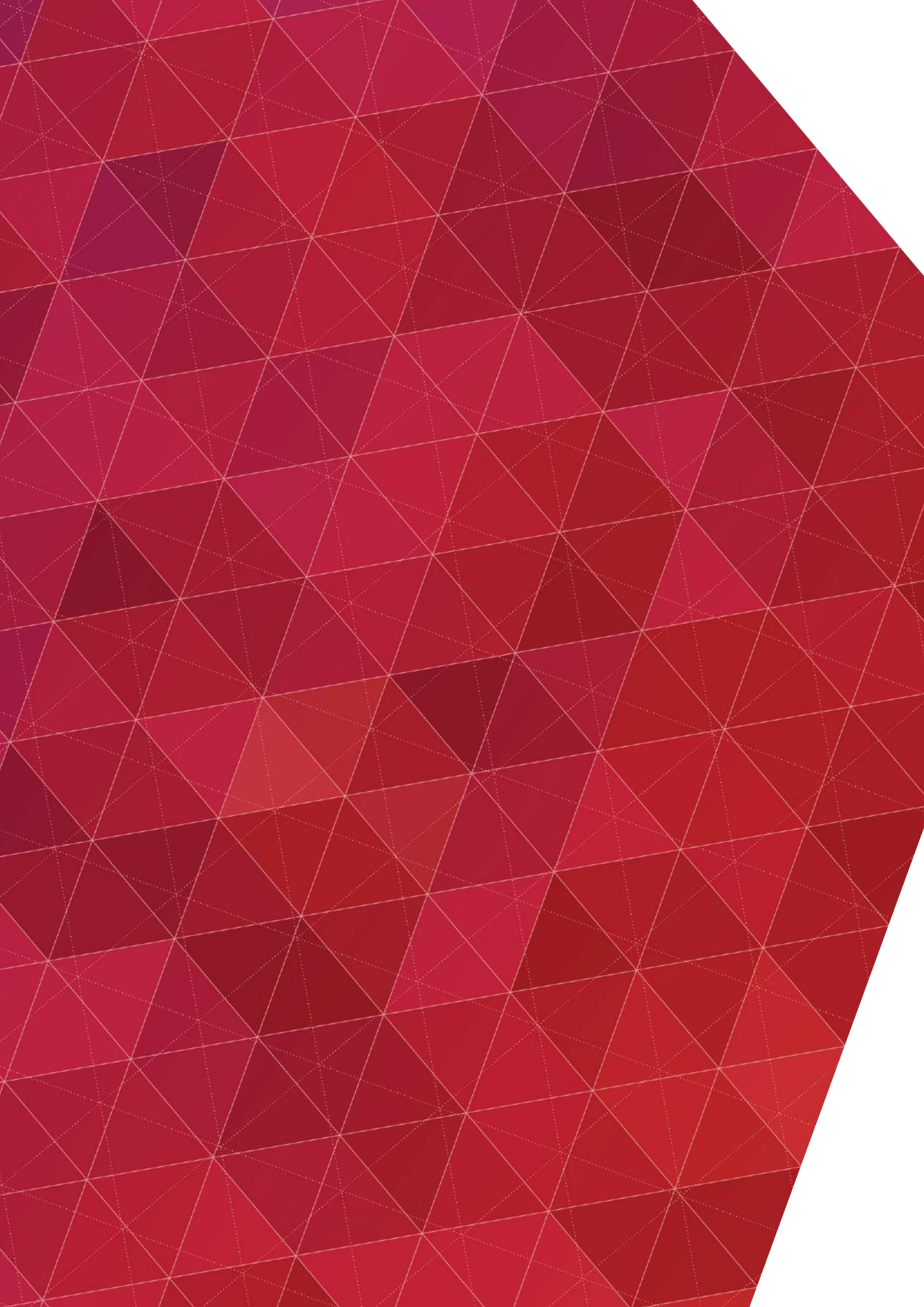
Embedded Solutions
OEM Premium Range

FOR PRESS BRAKES

AUGUST 2020

lazersafe



Performance without compromise.™

We are a technology company specialising in the development and manufacture of control, safety and operator protection systems for press brakes and related sheet metal machinery.

Our industry leading systems are designed and certified to the highest European and International safety standards. Press brakes equipped with Lazer Safe technology benefit through significantly higher levels of machine productivity and performance without compromising operator safety.

Since 1998 Lazer Safe has established a reputation as a technology innovator and an international centre of expertise that is recognised by many of the industry's most highly respected press brake manufacturers.

The Lazer Safe difference

Our OEM Premium Range of embedded solution have been designed to allow a high level of flexibility to meet the needs of individual press brake manufacturers. Unlike a component supplier, we provide tailored hardware and software solutions configured to suit any level of functionality, performance and price and personalised to suit the manufacturer's exact requirements.

OEM Embedded Solutions

Our OEM Embedded Solutions are available to press brake manufacturers that seek a standardised long-term solution with a technical partnership to develop and enhance the overall design of their machines.

For press brake manufacturers that only require embedded safety and guarding products for occasional use to meet customer demand, our OEM Signature Range offers flexible and economical solutions, combined with high levels of safety, features and performance. For one-off requirements, we also offer a range of stand-alone guarding solutions that are simple and quick to integrate. Visit our website www.lazersafe.com or contact us for more information.

OEM Partner Program

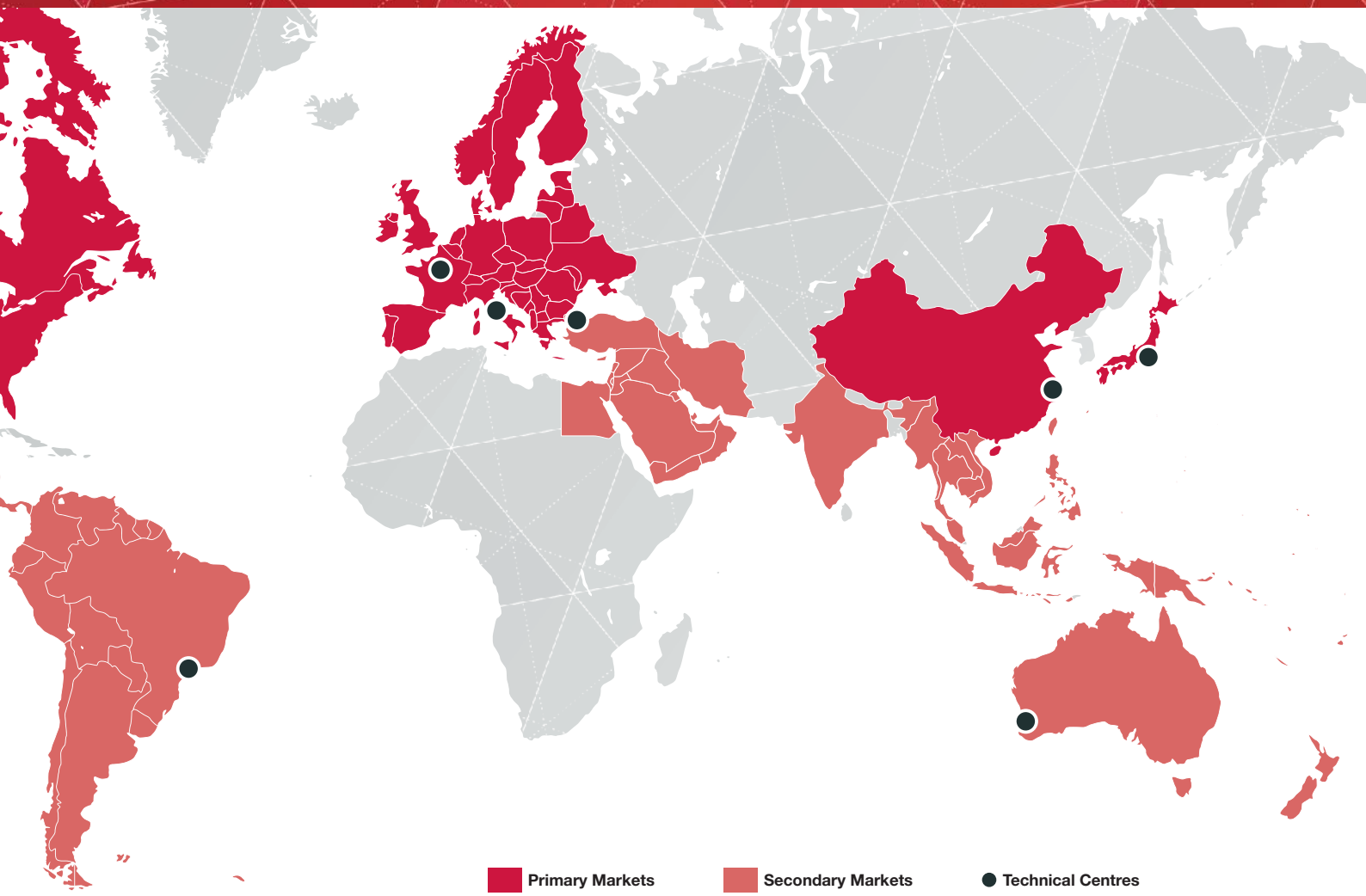
Our OEM Partner Program goes far beyond the normal scope of supplying products and services. We establish close technical and business relationships in order to develop a long-term partnership with each manufacturer which enables us to deliver and maintain the best and most up to date technology solutions. We work together with our partners to continually develop and evolve technology to meet the ever-growing safety and performance requirements of press brake users.

During the initial stages of a new partnership, we first collaborate with the manufacturer to evaluate their exact requirements for each machine series and model. Hardware and software solutions are then tailored for each machine application and in conjunction with engineering visits, we work alongside the manufacturer during the entire process; from the integration to seamlessly blend our technology with machine design, to customisation and testing, through to final machine production.

As an ongoing process, we continue to work with our partners to provide the highest level of technical and engineering support, incorporating the latest technology and features as they become available as well as looking for ways to enhance machine design to help manufacturers deliver more to their customers.

Press brake manufacturers that join our OEM Partner Program not only realise the benefits of our industry leading technology and engineering support, but can also take advantage of our complimentary marketing programs and initiatives that provide additional advantages in further promoting their individual brand and technology offerings to the global sheet metal market.

Our unique approach and commitment to our OEM Partners is part of our value added service and represents no additional cost to the manufacturer.



International markets

We partner with press brake manufacturers and export our systems to key markets around the world. Our primary markets are Europe, Japan, North America and China with secondary markets in South America, Turkey, Southeast Asia, Middle East, India and Australasia.

Product overview

For press brake manufacturers, we supply tailored hardware and software solutions that provide safety control and monitoring, optical laser protection, CNC communications interface, machine diagnostics and image processing technology. Our systems comprise three key elements; safety controllers, optical systems and mounting brackets. These elements are matched and configured to suit the manufacturer's requirements for each machine.

Safety controllers

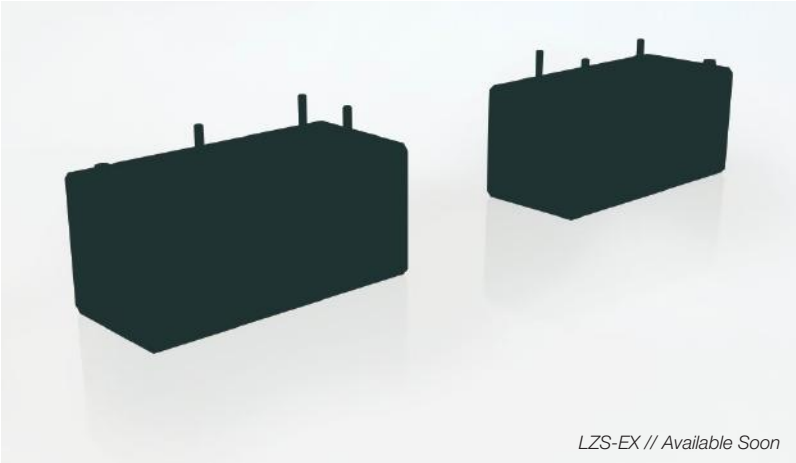
PCSS-A1

PCSS-A2

PCSS-A Tandem Adaptor

Optical systems

LZS-XL



LZS-EX // Available Soon

Mounting brackets

IRIS

Standard brackets

IRIS Plus

SmartLink brackets

PCSS-A series safety controllers

PRESS CONTROL SAFETY SYSTEM - ADVANCED

PCSS-A is a programmable safety controller designed to improve the performance and safety of press brakes. It provides flexibility for the press brake manufacturer and simplifies the design process by combining all related control, safety and monitoring functions into a single system and eliminates the need for complex integration of third party components and software. PCSS-A provides an optimum balance of functionality and performance with reduced build cost.

Compact and powerful

PCSS-A replaces conventional safety PLCs, safety relays and modules, guarding system controllers and muting hardware. The small foot print takes up minimal cabinet space with all safety, control and guarding elements connected directly to a single source. This cost effective design reduces the number of components and eliminates complex wiring for a clean and efficient cabinet layout.

Software simplified

CE Certified kernel software with pre-programmed safety function modules takes the work out of designing, testing and certifying system software. A user programmable application integrates with the kernel enabling the manufacturer to simply select the modules that suit the specific machine design and provides flexibility to program additional non-safety functions. This is ideal for finalising machine certification quickly and efficiently. Custom safety function modules can be developed and certified by our engineering team as part of our value added service.

Optical protection & optical imaging options

The manufacturer can select from a variety of optical protection and optical imaging options that connect directly to PCSS-A. No additional control hardware or software is required. These options provide flexibility and enable the highest possible levels of machine performance with speed change as low as 0mm and the option to expand machine functionality by adding optical imaging functions such as Bend Speed Management, Dynamic Angle Control, Active Angle Control plus much more.

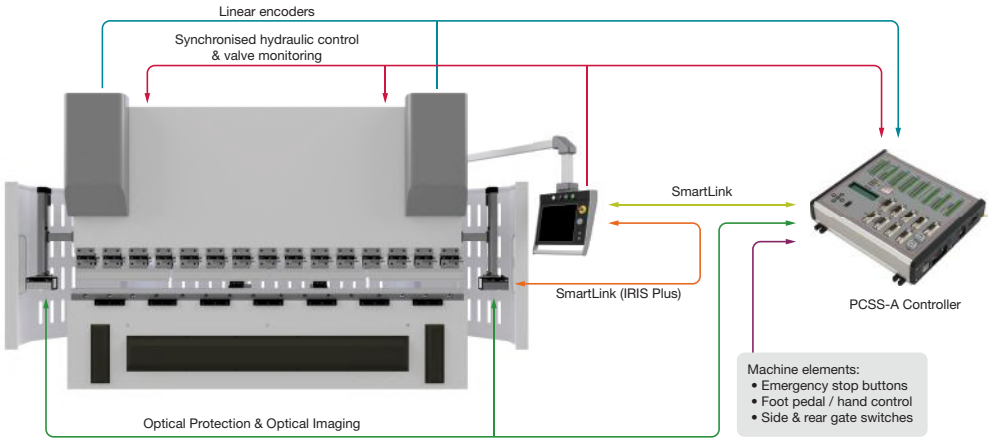
PCSS-A Standard features

- Streamlined management of machine safety elements including valve control, valve monitoring, foot pedals, hand controls, emergency stop, side and rear gate switches, level switches, etc.
- Optical protection system management, control, muting and monitoring.
- Dual optical protection support. Lazer Safe optical protection and third party light curtains can be installed on the same machine.
- Connects to Y1/Y2 linear encoders for automatic speed and stopping performance monitoring.
- Fully embedded communication software interface with the CNC system. Compatible with Delem, Cybelec and ESA. Custom CNC integration also supported.
- CE Certified hardware and software.

PCSS-A design

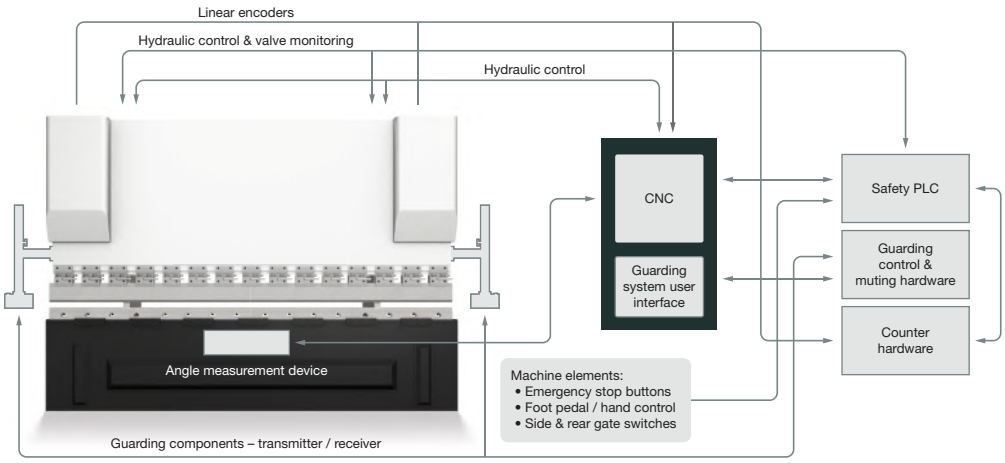
COMPARISON

Press Brake design streamlined with PCSS-A + Optical Protection & Imaging



This provides an efficient and cost effective platform with fewer components, reduced wiring, simplified interface and CE Certified hardware and software to minimise engineering and build time.

Press Brake designed with third party components



Traditional press brake design increases the level of complexity and requires many third party components to be made to work together leading to hardware and software compatibility issues, adds extra wiring and increased cabinet size. The manufacturer must consider CE Certification in design and integration when using third party hardware components plus develop and certify the control software. This inefficient design leads to longer manufacturing time and increased build cost.

PCSS-A technology

Our industry leading technology is designed to maximise press brake productivity and performance, streamline operation and enhance functionality and protection. These key technologies are the foundation of our products and form the building blocks that enable us to deliver superior features and performance to press brake manufacturers and users.

FlexSpeed is an advanced high speed hardware architecture that achieves faster response time to enhance machine performance and efficiency.

Traditional safety control systems employ a combination of hardware and software processing. This inefficient process slows down overall response and reaction times and when coupled with optical protection systems leads to a reduction in machine performance by forcing the machine to operate at reduced closing speed in order to improve stopping performance and increasing slow speed travel prior to bending.

FlexSpeed eliminates these delays and imposes no restriction on machine performance. This enables machines to operate with maximum speed and efficiency.

FlexSpeed Plus features a triple processor design to increase control processing speed and efficiency by as much as 50%.

SmartLink is an advanced communications process that seamlessly integrates safety, guarding and imaging functions with the CNC system to enhance the operation, functionality, performance and efficiency of the press brake. SmartLink is compatible* with Cybelec, Delem and ESA CNC systems or can be custom integrated with proprietary CNC systems by the press brake manufacturer.

**SmartLink functionality and features that are available with third party CNC systems will vary between CNC manufacturers.*

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.

AutoSense Plus provides additional monitoring to detect and diagnose specific machine electrical and hydraulic faults with visual alerts displayed on the CNC via SmartLink. Machine problems are quickly and easily identified to get the machine back into production with minimal downtime.

AutoSense Ultimate adds advanced Dynamic Valve Monitoring technology to automatically monitor hydraulic valves, associated control commands and machine actions. Dynamic Valve Monitoring reduces machine build cost and complexity by eliminating the need for separate monitoring systems and monitoring sensors built into the hydraulic valves. AutoSense Ultimate is available as standard with selected systems.

PCSS-A models

COMPARISON

PCSS-A1

1. Input and output connections.
2. LCD display.
3. Display navigations buttons.
4. TX & RX connections for LZS-XL, IRIS and IRIS Plus.
5. TX & RX connections for LZS-1, LZS-2 and light curtains.
6. Linear encoder input and output connections (Y2).
7. Linear encoder input and output connections (Y1).
8. SmartLink communications.
9. Software transfer and diagnostics.
10. Expansion port.

PCSS-A2

1. Input and output connections.
2. LCD display.
3. Display navigations buttons.
4. TX & RX connections for LZS-XL, IRIS and IRIS Plus.
5. TX & RX connections for LZS-1, LZS-2 and light curtains.
6. Linear encoder input and output connections (Y2).
7. Linear encoder input and output connections (Y1).
8. SmartLink communications.
9. Software transfer and diagnostics.
10. Expansion port.
11. CAN Open.
12. Ethernet.
13. SD card slot.

PCSS-A models

SPECIFICATIONS

	PCSS-A1	PCSS-A2
Technology		
SmartLink	●	●
FlexSpeed	●	-
FlexSpeed Plus	-	●
AutoSense / AutoSense Plus	●	●
AutoSense Ultimate with Dynamic Valve Monitoring	●	●
Specifications		
Safety Inputs	16	16
Safety Outputs	6	6
Standard Inputs	28	28
Standard Outputs	10	10
Linear Encoder I/O	2, both Y1 and Y2	2, both Y1 and Y2
Minimum encoder resolution	0.1 micron	0.1 micron
Speed capacity of the encoder counters	> 300mm/second	> 300mm/second
Response time (hardware interrupts)	< 1ms	< 1ms
SD Card (back-up, data logging and high speed software transfer)	-	●
CAN Open	-	●
Ethernet	-	●
Ether CAT (option)	-	●
Dimensions	229mm x 189mm x 45mm	229mm x 189mm x 57mm
Expansion Options		
PCSS-A Tandem Adaptor	●	●
SmartLink Brackets	●	●
Wireless Foot Pedal	●	●
Optics Compatibility		
LZS-XL / LZS-EX	●	●
IRIS / IRIS Plus	●	●
Third party light curtain support	●	●
Dual guarding support	●	●

Solution for tandem press brakes

The PCSS-A embedded safety controller range expands the possibilities for machine control with the next generation solution for tandem press brakes. The latest tandem solution comprises a Tandem Adaptor that synchronises safety functions and control across both machines and a dedicated optical system for flexible guarding in both single and tandem configurations.

The PCSS-A Tandem Adaptor is a compact module that interfaces the PCSS-A controllers in the master and slave machines via a safety communications protocol that simplifies installation and eliminates complex wiring. Management and switching of foot pedals, emergency stop buttons as well as side and rear gate interlock switches is handled automatically when the machines are operating in single or tandem configuration.

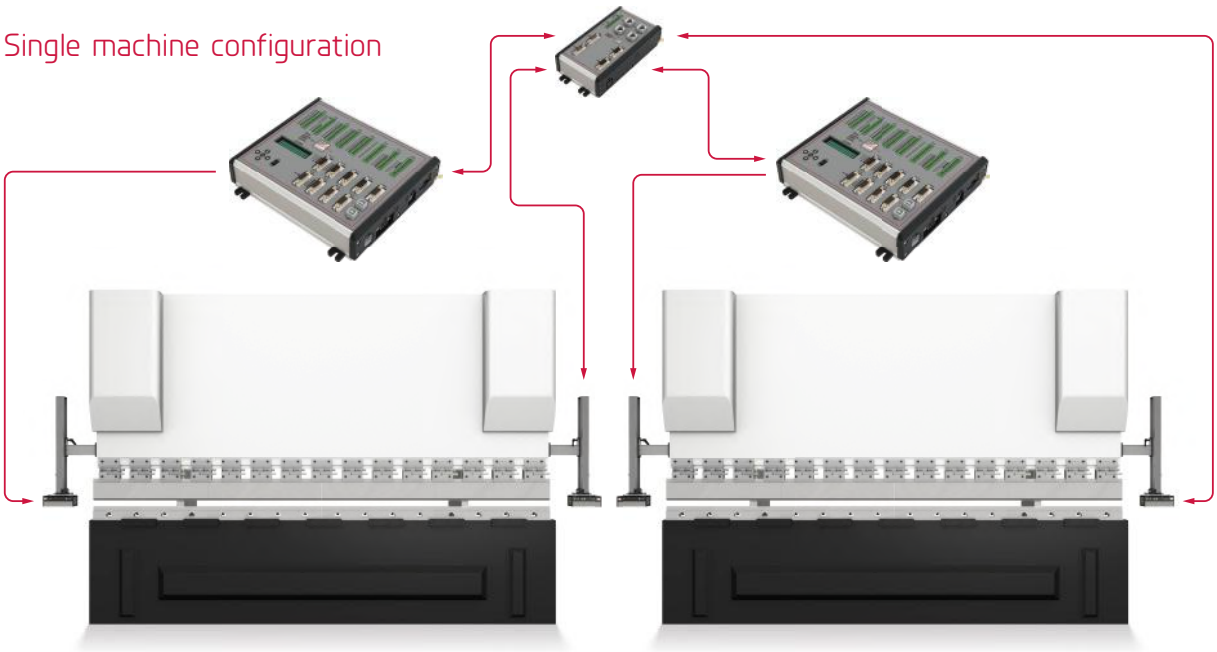
For optical protection, the tandem solution incorporates the LZS-XL optical system that is also managed via the Tandem Adaptor. When in single configuration, both machines can operate independently at high-speed with separate sets of the LZS-XL providing optical protection on each machine and with the added benefit of enhanced performance by enabling a minimum speed change point of just 3mm for both flat sheet and box bending.

When operating in a tandem configuration, the middle transmitter and receiver pair are removed* and the Tandem Adaptor manages switching and control of the LZS-XL system with optical protection spanning both machines. High-speed closing movement is protected through the system's advanced camera technology while safety is maintained without unnecessary interruptions, even if the machines are out of synchronisation prior to reaching the pinch point**.

**A custom mounting solution is required to suit the mechanical design of the tandem machine.*

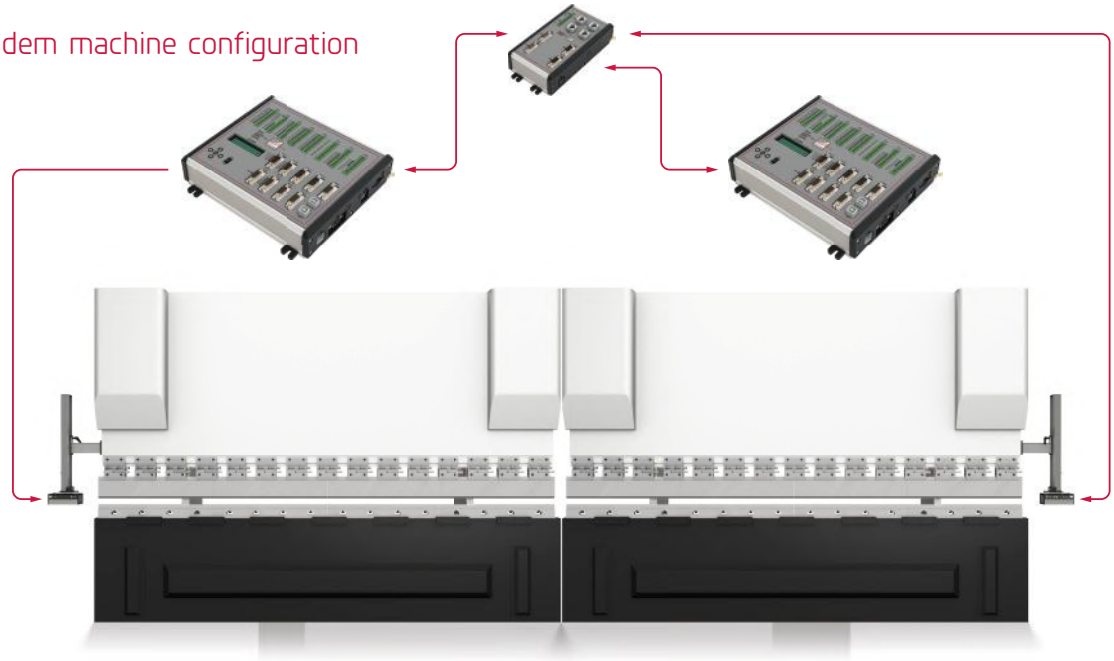
***For optimal performance, we recommend that tandem synchronisation does not exceed +/- 5mm.*

Single machine configuration



PCSS-A Tandem Adaptor

Tandem machine configuration



Wireless Foot Pedal

The wireless foot pedal solution is the new expansion option for the PCSS-A1 or PCSS-A2 platform that makes it simple to incorporate wireless functionality by integrating the wireless module into your existing foot pedal or by designing a new pedal from the ground up. The wireless system uses a safe, dual-channel SIL 3 communications method with two-way communication between the press brake and the foot pedal while also providing dynamic range and position monitoring through the use of ultrasonic sensors.

1. WRM
2. Reset Button
3. Up Button
4. Ultrasonic Sensors
5. Solar Panel
6. Display
7. E-Stop
8. Station Active LED
9. Battery Charge / Status
10. Wireless Comms Status
11. WRM Status
12. OEM Defined WRM ID

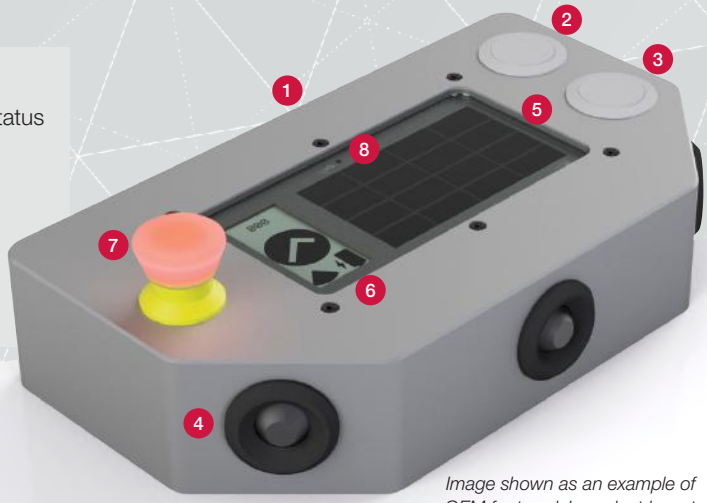


Image shown as an example of an OEM foot pedal pendant layout

Key Features

Safe wireless communications

The wireless foot pedal system uses a dual-channel SIL 3 communication method with two-way communications between the press brake and the foot pedal. The wireless technology has been developed by Lazer Safe and is TUV CE Certified.

Range and distance monitoring

An array of seven ultrasonic sensors installed in the foot pedal and on the press brake are used to triangulate the position of the foot pedal. The operating range and distance are configurable and automatically monitored.

Low power consumption

The system is extremely energy efficient due to the design of the dual-channel wireless transmission system in combination with the low power e-paper display, low power illuminated emergency stop button and indoor solar charging cell. Traditional wireless systems generally need to be recharged daily. The low power technology developed by Lazer Safe is unique in that the foot pedal can operate for up to one month before the battery requires a plug-in recharge.

Rechargeable battery

The supplied lithium ion battery holds enough charge for up to one month of usage before it requires a plug in recharge. There is a connection on the remote module to allow for USB charging of the battery without having to remove it from the foot pedal station. The machine operator can simply connect the foot pedal to any USB charger.

Indoor solar charging

The integrated solar charging cell provides continuous charge using ambient light to extend the life of the battery until a plug-in recharge is required. Depending on the ambient lighting conditions, solar charging can extend battery life by up to 20%.

E-paper display

A low-power E-paper display is incorporated into the Wireless Remote Module and displays critical user information such the current battery status, wireless connection status, active/sleep mode plus more.

Hardware

Wireless Remote Module (WRM)

The wireless pedal system comprises three main hardware components.

Wireless Remote Module (WRM)

This module is integrated inside the foot pedal pendant together with a set of three ultrasonic sensors and an illuminated emergency stop button.

Machine Module (MM)

This module is fitted to the side of the press brake and provides the wireless link between the WRM and the PCSS-A controller.

Ultrasonic Module (UM)

This module is fitted to the opposite side of the press brake and combines with the ultrasonic sensors in the MM to monitor the position of the foot pedal.

Wireless Remote Module

The WRM is a self-contained module that includes;

- 12 pulsed safety inputs (6 dedicated and 6 spare)
- Dual integrated antennas
- E-paper display
- Indoor solar charging cell
- Rechargeable lithium ion battery
- Connections for external USB charging port and wireless pairing button
- Pedal active status LED

Also supplied with and connected to the WRM are;

- An illuminated emergency stop button
- A set of three ultrasonic sensors

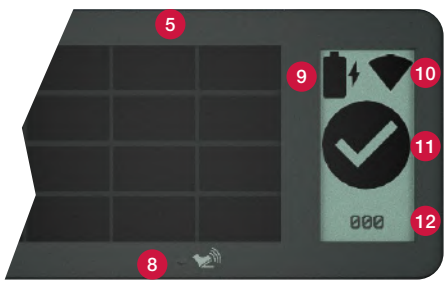
Of the 12 available inputs on the WRM, 6 inputs are preconfigured for the following functions;

- Down pedal x2 (NO and NC contacts)
- Emergency stop button x2 (NC contacts)
- Reset button x2 (NO and NC contacts)

The remaining 6 spare inputs can be custom configured for any auxiliary functions such as the up pedal, upper and lower tool clamping buttons, etc.

E-paper display

The low-power display shows information to the machine operator such as battery level, wireless signal strength and in-range status. The foot pedal identification number can be defined by the press brake manufacturer and also displayed on the CNC to show the operator which foot pedal is paired with the machine.



Wireless Foot Pedal

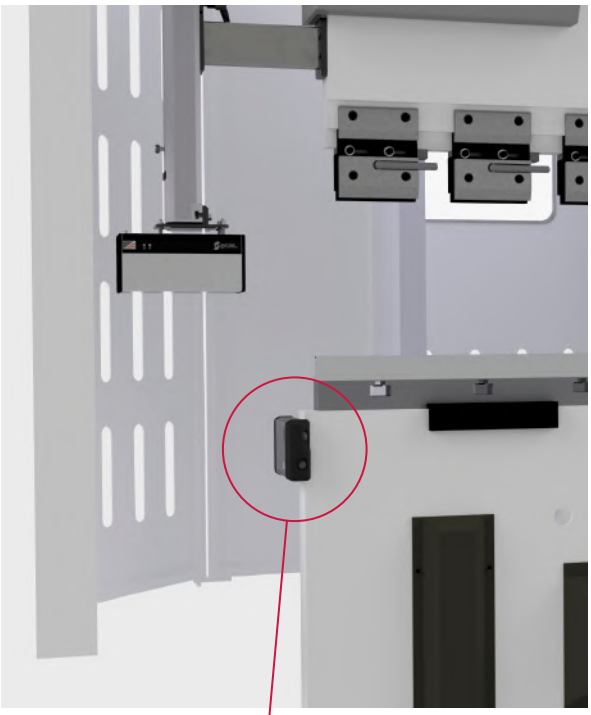
HARDWARE

Machine Module and Ultrasonic Module

The Machine Module (MM) and Ultrasonic Module (UM) are fitted to the lower front left and right sides of the press brake. The MM provides the interface between the PCSS-A controller and the wireless foot pedal. The MM communicates wirelessly with the WRM, and also contains a set of two ultrasonic sensors, while the UM contains an additional two ultrasonic sensors. The total combination of seven ultrasonic sensors located in the wireless foot pedal, MM and UM are used to triangulate the position of the foot pedal in relation to the front of the press brake.

Ultrasonic sensors

The active operating area is divided into three regions in front of the press brake; the centre, and the left/right wings. The ultrasonic sensors in the MM and UM monitor the location of the wireless foot pedal and ensure that the operator can only operate the press brake when the foot pedal is within the defined safe operating area and within clear line-of-sight of the machine. This prevents the machine from being operated if the foot pedal is outside the defined active area or hidden behind a screen or wall.



Machine Module (MM)

Ultrasonic Module (UM)

The Machine Module (MM) and Ultrasonic Module (UM) are fitted to either ends of the pressbrake. M12 cables connect the MM and UM to the PCSS-A via an expansion adaptor (supplied).

Key Benefits

Benefits for the press brake manufacturer	
✔	By far, the simplest, fastest and most cost effective way to incorporate wireless technology and integrates via the existing PCSS-A platform.
✔	The only complete SIL 3 wireless safety solution with TUV CE Certified hardware and software.
✔	Design flexibility enables press brake manufacturers to incorporate the technology into the existing foot pedal design, or to design a new pedal from the ground up.
✔	Flexibility to incorporate additional wireless controls and functions.
✔	Flexibility to tailor wireless functionality and customise the user interface in the CNC via SmartLink.
Benefits for the machine operator	
✔	Improved ergonomics. The operator has more freedom to move and position the foot pedal.
✔	Operation is simple and intuitive.
✔	Reduced operator fatigue.
✔	Eliminate trip hazards created by foot pedal cables lying across the floor.
✔	Eliminate the potential for cable damage.
✔	Clear floor space makes it easier to move trolleys and carts around the front of the press brake.
✔	Long battery life means operators can focus on bending parts without having to worry about frequent recharging. The foot pedal can be easily recharged by connecting to any USB charger or a USB charging port on the CNC.

Optical protection

Our premium range of optical protection systems provide press brake manufacturers with the optimal solution for superior operator protection combined with the highest possible level of machine productivity and performance.

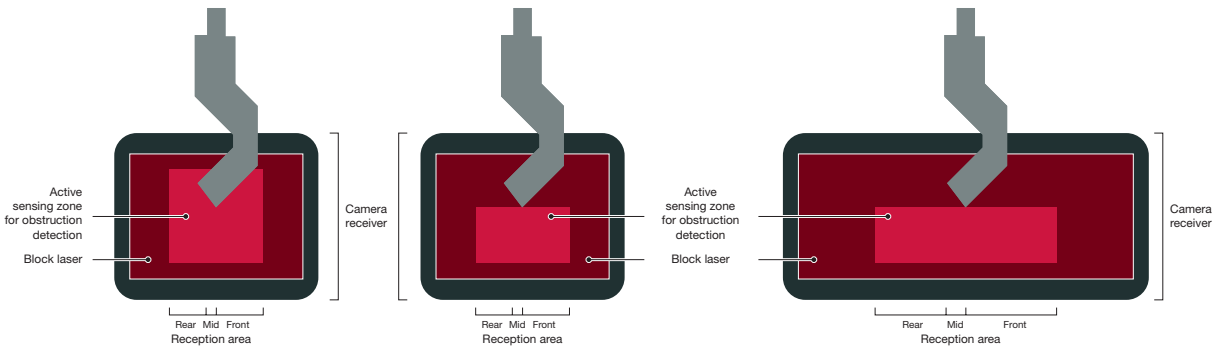
Close proximity protection enables safe handling of the work piece during high speed closing.

Optical protection systems comprise a laser transmitter and receiver that are mounted to the upper beam of the press brake. A continuous laser field protects the zone directly below and 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.

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.

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 shaped work pieces allowing parts to be formed safely at high speed to achieve maximum productivity.



Applies to IRIS and IRIS Plus *Applies to LZS-XL* *Applies to LZS-EX*

Optical protection technology

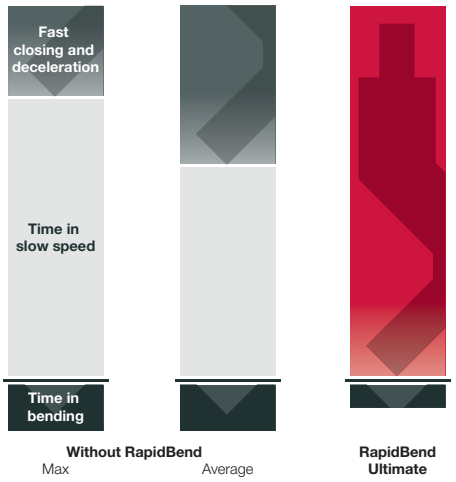
Our patented technology provides superior operator protection while maximising machine functionality, productivity and performance. Unlike traditional safety devices that limit or reduce machine performance, our advanced optical protection technology not only maintains performance but can enhance it to levels never before possible.

RapidBend Ultimate technology changes the game by enabling press brakes to operate without restriction to achieve maximum safety and performance.

Through a high-speed dynamic muting process and in conjunction with BendShield technology, the tools can close safely at maximum speed, then transition to bending speed right at the material pinch point. This effectively reduces the speed change point to 0mm, eliminating unnecessary slow speed travel to minimise the machine cycle time. RapidBend Ultimate works with a wide range of part profiles including box bending with side flanges.

With time savings of as much as 3 seconds per cycle, RapidBend Ultimate boosts machine performance to significantly enhance your productivity.

In comparison with other light or laser based guarding systems, RapidBend Ultimate technology can reduce machine cycle time by more than three seconds per cycle, represneting a significant saving in operating time and cost. RapidBend Ultimate guarantees a high level of performance irrespective of the machine closing speed or stopping performance.



BendShield is a dynamic sensing technology that provides an advanced level of optical tool protection for press brake operators by enveloping the punch tip with a protective field that has no gaps, while maintaining high-speed machine operation. With an object detection resolution of 2mm, BendShield detects even the smallest obstruction from any angle.

BendShield manages the active protection field to accommodate various part profiles from flat parts to box shaped parts with single and double side flanges as well as back-gauge fingers that are positioned close to the back of the die. Multiple segments within the protective zone are automatically and dynamically blanked on each bending cycle to maintain high-speed machine operation with optimal protection and minimal interruptions.

Press brakes with BendShield technology are not only the safest but also the most productive, with guaranteed levels of safety and high-speed performance.

Solutions for long press brakes

The LZS-XL and LZS-EX (coming soon) optical protection systems provide robust guarding solutions for long press brakes. With optical range of up to 22 metres, the systems feature advanced camera technology that is designed and optimised to withstand excessive vibration and laser distortion effects that are common to longer machines. The LZS-XL and LZS-EX optical systems provide a larger area of protection that covers a wide range of tools that are typically used on long press brakes, to ensure safe and stable operation even under extreme operating conditions.

For mounting to the press brake, the LZS-XL is available with Standard Linear Brackets in a range of vertical sizes up to one metre. The LZS-EX will be available with Heavy-Duty Linear Brackets that are designed for large high-tonnage machines where a more robust mounting solution is required.

How optical protection works

All functions of the optical protection system including mute point management, mode selection and user messages are embedded within the CNC system (via SmartLink). Mode selection is tailored via the CNC bend program to suit the shape and profile of the work piece and all functions of the system are automated during machine operation.

Muting

Muting temporarily deactivates the optical protection just before the punch makes contact with the material allowing the bend to be completed. When the bend program is started the tool and material data is sent to the PCSS-A controller via SmartLink. The mute point position is automatically calculated at 2mm above the programmed material surface and this position is optically verified on every cycle.

Operating modes

SmartLink enables guarding modes to be selected in the CNC bend program. A different mode can be selected for each bend step allowing the operator to streamline set-up to suit the profile of the work piece. SmartLink automatically switches guarding modes on each step of the bend program with automatic blanking of the sensors to eliminate unnecessary stops and reduce cycle time to achieve maximum productivity.

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.

Tray mode with programmed flange height

The operator has the option to program the height of the side flange in the bend program. During the cycle all sensors are active until the top of the flange is detected. The actual flange position is verified with the programmed position then the front and rear sensors are automatically blanked so the bend continues at high speed without stopping. Activation of the closing movement only requires a single pedal press and does not require any other operator confirmation (e.g. double pedal press). This mode is CE Certified and exclusive to Lazer Safe.

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.

Dual guarding option

This provides the flexibility to install both optical laser protection and a third party light curtain on the same machine. The operator can select which guarding device to activate for a particular bend job or the system can automatically switch between guarding devices on a bend by bend basis.

Special Functions

Advancements in camera-based technology make it possible to implement Special Functions that deliver higher levels of safety for the machine operator as well as greater operational stability in various environments, enhanced functionality and improved productivity.

Automatic tool alignment

Selected systems with a camera receiver feature 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 punch tip then automatically adjusts the position of the protective zone. This process can also be fully automated in the CNC via SmartLink, eliminating the need for the operator to press the TOOL ALIGN button.

Special Tools Mode

IRIS and IRIS Plus systems feature a Special Tools Mode that scans and detects any size and profile of non-v tool then automatically adjusts the size, shape and position of the active protective zone for optimal protection and performance. Special Tools Mode provides a wider physical scope for tool detection that eliminates the need for additional transmitter and receiver adjustments.

Soft Stop Mode

The Soft Stop Mode enables a decelerated stop instead of a hard-stop when the optical protection system detects an obstruction. This results in a smoother transition from fast closing speed to a complete stop. The Soft Stop Mode is available as an option with IRIS and IRIS Plus systems.

Fast Flattening Mode

When compatible flattening or hemming tools are used, a multi-stage muting process is activated to enable fast flattening operation. Fast Flattening Mode enables the tools to close at a higher speed before transitioning to bending speed just above the hem for decreased cycle times and improved productivity.

Adaptive Environment Sensing (AES)

An intuitive technology that automatically senses and adapts to variable environmental and machine conditions. Adaptive Environment Sensing technology maintains perfect system operation to ensure optimal machine performance on both standard and long bed machines, even in extreme operating conditions.

Automatic Cycle Start (ACS)

Automatic Cycle Start enables more efficient processing of parts by automatically closing the tools to the mute-point without the operator having to press the foot pedal to start each cycle.

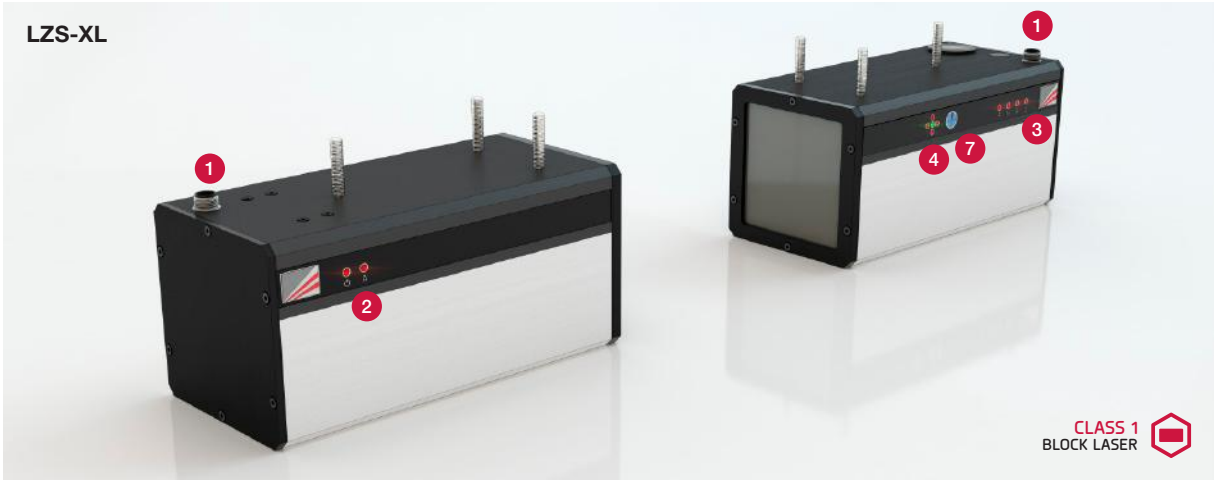
At the start of each bending cycle, ACS automatically triggers the tools to start closing at high-speed until the mute point is reached. Once arriving at the mute-point, the tool is automatically stopped so the operator can then insert the work-piece. The operator then presses the foot pedal to complete the bend. Once the machine returns to the top of stroke, ACS automatically triggers the tools to start closing again, saving time while handling material in between machine cycles.

ACS is CE Certified and exclusive to Lazer Safe.

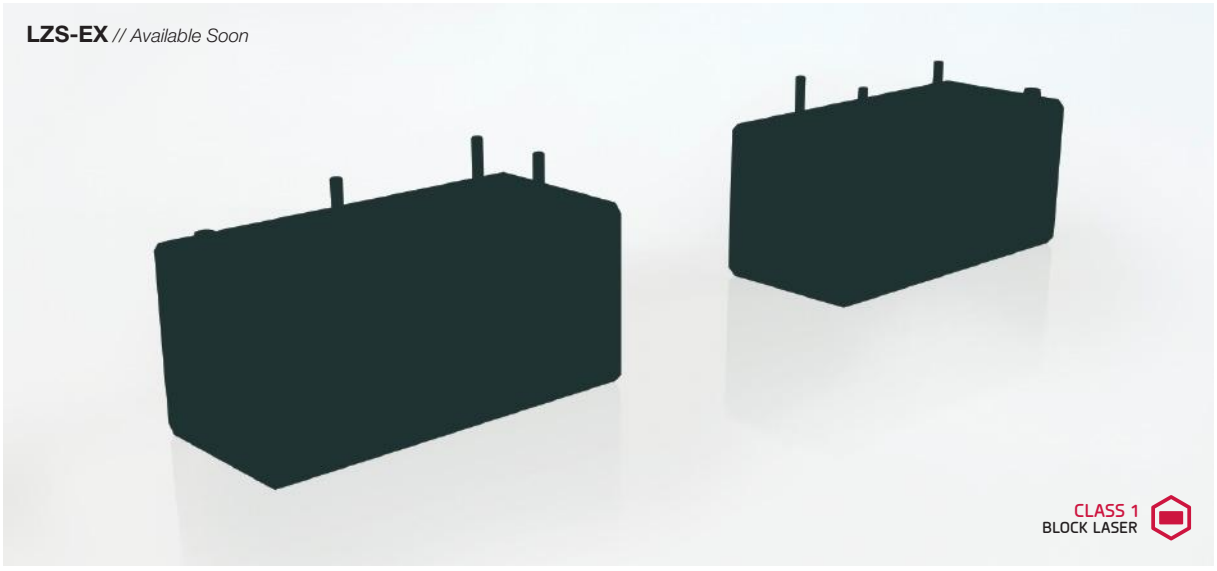
Optical protection systems

LASER TRANSMITTER AND RECEIVER SETS

LZS-XL



LZS-EX *// Available Soon*



1. M12 plug for connection to PCSS-A
2. Status LEDs - Power / Laser
3. Status LEDs - Power / Front/middle/rear Sensors
4. Status LEDs - Tool scan and adjustment
5. TOOL ALIGN button
6. SmartLink interface for image data transfer
7. Alignment confirmation button.

IRIS

IRIS Plus

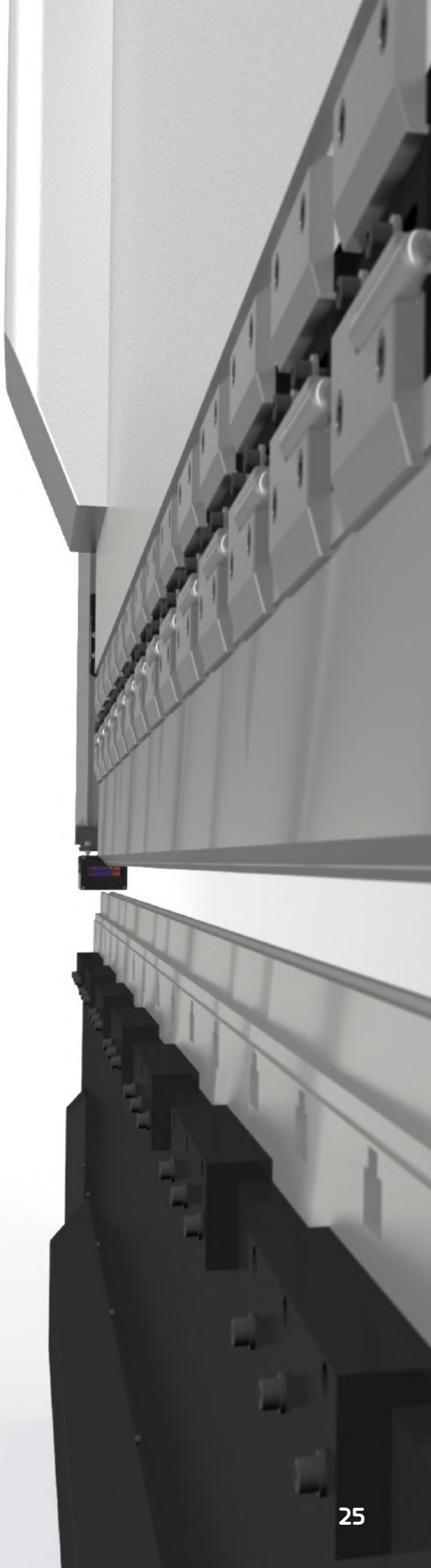
Optical protection systems

SPECIFICATIONS AND COMPARISON

**When LZS-XL is used on a tandem machine, the minimum speed change point is 3mm when used in single machine mode. When operating in tandem mode or when used on long press brakes, the minimum speed change point is 10mm for flat sheet bending and 14mm for box bending.*

COMPARISON	LZS-XL	LZS-EX
Optical protection functions	●	●
Optical imaging functions	-	-
Laser transmitter	CLASS 1 Block laser	CLASS 1 Block laser
Receiver	Camera receiver	Camera receiver
Maximum recommended optical range	15 metres	22 metres
Sensing area	45mm (H) x 45mm (W)	45mm (H) x 112mm (W)
Minimum object detection resolution	9mm	9mm
Connector type	M12 12 pin	M12 12 pin
Tool compatibility	V tools and non-standard tools	V tools and non-standard tools
Integrated status LEDs	●	●
Special Functions		
Automatic Tool Alignment	-	-
Automatic Alignment Confirmation	●	●
Special Tools Mode	-	-
Soft Stop Mode	-	-
Fast Flattening Mode	-	-
Automatic Cycle Start (ACS)	-	-
Bend Speed Management (BSM)	-	-
Adaptive Environment Sensing (AES)	●	●
Technology		
RapidBend Ultimate	-	-
BendShield	-	-
BendVision	-	-
Performance		
Minimum speed change point - flat sheet bending	3mm / 10mm*	TBC
Minimum speed change point - box bending	3mm / 14mm*	TBC
PCSS-A Series Compatibility		
PCSS-A1	●	●
PCSS-A2	●	●
PCSS-A Tandem Adaptor	●	-
Mounting Bracket Compatibility		
Standard Brackets	●	-
Heavy-Duty Brackets	-	●
SmartLink Brackets	-	-

IRIS	IRIS Plus
●	●
●	●
CLASS 1 Block laser	CLASS 1 Block laser
Camera receiver with integrated image processor	Camera receiver with integrated high-speed image processor
8 metres	4.5 metres
30mm (H) x 30mm (W)	30mm (H) x 30mm (W)
2mm	2mm
M12 12 pin	M12 12 pin
V tools and non-standard tools	V tools and non-standard tools
●	●
Special Functions	
●	●
-	-
●	●
●	●
●	●
●	●
●	●
●	●
Technology	
●	●
●	●
-	●
Performance	
0mm	0mm
0mm	0mm
PCSS-A Series Compatibility	
●	●
●	●
-	-
Mounting Bracket Compatibility	
●	●
-	-
●	●



Optical Imaging Technology

IRIS and IRIS Plus optical systems incorporate an integrated real-time image processor that is contained within the receiver unit. Our optical imaging technology provides greater flexibility for press brake manufacturers by combining high-performance optical protection with real-time image processing capabilities.

As combination systems, both IRIS and IRIS Plus models provide high-performance optical protection while the tools are closing at high speed, then once the bending process starts, the image processing functions take over. During bending, the systems take and process images in real-time and transfer live data to the CNC system via SmartLink. As the image data processing system is completely contained within the IRIS and IRIS Plus receivers, no additional processing hardware or software is required.

IRIS and IRIS Plus optical imaging is a flexible technology platform that allows press brake manufacturers to utilise the real-time image data to develop and implement a wide variety of advanced functions and processes in the CNC system. The optical imaging technology requires supporting CNC system software that is co-developed and customised for each manufacturer.

Optical imaging functions

Bend Speed Management (BSM)

The European press brake standard EN12622 mandates that bending speed be restricted to 10mm/s. This speed restriction provides a general level of safety by managing the speed at which the material facing toward the operator moves during bending. However in the machinery directive and EN12622 there are clauses that provide a basis for faster bending speeds with wider V dies, provided certain operations can be properly monitored.

In the CNC system the manufacturer can set a faster bend speed for larger width V dies and to facilitate a safe condition for faster bending, the Bend Speed Management process provides automatic monitoring of the speed at which the material facing the operator moves through its bending arc.

To do this, IRIS and IRIS Plus systems process real-time images of the bending process to calculate the angular velocity of the moving sheet and measure the speed at which the part is being formed. If the angular velocity with a wider V die is sufficiently less than the speed when using narrower V dies then a faster bending speed is permissible. This calculated speed is compared with the die width programmed in the CNC and if within the angular velocity threshold, enables the machine to continue bending the material at a speed greater than 10mm/s.

Bend Speed Management continuously monitors the bending process so in the event the angular velocity exceeds the maximum threshold or the operator selects an incorrect die width then the bend is stopped then continues to be completed at 10mm/s. Bend Speed Management* is available with both IRIS and IRIS Plus.

**Supporting software development is required for the CNC system.*

** IRIS Plus model shown*

Optical Imaging Technology

BENDVISION

BendVision is an extension of our image processing technology that provides real-time analysis of the bending process. The technology is incorporated into the existing hardware of the IRIS Plus optical guarding system so that no extra components are required, resulting in an efficient and cost-effective solution for press brake manufacturers.

BendVision processes images of the press brake tools and material during the bending process and transfers a range of information to the CNC via SmartLink including raw and processed images as well as live angle data during bending. The press brake manufacturer can use real-time BendVision data to enable a wide range of customised functions and processes. These functions and processes are co-developed with Lazer Safe and the press brake manufacturer.

BendVision for angle measurement

BendVision technology provides a range of real-time angle measurement data that includes the inside and outside angles of the material, average angle, material warp angle, material spring back angle for various material types, thickness and grain direction, plus end of relaxation angle once the bend has been completed.

BendVision for angle control

The ability for the CNC to receive BendVision angle data opens up a wide range of possibilities for real-time angle control. Instead of just confirming angles are within tolerance, the CNC can use the live angle plus a measured spring back angle to control the bending depth for flexible active and dynamic angle control solutions.

BendVision for tool recognition and confirmation

Raw and processed BendVision image data can be utilised in advanced tool recognition and confirmation processes. Live images of the punch and die can be compared with reference images that are stored in the CNC. Tool recognition and confirmation can be use for an array of functions including tool damage prevention if the programmed tools do not match the tools that are physically installed on the machine.

Angle control processes

These are two examples of angle control processes that can be implemented in the CNC system through the development of supporting software.

Active Angle Control (AAC)

Active Angle Control is designed for single parts or small batch production. During operation the bend is briefly paused prior to reaching the programmed angle while real time images are processed to calculate the material spring back. The bend is resumed and the spring back calculation is then used to automatically control the bending depth. After decompression, the final angle is automatically confirmed before proceeding to the next bend. Active Angle Control is a highly accurate angle control process that ensures spring back is calculated for each individual bend to achieve the correct angle.

Dynamic Angle Control (DAC)

Dynamic Angle Control is ideal for high speed processing of volume production parts. When the first part is formed, Active Angle Control is first initiated to automatically calculate the spring back of each individual bend in the part. After spring back is calculated and recorded for the first part, then Dynamic Angle Control is activated. Dynamic Angle Control uses real time angle data plus the recorded spring back value to automatically and accurately control the bending depth, with the final angle automatically confirmed after decompression before proceeding to the next bend. Dynamic Angle Control is a high speed process that ensures accuracy and consistency between parts with no delay to the bending operation.

	IRIS INTEGRATED REAL-TIME IMAGING SYSTEM	IRIS PLUS INTEGRATED REAL-TIME IMAGING SYSTEM
Optical protection functions	●	●
Optical imaging functions	●	●
Maximum recommended optical range	8 metres	4.5 metres
Optical sensor		
Camera	Digital Image Sensor	Digital Image Sensor
Frame rate / frequency	10ms/100Hz	10ms/100Hz
Data resolution (sensor)	-	0.01 degrees
Measurement technology		
Type	Integrated High-Speed Image Processor	Integrated High-Speed Image Processor
Memory depth	-	Records up to 10 seconds (1000 images) of bend data per cycle.
Measurement accuracy	-	Up to +/- 0.25 degrees
Measurement rate	-	10ms/100Hz (synchronised with frame rate)
Imaging technology		
Bend Speed Management*	●	●
BendVision*	-	●

**Supporting software development is required for the CNC system.*

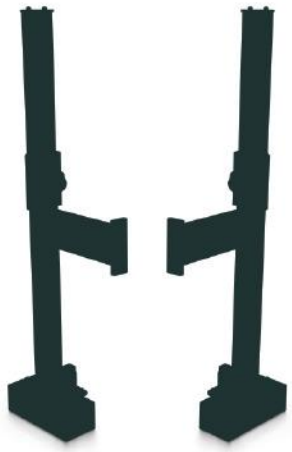
Mounting Brackets

Lazer Safe offers a range of mounting bracket solutions for attaching the laser transmitter and receiver to the press brake. Standard and custom sizes are available to suit various machine types, machine lengths and optical configurations.

Standard Brackets

Our Standard Brackets are manufactured from an extruded high-tensile alloy for rigidity and tolerance to machine vibration with linear rails and bearings that provide precision vertical adjustment of the laser transmitter and receiver. During tool change a spring loaded locking pin keeps the transmitter and receiver clear allowing the tools to be easily removed from the ends of the machine.

After tool change the transmitter and receiver are easily adjusted to match the tool height with the process taking only a matter of seconds. Multiple vertical lengths and horizontal mounting options are available to suit most machines and the bracket system is designed to aesthetically combine well with modern press brake designs.



Heavy-Duty Brackets

Heavy-Duty mounting brackets will be available for the upcoming LZS-EX optical system. The brackets will feature a robust dual linear bearing and rail design with vibration resistance to handle large scale press brake applications up to 22 metres in length.

	Standard Brackets	Heavy-Duty Brackets	SmartLink Brackets
Specifications			
Vertical bracket length	520mm / 700mm / 1000mm	TBC	700mm
Vertical adjustment range	350mm / 530mm / 830mm	TBC	500mm
Horizontal adjustment range	40mm	TBC	40mm
Maximum recommended machine length	15 metres	22 metres	6 metres
Main Features			
Precision linear bearings and rails	●	●	●
Free sliding operation	●	●	●
Automatic motorised drive system	-	-	●
Maximum speed of the motorised drive system	N/A	N/A	20mm/s
Adjustable locking handle	●	●	N/A
Tool change lock	Manual	Manual	Automatic
Optics Compatibility			
LZS-XL	●	-	-
LZS-EX	-	●	-
IRIS / IRIS Plus	●	-	●

SmartLink Brackets

Available with IRIS and IRIS Plus systems, SmartLink Brackets automate the process of adjusting and positioning the transmitter and receiver during tool change. The SmartLink Brackets incorporate a compact motorised drive system that is interfaced with the CNC system* for simple one-touch operation.

During tool change, the operator can press a HOME button on the CNC screen 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 starts the bend program and the brackets automatically drive the transmitter and receiver to the programmed punch position before the IRIS / IRIS Plus system automatically scans the punch and dynamically adjusts the protection zone. If tools are loaded from the front of the machine, then simply starting the new bend program will signal the brackets to drive from the current position to the new punch position without having to return to the HOME position.

Free sliding operation

The SmartLink 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.

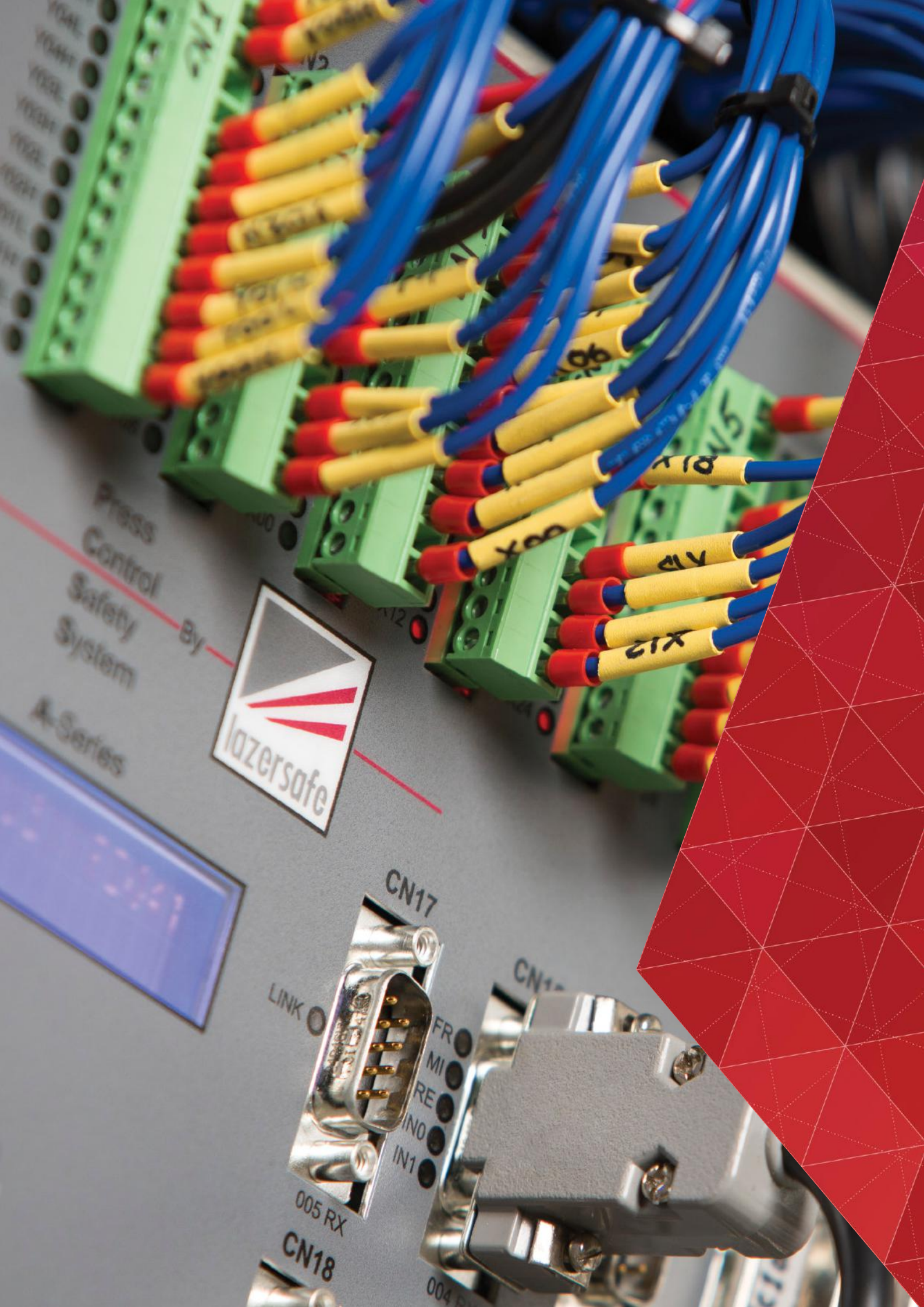
Manual operation

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

Press brakes with ATC systems

For press brakes with automatic tool changing systems, SmartLink Brackets offer the ultimate solution for completely automating the entire tool change process, eliminating the need for any operator interaction. When automatic tool change is initiated, the SmartLink Brackets can automatically move to a clear position for tool unloading / reloading and when tool change is complete, can automatically move to the new punch position, ready for the operator to start the next job.

**Supporting SmartLink software development is required for the CNC system.*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