

Prima Power

The Bend
The Combi
The Laser
The Punch
The System
The Software

Shear Genius®
Integrated punching and shearing



The vast majority of all fabricated sheet metal components are rectangular, so a highly economical method to produce them is to perform first punching and then shear the components loose in the same automatic process with an integrated right angle shear. Also, parts with two or three straight edges are perfect for fabrication with a right angle shear.

Shear Genius® provides more capacity, quality and cost-efficiency for flexible sheet metal working than any comparable system. Twenty years of experience in right angle shear technology combined with proven field performance in nearly 2,000 applications throughout the world has allowed providing Shear Genius® with major benefits:

- automated flexible fabrication
- no skeletons, less punching scrap – savings in raw material
- no nibble marks
- higher productivity
- reduced manufacturing costs
- faster return on investment

The Shear Genius® provides the competitive edge for today's demanding business environment.



Energy in Efficient Use®

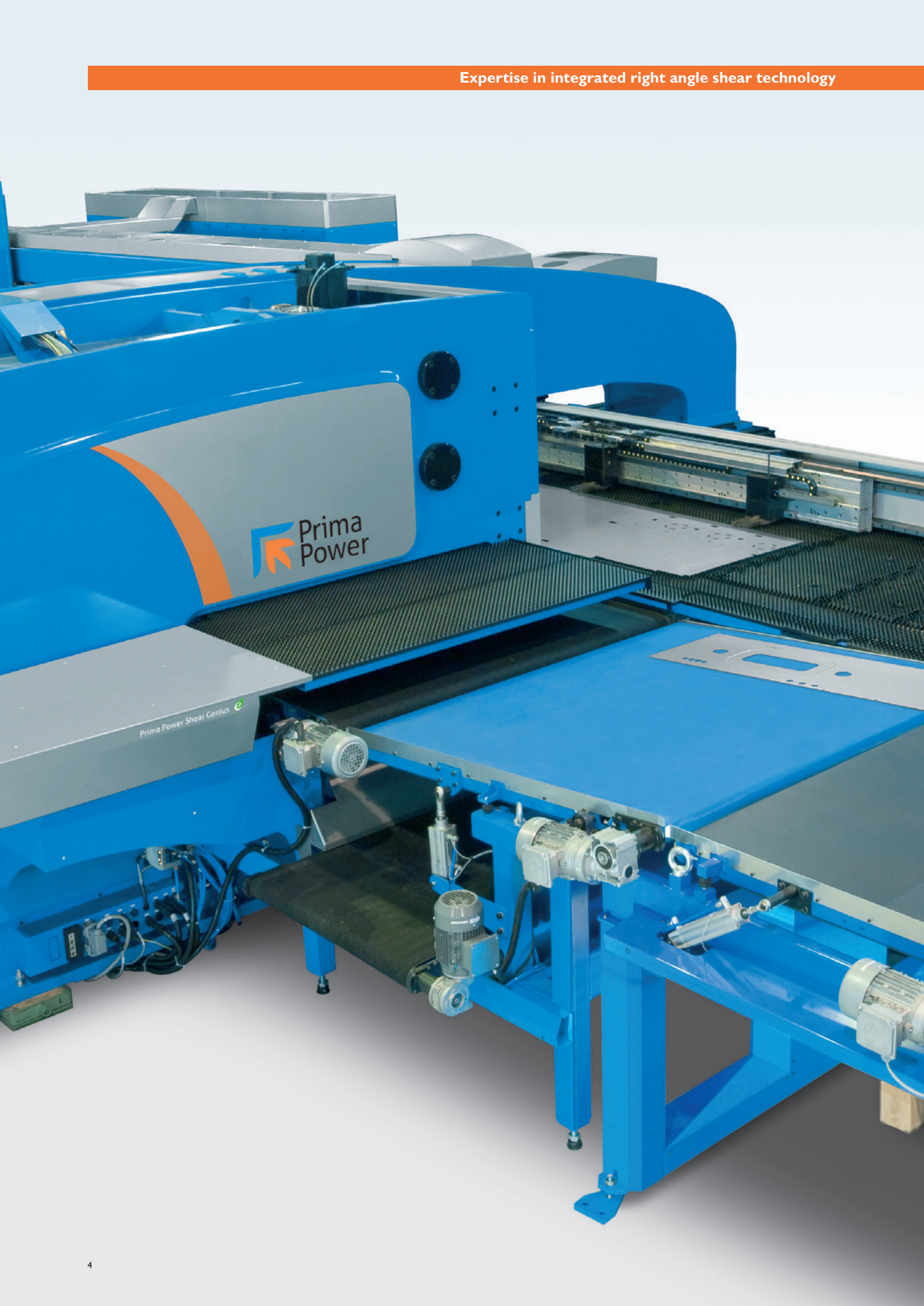
Servo-electric Shear Genius® SGe

Highest productivity with integrated shearing

Competitive edge for today's demanding business environment

Prima Power's basic Shear Genius® package consists of
* Automatic loading equipment
* 300 kN (33US ton) servo-electric turret punch press with capacity up to nearly 400 tools
* Integrated right angle shear

There are two Shear Genius® models for standard size sheets (max.)
* SGe6: 3,074 mm x 1,565 mm (120" x 60")
* SGe8: 4,300 mm x 1,565 mm (170" x 60")


Prima Power
Prima Power Shear Genius e

THE SHEAR GENIUS® PHILOSOPHY

The Shear Genius® philosophy is to provide one machine capable of transforming a full sized sheet into finished parts with scrap separated. These parts can be moved to final production stages without the need for secondary operations for costly material handling between loading, punching, shearing, sorting and unloading. With Shear Genius® you can use pre-cut sheets, but normally standard size sheets are processed while major savings are achieved through efficient nesting.

It is important not to think that this is the only way that Shear Genius® can be operated. When you need just a punching operation, Shear Genius® can be operated just as high-accuracy, high-performance turret punch press.

No other manufacturer approaches the Prima Power expertise in integrated right angle shear technology. This core competence enabled us to engineer new, productive features into a proven concept for increased productivity and material savings. By combining several work stages into an automated process, the Shear Genius® concept saves material, eliminates manual handling, decreases necessary floor space and investment in separate machine tools, tooling and energy.

Today, right angle shear technology is used throughout the industrial world in most varied applications, as independent production cells, or as central units within automatic material handling systems up to a factory-wide FMS level.

Here are some of the reasons why:

1) Avoid the cost of pre-shearing

Pre-shearing is a waste of time and money. Moreover, it is extremely difficult for a stand alone shear to achieve anything like the accuracy of components manufactured by an integrated right angle shear.

2) Just the right edge quality

One stroke detaches one or several components. Micro jointed or nibbled components often require an additional work stage, such as deburring, to improve edge quality. A right angle shear produces sufficiently high edge quality for practically every purpose. The component is usually ready for the next work stage as it unloads from the machine. For example, there is no oxide layer on the edges to be removed before painting.

3) Practically no consumables

As for consumables, Prima Power's right angle shear technology uses only energy and compressed air. The blades have several cutting edges – enough for years of production with an occasional sharpening. Blades, like punching tools, can be sharpened numerous times.



4) Don't pay for material you don't need

Modern production planning and automatic nesting software allow optimizing the use of raw material – a significant cost item in the production of sheet metal products. Compared with traditional methods, an integrated right angle shear can save significant raw material costs. The Shear Genius® method makes maximum use of material and eliminates micro-jointed parts and further manual operations.

5) Automated solution

Shear Genius® automates loading, punching & shearing with secondary work stages, as well as component exit. It eliminates manual separation of micro-jointed parts. The modular design of the Shear Genius® allows the addition of sorting and stacking equipment after the initial installation. The reliability of shearing and automatic component removal are inherent benefits of the right angle shear concept, and make Shear Genius® the optimum machine tool for high-level automation and unmanned operation.

SERVO-ELECTRIC HIGH-PERFORMANCE PUNCHING

An early and major step towards sustainable fabrication was taken on the introduction of the servo-electric E series turret punch press in 1998. Now Prima uses already the third generation of this technology.

The inherent benefits of servo-electric include energy efficiency, versatility and accuracy and low maintenance cost. This amounts to superior fabrication capabilities as well as outstanding operation economy, i.e. truly remarkable savings.

Performance values are truly impressive:
* Hit speed up to 1,000 hpm
* Sheet positioning speed up to 150 m/min
* Index speed 250 rpm
* Max 300 kN ram force
  available for all machine functions and for all tools

Servo-electric Shear Genius®: the benefits

+ Average power consumption 6 kVA / 5 kW
+ Power supply connection 17 kVA (3 x 25 A fuse / 400V)
+ Low energy consumption at three power modes: run / stand by / idle
+ Low maintenance cost
+ High versatility
+ High performance values
+ Wide range of options

= **Very high productivity in most varied applications**

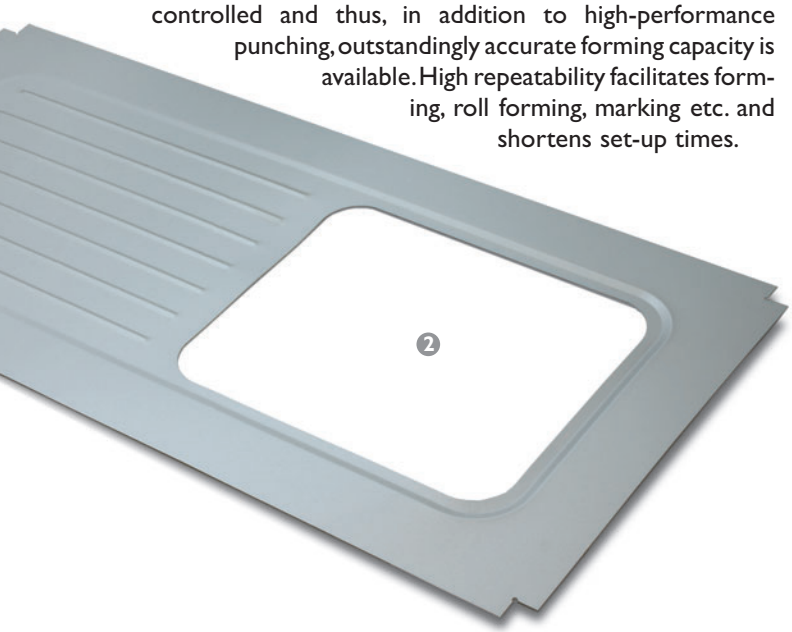
Ease of operation 1

Prima Power punching technology has properties such as automatic tool length measurement, optimization of stroke length and easy adjustment of the punching stroke. These combine with others, adding up to faster set-ups, more ease of operation and higher capacity.



Punching and forming 2

The servo-mechanically actuated punching stroke is NC-controlled and thus, in addition to high-performance punching, outstandingly accurate forming capacity is available. High repeatability facilitates forming, roll forming, marking etc. and shortens set-up times.

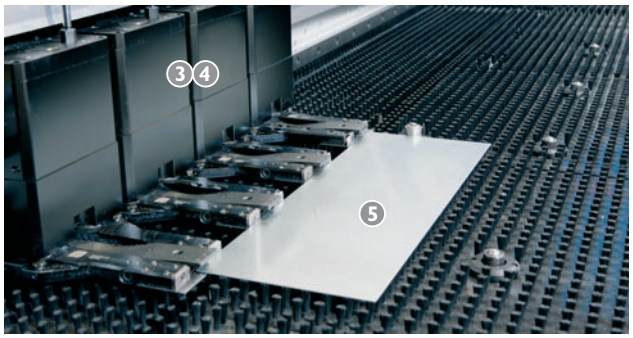


Sheet positioning 3

The machine features an axis actuation system based on maintenance free AC-servo motors. The construction allows positioning speeds up to 150 m/min; acceleration of the axes is adaptive and accuracy excellent.

Automatic clamp setting and moving 4

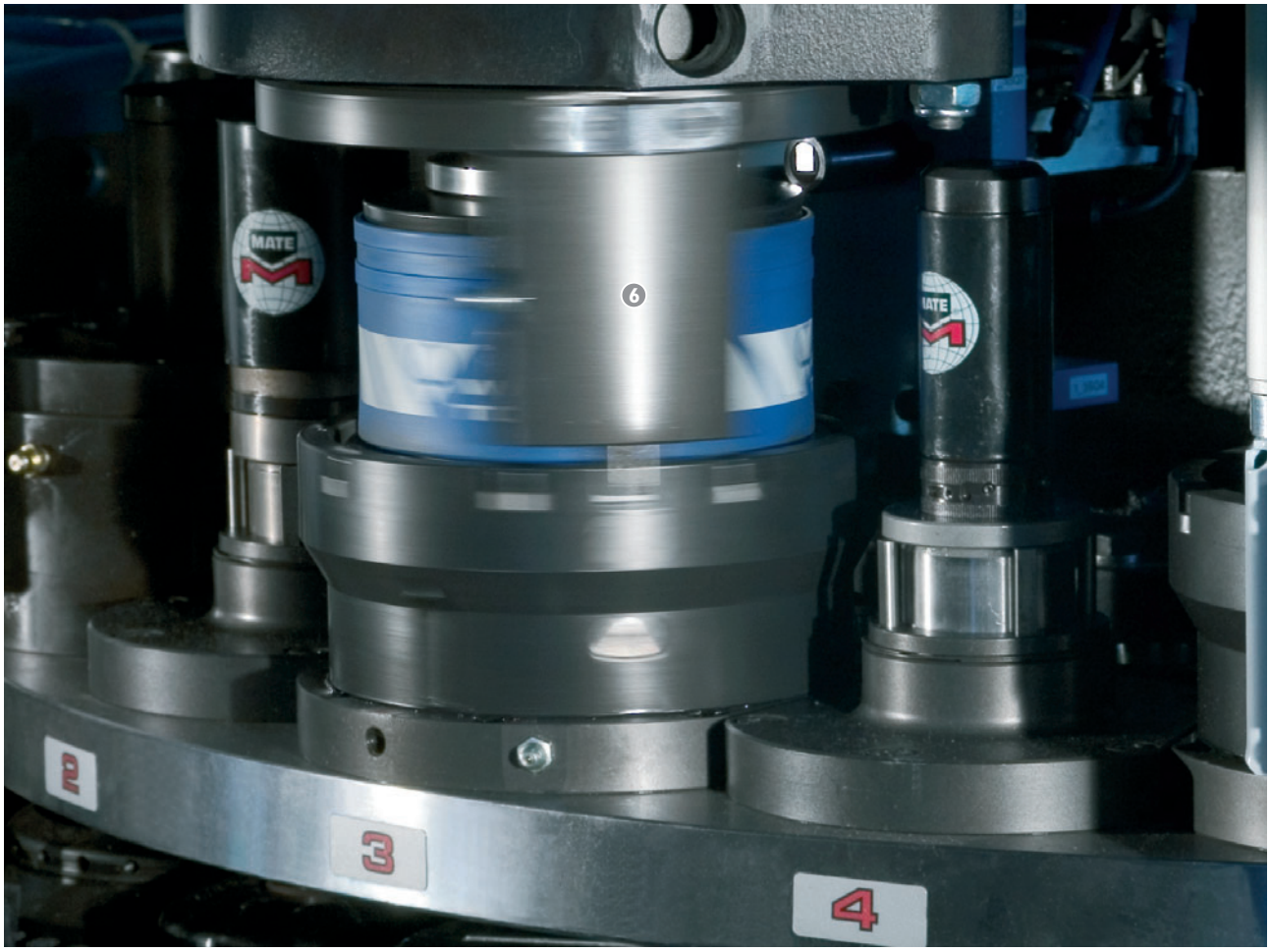
The Programmable Clamp Setting function automatically positions sheet clamps according to numerical program, minimizing clamp dead zones. When changing production from full size to small sheets, clamp settings can be made automatically without wasting operator time.



Loading large and small sheets 5

Sheets smaller than 600 mm x 300 mm are loaded manually. Loading is easy even with automation devices added to the system. Whether processing small, pre-cut sheets or full size material, sheet loading takes place with a simple push. Sheet supports allow easy positioning of heavy sheets.

Machines are equipped with brush tables, which protect sheet surface and prevent noise and vibration which would be hazardous for micro joints.

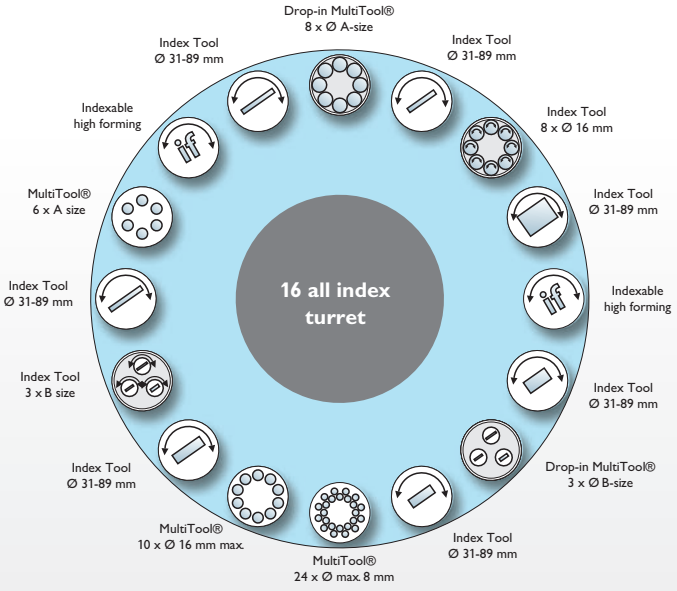


FastAuto Index 6

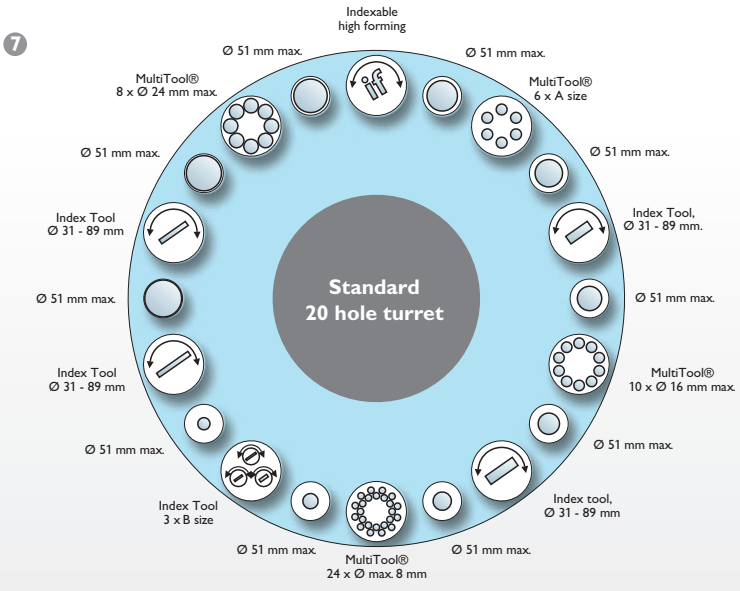
A large number of index tools facilitates set-ups and programming, shortens tool change times and increases production speed. Maximum index rotating speed is 250 rpm. The rotation mechanism of the punch and die is mechanically engaged and disengaged vertically. It enables full tonnage and punch speeds to be used in any station, with any tool size.

Large tooling capacity 7

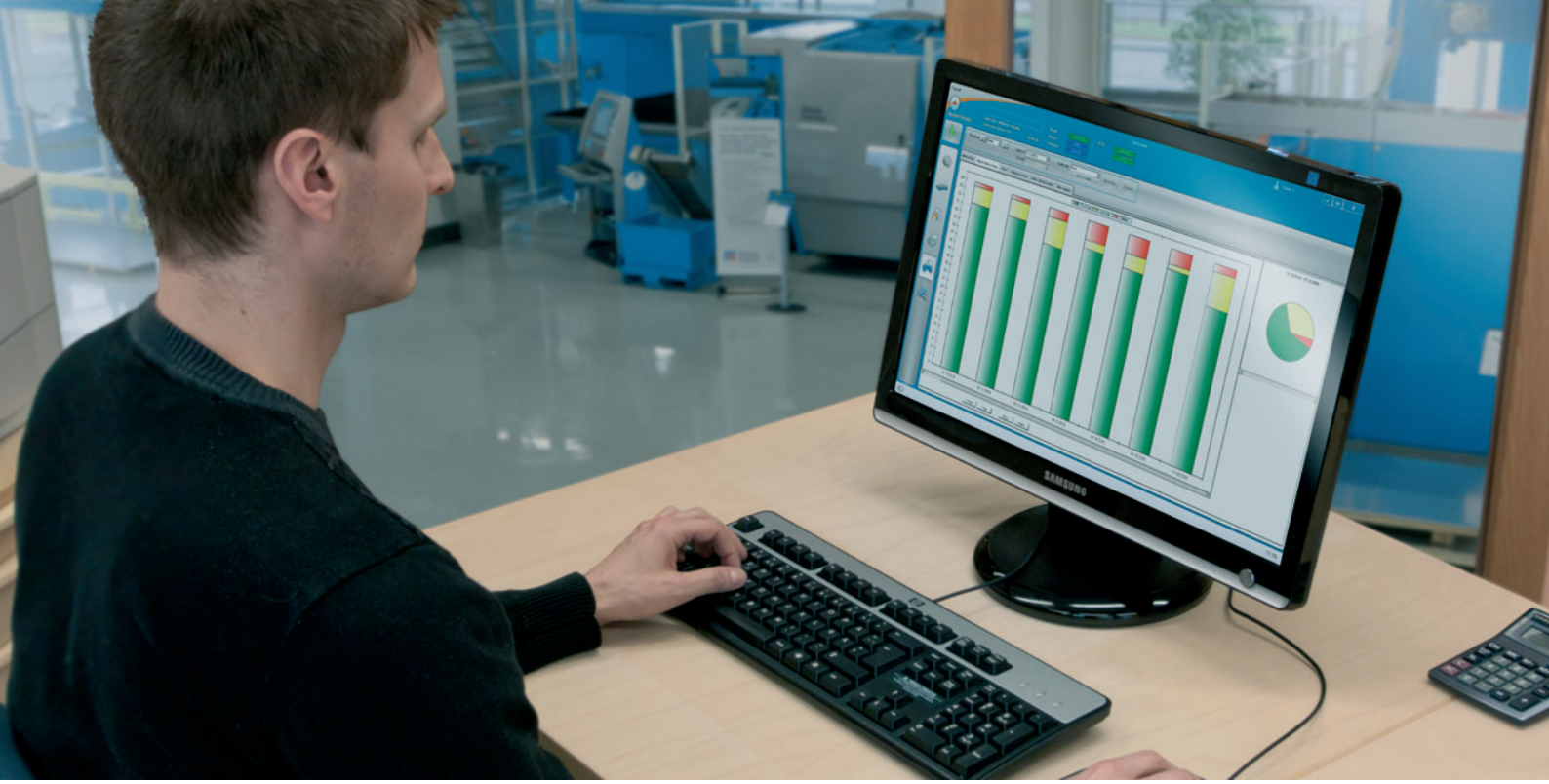
A totally re-designed turret can be chose; it can be customized and optimized for any requirement. Simultaneously, a record-breaking number of 384 tools can be available in the turret; thus unnecessary set-ups can be easily avoided. The original fully customized turret layout is also available. The maximum number of index tools has also been raised to 128.



Example of a customer specific turret layout. This one includes 69 tools, of which 18 index tools and 2 indexable high-forming station.



Example of a customer specific turret layout. This one includes 66 tools, of which 7 index tools and 1 indexable high-forming station.

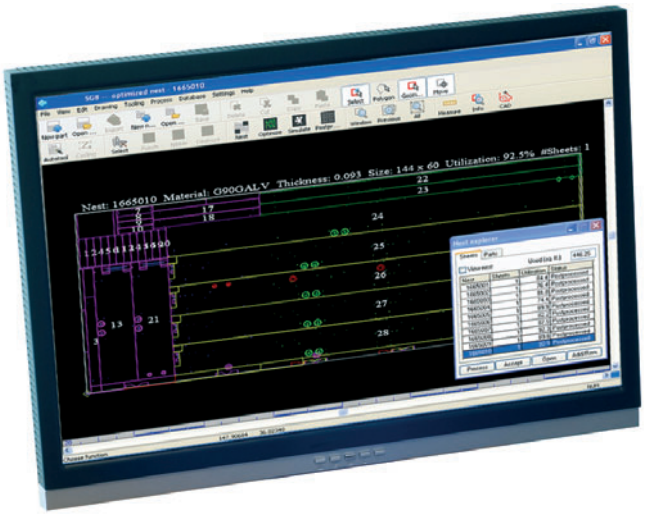


SOPHISTICATED SOFTWARE

Special attention has been paid to ease of machine setups and efficient programming. The benefits include excellent possibilities for e.g. roll forming and for other special tooling. With optional features, the software can be made compatible with standard ERP connections for importing orders and exporting reports.

NC Express™

Tulus®

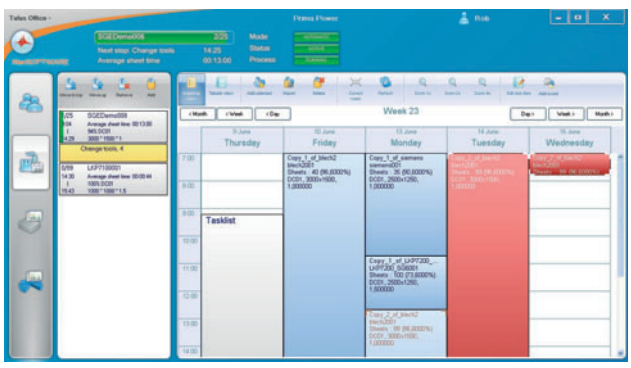


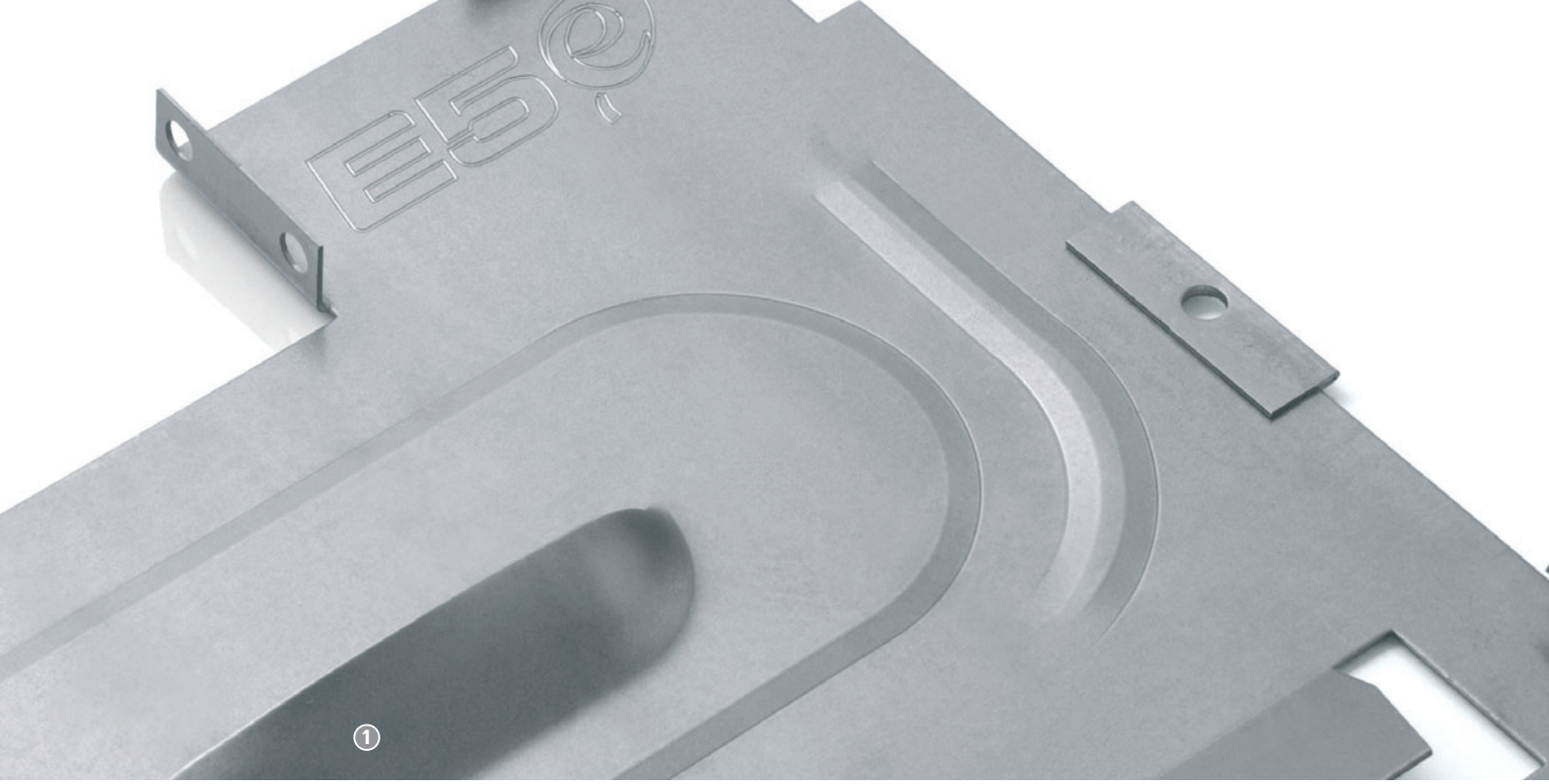


NC Express™ CNC programming system is a user friendly, integrated, and automated tool for programming the equipment. NC Express™ is for single part drafting and tooling or a fully-automated programming system for large production line.

Tulus® is management software of fabrication machines and systems. Tulus® controls machines with all essential information on machine related tasks within the same window. On arrival of new orders, Task management informs the operator of eventual needs for changes in materials, tooling, etc. Tool setting and other machine parameters can be easily set by interactive graphical interface. Additional production scheduling performance reporting and remote monitoring are available.

Above: Easy task list and tooling management with Tulus GUI.
Below: Tulus Office production follow-up and scheduling.





WIDE RANGE OF OPTIONS

There is a wide selection of optional equipment and features with which the standard machine can be customized to meet specific requirements. Most of these can also be installed later as machine upgrades.

Upforming 1

An additional forming cylinder is available. It is a servo operated ram installed in the lower machine frame. It lifts the forming die to a programmed position. The tool is retracted after forming, preventing a collision with the moving sheet. With this cylinder, versatile forms up to 16 mm (0.63") in height (incl. sheet thickness) can be made.

Fast component identification 2

There are several solutions for adding information to components to ensure reliable identification with different types of marking tools. SGe6 can also be equipped with an inkjet or a labelling device.

Extra clamp and individual movement 3

The machine can be equipped with extra clamp. Dead zones are completely eliminated with an individual clamp movement.

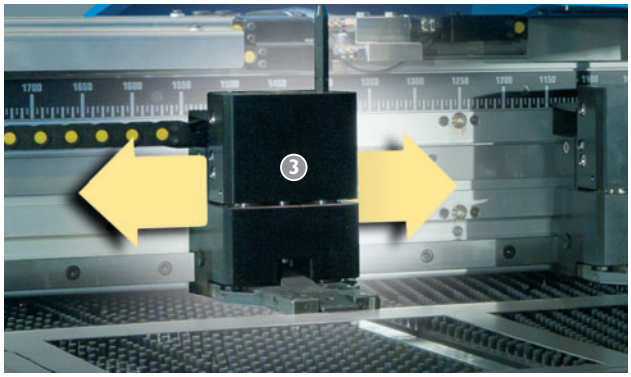
Multi-Tool® stations 4

The turret can be equipped with Multi-Tool® stations to increase the number of tools. The latest development in Multi-Tool® technology is the possibility of using drop-in style indexable Multi-Tools® on D-size index tool holders.

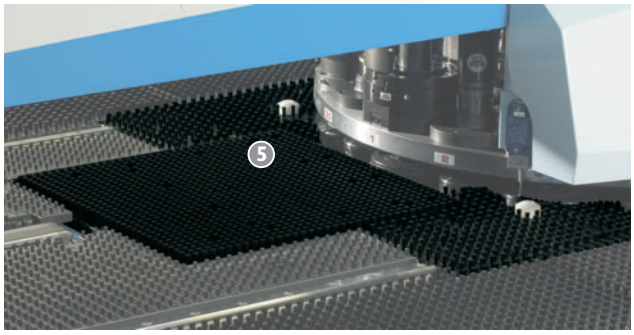
Lifting brush tables 5

Three brush table segments can be lifted to prevent sheet from scratching by tools which are higher than others. The function in no way complicates or slows down machine operation.









THE INTELLIGENT RIGHT ANGLE SHEAR

The Prima Power right angle shear is extremely fast in operation. Programmable blade height and automatic stroke depth adjustment combine to allow shearing speed up to 110 m/min (72.16"/s). In the right angle shear, sheet holders are programmable, allowing shearing close to forms. Blade speed is automatically selected for the maximum speed. Together with automatic shearing modes this optimizes operation speed.

The intelligent right angle shear always allows using the optimum solution for the stroke according to the part size to be made in each case, e.g.

- a single stroke for shearing a1,000 mm x 1,500 mm (39.37" x 59.06") component
- fast, multiple strokes in X direction up to maximum sheet length
- fast cut mode for shearing smaller components

The right angle shear can be used for 0.5...4 mm (0.02"...0.157") mild steel (aluminium up to 5 mm / 0.197"). For stainless steel max. thickness is 3 mm (0.12").

Programmable sheet holder

The lateral forces caused by the shearing action are compensated using pneumatic sheet holders for excellent shearing quality and high tolerances. In case there are forms or bends close to the shearing line, one or more segments of the holder can be programmed to stay in upper position so that component quality is not affected.

Automatic blade clearance setting

Blade clearance adjustment is automatic. Machine control calculates the optimum blade clearance for materials of different thickness and the adjustment unit in the right angle shear automatically sets the clearance correctly. This prolongs blade life and ensures high-quality, burr-free shearing.

Support of large work pieces

When shearing large pieces, they may occasionally be slightly bent or distorted. This possibility is eliminated with an automatic lifting mechanism integrated in the conveyor.

Part and scrap sorting

Shear Genius® can be used for processing pre-cut sheets and thus there is no shearing scrap at all. However, very often standard size sheets are used, or due to tolerances of the material supplier or eventual transport and handling damages it is advisable to trim the edges for straightness and correct dimensions. This scrap and eventual scrap between work pieces are automatically sorted onto a scrap pallet by a conveyor system included as standard. As work pieces are automatically exited from the machine for sorting or stacking, there is no need for the operator to separate scrap from work pieces manually.



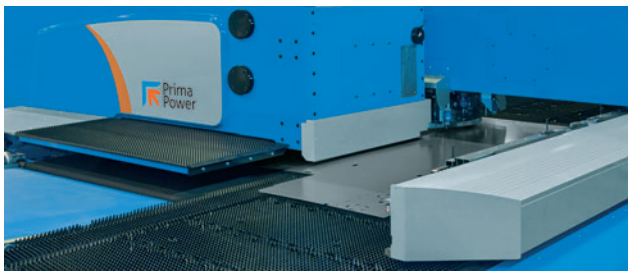
Long blade life

Shearing blades are of hardened steel and precision ground. Mechanical wear is minimal because of accurate blade support and automatic clearance adjustment, yet due to the heavy-duty operation wear necessarily is caused in the course of time. The upper blade has four and the lower two cutting edges, and by turning the blade a new, sharp edge is ready for use. Once there are no sharp edges left, the blades can be sent for grinding and re-used – a true Green Means® solution if anything.

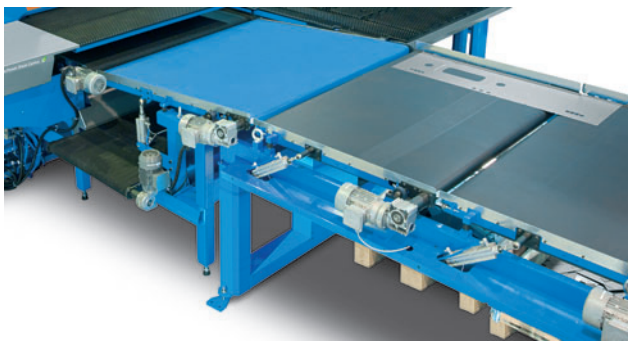
Outstanding accuracy

As the right angle shear is an integral part of the cell and not a separate machine, and since the sheet is firmly held throughout the fabrication process, high component accuracy is achieved.

Shear Genius® accuracy reaches new levels through a new actuation mechanism for X and Y movement of the coordinate table. All machines are carefully tested before delivery.



Programmable sheet holders and automatic clearance setting contribute to high component quality.



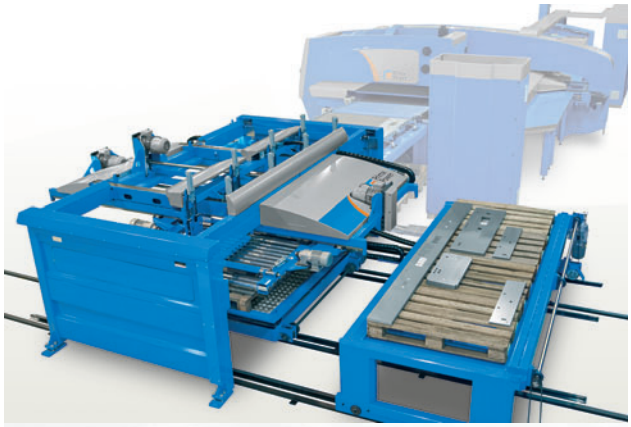
Part and trim sorting as standard.
Optional part sorting to 1 - 6 addresses.

FLEXIBLE MATERIAL HANDLING SOLUTIONS

The Shear Genius® construction is compatible with the whole Prima Power range of optional modular material handling equipment for sorting and stacking. Thus Shear Genius® solutions can automate

- material storage with automatic feed
- loading with possibility of material change during machine operation
- component exit
- scrap removal (punching and shearing)
- sorting and stacking of components

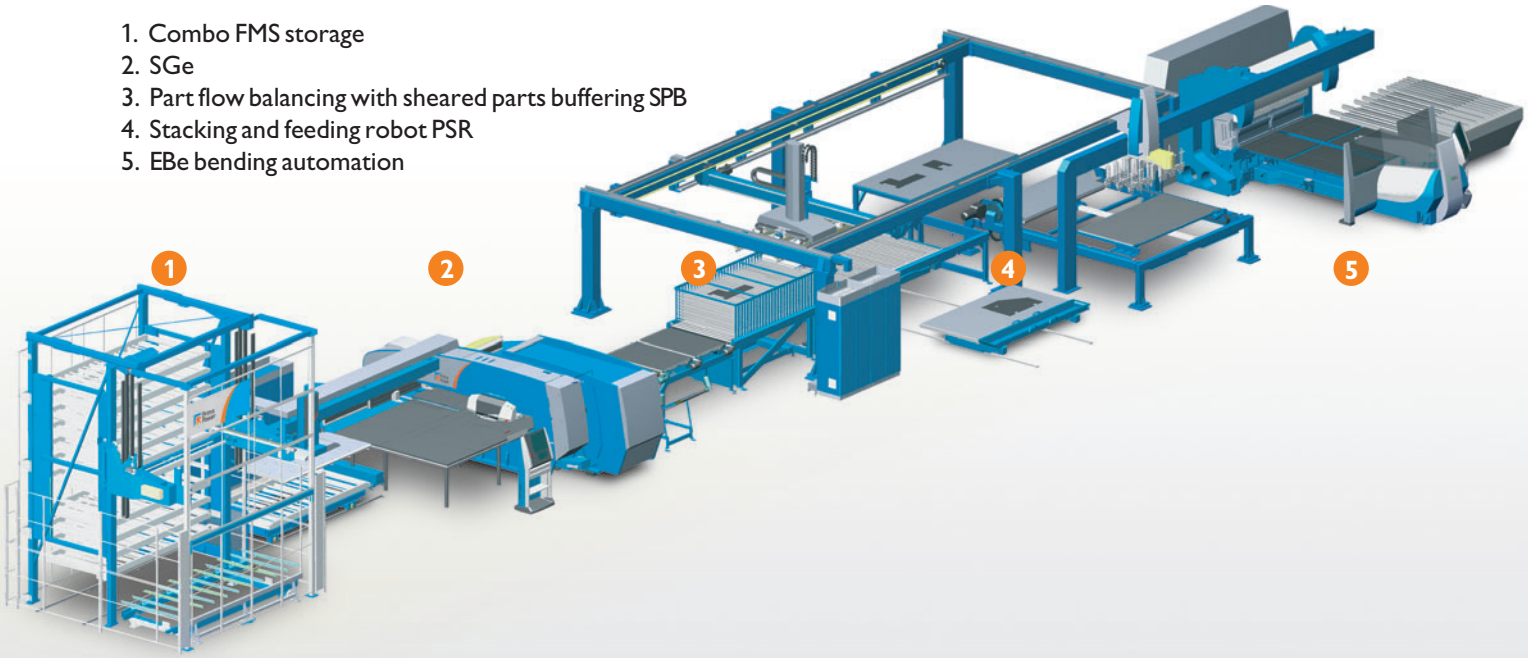
Shear Genius® technology is optimal for integration with subsequent bending by an automatic Prima Power bending cell. Prima Power PSBB processes blank sheets into bent components on a compact line, while Night Train FMS® provides factory-wide solutions for fully automatic fabrication.





Prima Power PSBB

1. Combo FMS storage
2. SGe
3. Part flow balancing with sheared parts buffering SPB
4. Stacking and feeding robot PSR
5. EBe bending automation



Night Train FMS®



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