>B2</b>	Bus plug, 5-pin, only for Hardware Bus
	STE-WLL190-05P *) order no. 6 026 580

\*) included in the “scope of supply” of cable receptacles C1b

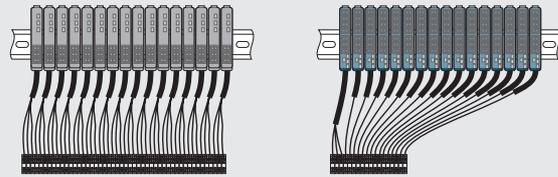


### “Wire-Saving” for a significant reduction in wiring due to the WLL 190T Hardware-Bus system

- The  $V_S$  voltage supply is only fed by a 3-core connecting cable (Master).
- Additional units (up to 15 x WLL 190T units) are connected via a single-core connecting cable (Slaves). This means only the Q output circuit is connected.
- All software options are also available.

**Example of wire reduction:**

16 conventionally wired photoelectric switches require 48 terminal connections.  
 16 wired WLL 190T units only need 18 terminal connections.  
**Savings: 30 terminals and associated wiring.**



## WLL 190T Accessories

### C Cable receptacles

**C1a** For A1:  $U_V + Q$ , 3-core cable, WLL 190T sensor plug

DOL-LL1903-02M, cable length 2 m, order no. 6 026 578

DOL-LL1903-05M, cable length 5 m, order no. 6 028 379

**C1b** Für A1: Q, single-core, WLL 190T sensor plug (only Wire-Saving)

DOL-LL1901-02M\*\*), cable length 2 m, order no. 6 026 579

DOL-LL1901-05M\*\*), cable length 5 m, order no. 6 028 380

**C2** For A2:  $U_V + Q$ , 4-core, M8, 4-pin

DOL-0804-G02M, cable length 2 m, order no. 6 009 870

DOL-0804-G05M, cable length 5 m, order no. 6 009 872

**C3** For A3:  $U_V + Q$ , 3-core, M8, 3-pin

DOL-0803-G02M, cable length 2 m, order no. 6 010 785

DOL-0803-G05M, cable length 5 m, order no. 6 022 009

### D End pieces

**D** End pieces for mounting profile rail assembly

BF-EB01-W190 order no. 5 313 011

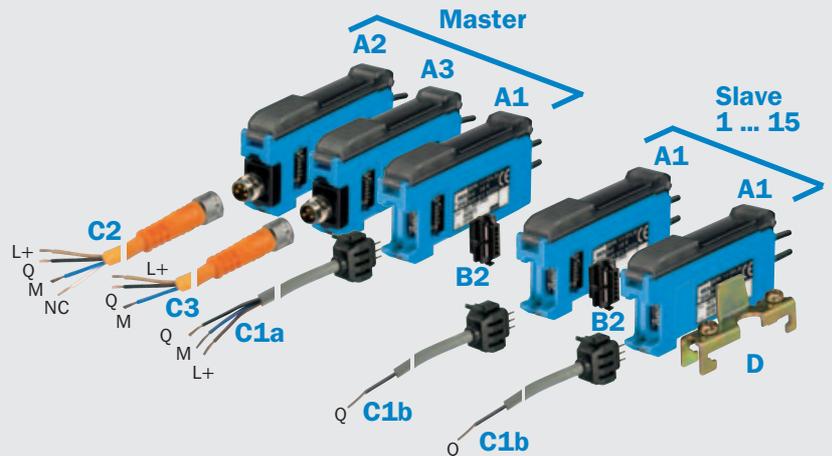
**Please note:**

- Do not mix 3-pin Bus plug with 5-pin Bus-plugs
- Do not connect WLL 190T Bus components whilst electrically powered

\*\*) included in the “scope of supply”: 5-pin Bus plug (B2)

## WLL 190T Hardware-Bus by means of 5-pin Bus plug.

- “Wire-Saving” – considerable reduction in cost and effort in electrical wiring.
- All options of the Software-Bus available..



The Hardware-Bus components

A: Master sensor, max. one sensor, either A1 or A2 or A3.

Cable receptacles C1a, C2 or C3.

Slave sensors, max. 15, only A1 with C1b cable receptacles.

B: Bus plug, 5-pin (black), only B2

D: End pieces, two

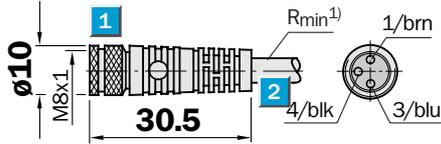
Dimensional drawings and order informations

SENSICK screw-in system M8, 3-pin/4-pin, enclosure rating IP 67

Female connector M8, 3-pin, straight

Cable diameter 5 mm, 3 x 0.34 mm<sup>2</sup>, sheath PVC

Type	Order no.	Cable length
DOL-0803-G02M	6 010 785	2 m
DOL-0803-G05M	6 022 009	5 m
DOL-0803-G10M	6 022 011	10 m

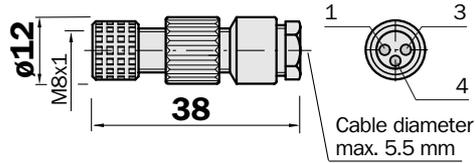


- 1 With screw locking
- 2 Connecting cable Ø 5 mm

<sup>1)</sup> Minimum bend radius in dynamic use  
R<sub>min</sub> = 20 x cable diameter

Female connector M8, 3-pin, straight

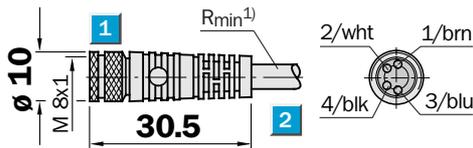
Type	Order no.	Cable length
DOS-0803-G	7 902 077	Cutable to size for cable Ø 3.5 – 5 mm with screw locking



Female connector M8, 4-pin, straight. Contacts as defined by EN 50044

Cable diameter 5 mm, 4 x 0.25 mm<sup>2</sup>, sheath PVC

Type	Order no.	Cable length
DOL-0804-G02M	6 009 870	2 m
DOL-0804-G05M	6 009 872	5 m
DOL-0804-G10M	6 010 754	10 m

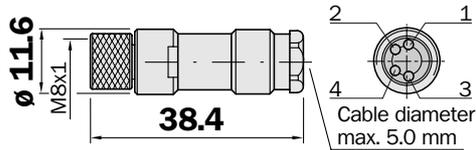


- 1 With screw locking
- 2 Connecting cable Ø 5 mm

<sup>1)</sup> Minimum bend radius in dynamic use  
R<sub>min</sub> = 20 x cable diameter

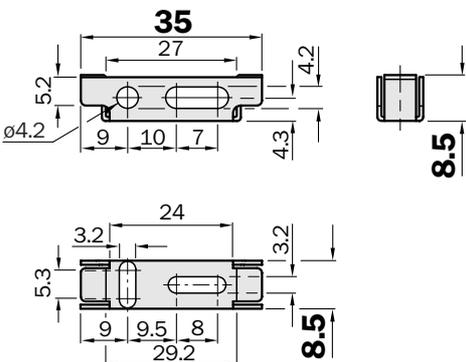
Female connector M8, 4-pin, straight

Type	Order no.	Cable length
DOS-0804-G	6 009 974	Cutable to size for cable Ø 3.5 – 5 mm with screw locking



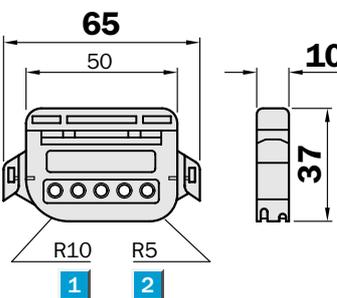
Mounting bracket WLL 170T\*

Type	Order no.
BEF-WLL 170	5 306 574



Cutter FC\* for fibre-optic cables

Type	Order no.
FC	5 304 141



- 1 Template for bending radius R 10 mm, for sensing tip Ø 1.5 mm and Ø 2.5 mm
- 2 Bending radius R 5 mm

\* Cutter is included with delivery of LL 3. See operating instructions.

\* Included with delivery of WLL 170(T) and WLL 190T

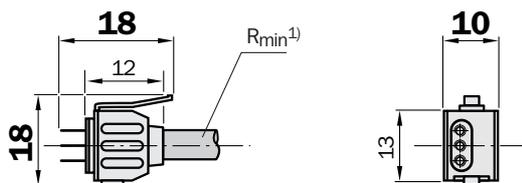
Dimensional drawings and order informations

**Connector WLL 190T, 3-wire**

**Cable diameter 3.8 mm, 3 x 0.14 mm<sup>2</sup>, sheath PVC**

**(WLL 190T – single unit or master cable for wire saving)**

Type	Order no.	Cable length
DOL-LL1903-02M	6 026 578	2 m
DOL-LL1903-05M	6 028 379	5 m



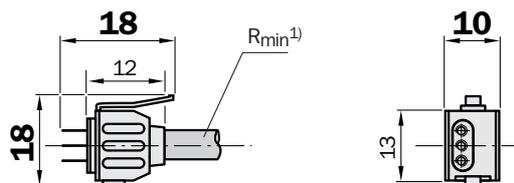
- 1) Minimum bend radius in dynamic use  
 $R_{min} = 20 \times \text{cable diameter}$   
 brn  $\geq L+$   
 blu  $\geq M$   
 blk  $\geq Q$

**Connector WLL 190T, 1-wire**

**Cable diameter 2.8 mm, 1 x 0.14 mm<sup>2</sup>, sheath PVC**

**(WLL 190T – Slaves cable for wire saving)**

Type	Order no.	Cable length
DOL-LL1901-02M	6 026 579	2 m
DOL-LL1901-05M	6 028 380	5 m

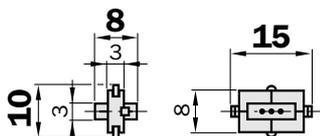


- 1) Minimum bend radius in dynamic use  
 $R_{min} = 20 \times \text{cable diameter}$   
 blk  $\geq Q$

**Bus plug, 3-pin for WLL 190T**

**Software-Bus**

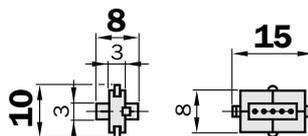
Type	Order no.
STE-WLL190-03P	6 026 581



**Bus plug, 5-pin for WLL 190T 2)**

**Hardware bus for wire saving**

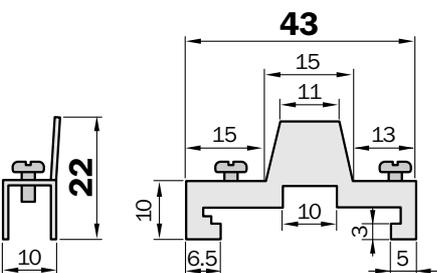
Type	Order no.
STE-WLL190-05P	6 026 580



- 2) Included with delivery of DOL-LL1901-02M and DOL-LL1901-05M

**Endcap for block installation WLL 190T on DIN-RAIL mounting 3)**

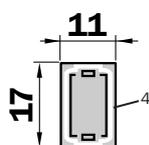
Type	Order no.
BF-EB01-W190	5 313 011



- 3) 2 pieces included with delivery of WLL 190T

**Protecting cap for WLL 190T 3)**

Type	Order no.
BF-WLL190-01	5 311 592



- 3) 2 pieces included with delivery of WLL 190T  
 4) Double sided adhesive tape. Remove protective foil for protection class IP 66

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E-Mail sales@sick.com.au

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