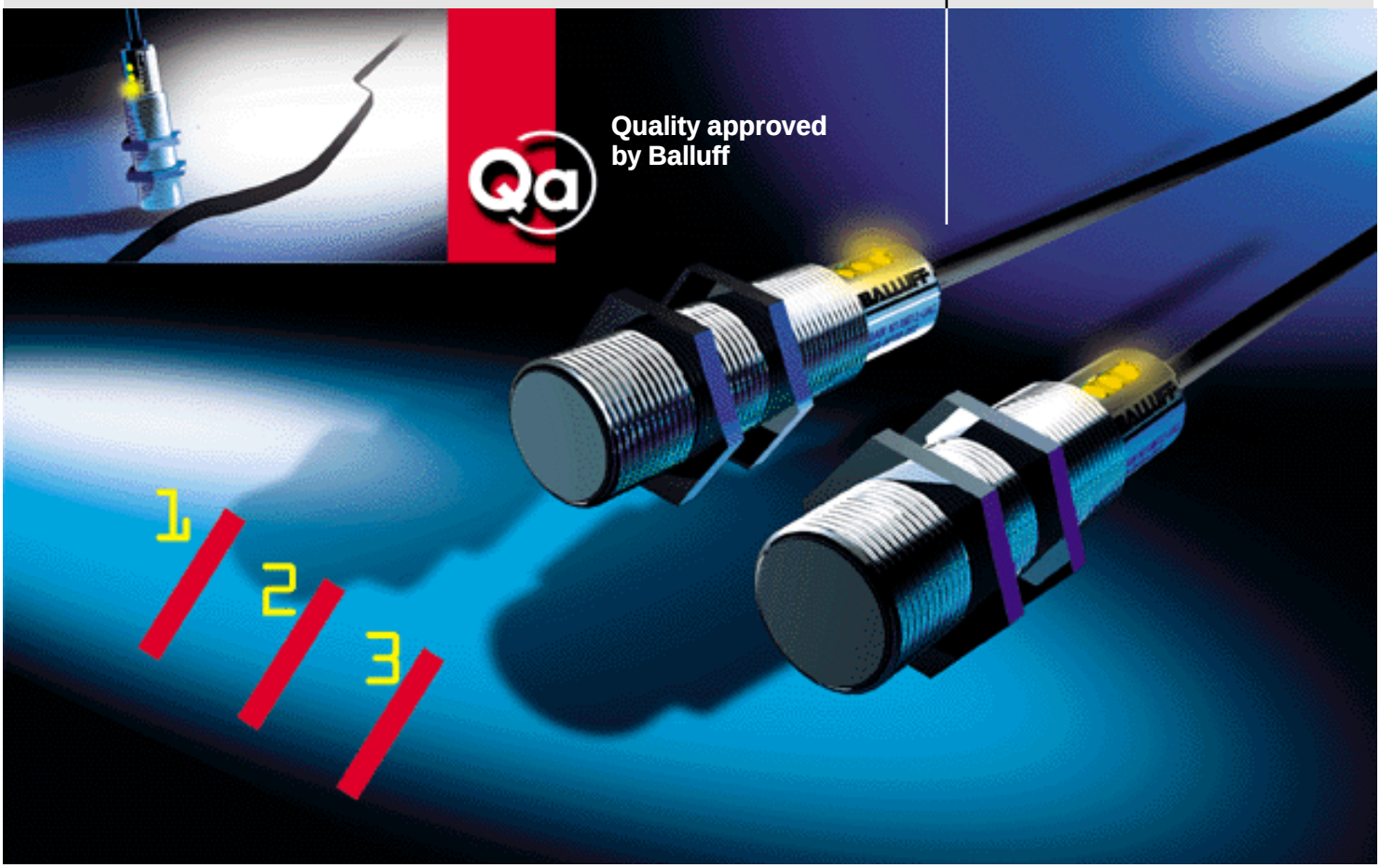
BALLUFF

BAW

The Inductive Analog Sensor –
with three programmable switching outputs

- 3 switching outputs and 1 analog output
- Teach-in programming
- Size M18
- Sensing range 4 mm
- High repeatability
- Compact, sealed, rugged and reliable



Analog Sensor –
with three programmable
switching outputs

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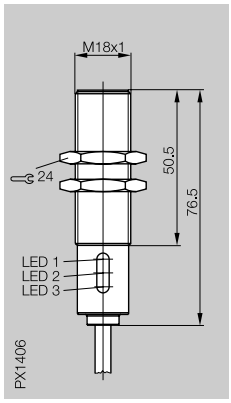
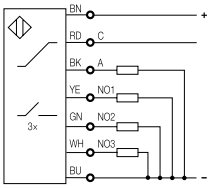
Quality approved by Balluff

Housing size	**M18×1**
Mounting	flush
Output signal	**Voltage 0...10 V**
Linear range s_l	1...5 mm

CE



Wiring diagram



Ordering code	BAW M18MI2-UAC50B-BP05-002
LED display for each output	yes
freely programmable switching distances	1...5 mm
Hysteresis	≤ 0.3 mm
Repeatability	≤ 0,1 mm
Current rating I_e for one output	20 mA
Voltage drop U_d at I_e	≤ 1.5 V

Analog sensor with integrated switching outputs

Inductive analog sensors output a signal which is proportional to the target distance.
Many applications also call for a switching signal at certain points along the travel distance. These discrete signals are used to indicate when a particular position of the target, generally the moving member of a machine, has been reached.
In the past this required the use of an additional, external analog switching device.
This separate component has now been eliminated.
Balluff has developed an analog sensor with three integrated switching thresholds. These thresholds are programmable and are available as a switching signal on their own dedicated lines.
All this is packaged in a standard M18 housing 76 mm in length.
The switching outputs are programmed using a "teach-in" procedure, whereby the sensor is positioned at the desired switching distance from the object.

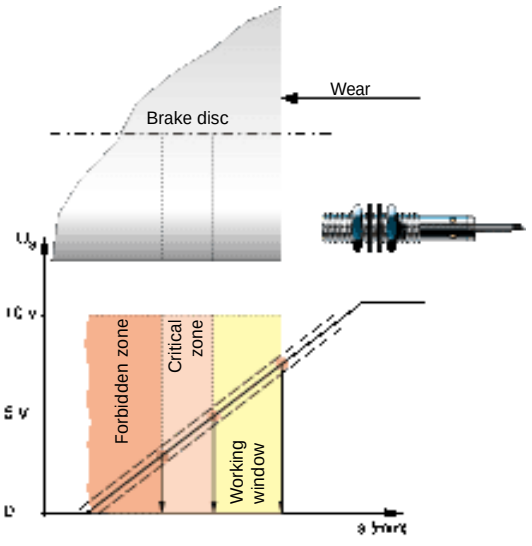
By connecting the control line with + the switch is "taught", i.e. now knows to switch an output whenever this internal signal level is reached.
An LED for each output indicates the switching state of that output.
In addition an analog signal from 0 to 10 V is output.
The linearity of this signal is <±3 %, with a sensing range of 1...5 mm.
The sensor may be flush mounted in steel.

Two in one – Sensor and analog switching unit

Instead of mounting two devices, only the sensor itself is necessary. Since programming is remote, the switching outputs can be set even if the sensor is mounted in an inaccessible location.

Setting specific switchpoints after a sensor is installed

When installing highly precise sensors, cumbersome calibration is often required.
To avoid this, sensors can be used whose switchpoints can be set directly in the sensor, without requiring connection to a PLC. This increases the switching accuracy at a specific switchpoint while reducing installation time.
By programming up to three switchpoints, "working windows" can be created which provide information about the specific operating condition for the object.
When a defined limit value is reached, a warning signal can be generated.





For easy programming:
BES 516-4

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Inductive Sensors

ULTRALINEAR™ Analog Sensors Set Point Output

Technical Description

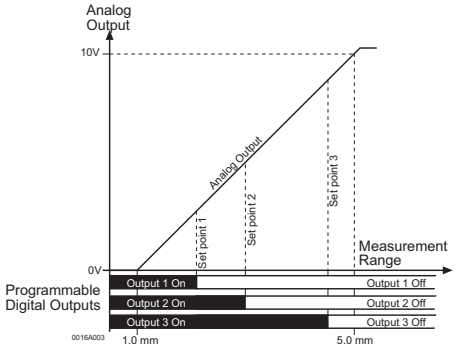
For the ultimate in flexibility, Balluff offers an ULTRALINEAR™ analog sensor with three independently programmable, discrete setpoint outputs, along with an analog voltage output for reference. By holding a metal target in position and momentarily connecting the control line to the supply, the output is preset to change states whenever it reaches the programmed analog signal level. Setpoint programming can be accomplished using your PLC or with an available hand-held programmer (order separately BES-516-4).

Features

All the exceptional features from our standard ULTRALINEAR™ family plus...

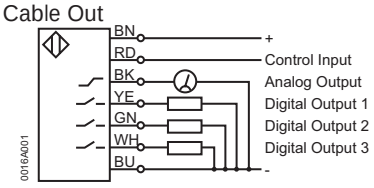
- Remotely programmable setpoints
- Process can be reconfigured on the fly by altering controller's programmed response
- No need to physically adjust sensor position for a particular setpoint
- Status LED for each setpoint output

Output Signals

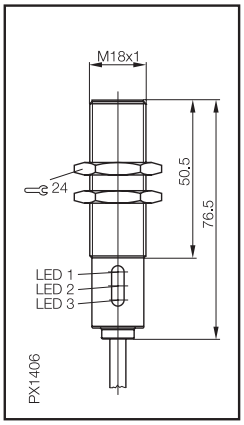


Wiring Diagram

Cable Out



Housing size	**M18×1**
Mounting	flush
Output signal	**0...10 V**
Linear range s_l	1...5 mm



Ordering code	BAW M18MI2-UAC50B-BP05-002
Voltage 0…10 V	
Rated operational voltage U_e	24 V DC
Supply voltage U_B	15…30 V DC
Ripple	≤ 3.6V DC
Linear span s_L [1]	4.00 mm
Midpoint of linear range s_e [2]	3.00 mm ± 0.3 mm
Resolution [3]	0.01 V per 0.004 mm
Repeatability [5]	± 0.12 mm
Non-linearity, max. [4]	± 0.12 mm
Temperature drift, max. [6] (+15…55 °C)	0.001 mm/°K
Ambient temperature range T_a	-10…+70 °C
Cutoff frequency (-3 dB analog output amplitude)	500 Hz
Maximum switching frequency, discrete outputs	1000 Hz
Load resistance R_L	≥2 kΩ
No-load supply current I_0 @ U_e	≤20.0 mA
Ambient temperature range T_a	-10…+70 °C
Current rating I_e per setpoint output	20.0 mA
Switchpoint hysteresis	≤0.3 mm
Switchpoint repeatability	≤0.1 mm
Rated insulation voltage U_i	75 V DC
Degree of protection per IEC 529	IP 67
Housing material	nickel plated brass
Sensing face material	PBTP
Connection	5 m unshielded PUR cable (7 x 24 AWG)
LED display for each setpoint output - active ON	yes
Short circuit/overload protected	yes
Protected against polarity reversal	yes



Optional BES-516-4 hand-held programming unit

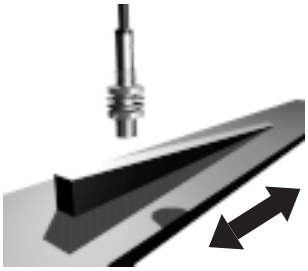


Analog Inductive Sensor Applications

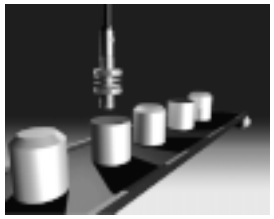
ANALOG

Applications

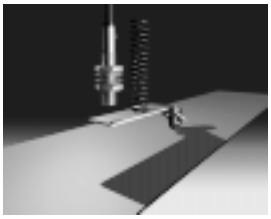
- distance measurement
- thickness measurement using opposed sensors
- thickness measurement using leverage
- concentricity measurement
- circularity measurement
- wobble measurement
- deflection measurement
- wear measurement
- metal homogenity measurement
- sorting metal objects by size, shape, material
- metal object orientation sensing
- absolute linear position feedback using direct metal target approach
- absolute linear travel feedback using angled metal surface to increase effective range
- absolute rotary position feedback using eccentric metal cam



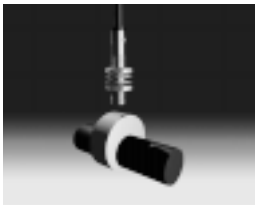
Position feedback using ramped target.



Sorting metal objects.



Paper thickness measurement using leverage. This arrangement can be used to distinguish between 1 or 2 sheets. Applications include document readers, mass printers, etc. Resolution varies with leverage.



Eccentricity sensing or absolute angle positioning.



Nuts are checked for correct orientation (automated assembly).



Measuring the deflection of a spring steel band to maintain pressure on sheet material.



Measuring deflection of a saw blade.
The saw blade position is detected by the sensor and the blade guide mechanism accordingly adjusted.



Detecting large linear motion on machines using economical analog sensors.
Detecting a defined center position of a sliding, rotating machine part.
A controller processes both sensor signals.

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