

- **Robust unit for reliable double sheet detection in destacking and loading facilities for sheet metal processing works (especially presses and press lines).**
- **Single surface contact measurement with DSP sheet metal thickness sensor up to 5.5 mm for Fe.**
- **Single surface contact measurement with BDWF sheet metal thickness sensor up to 5.5 mm for non-ferrous (NE).**
- **Single surface contact measurement with DSPW combination thickness sensor. up to 3.5 mm for Fe. up to 4.0 mm for non-ferrous (NE).**
- **Operation of 1 sensor directly at the device, and up to 4 sensors via a switch.**
- **256 program memories for different material types and thicknesses with the associated sheet metal thickness sensors in the standard operating mode.**
- **Indication of sheet thickness and program parameters.**
- **Standard version with electrically isolated parallel interface to system controller.**
- **Field bus version with interface to PROFIBUS DP.**

Application

Double Sheet Monitors check the automatic destacking and separation of ferrous and non-ferrous workpieces at sheet metal processing works (e.g. presses) with automatic feeding systems such as destackers, robots, feeders, etc. They reliably detect the situations when two or more sheets stick together, and allow thus to stop the process before resulting in damage to machinery or tooling.

The BDK Double Sheet Monitor is suitable for operation with various sheet metal thickness sensors for monitoring ferrous (Fe) and non-ferrous (NE) sheet metals. Depending on the sensor and/or measurement method a thickness up to max. 5.5 mm can be detected.

Configuration

A cover held by a standard rotary lock protects the evaluation device. Sensor and evaluation device are characterised by a sturdy construction and a high protection class. The ready-made connecting leads, with plugs and sockets on both sensor and device ends, permit quick and easy mounting and commissioning of the entire system.

Four operator keys and a four-line illuminated LC text display permit the convenient entry of device and measuring parameters. There are 256 program memory locations, which permit the storage of the measuring programs. They permit quick changes of material or tool during operation, and the programs remain stored even when the device is switched off.

© Klaschka Industrieelektronik GmbH • 75242 Neuhausen / Germany • Fon +49 7234 79 0 • Fax +49 7234 79 112 • e-mail: sales@klaschka.de • www.klaschka.de

Method of Operation

The double sheet metal monitoring and the measurement of the sheet metal thickness by means of the evaluation device BDK-ET-1.3 takes place by way of single surface contact measurement methods.

The selection between ferrous sheet measurement using the magnetic flux method and the non-ferrous sheet measurement based on the eddy current principle takes place automatically when selecting the sensor type. This procedure requires that the sensor rests on the sheet metal during the measurement.

After each measurement the sheet metal thickness is evaluated from the sensor signal in the microprocessor-controlled evaluation device and compared with the current threshold values.

On the LC display, sensor type, upper and lower threshold value, measurement internal/external and the calibration selection are presented in dependence of the selected program number. After each measurement the reading is updated and displayed.

The display is equipped with signal lamps, which optically indicate the active status of a measurement, of the proximity switch in the sensor as well as the 0-, 1-and 2-sheet detection. In connection with these messages the press controller allows an individual evaluation via three potential-free relay outputs K0, K1 and K2.

Parameters and similar are entered using the four keys next to the LC display.

Devices with PROFIBUS DP interface transmit via the field bus interface instead of the relay outputs the measured value, the 0-, 1- or 2-sheet metal messages, the memory location number of the current program and the current threshold value.

With the BDK-ET-1.3 the selection of the measuring program and initiation of the measurement can take place via a parallel interface to the PLC, with the BDK-ET/FP-1.3 via the field bus interface.

When being operated without PLC (stand alone operation), the measurement program can be selected on the device itself and the measuring operation can be triggered by a proximity switch within the sensor.

Technical Data

Evaluation Device

Inputs:

External start (STA)

- Lo-level	1 ... 8 V DC
- Hi-level	12 ... 30 V DC
- Lead breakage detection	0 ... 1 V DC
- Input current	approx. 10 mA
- Electrical isolation	yes (to power supply)

External threshold selection (A1 ... A8 and Reset)

- Lo-level	0 ... 4 V DC
- Hi-level	12 ... 30 V DC
- Input current	approx. 10 mA -
-Electrical isolation	yes (to power supply)

- ***Outputs:***

- Relay output K0	1 NO, 1 NC
- Relay output K1, K2	1 rev. switch each 6 A, 250 V AC

Measurement accuracy:

- At calibration point	± 0.1 mm
- Across measurement range	± 5% of sensor value
- Permissible air gap	see sensor data

Power supply:

- DC voltage	24 V DC
- Tolerance	± 15%
- Residual ripple	max. 10%

Power consumption:

- Measurement process active	max. 100 W
- Idle state	approx. 12 W

Overload protection:

- Melt fuse	T3.15 A

Housing:

- Version	metal, with window
- Protection rating	IP65
- Mounting	screw mounting (4 x M6)
- Weight	approx. 3.5 kg
- Ambient temperature	0 ... 55 °C

Order Data:

BDK-ET-1.3, relay outputs Double Sheet Metal Monitor for single surface contact measurement Power supply 24 V DC	**20.05-96**
BDK-ET/OB-1.3 **semi-conductor relay outputs**	**20.21-02**
BDK-ET/FP-1.3 PROFIBUS DP interface connection	**20.05-97**

© Klaschka Industrieelektronik GmbH • 75242 Neuhausen / Germany • Fon +49 7234 79 0 • Fax +49 7234 79 112 • e-mail: sales@klaschka.de • www.klaschka.de

DSP Thickness Sensor for ferrous (Fe) sheets

Exciter coil	
- Nominal voltage	approx. 38 V DC
- Power consumption	max. 2.2 A
Integral proximity switch	
- Switching distance	approx. 1.2 mm
Housing material	nickel-plated steel
Protection rating	IP 65
Ambient temperature	0 ... 60 °C

Versions:

Type	Ref. no.	Measuring range mm	Sheets … 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 non-ferrous (NE) sheets

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

Versions:

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

DSPW Combination Thickness Sensor for ferrous (Fe) and non-ferrous (NE) sheets

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

Type	Ref. no.	Measuring range mm	Sheets ... 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 rather **5 mm** by use of a special adapter for the sensor installation, which can be supplied separately on demand.

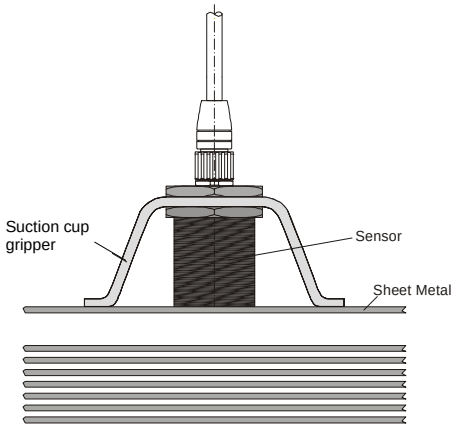
When using an unsuitable adapter, the accuracy and linearity of the sensor may deteriorate.

) **For using the DSPW-42sg-1s sensor, the evaluation device has to be equipped with software version E118 or higher.

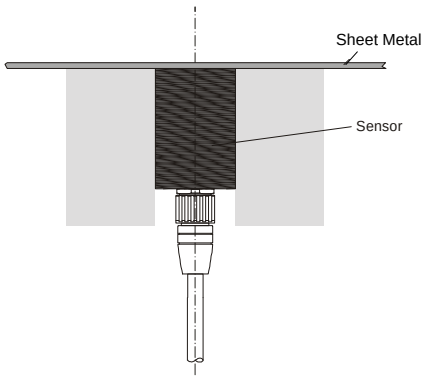
Standards Applied

Measuring relays and protection equipment	**EN 60255-1**
EMC emission	**EN 61000-6-4**
EMC immunity	**EN 61000-6-2**

Examples for mounting



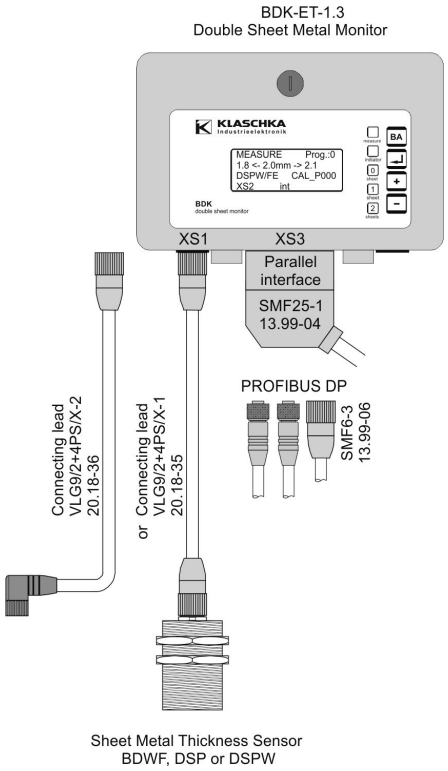
Single surface contact measurement with thickness sensors DSP, BDWF, or combination sensor DSPW in suction cup gripper.

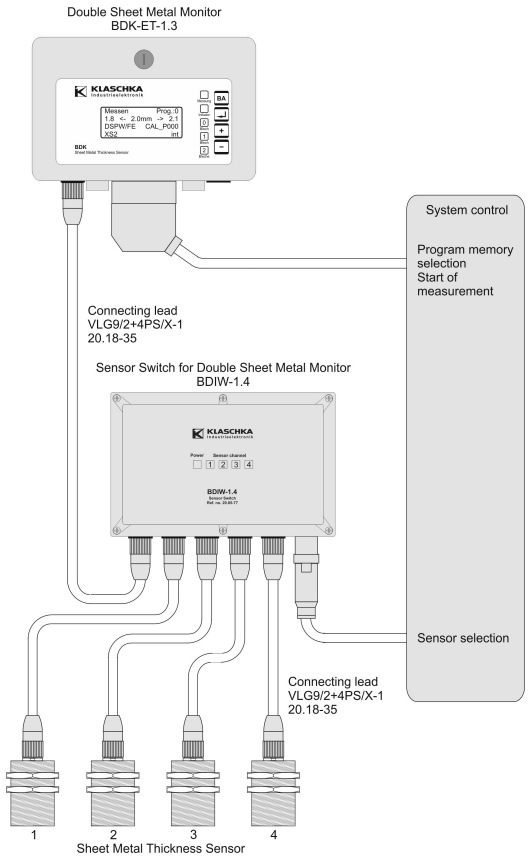


Single surface contact measurement with thickness sensors DSP, BDWF, or combination sensor DSPW mounted in the control station.

© Klaschka Industrieelektronik GmbH • 75242 Neuhausen / Germany • Fon +49 7234 79 0 • Fax +49 7234 79 112 • e-mail: sales@klaschka.de • www.klaschka.de

Accessories



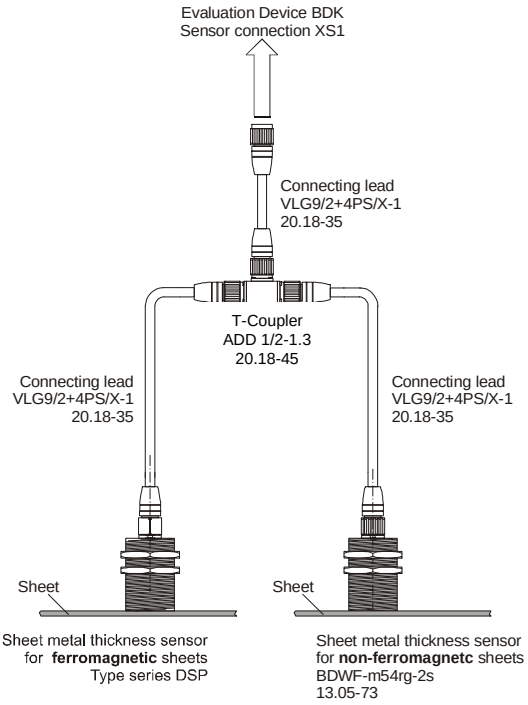


VLG Connecting Leads

Versions with connecting lead straight or angled – also available with open ends.

BDIW-1.4 Sheet Thickness Sensor Switch

Connection of up to 4 sensors to the BDK connector.



ADD1/2-1.3 T-Coupler

Connection of 2 different sensor types to the BDK connector.

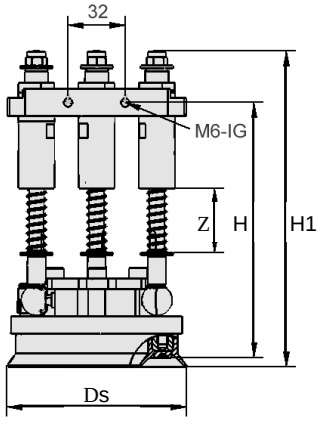
© Klaschka Industrieelektronik GmbH • 75242 Neuhausen / Germany • Fon +49 7234 79 0 • Fax +49 7234 79 112 • e-mail: sales@klaschka.de • www.klaschka.de

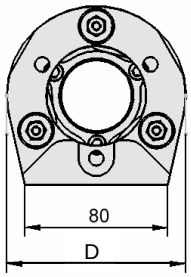
Sensor bracket with suction cup for mounting Sheet Thickness Sensor

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 (M36, M42, M54) design there are different versions of sensor brackets available.

1. For Sensors with M36 x 1.5, M42 x 1.5 and M54 x 0.75 thread
- spring-mounted, with a flexible spherical bearing



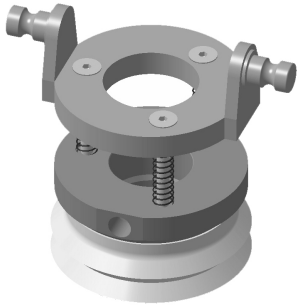


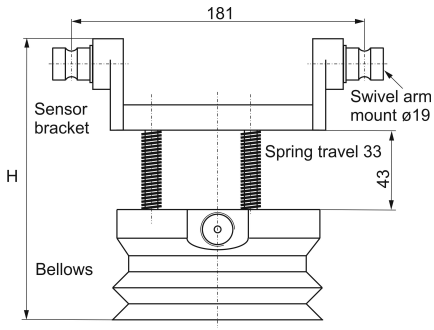


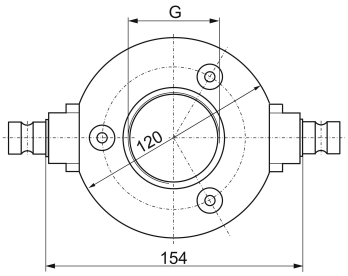
Type Ref. no.	D	Ds	H	H1	Z	Weight (g)
ZBF/FBF36-1 13.99-79	100	100	143	178	36	1120
ZBF/FBF42-1 13.99-77	100	100	143	178	36	1070
ZBF/FBF54-2 13.99-87	130	128.8	187	221	80	1300

Spare Parts for Sensor Brackets		
Type	Ref. no.	
ZBF/FB36+42-1	13.99-78	Suction cup for sensor brackets M36 + M42
ZBF/FB54-2	13.99-88	Suction cup for sensor bracket M54

2. For Sensors with M42 x 1.5 and M54 x 0.75 thread
-spring-mounted







Type Ref. no.	H	G	Weight (g)
ZBF/FBF42-2 13.99-84	165.2	M42 x 1.5	1300
ZBF/FBF54-1 13.99-69	162.0	M54 x 0.75	1500

Spare Parts for Sensor Brackets		
Type	Ref. no.	
ZBF/FB42-2	13.99-85	Bellows for sensor bracket M42
ZBF/FB54-1	13.99-68	Bellows for sensor bracket M54

© Klaschka Industrieelektronik GmbH • 75242 Neuhausen / Germany • Fon +49 7234 79 0 • Fax +49 7234 79 112 • e-mail: sales@klaschka.de • www.klaschka.de

Order Data (designation / ref.no)

Evaluation Devices

BDK-ET-1.3, relay outputs **20.05-96**
BDK-ET/OB-1.3, semi-conductor relay outputs **20.21-02**
BDK-ET/FP-1.3, PROFIBUS DP **20.05-97**

Sheet Metal Thickness Sensors for single-surface contact measurement

DSPW-42sg-1s **13.05-66**
for Fe sheets up to 3.0 mm /
for non-ferrous (NE) sheets up to 2.0 mm
Thread M42 x 1.5

- For using the DSPW-42sg-1s sensor, the evaluation device has to be equipped with software version E118 or higher.

DSPW-54sg-1s **13.05-67**
for Fe sheets up to 3.5 mm/
for non-ferrous (NE) sheets up to 2.5 mm
Thread M54 x 0.75

BDWF-m54rg-2s **13.05-73**
for non-ferrous (NE) sheets up to 5.5 mm
Thread M54 x 0.75

DSP-36sg-1s **13.05-86**
for Fe sheets up to 1.5 mm, thread M36 x 1.5

DSP-42sg-1s **13.05-87**
for Fe sheets up to 2.5 mm, thread M42 x 1.5

DSP-54sg-1s **13.05-89**
for Fe sheets up to 3.5 mm, thread M54 x 0.75

DSP-75sg-1s **13.05-90**
for Fe sheets up to 5.5 mm, thread M75 x 1.5

Connecting Leads and Accessories

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 straight and sensor-sided optionally straight or angled.

VLG9/2+4PS/X-1 **20.18-35**
Connecting lead BDK <---> sensor
Plug sensor-sided straight

VLG9/2+4PS/X-2 **20.18-36**
Connecting lead BDK <---> sensor
Plug sensor-sided angled

VLG9/2+4PS/X-3 **20.18-37**
Extension lead BDK <---> sensor
Plug sensor-sided straight

VLG9/2+4PS/X-4 **20.18-38**
Extension lead BDK <---> sensor
Plug sensor-sided angled

VLG9E/2+4PS/X-1 **20.18-39**
Connecting lead BDK and multi-coupling (open ends)

VLG9E/2+4PS/X-2 **20.18-40**
Connecting lead multi-coupling (open ends) and sensor, straight socket

VLG9E/2+4PS/X-3 **20.18-41**
Connecting lead multi-coupling (open ends) and sensor, angled socket.

ADD1/2-1.3 **20.18-45**
T-Coupler for connecting additional sensors,
1 x pin, 2 x socket

SMF25-1 **13.99-04**
Socket for connection of power supply and control leads for devices with parallel interface.

SMF6-3 **13.99-06**
Socket for connection of power supply leads for PROFIBUS devices.

Switch for connecting additional Sensors

BDIW-1.4 **20.05-77**
Sensor switch for selecting one out of four sensors (BDWF, DSP, DSPW).
Power supply 24 VDC.

Connecting leads for BDIW-1.4

VLG9/2+4PS/X-1 **20.18-35**
Connecting lead BDK <---> BDIW and
BDIW <---> Sensor connection BDWF, DSP, DSPW.
Plug sensor-sided straight.

VLG9/2+4PS/X-2 **20.18-36**
Connecting lead BDIW <---> Sensor connection BDWF, DSP, DSPW.
Plug sensor-sided angled.

SPF8-1 **13.99-05**
Lead socket for connecting supply and control leads.

Bracket for mounting sheet metal thickness sensor

Sensor bracket M36 x 1.5
spring-mounted, suction ring, flexible spherical bearing
ZBF/FBF/36-1 **13.99-79**

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

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**

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

Spare parts for sensor brackets:

Suction cup for sensor brackets M36 + M42
ZBF/FB36+42-1 **13.99-78**

Bellows for sensor bracket M42
ZBF/FB42-2 **13.99-85**

Bellows for sensor bracket M54
ZBF/FB54-1 **13.99-68**

Suction cup for sensor bracket M54
ZBF/FB54-2 **13.99-88**

We are certified according to DIN EN ISO 9001.

Subject to technical changes!

© Klaschka Industrieelektronik GmbH • 75242 Neuhausen / Germany • Fon +49 7234 79 0 • Fax +49 7234 79 112 • e-mail: sales@klaschka.de • www.klaschka.de