

## Operating Instructions short

translation




EC type examination certified



Zertifiziertes QM-System  
nach DIN ISO 9001:2000



### CONTENTS:

- Safety Instructions 
- Application
- Instruction for use
- Mechanical data
- Electrical connection
- Putting into operation

Please observe always



This is the operating instruction for the AKAS® models: AKAS®-3PM, AKAS®-3PF. Special instructions for each model are provided with its individual model marking. Attention is drawn to all safety instructions by this symbol.

#### Read the operating instructions

Particular attention must be paid to such instructions. These operating instructions provide to the user important information concerning the correct use of the AKAS®. These instructions are a component of the light barrier concerned. It is essential that they are easily available at the location where the safety light barrier is installed. Before the initial operation of the AKAS®, all requirements detailed in these operating instructions must be observed. Other relevant regulations and the requirements of the employers' liability insurance associations have also to be complied with.

#### Qualified Personnel

Mounting, initial operation and maintenance may only be performed by qualified persons.

#### Safety warning

Light barriers do not protect anybody from machine-caused flying objects.

The AKAS® protects fingers and hands that hold the sheet during the operation. **Therefore it does not protect during any fast engagement between the bending punch and the matrix short time before those are closed.** The protection function of the system is cancelled when the Muting lamp is on.

The front beams E3-E6 (AKAS®-3PM, AKAS®-3PF) which are turned to the operator before the bending line do not protect, if the box-bending function has been activated earlier.

With the integration of a AKAS® safety system, the standard should be strictly complied with the European Standard (EN 12622).

Protection circuits and Emergency can only stop the opening movement when the movement is interrupted with the RXOK outputs.

#### A-Test: putting into operation

The setting must be done in a way that the following test will be passed:

!!! If either test A or B fails, the machine must not be used until the problem is resolved !!!



- The B-Test must be done for safety reasons each 5 times on the left end and on the right end of the upper tool.
- The press brake must be equipped completely with the heaviest upper tool.
- Start of the closing movement from the maximum top dead centre (T.D.C)

#### B-Test: daily check (at least every 24 hours)

At the beginning of each shift and after each change of tools, the AKAS® press brakes protection must be checked as follows (see also EN 12622.2002):

Test must be carried out at both left and right ends of the bending punch. The punch must not touch the step-shaped test rod.



- a.) Place the test piece in position "10" on the lower tool. Select the box bending function if you use a system of the AKAS®3... product family. Now start the close down movement.
- b.) The press brake stops.
- c.) The test piece must be placed in position "15" under the upper tool. In this position ("15") the test piece may not touch the upper tool.
- d.) Drive up the press brake. Place the the test piece in position "35" on the lower tool. Select the normal bending function if you use a system of the AKAS®3... product family. Now start the close down movement.
- e.) The press brake must be stopped in a way that the test piece ("35") may not touch the upper tool.
- f.) Turn on the sender ( adjustment keyswitch to ON position) and move the test piece ("14") along the tip of the upper tool. The adjustment controll LED P1 on the AKAS® receiver has to remain ON during the test.

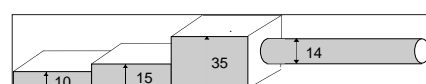


Fig.2/1

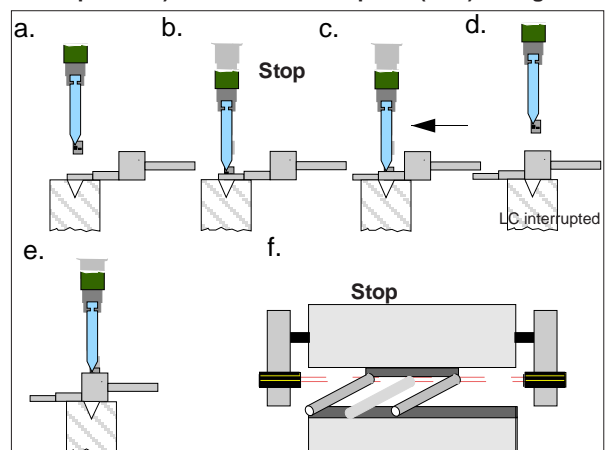


Fig.2/2

1. Use only tools with the same height in the same fixing on the press. All utilized tools must have one common bending line.

2. Stoppers, which are mounted at the matrix, lead to a premature switching-off of the downward movement.

3. The maximum allowable overrun traverse of the machine: 11mm / AKAS®-3P...

The press must have an automated overrun traverse control for the first stroke. If not, it can be realised by the AKAS®-3PF and a cam controller or by the Fiessler AMS-system . Before the initial start-up, the overrun traverse must be checked either by using the test rod (see page 9) or by using an Overrun Traverse measuring device. (upon customer's request, Fiessler Elektronik will perform the Overrun Traverse Measuring on the customer's machine.) **If one results of 10 consecutive measurements is larger than 11mm / AKAS®-3..., the fast speed must be reduced.**

4. Due to the missing synchronization during fast speed, AKAS® cannot be used for two machines aligned in parallel (e.g. "tandem press brake") .

5. Muting of AKAS.

During the slowspeed closing movement the control system of the machine must send the mute signal to the AKAS receiver. Please refer page 15 how to setup the correct blanking / mute point values .

**The control system of the machine must reliably guarantee, according to safety category 4, that from this point the stroke speed is  $\leq 10\text{mm / s}$ .**

5.1 **Bending boxes with AKAS** If the "boxbending" mode of AKAS is activated the blanking and the muting signal must be activated before the receiver element E2 (for Details see page 12) is interrupted. Please refer page 15 columns "boxmode" how to setup the correct blanking / mute point values for boxbending mode.

5.2 **Bending flat sheets with AKAS** Before the blanking signal is sent to the AKAS receiver any of the receiver elements E1 and E3 – E6 must not be interrupted by the sheet or the lateral die cover (for Details see on page 10)

But the receiver element E2 must be interrupted by the sheet or the lateral die cover.

The blanking signal can be a output signal from the machine NC.

The closing stroke can continue in high speed until the mute point is reached.

6. **The protection of a pressbrake by the AKAS® does not permit bending in the bottom of a box inside the box in fast speed.**

7. **The AKAS® does not protect:**

-if the machine is only run in the work speed, or AKAS will be interrupted during fast speed and the stroke will be continued in work speed

-if the overrun traverse of the press brake is too long

-from squeezing during the bending operation

-if the mutinglamp is constantly on

- if the lateral stencil cover is higher than the top of the die and the blanking signal (SP) is set to this wrong position of the lateral die cover. See pic 6/3 together with a wrong SP setting

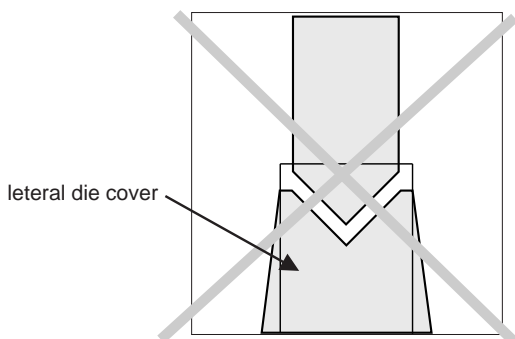


Fig.3/ 3

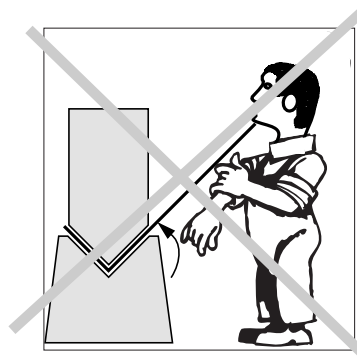


Fig.3/ 1

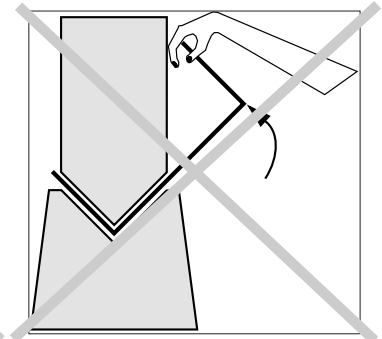


Fig.3/ 2

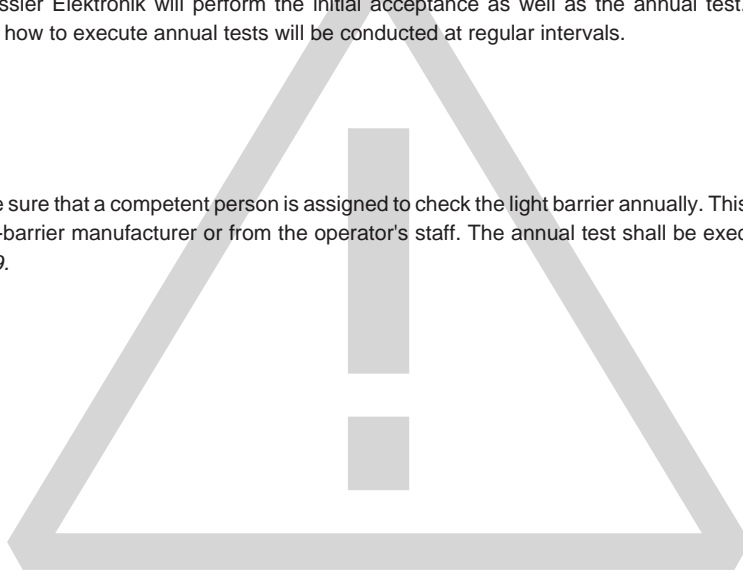
8. **The hazardous state of the machine must be terminated by the sensor function.**

9. **The safety level (class 4) of the accident preventing light barrier should at least correspond to the safety level of the control system of the machine.**

10. **Laser beams may be deviated due to air currents, this may cause unwanted and unforeseen machine stops. Therefore the machine must be erected at a place free of air currents.**

**Acceptance** Acceptance test: the installation acceptance test and inspections should be carried out by a competent person in possession of all the information supplied by the manufacturer of the machine and the ESPE.  
 Upon customer's request, Fiessler Elektronik will perform the initial acceptance as well as the annual test. Additionally, customer training seminars on how to execute annual tests will be conducted at regular intervals.

**Annual Inspection** The machine owner must make sure that a competent person is assigned to check the light barrier annually. This person can be an employee either from the light-barrier manufacturer or from the operator's staff. The annual test shall be executed according to the inspection *sheet on page 49*.



**bending of flat sheet metal**

The V opening of the die must be covered with the lateral die cover. This is necessary because The receiver element E2 must be interrupted before the SP signal ( blanking signal ) is activated. The SP signal must be active before any of the receiver elements E1 or E3 – E6 is interrupted by the sheet or the lateral die cover. The machine can still move in high speed for a maximum of 400ms. After this time the machine must move in slowspeed ( <= 10mm/s ).

**stroke start**

- If the SP signal is not active all receiver elements E1 – E6 must be free. During the following closing stroke only E1 und E3 – E6 must be free.
- If the SP signal is active the receiver element E2 must be interrupted. Attention, if SP is active but E2 is free, closing stroke is not possible (e.g. lateral die cover is missing or not in correct position)
- If the SP signal is active and at least receiver element E2 is interrupted, AKAS will turn off the SGA output (highspeed enable). Only a slowspeed stroke is allowed now.
- If the SP signal is not active and at least one of the receiver elements E1 or E3-E6 is interrupted (E2 does not matter now) it is possible to start a slowspeed stroke by pressing the footpedal two times. (SGA will turn off. E.g. for a bend inside a closed box)

**fast speed**

- If the SP signal is not activated the receiver elements E1 and E3-E6 must be free.
- If receiver element E2 is already interrupted and the SP signal is just activated, the receiver elements E3 and E4 must stay free for at least 27ms. (Important: E2 must be interrupted before SP is activated)
- If receiver element E2 is already interrupted and SP will be activated, the machine can continue to move in high-speed for up to 400ms. Before the 400ms are exceeded the machine must change to slowspeed. (Muting will only be activated in slowspeed)

**Principle of function bending of flat sheet metal**

1. Release the closing movement by activating the foot pedal. Receiver E1 to E6 are activated.
2. Press brake closes in **fast speed (> 10mm/s)**  
Receiver element E2 are deactivated, **E1,E3 bis E6 activated (protection)**

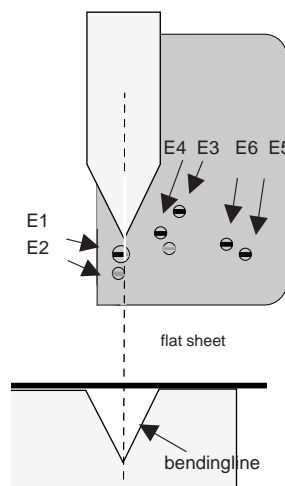


Fig.5/ 1

3. Position for AKAS blanking reached (SP signal is changing from SP = 0 to SP = 1):  
The receiver elements E1, E5 and E6 will be muted. E4 will stay active for about 27ms (max allowed travel distance 4mm). E3 will stay active.
4. After reaching the change-over point from fast speed to **slow speed (= 10 mm/s)**:  
(Distance between punch and sheet 0-6mm depending on the stopping distance of the machine)  
Receiver element E3 will be muted, so the complete AKAS receiver is muted now.
5. All receiver elements are muted and the muting lamp is on. The bending procedure is finished.  
(The fast speed mode and the slow speed mode are limited of about 2 min.)

**Advice** The beams of the AKAS® must be located at a certain distance to the bending punch.  
 (See **chapter 5.2 Overrun Traverse Measurement** and **chapter 5.8 Adjustment of the distance between the AKAS® and the bending punch**.  
 Caution! Use only tools with equal overall height within one fixing.

**Bending of wavy sheet metal**

**Closing movement with interrupted protective field**

The AKAS® system offers the possibility to execute a closing movement under monitored slow speed even when the protective field is interrupted by a wavy sheet metal.

After the interruption of the protective field and the release and reactivation of the foot pedal, the AKAS will deactivate the SGA output when the protective field is interrupted. By this, only slow speed will be enabled by the machine control (NC).

AKAS® provides a reaction time of about 200ms for the machine control and then activated the safety switching outputs for the closing movement (OSSDs). The OSSDs remain activated as long as the AKAS® receives a slow speed message to SGS and SGO:

by AKAS®...F within the next **70 ms** + the selected enhanced tolerance (see page 35/36)

by AKAS®...M within the next **170 ms** (A tolerance enhancement is possible only with the AKAS®...F systems).

**Function principle  
box bending**

see diagram page 56

1. "Box Bending" is activated by the box bending button. The signal at the box bending input KAST must be high (+24V) for at least 100 ms and after that low (0V) for at least 100 ms.  
(The box bending function can be canceled by twice activating the box bending button again)
  2. AKAS® confirms the selection of the box bending by activating the output HUSP and the LED *box-bending*
- HUSP output active: The speed change point ( fast -> slow ) must be a bigger value (refer table 15/1)  
The receiver elements E3 – E6 are muted, **E1 and E2 are active.**

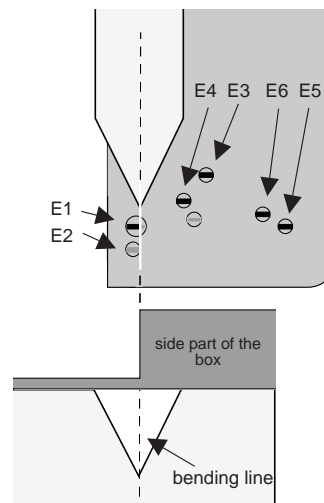


Fig.7/ 1

3. Release the closing movement by activating the foot pedal. The press closes in **fast speed (> 10mm/s)**.
4. After reaching the change-over point from fast speed to **slow speed (= 10 mm/s)** :  
E2 is deactivated, **E1 remains activated for 0,5s (5mm) more (=protection)**
5. All Receiver elements are muted and the muting lamp is on. The bending procedure is finished.  
(The fast speed mode and the slow speed mode are limited of about 2 min.)
6. After the bending procedure the box bending function is cancelled.

**Bending of the box bottom**

**Closing movement with interrupted protective field**

The AKAS® system offers the possibility to execute a closing movement under monitored slow speed even when the protective field is interrupted.

After the interruption of the protective field and the release and reactivation of the foot pedal, the AKAS will deactivate the SGA output when the protective field is interrupted. By this, only slow speed will be enabled by the machine control (NC).

AKAS® provides a reaction time of about 200ms for the machine control and then activated the safety switching outputs for the closing movement (OSSDs). The OSSDs remain activated as long as the AKAS® receives a slow speed message to SGS and SGO:

by AKAS®...F within the next **70 ms** + the selected enhanced tolerance (see page 36/37)

by AKAS®...M within the next **170 ms** (A tolerance enhancement is possible only with the AKAS®...F systems).

**Bending of very small pieces**



In the case of bending of very small pieces, which must be guided by the fingers, the **box-bending function must be selected. Otherwise, the fingers would interrupt E3, E4, E5, E6 (AKAS®-3P M/F) which would lead to the switching off of the bending process!**

**With activated box-bending function, a finger which is placed next to the slog on a large matrix, is not detected!!**

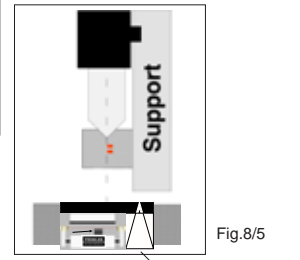
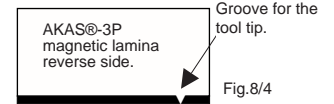
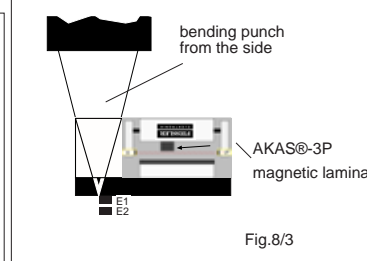
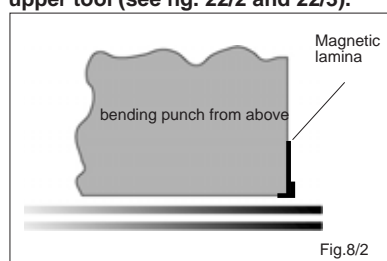
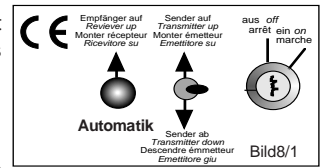
adjustment directions



You will find these adjustment directions also on the front plate of the receiver support!

1. For the **first adjustment** or after a **tool change** the **key-operated switch** at the support of the receiver must be turned to **"EIN"**(="ON"), if the foot pedal is not activated.
2. **Plate the magnetic lamina at the right hand side of the ram, with the groove on its reverse side, (fig.22/4) close to the top of the upper tool, and move it upwards until the lamina lies flush against the surface of the upper tool (see fig. 22/2 and 22/3).**

**AKAS®-3P...**



After having successfully adjusted the AKAS® system, place the magnetic lamina at the side of the matrix (as shown in fig. 22/5) in order to cover it. It must be attached in a way that its edge is even with the matrix surface.

During the whole operation, the magnetic lamina must remain at the side of the matrix in order to cover it.

3. Now, the operator may choose from 2 different adjustment modes:

**A. Automatic adjustment (Automatic Mode):**

By pushing **ONCE** the button **"Automatik"** this adjustment mode is started. The procedure is automatically stopped as soon as the AKAS® system has reached the correct distance beneath the bending punch. The automated adjustment procedure can be interrupted, if - during the downward movement of both the AKAS®-transmitter and the AKAS®-receiver - the **switch "Sender auf" (=transmitter up)** is activated. (This action will be of help primarily in the case of a large tool being exchanged by a considerably smaller tool.) By doing this, the downward movement of the transmitter and receiver towards the lowest point is prevented or stopped. If the transmitting light beam hits the receiver elements, i.e. the optics of both components are "locked into one another" (focussing), the AKAS® system will adjust itself automatically onto the exchanged tool newly fixed at the ram. If the light beam from the transmitter does not hit the receiver (i.e. the transmitter beams are interrupted by the newly mounted tool), both transmitter and receiver will move downward to the lowest point of the displacing range. When moving upwards again, they are searching the lower edge of the bending punch. The system will automatically adjust itself to the newly installed bending punch.



After having carried out this, the key at the **key-operated switch** is turned to **"Aus"** (=OFF) and the key is removed from its lock.

**After having completed the adjustment procedure, the tests (see page 9) must be carried out. If the key of the key-operated switch is removed from its lock, the outputs of the system are free only if the "Automated Mode" has been completely terminated.**

**B. Adjusting by hand (Manual Mode):**

By activating the button **"Sender ab"** (=transmitter down) the manual adjustment mode is started. Now the operator must check if either the transmitter beam hits the receiver : - adjustment indicators P do not light up (see **B1**) - or if the transmitter beam does not hit the receiver - adjustment indicators P light up (see **B2**)

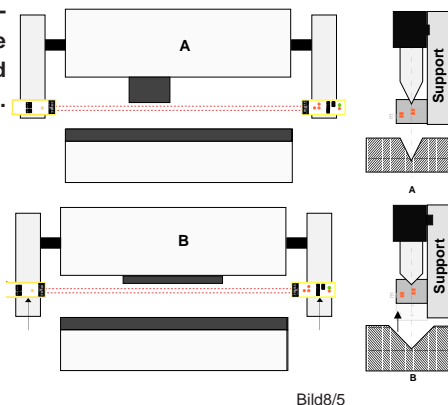
**B1: (This function is required during the first adjusting of the system)**

AKAS®-II-transmitter and AKAS®-receiver can be carried upwards or downwards by activating the switch "Sender auf / Sender ab" (transmitter up / down). This is to verify whether both transmitter and receiver are correctly mounted parallel to the bending line of the machine. By activating the "Automatik"-button, the operator may start the automated adjusting procedure.

**B2: (This function is carried out if the transmitter beam does NOT hit the receiver, p.e. if high matrixes are used)**

By activating the **"Automatik"**-button or the **"receiver up"**-button, the receiver is carried upwards. At the same time, the transmitter can be carried upwards by activating the switch "Sender auf/ab" (=transmitter up/down). As soon as the transmitter beam hits the receiver again - adjustment indicators P are out at the receiver-, the adjusting procedure can be terminated as described in the automated adjustment "Automatic Mode" A.).

Schematic layout of the AKAS®-II after a tool change-over and of the consecutive follow-up of the transmitter and the receiver.



**If the key of the key-operated switch is removed from its lock, the outputs of the system are free only if the "Automated Mode" has been completely terminated. The key switch must not be turned, if the foot pedal is activated. The key must be kept under the control of a responsible person (set-up man)!**



<b>Inspection Sheet</b>	<b>Inspection of a press brake safeguarded by a press brake protection system AKAS®</b>
No.: _____	
Date: _____	

customer's order number: _____ company: _____ address: _____ department: _____ Post Code/City: _____ phone: _____ Fax: _____ attending staff: _____ inspecting company: _____ inspector: _____	Hex schwitch position: _____ machine builder: _____ machine type: _____ Serial no.: _____ machine control by: _____ machine located at: _____ inventory no.: _____ cost centre: _____ type of control: _____ Muting box no.: _____ AKAS® no.: _____ AMS no.: _____ Sensors 1/2, nos: _____
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**1. Inspection:**

- first inspection     
  maintenance contract existing     
  regular inspection requested  
 regular inspection     
  cost estimate of maintenance contract requested

**2. Installation:**

detection range: \_\_\_\_\_ m      optional swivable holder at:  transmitter     receiver

**3. Visual Inspection of the Installation**

- |  |  |
|--|--|
| <input type="checkbox"/> 3.1 correct electric connection   | 3.10 max. work speed: _____ mm/s   |
| <input type="checkbox"/> 3.2 cables damage free  | 3.11 max. fast speed: _____ mm/s   |
| <input type="checkbox"/> 3.3 strain relief at both sides of cable loop   | 3.12 Overrun traverse of the AKAS® is: _____ mm<br>when interrupted during fast speed motion |
| <input type="checkbox"/> 3.4 cable protected against all mechanical damages by metal sheet                           |  |
| <input type="checkbox"/> 3.5 correct position of vertical light grid (not too far behind from bending line)          |  |
| <input type="checkbox"/> 3.6 correct position of vertical light grid (distance sufficiently behind the bending line) |  |
| <input type="checkbox"/> 3.7 transmitter beams are parallel to the ram   |  |
| <input type="checkbox"/> 3.8 work speed < 10 mm/s  |  |
| <input type="checkbox"/> 3.9 test with test rod passed   |  |

After viewing of the electrical diagrams, the electrical integration of the AKAS® can be accepted as safe according to safety class 4 EN 954T.1, under the condition that the machine control is wired exactly as shown in the said diagrams.

**4. Cooperation between the AKAS® system and the machine**

- 4.1 The stopping of the AKAS® during the dangerous movement complies with the safety level of safety category 4
- 4.2 control elements : OK
- 4.3 closing movement during foot operated motion with AKAS® only possible when foot pedal remains pressed down
- 4.4 interruption of the AKAS® during fast speed: OK
- 4.5 interruption of the AKAS® during work speed: OK
- 4.6 operation mode „foot-fast motion“ is possible only when AKAS® is activated
- 4.7 AKAS® is switched off in all operation modes where AKAS® is not activated
- 4.8 Muting signal is given if the gap above metal sheet corresponds to distance between „lower edge E2 and tool tip+2mm“
- 4.9 Muting signal from valve position signal during work stroke or AMS
- 4.10 Muting signal monitored by AKAS® , Safety PLC e.g. FPSC or machine control
- 4.11 Muting signal monitored by machine control

**Muting point in mm:** \_\_\_\_\_

- 4.21 PLC input is controlled by ESPE output.
- 4.22 Muting signal unsafe
- 4.23 Safety level of the following machine control is lower than ESPE
- 4.24 Secondary control is single channel
  
- 4.30 The protective effect might be cancelled by a malfunction of the press.

If tops 3 and 4.1 - 4.10 are not completely ticked, or if one or more of the tops 4.21 - 4.24 are ticked, the AKAS® installation is **not** in a faultless condition. In this case, the protective effect by the system is not completely provided.

**5. Comments**

**Inspection Badge:**       badge issued       badge not issued

The inspection refers only to the functionality check of the AKAS® according to the regulations. It does **not** replace the safety check of the machine itself. All modifications of the AKAS® or of the machine may impair the protective effect of the AKAS®. In this case, the inspection must be repeated.

\_\_\_\_\_ , \_\_\_\_\_ .....

## other Safety products



Safety Mats



Safety-Footpedal



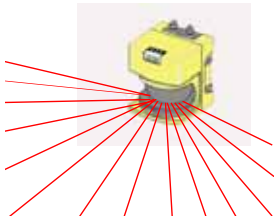
Parametricable Safetycontrol FPSC



Press Brake Protection System AKAS



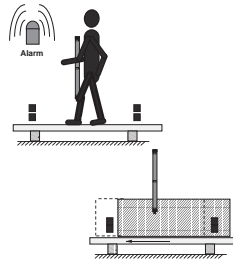
Safety-Light-Curtain



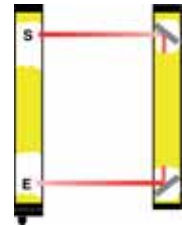
Proximity Laser Scanner



Single-Safety-Beam



Safety-Light-Grid with muting function



Safety-Light-Grid

## Service

As a special feature for training our customers, Fiessler Elektronik offers one-day safety workshops. Our service team provides you with expert advice and information for the reliable integration of our safety equipment into your machine.

## HOMOLOGATIONS

In order to ensure and maintain the high quality level of the Fiessler safety products, a quality control security system has been established early. Fiessler Elektronik holds the DIN ISO EN 9001 Certificate and, thanks to the company-owned EMC laboratory, all products must pass a inspection without exception before they leave the company. All safety equipment comply with the applicable national and international standards. Development and Design is made in close cooperation with the German employer's liability insurance associations. All homologations are obtained only after having passed strict tests by the German surveyor organisation TÜV.



## AWARD OF

### APPRECIATION

for exemplary performance in the development of the press brake protection system AKAS.

The award was bestowed upon Fiessler Elektronik by the ministry of trade and commerce of the federal state of Baden-Württemberg.



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Fiessler Elektronik has representations in all major industrial

