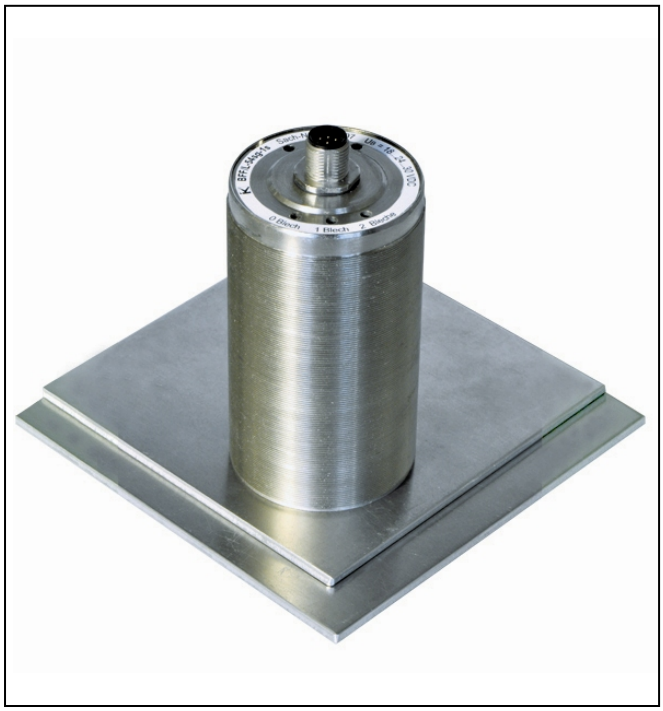


Application

The self-contained Double Sheet Metal Sensor BDK Uno is used for single-surface contact monitoring of non-ferrous (NF) sheet metals. It is especially suitable when sheets are to be measured to detect double sheets. The BDK Uno sensor can be installed in a suction cup gripper or in a control station as integral part. Non-magnetic sheets with a thickness of 0.1 mm to 6 mm for aluminium or 0.3 mm to 5 mm for stainless steel can be monitored.

Configuration

The BDK Uno for non-ferrous sheets consists of a sensor and evaluation electronics in a cylindrical housing made from nickel-plated steel. The exciter coil of the sensor generates an eddy current field in the non-ferous sheet to be measured by the sensor coil. The field strength is nearly proportional to the sheet thickness. Since the field does not suck in the sheets, it is necessary, for measurement, that the sheet covers the complete sensor's surface without air gap.

The BDK Uno for non-ferrous sheets is fitted with an 8-pole M12 connector for the power supply and control and signal function. Two semiconductor outputs (K0 and K1) indicate the number of the detected sheets. There are three LEDs for visual monitoring and for calibration indication. An optional version has a non-linear analogue output (with a choice of current or voltage output) to assist, for example, threshold value monitoring in a post-connected Programmable Logic Controller (PLC).

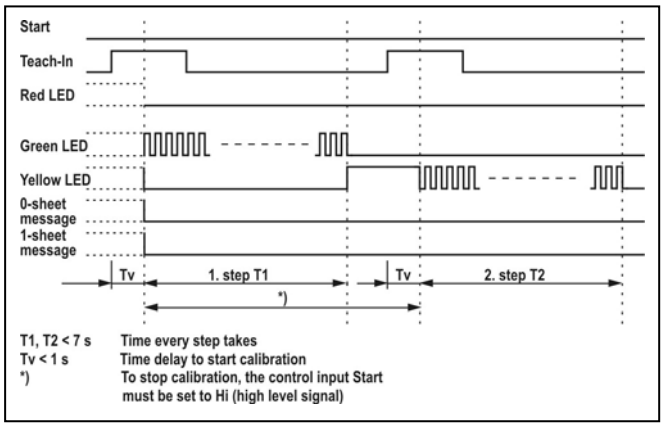
Teach-In

Calibration is initiated by the high active control input *Teach-In*. It consists of two equal parts (two step calibration). The system is calibrated for sheet thickness and sheet type.

The evaluated calibration parameters are stored in a non-volatile memory (EEPROM) so that they are available even after a power failure.

To start calibration, the control input *Teach-In* must be set for approx. 2 seconds to *Hi* (high level signal) while *Start* is *Lo* (low level signal). The green LED blinks. After the first calibration step, the green LED is switched off and the yellow LED switched on. To start the second calibration step, *Teach-In* must again be set to *Hi* for about 2 seconds. The yellow LED blinks during calibration and switches off when calibration has finished. The sheet metal must rest on the sensor and cover completely the sensing face during the first or the second calibration step. Sheets of different thickness and type require recalibration.

If calibration is started by mistake, this procedure may be stopped before the second calibration step begins (see timing diagram for *Teach-In*). To do so, the control input must be set to *Hi* for at least 400 ms. The sensor then returns to its previous operating mode.



Timing diagram: Teach-In

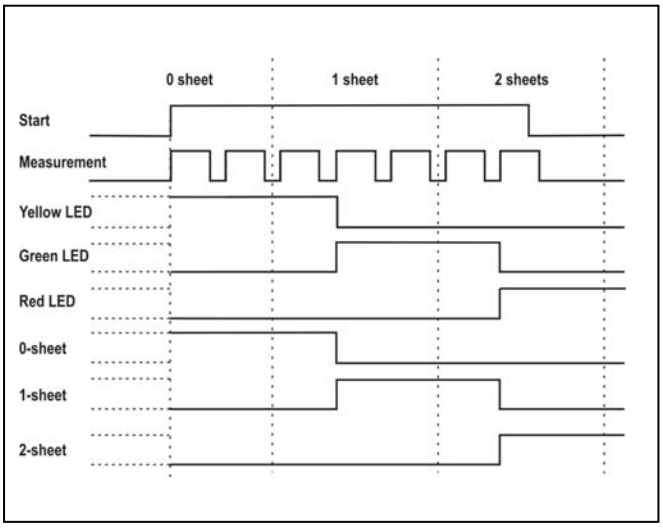
Outputs

After every measurement the current result (0-, 1-, or 2-sheet(s)) is available at two semi-conductor outputs for further processing in a Programmable Logic Controller (PLC). There are three LEDs for visual monitoring. The diagram below shows the time sequences of a measurement.

Message outputs		
Sheets	0-sheet message	1-sheet message
0	1	0
1	0	1
2	0	0

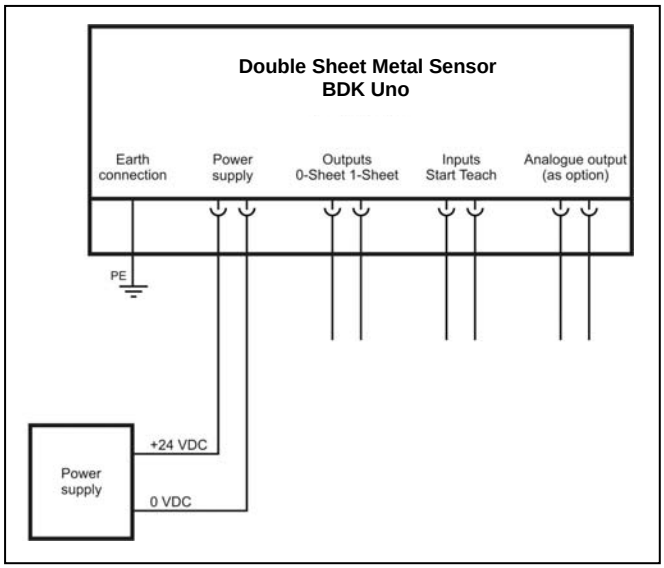
LED			
Sheets	yellow LED	green LED	red LED
0	**on**	off	off
1	off	**on**	off
2	off	off	**on**

Measurement is initiated by the control input *Start*. As long as this is set to *Lo*, the sensor is on standby and stores the last measuring result. Measurement is possible as long as the sheet is within the measuring range. For a continuous measurement the control input has to be set to *Hi*.

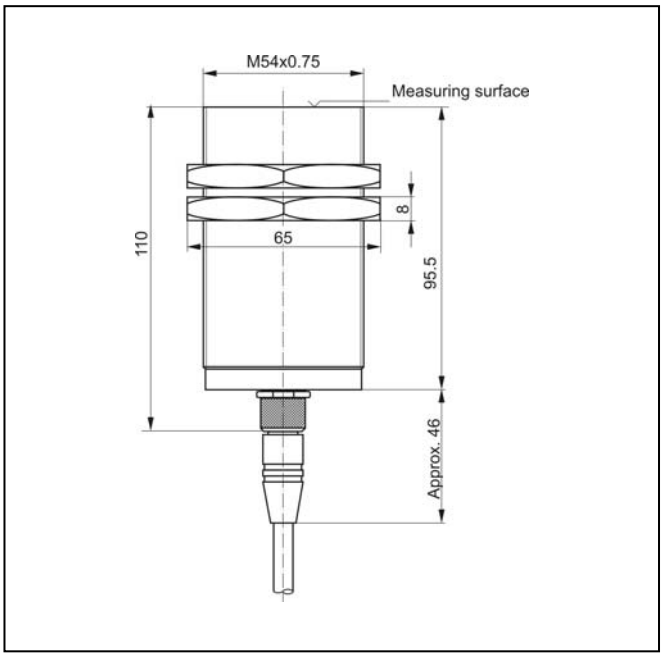


Timing diagram: Measuring procedure

Wiring diagram



Housing dimensions



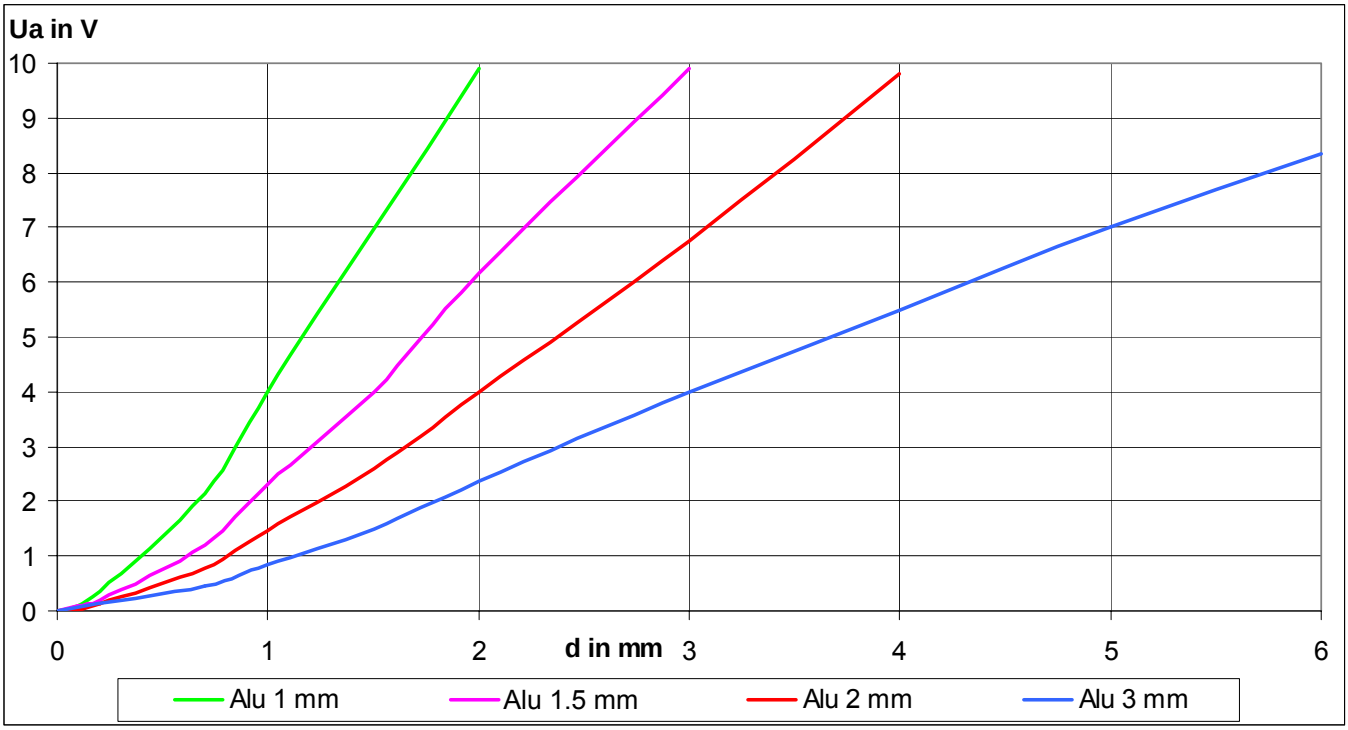


Diagram: Output voltage at the analogue output (ref. no. **13.35-06**) depending on the sheet metal thickness d and material (Aluminium sheets)

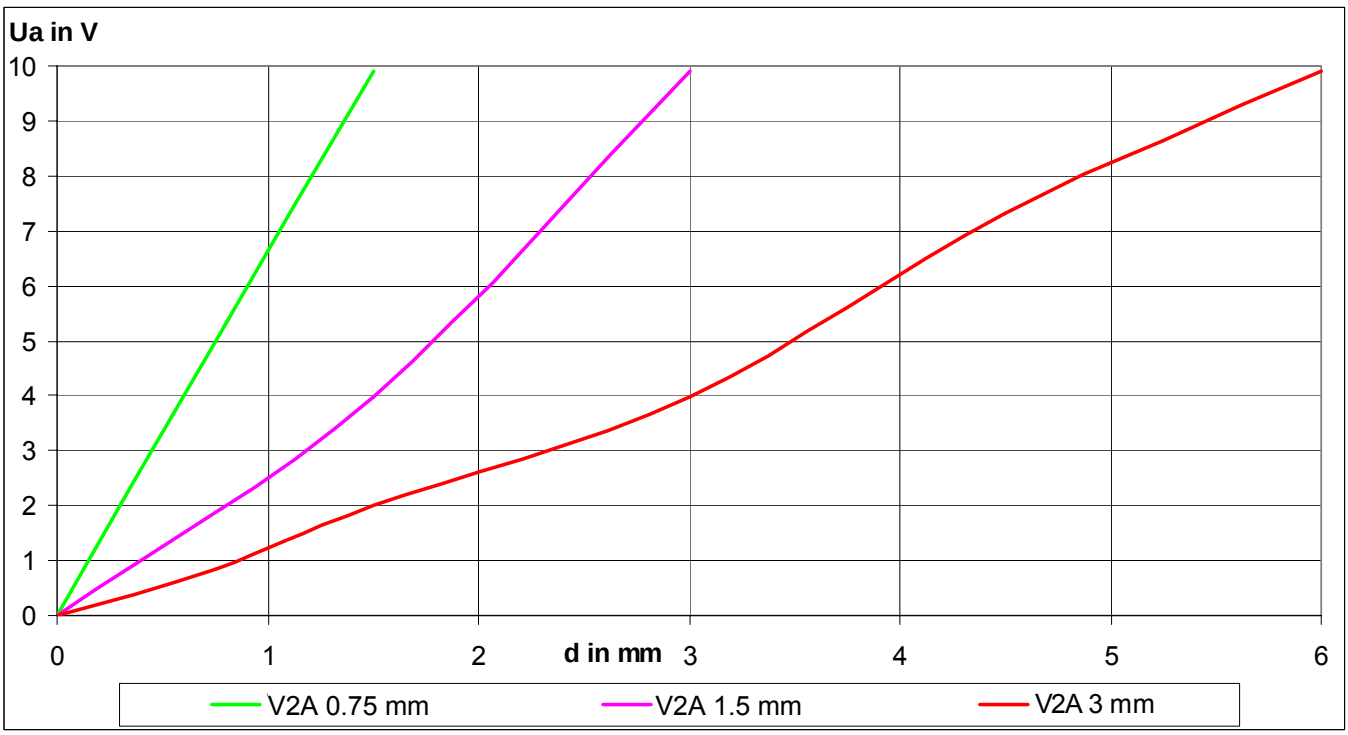


Diagram: Output voltage at the analogue output (ref. no. **13.35-06**) depending on the sheet metal thickness d and material (V2A sheets)

Technical data

Self-contained Double Sheet Metal Sensors BDK Uno for non-ferrous sheet metals

Single surface contact measurement

BED/L-54sg-1s Ref. no. **13.35-05**

Operating voltage U_B	19 … **24** … 30 V DC
Reverse polarity protection	yes
Current consumption	max. 300 mA
Operating temperature	0 … + 55 °C
Inputs	
Start signal	Hi = 12 … **24** … 30 V DC Lo = 0 … 5 V DC
Input current	approx. 5 mA (for 24 V DC)
Teach-In	Hi = 12 … **24** … 30 V DC Lo = 0 … 5 V DC
Input current	approx. 5 mA (for 24 V DC)
Outputs	
Logic outputs	semiconductor, plus switching, short-circuit proof
Output voltage	≥ U_B – 1.75 V
Output current	max. 100 mA
Electrical isolation	no
Status indicator	three LEDs in red, green, yellow
Measuring time	max. 20 ms, min. 3 ms
Measuring procedure	eddy current
Wiring	M12 Euro connector
Dimensions (H x D)	950 x 54 mm^2
Weight	approx. 750 g
Material housing	nickel-plated stainless steel
Sheet metal thickness range (1-sheet)	
Non-ferromagnetic (Alu)	0.1 … 6 mm
Non-ferromagnetic (V2A)	0.3 … 5 mm

BEE/L-54sg-1s Ref. no. **13.35-06**

Data like BED/L-54sg-1s (13.35-05),
but with additional analogue voltage output.

Output voltage	0 … 10 V, non-linear 1-sheet corresponds to 40 % of the value range
Load resistance	≥ 10 kΩ
Electrical isolation	no
Resolution	256 steps

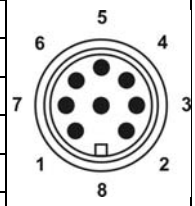
BEF/L-54sg-1s Ref. no. **13.35-07**

Data like BED/L-54sg-1s (13.35-05),
but with additional analogue current output.

Output current	0 … 20 mA, non-linear 1-sheet corresponds to 40 % of the value range
Load resistance	≤ 500 Ω
Electrical isolation	no
Resolution	256 steps

Pin assignment

Pin no.	Colour	Function
1	white	+24 V DC
2	brown	M
3	green	0-sheet message K 0
4	yellow	1-sheet message K1
5	grey	Start signal
6	pink	Teach-In signal
Only for ref. no **13.35-06** a. **13.35-07**		
7	blue	Analogue output
8	red	Analogue output M



The Double Sheet Metal Sensor must be earthed either at the device end (housing) or at the shield connector.

Connection leads

All connection leads are resistant to oil and suitable for drag chains. When ordering, please indicate the lead length X (standard value X = 5 m).

VLG8E/8S/5-1 **5 m** Ref. no. 20.18-92-050
Connection lead of 5 m for
BDK Uno, BDK Duo
straight, shielded.

VLG8E/8S/10-1 **10 m** Ref. no. 20.18-92-100
Connection lead of 10 m for
BDK Uno, BDK Duo
straight, shielded.

VLG8E/8S/20-1 **20 m** Ref. no. 20.18-92-200
Connection lead von 20 m for
BDK Uno, BDK Duo
straight, shielded.

By using unshielded leads, interference signals may be generated.

Max. lead length is 50 m (for 0.25 mm^2 lead diameter).

We are certified according to DIN EN ISO 9001.

Subject to changes!