



DENKI SEIGYO

DSPSL-500DP / DSPSL-500DN SERIES



Laser Diffuse Photoelectric Sensor with Background Suppression

1. PRODUCT OVERVIEW

The Denki Seigyo DSPSL-500DP / DSPSL-500DN is a compact **laser diffuse photoelectric sensor with background suppression**, designed for precise object detection independent of object color, reflectivity, or background conditions.

Utilizing a **visible red Class 1 laser** and advanced background suppression technology, the sensor reliably detects targets while ignoring unwanted backgrounds. The fine laser spot enables detection of small objects and accurate positioning in high-speed industrial automation applications. This design is inspired by the performance characteristics of industrial laser sensors such as the referenced SICK GTB6L series.

The DSPSL Series is ideal for electronics assembly, semiconductor manufacturing, packaging machinery, robotic systems, pharmaceutical equipment, and precision automation.

2. KEY FEATURES

- Laser diffuse sensing with background suppression
 - Detection distance up to **500 mm**
 - Visible red laser light source
 - Class 1 laser safety design
 - Adjustable sensing distance
 - Small laser spot for precision detection
 - Light ON / Dark ON selectable
 - PNP and NPN output models
 - Fast response time
 - Compact rectangular housing
 - Built-in operation and output indicators
 - Excellent immunity to object color variations
 - Background suppression technology minimizes false detection
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3. MODEL STRUCTURE

Example:

DSPSL-500DP

Code	Description
DS	Denki Seigyo
PSL	Photo Sensor Laser
500	500 mm Sensing Distance
D	DC Supply
P	PNP Output

DSPSL-500DN

Code	Description
DS	Denki Seigyo
PSL	Photo Sensor Laser
500	500 mm Sensing Distance
D	DC Supply
N	NPN Output

4. PRODUCT DESCRIPTION

The DSPSL Series uses advanced optical triangulation technology to achieve stable object detection while suppressing backgrounds beyond the taught sensing distance.

The sensor incorporates a precision laser emitter producing a focused light spot that enables reliable detection of small targets, even in applications with limited mounting space.

A potentiometer adjustment allows fine tuning of the sensing range and switching threshold for optimal performance. Similar adjustment and operating mode concepts are shown in the reference laser sensor datasheet.

5. MODEL SPECIFICATIONS

Model	Output Type	Sensing Distance	Light Source
DSPSL-500DP	PNP	1–500 mm Adjustable	Red Laser
DSPSL-500DN	NPN	1–500 mm Adjustable	Red Laser



6. TECHNICAL SPECIFICATIONS

Optical Specifications

Parameter	Specification
Detection Method	Laser Diffuse with Background Suppression
Light Source	Visible Red Laser
Laser Class	Class 1
Wavelength	650–680 nm
Spot Diameter	Approx. Ø0.5 mm
Sensing Distance	1–500 mm Adjustable
Recommended Range	5–500 mm
Smallest Detectable Object	Approx. Ø0.4 mm

Electrical Specifications

Parameter	Specification
Supply Voltage	10–30 VDC
Current Consumption	≤ 25 mA
Output Type	PNP / NPN
Output Current	≤ 100 mA
Switching Function	Light ON / Dark ON Selectable
Response Time	≤ 0.5 ms
Switching Frequency	1,000 Hz
Protection Circuit	Reverse Polarity / Short Circuit / Overcurrent

Environmental Specifications

Parameter	Specification
Protection Rating	IP67
Operating Temperature	-20°C to +70°C
Humidity	35–95% RH
Vibration Resistance	10–55 Hz
Shock Resistance	30 G
Ambient Light Immunity	≥ 10,000 Lux



Mechanical Specifications

Parameter	Specification
Housing Type	Rectangular
Housing Material	ABS Engineering Plastic
Lens Material	PMMA
Cable Type	3-Wire PVC Cable
Cable Length	2 m Standard
Dimensions (W×H×D)	Approx. 12 × 32 × 22 mm
Weight	Approx. 60 g

7. DISPLAY & ADJUSTMENT

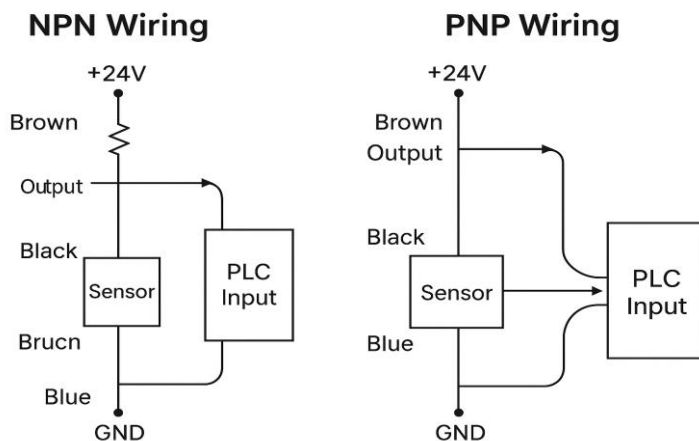
Indicators

Indicator	Function
Green LED	Power ON
Yellow LED	Output Status

Adjustment

Control	Function
Potentiometer	Sensing Distance Adjustment
Mode Switch	Light ON / Dark ON Selection

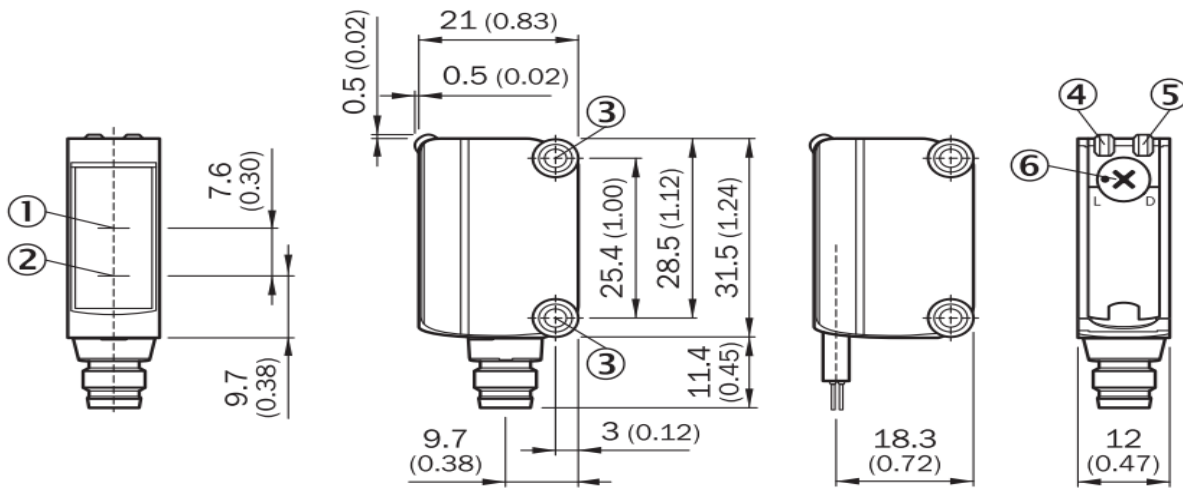
8. WIRING DIAGRAM



9. DIMENSIONS

Sensor Body

Parameter	Dimension
Width	12 mm
Height	31.5 mm
Depth	21 mm
Mounting Hole	M3



10. APPLICATIONS

The DSPSL Series is ideal for:

- Semiconductor manufacturing
- Electronics assembly
- PCB inspection systems
- Packaging machinery
- Pharmaceutical equipment
- Robotics and automation
- Small component detection
- Position verification
- High-speed counting applications
- Label and mark detection



11. ORDERING INFORMATION

Model	Output	Supply Voltage	Sensing Distance	Connection
DSPSL-500DP	PNP	10–30VDC	30–500 mm	2 m Cable
DSPSL-500DN	NPN	10–30VDC	30–500 mm	2 m Cable

12. PRODUCT SUMMARY

The **Denki Seigyo DSPSL-500DP / DSPSL-500DN Laser Photoelectric Sensor** combines:

- ✓ Laser precision detection
- ✓ Background suppression technology
- ✓ 500 mm sensing range
- ✓ Light ON / Dark ON operation
- ✓ Compact industrial housing
- ✓ High-speed response
- ✓ PNP and NPN output options

Designed for demanding industrial automation applications, the DSPSL Series delivers reliable object detection, superior background rejection, and high-performance laser sensing in a compact package.