P2lean

The flexible bending solution.

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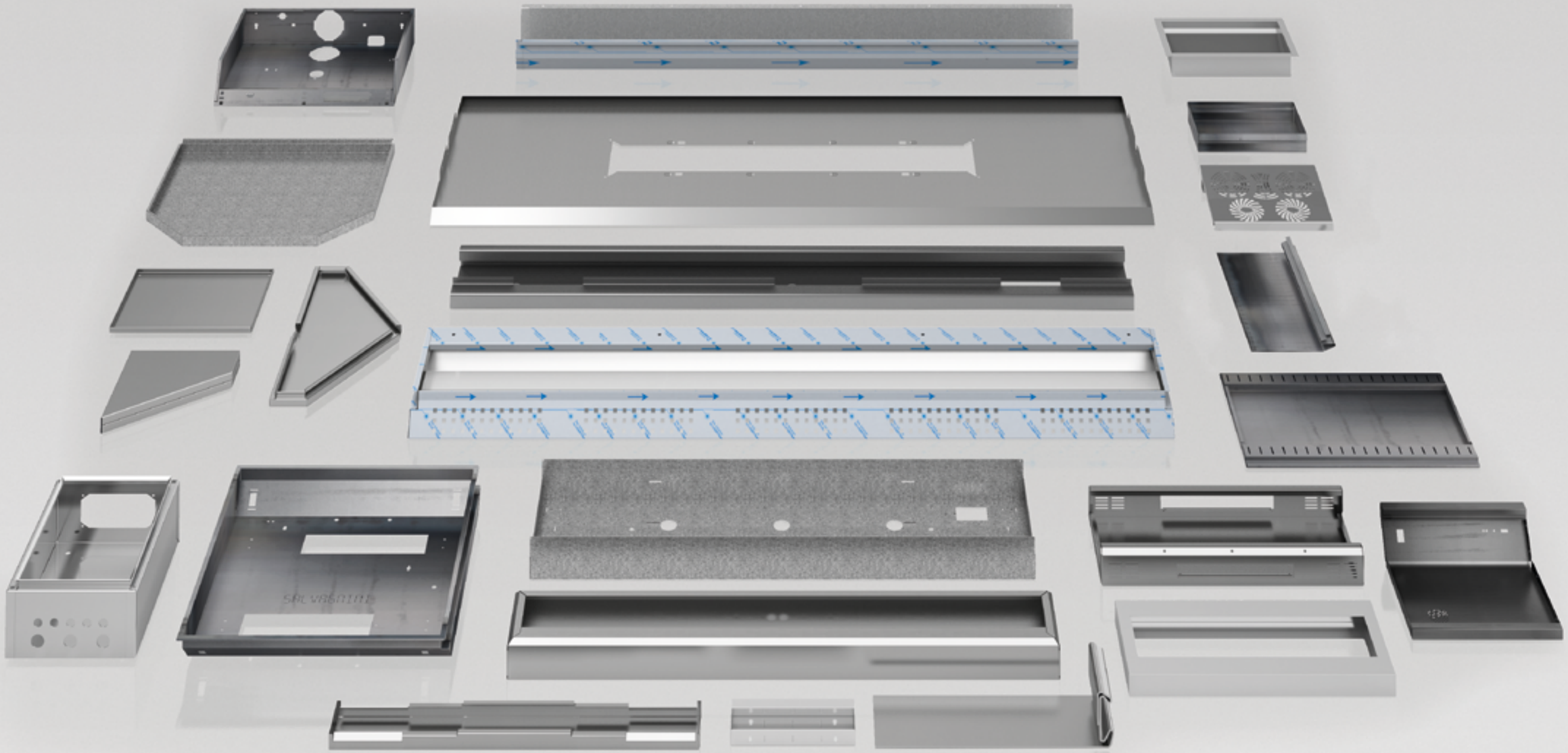
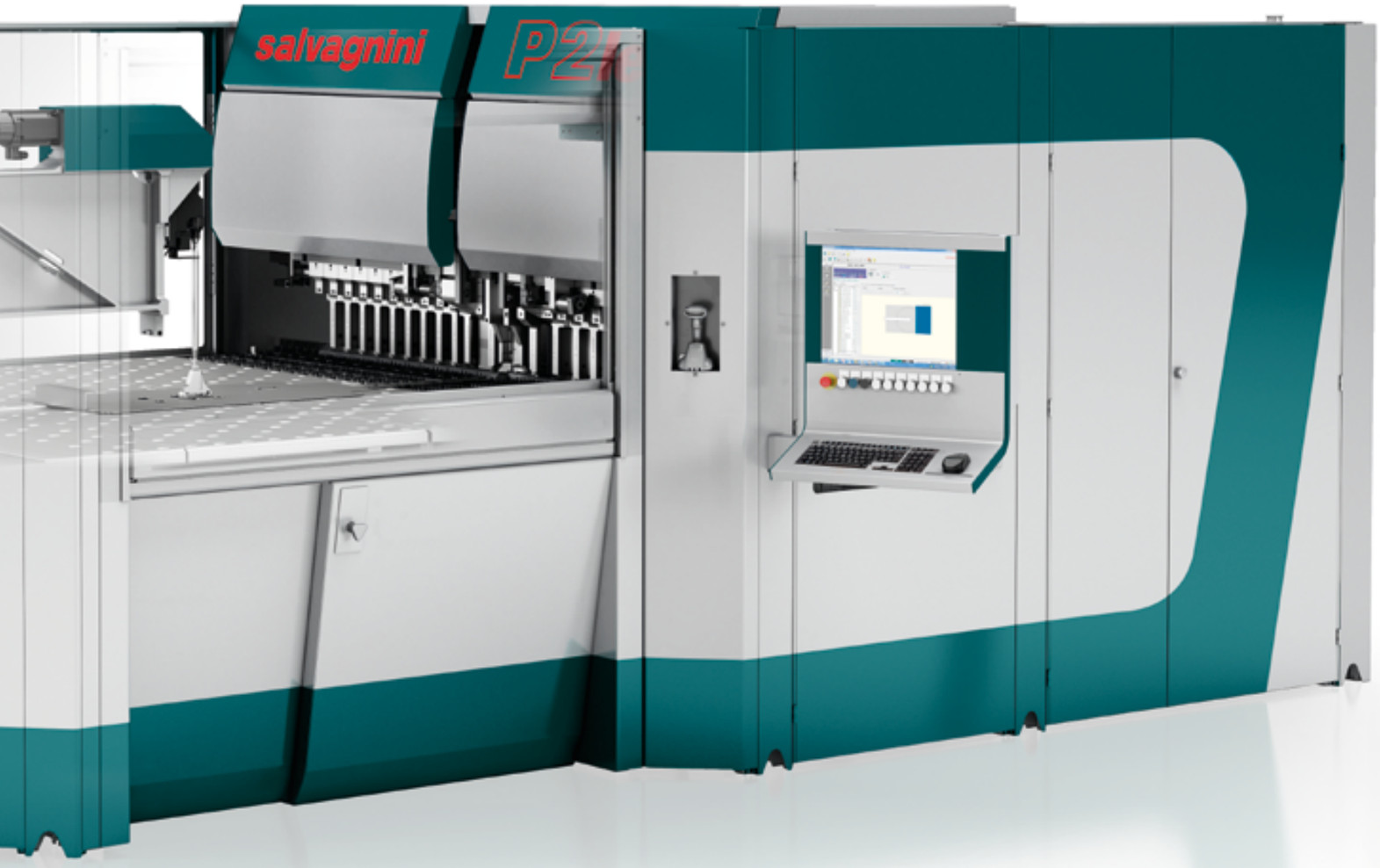
Your daily production partner.

The Panel Bender is a smart manufacturing tool, invented by Guido Salvagnini in 1977, designed for flexible and automatic production of panels starting from punched and cut parts without retooling or operator intervention.



The compact P2lean Panel Bender produces a wide variety of parts and panels in different shapes sequentially and automatically, proving itself a reliable partner for daily operation and a winning production tool for changing market needs.

The Salvagnini P2lean hits the bull's-eye. With the first shot.



MAC 2.0

Set-up in masked time

Reduced consumption

Zero scrap

Zero set-up time

*Thanks to **universal bending tools that require no initial set-up, and in-cycle retooling in masked time,** the P2lean can produce a wide variety of parts in different materials and thicknesses, including both kits and single pieces, without scrap or downtime.*

Adaptive technology

Featuring embedded MAC 2.0 technology, the P2lean detects in-cycle any variations in the material being processed and automatically compensates for them.

Precision and repeatability

The oscillating blade operating principle and exclusive bending formula make the Panel Bender amazingly accurate and responsive.

Fully automatic production cycle

*With a P2lean, the operator only has to place the sheet on the work surface and pick the finished part up at the end of bending cycle. Thanks to the manipulator and the automatic set-up, **the machine does not require any manual intervention in cycle.***

Sustainable consumption and small spaces

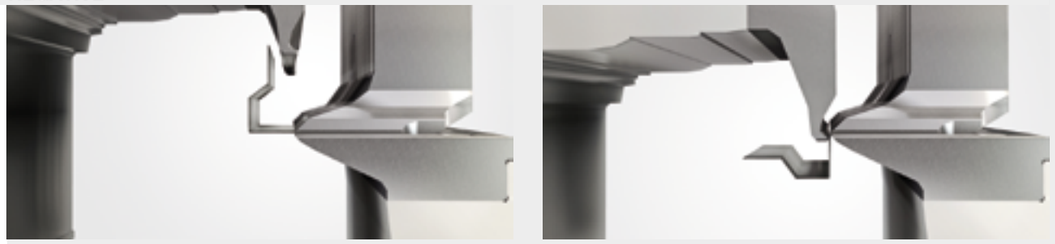
P2lean uses only 18 sq.m. of space and consumes 5 kW (P2lean-2116), thanks to direct-drive technology and compact and optimized design.

Flexible automation.

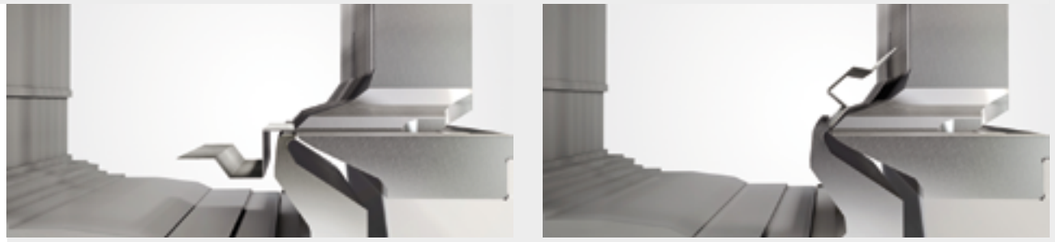
Universal bending tools

The P2lean uses universal bending tools that **do not require set-up times** and **adapt automatically** to panel geometry; this become a plus for operator safety and ensures productivity and flexibility. Bending on each side of the sheet is achieved thanks to the controlled interpolated movements of the two oscillating blades that make the bends, while the sheet is handled automatically.

Down bend – NEGATIVE



Up bend – POSITIVE



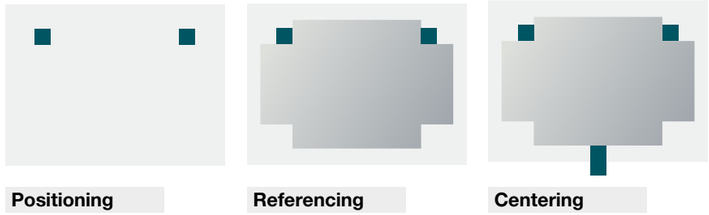
Flattened bend - WITH BLADE

WATCH THE VIDEO

Universal bending tool: zero set-up and **absolute versatility.**

One single and controlled centering process

Finished panels are **always of the right size** thanks to the controlled reference stops. **The sheet is centered just once on the notches:** this reduces cycle time and possible errors in accuracy, which are all absorbed by the first bend.

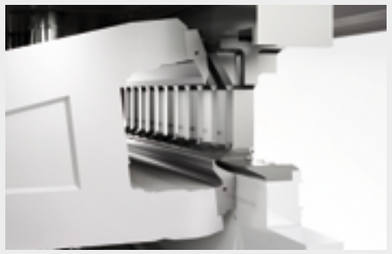


Positioning **Referencing** **Centering**

Technical focus

PRESS
The press is the working heart of the Panel Bender. Its sturdy frame holds:

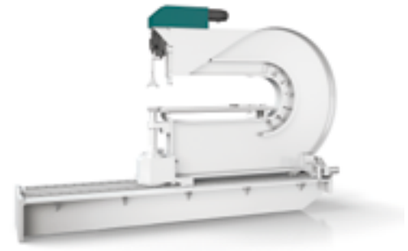
- *the* ***bladeholder,*** *which has upper and lower blades, the two tools featuring interpolated controlled movement and responsible for bending;*
- *the* ***counterblade,*** *which helps clamp the sheet during the cycle;*
- *the* ***blankholder,*** *one of the distinguishing features of the Salvagnini Panel Benders which works simultaneously with the blades and counterblade to bend and hold the sheet accurately and effectively.*



AUTOMATIC BLANKHOLDER
P2lean Panel Benders are equipped with a blankholder (ABA) that automatically adjusts itself to the dimensions of the panel to be bent, eliminating the need for tool change. The ABA tool bending profile allows inward bends up to 55 mm. Blankholder length is adjusted in 5 mm steps.

Automatic manipulator

The sheet is handled, gripped and rotated by the manipulator, which handles all sheet movements throughout the processing cycle quickly and entirely automatically. The operator's only task is to position the sheet on the feeding device, where applicable, and remove the manufactured item once bending is complete.

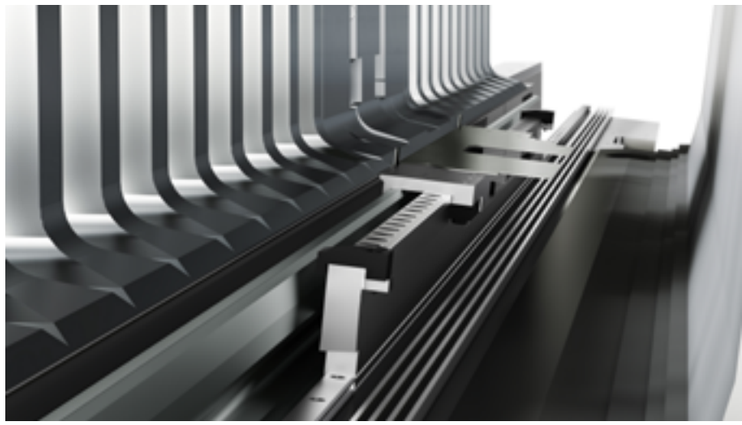


P/CLA TOOLS

Custom solutions, designed to widen versatility.

P tools: P auxiliary tools can be **inserted and removed under the blankholder quickly and automatically.** They allow narrow panels to be handled and tubular, hidden or radius bends, or bends with intrusive embossings, to be made.

CLA tools: CLA auxiliary blades are modular in length, come in both positive and negative versions (for making upward or downward tabs) and engage and disengage quickly and automatically between the blank and the bending blades. They are used to make bends that are shorter than the side to be bent. Auxiliary blades can be set up manually or, in some models, **automatically** with the **CLA/SIM** option, which **composes sequences** of different lengths in masked time.



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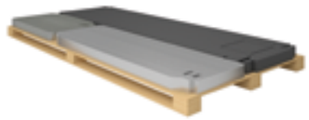
The evolution continues.

MAC 2.0: guaranteed quality, each and every time.

Bending technology, machine type and material are the three factors that determine the result of the bending process.
The proprietary bending formula that controls movements, FEM deflection analysis and the numerous innovative solutions built into the machine - such as accurate thickness measurement and thermal bending unit compensation - eliminate any effects linked to the machine factor.
Then there is the MAC 2.0 adaptive technology which enables the machine to compensate in-cycle for any variations in material quality.
An innovative control procedure means that even the slightest variations in the material's mechanical properties are detected and, where necessary, compensated for in-cycle by the movements of the bending unit.
As a result, part quality remains consistent, even with variations in material, resulting in zero waste and optimized production times, for maximum productivity.
MAC 2.0 also reduces costs per part as the Salvagnini Panel Bender delivers an accurate bending result regardless of material quality.

Technology

Machine



Material

LEAN GENERATION

Concepts

- To design a Panel Bender that is ready for the future, to satisfy the market requirements of today and tomorrow.
- To create a reliable, productive and simple manufacturing tool.
- To offer a solution that can easily be integrated into FMCs and is able to communicate with other machines/devices in Factory 4.0.

Features

- **Flexible productivity:** JIT and single-batch production that is always on time.
- **Lean manufacturing:** no intermediate handling, no working scrap, zero set-up time.
- **Lean design:** MAC 2.0 technology, direct drives and optimized bending units.

Results

- A universal tool bends thicknesses from 0.4 to 3.2 mm (mild steel).
- Consumption is less than 5 kW (P2lean-2116).
- Compact layout and lean architecture.

Technical focus

DIRECT DRIVE
The P2lean Panel Bender adopts only electric actuators, thus removing the hydraulics. Bending cylinders are driven by brushless motors, which has great advantages in terms of the reduced wear and deterioration of components that, unlike in other similar technologies, are no longer subjected to continuous extreme stress over and over on the same point.

Maximum thickness up to 3.2 mm (mild steel)

Low consumption

Performance > 20%

- P2lean
- P2Xe
- P2X

Feasibility
- S_{max}= 3,2 increased working thicknesses
- Option P, Option DPM
- 2180 mm bending length

Construction simplicity
- Decentralized drives
- Evoluted measuring system
- CAN-Bus

Flexibility
- CLA/SIM
- ABA
- CLA/N

Electric drives
- 100% Electric actuators, pneumatic blankholder tools locking system
- 90% Electric ABA & Option P
- 80% Electric Manipulator and Clamping device

Adaptability
- MAC 2.0
- Advanced bending formula
- Bending formula

Energy efficiency
- 5 kWh
- 8 kWh
- 10 kWh

Technical data.

Technical specifications	P2lean-2116	P2lean-2516	P2lean-2120	P2lean-2520
Maximum length of incoming sheet (mm)	2495	2795	2495	2795
Maximum width of incoming sheet (mm)	1600	1600	1600	1600
Maximum diagonal that can be rotated (mm)	2500	2800	2500	2800
Maximum bending force (kN)	330	660	330	660
Maximum sheet bending force (kN)	530	1060	530	1060
Maximum bending length (mm)	2180	2500	2180	2500
Maximum bending height (mm)	165	165	203	203
Minimum thickness (mm)	0.4	0.5	0.4	0.5
Maximum thickness and bending angle steel, UTS 410 N/mm² (mm)	3.2 (±90°) 2.5 (±120°) 2.1 (±135°)	3.2 (±90°) 2.5 (±130°) 2.1 (±135°)	3.2 (±90°) 2.5 (±120°) 2.1 (±135°)	3.2 (±90°) 2.5 (±130°) 2.1 (±135°)
Maximum thickness and bending angle stainless steel, UTS 660 N/mm² (mm)	2.5 (±90°) 2.1 (±120°) 1.6 (±130°)	2.5 (±90°) 2.1 (±125°) 1.6 (±135°)	2.5 (±90°) 2.1 (±120°) 1.6 (±130°)	2.5 (±90°) 2.1 (±125°) 1.6 (±135°)
Maximum thickness and bending angle aluminium, UTS 265 N/mm² (mm)	4.0 (±120°) 3.5 (±130°)	4.0 (±120°) 3.5 (±130°) 3.0 (±135°)	4.0 (±120°) 3.5 (±130°)	4.0 (±120°) 3.5 (±130°) 3.0 (±135°)
Average consumption (kW)	5.0	9.0	5.0	9.0
Noise level (Machine Directive 2006/42/EC) (dB)	68	69	68	69

Values refer to a standard machine with LIP / LS1P blades. Salvagnini reserves the right to modify this data without prior notice.

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CHECKLIST

In one machine a complete range of strategies for the future.

Flexible
Wide and diversified production.
Bending tool with optimized profile to bend from 0.4 to 3.2 mm.

Productive
Universal tools and set-up in masked time.
Automatic set up of the blankholder in masked time for kit production.

Smart
Adaptive technology, zero waste.
Automatic control and adjustment of bending tool movements in response to sheet behaviour variations thanks to MAC 2.0 tecnology.

Safe
Completely automated management.
No operator intervention during bending.

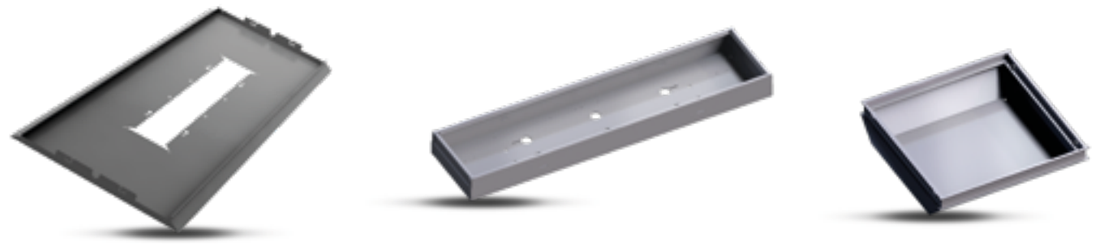
Simple
Easy and intuitive programming.
Onboard machine 3D programming to simulate the entire process.

Sustainable
Reduced consumption.
Low average consumption thanks to electric actuators.

Versatile
Customization based on individual needs.
Possibility of machine customization for the production of profiles, boxes and narrow panels.

Designed to give your business multiple solutions.

Lighting sector



Metal furniture

Catering & Hotellerie

HVAC

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Simply our trademark

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