



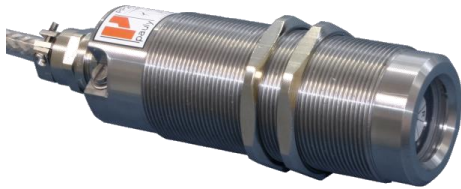
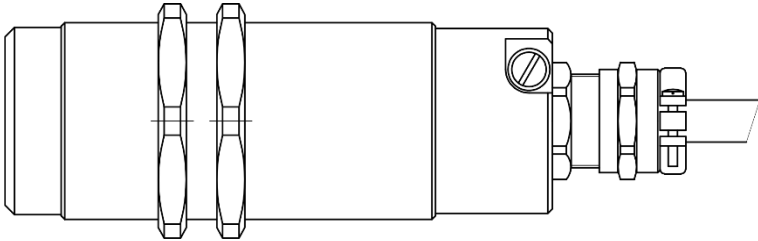
**Operating Instructions**

**Diffuse-Reflective Sensor  
with Passive Background  
Response Suppression**

**JP705/yL Ex  
JP7051/yL Ex**

**for Hazardous Areas**

,4129GE'

Features	Applications
<ul style="list-style-type: none"> <li>✓ Various working ranges 100 mm, 200 mm, 300 mm</li> <li>✓ Explosion-proof Diffuse-Reflective Sensor</li> <li>✓  II 2G Ex db IIC T6 Gb</li> <li>✓  II 2D Ex tb IIIC T80°C Db</li> </ul>	<ul style="list-style-type: none"> <li>○ Detection of materials/objects in hazardous areas in Zone 1 or Zone 21</li> </ul> <div style="text-align: center;">  <p><b>JP705/yL Ex / JP7051/yL Ex</b> Diffuse-Reflective Sensor</p> </div>
 <p>Sketch of <b>JP705/yL Ex / JP7051/yL Ex</b></p>	

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## Table of Contents

<b>1 Identification</b>	<b>3</b>
1.1 Product Brand	3
1.2 Product Versions / Marking	3
1.3 Manufacturer's Name and Address	3
01.4 Declaration of Conformity	3
<b>2 Product Description</b>	<b>4</b>
2.1 General Functions and Range of Applications, Use in Accordance with the Intended Purpose	4
2.2 Safety Information, Summary (use for purposes other than that intended)	5
<b>3 Definitions – Technical Data</b>	<b>6</b>
<b>4 Preparing the Product for Use</b>	<b>7</b>
<b>5 Connection</b>	<b>7</b>
5.1 Wiring the diffuse-reflective sensor	7
5.2 PE connection at the diffuse-reflective sensor	7
<b>6 Marking the Diffuse-Reflective Sensor</b>	<b>8</b>
<b>7 Maintenance and Cleaning</b>	<b>8</b>
<b>8 Spare Parts List</b>	<b>9</b>
<b>9 Decommissioning the Product</b>	<b>9</b>
<b>10 Annex – Supplementary Documents</b>	<b>9</b>


## 1 Identification

<b>1.1 Product Brand</b>	“JP705/yL... Ex” Diffuse-reflective sensor for hazardous (potentially explosive) areas		
<b>1.2 Product Versions / Marking</b>	Infrared light:	JP705/yL Ex	y = scanning range 100 mm, 200 mm or 300 mm
	Red light:	JP7051/yL Ex	
<b>1.3 Manufacturer’s Name and Address</b>	<b>Fotoelektrik Pauly GmbH</b> <b>Wahrbrink 6, 59368 Werne, Germany</b>		
<b>01.4 Declaration of Conformity</b>	The above products were developed and manufactured in conformance to the following standards or normative documents!		

- Low-voltage directive 2014/35/EU
- EMC directive 2014/30/EU
- ATEX directive 2014/34/EU

EC-Type Examination Certificate of Equipment and Components for Use in Hazardous Areas (Directive 94/9/EC):

Certificate No.: **BVS 08 ATEX E 122 X**

Marking:  II 2G Ex db IIC T6 Gb  
II 2D Ex tb IIIC T80°C Db

IECEX Certificate of Conformity, IEC Certification Scheme for Explosive Atmospheres:

Certificate No.: **IECEX BVS 12.0029X**

Marking: Ex db IIC T6 Gb  
Ex tb IIIC T80°C Db

### Applied Standards and Technical Specifications:

IEC 60079-0:2017	General Requirements
IEC 60079-1:2014	Equipment protection flameproof enclosure “d”
IEC 60079-31:2013	Equipment dust ignition protection by enclosure “t”

### 2 Product Description

#### 2.1 General Functions and Range of Applications, Use in Accordance with the Intended Purpose

The “JP705/yL Ex“ or “JP7051/yL Ex“ diffuse-reflective sensor was developed for use in hazardous areas in Zone 1 and Zone 21.

The “JP705/yL Ex“ and “JP7051/yL Ex“ diffuse-reflective sensors consist of a transmitter and a receiver. The transmitter and receiver electronics are fitted onto a joint printed circuit board. The printed circuit board is accommodated in a flameproof enclosure. The transmitting and receiving beam is formed to produce a joint overlapping area. The object to be scanned should have at least the size of the overlapping area. The surface of the object being scanned serves itself as a reflection area. A sufficiently high reflection level causes the receiver to respond.

When 24 VDC supply voltage is applied, the transmitter light is switched on and the receiver is in direct receiving readiness. A modulated light signal is generated by the transmitter. The “JP705/yL Ex” type works with invisible infra-red light. The “JP7051/yL Ex” type works with visible red light. The transmitted light signal has a defined clock ratio. The receiver sees the modulated light transmitted by the transmitter and reflected by the scanned object itself. The switching output in the receiver is switched on or off depending on the selected signal mode – bright-switching or dark-switching.

When the “bright-switching” signal mode is selected, the transistor is switched on when an object is detected – i.e. the diffuse-reflective sensor is occupied.

When the “dark-switching” signal mode is selected, the transistor is switched on if there is no object positioned in the diffuse-reflective sensor’s detection area – the diffuse-reflective sensor is not occupied therefore.

When switched on, the switching output supplies a voltage potential of 24 VDC. When switched off, the P-N-P transistor provides a high level of impedance (obstructed).

The switching state of the diffuse-reflective sensor is typically evaluated with a PLC or a monitoring device. Depending on the logical operator used, a pull-down resistor may be necessary.

The diffuse-reflective sensor works with passive background response suppression. Diffuse-reflective sensors are available with three different permanently set working ranges.

Working ranges: 30 ... 100 mm, 30 ... 200 mm or 30 ... 300 mm. The diffuse-reflective sensor can be used to track materials or detect the presence of an object in the many different automated industrial applications.

### 2.2 Safety Information, Summary (use for purposes other than that intended)



The owner / managing operator / installer must acquire information about the Ex regulations that apply to his area of application and conform to these regulations. The same applies when cables and conductors are being installed and wired. In applications in Zone 21 it must be ensured when installing the connection cable that electrostatic charging cannot lead to ignitable discharges.



The diffuse-reflective sensor may be installed only by an authorised and qualified person with the required specialist knowledge on how electrical equipment should be installed in hazardous areas.



The requirements of EN 60079-14 must be observed.



The diffuse-reflective sensor may not be dismantled.



If the connection is established in a hazardous area:  
the power supply cable for the transmitter and receiver must be connected in an enclosure. The enclosure used must meet the requirements of a recognised type of protection (complying with EN60079-0, Section 1).



If the enclosure or cable entry is damaged or no longer leak-tight, the device must be put out of operation immediately.



External sources of heat or cold in the form of radiating sources capable of impermissibly heating or cooling the device's surfaces are not admissible and special care must be taken to prevent them occurring.

### 3 Definitions – Technical Data

(See enclosed data sheet in the annex for a precise specifications)

Diffuse-Reflective Sensor	JP705/yL Ex	JP7051/yL Ex
Sensing ranges (surface black – see relative data sheet also)	30...100 mm (y =100) 30...200 mm (y =200) 30...300 mm (y =300)	
Enclosure material:	Stainless steel	
Dimensions:	M42x1.5 x 147 mm	
Weight	approx. 1500 g (incl. 5 m cable)	
Protection mode	IP66 (Protection against Dust and Powerful Water Jets)	
Voltage supply	24 VDC	
Power consumption	40 mA / <1 W without load	
Connection	No. cable 4x0.75 mm <sup>2</sup> shielded (typical length 5 m)	
Emitted light	LED 850...880 nm, invisible	LED 650 nm, visible
Switching output	PNP transistor, short-circuit proof 50 mA	
Signal mode	Bright-switching (Optional: dark-switching)	
Switch indicator	green LED	
Ambient temperature (T <sub>amb.</sub> )	-20 to +60 °C	
Storage temperature	-20 to +70 °C	
Steady light resistance	> 80 kLux	
Access time	< 12 ms/switch transition	
Interference suppression	Forced synchronisation	

All specification: see data sheet

### 4 Preparing the Product for Use

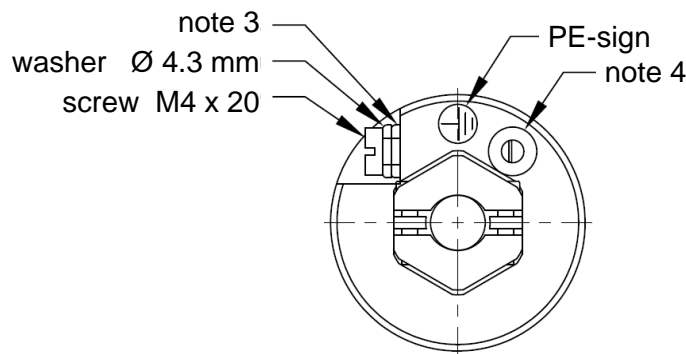
The diffuse-reflective sensor diffuse-reflective sensor must be aligned to the object to be detected. When installing, observe the operating instructions and the data sheets.

### 5 Connection

#### 5.1 Wiring the diffuse-reflective sensor

Wire the JP705/yL Ex and JP7051/yL Ex diffuse-reflective sensors in accordance with the data sheet.

#### 5.2 PE connection at the diffuse-reflective sensor



Note 3: Connection for cable lug with ring eyelet, internal diameter 4.3 mm, External diameter maximum of 9.5 mm.

Note 4: Connection of rigid conductors: 4 mm<sup>2</sup> to 6 mm<sup>2</sup>.  
Connection of flexible conductors with ferrule: 4 mm<sup>2</sup>.



Only one of the two connection possibilities may be used, either that described in note 3 or in note 4!

## 6 Marking the Diffuse-Reflective Sensor

Diffuse-Reflective Sensor:  
JP705/100L Ex

	<b>CE 0158</b> Type: JP705/100L Ex II 2G Ex db IIC T6 Gb II 2D Ex tb IIC T80°C Db IP66 ATEX cat.no.: BVS 08 ATEX E 122 X IECEx CoC: IECEx BVS 12.0029X Temp.: -20 °C ≤ Ta ≤ +60 °C Art.no.: 4129A01x... Ser.no.: C2A.8888	 光控传感器 德国制造 Ex ID A21 IP66 T80°C  Certificate No.: 22-AV4BO-0096X to 22-AV4BO-0101X Date of issue: 2022-03-24 Made in Germany Fotoelektrik Pauly   59368 Werne www.fotoelektrik-pauly.de	
			+24VDC 1 OV 2 OV shield Out 3 PE GN/YE

Diffuse-Reflective Sensor:  
JP7051/100L Ex

	<b>CE 0158</b> Type: JP7051/100L Ex II 2G Ex db IIC T6 Gb II 2D Ex tb IIC T80°C Db IP66 ATEX cat.no.: BVS 08 ATEX E 122 X IECEx CoC: IECEx BVS 12.0029X Temp.: -20 °C ≤ Ta ≤ +60 °C Art.no.: 4129M01A01x... Ser.no.: C2A.8888	 光控传感器 德国制造 Ex ID A21 IP66 T80°C  Certificate No.: 22-AV4BO-0096X to 22-AV4BO-0101X Date of issue: 2022-03-24 Made in Germany Fotoelektrik Pauly   59368 Werne www.fotoelektrik-pauly.de	
			+24VDC 1 OV 2 OV shield Out 3 PE GN/YE

Diffuse-Reflective Sensor:  
JP705/200L Ex

	<b>CE 0158</b> Type: JP705/200L Ex II 2G Ex db IIC T6 Gb II 2D Ex tb IIC T80°C Db IP66 ATEX cat.no.: BVS 08 ATEX E 122 X IECEx CoC: IECEx BVS 12.0029X Temp.: -20 °C ≤ Ta ≤ +60 °C Art.no.: 4129A02x... Ser.no.: C2A.8888	 光控传感器 德国制造 Ex ID A21 IP66 T80°C  Certificate No.: 22-AV4BO-0096X to 22-AV4BO-0101X Date of issue: 2022-03-24 Made in Germany Fotoelektrik Pauly   59368 Werne www.fotoelektrik-pauly.de	
			+24VDC 1 OV 2 OV shield Out 3 PE GN/YE

Diffuse-Reflective Sensor:  
JP7051/200L Ex

	<b>CE 0158</b> Type: JP7051/200L Ex II 2G Ex db IIC T6 Gb II 2D Ex tb IIC T80°C Db IP66 ATEX cat.no.: BVS 08 ATEX E 122 X IECEx CoC: IECEx BVS 12.0029X Temp.: -20 °C ≤ Ta ≤ +60 °C Art.no.: 4129M01A02x... Ser.no.: C2A.8888	 光控传感器 德国制造 Ex ID A21 IP66 T80°C  Certificate No.: 22-AV4BO-0096X to 22-AV4BO-0101X Date of issue: 2022-03-24 Made in Germany Fotoelektrik Pauly   59368 Werne www.fotoelektrik-pauly.de	
			+24VDC 1 OV 2 OV shield Out 3 PE GN/YE

Diffuse-Reflective Sensor:  
JP705/300L Ex

	<b>CE 0158</b> Type: JP705/300L Ex II 2G Ex db IIC T6 Gb II 2D Ex tb IIC T80°C Db IP66 ATEX cat.no.: BVS 08 ATEX E 122 X IECEx CoC: IECEx BVS 12.0029X Temp.: -20 °C ≤ Ta ≤ +60 °C Art.no.: 4129A03x... Ser.no.: C2A.8888	 光控传感器 德国制造 Ex ID A21 IP66 T80°C  Certificate No.: 22-AV4BO-0096X to 22-AV4BO-0101X Date of issue: 2022-03-24 Made in Germany Fotoelektrik Pauly   59368 Werne www.fotoelektrik-pauly.de	
			+24VDC 1 OV 2 OV shield Out 3 PE GN/YE

Diffuse-Reflective Sensor:  
JP7051/300L Ex

	<b>CE 0158</b> Type: JP7051/300L Ex II 2G Ex db IIC T6 Gb II 2D Ex tb IIC T80°C Db IP66 ATEX cat.no.: BVS 08 ATEX E 122 X IECEx CoC: IECEx BVS 12.0029X Temp.: -20 °C ≤ Ta ≤ +60 °C Art.no.: 4129M01A03x... Ser.no.: C2A.8888	 光控传感器 德国制造 Ex ID A21 IP66 T80°C  Certificate No.: 22-AV4BO-0096X to 22-AV4BO-0101X Date of issue: 2022-03-24 Made in Germany Fotoelektrik Pauly   59368 Werne www.fotoelektrik-pauly.de	
			+24VDC 1 OV 2 OV shield Out 3 PE GN/YE

## 7 Maintenance and Cleaning

- ❖ Maintenance and cleaning work may be done only by qualified personnel who are familiar with the location and have received the relevant instructions.
- ❖ Only a damp cloth may be used to clean the viewing glass. Do not use any caustic detergents!
- ❖ If the enclosure and/or cable entry are damaged or no longer leak-tight, the device must be put out of operation immediately.
- ❖ Repairs to the device itself may be done only by the manufacturing company itself.



### 8 Spare Parts List

Designation	Type	Version	Order Code
Infrared light diffuse-reflective sensor	JP705/100L Ex	/e2/5mK4/ir/24VDC [h] or [d]	4129A01x...
Infrared light diffuse-reflective sensor	JP705/200L Ex	/e2/5mK4/rl/24VDC [h] or [d]	4129A02 x...
Infrared light diffuse-reflective sensor	JP705/300L Ex	/e2/5mK4/rl/24VDC [h] or [d]	4129A03 x...
Red light diffuse-reflective sensor	JP7051/100L Ex	/e2/5mK4/rl/24VDC [h] or [d]	4129M01A01x...
Red light diffuse-reflective sensor	JP7051/200L Ex	/e2/5mK4/rl/24VDC [h] or [d]	4129M01A02x...
Red light diffuse-reflective sensor	JP7051/300L Ex	/e2/5mK4/rl/24VDC [h] or [d]	4129M01A03x...

For order enquiries the type, version and order code must be specified.

### 9 Decommissioning the Product

- ❖ The product may be decommissioned only by qualified personnel who are familiar with the location and have received the relevant instructions.

### 10 Annex – Supplementary Documents

Data sheet	(Infra-)red light diffuse-reflective sensor	E_41291	2023-08-17
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D-59368 Werne, 2023-10-23

\* 41292 GE \*

Fotoelektrik Pauly GmbH

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