• Robust unit for reliable double sheet detection in de-stacking 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.
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: approx. 10 mA
- Input current
- 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

**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 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 20.05-96
- Double Sheet Metal Monitor for single surface contact measurement
- Power supply 24 V DC
- BDK-ET/FP-1.3 20.21-02
- PROFIBUS DP interface connection 20.05-97
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 range: 0 ... 60 °C

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. no.</th>
<th>Measuring range mm</th>
<th>Sheets ... mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSP–36sg-1s</td>
<td>13.05-86</td>
<td>0.2 ... 2.0</td>
<td>1.5</td>
</tr>
<tr>
<td>DSP–42sg-1s</td>
<td>13.05-87</td>
<td>0.2 ... 3.0</td>
<td>2.5</td>
</tr>
<tr>
<td>DSP–54sg-1s</td>
<td>13.05-89</td>
<td>0.2 ... 4.0</td>
<td>3.5</td>
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<tr>
<td>DSP–75sg-1s</td>
<td>13.05-90</td>
<td>0.2 ... 6.0</td>
<td>5.5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. no.</th>
<th>Measuring range mm</th>
<th>Sheets up to mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDWF–m54rg-2s</td>
<td>13.05-73</td>
<td>0.2 ... 6.0</td>
<td>5.5</td>
</tr>
</tbody>
</table>

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

Examples for mounting

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

Standards Applied

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

*) 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.

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