



The Bend  
The Combi  
The Laser  
The Press  
The Punch  
The Shear  
The System  
The Software

**Shear Genius® – new generation of integrated punching and shearing technology**

# Servo-electric Shear Genius® SG

Highest productivity with 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.

Thirty years of experience in right angle shear technology combined with proven field performance in nearly 3,000 applications throughout the world has allowed providing Shear Genius® with major benefits.

**1+1 > 2**

*Punch + Shear  
= The cost cutting solution*

## Servo-electric Shear Genius® benefits:

- + Fast setup with up to 384 tools in a turret
- + 300 kN (33 US ton) force for demanding products
- + Average power consumption 6 kVA / 5 kW
- + Power supply connection 17 kVA (3 x 25 A fuse / 400 V)
- + Low energy consumption at three power modes: run / stand by / idle
- + Low maintenance cost
- + High versatility
- + High performance values
- + Automated flexible fabrication
- + No skeletons, less punching scrap = savings in raw material
- + No nibble marks
- + Fast loading cycle with new loading device LD
- + Accurate pre-cut raw material loading
- + Higher productivity
- + Reduced manufacturing costs
- + Faster return on investment
- + Wide range of options, can also be installed later as machine upgrades

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



**ACCESSIBLE**  
Easy to use and monitor



**INTELLIGENT RAM**  
More tools in turret and shorter tool change times



**SCRATCH FREE**  
Vertically moving brushes prevent the scratching of sensitive materials



**MODULAR TECHNOLOGY**  
Both machine and automation for it are modular to meet customer's needs



Machine shown here is equipped with automation and other options

**Shear Genius® package:**

Automatic loading equipment  
300 kN (33 US ton) servo-electric turret punch press  
Integrated right angle shear

**Two models for standard size sheets (max.)**

SG 1530: 3,074 mm x 1,565 mm (120" x 60")  
SG 1540: 4,300 mm x 1,565 mm (170" x 60")

**Two performance levels**



The new Genius series has models on two complementary performance levels: **PURE** meets all the targets set for an attractively priced, yet efficient production machine;



**DYNAMIC** offers the best productivity and performance in the market. Both models come with the latest features and can be equipped with the whole range of options and automation.

**The Shear Genius® philosophy**

The Shear Genius® philosophy is to provide one machine capable of transforming parts to final production stages without the need for secondary operations for costly material handling between loading, punching, shearing, sorting and unloading. Shear Genius® concept saves material, 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 like panels, doors, HVAC, cabinets etc., also in 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. Shear Genius can be fed with sheets up to 4,300 x 1,500 and direct from a coil line.

**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. The new shear also reduces 75 % of the maintenance time.

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

Compared with traditional methods, an integrated right angle shear can save significant raw material costs with continuous line nesting. The Shear Genius® method makes maximum use of material and eliminates micro-jointed parts and further manual operations.

**5) Automated solution**

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, unmanned operation and PSBB production line.



## 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 Power uses already the third generation of this technology.

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 for all functions and tools

### Multi-Tool® stations

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.

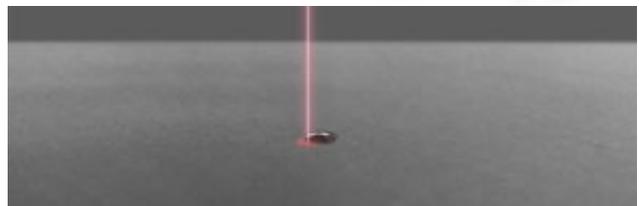
### Improved punching reliability

Optional hole check system improves reliability with advanced automation and unmanned 24/7 operations.

### ECOPUNCH® concept

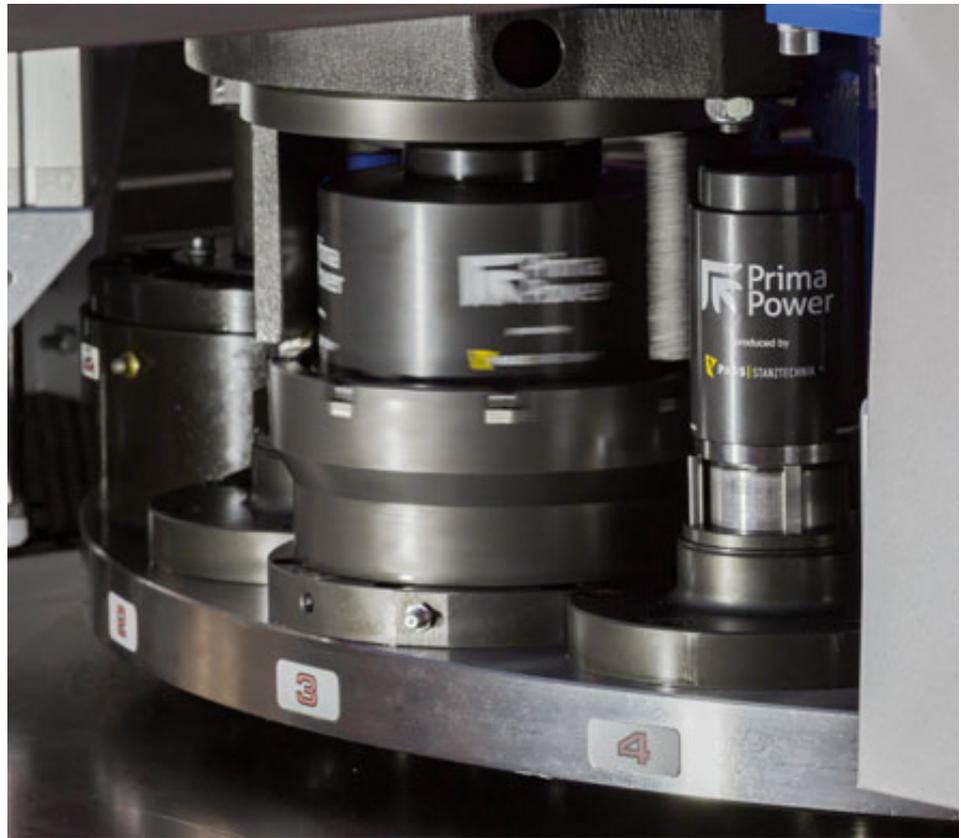
Prima Power is the pioneer of servo-electric punching. The first punch press with the technique was introduced in 1998.

Prima Power's ECOPUNCH® concept is an astonishing money saver in terms of energy consumption. Compared to traditional method Prima Power can produce more parts at same energy.



## FastAuto Index

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 punching speeds to be used in any station, with any tool size.



## Intelligent ram

A new option is the Intelligent ram, which shortens tool change time and increases the number of tools in turret and especially that of index tools. Intelligent ram includes a rotating ram head, which enables old Multi-Tool® types to be used as indexable. Also new Multi-Tool® innovations such as 4A and 4B can be used with the new Intelligent ram.

Up to 300 kN servo-electric punching force can be selected for the ram. Automatic overload protection and central lubrication ensure dependable machine operation.



Video



# ... forming, marking and tapping



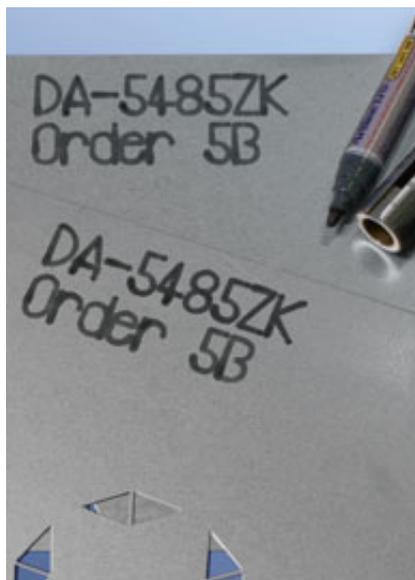
Video

## High upforming

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 cylinder provides 200 kN forming power for speedy making of complicated forms up to 16 mm (0.63") in height (incl. sheet thickness). All forming tools are indexable.

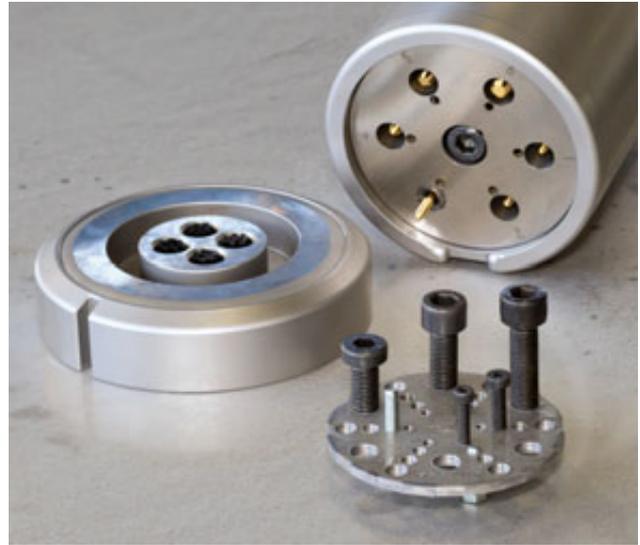
## Fast component identification

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



## Easy and versatile tapping

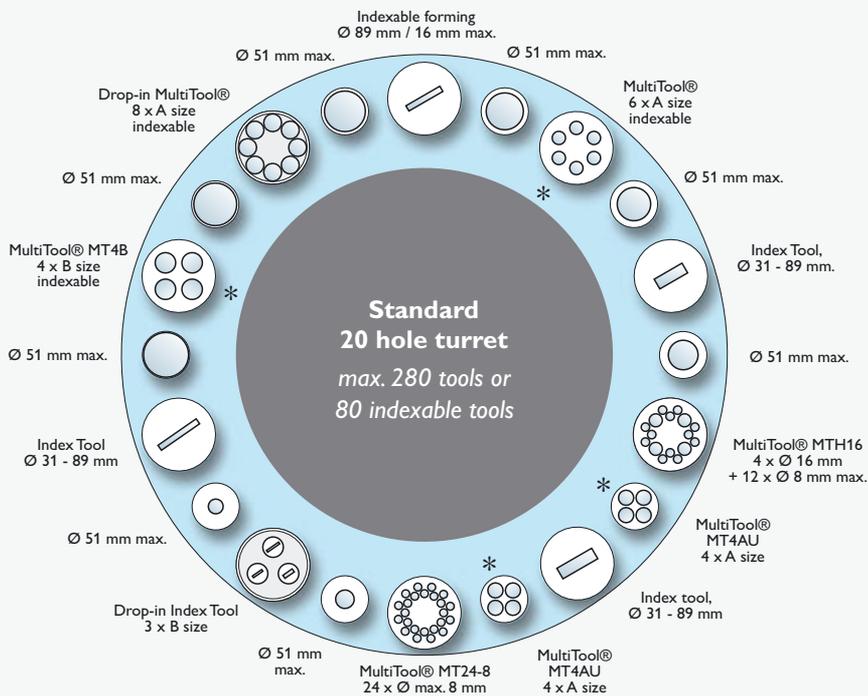
Further options include the servo-operated tapping unit TU6, an automatic six head tapping station and tapping monitoring system.



## Large tooling capacity

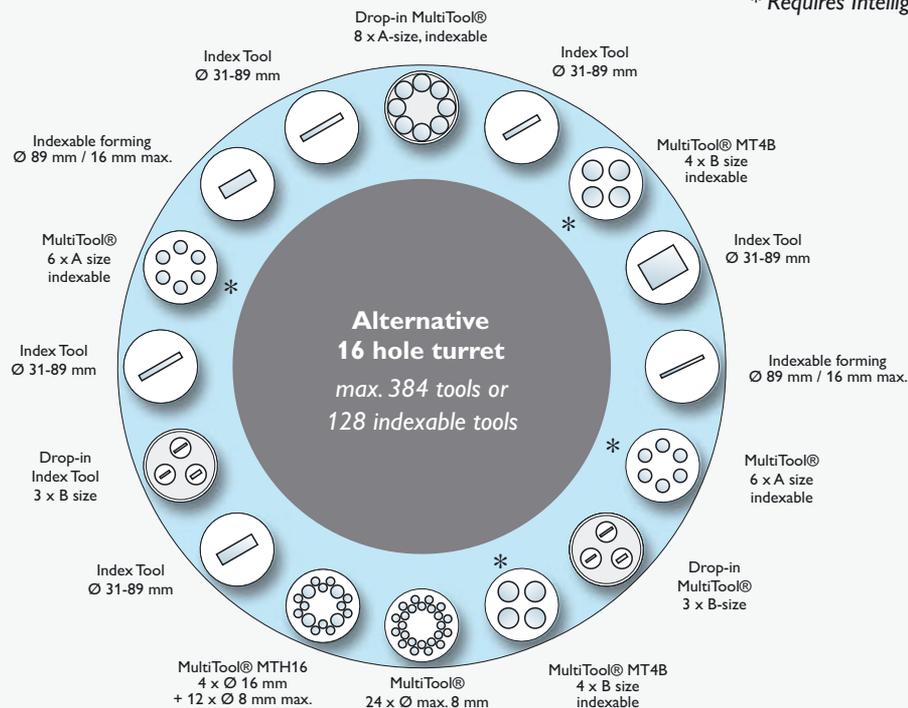
A totally re-designed turret which can be customized and optimized for any requirement. Simultaneously, a record-breaking number of 384 tools can be available in the turret; thus unnecessary set-ups can be easily avoided. The maximum number of index tools has also been raised to 128.

Customer specific layout with 81 tools, of which 25 index tools.



\* Requires Intelligent ram.

Customer specific layout with 79 tools, of which 39 index tools.





## The intelligent right angle shear

The Prima Power right angle shear is extremely fast in operation. Programmable blade height and automatic stroke depth adjustment optimize shearing. 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 of the optimum solution for the stroke according to the part size to be made in each case, e.g.

- a single stroke for shearing a 1,000 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 the right angle shear, sheet holders are programmable, allowing shearing close to forms.

### 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 correct clearance. This prolongs blade life and ensures high-quality and burr-free parts.

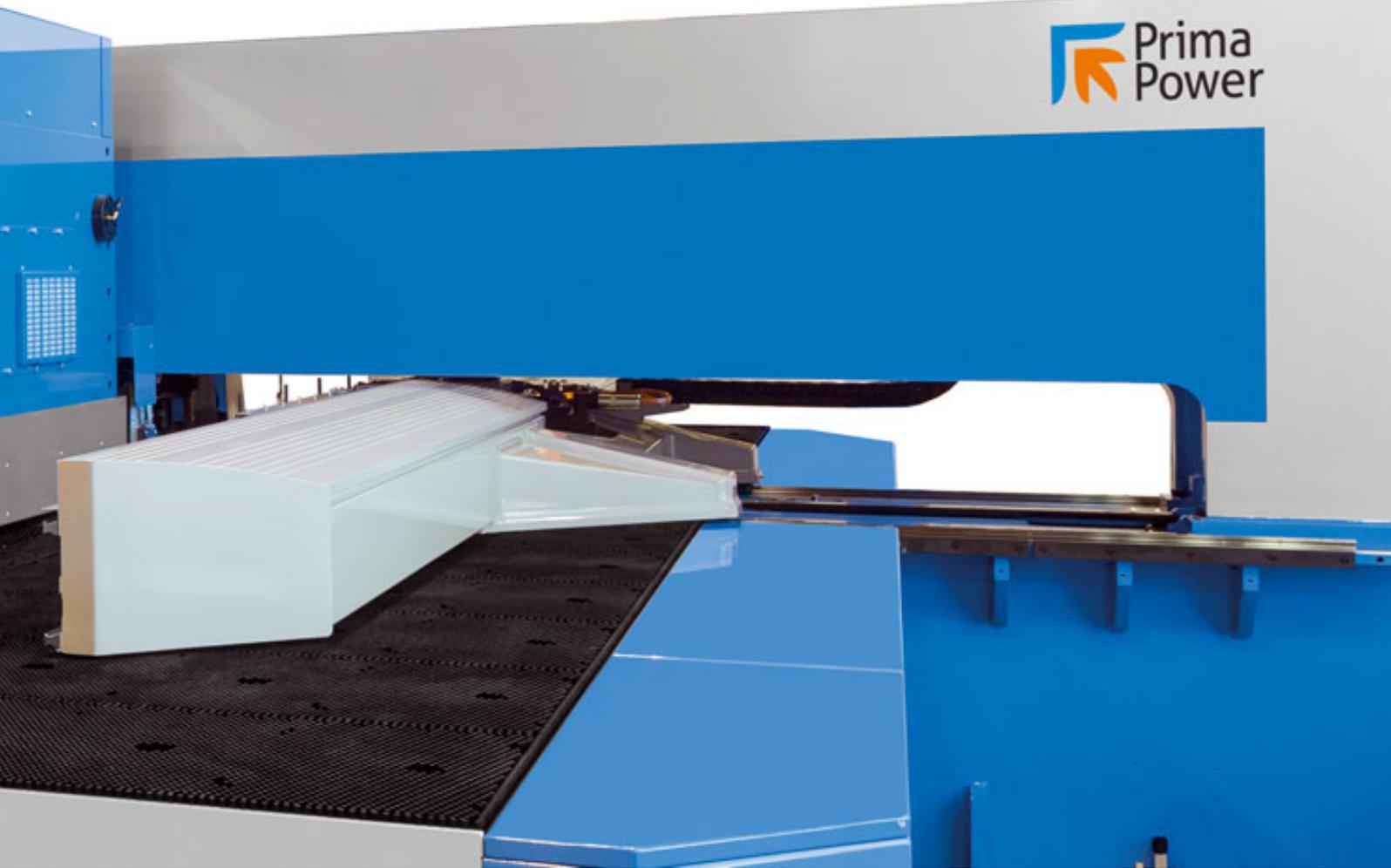
### Outstanding accuracy

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.

### Support of large work pieces

When shearing large pieces an automatic lifting mechanism integrated in the conveyor holds the parts for high accuracy.



### Intelligent part sorting

New shear has a unique system to sort parts and scrap. If there are any trims or leftover on the sheet, it is sorted out through the shear frame and conveyor. Inside the shear, fast inverter driven conveyor system separate scrap and move the parts to sorting or stacking without any delay or waiting time. For scrap part sorting, metallic conveyor belt is now available on standard and also optional lifting conveyor. Improved sorting conveyors having new inverter technology for faster sorting of components. Also, additional pallet changer, SU sorting unit can be installed to extend the part sorting addresses.

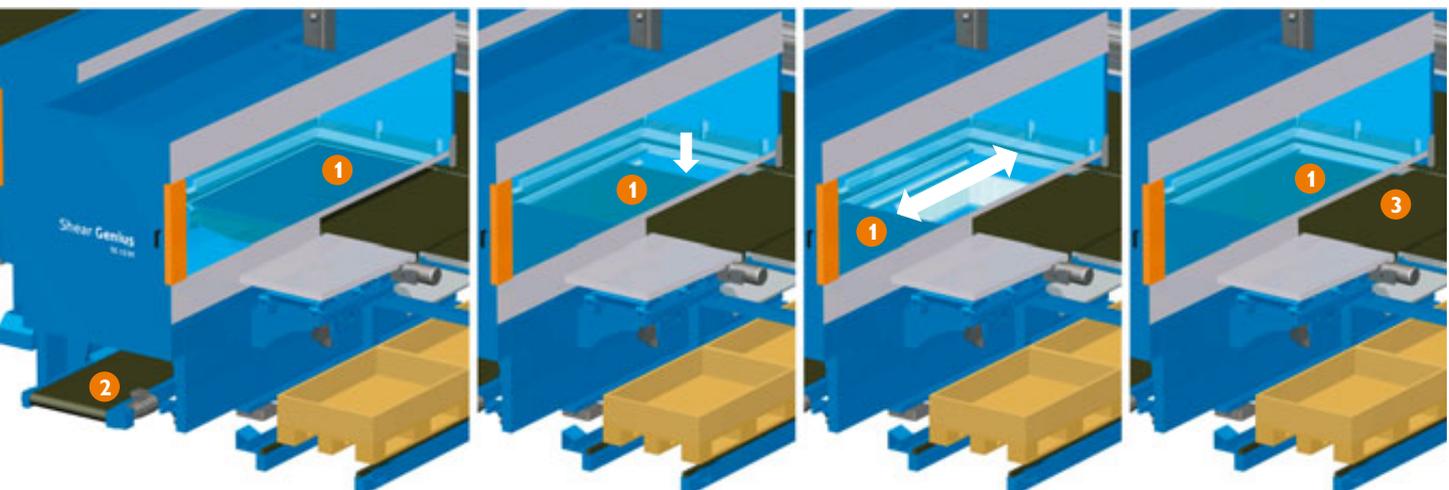
*Shear is covered with brush tables during punching. Shearing part conveyor (1) and scrap conveyor (2) are stopped.*

*Scrap parts fall through the opening conveyor inside the frame, this reduces waiting time dramatically. Depending on scrap part size the part conveyor (1) withdraws to required distance.*

### Long blade life time, engineer-friendly setup

Shear blades are hardened tool steel with very long life time combined with automatic clearance setting. However, blades can be turned and reused since they have more than one cutting edge each. When all corners are used, blades can be sharpened and reused. With the new intelligent shear, blade maintenance time is 75 % shorter due to new shear construction and new remote control box for service engineer tests and adjustments.

*Fast moving conveyor (1) supports the parts during cutting and delivers them to sorting or stacking (3).*





## Accessible

Shear Genius is operated with a modern control unit and its touch screen panel. Management of machine set-up and work queues is easy with Tulus® user interface. The NC Express™ programming system and Tulus® work in perfect combination, provide comprehensive reports on machine and production status, and can be linked to the factory ERP system when required. Monitoring of machine operation is facilitated by four optional cameras that send image to the upper display. Special attention has been paid to ergonomics and user friendliness of the control unit.

Work orders created by NC Express e<sup>3</sup> can be loaded to machine's task list easily by a bar code reader. TaskLoader system selects work orders from the database automatically and adds them to machine's task list including all information on e.g. required NC programs, tooling and material needed in production.

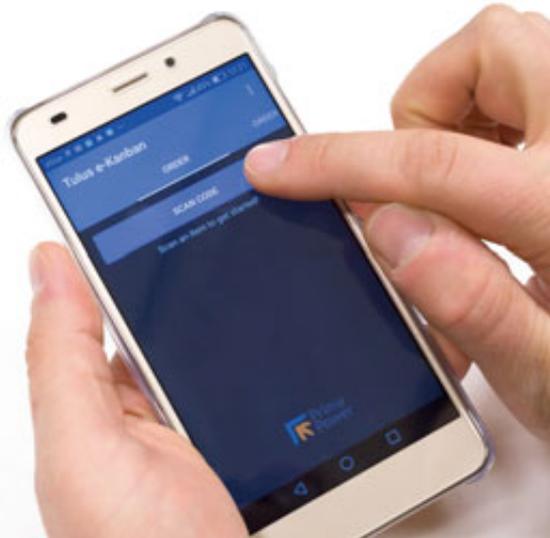


Further options to add accessibility include applications for handheld equipment.

### Tulus® e-Kanban, digital ordering process

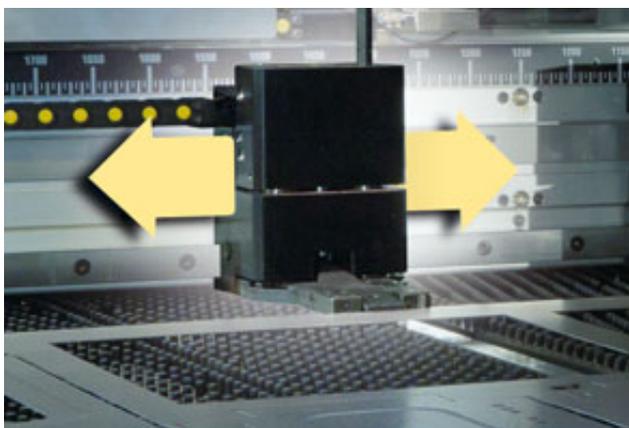
Tulus® e-Kanban, despite its name, is not only replacing the Kanban cards but it also monitors the part ordering processes. Part's metadata is used to determine the batch size, storage location, where the order is placed etc. No special tools are required: the bar codes can be read with a smartphone or a tablet.

The order can go either to ERP or directly to Tulus® Power Processing order management. The orders come in digitally, thus human errors are minimized since there is no longer a need to update paper documents. Tulus® e-Kanban also monitors the process and tells the user if the parts are already ordered and in which work step the parts are currently going.



### Tulus® MUPS

To make the operator's work easier, a new Android-based Tulus® MUPS application has been developed. It provides instructions for tool set-ups and other operation tasks.



### Sheet positioning

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.

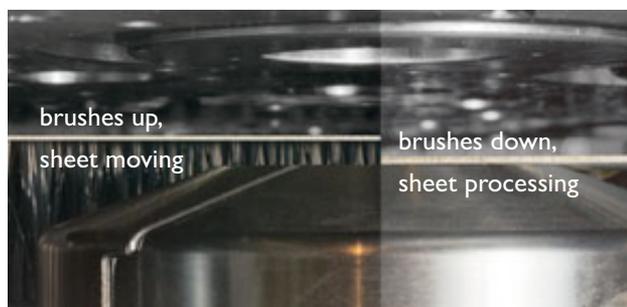
### Automatic clamp setting and moving

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.

## Scratch free

Machine tables have been redesigned and equipped with more dense brushes, which together with the more solid table frame enable handling of sheets up to 250 kg in weight.

A new option is having moving brushes also in front and inside of the turret and in front of the shear, which prevents effectively the scratching of sensitive materials. The movement is activated by the program when needed.





# Modular automation

The flexible and modular Prima Power range of automation ensures the optimal way of material handling for extensive unmanned operation and thus lower production cost. Shear Genius® is compatible with the whole range of optional material handling equipment for fast raw material feeding, sorting and stacking. Due to the wide range and modularity, the optimum solution can be found for every application and all system sizes.

Shear Genius® solutions can automate

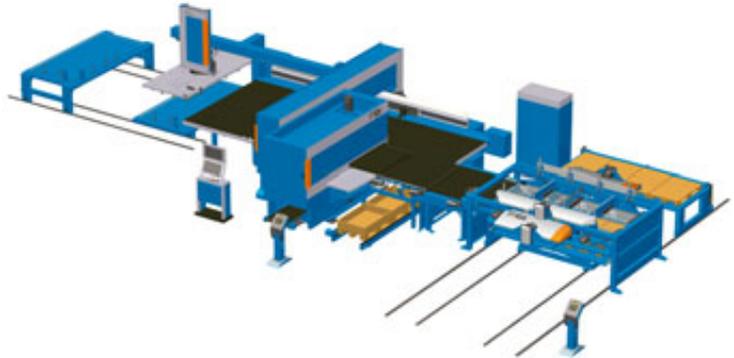
- Fast raw material availability
- Raw material change in hidden time during machine operation
- Sorting and stacking of components
- Exit of components without interrupting machine operation
- Integration to next process steps such as bending
- Storage connections

## Automated part handling

### Shear Genius with stacking system STS

Stacking solution with fast stacking address change based on guided free fall part stacking.

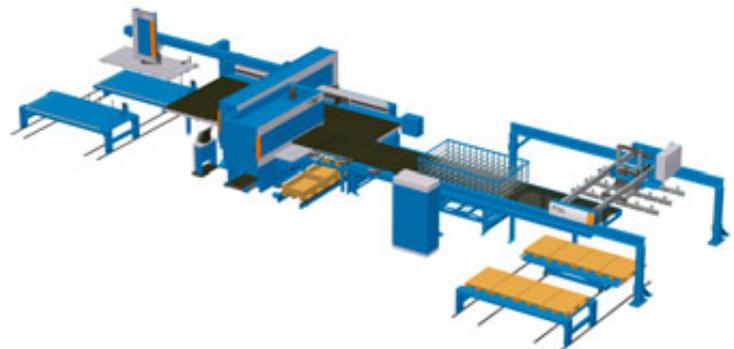
- Guided free fall stacking
- Fast stacking and address change
- Up to two stacking wagons
- Multiple stacking addresses



### Shear Genius with picking and stacking robot PSR

Stacking solution with high flexibility based on accurate and gentle part stacking by gripper.

- Accurate and gentle stacking by gripper
- Scratch free
- Large stacking area: up to four wagons and two stacking tables at the same time
- Connection to panel bender

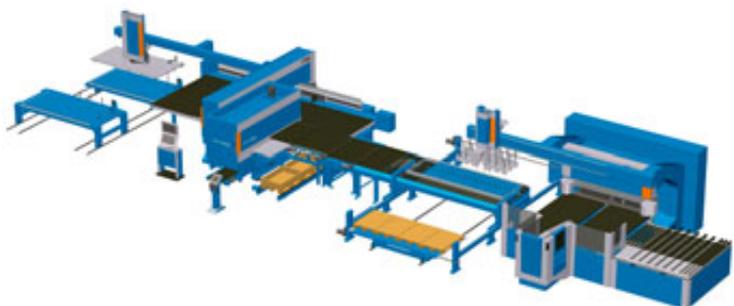


## Shear Genius as a part of automated manufacturing line

### PSBB with PCD

Compact PSBB manufacturing line for fully automatic manufacturing process dedicated for panel production and door manufacturing.

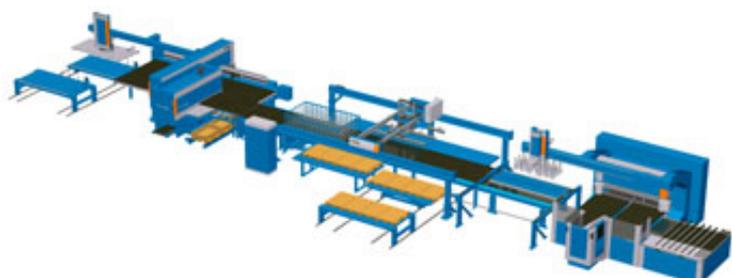
- Part buffering to conveyors
- Part stacking
- External part feed to bending
- Part turning before bending



### PSBB with PSR

PSBB manufacturing line with high flexibility and large capacity of buffering and stacking components between punching/shearing and bending process.

- Large stacking capacity
- External feed of bent parts
- Part turning before bending
- Balancing (buffering) between punching/shearing and bending process
- Re-organization of part flow before bending

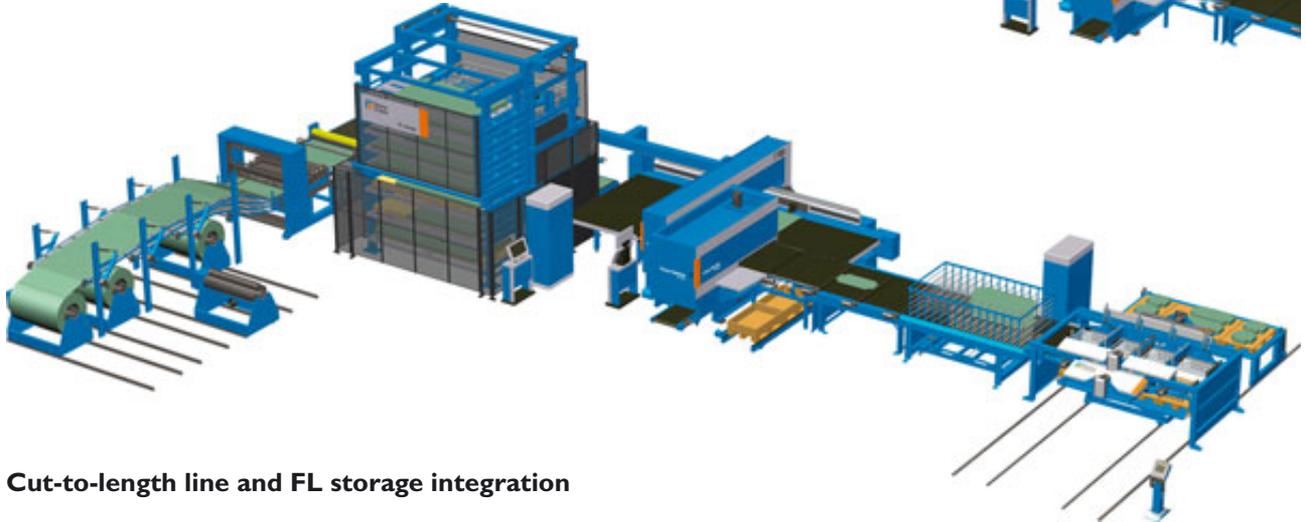
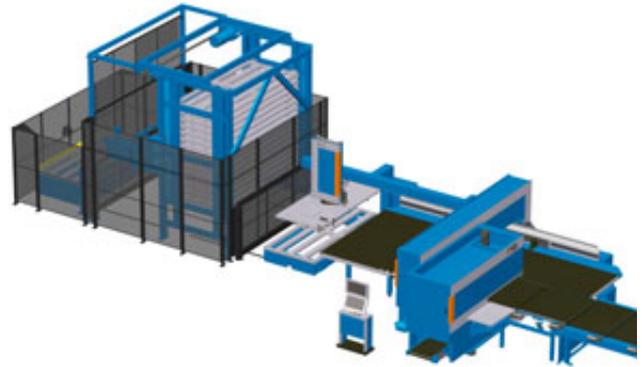


## Automated manufacturing lines with storage solutions

### Combo Tower with 90 degree connection by using rotating gripper of loading device LD

Combo Tower is a compact material storage enabling the availability of different materials whenever needed automatically and without delays.

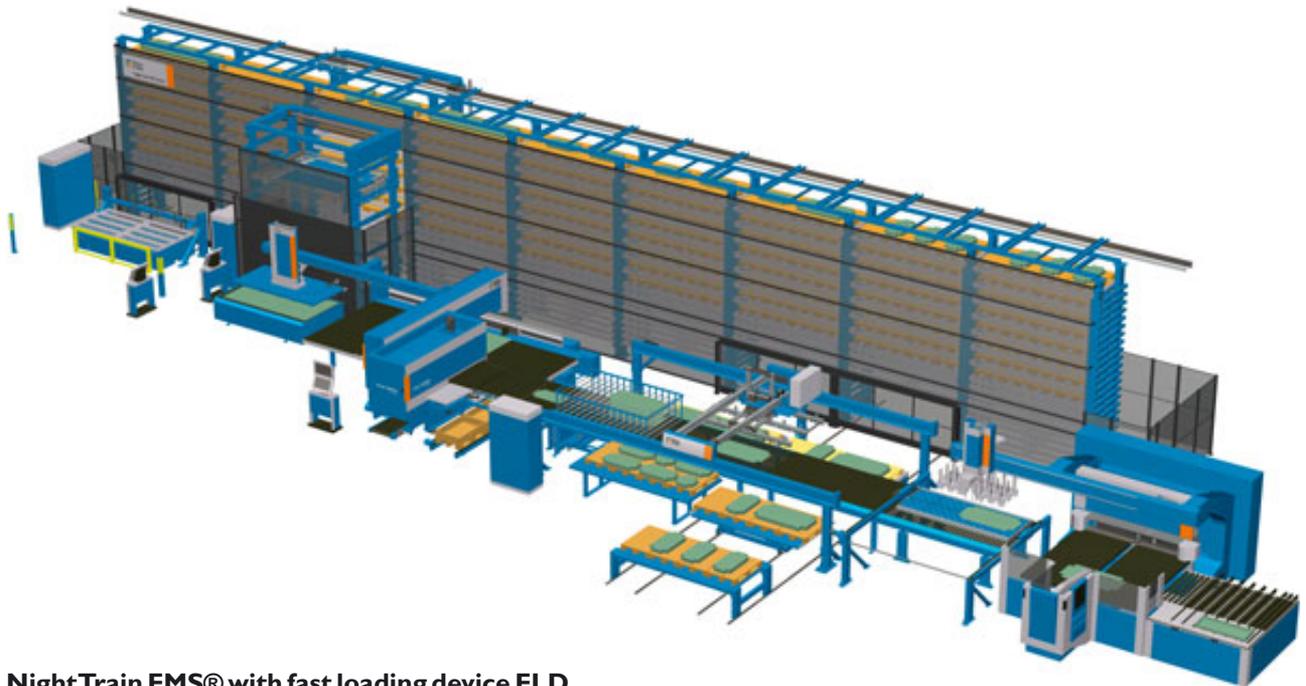
The Rotating gripper option of loading device LD enables more flexible placement of manufacturing lines to customer premises as required by production logistics.



### Cut-to-length line and FL storage integration

FL storage is a process efficient solution when fast material changes are required due to production requirements. FL storage can deliver material to the machine cell in hidden time.

With cut-to-length line integration remarkable savings in material usage can be achieved and machine utilization can be increased. Cut-to-length line can be used to feed material to the FL storage.



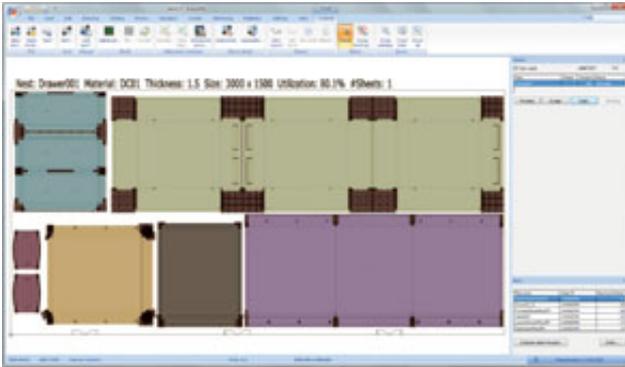
### NightTrain FMS® with fast loading device FLD

Night Train FMS® is a comprehensive solution for a sheet metal working factory designed for automated operation, where the main equipment is an automatic logistic centre. It can serve as material storage and as buffer storage for punched/sheared and laser-cut parts. Automatic storage enables long unmanned production times.

When fast material changes are required to machine cells, Fast loading device FLD can be placed between Night Train FMS and machine cell. FLD picks up material directly from the cassettes on shelving unit and brings it to machine cell in hidden time without delays.

# Proprietary 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 e3** programming system is a user friendly, integrated and automated tool for managing Prima Power equipment in the most efficient manner. As a scalable application it can be used as a single part drafting and tooling program or as a fully automatic machine tool programming system. Either way the results are the same – optimized automatic NC-code creation.

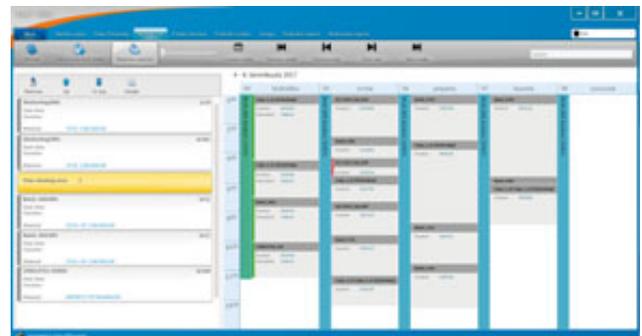
**Tulus®** is management software of fabrication machines and systems. Tulus® controls machines with all essential information on machine related tasks within the same window. On arrival of new orders, Task management informs the operator of eventual needs for changes in materials, tooling, etc. Tool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

## NC Express e<sup>3</sup>

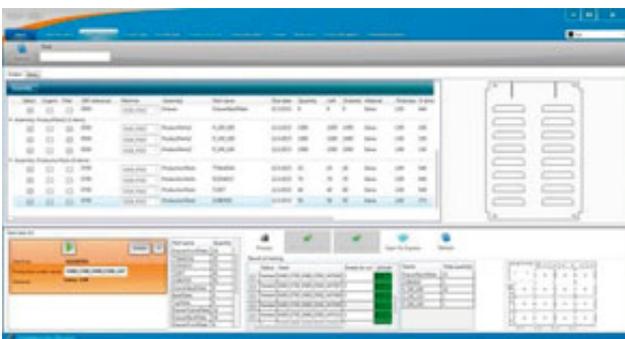
**NC Express e3**  
punch-shear nesting layout.



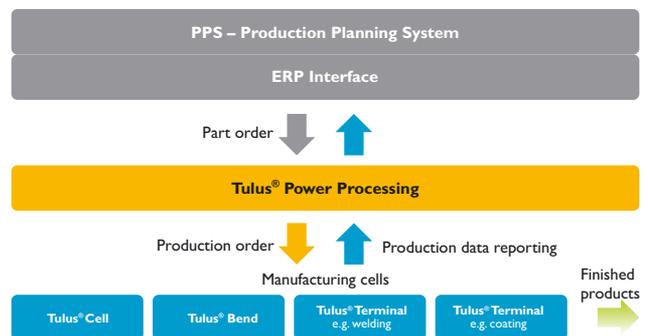
**Tulus® GUI**  
Easy task list and tooling management



**Tulus® Office**  
Production follow-up



**Tulus® Power Processing**  
manufacturing execution system (MES)



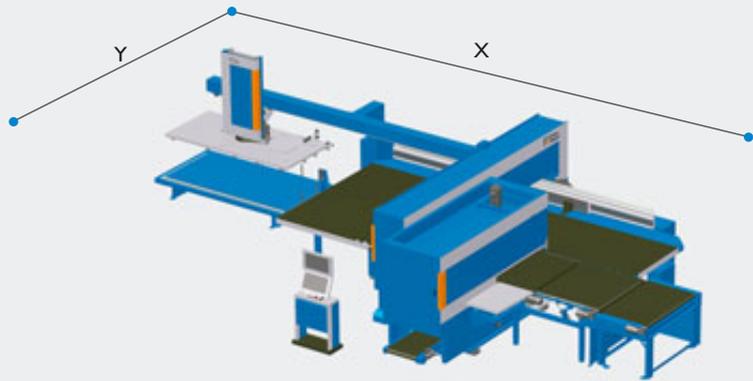
With Tulus® Power Processing you can control the whole production process from order management, programming and machine time scheduling all the way to the finished product and reporting.

# Technical specifications

Approximate main dimensions  
without safety systems

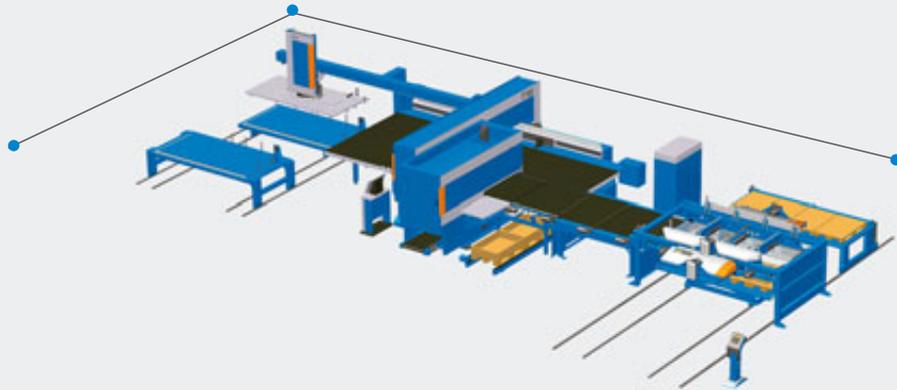
## Shear Genius

SG 1530: Y 6.6 m, X 12.6 m  
SG 1540: Y 6.6 m, X 15.9 m



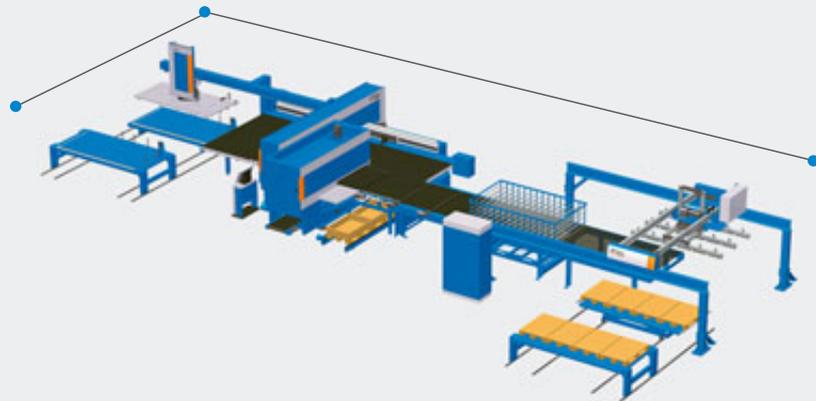
## Shear Genius with STS

SG 1530: Y 7.8 m, X 18.9 m  
SG 1540: Y 7.8 m, X 22.8 m



## Shear Genius with PSR

SG 1530: Y 9.2 m, X 14.6 m  
SG 1540: Y 9.2 m, X 18.5 m



Model	Max. sheet size	X movement	Table height
<b>SG1530</b>	3,000 mm x 1,500 mm	3,000 mm	1,100 mm
<b>SG1540</b>	4,300 mm x 1,500 mm; with repositioning	3,000 mm	1,100 mm

Performance level	<b>SG Pure</b>	<b>SG Dynamic</b>
Punching force, kN	230	300
Punching speed, 1/min	700	1.000
Axis positioning speed, m/min	127	150
Index rotation speed, r/min	180	250
Max. no. of tools / index tools	16 hole turret 280/80, 20 hole turret 384/128	
Max. sheet thickness, punch, mm	8	
Max. sheet thickness, shear, mm	Al 5, Mild steel 4, Stainless steel 3	
Max. sheet weight, kg	250	
Average power consumption, kW	5	

[primapower.com](http://primapower.com)

