

## W24-2Exi

### Photoelectric sensors for explosive atmospheres

Safe and reliable switching in Ex-areas (gas)

The W24-2Exi Series has been developed for applications in explosive areas, in order to provide intrinsic safety according to EN 60079-0 (2006), EN 60079-11 (2007) and EN 60079-28 (2007), and EC type examined by the "Physikalisch-Technische Bundesanstalt (PTB)" in Braunschweig, Germany. The switching outputs of the devices are designed according to EN 60947-5-6 (NAMUR).

Therefore, the W24-2Exi Series labelled  $\text{Ex II 2G Ex ia op is IIC T4}$  complies with the requirements of Category 2G according to the new Directive 94/9/EC (ATEX) and may be used in the explosive areas "Zone 1 (gas)" and "Zone 2 (gas)".

The device variants used depend on the specific application:

- the WL24-2Exi photoelectric reflex sensor has a maximum scanning range up to 22 m/PL80A,
- the WLL24-2Exi fibre-optic cable version which, depending on the type of optical head, can be used in both through-beam and proximity mode whereby the maximum distance to the object is 1,000 mm and 40 mm respectively.

The sturdy zinc die-cast housings with enclosure rating IP 67 (IP 65 with WLL24), the cable glands and plugs that can be rotated towards the bottom and rear of the sensor, and very good insensitivity to ambient light make all of these devices ideally suited for use in industrial environments.

- the WT24-2Exi photoelectric proximity sensor with an adjustable scanning distance of 100 ... 2,000 mm and background suppression,

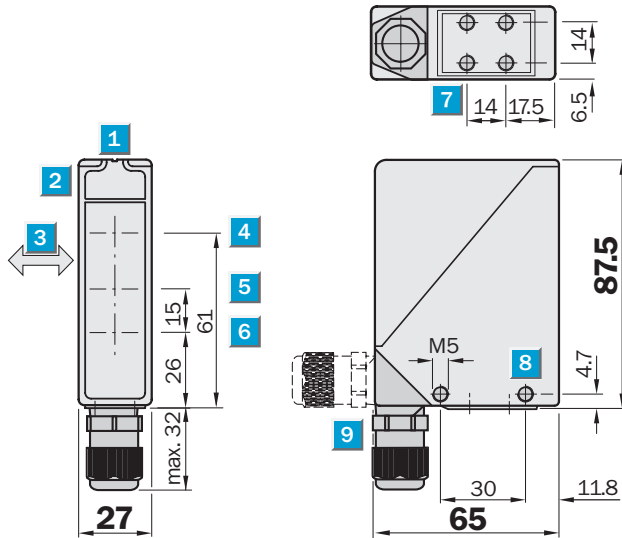
**Scanning distance**  
40 ... 2,000 mm

Photoelectric proximity sensors

**Marking:**

- Ex II 2G Ex ia op is IIC T4 according to Directive 94/9/EG (ATEX)
- According to category 2G
- Switching output: EN 60947-5-6 (NAMUR)
- Background suppression can be set very precisely
- Infrared light

**Dimensional drawing**



**Adjustments possible**

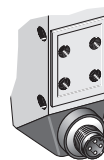
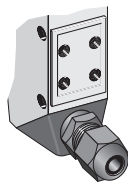


- 1 Alignment sight
- 2 LED signal strength indicator
- 3 Standard direction of the material being scanned
- 4 Middle of optic axis, sender
- 5 Middle of optic axis, receiver at close range
- 6 Middle of optic axis, receiver at long range
- 7 M5 threaded mounting hole, 6 mm deep
- 8 M5 threaded mounting hole
- 9 M16 screw fixing or M12 plug, rotatable by 90°
- 10 Adjustment of scanning distance: Potentiometer

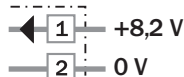
**Connection types**

WT24-2X200

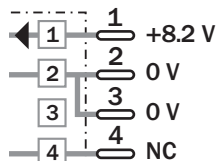
WT24-2X400



M16, terminals



4-pin, M12



**Accessories**

- Mounting systems
- Plug 4-pin, M12
- Switching amplifier

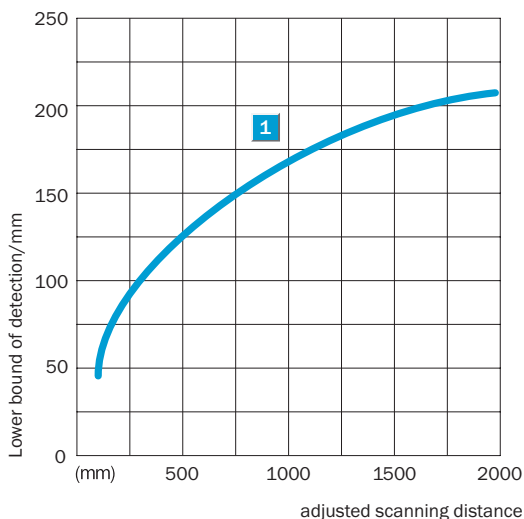
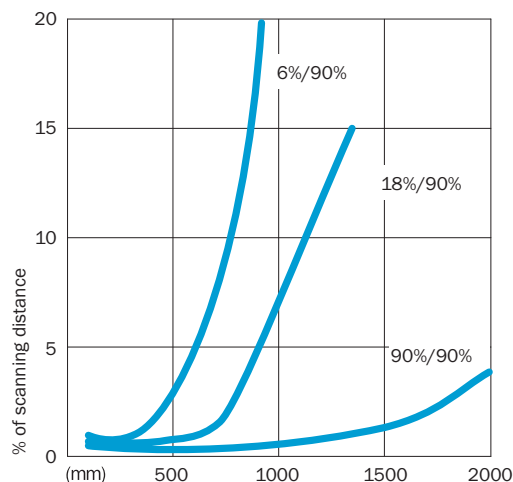


Technical data		WT24-2	X200	X400								
<b>Scanning distance, typ. max.</b>	40 ... 2,000 mm <sup>1)</sup>											
Operating distance	100 ... 2,000 mm <sup>1)</sup>											
Adjustment of operating distance	Potentiometer											
<b>Light source<sup>2)</sup>, light type</b>	LED, infrared light											
Light spot diameter	Approx. 50 mm at 2,000 mm											
<b>Supply voltage V<sub>S</sub><sup>3)</sup></b>	5 ... 15.5 V DC											
Residual ripple <sup>4)</sup>	0.4 V <sub>pp</sub>											
<b>EC-type examination certificate</b>	PTB 03 ATEX 2105											
Input voltage U <sub>i</sub> max.	15.5 V											
Input current I <sub>i</sub> max.	53 mA											
Input power P <sub>i</sub> max.	100 mW											
Internal capacity C <sub>i</sub> max.	80 nF											
Internal inductivity L <sub>i</sub> max.	≈ 0 μH (negligible small)											
<b>Switching output/current consumption</b>	Control current dependent on switching <sup>5)</sup>											
	Object is detected ≥ 2,2 mA											
	Object is not detected ≤ 1 mA											
Switching mode	Light-switching											
Response time <sup>6)</sup>	≤ 10 ms											
Max. switching frequency <sup>7)</sup>	50 Hz											
<b>Connection types</b>	M16, terminal connection											
	Plug 4-pin, M12											
<b>Protection class<sup>8)</sup></b>	<input type="checkbox"/>											
<b>Circuit protection<sup>9)</sup></b>	A, C											
<b>Enclosure rating</b>	IP 67											
<b>Ambient temperature T<sub>A</sub></b>	Operation: -20 °C ... +60 °C											
	Storage: -25 °C ... +70 °C											
<b>Weight</b>	Approx. 330 g											
<b>Housing material</b>	Zinc die-cast housing											

1) Object with 90 % remission (based on standard white to DIN 5033)  
 2) Average service life 100,000 h at T<sub>A</sub> = +25 °C  
 3) Limit values, Supply with switching amplifier EN2Ex (R<sub>i</sub> approx. 1 kΩ)  
 4) May not exceed or fall short of V<sub>S</sub> tolerances  
 5) According to EN 60947-5-6 (NAMUR)  
 6) Signal transit time with resistive load  
 7) With light/dark ratio 1:1  
 8) Reference voltage DC 50 V  
 9) A = V<sub>S</sub>-connections reverse-polarity protected  
 C = Interference pulse suppression

Scanning distance	Lower bound of detection	Order information	
		<b>Type</b>	<b>Order no.</b>
		WT24-2X200	1041910
		WT24-2X400	1040722

- \*) Lower bound of detection area depending on the adjusted scanning distance
- 1 Scanning distance on black, 6 % remission
  - 2 Scanning distance on grey, 18 % remission
  - 3 Scanning distance on white, 90 % remission

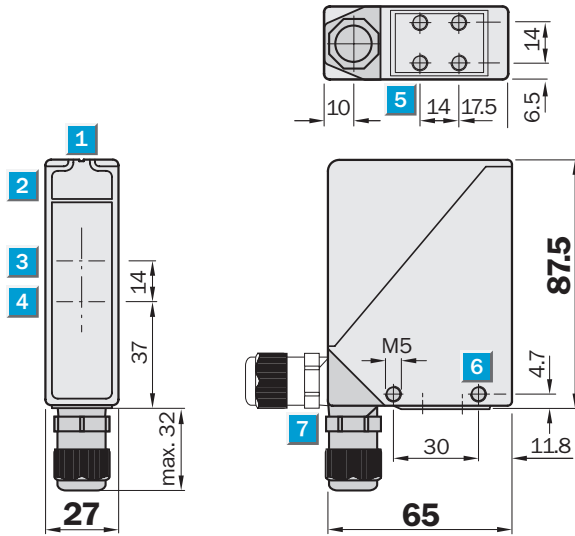


**Scanning range**  
0 ... 22 m

Photoelectric reflex sensors

- **Marking:**  
⊕ II 2G Ex ia op is IIC T4 according to Directive 94/9/EG (ATEX)
- According to category 2G
- **Switching output:**  
EN 60947-5-6 (NAMUR)
- Red light
- Device plug can be rotated through 90°

**Dimensional drawing**



**Adjustments possible**

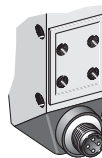
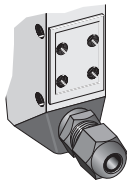


- 1 Alignment sight
- 2 LED signal strength indicator
- 3 Middle of optic axis, sender
- 4 Middle of optic axis, receiver
- 5 M5 threaded mounting hole, 6 mm deep
- 6 M5 threaded mounting hole
- 7 M16 screw fixing or M12 plug, rotatable by 90°
- 8 Sensitivity adjustment: Potentiometer

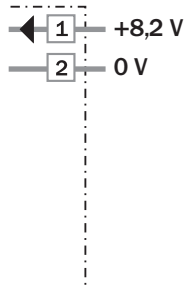
**Connection types**

WL24-2X230

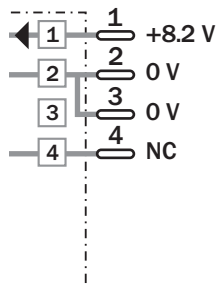
WL24-2X430



**M16, terminals**



**4-pin, M12**



Accessories
Mounting systems
Reflectors
Plug 4-pin, M12
Switching amplifier

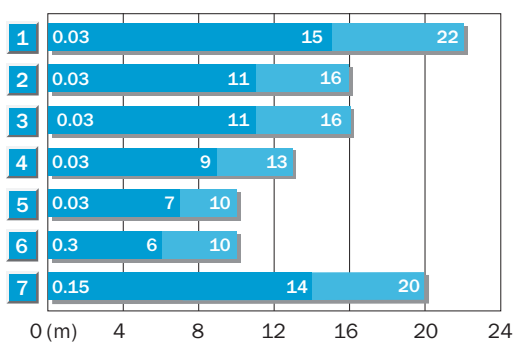
Technical data		WL24-2	X230	X430								
Scanning range typ. max.	0 ... 22 m											
Scanning range, recommended	0 ... 15 m											
Relating to	Reflector PL80A											
Sensitivity adjustment	Potentiometer											
Light source <sup>1)</sup> , light type	LED, red light											
Light spot diameter	250 mm at 15 m											
Supply voltage $V_s$ <sup>2)</sup>	5 ... 15.5 V DC											
Residual ripple <sup>3)</sup>	0.4 $V_{pp}$											
EC-type examination certificate	PTB 08 ATEX 2029											
Input voltage $U_i$ max.	15.5 V											
Input current $I_i$ max.	53 mA											
Input power $P_i$ max.	100 mW											
Internal capacity $C_i$ max.	80 nF											
Internal inductivity $L_i$ max.	≈ 0 $\mu$ H (negligible small)											
Switching output/current consumption	Control current dependent on switching <sup>4)</sup>											
	Light beam not interrupted ≥ 2.2 mA											
	Light beam interrupted ≤ 1 mA											
Switching mode	Light-switching											
Response time <sup>5)</sup>	≤ 10 ms											
Max. switching frequency <sup>6)</sup>	50 Hz											
Connection types	M16, terminal connection											
	Plug 4-pin, M12											
Protection class <sup>7)</sup>	<input type="checkbox"/>											
Circuit protection <sup>8)</sup>	A, C											
Enclosure rating	IP 67											
Ambient temperature $T_A$	Operation: -20 °C ... +60 °C											
	Storage: -25 °C ... +70 °C											
Weight	Approx. 330 g											
Housing material	Zinc die-cast housing											

<sup>1)</sup> Average service life 100,000 h at  $T_A = +25$  °C  
<sup>2)</sup> Limit values. Supply with switching amplifier EN2Ex (R<sub>i</sub> approx. 1 kΩ)

<sup>3)</sup> May not exceed or fall short of  $V_s$  tolerances  
<sup>4)</sup> According to EN 60947-5-6 (NAMUR)  
<sup>5)</sup> Signal transit time with resistive load

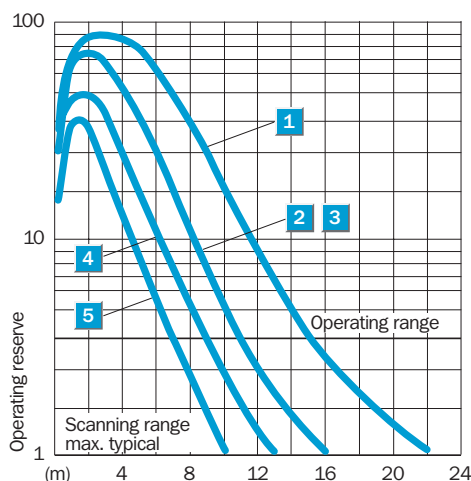
<sup>6)</sup> With light/dark ratio 1:1  
<sup>7)</sup> Reference voltage 50 V DC  
<sup>8)</sup> A =  $V_s$ -connections reverse-polarity protected  
 C = Interference pulse suppression

Scanning range and operating reserve





■ Operating range ■ Typ. max. scanning range

Reflector type	Operating range
1 P L80A	0.03 ... 15 m
2 PL50A	0.03 ... 11 m
3 PL40A	0.03 ... 11 m
4 PL30A	0.03 ... 9 m
5 PL20A	0.03 ... 7 m
6 Diamond Grade (20 cm x 20 cm)	0.3 ... 6 m
7 C110	0.15 ... 14 m




Order information

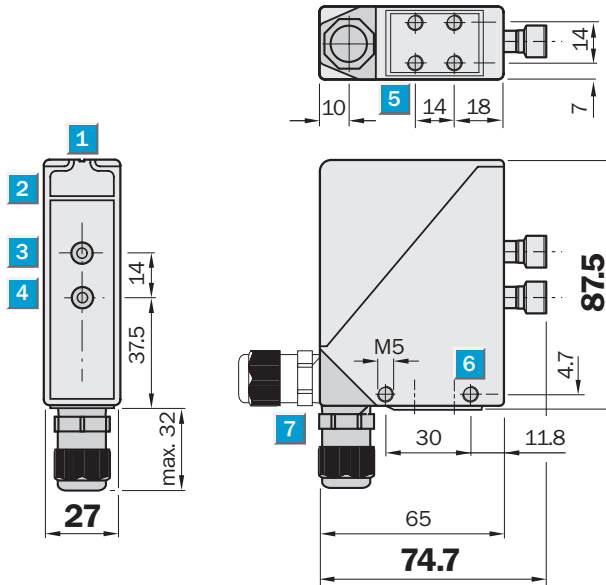
Type	Order no.
WL24-2X230	1026036
WL24-2X430	1026037

	<b>Scanning distance</b> 0 ... 40 mm
	<b>Scanning range</b> 0 ... 1,000 mm
Photoelectric sensors with fibre-optic cable	

**Marking:**

-  II 2G Ex ia op is IIC T4 according to Directive 94/9/EG (ATEX)
- EN 60947-5-6 (NAMUR)
- Red light
- Fibre-optic cable, exchangeable

**Dimensional drawing**



**Adjustments possible**

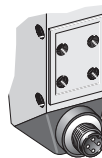
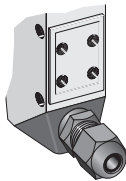


- 1 Alignment sight
- 2 LED signal strength indicator
- 3 Middle of optic axis, sender
- 4 Middle of optic axis, receiver
- 5 M5 threaded mounting hole, 6 mm deep
- 6 M5 threaded mounting hole
- 7 M16 screw fixing or plug M12, 4-pin, rotatable by 90°
- 8 Sensitivity adjustment: Potentiometer

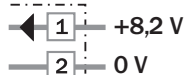
**Connection types**

WLL24-2X230

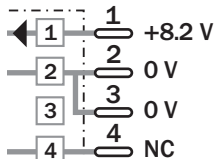
WLL24-2X430



M16, terminals



4-pin, M12



**Accessories**

- Mounting systems
- Reflectors
- Plug 4-pin, M12
- Switching amplifier

Technical data		WLL24-2	X230	X430							
<b>Scanning distance typ. max.</b>	0 ... 40 mm <sup>1)</sup>										
<b>Scanning distance</b>	0 ... 25 mm <sup>2)</sup>										
<b>Scanning distance</b>	0 ... 10 mm <sup>3)</sup>										
Fibre-optic cable (proximity system)	LL3-DB01										
Adjustment of operating distance	Potentiometer										
<b>Scanning range typ. max.</b>	0 ... 1,000 mm										
Fibre-optic cable (Through-beam system)	LL3-TB02 and tip adapter LL3-TA01										
<b>Scanning range, recommended</b>	0 ... 100 mm										
Fibre-optic cable (Through-beam system)	LL3-TB02										
Sensitivity adjustment	Potentiometer										
<b>Light source<sup>4)</sup>, light type</b>	LED, red light										
<b>Supply voltage V<sub>s</sub><sup>5)</sup></b>	5 ... 15.5 V DC										
Residual ripple <sup>6)</sup>	0.4 V <sub>pp</sub>										
<b>EC-type examination certificate</b>	PTB 08 ATEX 2029										
Input voltage U <sub>i</sub> max.	15.5 V										
Input current I <sub>i</sub> max.	53 mA										
Input power P <sub>i</sub> max.	100 mW										
Internal capacity C <sub>i</sub> max.	80 nF										
Internal inductivity L <sub>i</sub> max.	≈ 0 μH (negligible small)										
<b>Switching outputs/current consumption</b>	Control current dependent on switching <sup>7)</sup>										
	Light beam not interrupted ≥ 2.2 mA										
	Light beam interrupted ≤ 1 mA										
Switching mode	Light-switching										
Response time <sup>8)</sup>	≤ 10 ms										
Max. switching frequency <sup>9)</sup>	50 Hz										
<b>Connection types</b>	M16, terminal connection										
	Plug 4-pin, M12										
<b>Protection class<sup>10)</sup></b>	<input type="checkbox"/>										
<b>Circuit protection<sup>11)</sup></b>	A, C										
<b>Enclosure rating</b>	IP 65										
<b>Ambient temperature T<sub>A</sub></b>	Operation: -20 °C ... +60 °C										
	Storage: -25 °C ... +70 °C										
<b>Weight</b>	Approx. 330 g										
<b>Housing material</b>	Zinc die-cast housing										

<sup>1)</sup> Object with 90 % remission (based on standard white to DIN 5033)

<sup>2)</sup> Object with 18 % remission, gray

<sup>3)</sup> Object with 6 % remission, black

<sup>4)</sup> Average service life 100,000 h at T<sub>A</sub> = +25 °C

<sup>5)</sup> Limit values, Supply with switching amplifier EN2Ex (R<sub>i</sub> approx. 1 kΩ)

<sup>6)</sup> May not exceed or fall short of V<sub>s</sub> tolerances

<sup>7)</sup> According to EN 60947-5-6 (NAMUR)

<sup>8)</sup> Signal transit time with resistive load

<sup>9)</sup> With light/dark ratio 1:1

<sup>10)</sup> Reference voltage 50 V DC

<sup>11)</sup> A = V<sub>s</sub>-connections reverse-polarity protected

C = Interference pulse suppression

Order information	
Type	Order no.
WLL24-2X230	1026038
WLL24-2X430	1026039

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