

Laser Light Barrier Systems for Long Range Applications GLS-1000 / GLS-2000

Features

- Installation Distances
 - GLS-1000 up to 1000 m at Visibility 520 m
 - GLS-2000 up to 2000 m at Visibility 730 m
- Safe Class 1 Laser Product
- Alarm and Pre-Alarm Relay Outputs
- Alarm and Pre-Alarm Test Functions
- Received Optical Power Monitor
- Supply Voltage 24 VDC
Optional 90 - 264 VAC
- Easy Installation within a few hours
- Rugged, weatherproof design



GLSeF121

General Description

The laser light barrier systems GLS are suitable for perimeter protection and other long range applications, where reliable operation also under adverse weather conditions is essential.

The system GLS-2000 is operable at 2000 m at visibilities down to 730 m; the system GLS-1000 at 1000 m down to 520 m.

The systems combine high speed light barrier functions with the high sophistication of transmitter and receiver electronics developed for OPTEL's free space optics systems.

The transmitter unit contains a class 1, eye-safe semiconductor laser device, which emits light pulses at a fixed pulse repetition rate of 1 kHz, as long as the supply voltage is applied.

For test purposes it is possible to inhibit the emission of laser pulses.

When a system is set up and aligned, the highly sensitive photodetector in the light barrier receiver unit picks up the light pulses and the integrated alarm relay is switched from the 'Alarm On' state to the 'Alarm Off' state.

If the connection between the transmitter and receiver is cut off by an object moving into the optical path, or if there is a technical defect in the electronics or in the power supplies, the alarm relay switches to the 'Alarm On' state.

The use of a semiconductor laser transmitter and a highly sensitive photodetector guarantees reliable operation under difficult conditions. Due to an incorporated optical filter even high background illumination by the sun does not lead to a decline in functionality.

To enhance the advantages of the system, it is possible to delay the activation of the alarm relay. By delaying the reaction time of the alarm relay it is possible to avoid false alarms and consequential problems due to the loss of a few possibly inconsequential light pulses.

If the optical receiver detects laser signals again before the delay time has ended, the 'Alarm On' state will not be initiated.

The operational safety is further enhanced by an additional 'Pre-Alarm' relay output, which is triggered independently from the 'Alarm' circuitry.

The 'Pre-Alarm On' state is triggered, if the strength of the received optical signal falls below an individually adjustable threshold, well above the 'Alarm On' threshold. The decrease of the signal strength might be due, e.g. to misalignment or dirty optics.

The 'Pre-Alarm On' state is an early warning signal, that can be used to initiate a maintenance cycle.

By setting the 'Pre-Alarm On' threshold with a sufficient margin to the fixed 'Alarm On' threshold, false alarms can be avoided and maintenance cycles can be kept to a necessary minimum.

A further function provides a DC voltage level between approx. 0 volt and +10 volts in relation to the signal strength of the received laser pulses. This function can be used for the alignment of the transmitter and receiver units and during operation to monitor systems performance.

Laser Safety

The GLS laser transmitter is eye-safe and does not emit hazardous laser radiation.

There is no danger from the laser, even while looking directly into the laser with an optical instrument (telescope, binoculars, magnifying glass).

The following label is located on top of the transmitter housing, to indicate that the light barrier transmitter unit is a Class 1 laser product as defined in IEC 60825-1 specifications.



General Technical Data

Operating Range	max. approx.1000 m (GLS-1000) max. approx.2000 m (GLS-2000)
Supply Voltage	<ul style="list-style-type: none"> • 24 VDC \pm 20 % Devices are protected against over-voltage (max. approx. 40 VDC) under-voltage and wrong polarity
Optional Supply Voltage	<ul style="list-style-type: none"> • 90 - 264 VAC
Power Consumption / Unit	max. approx. 3 W
Connecting Cable	TPE 0.75 mm ²
Cable Length (non-detachable)	2 m
Protection Rating	IP65
Operating Temperature	-20 °C ... +60 °C
Humidity	95 %, Non-Condensing
Weight / Unit incl. Wall Attachment	max. approx. 10 kg

Technical Data Transmitter Unit GLS-1000 / GLS-2000

Optical Transmitter	Semiconductor Laser Diode
Laser Classification (IEC 60825-1)	Class 1
Transmitter Lens Diameter	20 mm
Transmission Wavelength	nom. 904 nm
Transmitting Angle (Far Field)	approx. 3 mrad
Pulse Repetition Frequency	1 kHz
Operation Indicator 'PWR'	LED Green
Transmission Indicator 'TX'	LED Green

Technical Data Receiver Unit GLS-1000/ GLS-2000

Receiver Element	Photodiode
Detection Wavelength	904 nm \pm 10 nm
Minimal Detectable Power	< 500 nW
Receiver Lens Aperture	70 mm
Field of View (Far Field)	nom. approx. 4 mrad
'Analog' DC Voltage Level	max. approx. 10 VDC
Adjustable Alarm Response Time	min. approx. 10 ms
'Alarm' Output Pulse Width	min. approx. 300 ms
'Pre-Alarm' Output	
Adjustable Threshold Range	6 dB ... 30 dB
'Alarm' + 'Pre-Alarm' Relay	
Cut-off Voltage	max 110 VDC
Cut-off Current	max. 2 A
Cut-off Power	max. 60 W
Operation Indicator 'PWR'	LED Green
Alarm Indicator 'A'	LED Green / Red
Pre-Alarm Indicator 'PA'	LED Green / Red

Reliability

OPTEL has delivered optoelectronic equipment for outdoors use for more than 20 years.

Systems are especially designed for operation in harsh outdoor environments of widely varying temperatures, wind, rain, snow, direct sunlight and aggressive aerosols.

Carefully selected materials and components and ruggedly designed electronics in compact hermetic housings ensure long-lasting and trouble-free operation.

Service / Maintenance

The laser light barrier systems GLS need no special maintenance. Under normal circumstances, it should suffice to check the alignment and clean the optics once a year.

Alignment Aids

Systems setup and alignment is aided by alignment aids and indicator lights on the rear panel.

- Transmitter unit: The internal oscillator is activated when the power supply is switched on and initiates the emission of a continuous train of laser pulses.

- Receiver unit: The electrical output connector 'Analog' is providing a DC voltage level between 0 volt and +10 volts. This DC voltage level is directly related to the signal strength of the laser pulses received from the transmitter unit.

The 'Alarm' relay will be switched from the 'Alarm On' state to the 'Alarm Off' state at an 'Analog' voltage level of approx. 0 V.

The 'Pre-Alarm' relay will be switched from the 'Pre-Alarm On' state to the 'Pre-Alarm Off' state at a minimum 'Analog' voltage level of approx. 4 V.

- Receiver unit: The potentiometer 'C' provides the means to increase the required signal strength to activate the 'Pre-Alarm' relay.
- Receiver unit: The output connector 'Analog' also provides a switching contact activated by the 'Pre-Alarm' relay. If connected to a torch light, the light will shine as long as the light barrier is in the 'Pre-Alarm Off' state.

Indicator Lights

The functions of the light barrier can be monitored by checking the following indicator lights on the rear panel of the units.

- Transmitter and Receiver unit: The green indicator LED 'PWR' (Power) lights up when the unit is connected to the supply voltage.
- Transmitter unit: The green indicator LED 'TX' (Transmit) lights up when the transmitter unit is connected to the supply voltage and when laser transmission is not inhibited.
- Receiver unit: The 6-element LED array 'RX' (Receive Laser) lights up when laser signals of the transmitter unit are received. The number of lighted LED's indicates the strength of the received optical signals.
- Receiver unit: The dual colour indicator LED 'A' (Alarm) lights up 'Red' (Alarm On) when no laser pulses are received and changes to 'Green' (Alarm Off) when laser pulses are detected.
- Receiver unit: The dual colour indicator LED 'PA' (Pre-Alarm) lights up 'Red' (Pre-Alarm On) when no laser pulses above a pre-adjusted signal strength are detected and changes to 'Green' (Pre-Alarm Off) when laser pulses above the pre-adjusted signal strength are detected.

Special Features

- Transmitter unit: Laser transmission can be monitored electrically. The monitoring output provides a digital TTL signal tracking the indicator LED 'TX'.
- Transmitter unit: For test purposes, the emission of laser pulses can be inhibited. By stopping the internal oscillator, the light barrier receiver will be forced to change from the 'Alarm Off' state to the 'Alarm On' state.

LASER LIGHT BARRIER SYSTEM

GLS-1000 / GLS-2000

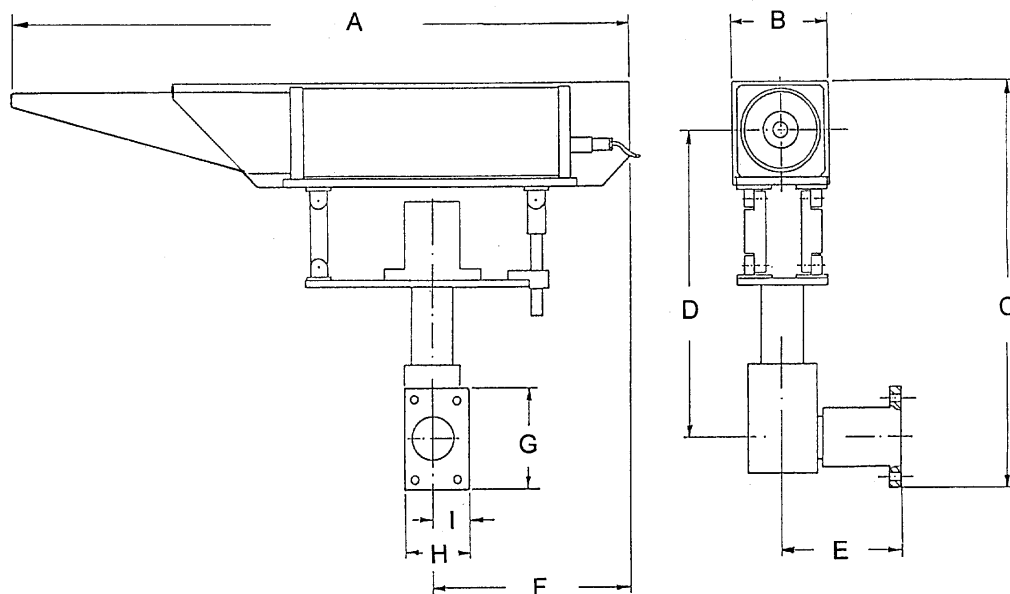
- Receiver unit: For remote monitoring the 'Analog' voltage is also available at the connection cable.
- Receiver unit: For test purposes, the 'Alarm' relay can be switched from the 'Alarm Off' state to the 'Alarm On' state.
- Receiver unit: For test purposes, the 'Pre-Alarm' relay can be switched from the 'Pre-Alarm Off' state to the 'Pre-Alarm On' state.
- Receiver unit: For operation, it is possible to delay the activation of the alarm relay. By delaying the reaction time it is possible to reduce or completely avoid false alarms, due to the loss of a few possibly inconsequential light pulses. If laser signals are detected again before the delay time has ended, the 'Alarm On' state will not be initiated.

Mechanical Outline

GLS Outdoor Unit

with **Weather Protection Cover** and **Optics Protection Tube**
mounted on **Alignment Base** with **Angled Wall Attachment**

4 Mounting Holes: Oval 17 mm x 11 mm Hole Pattern: 78 mm x 78 mm



System	A	B	C	D	E	F	G	H	I
OCS Outdoor Housing	690	120	375	min. 260	min. 220	230	105	105	53

All dimensions in mm

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