

LBC Series

▶ Laser Blade Counters

The LBC Series laser blade counters are primarily used for detecting and counting the vanes or blades of turbochargers and fans.

The high scanning frequency and the standardized data evaluation of the laser sensor allow its application with objects of different color and speeds of up to 30000 rpm.

The visible laser spot and the automatic power correction feature facilitate sensor alignment to the respective objects. An analog signal (0 ... +10V) and a digital signal (0V/+24V) are available as outputs.



Characteristics

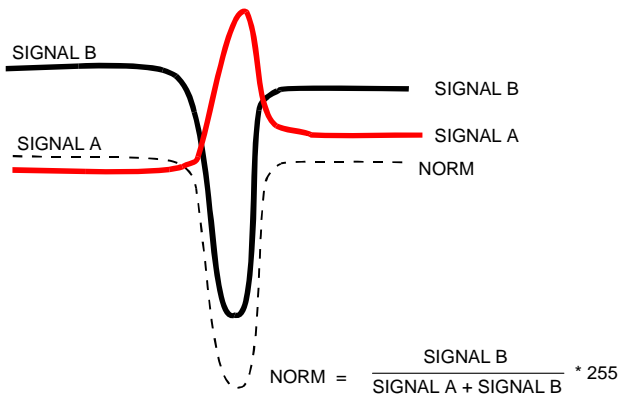
Functional principle of the sensor

The laser sensors of LBC Series operate according to the shadowing principle, i.e. a laser spot that is projected onto the vanes is viewed from two different angles.

The viewing angle of receiver A is almost identical to the emitted laser beam, the viewing angle of receiver B, however, is angular with respect to the laser beam. Receiver A is used to keep the laser power constant. Viewed from receiver B, the laser spot is now completely covered in a certain rotation angle range, which guarantees a highly reliable detection of the impeller vanes.

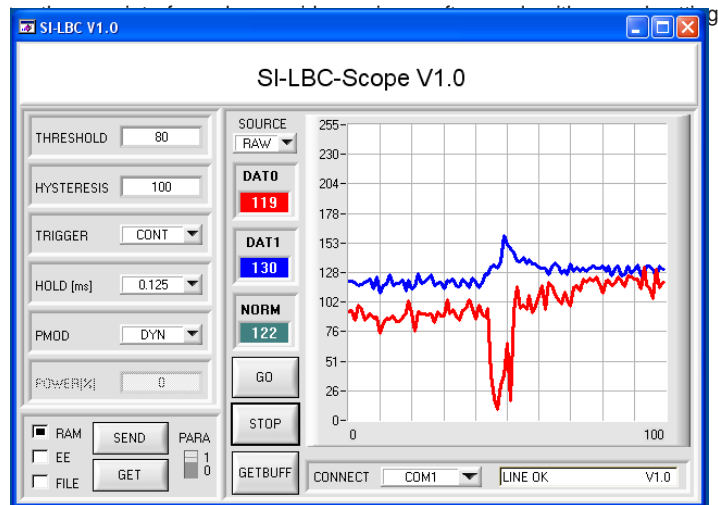
In order to avoid double or multiple counting, a special algorithm is applied that locks the laser sensor for a certain time (the so-called dead time) after a vane is detected. Furthermore, standardized (intensity-independent) evaluation and automatic laser power correction almost completely suppress surface influences.

The special geometry of the sensor allows it to work in a distance range of 150 mm to 300 mm from the impeller. Speeds of up to 30000 rpm. are displayed both in a digital (0V/+24V) and analog (0V .. +10V) way.



Parameterisation under Windows® with software LBC-Scope V1.0

The sensors can easily be set with the help of a Windows® user interface in which the sensor signals are displayed in numerical and graphical form;



Parameters such as e.g.

- Threshold (sensitivity)
- Hysteresis
- Laser power mode (static or dynamic)
- Output pulse lengthening
- Dead time (static or dynamic)

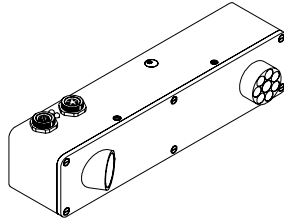
can be set with the software.



Product Overview

Laser blade counter with a reference distance of 200 mm (working range 150 mm ... 250 mm):

Product name LBC-200



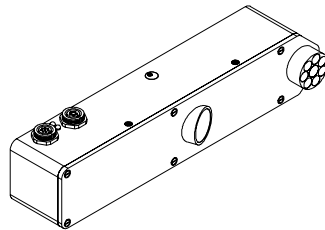
Laser	Semiconductor laser, 670 nm, AC-operation, 1mW max. opt. power, laser class 2 (DIN EN 60825-1)
Optical filter	Interference filter + red light filter
Reference distance	typ. 200 mm
Working range	typ. 150 mm ... 250 mm
Digital output (OUT0)	pnp bright-switching/npn dark-switching or pnp dark-switching/npn bright-switching
Analog output	0 ... +10V
Voltage supply	+12VDC ... +32VDC
Sensitivity setting	adjustable under Windows®
Laser power correction	adjustable under Windows®
Current consumption	typ. 150 mA
Dead time	adjustable under Windows®
Dead time mode	static or dynamic, adjustable under Windows®
Scan frequency	typ. 15 kHz (without averaging)
Switching state indication	Visualization by means of a yellow LED
Operation indication	Visualization by means of a green LED
Potentiometer	for adjustment of analog value (0 ... +10V)
Dyn. output (pulse lengthening)	adjustable under Windows®
Modulation frequency	typ. 100 kHz
Max. rotation speed	typ. 30000 RPM
Enclosure rating	IP54
Operating temperature range	-20°C ... +50°C
Housing material	Aluminum, anodized in blue
Housing dimensions	LxWxH approx. 175 mm x 40 mm x 40 mm
Interface	RS232, parameterizable under Windows®
Type of connector	Connection to PLC: 8-pole female connector Binder 712 Connection to PC (RS232-interface): 5-pole female connector Binder 702
Connecting cables	to PLC: cab-las8/SPS (different cable lengths available) to PC: cab-las5/PC, cab-las5/USB, or SI-RS232/Ethernet-5 (different cable lengths available)
Max. switching current	100 mA, short-circuit-proof
EMC-test acc. to	DIN EN 60947-5-2



Product Overview

Laser blade counter with a reference distance of 230 mm (working range 180 mm ... 280 mm):

Product name LBC-230



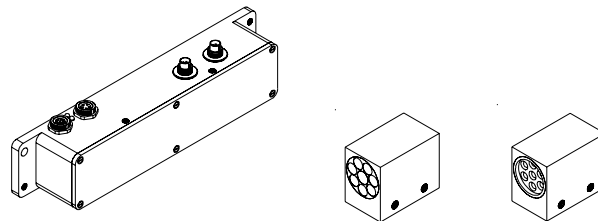
Laser	Semiconductor laser, 670 nm, AC-operation, 1mW max. opt. power, laser class 2 (DIN EN 60825-1)
Optical filter	Interference filter + red light filter
Reference distance	typ. 230 mm
Working range	typ. 180 mm ... 280 mm
Digital output (OUT0)	pnp bright-switching/npn dark-switching or pnp dark-switching/npn bright-switching
Analog output	0 ... +10V
Voltage supply	+12VDC ... +32VDC
Sensitivity setting	adjustable under Windows®
Laser power correction	adjustable under Windows®
Current consumption	typ. 150 mA
Dead time	adjustable under Windows®
Dead time mode	static or dynamic, adjustable under Windows®
Scan frequency	typ. 15 kHz (without averaging)
Switching state indication	Visualization by means of a yellow LED
Operation indication	Visualization by means of a green LED
Potentiometer	for adjustment of analog value (0 ... +10V)
Dyn. output (pulse lengthening)	adjustable under Windows®
Modulation frequency	typ. 100 kHz
Max. rotation speed	typ. 30000 RPM
Enclosure rating	IP54
Operating temperature range	-20°C ... +50°C
Housing material	Aluminum, anodized in blue
Housing dimensions	LxWxH approx. 200 mm x 40 mm x 40 mm
Interface	RS232, parameterizable under Windows®
Type of connector	Connection to PLC: 8-pole female connector Binder 712 Connection to PC (RS232-interface): 5-pole female connector Binder 702
Connecting cables	to PLC: cab-las8/SPS (different cable lengths available) to PC: cab-las5/PC, cab-las5/USB, or SI-RS232/Ethernet-5 (different cable lengths available)
Max. switching current	100 mA, short-circuit-proof
EMC-test acc. to	DIN EN 60947-5-2



Laser blade counter (split version), working range individually adjustable:

Product name

LBC-CON1 (electronic control unit)
LBC-FE-TR (transmitter-/receiver unit), **LBC-FE-R** (receiver unit)



Laser	Semiconductor laser, 670 nm, AC-operation, 1mW max. opt. power, laser class 2 (DIN EN 60825-1)
Optical filter	Interference filter + red light filter
Digital output (OUT0)	pnp bright-switching/npn dark-switching or pnp dark-switching/npn bright-switching
Analog output	0 ... +10V
Voltage supply	+12VDC ... +32VDC
Sensitivity setting	adjustable under Windows®
Laser power correction	adjustable under Windows®
Current consumption	typ. 150 mA
Dead time	adjustable under Windows®
Dead time mode	static or dynamic, adjustable under Windows®
Scan frequency	typ. 15 kHz (without averaging)
Switching state indication	Visualization by means of a yellow LED
Operating indication	Visualization by means of a green LED
Dyn. output (pulse lengthening)	adjustable under Windows®
Modulation frequency	typ. 100 kHz
Max. rotation speed	typ. 30000 RPM
Working range	individually adjustable (max. 250 mm to the object)
Enclosure rating	IP54
Operating temperature range	-20°C ... +50°C
Housing material	Aluminum, anodized in blue
Housing dimensions	Electronic control unit LBC-CON1: LxWxH approx. 205 mm x 40 mm x 40 mm Transmitter-/receiver unit: LBC-FE-TR: LxWxH approx. 40 mm x 32 mm x 24 mm Receiver unit LBC-FE-R: LxWxH approx. 40 mm x 32 mm x 24 mm
Interface	RS232, parameterizable under Windows®
Type of connector	Connection of LBC-CON1 to PLC: 8-pole female connector Binder 712 Connection of LBC-CON1 to PC (RS232-interface): 5-pole female connector Binder 702 Connection of LBC-CON1 to LBC-FE-TR: 8-pole connector Binder 712 Connection of LBC-CON1 to LBC-FE-R: 5-pole connector Binder 702
Connecting cables	LBC-CON1 to PLC: cab-las8/SPS LBC-CON1 to LBC-FE-TR: cab-lcc-8, LBC-CON1 to LBC-FE-R: cab-lcc-5 LBC-CON1 to PC: cab-las5/PC, cab-las5/USB, SI-SR232/Ethernet-5 (different cable lengths available)
Max. switching current	100 mA, short-circuit-proof
EMC-test acc. to	DIN EN 60947-5-2



Application Examples

Measuring the speed of impellers (turbocharger or fan) with laser sensor LBC-200

