PX



The compact and flexible panel bending platform

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CHANGE

What is Salvagnini's perspective on panel bending?

For Salvagnini, panel bending is a fully automated, flexible sheet metal bending process, designed by Guido Salvagnini in 1977.

Salvagnini panel benders combine speed, flexibility and precision, making them the ideal solution for batch one, small batch and kit production of parts or three-dimensional panels starting from blanks.

Within the Salvagnini range, PX is the entry-level solution for automatic panel bending: a platform offering access to the Salvagnini ecosystem with a sustainable investment, without compromising on quality, reliability, service, integration and continuity.

Discovering Generation 4.

With the new Generation 4, Salvagnini presents innovative solutions for **improving simple use and repeatability of jobs, eliminating low added value activities, reducing lead times and optimizing production flows**, for lower product costs and increasingly high business competitiveness.
For the PX platform, Generation 4 introduces **safeguarding** with a modern design, redesigned for full integration with the P-Robot, extending the platform with the new **PX-2520**.

What are the challenges faced by companies today?

In a rapidly changing market, manufacturing companies have to improve overall efficiency, reducing costs, waste and consumption without compromising on the quality of the finished product. They must also rapidly adapt to market demands, managing variable production mixes, volumes and increasingly smaller batches, different materials and increasingly tight delivery times.

ORGANIZATION

Planning changes continuously, guaranteed deliveries are increasingly difficult and production is not always easy to program. Digitalizing and automating means making programming more reliable while building efficient, traceable and reactive factory flows.

WORKFORCE

Skilled personnel are increasingly hard to source. The more production depends on people, the greater the operating risk and uncertainty. Automating does not mean replacing people, but rather enhancing their skills, recovering efficiency and allowing technology to perform the repetitive activities with low added value.

PRODUCTION SPACE

Extending or building new plants is complex and costly. Growth therefore increasingly depends on the ability to increase productivity and eliminate inefficiencies. Compact, automated solutions help companies to grow without occupying more but rather optimizing the available space, thus assuring smoother production flows.

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The compact and flexible panel bending platform.

PX is the high-performance panel bender with a minimal configuration: a compact, flexible and accessible platform designed to offer Salvagnini automation, quality and reliability with a sustainable investment.



PX is part of the X range, Salvagnini’s minimal and accessible technology solutions.

It is a range built around a precise industrial concept: to offer Salvagnini's founding values – quality, reliability, service, integration and continuity – with more standardized, user-friendly solutions.

The logic is to allow companies to enter the Salvagnini ecosystem at a more accessible entry level.

These solutions are designed for those who do not require high customization but are looking for a solid, supported and integrable technology suited to their own production needs.

The guided configuration is an industrial design choice. The customer gets what is really needed for their own process, with more clarity, better controlled schedules and a more consistent investment.



Who is the PX designed for?

PX is designed for companies looking to enter the panel bending world with a high-performing, compact and automatic solution marked by a **minimal configuration** and a **sustainable investment**.

It is the ideal choice for anyone looking for:

- **constant quality and reliability;**
- **bending process automation;**
- **flexibility in the management of kits, small batches and batch ones;**
- **high productivity and short cycle times;**
- **simple configuration, use and management;**
- **possibility to integrate the panel bender in robotized cells and advanced factory systems;**
- **service, skill and continuity of the Salvagnini ecosystem.**

How can we justify the investment in a PX?

PX offers a particularly positive balance of high performance and limited investment.

With its automatic bending and handling cycles, it achieves an average of **up to 17 bends per minute**, ensuring productivity, precision and constant quality.

The universal bending tools are also used to machine different thicknesses and materials without re-tooling, making the PX ideal for the production of kits, small batches and batch ones.

It is a precise, flexible and productive solution that improves process efficiency, reduces running costs and increases margins.



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PRECISION

How to obtain maximum precision?

The sheet metal is centered only once at the start of the process, along the notches and against controlled reference stops. This minimizes both the cycle time and any potential precision errors.

The proprietary Bending Formula automatically optimizes the bending parameters.

MAC3.0, the set of integrated technologies – sensors, formulas and algorithms – detects any material variations in real time and compensates them to guarantee precise, repeatable and high-quality bends.

ADAPTATIVITY

How to make production independent of changes in material?

MAC3.0 makes the panel bender intelligent.
During the cycle, the system detects any differences between the actual mechanical characteristics of the material and the expected nominal values, automatically compensating them by adapting the movements of the bending unit and the manipulator. MAC3.0 reduces waste and the need for corrections, guaranteeing a constant bend angle and correct flange and box dimensions.

How to make production independent of external variations?

PX integrates advanced sensors that measure the actual thickness and effective size of the part, also detecting any deformations caused by variations in temperature. The data are fed in real time into the Bending Formula, which calculates the correct force to apply to the sheet metal, guaranteeing the precision, repeatability and quality of the finished product.

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Production flexibility.

How to adapt the panel bender to different production needs?

PX integrates an automatic blankholder that adapts the tool length according to the size of the part to be produced in-cycle, without machine downtime or manual re-tooling.

It can also be equipped with CLA auxiliary blades, available with manual set-up, in standard lengths and both positive and negative, for making upward or downward tabs and bends that are shorter than the overall panel length.

PX can work as an independent solution, can be integrated into a P-Robot robotized cell, or can run in an FSJ – Flexible Smart Job Shop, in which different Salvagnini technologies communicate and cooperate to automatically and flexibly manage complex production flows.

How to make the process reactive to changes in the production lists?

PX can be integrated with OPS, the Salvagnini process software that connects the panel bender with the factory ERP/MRP.

OPS receives and updates the production lists in real time, organizing priorities and managing sequences composed of different parts. The universal tools, automatic in-cycle set-up and fully automated handling allow the panel bender to rapidly respond to variations in the planning schedule.



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How to combine productivity and flexibility?

Conventional bending generally has low OEE and its flexibility often depends on costly and time-consuming tool changes, or the use of more than one press brake.

PX natively combines productivity and flexibility: productivity is ensured by automatic bending and handling cycles, while flexibility comes from the use of universal tools that can process a whole range of machinable thicknesses and materials without re-tooling.

With its advanced cycle, PX can complete an average of 17 bends a minute.

How long does re-tooling take?

With PX, there is no re-tooling of the universal tools. The upper and lower blades, the counterblade and the blankholder are able to process the whole range of machinable materials and thicknesses.

The blankholder automatically adapts to the shape of the panel during the cycle, with no machine downtime or manual intervention.

Do manual loading and unloading affect the total cycle time?

In the manual configuration, the operator places the sheet metal on the worktable and picks the finished part after bending.

PX's advanced cycles minimize the impact of these activities on the overall cycle time, allowing the panel to be unloaded while positioning the new sheet metal: two combined actions in one.

When integrated with the P-Robot, PX can automate loading or unloading operations, or both, increasing autonomy and production continuity.

Does the set-up affect productivity?

The set-up has minimal impact on productivity. When the program is loaded, the blankholder automatically adapts in masked time, while the manipulator gets into position for gripping and handling the sheet.

How to produce in kits or batch-one?

The automatic blankholder adapts the tool length according to the size of the part in-cycle, without machine downtime or manual re-tooling.

PX is therefore the ideal solution for production in kits, small batches and batch ones, as it passes quickly from one item to the next while maintaining high quality and efficiency.



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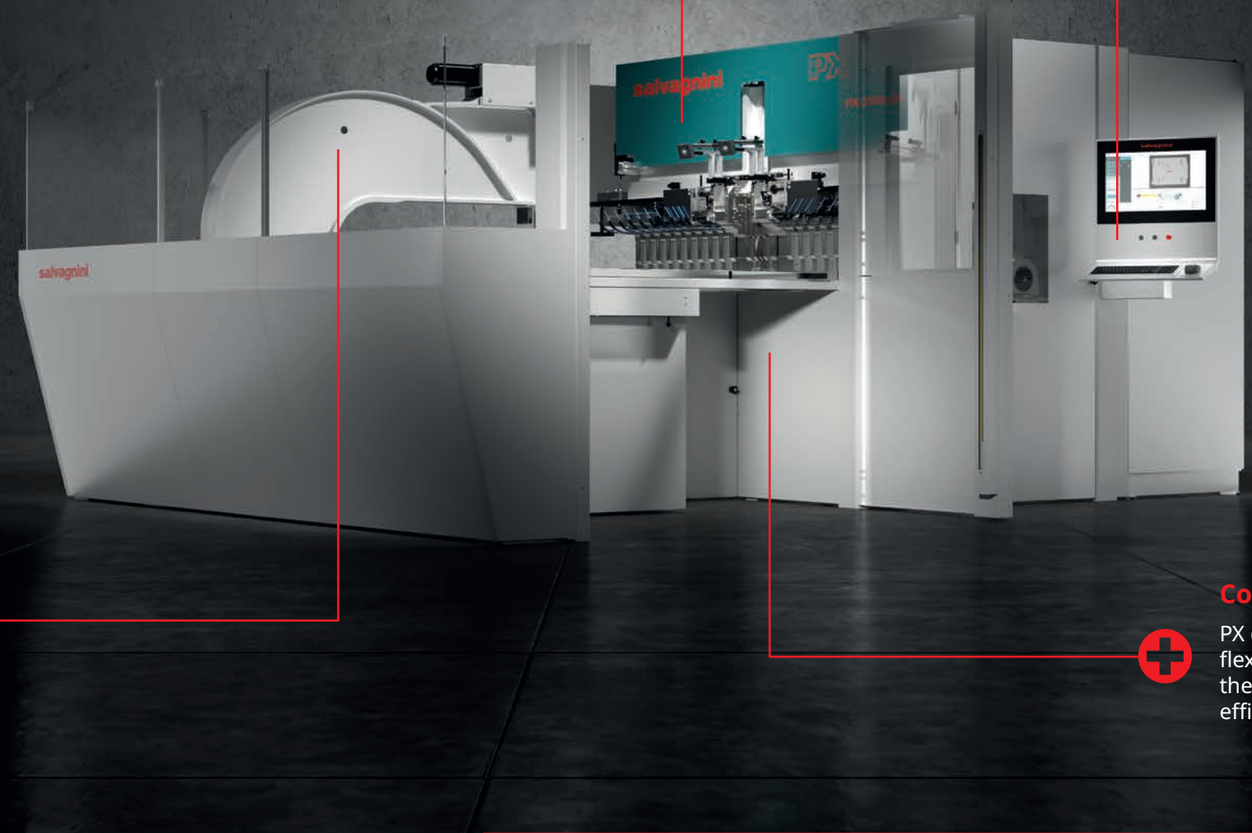
Quality and automation in a minimal configuration.

Flexible automation

The universal tools automatically adapt to the shape of the panel during the cycle, without machine downtime or manual re-tooling, allowing production to efficiently manage kits, small batches and batch ones.

Adaptive system

The advanced sensors, Bending Formula and MAC3.0 make the system intelligent and able to automatically adapt to changes in the material and the external environment, eliminating waste and corrections while guaranteeing precision and repeatability.



Connectivity 4.0

The proprietary STREAM, LINKS and OPS software connect the panel bender with the company departments involved in the production flow, from programming to production, including performance monitoring.

Compact layout

PX concentrates automation, productivity and flexibility in a compact solution, helping to optimize the available space and make the factory flows more efficient.

PX comes with a more standardized guided configuration, **designed to offer the customer what they really need in their process.**
Less complexity means greater commercial clarity, better controlled schedules, simpler management and a more consistent investment.

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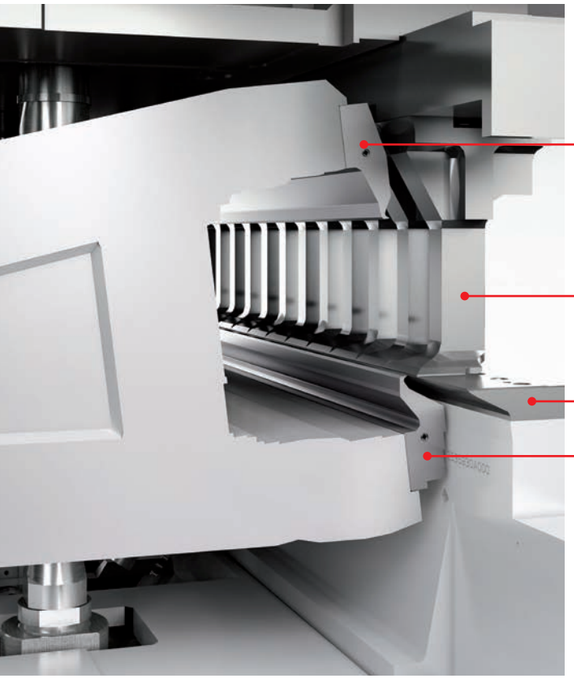
Operating mode: simple, quick and lean.

Upper blade, lower blade, counterblade and blankholder are the **four universal tools** used to process different thicknesses and materials without machine downtimes or manual re-tooling.

Each side of the sheet is bent thanks to the **controlled interpolated blade movements.**



The upper (A) and lower (D) blades are the tools that feature interpolated controlled movement responsible for bending. They make positive and negative bends as well as hems.

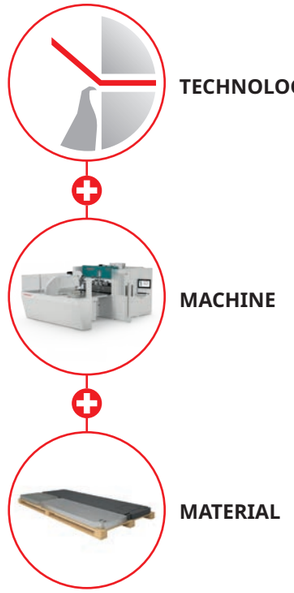
The **automatic blankholder (B)** works simultaneously with the blades and counterblade to accurately clamp and bend the sheet. It adapts its length to the part size automatically, during the cycle and with no manual re-tooling.

The **counterblade (C)** helps to clamp the sheet during the cycle, ensuring precise and stable machining.

Automatic manipulator

It manages the sheet gripping, rotation and handling throughout the cycle, quickly and completely automatically. In the standalone configuration, **the operator only has to load the sheet metal and unload the finished product.** In the robotized configuration, even these activities can be automated.

Adaptive system.



One single and controlled centering process

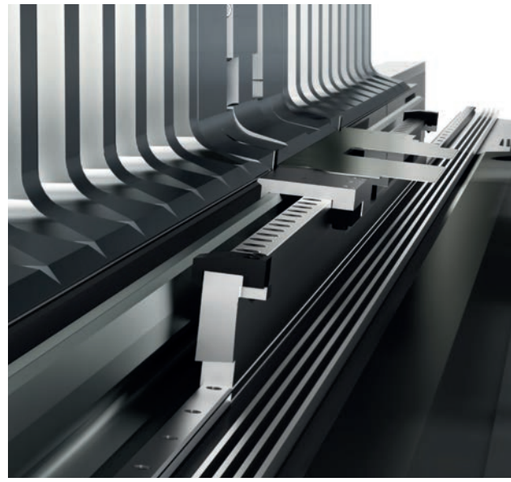
The sheet metal is centered on the notches **just once** at the start of the process, against controlled mechanical stops. This solution minimizes the cycle time and concentrates any dimensional errors on the first bend. The mechanical stops offer a further **guarantee of finished panels of the correct size, every time.**

MAC3.0: automatic in-cycle compensation

MAC3.0 detects any differences between the actual mechanical characteristics of the material and the expected nominal values, compensating them by **automatically adapting** the movements of the bending unit. A digital display integrated into the operator interface is used to monitor the characteristics of the machined material in real time.

CLA tools

PX can be equipped with auxiliary blades, manually modular in length, available in both positive and negative versions, for making upward or downward tabs or bends that are shorter than the whole sheet length.



Proprietary bending formula.

Salvagnini's proprietary Bending Formula **defines the force and manages the movements of the universal tools,** analyzing different parameters in real time, including deflections, temperature and thickness. Technology, machinery and material **dialog continuously** to guarantee the precision, repeatability and quality of the finished product.

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P-Robot: the robotic panel bending platform.

P-Robot is the platform for robotized panel bending applications.

P-Robot was designed to robotize the loading and unloading operations of a compact panel bender, but today includes all the robotized applications to assist a panel bender.

P-Robot is therefore not a single configuration, but a platform integrating different applications and production strategies.



Depending on the need, P-Robot can automate:

- only loading;
- only unloading;
- both loading and unloading;
- the handling of semi-finished parts and finished panels;
- many complementary activities integrated into the production flow.

The platform uses **only robots** and continues to develop on the practical experience gained by Salvagnini in different sectors and production contexts.

A flexible production strategy.

P-Robot is used to autonomously produce **kits, batches and single parts**, meeting the challenges of an industrial context marked by high item turnover rates, short lead times and a lack of skilled personnel.

Simple programming

The smart teaching systems and MOVE software, integrated into the machine interface, guide the operator in defining the robot movements without requiring specific knowledge of the related programming language.

This approach reduces set-up times and speeds up the start of production.

RVS: Robot Vision System.

P-Robot can be equipped with RVS, the Salvagnini **artificial vision system** that simplifies part recognition and handling, **optimizing the intermediate steps and reducing programming activities.**

The optional quality control function applied to incoming sheets also helps to identify any non-conforming parts before machining, **increasing the efficiency of the whole process.**

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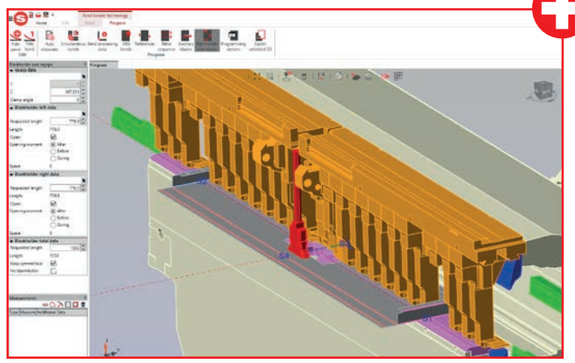
The software ecosystem.

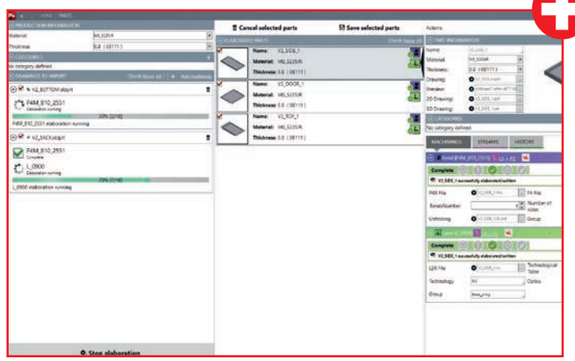
STREAM is Salvagnini's programming suite **that improves reactivity and reduces costs, operating errors and process inefficiencies.**



STREAM BEND

STREAMBEND is the software for developing panel bending programs, even for multiple parts.

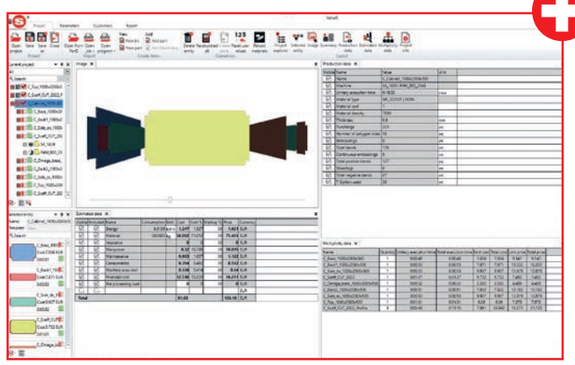
It can operate:
- automatically, autonomously developing programs starting from a 3D model;
- interactively, used for generation/editing/completion operations;
- as a simulator, to virtually assess the results before production on board the machine.



PARTS

PARTS manages the database of products and parts processed in the company.

It is the point of access to all programming activities, integrating with the STREAM applications, defining the production flows of each part and classifying the elements according to common or customized categories.



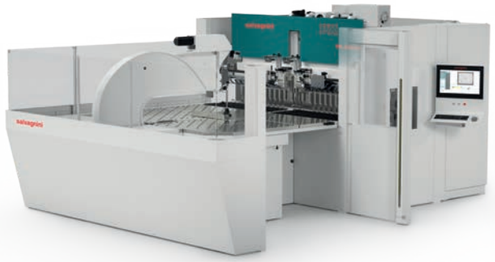
VALUES

VALUES is used to accurately estimate production costs, considering not only each technology but the whole process, including any upstream or downstream operations.

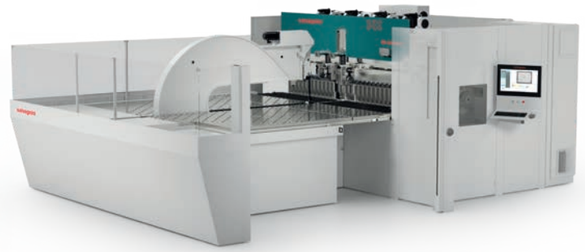
Two models to support production.

The PX platform has two models, designed to respond to different dimensional and production requirements. It can bend panels **up to 2500 mm in length and 203 mm in height**, maintaining a compact and minimal configuration consistently with the needs of the reference segment.

PX-2120



PX-2520



PX integrates Salvagnini automation, flexibility and quality in an accessible platform, designed **to accompany the customer's production developments.**

TECHNICAL SPECIFICATIONS	PX-2120	PX-2520
Maximum length of incoming sheet (mm)	2495	2795
Maximum width of incoming sheet (mm)	1600	1600
Maximum diagonal that can be rotated (mm)	2500	3200
Maximum bending length (mm)	2180	2500
Maximum bending height (mm)	203	203
Maximum bending force (blades) (kN)	330	660
Maximum bending force (blankholder) (kN)	530	1060
Minimum thickness (mm)	0.4	0.4
Maximum thickness, steel, UTS 410 N/mm² (mm)	3.2	3.2
Maximum thickness, stainless steel, UTS 660 N/mm² (mm)	2.5	2.5
Maximum thickness, aluminum, UTS 265 N/mm² (mm)	3.2	4.0
Average absorbed power (kW)	5	6
Noise level (Machine Directive 2006/42/EC) (dB)	70	70

Values refer to a standard machine. Salvagnini reserves the right to modify this data without warning.

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Coordinate your factory in real time, with OPS.



OPS is Salvagnini's modular process software that **coordinates and distributes information** among the company departments, making the production process more efficient.

It receives the production list from the ERP/MRP, supports the programming activities and applies rules and algorithms to **automate the process**.

OPS can:

- organize production, defining priorities;
- manage order changes or cancellations;
- check the availability of semi-finished parts;
- automatically process the production lists;
- group parts according to order, job and sequence;
- manage kit compositions;
- generate feedback for the ERP/MRP;
- update the progress of each part in real time;
- coordinate different technologies in an FSJ cell.

OPS Shop Floor Control. Control integrates labeling and traceability solutions downstream of bending. The part **ID and logistics information** can be displayed on the screen or printed on a label, also with a barcode to automatically call up the next machining program. **This solution reduces sorting times, limits identification errors and increases production flow reactivity.**

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Transforming values into value.

A modular solution developed on 3 service levels, designed respectively for:

Act
to support the management of day-to-day needs.

Plan
to offer preventive maintenance and planning services.

Grow
to maximize system use and performance.

Proximity, **reliability** and **an eye on the future** are the values that have always been found in the wide range of services available for responding to contemporary challenges.

LINKS

LINKS (ACT) is the IoT solution that improves the overall effectiveness of Salvagnini systems, using the latest business intelligence technologies. LINKS is used to monitor the machine performance and access the production data, logbooks, performance KPIs, telemetry and parameter monitoring, through the Condition Monitoring process.

SupportYou

SupportYou (ACT) is a subscription-based service that manages updates and provides support for using and programming STREAM and all the applications in the office station.

Close2You

Close2You Report (PLAN) uses LINKS data to offer an overview of the state of health of a system, suggesting the required maintenance interventions according to their criticality and proposing agreed interventions to minimize the risk of malfunctions.

Rethinks

Rethinks (GROW) is the specific solution for anyone wishing to optimize their production process and improve quality and efficiency, reducing the number of work steps, material usage and costs.

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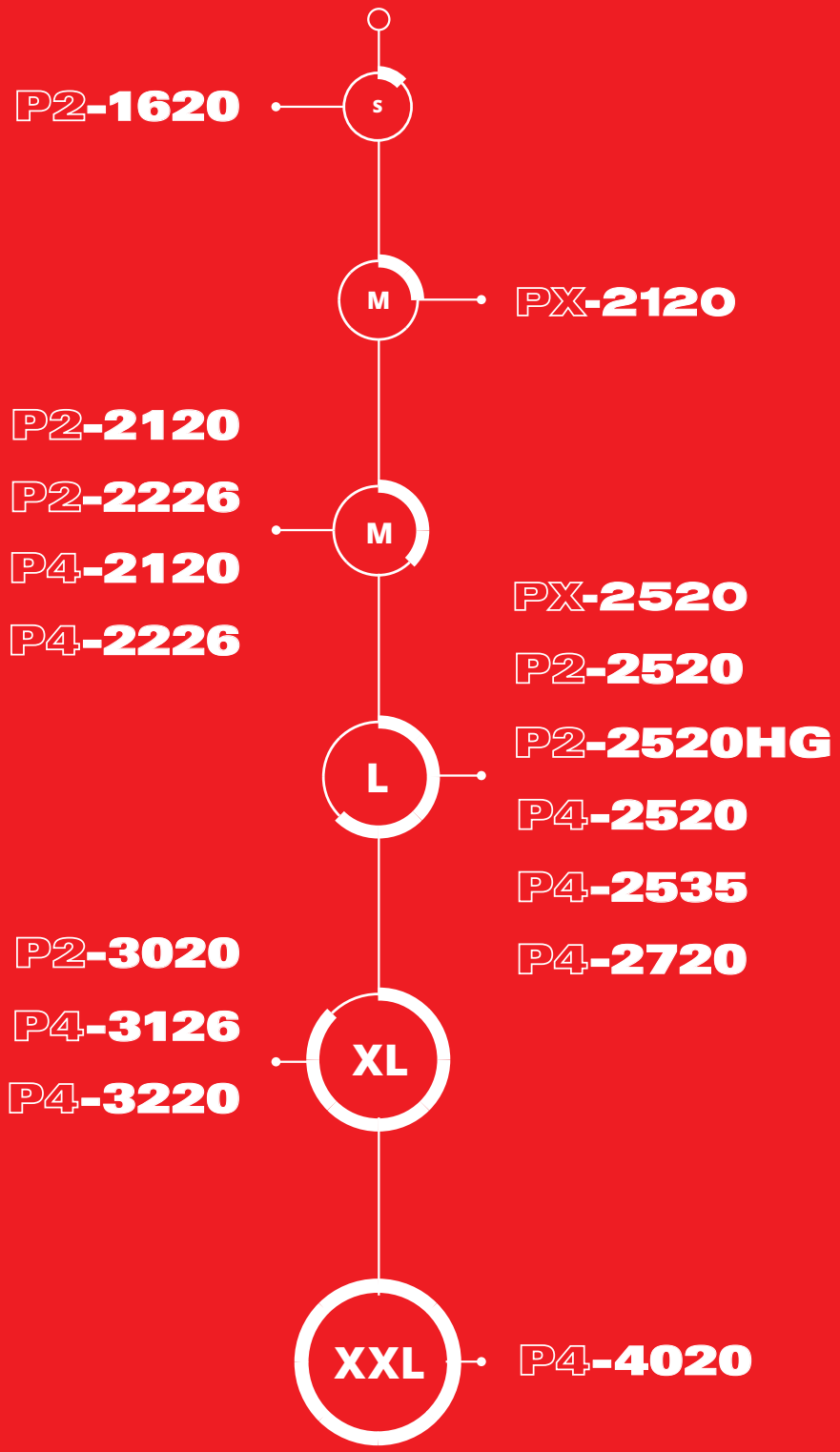

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