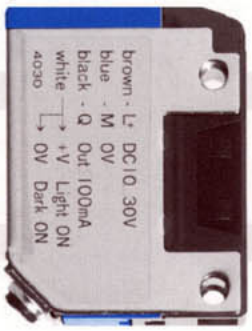
# W 170 Series
# Photoelectric Switches

**WS/WE 170** — **7 m**

**WL 170** — **0.01 to 2.5 m**
**0.1 to 0.5 m**

**WT 170** — **10 to 400 mm**
**10 to 90 mm**




Complete »miniature photoelectric switch family« in robust, stainless steel/plastic enclosure.

Through-beam photoelectric switch with high range; slotted masks and polarisation filter attachments available as accessories.

Photoelectric reflex switch with polarisation filter for trouble-free detection of reflective objects.

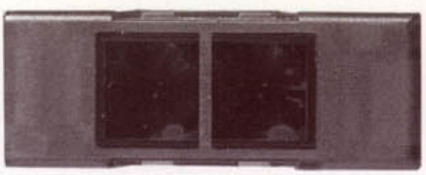
Photoelectric reflex switch with enhanced sensitivity for detection of transparent or small objects.

Photoelectric proximity switch, »energy type« with high scanning range.

Photoelectric proximity switch, »focused optics« type, with enhanced sensitivity and background suppression.

All versions are equipped with a visible red-light transmitter LED.

Optional connecting cables or connector socket M 8, 4-pole.



Precision optical system for high switching accuracy.

PNP or NPN switching output 100 mA. Protected against short-circuits, overload and reverse polarity. With standard switch-on period.

Optional switching output Q or $\overline{Q}$ with control line.

All versions with UL approval.


User-friendly sensitivity indicator.

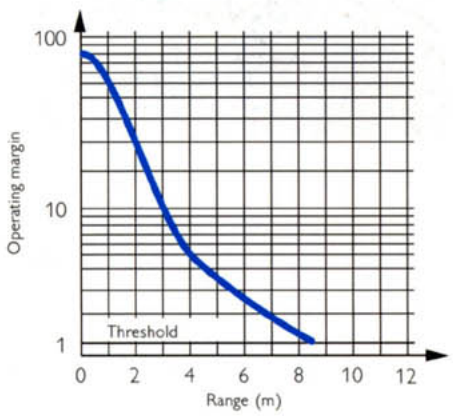
SICK
optic
electronic

## Scanning Range

**7 m**

### Features:

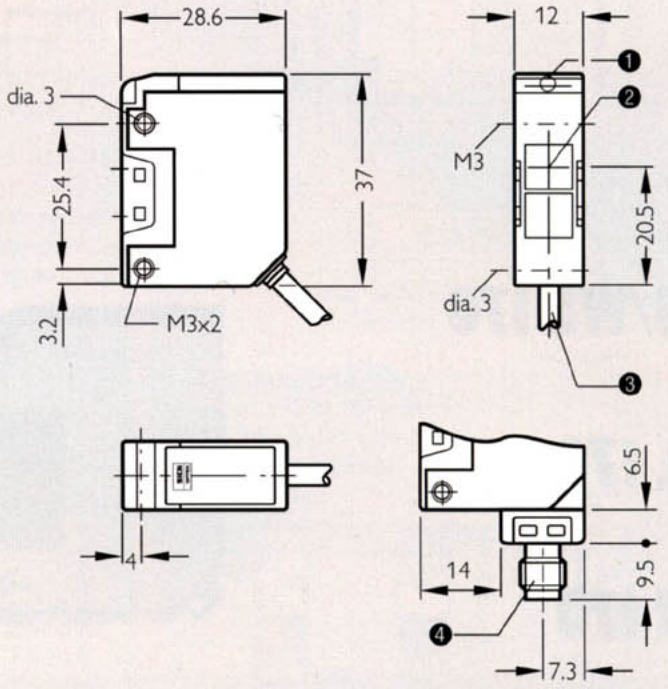
- Robust stainless steel/plastic housing
- Switching output protected against short-circuits and overload
- Red-light transmitter LED
- Reverse polarity protected
- Easy to adjust (with red receiver display)
- Test input for device and system test
- Light/dark setting – switchover via control line
- UL approval
- Connecting cable or connector socket M 8, 4-pole
- Polarisation filter attachments (accessories) for reducing mutual interference when using more than one WS/WE 170 unit




## WS/WE 170

**WS 170-D 132**
**WE 170-P/N 132**

Dimensions in mm



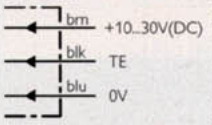

**WS 170-D 430**
**WE 170-P/N 430**

❶ Red reception display
❷ Transmission axis (WS transmitter)/receiver axis (WE receiver)
❸ Connecting lead
❹ Connector socket M 8, 4-pole

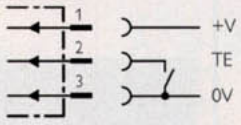
See accessories for line sockets and cable couplers.
Retaining bracket in scope of supply, see accessories.
Slotted mask BL-170-10 and polarisation filter attachments BL-170 pole-f., see accessories.

## Connection diagram

**WS 170 -D 132**

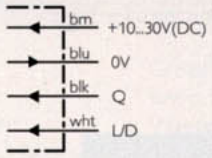



**WS 170 -D 430**

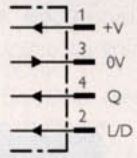



| brn | blu | blk | wht |
|---|---|---|---|
| brown | blue | black | white |

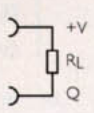
**WE 170 -P/N 132**



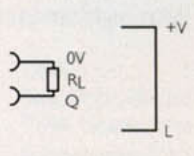

**WE 170 -P/N 430**




**N**




**P**




L/D = control line

light switching
dark switching

# WS/WE 170
# Through-beam photoelectric switch

| Type WS/WE 170 | Transmitter WS 170 | Receiver WE 170-N -P | |
|---|---|---|---|
| **Part-No.** | see table | | |
| **Operating range (RW)** | 0 to 7 m | | |
| Light spot diameter | approx. 440 mm at a distance of 7 m | | |
| **Light transmitter** | LED, red-light | – | |
| **Supply voltage $V_S$** [1] | 10 to 30 V DC | | |
| Current consumption (no load) | ≦ 20 mA | ≦ 30 mA | |
| Max. residual ripple [2] | ± 10 % | | |
| Light receiver switching type [3] | – | light/dark switchover via control lead | |
| **Switching outputs** open collector | | NPN | PNP |
| Signal voltage HIGH | | approx. $V_S$ | $V_S$ – (≦ 1.5 V) |
| Signal voltage LOW | | ≦ 1.5 V | approx. 0 V |
| Max. output current | ≦ 100 mA | | |
| Test input $T_E$ | Transmitter cut-off 0 V | | |
| Response time; switching frequency | | 1 ms max.; 500/s min. | |
| **VDE protection class** | III | | |
| **Type of protection (IEC 144)** | IP 67 | | |
| Protection circuits [4] | A, B | A, B, C, D | |
| Ambient operating temperature $T_U$ | – 25 to + 55 °C | | |
| Storage temperature $T_L$ | – 40 to + 70 °C | | |
| Connecting cable | 2 m, 3 x 0.2 mm², ø 4.0 mm | 2 m, 4 x 0.2 mm², ø 4.0 mm | |
| Connector socket | M 8, 4-pole | | |
| Weight | 25 g with connector socket, 66 g with 2 m lead | | |

1) Limit values
2) Must not exceed or fall below $V_S$ tolerances
3) Control line open
NPN: light / PNP: dark switching
Control line + V: light /
Control line 0 V: dark switching
4) A = $V_S$ connections non-interchangeable
B = Inputs/outputs non-interchangeable
C = Spurious pulse suppression
D = Outputs short-circuit and overcurrent-protected

## Selection table

| | Switching output | |
|---|---|---|
| | NPN | PNP |
| with connecting cable 2 m | | |
| Type | WS/WE 170-N 132 | WS/WE 170-P 132 |
| Part-No. | 6 010 183 | 6 010 181 |
| with connector socket M 8-4 pole | | |
| Type | WS/WE 170-N 430 | WS/WE 170-P 430 |
| Part-No. | 6 010 184 | 6 010 182 |

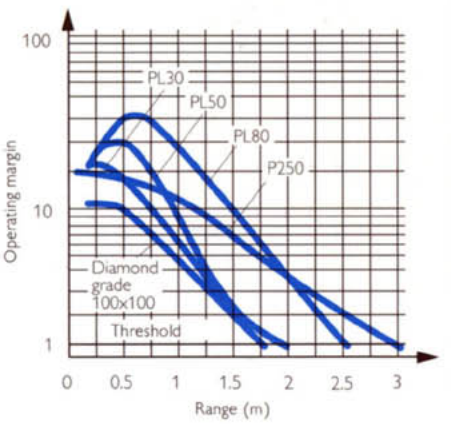
**Important:** Part-No. includes transmitter and receiver!

## Scanning Range

**0.01 to 2.5 m**

## Features:

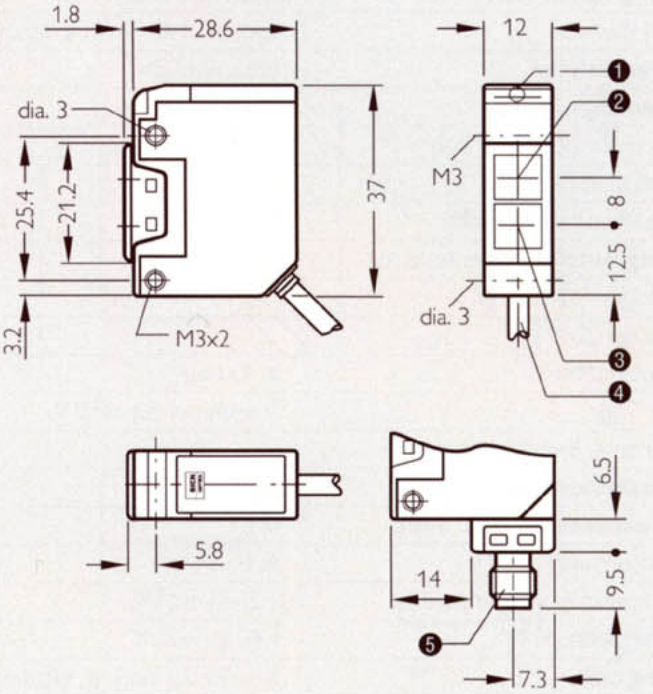
- Polarisation filter ensures that objects with reflective surfaces are also detected
- Robust stainless steel/plastic housing
- Switching output protected against short-circuits and overload
- Red-light transmitter LED
- Non-interchangeable
- Easy to adjust (with red receiver display)
- Light/dark setting – switchover via control line
- UL approval
- Connecting cable or connector socket M 8, 4-pole




## WL 170

**WL 170-P/N 132**

Dimensions in mm







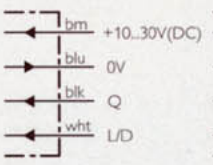
**WL 170-P/N 430**

❶ Red reception display
❷ Reception axis
❸ Transmission axis
❹ Connecting cable
❺ Connector socked M 8, 4-pole

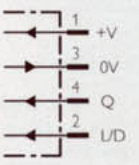
See accessories for line sockets and cable couplers.
Retaining bracket in scope of supply, see accessories.

## Connection diagram

**WL 170 -P/N 132**

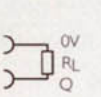



**WL 170 -P/N 430**




**N**


**P**





L/D = control line

light switching

dark switching

| brn | blu | blk | wht |
|---|---|---|---|
| brown | blue | black | white |

# WL 170
# Photoelectric reflex switch with polarisation filter

| Type WL 170 | -N | -P |
|---|---|---|
| **Part-No.** | see table | |
| Typical max. scanning range | 0.01 to 3.1 m | |
| **Operating range (RW) with reflector P 250** | 0.01 to 2.5 m | |
| Light spot diameter | approx. 200 mm at distance of 2.5 m | |
| **Light transmitter** | LED, visible red light | |
| **Supply voltage $V_S$** [1] | 10 to 30 V DC | |
| Current consumption (no load) | ≦ 30 mA | |
| Max. residual ripple [2] | ± 10 % | |
| Light receiver switching type [3] | Light/dark switchover via control lead | |
| Polarisation filter | Yes | |
| **Switching outputs,** open collector | NPN | PNP |
| Signal voltage HIGH | approx. $V_S$ | $V_S$ – (≦ 1.5 V) |
| Signal voltage LOW | ≦ 1.5 V | approx. 0 V |
| Max. output current | ≦ 100 mA | |
| Response time; switching frequency | 0.7 ms max.; 700/s min. | |
| **VDE Protection class** | III | |
| **Type of protection (IEC 144)** | IP 67 | |
| Protection circuits [4] | A, B, C, D | |
| Ambient operating temperature $T_U$ | – 25 to + 55 °C | |
| Storage temperature $T_L$ | – 40 to + 70 °C | |
| Connecting lead | 2 m, 4 x 0.2 mm², ø 4.0 mm | |
| Connector socket | M 8-4 pole | |
| Weight | 25 g with connector socket, 66 g with 2 m lead | |

1) Limit values
2) Must not exceed or fall below $V_S$ tolerances
3) Control line open
NPN: light / PNP: dark switching
Control line + V: light /
Control line 0 V: dark switching
4) A = $V_S$ connections non-interchangeable
B = Inputs/outputs non-interchangeable
C = Spurious pulse suppression
D = Outputs short-circuit and overcurrent-protected

## Selection table

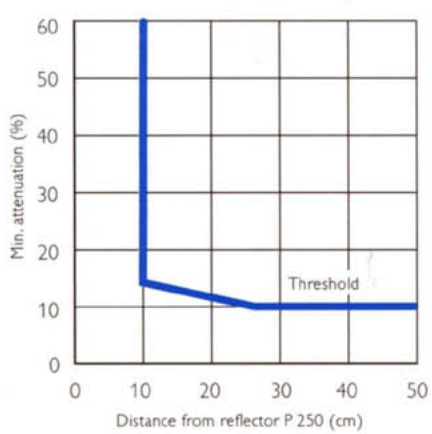
| | Switching output | |
|---|---|---|
| | NPN | PNP |
| with connecting cable 2 m | | |
| Type | WL 170-N 132 | WL 170-P 132 |
| Part-No. | 6 010 191 | 6 010 189 |
| with connector socket M 8-4 pole | | |
| Type | WL 170-N 430 | WL 170-P 430 |
| Part-No. | 6 010 192 | 6 010 190 |

## Scanning Range

**0.1 to 0.5 m**

### Features:

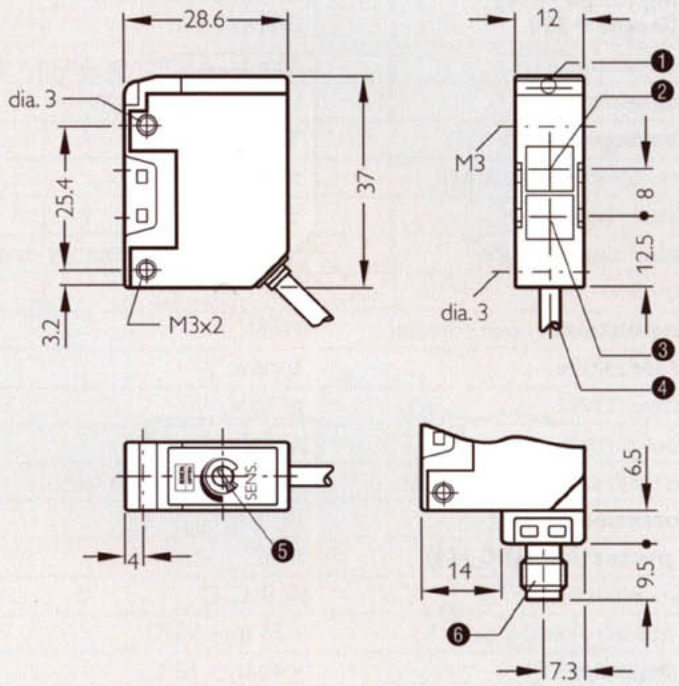
- Detection of glass, transparent foils or small parts (min. attenuation ≧ 20%)
- Focused optics system
- LED light transmitter, visible red light
- Variable sensitivity
- Robust stainless steel/plastic enclosure
- Switching output protected against short-circuits and overload
- Reverse polarity protected
- Easy to adjust (with red receiver display)
- Light/dark setting – switchover via control line
- UL approval
- Connecting cable or connector socket M 8, 4-pole




## WL 170

**WL 170 -P/N 122**

Dimensions in mm



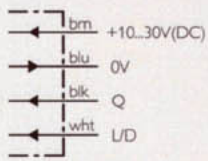

**WL 170 -P/N 420**

❶ Red reception display
❷ Reception axis
❸ Transmission axis
❹ Connecting cable
❺ Sensitivity selector (270°)
❻ Connector socket M 8, 4-pole

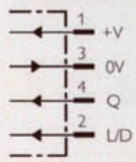
See accessories for line sockets and cable couplers.
Retaining bracket in scope of supply, see accessories.

## Connection diagram

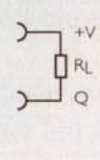
**WL 170 -P/N 122**



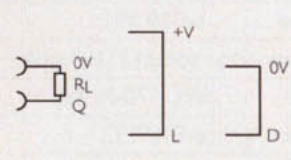

**WL 170 -P/N 420**




**N**




**P**




L/D = control line

light switching dark switching

| brn | blu | blk | wht |
|---|---|---|---|
| brown | blue | black | white |

# WL 170
# Photoelectric reflex switch for transparent objects

| Type WL 170 | -N | -P |
|---|---|---|
| **Part-No.** | see table | |
| Typical max. scanning range | 0.1 to 0.56 m | |
| **Operating range (RW) with reflector P 250** | 0.1 to 0.5 m | |
| Threshold | from 20% light attenuation onwards, variable | |
| Light spot diameter | approx. 30 mm at a distance of 0.5 m; approx. 5 mm in focal point at 90 mm | |
| **Light transmitter** | LED, visible red light | |
| **Supply voltage $V_S$** [1] | 10 to 30 V DC | |
| Current consumption (no load) | ≦ 30 mA | |
| Max. residual ripple [2] | ± 10 % | |
| Light receiver switching type [3] | Light/dark switchover via control lead | |
| Polarisation filter | No | |
| **Switching outputs,** open collector | NPN | PNP |
| Signal voltage HIGH | approx. $V_S$ | $V_S$ – (≦ 1.5 V) |
| Signal voltage LOW | ≦ 1.5 V | approx. 0 V |
| Max. output current | ≦ 100 mA | |
| Response time; switching frequency | 0.7 ms max.; 700/s min. | |
| **VDE protection class** | III | |
| **Type of protection (IEC 144)** | IP 67 | |
| Protection circuits [4] | A, B, C, D | |
| Ambient operating temperature $T_U$ | – 25 to + 55 °C | |
| Storage temperature $T_L$ | – 40 to + 70 °C | |
| Connecting lead | 2 m, 4 x 0.2 mm², ø 4.0 mm | |
| Connector socket | M 8-4 pole | |
| Weight | 25 g with connector socket, 66 g with 2 m lead | |

1) Limit values
2) Must not exceed or fall below $V_S$ tolerances
3) Control line open
NPN: light / PNP: dark switching
Control line + V: light /
Control line 0 V: dark switching
4) A = $V_S$ connections non-interchangeable
B = Inputs/outputs non-interchangeable
C = Spurious pulse suppression
D = Outputs short-circuit and overcurrent-protected

## Selection table

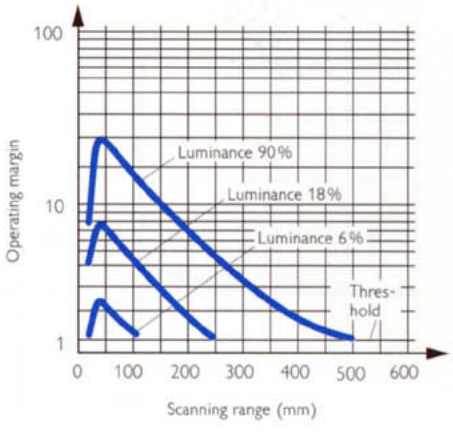
| | Switching output | |
|---|---|---|
| | NPN | PNP |
| with connecting cable 2 m | | |
| Type | WL 170-N 122 | WL 170-P 122 |
| Part-No. | 6 010 187 | 6 010 185 |
| with connector socket M 8-4 pole | | |
| Type | WL 170-N 420 | WL 170-P 420 |
| Part-No. | 6 010 188 | 6 010 186 |

## Scanning range

**10 to 400 mm**

### Features:

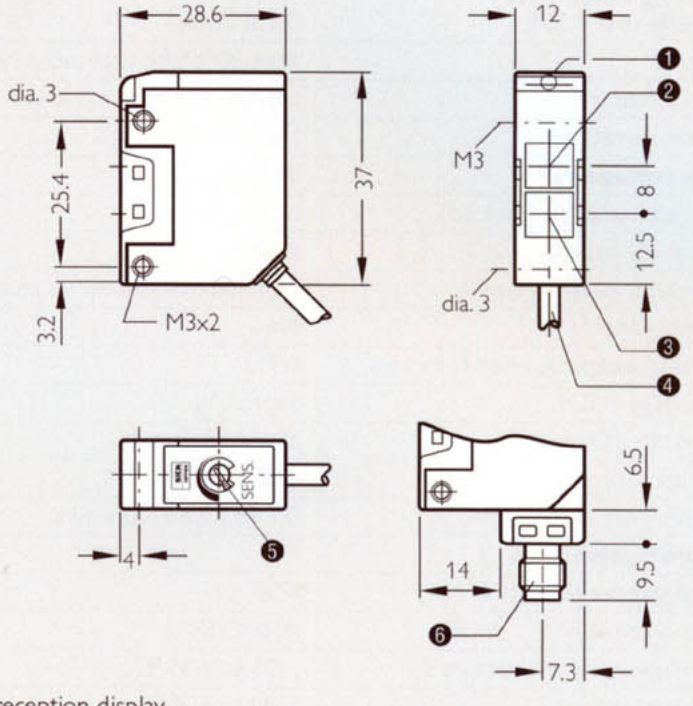
- Energetic sensor for standard applications
- Variable sensitivity (270°)
- LED light transmitter, visible red light
- Robust stainless steel/plastic enclosure
- Switching output protected against short-circuits and overload
- Reverse polarity protected
- Easy to adjust (with red receiver display)
- Light/dark setting – switchover via control line
- UL approval
- Connecting cable or connector socket M 8, 4-pole




## WT 170

**WT 170 -P/N 132**

Dimensions in mm



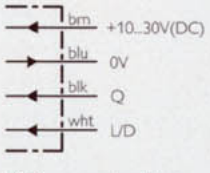

❶ Red reception display
❷ Reception axis
❸ Transmission axis
❹ Connecting lead
❺ Sensitivity selector (270°)
❻ Connector socket M 8, 4-pole

**WT 170 -P/N 430**

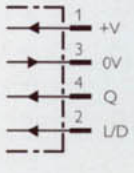
See accessories for line sockets and cable couplers.
Retaining bracket in scope of supply, see accessories

## Connection diagram

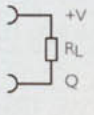
**WT 170 -P/N 132**



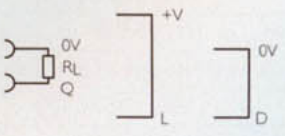

**WT 170 -P/N 430**




**N**




**P**




L/D = control line

light switching

dark switching

| brn | blu | blk | wht |
|---|---|---|---|
| brown | blue | black | white |

# WT 170
# Photoelectric proximity switch energy type

| Type WT 170 | -N | -P |
|---|---|---|
| **Part-No.** | see table | |
| **Scanning Range SR** | 10 ... 400 mm, based on standard white 90% luminance | |
| Light spot diameter | approx. 40 mm at a distance of 400 mm | |
| Beam angle | approx. 5° | |
| **Light transmitter** | LED, visible red light | |
| **Supply voltage $V_S$** [1] | 10 to 30 V DC | |
| Current consumption (no load) | ≦ 30 mA | |
| Max. residual ripple [2] | ± 10 % | |
| Light receiver switching type [3] | Light/dark switchover via control lead | |
| **Switching outputs** open collector | NPN | PNP |
| Signal voltage HIGH | approx. $V_S$ | $V_S$ – (≦ 1.5 V) |
| Signal voltage LOW | ≦ 1.5 V | approx. 0 V |
| Max. output current | ≦ 100 mA | |
| Response time; switching frequency | 0.7 ms max.; 700/s min. | |
| **VDE protection class** | III | |
| **Type of protection (IEC 144)** | IP 67 | |
| Protection circuits [4] | A, B, C, D | |
| Ambient operating temperature $T_U$ | – 25 to + 55 °C | |
| Storage temperature $T_L$ | – 40 to + 70 °C | |
| Connecting lead | 2 m, 4 x 0.2 mm², ø 4.0 mm | |
| Connector socket | M 8, 4 pole | |
| Weight | 25 g with connector socket, 66 g with 2 m lead | |

1) Limit values
2) Must not exceed or fall below $V_S$ tolerances
3) Control line open
NPN: light / PNP: dark switching
Control line + V: light /
Control line 0 V: dark switching
4) A = $V_S$ connections non-interchangeable
B = Inputs/outputs non-interchangeable
C = Spurious pulse suppression
D = Outputs short-circuit and overcurrent-protected

## Selection table

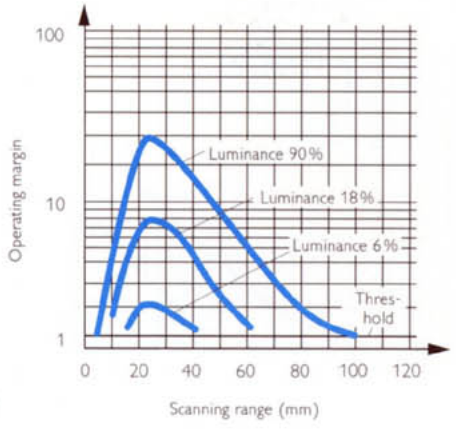
| | Switching output | |
|---|---|---|
| | NPN | PNP |
| with connecting cable 2 m | | |
| Type | WT 170-N 132 | WT 170-P 132 |
| Part-No. | 6 010 199 | 6 010 197 |
| with connector socket M 8, 4 pole | | |
| Type | WT 170-N 430 | WT 170-P 430 |
| Part-No. | 6 010 200 | 6 010 198 |

## Scanning range

**10 to 90 mm**

### Features:

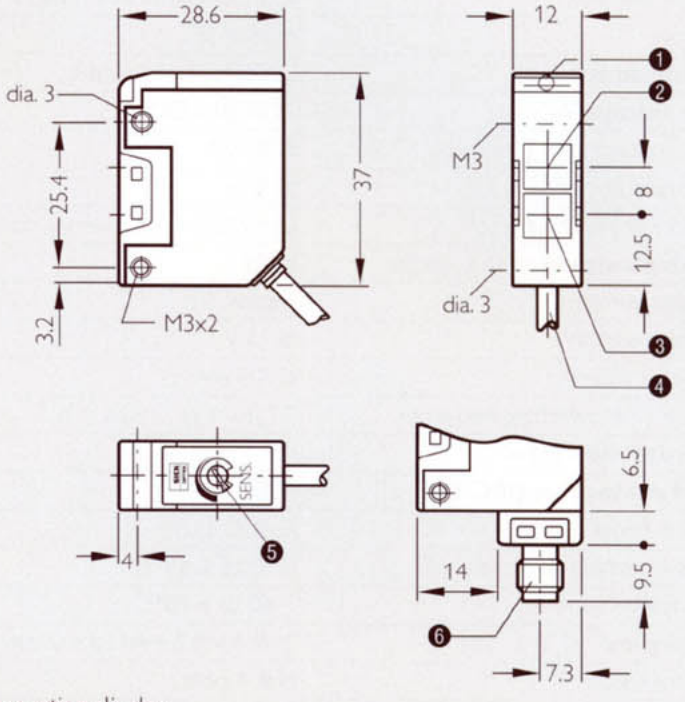
- Focused proximity switch with background suppression and high sensitivity
- Variable sensitivity (270°)
- LED light transmitter, visible red light
- Robust stainless steel/plastic enclosure
- Switching output protected against short-circuits and overload
- Reverse polarity protected
- Easy to adjust (with red receiver display
- Light/dark setting – switchover via control line
- UL approval
- Connecting cable or connector socket M 8, 4-pole




## WT 170

**WT 170 -P/N 112**

Dimensions in mm



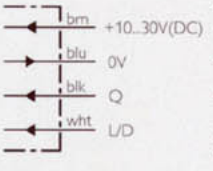

❶ Red reception display
❷ Reception axis
❸ Transmission axis
❹ Connecting lead
❺ Sensitivity selector (270°)
❻ Connector socket M 8, 4-pole

**WT 170 -P/N 410**

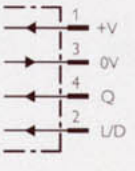
See accessories for line sockets and cable couplers.
Retaining bracket in scope of supply, see accessories.

## Connection diagram

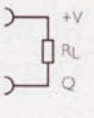
**WT 170 -P/N 112**



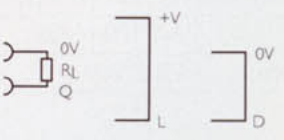

**WT 170 -P/N 410**




**N**




**P**




L/D = control line

light switching dark switching

| brn | blu | blk | wht |
|---|---|---|---|
| brown | blue | black | white |

# WT 170
# Photoelectric proximity switch with background suppression

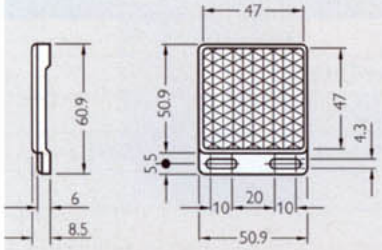
| Type WT 170 | -N | -P |
|---|---|---|
| **Part-No.** | see table | |
| **Scanning range TW** | 10 to 90 mm, object with 90% luminance (as per DIN 5033) | |
| | 15 to 35 mm, object with 6% luminance (as per DIN 5033) | |
| Background suppression | from approx. 120 mm onwards, background with 90% luminance (as per DIN 5033) | |
| Light spot diameter | approx. 3.5 mm at a distance of 40 mm | |
| Beam angle | focus 40 mm | |
| **Light transmitter** | LED, visible red light | |
| **Supply voltage $V_S$** [1] | 10 to 30 V DC | |
| Current consumption (no load) | ≦ 30 mA | |
| Max. residual ripple [2] | ± 10 % | |
| Light receiver switching type [3] | Light/dark switchover via control lead | |
| **Switching outputs** open collector | NPN | PNP |
| Signal voltage HIGH | approx. $V_S$ | $V_S$ – (≦ 1.5 V) |
| Signal voltage LOW | ≦ 1.5 V | approx. 0 V |
| Max. output current | ≦ 100 mA | |
| Response time; switching frequency | 0.7 ms max.; 700/s min. | |
| **VDE protection class** | III | |
| **Type of protection (IEC 144)** | IP 67 | |
| Protection circuits [4] | A, B, C, D | |
| Ambient operating temperature $T_U$ | – 25 to + 55 °C | |
| Storage temperature $T_L$ | – 40 to + 70 °C | |
| Connecting lead | 2 m, 4 x 0.2 mm², ø 4.0 mm | |
| Connector socket | M 8, 4-pole | |
| Weight | 25 g with connector socket, 66 g with 2 m lead | |

1) Limit values
2) Must not exceed or fall below $V_S$ tolerances
3) Control line open
NPN: light / PNP: dark switching
Control line + V: light /
Control line 0 V: dark switching
4) A = $V_S$ connections non-interchangeable
B = Inputs/outputs non-interchangeable
C = Spurious pulse suppression
D = Outputs short-circuit and overcurrent-protected

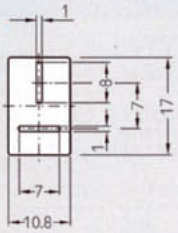
## Selection table

| | Switching output | |
|---|---|---|
| | NPN | PNP |
| with connecting cable 2 m | | |
| Type | WT 170-N 112 | WT 170-P 112 |
| Part-No. | 6 010 195 | 6 010 193 |
| with connector socket M 8, 4-pole | | |
| Type | WT 170-N 410 | WT 170-P 410 |
| Part-No. | 6 010 196 | 6 010 194 |

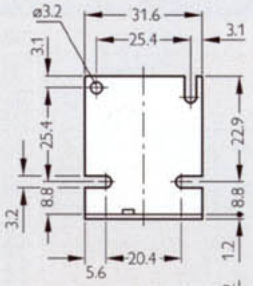
# Accessories




Reflector PL 250 contained in scope of supply of WL 170
Part-No. 5 304 812

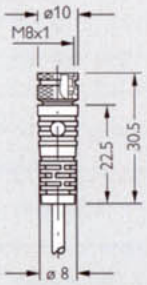



Slotted mask BL-17-10
Part-No. 5 305 687, scope of supply: 2 x
Mounted with self-adhesive back.
For detecting small objects or increasing the switching accuracy.

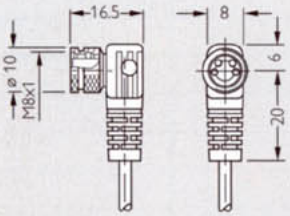



Retaining bracket
BF-W 170
Part-No. 5 305 686
for WS/WE 170,
WL 170 and WT 170
contained in scope of supply

Line sockets M 8, 4-pole, with screwed connection and connecting lead
Contact assignment as per EN 50044



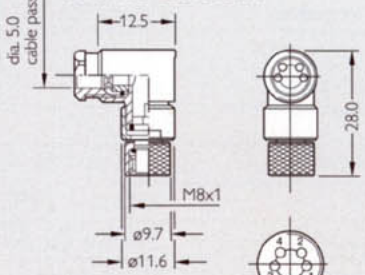

2 m: straight
6 009 870
5 m: straight
6 009 872



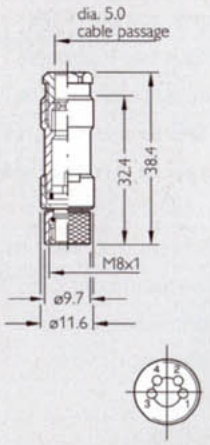

Line socket, offset
6 009 871 with 2 m lead
6 009 873 with 5 m lead

1 = brown
2 = white
3 = blue
4 = black

Line socket M 8, 4-pole preassembled for lead dia. 3.5 – 5 mm with screwed connection



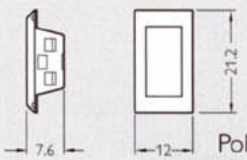

Line socket, straight:
Part-No. 6 009 975




Line socket, straight:
Part-No. 6 009 974

Operating ranges and minimum lateral mounting distance for 2 x WS/WE 170

| Accessories | Max. operating range | Min. lateral mounting distance | Min. mounting distance | Min. lateral mounting distance |
|---|---|---|---|---|
| Without attachments | 7 m | > 450 mm | 250 mm | < 125 mm |
| Slotted mask BL 170-10 Part-No. 5 305 687 | 1 m | > 60 mm | 150 mm | < 30 mm |
| Polarisation filter attachment BL 170-Polf. Part-No. 5 305 688 | 3 m | No mutual interference | 0 mm | No mutual interference |
| Slotted masks mounted with polarisation filters | 0,5 m | No mutual interference | 0 mm | No mutual interference |




Polarisation filter attachments for horizontal and vertical polarisation BL-170-Polf.
Part-No. 5 305 688
Scope of supply: 4 x
(2 x polarisation in X axis,
2 x polarisation in Y axis)