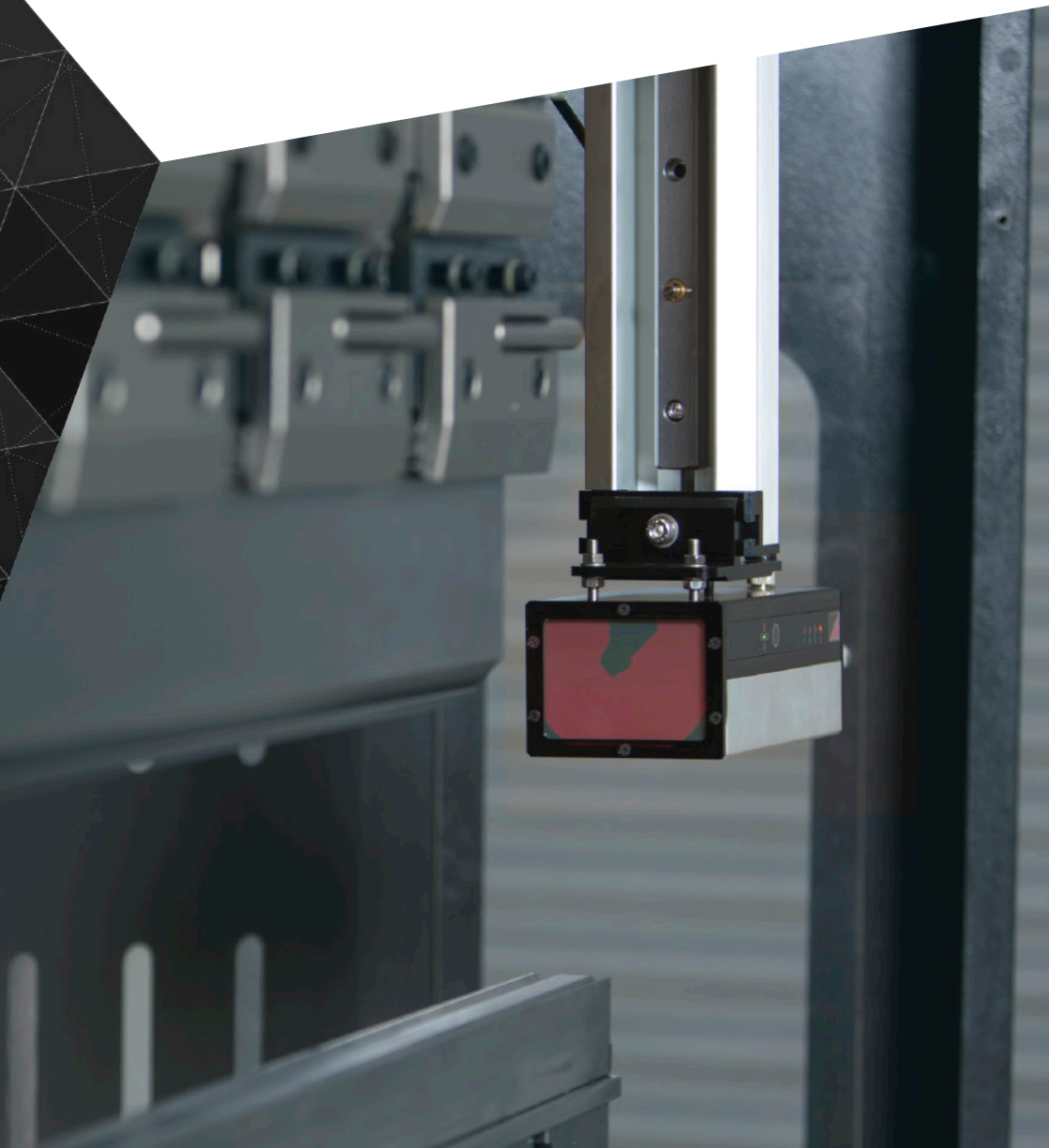


Sentinel Plus

PRESS BRAKE
GUARDING SYSTEM

SENTINEL PLUS / SENTINEL PLUS XL /
SENTINEL PLUS AUTOMATIC

SEPTEMBER 2020



Sentinel Plus

Sentinel Plus is the most advanced press brake guarding system ever designed for retrofit applications and is optimised for high-speed performance machines. Available in three configurations, Sentinel Plus uses industry leading camera sensor technology to deliver exceptional levels of machine safety, productivity and performance.

Sentinel Plus laser protection

The Sentinel Plus laser transmitter and receiver are mounted to the upper beam of the press brake. A continuous block laser field protects the zone around the punch tip allowing the operator to hold the work piece as the tools close at high speed. If an obstruction is detected the machine is automatically stopped.

1. Automatic Mute Point Set-up

The 2mm mute point set-up is automatically initiated on the first cycle. The system detects the material surface and the operator is prompted to confirm the mute point via the user interface panel. Sentinel Plus automatically monitors the mute position and detects changes in tool size and material thickness.

2. Sentinel Plus user interface panel

The 4.3" colour graphics display makes the system very simple to operate. A magnetic backing allows the panel to be easily moved.

3. Laser Transmitter (TX)

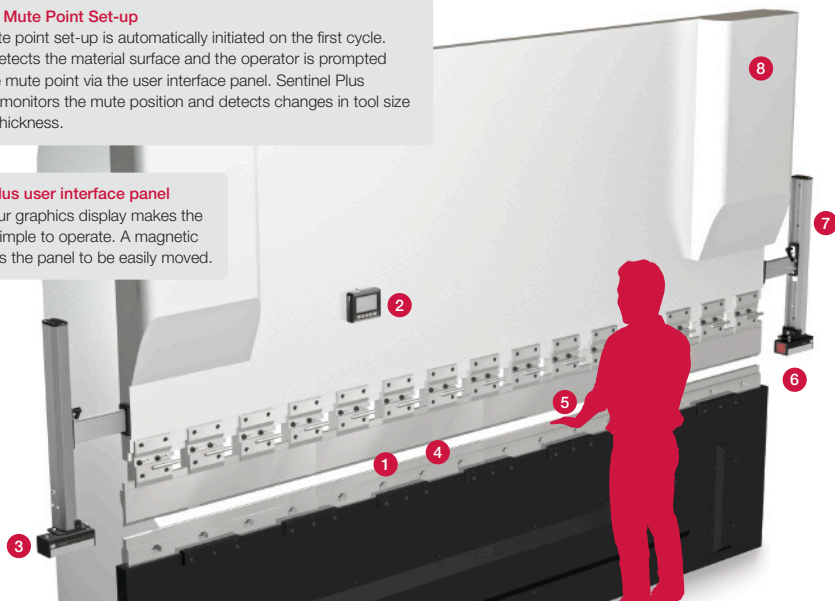
As the tools close in high speed the protective zone is progressively muted while machine deceleration and speed is monitored. The system provides optical protection until the tool opening is 2mm.

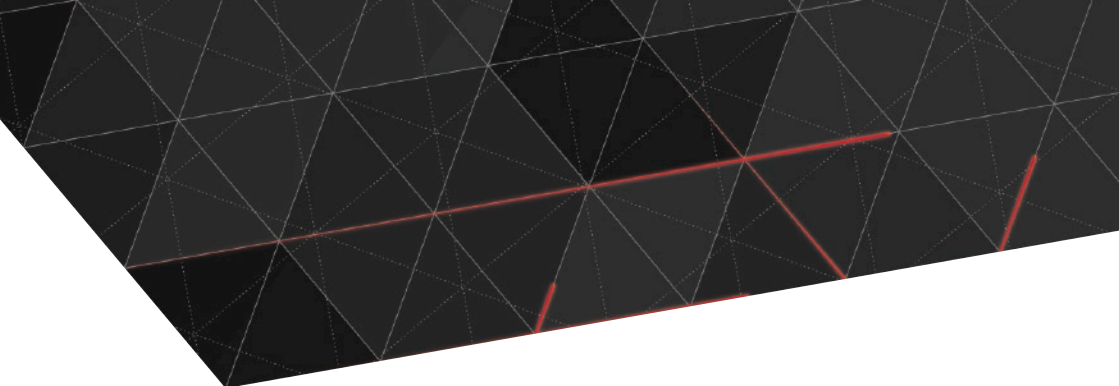
4. RapidBend Plus

RapidBend Plus technology significantly enhances machine performance by enabling the tools to close at high speed until the opening is only 2mm.

5. Close Proximity Protection

Sentinel Plus enables the operator unrestricted access to the tooling area. The operator can hold the work piece as close as 20mm from the bend line and operate the machine safely in high speed. This increases productivity and reduces operator fatigue - no more stepping in and out of the tool area as with traditional light curtains.





This close proximity protection allows the operator unrestricted access to the point of operation for increased productivity and unlike traditional light curtains, reduces fatigue by enabling the operator to remain standing in the same position.

8. AutoSense

AutoSense technology automatically monitors machine performance in real-time.

7. Mounting Brackets

Options include quick-adjust linear brackets and fully automatic motorised brackets.

6. Camera Receiver (RX)

The camera receiver features Automatic Tool Alignment to detect the tool profile for simple and fast set-up. BendShield technology monitors the area around the punch tip for optimal protection.



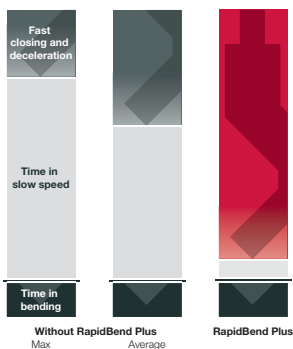
Sentinel Plus technology

Our patented technology provides superior operator protection while enhancing machine performance to significantly improve your productivity.

RapidBend Plus is a performance technology designed for high-speed press brakes that employs a dynamic muting process that enables the tools to close safely at high-speed until the punch is just 2mm above the material surface. This minimises the slow speed travel distance on every bend cycle for both flat profile parts and box profile parts with side flanges.



RapidBend Plus is compatible with most high-speed performance CNC press brakes*, reducing the minimum speed change point down to 2mm.



**For retrofit applications, RapidBend Plus can reduce the minimum speed change point to 2mm, however results may vary depending on the press brake type and capabilities. Consult your Lazer Safe Retrofit Dealer for more information.*

In comparison with other systems, RapidBend Plus technology can reduce your machine cycle time by more than two seconds per cycle, representing a significant saving in operating time and cost.

BendShield technology



provides advanced optical protection by enveloping the punch tip with a protective field that has no gaps. BendShield has an object detection resolution of 2mm to detect even the smallest obstruction from any angle. Optical protection remains active until the tool opening is reduced to 2mm preventing fingers and hands entering the point of operation.

AutoSense is an automatic monitoring technology that

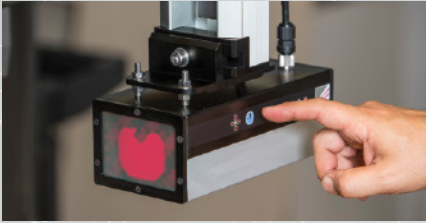


tracks machine operation and performance in real time. AutoSense automatically monitors control commands, motion, direction, speed and stopping performance to maintain a high level of machine and operator protection. AutoSense also guarantees compliance with international safety standards that mandate automatic monitoring of machine overrun and safe speed.

Special Tools Mode

Sentinel Plus features a Special Tools Mode that scans and detects the size and profile of any non-v tool then automatically adjusts the protective zone for optimal protection and performance.

Automatic tool alignment



The Sentinel Plus camera receiver features automatic tool alignment that eliminates the need for precise manual adjustment and reduces tool set-up time. After tool change simply press the TOOL ALIGN button on the receiver. The receiver scans the punch to locate the tool tip then automatically adjusts the protection zone.

Sentinel Plus user interface panel



The Sentinel Plus panel displays system and machine status in real time and provides the operator with simple to follow instructions and messages making the system very easy to operate. The active status of the optical protection is clearly displayed and the operator can quickly change guarding modes with the press of a button.

The panel features a magnetic backing allowing it to be placed on the front of the machine within easy reach and view of the operator.

Dual guarding support - the best of both worlds.

In addition to laser guarding, Sentinel Plus enables connection of third party light curtains for the ultimate flexibility. For bending operations where light curtains are more suitable (eg. multi height tooling), the operator can simply switch from laser protection to light curtain protection.

Additional machine monitoring

Sentinel Plus provides optional monitoring of additional machine safety elements including emergency stop buttons plus side and rear gate interlock switches with real-time status displayed on the user interface panel.

Support for up-acting machines

Sentinel Plus includes dedicated modes for up-acting press brakes such as Amada RG models. For most up-acting machines, Sentinel Plus eliminates the need for complex and expensive hydraulic and electrical modifications during installation and on some models that are equipped with a treadle bar, can retain the ability for the treadle to control the ram motion and speed during bending.

External Device Monitor (EDM)

Sentinel Plus provides the option to connect and monitor up to four external devices such as valve sensors or relays. The EDM response time is configurable and the status of each external device is displayed on the user interface panel in the event of a device failure.

Mounting Bracket Options

Standard Brackets

Sentinel Plus systems are supplied as standard with a free-sliding linear mounting bracket system that attaches the transmitter and receiver to the upper beam of the press brake. The brackets are manufactured from an extruded high-tensile alloy for rigidity and resistance to machine vibration with linear rails and bearings providing precision vertical adjustment of the transmitter and receiver. During tool change, the transmitter and receiver are locked clear allowing tools to be easily removed and loaded from the ends of the machine.

After tool change, the transmitter and receiver are quickly moved back into position. The receiver status LEDs provide clear indication when the system is aligned so the tool change process is very simple and takes only a matter of seconds.



Sentinel Plus Automatic

Available as an optional upgrade*, the addition of motorised brackets automates the process of adjusting the laser transmitter and receiver after tool change. The Automatic Brackets incorporate a compact motorised drive system that is controlled via the Sentinel Plus user interface panel with simple one-touch operation.

During tool change, the operator can press the BRACKETS HOME button to drive the transmitter and receiver to the top position so punches can be removed and loaded from the ends of the machine. Once a new punch has been installed, the operator simply presses the AUTO ADJUST button and the brackets automatically drive the transmitter and receiver to the punch position until the camera receiver detects the tool tip, then Sentinel Plus automatically scans the punch and dynamically adjusts the protection zone.

Free sliding operation

The Automatic Brackets retain the same free-sliding operation as the Standard linear brackets so that if a static object is contacted when the brackets are adjusting or when the machine is moving down, then the brackets slide up to avoid potential damage.

Manual operation

In addition to the automatic adjustment, the Automatic Brackets can be manually positioned up and down via directional controls on the HMI. They can also be manually driven in the event of a power failure.



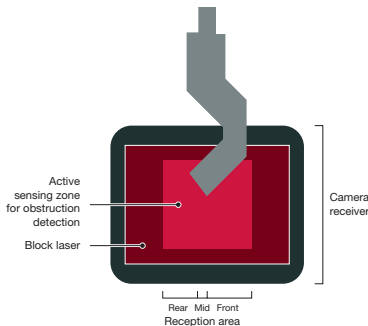
**Automatic Brackets are compatible with the Sentinel Plus system only and are not available with Sentinel Plus XL.*

SENTINEL PLUS PRESS BRAKE GUARDING SYSTEM

How it works

The laser field is processed by the receiver and divided into three continuous zones to detect obstructions entering from the front, sides and rear of the tool area.

The front zone provides protection forward of the tool while the middle zone protects the area just behind the tip of the punch. The rear zone provides additional protection for the open gaps created when segmented tooling is used. The protective zones are independently and automatically muted to suit different shape work pieces allowing parts to be formed safely at high speed to achieve maximum productivity.



Muting

Muting temporarily deactivates optical protection just before the punch makes contact with the material allowing the bend to be completed. On start-up Sentinel Plus automatically determines the mute point by detecting the material position. During operation the optical protection is automatically muted when the tool opening is 2mm, reducing the chance of an operator's fingers or hands entering this small space between the punch and material.

Sentinel Plus automatically monitors the material position on every bend so changes in material thickness or tool size are detected and the machine automatically stopped. After a tool or material change the operator simply initiates a new mute point set-up cycle with the press of a button.

Operating modes

Sentinel Plus features a range of modes to suit different shape and profile work pieces. At the press of a button simply select a mode that best suits each bend job to achieve the best level of productivity and performance.

Normal Mode

In Normal Mode all sensors are active, allowing the tools to close safely at high speed. If any sensor is blocked, the machine is automatically stopped. If any sensor remains blocked then the bend can be completed at 10mm/s safe speed.

Tray Mode

Tray Mode is designed for bending tray or box shaped work pieces where the side flanges block the front or rear sensors. In tray mode all sensors are active and the machine is stopped if a side flange is detected. The operator presses the pedal again to confirm the presence of the side flange then the system automatically blanks the front and rear sensors and the bend continues at high speed.

Mute Stop Mode

Ideal for forming parts with side flanges that block the entire sensing zone. The tools close at high speed and stop automatically at the mute point allowing the operator to simply insert the work piece then press the pedal to complete the bend.

Back Gauge Mode

Back gauge mode is designed for bend cycles where the back gauge fingers are positioned very close to the bend line and detected by the rear sensor.

To maintain protection while avoiding unnecessary interference the rear sensor is automatically blanked just above the back gauge fingers so the bend can be completed without stopping.

Field Muted Mode

In Field Muted Mode the optical protection is turned off and closing speed restricted to 10mm/s safe speed. Field Muted Mode is ideal for bending operations where the laser transmitter or receiver must be moved clear to accommodate work pieces that extend past the ends of the machine bed.

Tool Set-up Mode

Traditional guarding systems can interfere with machine tool set-up and referencing that can lead to longer set-up times or the need to bypass the guarding system entirely. Sentinel Plus Tool Set-up Mode eliminates interference and enables tool set-up and referencing to be performed quickly and easily.

Light Curtain Mode (optional)

Sentinel Plus allows the operator to set the material position then automatically calculates the light curtain mute point at a 6mm tool opening. During operation Sentinel Plus automatically monitors the machine stop time when ever the light curtain is interrupted and on every machine stop. Sentinel Plus also provides flexibility with safe speed operation. If the light curtain is interrupted when the tool opening is greater than 6mm then the bend can be completed at 10mm/s safe speed.



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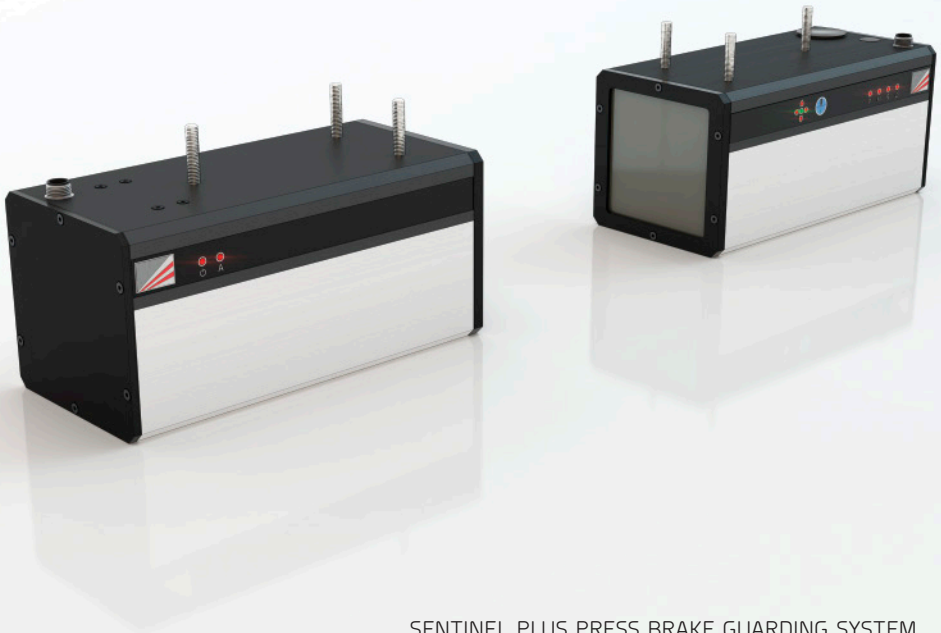
Sentinel Plus XL

The robust guarding solution for long press brakes.

Sentinel Plus XL is an optional upgrade for the Sentinel Plus press brake guarding system*. The XL option uses a long range laser transmitter and camera receiver to extend the optical range of the guarding system from 8 meters (26 feet) to a maximum recommended range of 15 meters (50 feet). Using advanced camera technology, Sentinel Plus XL is optimised for larger press brake applications with greater resistance to machine vibration and environmental effects.

Sentinel Plus XL provides wider optical coverage and protection for a range of tools that are typically used on long press brakes and the system ensures stable operation even under extreme operating conditions.

**When the Sentinel Plus XL option is installed, there are some performance and functional differences compared with the standard Sentinel Plus configuration. Consult your Lazer Safe Retrofit Dealer for more information.*



SENTINEL PLUS PRESS BRAKE GUARDING SYSTEM

Product specifications

Sentinel Plus / Sentinel Plus Automatic

Controller

Hardware	CE Certified Category 4 Safety Controller with integrated force guided relays and encoder feedback system
Software	CE Certified Kernel Software with application software interface
Technology	RapidBend Plus / AutoSense / BendShield

Laser transmitter / receiver

Laser transmitter	CLASS 1 Block laser
Receiver	Camera receiver
Maximum recommended optical range	8 meters / 26 feet
Minimum object detection resolution	2mm
Minimum speed change point	2mm
Connector type	M12 12 pin
Tool compatibility	V tools and non standard tools
Special functions	Automatic Tool Alignment / Special Tools Mode
Integrated status LEDs	Transmitter status (power / laser); Receiver status (power / front / middle / rear sensors / automatic alignment)

User interface panel

Display	4.3" widescreen colour graphics display
Connector type	M12 8 pin

Mounting brackets

	Standard	Automatic
Vertical bracket length (mm)	520 / 700 / 1000	700
Vertical adjustment range (mm)	350 / 530 / 830	500
Horizontal adjustment range (mm)	40	40
Free sliding operation	●	●
Automatic motorised drive system	-	●
Tool change lock	Manual	Automatic

Certification and standards compliance

Sentinel Plus hardware and software is CE Certified and compliant with all international press brake safety standards including EN12622, ANSI B11.3-2012, CSA Z142-10 and NR12. UL Listed for USA and Canada. UL File No. E514131.

Sentinel Plus XL Option for Long Press Brakes

Controller

Hardware	CE Certified Category 4 Safety Controller with integrated force guided relays and encoder feedback system
Software	CE Certified Kernel Software with application software interface
Technology	AutoSense

Laser transmitter / receiver

Laser transmitter	CLASS 1 Block laser
Receiver	Camera receiver
Maximum recommended optical range	15 meters / 50 feet
Minimum object detection resolution	9mm
Minimum speed change point	14mm
Connector type	M12 12 pin
Tool compatibility	V tools and non standard tools
Special functions	Automatic Alignment Confirmation
Integrated status LEDs	Transmitter status (power / laser); Receiver status (power / front/ middle/rear sensors / alignment confirmation)

User interface panel

Display	4.3" widescreen colour graphics display
Connector type	M12 8 pin

Mounting brackets

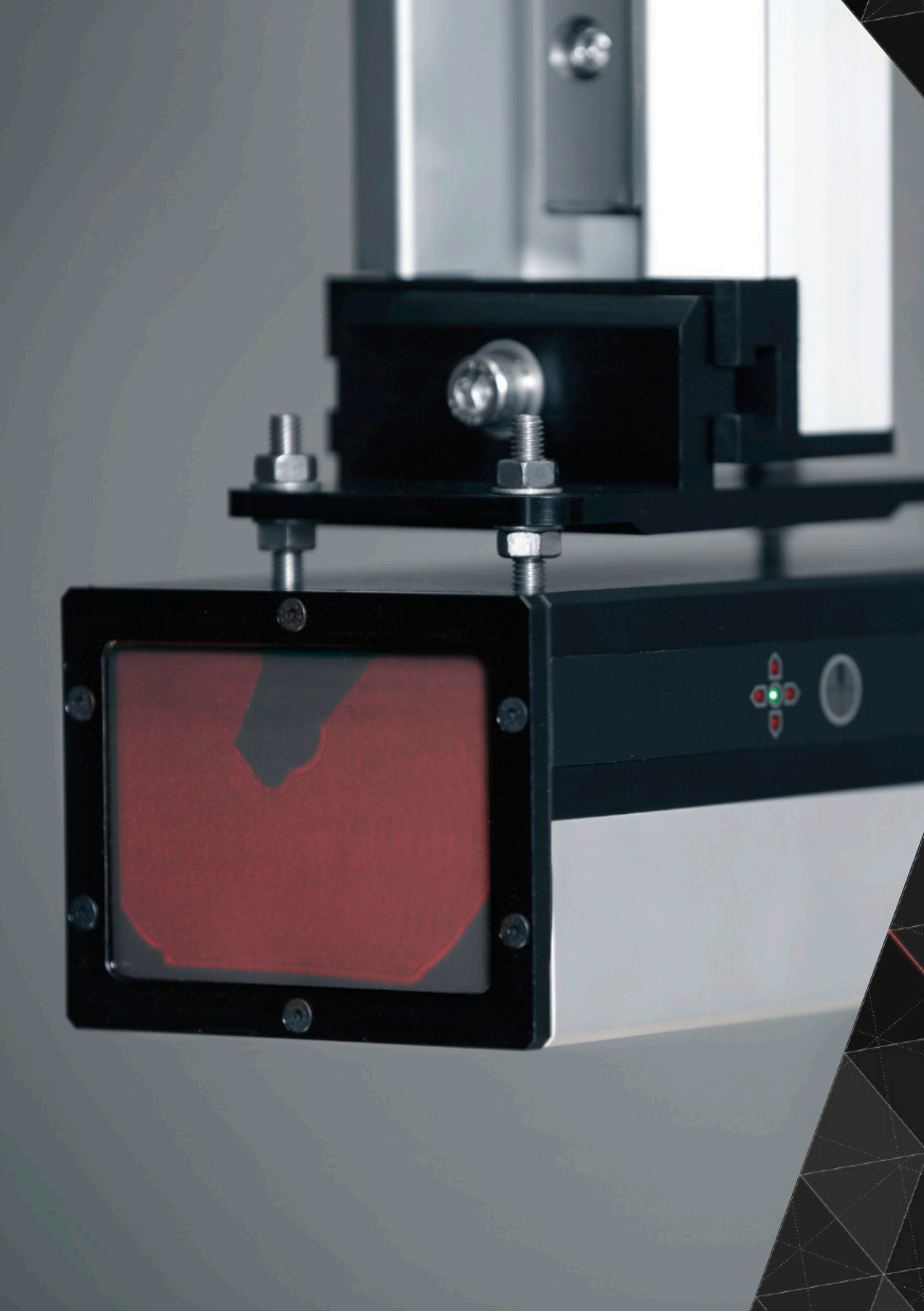
Standard

Vertical bracket length (mm)	520 / 700 / 1000
Vertical adjustment range (mm)	350 / 530 / 830
Horizontal adjustment range (mm)	40
Free sliding operation	●
Tool change lock	Manual

Sales and installation

Sentinel Plus is available supplied and installed from Lazer Safe Retrofit Dealers, the original press brake manufacturer and participating machinery dealers.

For your nearest Lazer Safe Retrofit Dealer visit www.lazersafe.com/contact/retrofit.



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Patents

Lazer Safe products are subject to patents granted or applied for in various global territories.

LS-MKT-M-006 v3



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