PRODUCT INFORMATION

V4000 Press Brake
Safety camera system

The innovative safety solution for press brakes

SICK
Sensor Intelligence.

The V4000 Press Brake

The V4000 PB is a camera based system for complete protecting of press brakes. It is a compact system, consisting of a sender and a receiver, mounted on the upper beam of the press to protect against the hazardous fast closing movement. It provides a safety volume below the punch line and its Output Signal Switching Device (OSSD) deliver a stop signal to the press controller in order to stop the movement, in case a finger or hand has been detected.

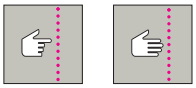
The protection system is easy to integrate into the machine controller. It uses the existing linear encoders to calculate the position of the top death centre, the velocity, the moving direction and the stopping distance. V4000 PB functions can also be easily integrated into the HMI.

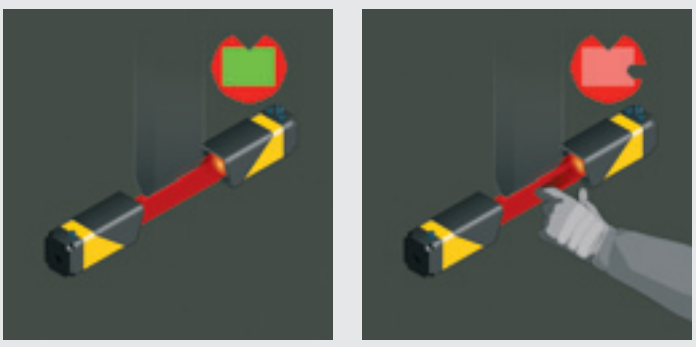
V4000 PB corresponds to type 4 of IEC 61496–1 and –2 and can be used in accordance with IEC 61508 to SIL3, as well as cat. IV to EN 954-1. Fulfils CE and cULus requirements.

PROTECTION PRINCIPLE

Safety volume:

- Height 26 mm
- Width 40 mm
- Resolution better than 14 mm
- Scanning range up to 7.5 m
- High immunity against vibrations and misalignments





Monitoring of the protection volume:
The V4000 PB monitors the protection volume directly below the upper tool.
Each infringement of the protection volume generates a dual-channel signal resulting in a safe stop of the press brake. The resolution of the V4000 PB is better than 14 mm.

Customer benefits

Maximum productivity

OPERATOR

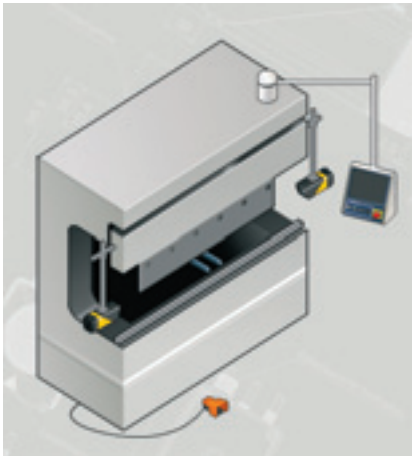
- Because of foot switch monitoring, both hands free to handle the metal sheet
- Maximum safety for finger and hand protection
- Resolution better than 14 mm
- Simple and fast tool changes due to large tolerance bands
- Self-learning modes simplifies material change
- Interruption-free bending cycles
- Intuitive use
- LED and 7-segment display for fast diagnostics

PRODUCTION

- Maximum safety at maximum speed (up to 300 mm/s)
- Simple and fast retrofitting
- Can be used on older machines
- Reduction of downtimes through powerful diagnosis functions
- Vibration immunity even at emergency stops. The result is higher reliability.
- Supports even complex bending tasks
- Maximum productivity through optimised machine cycles
- Worldwide service support for commissioning, maintenance, and repair

MACHINE MANUFACTURER

- Cat. IV, SIL3 system
- Approved technology
- Camera based technology for complete protecting the hazardous area through generous protection volumes
- Compact safety solution
- Easy to integrate into all safety controllers
- Supports even complex bending sequences
- Complete integration into HMI possible
- Enables data exchange with machine controller
- Visualisation and diagnosis software

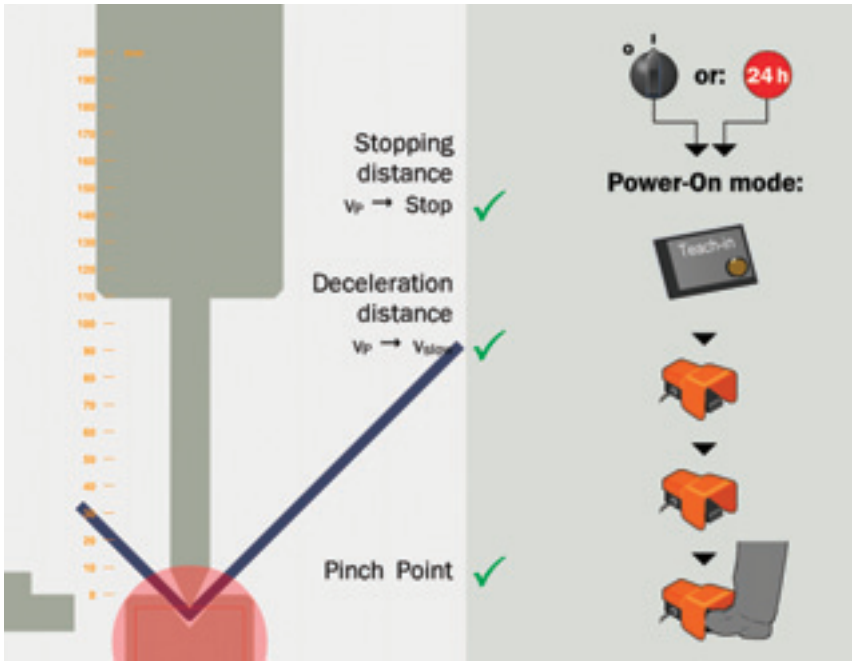


V4000 PB on a press brake

Bending modes
Press brake application

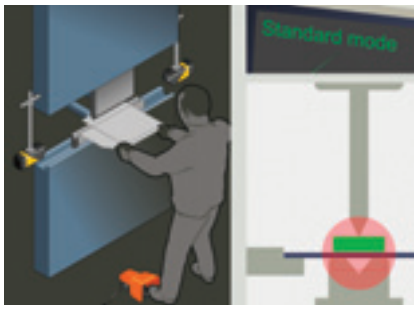
POWER-UP CYCLE

When the press is powered on (or after a period of 24 hours) the V4000 PB acquires the most important machine parameters such as, stopping distance, deceleration distance and pinch point.



BENDING IN STANDARD MODE

Standard mode is used to bend flat metal sheets.
The V4000 PB detects infringement at each position, from the top, from the sides and from the bottom and provides a dual channel stop signal.



Monitoring of the protection volume:
The V4000 PB travels with the upper beam. It monitors the entire protection volume.
It mutes automatically 6 mm above the pinch point.

Box and Back gauge mode

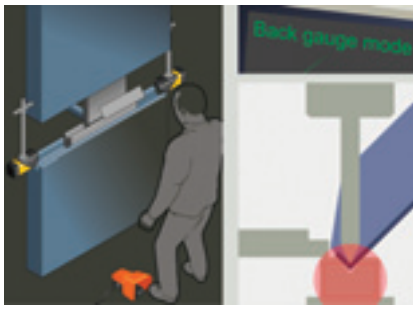
BENDING IN BOX MODE

Box mode is used to bend metal sheets with flanges.
The V4000 PB ensures maximum safety while the box is present in the protection volume.

Monitoring of the protection volume:
The V4000 PB travels with the upper beam and recognises the presense of the box. It monitors the protection volume opposite the box, where an infringement could happen.
It mutes automatically 6 mm above the pinch point.

BENDING IN BACK GAUGE MODE

Back gauge mode is used to bend metal sheets with flanges, requiring a back gauge.
The V4000 PB ensures maximum safety while bending short flanges.



Monitoring of the protection volume:
The V4000 PB travels with the upper beam. It monitors the protection volume between the box and the back gauge where an infringement could happen.
It mutes automatically 6 mm above the pinch point.

Ordering information

V4000 PRESS BRAKE ORDERING INFORMATION

Part number	Type code	Part number	Type code
Sender		Receiver	
1025765	V4000 PB sender	1025766	V4000 PB receiver

V4000 PB ACCESSORIES ORDERING INFORMATION

ACCESSORIES

Part	Description	Part number
PBI (Press Brake Interface)		1026798
Spare part set PBI plug	• With extractor for PBI, 16-pin • 2 pieces	2032051
Spare part set V4000 PB plug	• Receiver 16-pin • 2 pieces	2032052
Set of masks	• Receiver mask, sender mask, press crosshead masks	2030829
Test piece	• For protection volume monitoring	4040724
Magnetic plate	• For covering the female die opening below the workpiece	4040736

MOUNTING ACCESSORIES

Part	Description	Part number
Mounting kit 1	• Alignment plate • 2 pieces	2031126
Mounting kit 2	• Mounting arm • 2 pieces	2031745

CONNECTING CABLES

Part	Description	Part number
Connecting cables for self-configuration Yard ware Wire cross-section 0.34 mm²	• Sender - receiver, 4-pin, approved for trailing cables	6029221
	• Receiver - PBI, 4-pin	6029222
	• Receiver - control cabinet, 18-pin, Approved for trailing cables	6029223
Power supply 24 V DC, 2.5 A		6010361
Service cable 2 m	Connecting cable between configuration connection and serial PC interface M8 4-pin/SubD 9-pin (DIN 41642)	6021195
Service cable 8 m		2027649

Technical specifications

DETAILED TECHNICAL SPECIFICATIONS

Laser protection class	Laser class 1M (21 CFR 1040.10 and 1040.11, IEC 60825-1:2001)
Protective field range	0 m ... 7.5 m
Size of safety volume	40 x 26 mm
Resolution	10 ... 14 mm
Protection class according to DIN VDE 0106, DIN EN 50178	III
Enclosure rating (IEC 60529)	IP 54
Supply voltage V_S at device [1]	24 V (19.2 V ... 28.8 V)
Synchronisation	Electrical
Category to IEC 61496	Type 4
Safety integrity level according to IEC 61508	SIL3

SENDER UNIT

Power consumption	Max. 0.2 A

RECEIVER UNIT

Output signal switching devices (OSSDs)	2 PNP semiconductors (short-circuit protected 2)/cross-circuit monitored)
Response time T1	10 ms
Switching voltage HIGH (active, V_{eff})	24 V (V_S – 2.7 V ... V_S)
Switching voltage LOW (inactive)	0 V (0 V ... 3.5 V)
Switching current	0 mA ... 500 mA
Power consumption	Max. 0.5 A (without OSSD)
Application diagnostic output for teach-in request, set speed request V_{slow}	PNP semiconductor, short-circuit protected [2]
Switching voltage HIGH (active)	24 V (V_S – 3.3 V ... V_S)
Switching voltage LOW (inactive)	High resistance
Switching current	0 mA ... 200 mA

OPERATING DATA

Connection	Plug-in connection housing with screw terminal connections
Length of cable [3]	Max. 30 m
Wire cross-section	Min. 0.14 mm²
Ambient operating temperature	0 °C ... +50 °C
Air humidity (non-dewing)	15 % ... 95 %
Storage temperature	–25 °C ... +70 °C (max. 24 h)
Vibration resistance	5 g, 10 Hz ... 100 Hz according to IEC 61496-1, sections 5.1.2 and 5.4.2
Shock resistance	
Single shock	15 g, 11 ms according to EN 60068-2-27
Continuous shock	10 g, 16 ms according to IEC/EN 61496-1, sections 5.1.2 and 5.4.4.2

[1] The external voltage supply must be capable of buffering brief mains voltage failures of 20 ms as specified in EN 60204-1. Suitable power supplies are available as accessories from SICK (Siemens type series 6 EP 1)

[2] Applies to the voltage range between –30 V and +30 V

[3] Depending on load, power supply and wire cross-section. The technical specifications must be observed.

You can find more detailed data in the operating instructions. Download at www.sick.com

RANGE OF EXPERTISE

INDUSTRIAL SENSORS

Our complete range of sensors provides answers to suit any application in the field of automation. Even under rugged ambient conditions objects are reliably detected, counted and positioned in respect of their form, location and surface finish, as well as their distances established with pin-point accuracy.

INDUSTRIAL SAFETY SYSTEMS

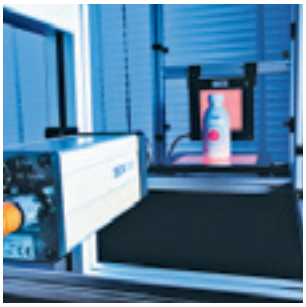
Comprehensive safeguarding of both personnel and machinery! As specialists in Sensor Technology, SICK develops and manufactures pioneering products for providing protection in hazardous zones, dangerous locations and for safeguarding access points. By providing services, which encompass all aspects of machine safety and security, SICK is setting new standards in Safety Technology.

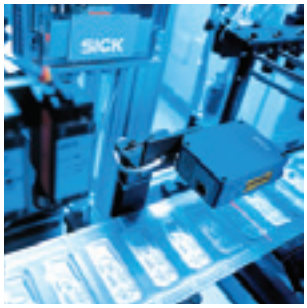
AUTO IDENT

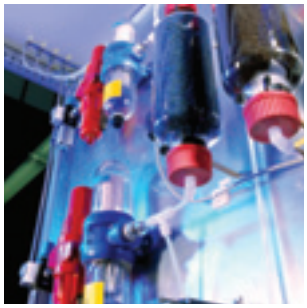
Whether the tasks involve identification, handling, classification or volume measurement, innovative Auto Ident systems and laser measuring systems function extremely reliably, even under rapid cycle times. They conform to the latest Standards and can be simply and speedily integrated in all industrial environments and external applications.

ANALYZERS AND PROCESS INSTRUMENTATION

System control, maintaining setpoints, optimising process control and monitoring the flow of materials – the instruments and services for Analysis and Process Measurement, supplied by SICK MAIHAK, are setting the standards for these applications in terms of Technology and Quality.







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