



Double Sheet Detector BDK-A

- **NEW Universal System**
- **5" colour touch display (TFT)**
- **easy and convenient operator guidance**
- **current parameters + measuring display**
- **additional control by LED lights**
- **for ferrous and non-ferrous metal sheets**
- **reliable measuring in harsh environment**
- **high tolerance with possible air gap**
- **contact measurement up to 5.5 mm**
- **non-contact measurement up to 6.5 mm**
- **operation with 2 Sensors and more**
- **extensible with T-Coupler and Switch**
- **up to 2048 program memories**
- **serial Interfaces, PROFIBUS, PROFINET**
- **compatible with BDK-1.3 and BDK-ET**

When metal sheets are automatically removed from a stack, it often happens that several sheets are accidentally fed to the processing station. If this is not recognised in time, production downtimes, damage to machinery or toolings with costly repairs and are often unavoidable.

Klaschka double sheet metal detectors provide safe and cost-effective protection. The BDK and BDIG systems have proven themselves for many years in forming technology and especially in the automotive industry. They work reliably in harsh environments, measure quickly and accurately with a high tolerance (even with possible air gap between two sheets).

The new innovative BDK-A generation combines these features and, with its 5" colour touch display (TFT), offers fast, convenient operator guidance and visualisation of all program steps, processes and measurement results.

With suitable connecting leads and plug connectors, the system can be installed and commissioned quickly and easily.

Ferrous / magnetic (Fe) and non-ferrous /non-magnetic (NE) sheets can be reliably inspected with contact sensors up to 5.5 mm and with non-contact sensors up to 6.5 mm.

Up to 4 (different) sensors can be connected by using T-couplers. With sensor switches, up to 8 (identical or different) sensors can be fitted using.

With these flexible configuration options and the storage of up to 2048 programmes, a quick and easy change of working process with different sheet type or forming tool is possible.

Application

Double Sheet Metal Detectors ensure the proper sheet feeding and prevents transporting multiple sheets to next processing station.

Characteristics

Sensors and Monitors are characterised by a robust design and a high protection class.

The 5" colour touch display (TFT) enables conveniently enter the device and measurement parameters. For storing the measuring programmes, there are up to 2048 program memory locations available.

The BDK-A is suitable for monitoring sheet thicknesses of up to 6.5 mm with various sheet thickness sensors, depending on the sensor or measuring method.

Measuring methods

Selectable methods are contact (single surface) and non-contact (single surface and double surface).

Single surface contact measurement:

Ferrous sheets (Fe) from 0.2 up to 5.5 mm.
Detection with Sensors DSP.

Non-ferrous sheets (NE) from 0.2 up to 5.5 mm.
Detection with Sensor BDWF.

Ferrous sheets (Fe) from 0.2 up to 3.5 mm and also
Non-ferrous sheets (NE) from 0.2 up to 4 mm.
Detection with Sensors DSPW.

Single surface non-contact measurement:

Ferrous sheets (Fe) from 0.2 up to 6.5 mm.
Placed on a solid surface, e. g. conveyor belt.
Detection with Sensors DSD.

Double surface non-contact measurement:

Ferrous sheets (Fe) from 0.2 up to 3 mm and also
Non-ferrous sheets (NE) from 0.2 up to 6 mm.
Detection with Sensors BDWD/S (transmitter) and
BDWD/E (receiver).

Operating principle

The display is used for operation and parameter input, as well as for displaying the respective menu data: Measurement, Program no., Sensor Type, Sensor-connection right or left, external or internal start and repeat time.

The current value is displayed after each measurement. Additional lights indicate the active status.

The selection of the measuring program and initiation of the measurement can take place via either a parallel interface to the PLC or the field bus interface.

With integrated fieldbus interface, e.g. PROFIBUS or PROFINET, the output of measured value, the 0...2 sheet message, the program no. and the current limit value are issued via the fieldbus interface.

Technical Data

Evaluation Devices BDK-A

Measurement accuracy

- | | |
|----------------------------|-----------------------|
| - At calibration point | ± 0,1 or 0,2 mm |
| - Across measurement range | ± 5 % of Sensor value |
| - Permissible air gap | see sensor data |

Power supply

- | | |
|-------------------|-----------|
| <u>DC</u> | 24 VDC |
| - Tolerance | ± 15 % |
| - Residual ripple | max. 10 % |

Power consumption

- | | |
|------------------------------|---|
| - Measurement process active | max. 100 VA
DSP und DSPW-Sensors
(others 20 VA) |
| - Idle state | approx. 12 VA |

Overload protection

- | | |
|---------------|--------------------|
| - with 24 VDC | via fuses, T3.15 A |
|---------------|--------------------|

Housing

- | | |
|---------------------|-------------------------|
| - sturdy metal | with window |
| - Mounting | screw mounting (4 x M6) |
| - Protection rating | IP 65 |

Weight

approx. 3.3 kg

Ambient temperature

0 ... 55 °C

Control inputs (20.21-10)

External start (STA)

- | | |
|------------------------|--------------------------|
| - Lo-level | 1 ... 8 VDC |
| - Hi-level | 12 ... 30 VDC |
| - Lead break detection | 0 ... 1 VDC |
| | Input current appr. 10mA |
| - Electrical isolation | yes (to power supply) |

External threshold selection

- | | |
|------------------------------|-----------------------|
| (A1 ... A10 and relay reset) | |
| - Lo-level | 0 ... 4 VDC |
| - Hi-level | 12 ... 30 VDC |
| - Input current | approx. 10 mA |
| - Electrical isolation | yes (to power supply) |

Relay outputs (20.21-10)

Elektromechanical relays

- | | |
|------------------------|------------------------------|
| - Relay output K0 | 1 NC, 1 NO |
| - Relay outputs K1, K2 | 1 change over switch
each |
| | 1 A, 30VDC |

Order data

- | | |
|-------------------------------------|-------------------|
| BDK-A/PR-4.3 (Relay outputs) | Ref. no. 20.21-10 |
| BDK-A/PB-4.3 (PROFIBUS DP) | Ref. no. 20.21-11 |
| BDK-A/PN-4.3 (PROFINET IO) | Ref. no. 20.21-12 |

**DSP thickness sensor for Fe sheets
(single surface contact measurement)**Field coil

- Nominal voltage approx. 36 VDC
- Power consumption max. 2.2 A

Proximity switch (integrated)

- Switching distance approx. 1.2 mm
Housing material nickel-plated steel
Protection rating IP 65
Ambient temperature 0 ... 60 °C

Type	Ref. no.	Measuring range mm	Sheets up to mm
DSP-36sg-1s	13.05-86	0.2 ... 2.0	1.5
DSP-42sg-1s	13.05-87	0.2 ... 3.0	2.5
DSP-54sg-1s	13.05-89	0.2 ... 4.0	3.5
DSP-75sg-1s	13.05-90	0.2 ... 6.0	5.5

**BDWF thickness sensor for NE sheets
(single surface contact measurement)**

Power supply 24 VDC
Signal voltage 10 Vpp
Sheet detection
- Switching distance 1 ... 5 mm
(dep. on sheet type)
Housing material nickel-plated steel
Protection rating IP 65
Ambient temperature 0 ... 60 °C

Type	Ref. no.	Measuring range mm	Sheets up to mm
BDWF-m54rg-2s	13.05-73	0.2 ... 6.0	5.5

**BDWD/S und BDWD/E thickness sensors
for Fe- and NE sheets
(double surface non-contact measurement)**

Power supply 24 VDC
Signal voltage 10 Vpp
Housing material nickel-plated steel
Protection rating IP 65
Ambient temperature 0 ... 60 °C

Type	Ref. No.	Measuring range mm	Sheets up to mm
BDWD/S-m36rg-1s (transmitter)	13.05-74	Fe 0.2 ... 3.5 NE 0.2 ... 20.0	3.0 6.0
BDWD/E-m36rg-1s (receiver)	13.05-75		
BDWD/S-60aq30-1Y1 (transmitter)	13.05-76		
BDWD/E-60aq30-1Y1 (receiver)	13.05-77		

**DSD thickness sensors for Fe sheets
(single surface non-contact measurement)**

Power supply 24 VDC
Housing material nickel-plated brass
Protection rating IP 65
Ambient temperature 0 ... 60 °C

Type	Ref. no.	Measuring range mm	Sheets up to mm
DSD-18mg 61n0,5/3-1Sd1	13.05-91	0.5 ... 7.0	3.5
DSD-30mg 74n3/6,5-1Sd1	13.05-94	3 ... 13.0	6.5

(reduced measuring range for non-ferrous (NE) sheets, further details on request)

**DSPW thickness sensor for Fe- und NE sheets
(single surface contact measurement)**

Power supply 24 VDC
Sheet detection
- Switching distance 1 ... 5 mm
(dep. on sheet type)
Housing material nickel-plated steel
Protection rating IP 65
Ambient temperature 0 ... 60 °C

Type	Ref. no.	Measuring range mm	Sheets up to mm
DSPW-42sg-1s	13.05-66	Fe 0.2 ... 3.5 NE 0.2 ... 2.5 NE 0.2 ... 4.0 *)	3.0 2.0 3.0
DSPW-54sg-1s	13.05-67	Fe 0.2 ... 4.0 NE 0.2 ... 3.0 NE 0.2 ... 5.0 *)	3.5 2.5 4.0

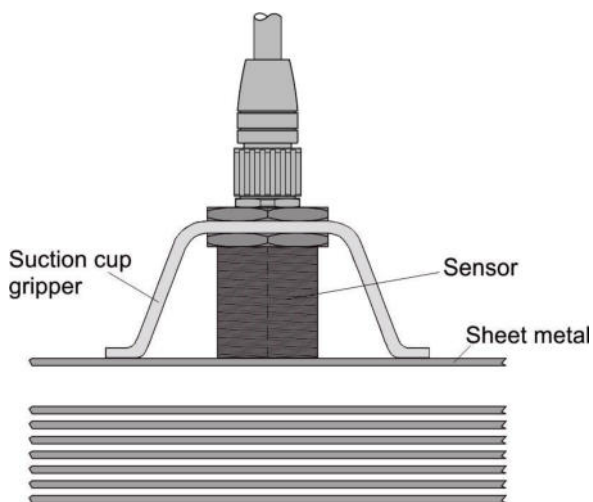
*) The measuring range for non-ferrous (NE) sheets can be extended to **4 mm** or **5 mm** by use of a special adapter for the sensor installation, which can be supplied separately on demand.

When using an unsuitable adapter, the accuracy and linearity of the sensor may deteriorate. If you need any further support, our team is pleased to be at your disposal.

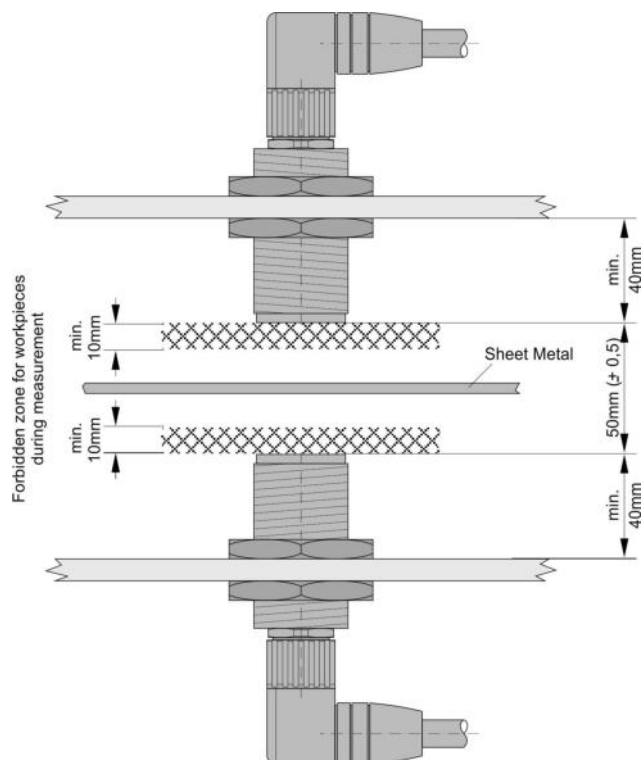
Standards applied

Structure and electrical safety EN 60255-6
(VDE 0435 part 6)
EMC emission EN 61000-6-4
EMC immunity EN 61000-6-2

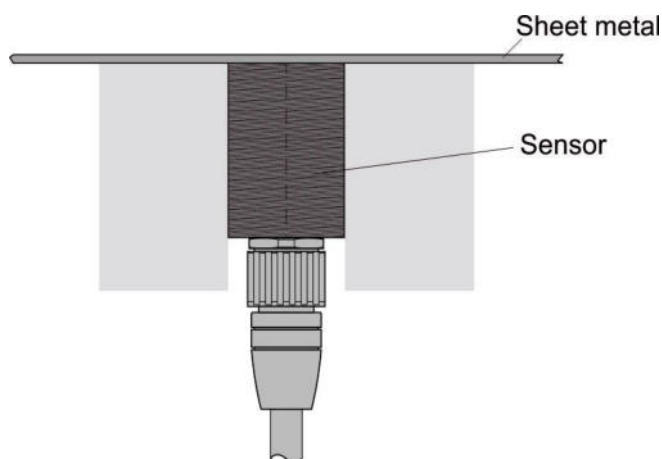
Examples for Installation



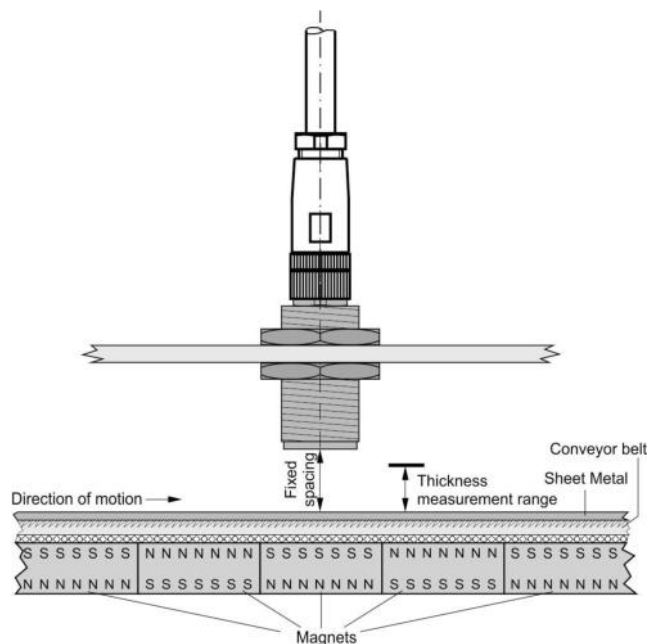
Single surface contact measurement
Sensors DSP, BDWF or DSPW (combination sensor)
Mounted in suction cup gripper.



Double surface non-contact measurement
Sensor pair BDWD/S and BDWD/E.



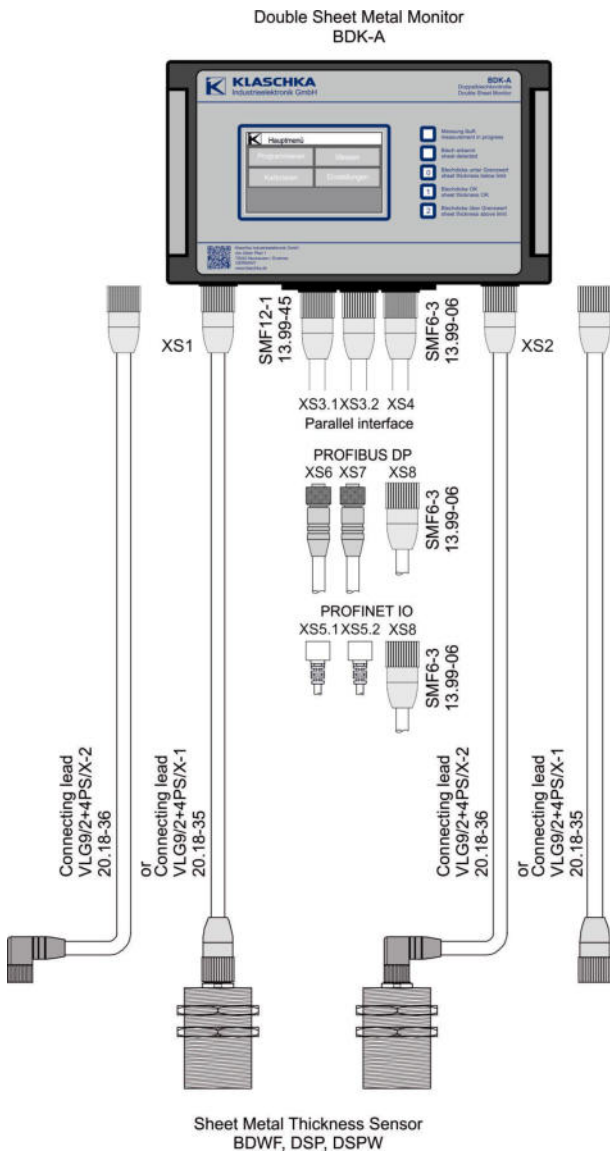
Single surface contact measurement
Sensors DSP, BDWF or DSPW (combination sensor)
Mounted in the control station.



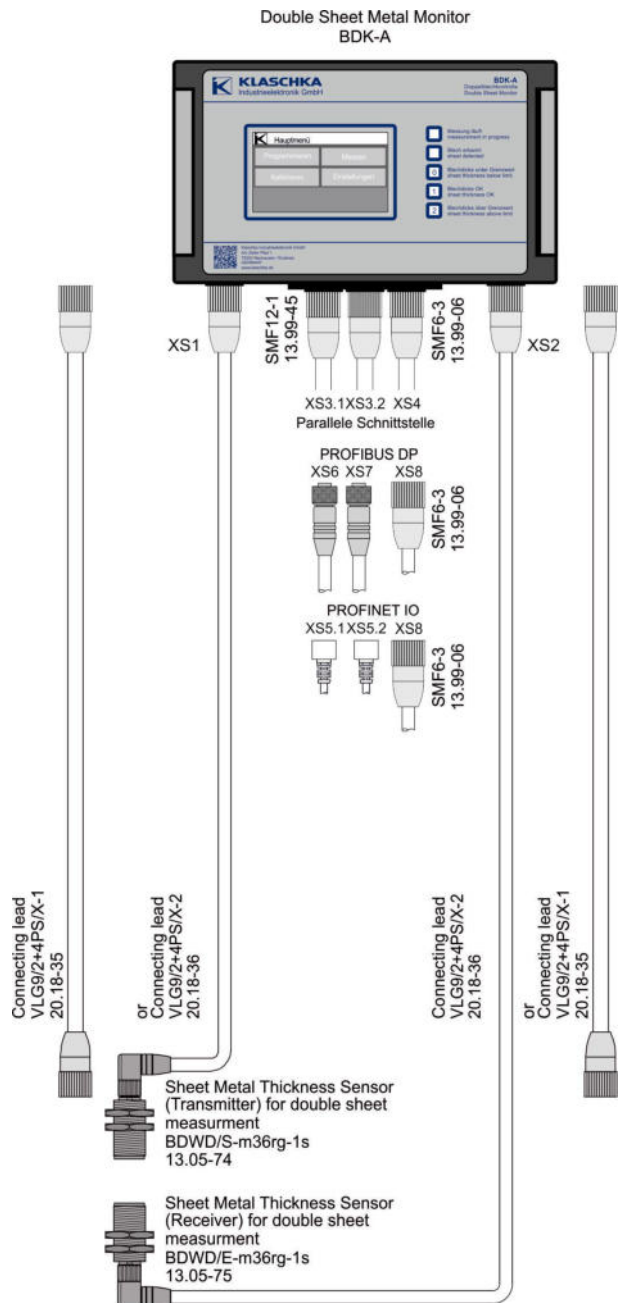
Single surface non-contact measurement
Sensor DSD on reference basis (e. g. Conveyor belt).

Configuration examples

Sensors and Connecting leads for single surface contact measurement



Sensors and Connecting leads for Double surface non-contact measurement



Notes about Connecting leads VLG

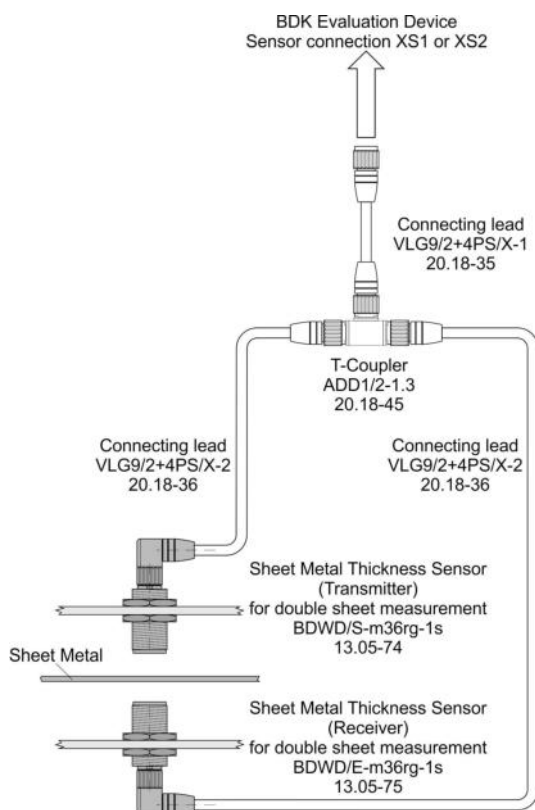
Sockets for Connecting leads at Evaluation Device BDK-A are straight.

Sockets for Connecting leads at Sensor-side are straight or angled performed.

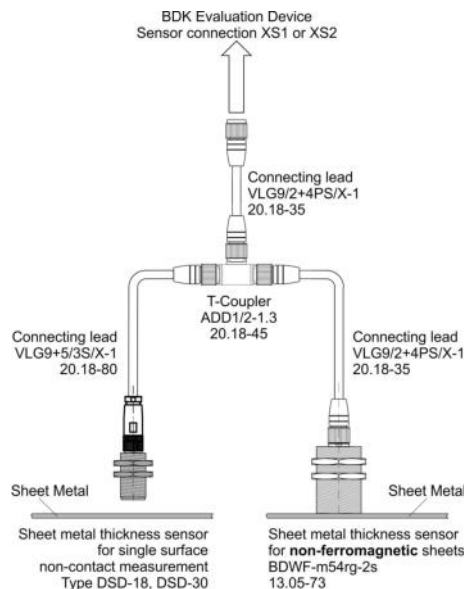
All Connecting leads are oil-resistant and suitable for drag chains.

Extension leads (BDK-A leading to multiple coupling or multiple coupling leading to Sensor) are also available with open ends to multiple coupling.

Double surface non-contact measurement (Fe- or NE sheets), Sensor connection with T-Coupler

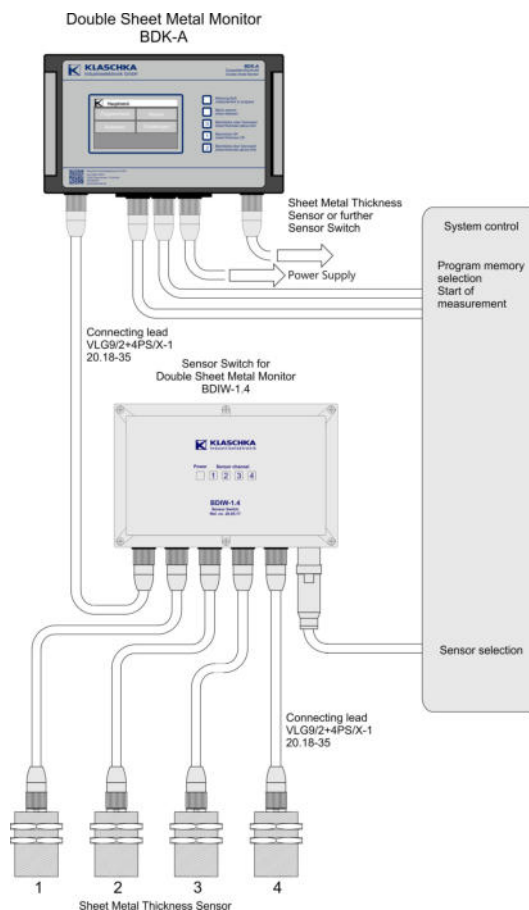
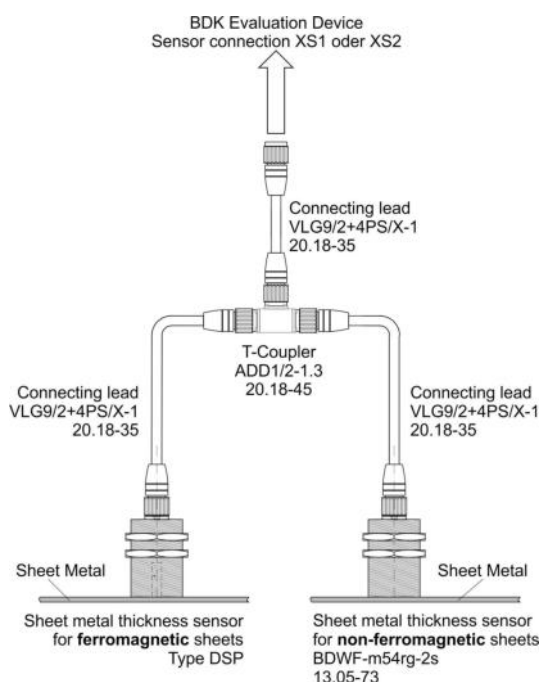


Single surface non-contact measurement (Fe sheets), and Single surface contact measurement (Fe/NE sheets and also Fe sheets or NE sheets)



Sensor Switch BDIW, connection up to 4 Sensors

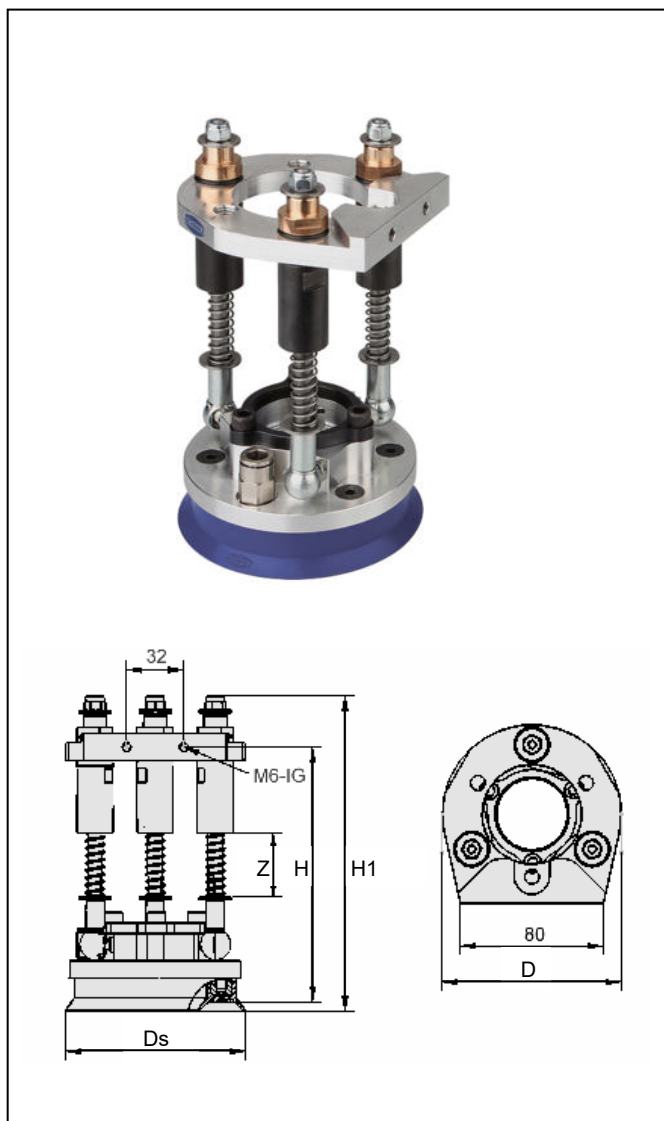
Single surface contact measurement (Fe sheets and NE sheets), Sensor connection with T-Coupler



Sensor bracket with suction cup for mounting Sheet Thickness Sensor

For single-surface contact monitoring (e.g. for destacking equipment), sheet thickness sensors are often built into the suction cup of the gripper. For the DSP, DSPW, and BDWF thickness sensors with (M42, M54) design there are different versions of sensor brackets available.

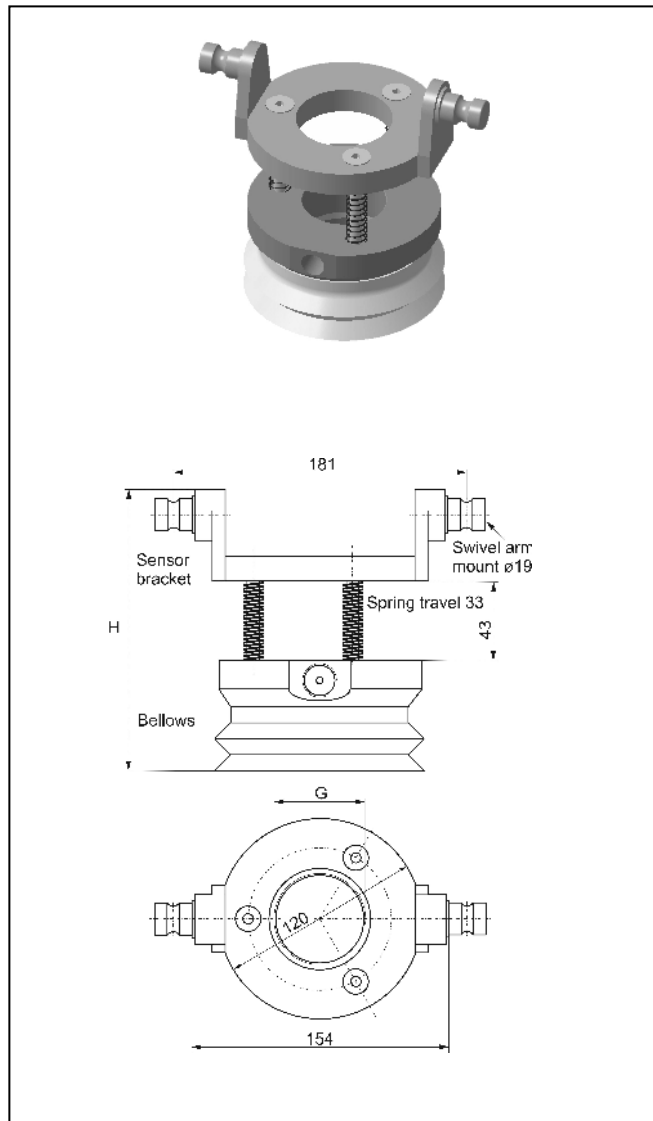
For sheet thickness sensors with M42 x 1.5 and M54 x 0.75 thread - spring-mounted, with suction ring, with flexible spherical bearing



Type Ref. no..	D	Ds	H	H1	Z	Weight (g)
ZBF/BBF42-1 13.99-77	100	100	143	178	36	1070
ZBF/BBF54-2 13.99-87	130	128,8	187	221	80	1300

Spare Parts for Sensor Brackets		
Type	Sach-Nr.	
ZBF/BB42-1	13.99-78	Suction cup for sensor M42
ZBF/BB54-2	13.99-88	Suction cup for sensor M54

For sheet thickness sensors with M42 x 1.5 and M54 x 0.75 thread - spring-mounted, with bellows



Type Ref. no..	H	G	Weight (g)
ZBF/BBF42-2 13.99-84	165,2	M42 x 1,5	1300
ZBF/BBF54-1 13.99-69	162,0	M54 x 0,75	1500

Spare Parts for Sensor Brackets		
Typ	Sach-Nr.	
ZBF/BB42-2	13.99-85	Bellows for sensor bracket M42
ZBF/BB54-1	13.99-68	Bellows for sensor bracket M54

Order Data

Evaluation Devices BDk-A

Characteristics and benefits

sturdy Metal Housing for harsh environment
5" colour touch display (TFT)
convenient operator guidance
Up to 2048 program memories
usable for complete range of measurement methods:
- contact and non contact
- single surface and double-surface
- ferrous and non-ferrous metal sheets
- installation and extension with up to 8 Sensors
- comfortable retrofitting with all measuring methods

(Ref. no.)

BDK-A/PR-4.3 (Relay outputs)	20.21-10
BDK-A/PB-4.3 (PROFIBUS DP)	20.21-11
BDK-A/PN-4.3 (PROFINET IO)	20.21-12

Additional Note:

New designed Double Sheet Detection Monitor BDk/A is also suitable as a compatible successor and replacement for our long time and numerous approved systems BDk-1.3 and BDk-ET.

The identical range of Sensors, Connecting Leads and Accessories are applicable to the previous system configurations BDk-1.3 and BDk-ET.

Exception for BDk-A/PR with relay-output (20.21-10):
New Lead sockets (SMF) for connection:

1x SMF6-3, 13.99-06 (for power supply lead)
2x SMF12-1, 13.99-45 (for controller leads).
BDk-1.3 (20.05-80) and BDk-ET (20.05-96) needs
SMF25-1, 13.99-04.

Sheet Metal Thickness Sensors

Single-surface contact, Ferrous (Fe) sheets

DSP-36sg-1s Sensor for Fe sheets up to 1.5 mm thread M36 x 1,5.	13.05-86
DSP-42sg-1s Sensor for Fe sheets up to 2.5 mm, thread M42 x 1.5 .	13.05-87
DSP-54sg-1s Sensor for Fe sheets up to 3.5 mm, thread M54 x 0.75	13.05-89
DSP-75sg-1s for Fe sheets up to 5.5 mm, thread M75 x 1.5	13.05-90

Single-surface contact, non-ferrous (NE) sheets

BDWF-m54rg-2s Sensor for NE sheets up to 5.5 mm, thread M54 x 0.75	13.05-73
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Single-surface contact, Ferrous (Fe) sheets and non-ferrous (NE) sheets

DSPW-42sg-1s Sensor for Fe sheets up to 3.0 mm, and NE sheets up to 2.0 mm, thread M42 x 1.5	13.05-66
DSPW-54sg-1s Sensor for Fe sheets up to 3.5 mm, and NE sheets up to 2.5 mm, thread M54 x 0.75	13.05-67

Double-surface non-contact, Ferrous (Fe) sheets and non-ferrous (NE) sheets

BDWD/S-m36rg-1s (Transmitter) Sensor for Fe sheets up to 3.0 mm, and NE sheets up to 6.0 mm, thread M36 x 1.5	13.05-74
BDWD/E-m36rg-1s (Receiver) Sensor for Fe sheets up to 3.0, and NE sheets up to 6.0 mm, thread M36 x 1.5	13.05-75
BDWD/S-60aq30-1Y1 (Transmitter) Sensor for Fe sheets up to 3.0 mm, and NE sheets up to 6.0 mm, rectangular housing 60x60 mm	13.05-76
BDWD/E-60aq30-1Y1 (Receiver) Sensor for Fe sheets up to 3.0 mm, and NE sheets up to 6.0 mm, rectangular housing 60x60 mm	13.05-77

Single-surface non-contact, Ferrous (Fe) sheets, non-ferrous (NE) sheets with reduced range

DSD-18mg61n0,5/3-1Sd1 Sensor for Fe sheets up to 3.5 mm Measuring range for NE sheets depends on type, (further details on request) thread M18 x 1.	13.05-91
DSD-30mg74n3/6,5-1Sd1 Sensor for Fe sheets up to 6.5 mm Measuring range for NE sheets depends on type, (further details on request) thread M30 x 1,5.	13.05-94

Connecting Leads and Accessories**Lead sockets****SMF6-3** 13.99-06

Lead socket for connection of power supply leads for BDK-A/PR (Relay outputs), BDK-A/PB (PROFIBUS) and BDK-A/PN (PROFINET)

SMF12-1 13.99-45

Lead socket, 12-pole, for connection of supply leads for BDK-A/PR (Relay Outputs) (2x each device)

Connecting Leads

All Connecting leads are oil-resistant and suitable for drag chains.

Please indicate the lead length X when ordering. (standard length X = 5 m).

The connectors are device-sided (BDK-A) straight and sensor-sided optionally straight or angled.

Extension leads (BDK-A, leading to multiple coupling, or multiple coupling, leading to Sensor) are also available with open ends to multiple coupling.

VLG9/2+4PS/X-1 20.18-35

Connecting lead BDK <---> sensor, lead socket sensor-sided straight

VLG9/2+4PS/X-2 20.18-36

Connecting lead BDK <---> sensor, lead socket sensor-sided angled

VLG9/2+4PS/X-3 20.18-37

Extension lead: BDK-lead (VLG) <---> sensor, lead socket sensor-sided straight

VLG9/2+4PS/X-4 20.18-38

Extension lead: BDK-lead (VLG) <---> sensor, lead socket sensor-sided angled

VLG9E/2+4PS/X-1 20.18-39

Connecting lead BDK and multiple coupling (open ends)

VLG9E/2+4PS/X-2 20.18-40

Connecting lead multiple coupling (open ends) and sensor, lead socket straight

VLG9E/2+4PS/X-3 20.18-41

Connecting lead multiple coupling (open ends) and sensor, lead socket angled

VLG9+5/3S/X-1 20.18-80

Connecting lead BDK <---> DSD-18/DSD-30, lead socket sensor-sided straight

VLG9+5/3S/X-2 20.18-81

Connecting lead BDK <---> DSD-18/DSD-30, lead socket sensor-sided angled

T-Coupler for connecting additional Sensors**ADD1/2-1.3** 20.18-45

for additional 2 Sensors
1 x pin, 2 x socket

Sensor Switch for connecting additional Sensors**BDIW-1.4** 20.05-77

Sensor switch for selecting one out of four sensors (DSP, DSPW, BDWF, BDWD, or DSD).
Power supply 24 VDC.

SPF8-1 13.99-05

Lead socket for connecting supply and control leads.

Connecting leads for BDIW-1.4**VLG9/2+4PS/X-1** 20.18-35

Connecting lead BDK <---> BDIW and BDIW <---> Sensor connection DSP, DSPW, BDWF, BDWD plug sensor-sided straight.

VLG9/2+4PS/X-2 20.18-36

BDIW <---> Sensor connection DSP, DSPW, BDWF, BDWD plug sensor-sided angled.

VLG9+5/3S/X-1 20.18-80

Connecting lead BDIW <---> DSD-18/DSD-30, lead socket sensor-sided straight.

VLG9+5/3S/X-2 20.18-81

Connecting lead BDIW <---> DSD-18/DSD-30, lead socket sensor-sided angled.

Sensor Bracket for installing Thickness Sensor

Sensor bracket M42 x 1.5, spring-mounted, with suction ring, **flexible spherical bearing** ZBF/FBF42-1 13.99-77

Sensor bracket M54 x 0.75, spring-mounted, with suction ring, **flexible spherical bearing** ZBF/FBF54-2 13.99-87

Sensor bracket M42 x 1.5, spring-mounted, with bellows ZBF/FBF42-2 13.99-84

Sensor bracket M54 x 0.75, spring-mounted, with bellows ZBF/FBF54-1 13.99-69

Spare Parts for Sensor Brackets

Suction cup for brackets M42 (139977) ZBF/FB42-1 13.99-78

Suction cup for bracket M54 (139987) ZBF/FB54-2 13.99-88

Bellows for brackets M42 (139984) ZBF/FB42-2 13.99-85

Bellows for brackets M54 (139969) ZBF/FB54-1 13.99-68

We are certified according to DIN EN ISO 9001.

Subject to changes!