BOL 27K-PS/NS-01

Line sensor

INSTRUCTION MANUAL

CONTROLS

OUTPUT LED
The yellow LED ON indicates that the NO output is closed.

DISPLAY (green-coloured display)
The display indicates the value of the measurement detected [operating mode function].
Please refer to the following paragraphs for the correct indications to follow during the acquisition or setting phase.

M1, M2 LEDs
The LED couple visualises the operating mode according to the table given below:

OPERATING MODE	M1 LED	M2 LED
Object beg. – Object end	OFF	OFF
Object centre position	OFF	ON
Width measurement	ON	OFF
Area	ON	ON

ALARM LED
The blinking of the alarm LED indicates that the received signal is insufficient for the correct sensor functioning. In this case the "digital alarm" output is activated.

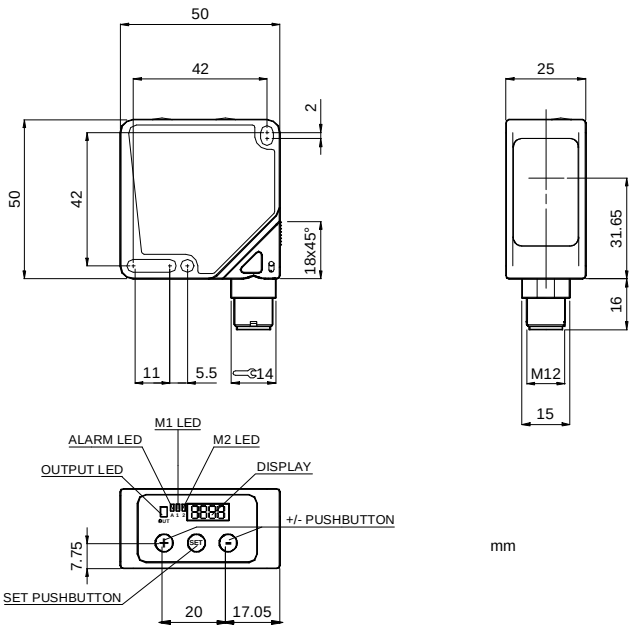
SET PUSH-BUTTON
Pressing the push-button for at least 2 seconds activates the self-setting procedure (2 thresholds => 2 phases).
A long pressure on the button (at least 6 seconds) allows the user to access into the sensor parameter setting menu.
Please refer to the following paragraphs for the correct indications to follow during the parameter setting phase.

+/- PUSH-BUTTONS
Pressing the + or – push-buttons for at least 2 seconds allows the user to access into the manual adjustment mode of the 2 switching thresholds.
The contemporary pressure on the + and – push-buttons (at least 2 seconds) activates the acquisition procedure of the working area map.
The contemporary pressure on the + and – push-buttons (at least 6 seconds) activates the setting procedure of the reflecting tape characteristics.
Please refer to the following paragraphs for the correct indications to follow during functioning.

INSTALLATION

The sensor can be mounted by means of the three housing's holes using two screws (M4x35 or longer) with washers.
Various orientable fixing brackets to ease the sensor positioning are available (please refer to the accessories listed in the catalogue).
The operating distance is measured from the front surface of the sensor optics.
The M12 connector can be oriented at three different positions using the specific fastening spring and rotating the block of 180°.

DIMENSIONS



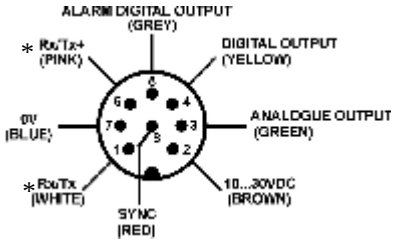
mm

TECHNICAL DATA

Power supply:	10 … 30 Vdc limit values
Ripple:	2 Vpp max.
Consumption (output current excluded):	70 mA max.
Outputs:	1 PNP or NPN output 30 Vdc max. (short circuit protection) 1 PNP or NPN alarm output 30 Vdc max. (short circuit protection) 4-20mA analogue output
SYNC input:	PNP (+V)
Output current:	100 mA max.
Output saturation voltage:	≤ 2 V
Switching frequency:	> 130 Hz
Indicators:	4 digit display (GREEN), OUTPUT LED (YELLOW) 1 ALARM LED (GREEN) 2 LEDs (M1, M2) operating mode (GREEN)
Setting:	+, -, SET push-buttons
Data retention:	non volatile EEPROM memory
Operating temperature:	-10 … 55 °C
Storage temperature:	-20 … 70 °C
Electrical protection:	Class 2
Operating distance (typical values):	200 mm
Measurement range:	150 mm
Minimum object detectable:	0.9 mm
Resolution:	0.15 mm
Linearity:	1% max.
Emission type:	infared (875nm)
Ambient light rejection:	according to EN 60947-5-2
Vibrations:	0.5 mm amplitude, 10 … 55 Hz frequency, for each axis (EN60068-2-6)
Shock resistance:	11 ms (30 G) 6 shock for each axis (EN60068-2-27)
Housing material:	ABS
Lens material:	Glass window and lenses
Mechanical protection:	IP67
Connections:	8-pole M12 connector
Weight:	100 g. max.

CONNECTION

M12 CONNECTOR



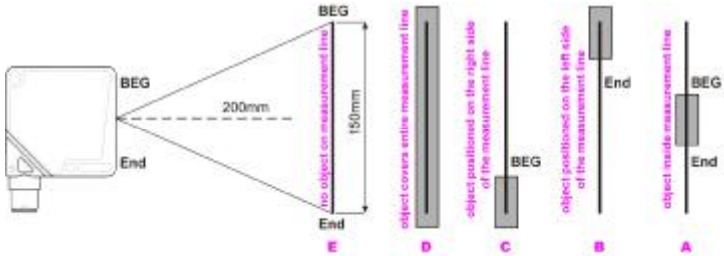
* Available only for the versions with RS485 serial interface (consult factory).
NOTE: The wire colours are referred to the cables manufactured according to the European standard.

FUNCTIONING

The BOL 27K-PS/NS-01 sensor is a line sensor.
The typical functioning diagram is shown in the drawing given below. The object to detect is placed in front of the sensor and the reflecting tape (inside the package) behind the sensor. The sensor illuminated with IR lights the tape and receives the reflected light on a photodiode array. Each object placed between the reflecting tape and the sensor is naturally detected as a dark spot on a luminous background.
The sensor has 5 operating modes:

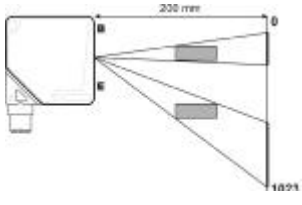
- **Object beg.**: the position of the first object edge is detected
- **Object end**: the position of the second object edge is detected
- **Object centre**: the centre of the object is measured
- **Width**: the distance between the first and last object edge is measured
- **Area**: the sum of all the object obscured zones is measured

The following diagram shows the sensor output according to the possible object position inside the meaurement zone.



	First ob. edge	Last ob. edge	Center	Width	Area
A	Beg	End	(Beg+End)/2	End-Beg	End-Beg
B	End	End	0	0	End
C	Beg	Beg	0	0	1023-Beg
D	0	0	0	0	1023
E	0	0	0	0	0

APPLICATION NOTES



The drawing shows how the same object can generate different obscured zones if placed in different positions inside the sensor working zone. The same happens if the object is placed at different distances.
The "Area" operating mode is particularly sensitve to the reflecting tape's characteristics and for this reason the sensor can detect the main specifications of the tape used (please refer to "Advanced functions" paragraph").