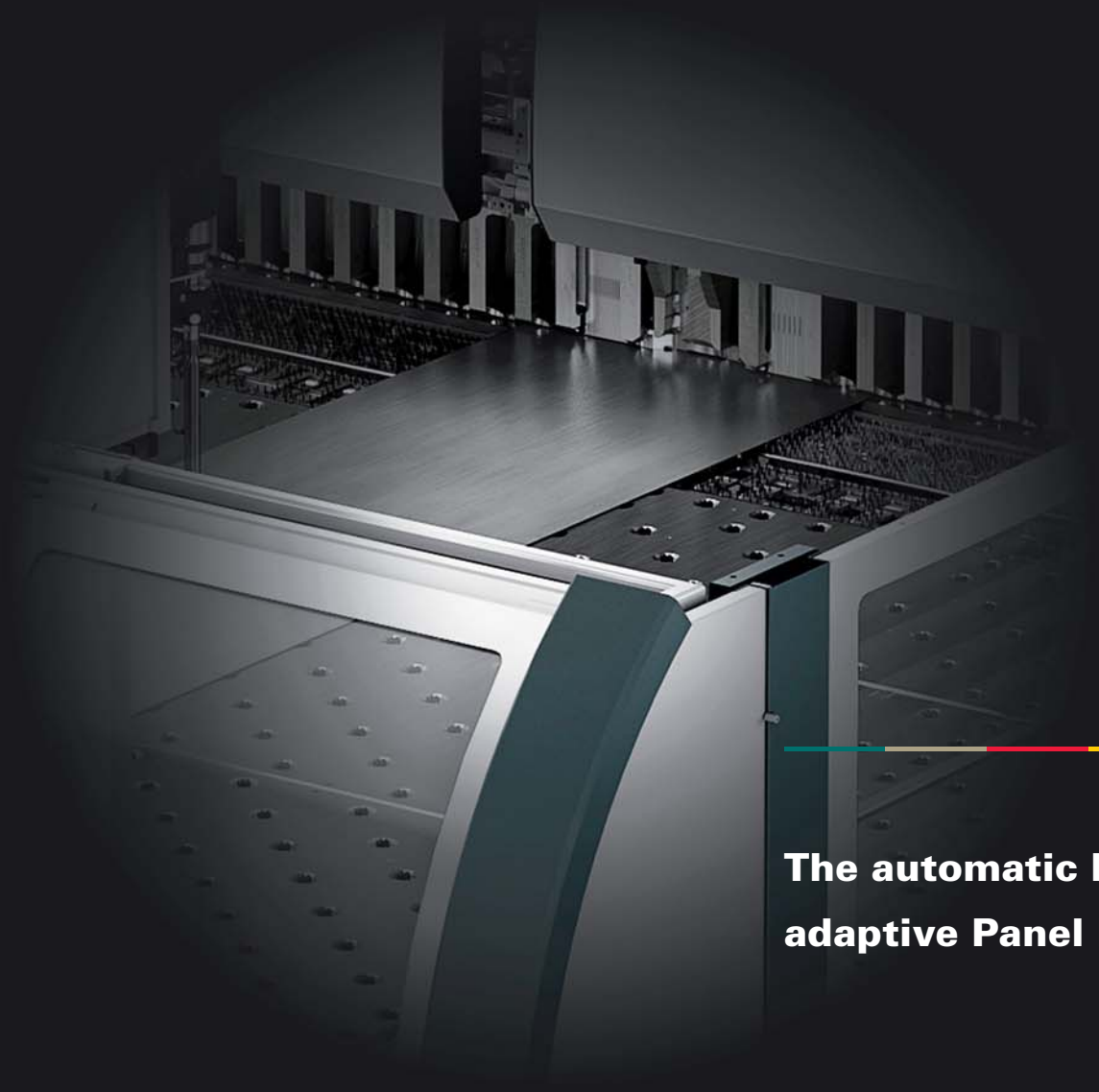
P4Xe



The automatic hybrid adaptive Panel Bender.

salvagnini

The perfect balance.

An amalgam of technology. A highly flexible, efficient and automatic system which uses particularly refined software cycles to produce a wide range of panels with four universal bending tools. An adaptive machine which automatically compensates for all the deflections that occur in-cycle, minimizing wastage. A winning solution, even when working in line with punching machines. A machine where proprietary bending algorithms deliver extremely fast and accurate movements, ensuring surprisingly high product quality. **P4Xe: you have chosen to work with the best.**

Productivity

Flexibility

Automation

High quality

Ethics

Services

Productivity also means working in masked time,

No time wasting.

The sheet centering principle on Salvagnini Panel Benders represents a considerable advantage over similar technologies because the blank is centered **only once, at the beginning of the machining cycle**. On the P4Xe, feeding and the centering cycle take place in masked time, thanks to the flying pincer carriage which, once it has positioned the blank, returns to its rest position while the centering cycle takes place.

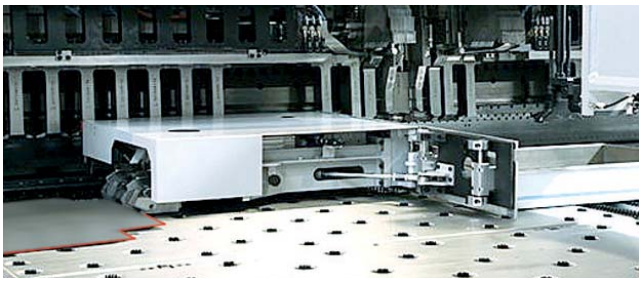
The reference stops for incoming sheets are positioned on the notches. The dimensions of the finished panel will always be correct, since any dimensional errors on the sheet are recovered in the first bend on the side.

Detail of feeding pincer carriage

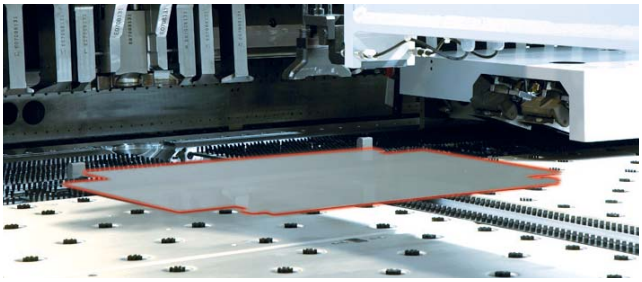
with maximum precision.

Mode of operation:
a single centering cycle in masked time.

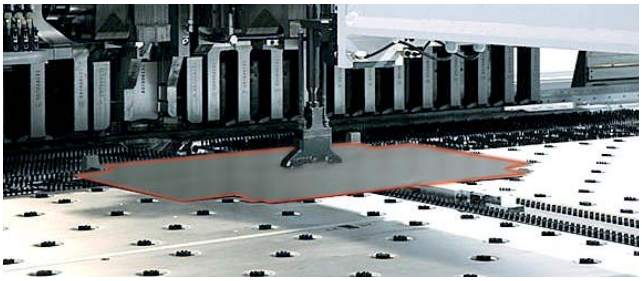
Pick-up

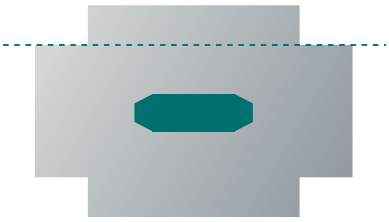


Positioning

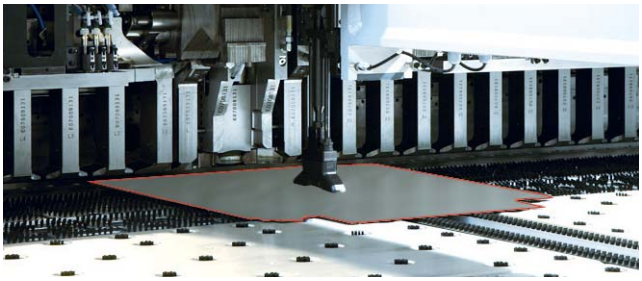


Centering

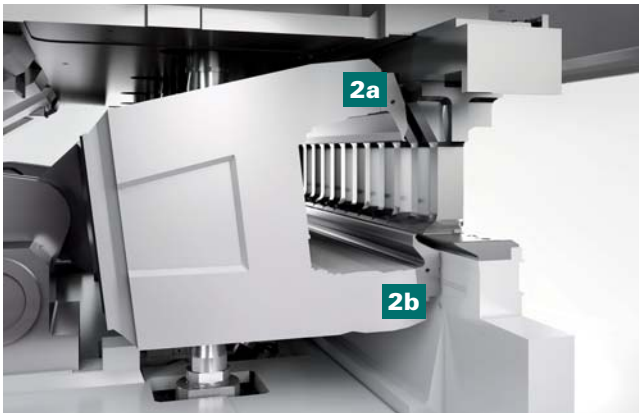




Bending



Four universal bending tools for maximum versatility.



The press is the functional heart of the Salvagnini P4Xe Panel Bender. It is composed of:

- a solid structure on which the blankholder tool **1** is installed;
- the bending unit (bladeholder) **2**, a C-shaped structure that holds the upper **2a** and lower **2b** blades, as well as any optional tools (CLA, CUT);
- the counterblade **3**, which is joined to the press and works with the blankholder to firmly grip the blank while the blades are bending it.

Technical specifications.

Machine	P4Xe-2116		P4Xe-2516	P4Xe-2516/3
Technical specifications				
Maximum length of incoming sheet (mm)	2495		2795	2795
Maximum width of incoming sheet (mm)	1524		1524	1524
Max. diagonal that can be rotated (mm)	2500		2800	2800
Maximum bend length (mm)	400-1950	1950-2180	2500	2500
Maximum bend height (mm)	165		165	165
Minimum thickness (mm)	0.5		0.5	0.5
Max. thickness and bend angle	2.5 (± 90°)	2.1 (± 90°)	2.5 (± 90°)	3.2 (± 90°)
steel, UTS 410 N/mm² (mm)	2.1 (± 135°)	1.6 (± 135°)	2.1 (±135°)	2.5 (±130°)
Max. thickness and bend angle	2.1 (± 90°)	1.6 (± 90°)	2.1 (± 90°)	2.5 (± 90°)
stainless steel, UTS 580 N/mm² (mm)	1.6 (± 130°)	1.2 (± 135°)	1.6 (±130°)	2.1 (±125°)
Max. thickness and bend angle	3.2 (± 90°)	2.5 (± 90°)	3.2 (± 90°)	3.2 (±125°)
aluminium, UTS 265 N/mm² (mm)	2.5 (± 130°)	2.1 (± 130°)	2.5 (±130°)	-

Machine	P4Xe-3216	P4Xe-3216/3	P4Xe-3816		P4X-2725
Technical specifications					
Maximum length of incoming sheet (mm)	3495	3495	3990		3048
Maximum width of incoming sheet (mm)	1524	1524	1524		1524
Max. diagonal that can be rotated (mm)	3500	3500	4000		3100
Maximum bend length (mm)	3200	3200	400-3200	3200-3850	2700
Maximum bend height (mm)	165	165	165		254
Minimum thickness (mm)	0.5	0.5	0.5		0.5
Max. thickness and bend angle	2.5 (± 90°)	3.2 (± 90°)	2.5 (± 90°)	2.1 (± 90°)	3.2 (± 90°)
steel, UTS 410 N/mm² (mm)	2.1 (±135°)	2.5 (±130°)	2.1 (± 135°)	1.6 (± 135°)	2.3 (±135°)
Max. thickness and bend angle	2.1 (± 90°)	2.5 (± 90°)	2.1 (± 90°)	1.6 (± 90°)	2.3 (± 90°)
stainless steel, UTS 580 N/mm² (mm)	1.6 (±130°)	2.1 (±125°)	1.6 (± 130°)	1.2 (± 135°)	1.6 (±135°)
Max. thickness and bend angle	3.2 (± 90°)	3.2 (±125°)	3.2 (± 90°)	2.5 (± 90°)	3.2 (± 90°)
aluminium, UTS 265 N/mm² (mm)	2.5 (±130°)	-	2.5 (± 130°)	2.1 (± 130°)	2.3 (±135°)

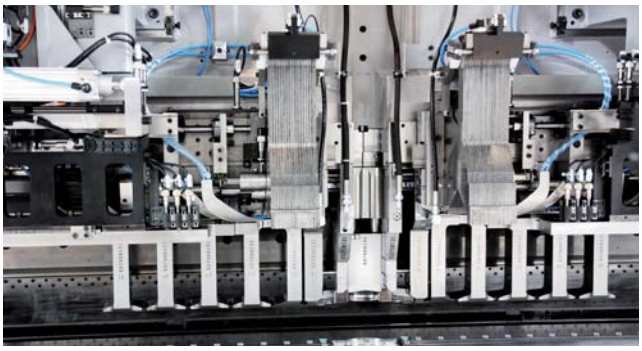
Machine	P4Xe-2116		P4Xe-2516	P4Xe-2516/3
Technical specifications				
Maximum length of incoming sheet (in)	98.2″		110″	110″
Maximum width of incoming sheet (in)	60″		60″	60″
Max. diagonal that can be rotated (in)	98.4″		110.2″	110.2″
Maximum bend length (in)	15.75″-76.77″	76.77″-85.83″	98.4″	98.4″
Maximum bend height (in)	6.5″		6.5″	6.5″
Minimum thickness (gage)	25		25	25
Max. thickness and bend angle	13 (± 90°)	14 (± 90°)	13 (± 90°)	11 (± 90°)
steel, UTS 59500 psi (gage)	14 (± 135°)	16 (± 135°)	14 (±135°)	13 (±130°)
Max. thickness and bend angle	14 (± 90°)	16 (± 90°)	14 (± 90°)	13 (± 90°)
stainless steel, UTS 84200 psi (gage)	16 (± 130°)	18 (± 135°)	16 (±130°)	14 (±125°)
Max. thickness and bend angle	11 (± 90°)	13 (± 90°)	11 (± 90°)	11 (±125°)
aluminium, UTS 38500 psi (gage)	13 (± 130°)	14 (± 130°)	13 (±130°)	-

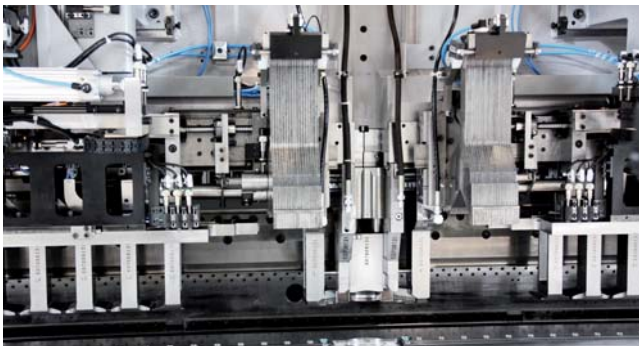
Machine	P4Xe-3216	P4Xe-3216/3	P4Xe-3816		P4X-2725
Technical specifications					
Maximum length of incoming sheet (in)	137.6″	137.6″	157″		120″
Maximum width of incoming sheet (in)	60″	60″	60″		60″
Max. diagonal that can be rotated (in)	137.8″	137.8″	157.5″		122″
Maximum bend length (in)	126″	126″	14.75″-126″	126″-151.57″	106.3″
Maximum bend height (in)	6.5″	6.5″	6.5″		10″
Minimum thickness (gage)	25	25	25		25
Max. thickness and bend angle	13 (± 90°)	11 (± 90°)	13 (± 90°)	14 (± 90°)	11 (± 90°)
steel, UTS 59500 psi (gage)	14 (±135°)	13 (±130°)	14 (± 135°)	16 (± 135°)	13 (± 135°)
Max. thickness and bend angle	14 (± 90°)	13 (± 90°)	14 (± 90°)	16 (± 90°)	13 (± 90°)
stainless steel, UTS 84200 psi (gage)	16 (±130°)	14 (±125°)	16 (± 130°)	18 (± 135°)	16 (± 135°)
Max. thickness and bend angle	11 (± 90°)	11 (±125°)	11 (± 90°)	13 (± 90°)	11 (± 90°)
aluminium, UTS 38500 psi (gage)	13 (±130°)	-	13 (± 130°)	14 (± 130°)	13 (± 135°)

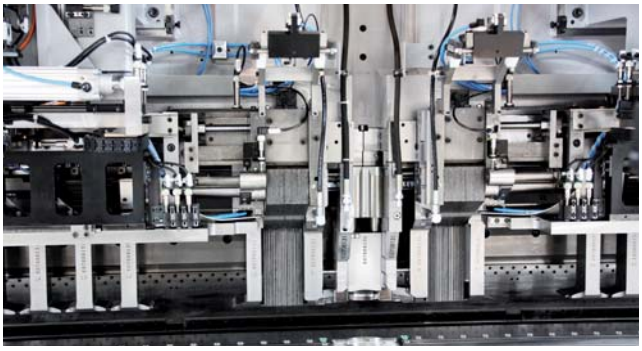
Salvagnini reserves the right to modify this data without prior notice.

Flexibility means making all possible bends with zero

The blankholder:
a solution for all production requirements.







In Salvagnini Panel Benders, the blankholder changes its configuration according to the dimensions of the panel being bent. The bending blades are universal, because it is the blankholder that automatically adjusts its size to move and grip the panel and make the different bends. The blankholder can be composed in 5 mm/0.19" steps, from the minimum to the maximum length. The central section is shaped to give the manipulator as much space as possible to advance.

Automatic blankholder set-up.

The automatic, instant composition version is known as ABA (Automatic Blankholder Adjustment) and is fitted on all **16 model machines. A programmable blankholder for automatic set-up, the U1, is installed on the P4Xe-2725 model where, like the ABA, it performs tool changes in masked time. With ABA, blankholder tool composition takes place in masked time and in-cycle set-up adjustment requires zero time.

Manual blankholder set-up (MLA).

The manual version, referred to as MLA (Manual Length Adjustment), allows fast and ergonomic set-up by inserting/removing light, modular segments and moving end segments along support guides.

Tools for special applications.

Detail of CLA blade

Example of bend made with CLA blade

Sometimes for special production needs, such as some tubular bends, or panels with complex bending profiles, it is industrially necessary to use special tools such as the T or P and CLA options. The T (P4Xe-2725) or P (P4Xe**16) option is a mechanism that can insert and remove an auxiliary tool under the blankholder quickly and automatically. The CLA tools are modular in length, engaging and disengaging quickly and automatically between the blank and the bending blades. They are used to make bends that are shorter than the side being bent. The CLA blades can be positive (for making upward tabs) or negative (for making downward ones).

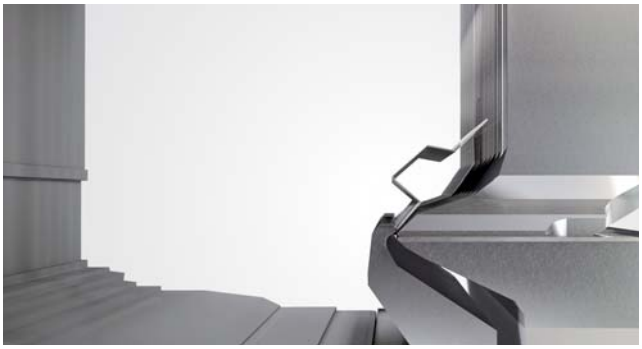
Flexibility means simple programming even for very

Bending: fast, simple and lean.

The blank is moved on a horizontal plane by the manipulator. A rotator fitted on the manipulator quickly and accurately places the side to be bent in front of the press. The blankholder holds the blank firmly in position. The bending unit and its blades can thus make any number of bends, up or down, in rapid succession.

Down bend (negative)

Up bend (positive)



Safe edge (flattened with blade)

special bends.

Software.

JOB.CONSOLE

JOB.CONSOLE is the set of software packages integrated into the SiX controller to graphically manage and supervise the system. JOB.CONSOLE provides the operator with all the information he needs to run production, thanks to the following modules:

Salvagnini Console

Main system command module that allows user- friendly management by:

- filing and editing production programs directly via the graphical interface;
- making parts of the system perform semi-automatic movements, guided by a self-explanatory graphical interface.

Maintenance Manager

Database that analyzes the movements and cycles of the components of the system, allowing simple and structured management of maintenance activities.

JOBP4Xe

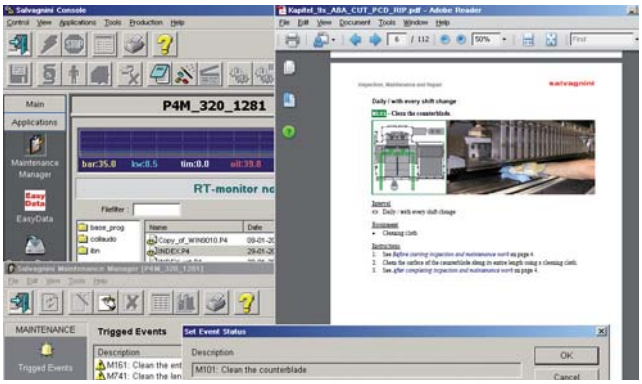
Software that dynamically programs the day's production: the operator can create a series of programs called "job" (or list) on the screen. JOBP4Xe allows a series of jobs to be prepared, edited or suspended, without stopping the current production.

EasyData

Integrated diagnostic software for interactively browsing the documentation. EasyData provides information about each of the components managed by the Salvagnini controller, using photos, part codes and automatic filters. The system's electrical and/or hydraulic diagrams are available in the main command console.

The operator can:

- search for specific text or codes in the diagrams;
- add personalized notes or photos to the image archive;
- print one or more diagrams from the documentation or export them in PDF or JPG format.



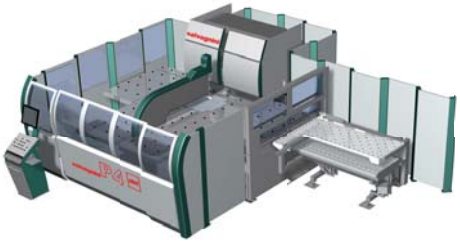
Kit production.

The P4 Panel Bender, either in a stand-alone version or in-line with an S4 punch/shear, makes kit assembly production possible, thanks to Salvagnini's universal bending tools, zero set-up time and unmanned operation.

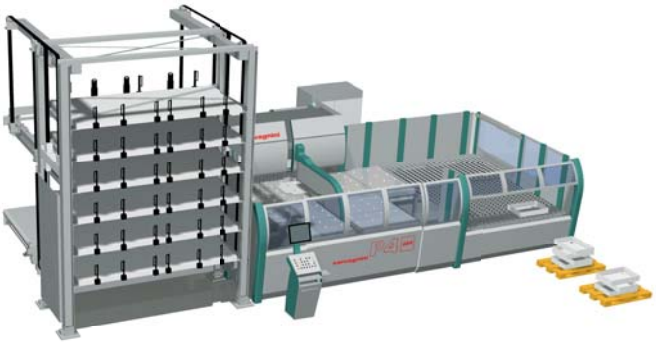
Automation in all phases of the process means qual

Configuration and models.

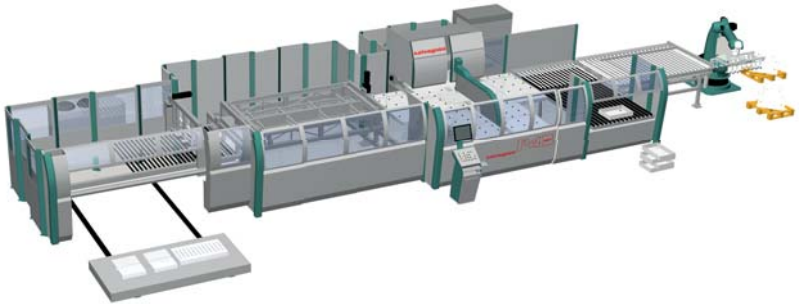
An extraordinarily high-throughput machine, the P4Xe Panel Bender is characterized by simple, intuitive programming and agile, precise sheet handling. It can be set up in a variety of ways for different production needs. The various configurations will depend on the user's preferences in terms of loading/unloading solutions and on the model of machine. The Salvagnini range of Panel Benders incorporates 5 different models, split into two families, P4Xe-**16 and P4Xe-2725, which together cover countless production requirements: the more compact version that bends up to 2180 mm (85.83"); the XXL model that produces panels up to 4 m (157") long; a machine that makes bends up to 165 mm (6.5") high; and another capable of making bends up to 254 mm (10") high on mild steel up to 3.2 mm (11 gage) thick.



BASIC Configuration:
Semi-automatic loading and unloading.



AUTO Configuration:
Feeding from a store-tower and automatic unloading onto an accumulator.



FLEX Configuration:
Automatic feeding from a table and robotic unloading onto an accumulator.

ity and economy.

Feeding solutions.

The P4 Panel Benders can be fed manually (with HPT) or automatically. The PCD automatic feeder picks sheets up from a pack of blanks and feeds them to the Panel Bender in masked time (i.e. during the machine's work cycle). The PCD can also be used as a pass-through connection for sheets coming from an S4 punch-shear in the same line. There are also solutions for automatic feeding from compact (MVP) or extended (MV) pack store-towers.
The proprietary Pack Modus software assures totally balanced production and manages all the intermediate stations in the optimum manner, allowing the production line to run continuously.

Unloading solutions.

The P4 Panel Benders are well suited to being accessorized with manual, automatic or robotic unloading devices.
The most common unloading systems for Panel Benders are:

- manual: an operator picks the bent part up and moves it as required;
- automatic: a connection automatically transports the part to the next station for welding, assembly or painting;
- robotic with palletizing: a robot unloads/ palletizes the parts produced.

Quality is producing parts that are always perfect, fr

The manipulator: superior accuracy and versatility.

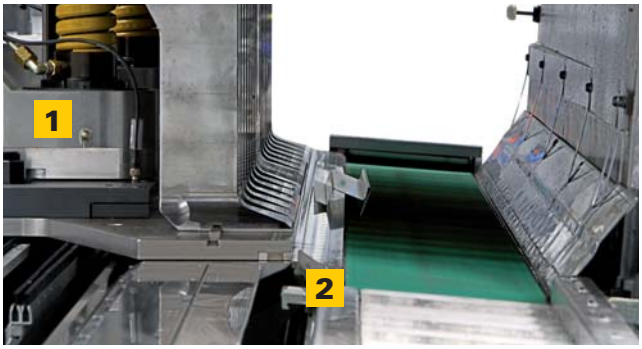
Sheets are handled, gripped and rotated by the manipulator, clamp and rotator respectively: sheet movement throughout the entire processing cycle is both fast and totally automatic. The controlled descent of the clamping unit reduces cycle times and regulates clamping force. The innovative structure and the digital drives that control the electric motors mean that sheet gripping and rotation remain precise and accurate throughout the entire life cycle of the Panel Bender. The continuous rotator ensures an angular resolution of 0.01° for more flexible production - even with polygonal panels.

Detail of manipulator

om the first to the last.

The Salvagnini CUT option: extremely accurate profiles.

The CUT option is used to obtain a number of different profiles or narrow panels from a single sheet. This is accomplished by making separation cuts after each of the sequences of bends that give the profile its shape. The CUT option functions by using a cutting reference created by a T/P tool **1** in the shape of a plate, and a cutting blade **2** placed over the lower bending blade.



Automatic crowning.

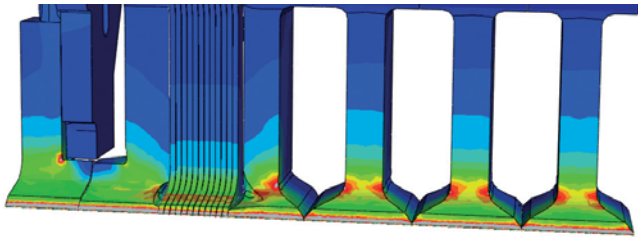
On request, the Panel Bender can be equipped with an automatic crowning system which guarantees extremely high bend quality even in limit applications.

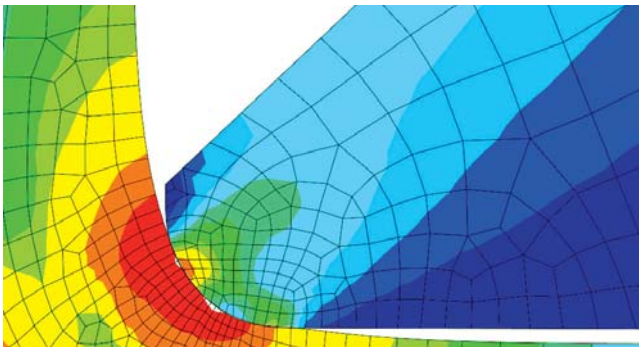
Rolling mode.

In the P4Xe, bending is managed by an algorithm that combines the interpolated movement of the blade with it rolling on the sheet. This eliminates the friction between bending tool and material, improving end-part quality and reducing tool wear.

ABT™

Different batches of material often yield different results (bends more or less closed) and show variations in machine behavior because of changing atmospheric conditions (temperature). Inconsistent behavior affects part quality and requires the product to be continually modified, leading to considerable material waste. To assure consistent accuracy and to improve machine productivity, Salvagnini has implemented proprietary technology known as ABT™ (Advanced Bending Technology) in its Panel Benders. This is a set of components, formulas, algorithms and devices which are integrated into the Panel Bender in order to provide high performance and reliability. The ABT™ technology has been applied and implemented throughout all machine components: hydraulic, pneumatic, mechanical and electronic. The result is a hybrid adaptive Panel Bender which makes it possible to achieve unparalleled quality, with low consumption, high throughput and a minimum layout.





Minimum tool wear.

The most recent simulation technologies and the FEM analyses on dilation, force and structural distortion have led to component innovations, and to their mode of operation being redesigned, reinforced and modified so as to assure an extremely high degree of product repeatability, quality and reliability.

Rapid return on investment.

The P4Xe always guarantees an effective return on your investment thanks to its low processing waste (ABT™ technology), to the high quality of the bent parts (proprietary control and software), to the reliability of the product and process (digital communications protocols) and to its production flexibility combined with a high level of automation.

Our concept of ethics: reduced consumption, safe technology, ecological responsibility.

High-performance components.

The intensive utilization of high-efficiency components and low-consumption actuators in operations that do not require any special power, such as handling, centering, feeding and unloading, have helped to drastically reduce energy consumption. Thanks, too, to the refined software cycles, the following important results have been achieved:

- the machine automatically compensates for any deflections in-cycle;
- the manipulator and the automatically set-up blankholder are driven by electric actuators.

Considerable attention has also been paid to machine maintenance: this is now even more cost-effective, thanks to the use of original design solutions and commercially available components, the optimization of the parts in the bending unit and the introduction of the new bending mode.

Reduced environmental impact.

All design choices have been focussed to improve energy efficiency and reduce environmental impact: the mean electrical consumption has been reduced by 75% (in the P4Xe-2116, for example, it does not exceed 11 kW).

Extremely low noise levels.

Continuing with its commitment to environmental respect, Salvagnini has further reduced the noise level of the P4Xe, creating an extraordinarily quiet machine.

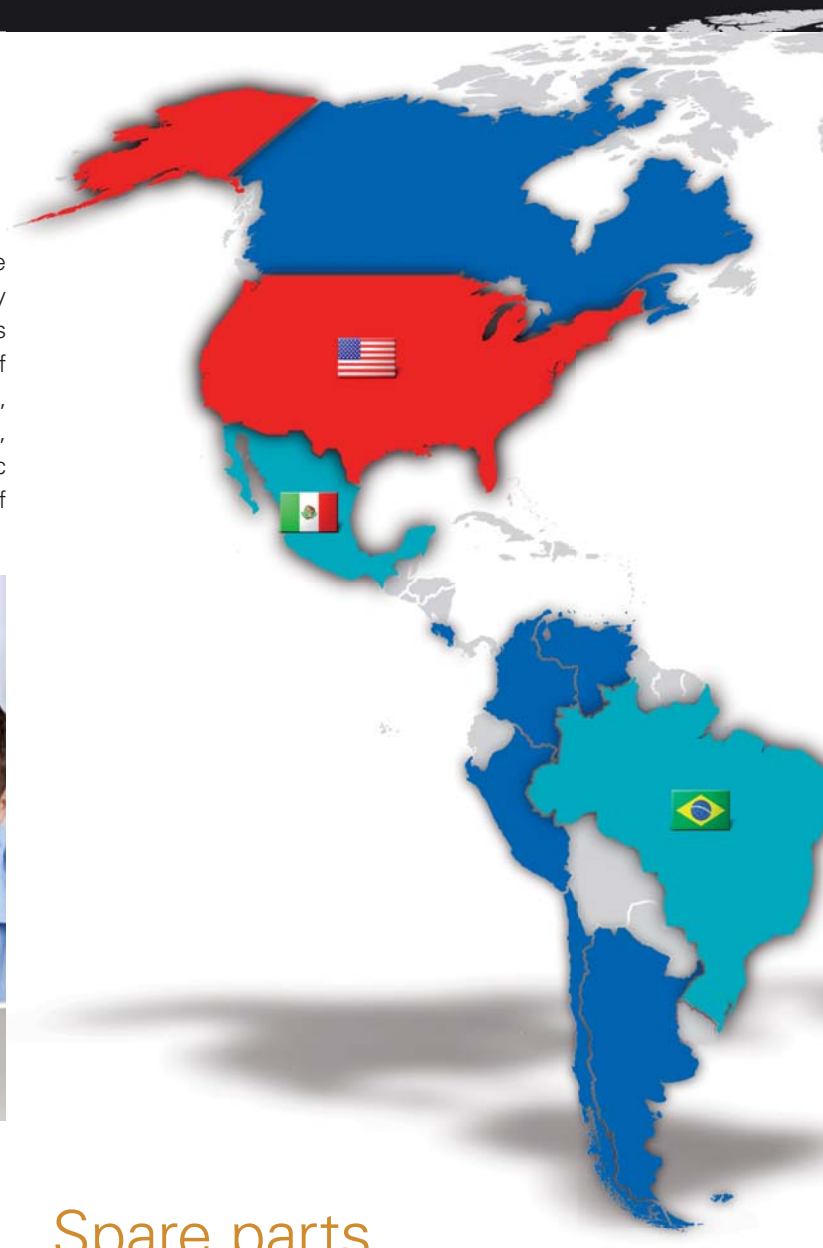
Ecologically responsible.

With maximum respect for the environment in mind, Salvagnini has chosen to use only metal covers for its machines and the main system command console. Salvagnini has also made an important investment to connect its production facility to an ecological power plant that provides both thermal and electric energy.

Beyond the machine, you will find even more Salvag
specialized personnel trained in-house and a worldw

Training

Salvagnini strongly believes in the value of training those who use its systems, considering this to be an increasingly important aspect of the automation concept. For this reason, the Salvagnini training program is the synthesis of our consolidated know-how of, and direct experience with, sheet processing systems. In addition to standard courses, Salvagnini also offers individual training courses for specific machines and functions as well as on-site training if requested.



Customer service

Salvagnini systems are always installed on customer premises by highly specialized personnel, trained in-house. Thanks to the Salvagnini software and system technology, customers always receive a quick response, preventing any machine downtime. Salvagnini's preventive maintenance programs aim to keep machines in excellent working order.

Spare parts

All industrial machines may require parts to be replaced at some time. Preventive maintenance programs certainly help to identify part wear before faults occur, but having the necessary spare parts on hand, nearby and ready for rapid installation, is also essential. To ensure this, Salvagnini has built a world-wide network of spare part warehouses, with constantly updated part selections, ready for immediate delivery wherever needed.

nini excellence: innovative training programs, ide customer service network.

4 production facilities

18 operational sites

75 countries in which at least one system has been installed

1300 employees

4400 installations in 75 countries

5 product lines

79000 m^2 of covered production space

159 different application sectors

** Data as at October 2012.*

3962020312

Punching

S4Xe SL4

Panel forming

P4Xe P2Xe P1

Laser cutting

L3 L5

Bending

E3 B2 B3 KinEtic ROBOformER

Automatic storage

MV MD MVL

Systems

AJS® FMS S4Xe + P4Xe

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