

Product Part Number
BOD 63M-LI06-S4

## Safety Advisory

## Laser Protection Regulations



The emitter corresponds to Laser Class 2 according to IEC 60825-1. This means that no additional precautions need to be taken for
operation. The device should be installed so that the laser warning label is easily visible.

These devices may not be used in applications where the safety of persons depends on device function.
C $\epsilon$ The CE Mark verifies that our products meet the requirements of the current EMC Directive.
Testing in our EMC Laboratory, which is accredited by DATech for Testing of Electromagnetic Compatibility, has shown that these Balluff products satisfy the EMC requirements of the following Generic Standards:
EN 61 000-6-4 (Emission) and
EN 61 000-6-2 (Noise Immunity)

## Application

Only for NFPA 79 applications (machines with a supply voltage of maximum 600 volts). Device shall be connected only by using any R/C (CYJV2) cord, having suitable ratings.

## Principle of operation

The BOD 63M measures distances which are output over the IO-Link interface. The sensor also has one adjustable switching output.
The BOD 63M works according to the principle of time of flight. A light pulse is sent out, reflected from the object and received again. The time of flight of this light pulse is measured and converted into a digital distance signal.

Display and operating elements


1) Stability indicator (red)
2) Output function indicator OUT 2 (yellow)
3) Output function indicator OUT 1 (yellow)
4) Power on indicator (green)
5) SET-button for switching distance 1 (OUT1)
6) SET-button for switching distance 2 (OUT2)

Fig. 1: Display and operating elements
The green LED indicates the ready state of the sensor. The yellow LED "OUT 1 " indicates the „active" state of switching output 1.
The yellow LED "OUT 2" indicates the „active" state of switching output 2.
The red LED indicates that the intensity of the signal for reliable operation is not sufficient.
The SET buttons are used to set the switching distances of the sensor independently of each other.

Installation


1) Optical axis of emitter
2) Optical axis of receiver
3) Display and control panel
4) rotatable by $270^{\circ}$

Fig. 5: Dimensions
Connections


Fig. 2: Wiring diagram, connector pins

1. Install and align the sensor.
2. Open the menu: Hold down both buttons simultaneously for 3 s . The green LED flashes.
3. Position the object in the beam path.
4. Store the current object position: Press SET "Out 1" for 2 s . During this time the output function indicator OUT1 flashes.
Note! This switching output is immediately active!
5. Optional: To store the second object position, reposition the object.
6. Saving the current object position: Press SET "Out 2" for 2 s . During this time the output function indicator OUT2 flashes.
Note! This switching output is immediately active!
7. To exit the menu: Hold down both buttons simultaneously for 3 s . The sensor is ready. The sensor will also exit teach-in mode automatically after 2 min . without pressing any buttons.

## Digital signal

A digital signal is output depending on the position of the object.

$a=\max$. non-linearity
$b=$ Measuring range
Fig. 3: IO-Link data (hexadecimal)

## Process data

## Output data

The sensor sends 3 bytes to the Master.

| Byte 0 |  |  |  |  |  | Byte 1 |  |  |  | Byte 2 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 7 | 65 | 4 | 3 | 2 | 10 | 76 | 54 | 31 | 10 | 76 | 65 | 54 | 32 | 10 |
|  |  | - | $\pm$ .0 0 0 0 0 0 0 0 0 | ¢ |  |  | MS |  | istanc | e | value | LSB |  |  |

Distance value Distance in mm from the active surface of the sensor to the target
Switchpoints "1" Switching distance not reached
1... 4
"0" Switching distance exceeded
Fehler "1" Receiving power too low, the distance value is not reliable. Distance value FFFF
"0" Distance value is reliable.

## Input data

The sensor receives 1 byte from the Master.


| Laser ON | "1" | Laser turned on |
| :--- | :---: | :--- |
|  | "0" | Laser turned off |

## Parameter data

The sensor parameters are configured over the SPDU channel. The following addresses can be read:

| Index (Hex) | Description | Data width | Content |
| :---: | :---: | :---: | :---: |
| 0010 | Manufacturername | 7 bytes | Balluff |
| 0011 | Manufacturer text | 15 bytes | www.balluff.de |
| 0012 | Product name | 15 bytes | BOD 63M- <br> LI06-S4 |

The following addresses can be parameterized:

| Index <br> (Hex) | Description | Data width | Value <br> range | Default <br> values |
| :---: | :---: | :---: | :---: | :---: |
| 0040 | Switchpoint 1 | 2 bytes | $200-6000$ | EEPROM |
| 0041 | Switchpoint 2 | 2 bytes | $200-6000$ | EEPROM |
| 0042 | Switchpoint 3 | 2 bytes | $200-6000$ | 3000 |
| 0043 | Switchpoint 4 | 2 bytes | $200-6000$ | 3000 |



Fig．6：Measuring range as a function of object reflection

## Measuring accuracy

The sensor does not attain its full accuracy until operating temperature is reached，i．e．some time after power－on． The duration of this warm－up phase depends on ambient conditions．

| Accessories |  |
| :--- | :--- |
| Connecting | BKS－B 19－1／GS4－PU－．．．for operating <br> cable： |
|  | in IO－Link mode <br> BKS－B 19－3．．．for operating in SIO <br> mode |
|  | For high－noise environments a shielded <br> cable is recommended： |
|  | BKS－S 19－14－PU－05 with RSC 4／7 <br> connector |
| Mounting | BOD 63－HW－1 |
| bracket： |  |

## Technical data

Optical

| Working distance | $200 . . .6000 \mathrm{~mm}$ |
| :--- | :--- |
| Emitter light type | Laser red light，pulsed， <br> can be turned off（only in <br> IO－Link mode） |
| Laser Class acc．IEC 60825－1 | 2 |
| Pulse power $\mathrm{P}_{\mathrm{p}}$ | $<70 \mathrm{~mW}$ |
| Average power P | $<1 \mathrm{~mW}$ |
| Wavelength | 660 nm |
| Pulse width t | 7 ns |
| Pulse repetition frequency f | 2 MHz |
| Light spot diameter <br> at range 200 mm <br> at range 6000 mm | 10 mm |
| Resolution | 10 mm |
| Gray value shift | $\leq 1 \mathrm{~mm}$ |
| Repeat accuracy | $\leq 1.5 \%$ |
| Temperature drift | $\leq \pm 4 \mathrm{~mm}$ |
| Switching hysteresis | $\leq 1.5 \mathrm{~mm} / \mathrm{K}$ |
| Utilization category | $\leq 15 \mathrm{~mm}$ |

Electrical

| Supply voltage $\mathrm{V}_{\mathrm{s}}$ | $18 \ldots . .30 \mathrm{~V} \mathrm{DC}$ |
| :--- | :--- |
| No－load current lo max． | $\leq 90 \mathrm{~mA}$ |
| Rated operating current | 200 mA |
| Switching outputs | 2, PNP／N．O．（only in SIO <br> mode） |
| Error signal | Yes（only in IO－Link <br> mode） |
| Button lock | Yes（only in IO－Link <br> mode） |
| Voltage drop V ${ }_{\mathrm{d}}$ at l l |  |
| Switchpoint settings | $\leq 2.5 \mathrm{~V}$ |
|  | Teach－In／IO－Link |
| IO－Link data |  |
| Baud rate | 38.4 kbaud |
| Linearity | $\leq \pm 1 \%$ |
| Repeat accuracy | $\leq \pm 4 \mathrm{~mm}$ |
| Temperature drift | $\leq 1.5 \mathrm{~mm} / \mathrm{K}$ |
| Measuring range | $200 \ldots . .6000 \mathrm{~mm} \rightarrow$ |
| Min．process data cycle | $\leq 16.5 \mathrm{~ms}$ |


| Mechanical |  |
| :--- | :--- |
| Connection type | Connector，M12x1 <br> 4－pin |
| Housing material | Al alloy |
| Lens material | Glass |
| Weight（incl．holder） | 260 g |
| Contamination class | 3 |

## Time（SIO－mode）

| Ready delay | $\leq 50 \mathrm{~ms}$ |
| :--- | :--- |
| Switching frequency | $\geq 150 \mathrm{~Hz}$ |
| On－delay | $\leq 3.4 \mathrm{~ms}$ |
| Off－delay | $\leq 3.4 \mathrm{~ms}$ |


| Indicators |  |
| :--- | :--- |
| Power | Green LED |
| Output function | $2 \times$ yellow LED |
| Error | Red LED |

## Ambient

| Degree of protection | IP 67 |
| :--- | :--- |
| Protection class | II |
| Reverse polarity protected | Yes |
| Short circuit protected | Yes |
| Permissible ambient light | $\leq 10 \mathrm{kLux}$ |
| Ambient temperature $\mathrm{T}_{\mathrm{a}}$ | $-10 \ldots+60^{\circ} \mathrm{C}$ |

US 81112
for use in the secondary of a class 2 source of supply

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