

**KEY**

**KEY  
COMPONENTS  
SUPPLIER**

**4ManPro<sup>©</sup>**  
ELEMENTS FOR  
MANUFACTURING PROCESSES



**3 About Us**

**5 Lean Production**

**7 Smart Design**

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## **Protective Cover System**

**9 Bellows**

**11 Bellows with Lamella**

**13 Telescopic Covers**

---



## **Chip Conveying and Filtering System**

**17 Chip Conveyors**

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## **Machine Guards System**

**21 Machine Enclosure**

**23 Painting**



# Keyarrow

## Worldwide Network

Integrity, Innovation, and Teamwork are our management philosophy; Concise, Quick and Exact as principle. We provide 5-in-1 product integration services, and In-House factory—a zero-distance service all over Taiwan & China. From Taiwan to Asia, and to the world, Keyarrow strives in manufacturing key components for machine tools, determined to be the “Arrow of Key value” and a world leading brand for machine tools development. The most reliable and dependable loyal partner.

## General information

Establishment : 1983

Taiwan : Taichung

Kaohsiung

Jingke

China : Jiaxing, Zhejiang

Songjiang, Shanghai

Yuxi, Yunnan

Global Market : More than 30 countries.

Employees : 760 people

## About Us

Started as Machine Guards System manufacturer, Keyarrow turned core competencies into Steel Telescopic Covers for machine tools. The brand [Keyarrow] born afterwards in 1993.

For years Keyarrow had been dedicated in new products and technologies (such as CSPM) development. Now we have more than 117 patents over 18 countries, and authorized NABELL Japan for our patents, techniques, and production system in 2004.

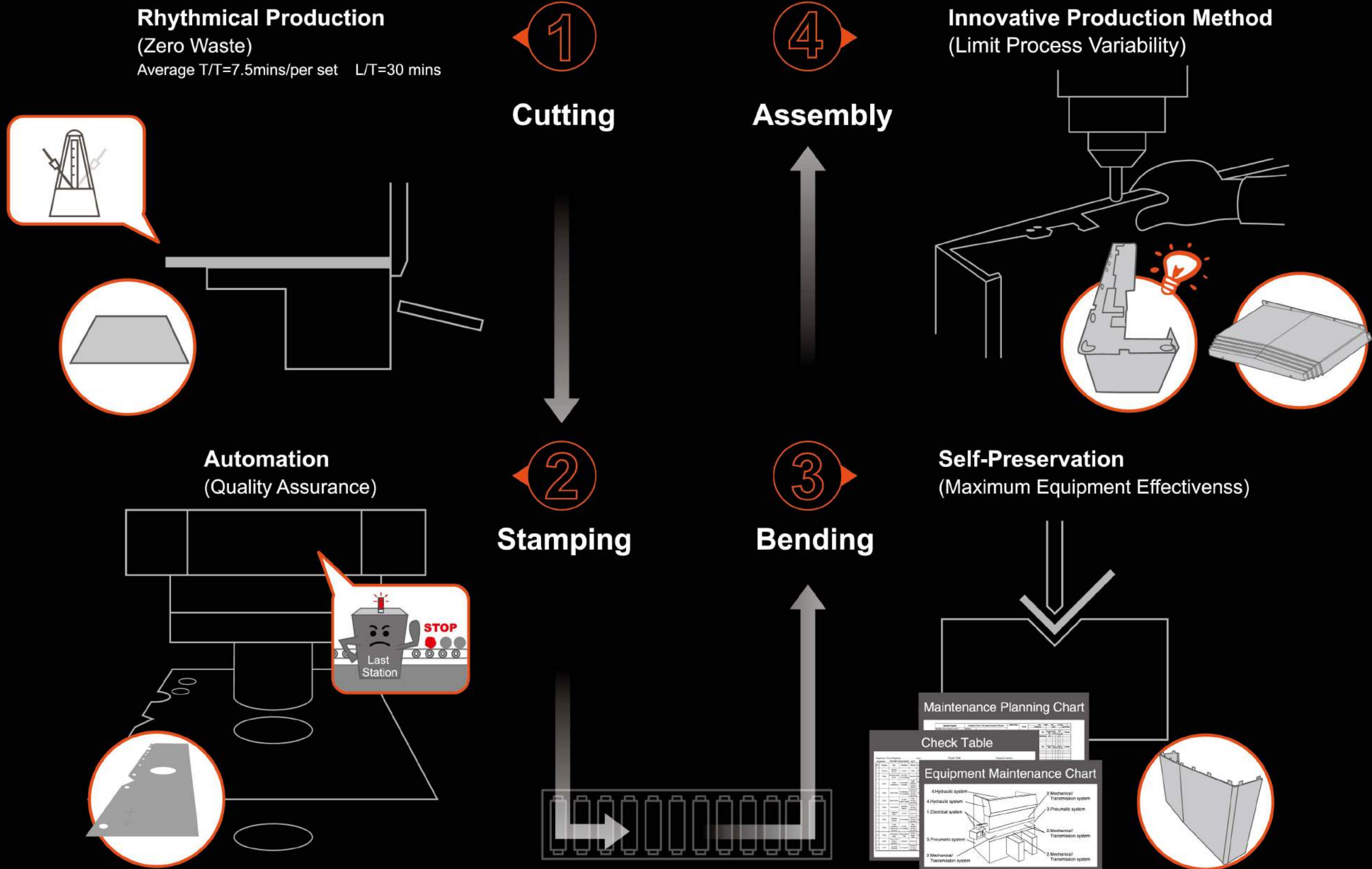
March 2007, Keyarrow implemented KAPS (Keyarrow Production System) based on “5S+TPM”, and TPS spirit (Toyota Production System). Aim for “**Deliver high quality product to customer’s production line on time.**”, keep improving ourselves towards zero defects and zero customer inventories.

By continuously receiving TPM Excellence Award, Category A in 2013, and Award for Excellence in Consistent TPM Commitment in 2015, the first factory among the world who provides “complete machine protection solution”, with product range covering Bellows, Telescopic Covers, Chip Conveyors and Machine Enclosure.

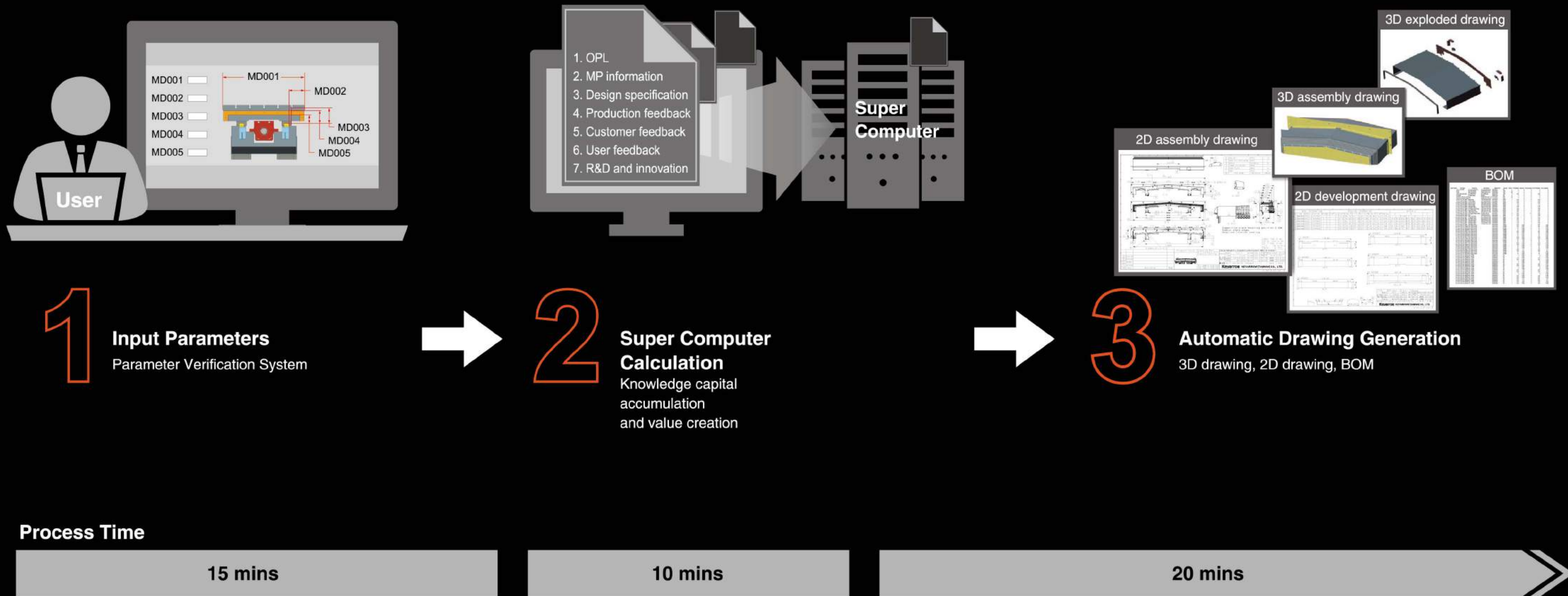
Providing complete integration services; from development to finished products, and beyond. Keyarrow, not only the strongest support you can always count on, and more, the best partner who can greatly increase overall competitiveness for machine manufacturers.

Seize the world,  
Future in hand.





# Smart Design





## Material / Technology / Features









### Eco-Friendly Material :

- Eco-Friendly Material : RoHS certified stiffener; RoHS/Reach certified textile.
- Thermosetting Coating : Engineered textile coated with thermosetting PU, excellent resistance for hot shavings contact.

### Reliable Technologies :

- Light Structure : Low inertia, suitable for high speed machines.
- Pleating : Flexible pleat with excellent characteristics, minimal space requirements.
- Welding Technique : Auto thermic-welded technique, stable welding, high strength.
- Professional Equipment : Self developed production equipment; self-made fixtures & gauges.

## Specifications

Configuration	Specification	Adaption	Features
 Flat Top		VMC EDM Laser Processing Machine	<ul style="list-style-type: none"> <li>■ For medium, small machines, minimal space requirements.</li> <li>■ Simple structure, most economical and practical choice.</li> </ul>
 Mountain	Triple Side Protection Horizontal/-Vertical Moving Speed:48m/min ↓	VMC	<ul style="list-style-type: none"> <li>■ For large, medium, small machines.</li> <li>■ Bilateral chip removal / higher usage strength requirement.</li> </ul>
 Multi angle		VMC Horizontal Grinding Machine	<ul style="list-style-type: none"> <li>■ For large, medium machines.</li> <li>■ Better protective space adjustability.</li> </ul>
 Slanting		VMC	<ul style="list-style-type: none"> <li>■ For medium, small machines.</li> <li>■ Unilateral chip removal.</li> </ul>
 L-out	Double Side Protection Horizontal Moving Speed:48m/min ↓	EDM Vertical Lathe Double Column Machining Center	<ul style="list-style-type: none"> <li>■ For large, medium, small machines.</li> <li>■ Most economical choice for double side protection.</li> </ul>
 L-in		Bridge Type Machining Center	<ul style="list-style-type: none"> <li>■ For large, small machines.</li> <li>■ Inner concave double side protection.</li> </ul>
 Square	Quadruple Side Protection Horizontal/Vertical Moving Speed:60m/min ↓	Laser Processing Machine	<ul style="list-style-type: none"> <li>■ Laser beam protection Four sides' protection.</li> <li>■ Light weight sliding design, meet high speed requirement.</li> </ul>
 Patio	Triple Side Protection Horizontal Moving Speed:48m/min ↓	Bridge Type Machining Center	<ul style="list-style-type: none"> <li>■ For medium, small machines.</li> <li>■ Protection of the patio/roof.</li> </ul>

- Restriction straps, wheels and guides are optional based on speed and weight requirements.
- With synchronize mechanism, speed can reach to 200M/min, 3G



## Material / Technology / Features

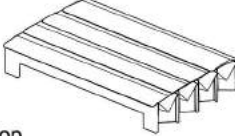
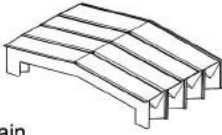
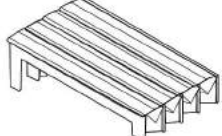
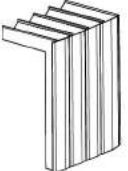
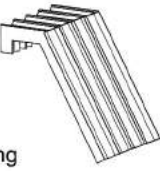
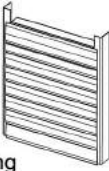
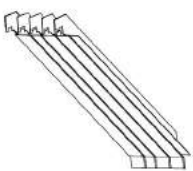

### Ultralight Material Technology :

- Certified : RoHS certified stiffener, and RoHS/Reach certified textile.
- Laminate Protection : Light, thin, high sealing effect, provides best protection.

### Special Sheet Lamination Method :

- Ultralight Lamella : Low moving resistance, tough stainless steel lamellas, excellent resistance for hot shavings.
- Leveling Technology : High precision leveling technology, flexible and durable material.
- Patented Spring Clip : Patented inserting spring clip design, allows single lamella replacement with simple tools.
- Patented Synchronize Mechanism : Patented CSPM design, allows cover moves synchronously & parallel.

## Specifications

Configuration	Specification	Adaption	Features
 Flat top		VMC	<ul style="list-style-type: none"> <li>■ For medium, small machines, smaller space required.</li> <li>■ Simple structure, most economical and practical choice.</li> </ul>
 Mountain	Triple Side Protection. Horizontal/Vertical Moving Speed: 48m/min ↓	VMC	<ul style="list-style-type: none"> <li>■ For large, medium, small machines.</li> <li>■ Bilateral chip removal.</li> </ul>
 Slanting		VMC Turning Machine	<ul style="list-style-type: none"> <li>■ For medium, small machines.</li> <li>■ Unilateral chip removal.</li> </ul>
 L-out		VMC HMC Vertical Lathe	<ul style="list-style-type: none"> <li>■ For large, medium, small machines.</li> <li>■ Heavy duty front protection.</li> <li>■ Light duty up/down protection.</li> </ul>
 LS-Slanting	Double Side Protection. Horizontal Moving Speed:48m/min ↓	Double Column Machining Center	<ul style="list-style-type: none"> <li>■ For large, medium, small machines.</li> <li>■ Heavy duty front protection.</li> <li>■ Light duty up/down protection.</li> </ul>
 Frame Guiding	Single Side Protection Vertical Moving Speed:48m/min ↓	VMC HMC Horizontal Boring Machine	<ul style="list-style-type: none"> <li>■ For large, medium, small machines.</li> <li>■ Vertical long-stroke moving.</li> </ul>
 L-in	Double side protection. Horizontal Moving Speed:60m/min ↓	Bridge Type Machining Center	<ul style="list-style-type: none"> <li>■ For medium, small machines.</li> <li>■ Double sides roof protection.</li> </ul>
 Wall	Single side protection Horizontal Moving Speed:48m/min ↓	Sliding Column Machining Center	<ul style="list-style-type: none"> <li>■ For large, medium machines.</li> <li>■ Vertical protection.</li> </ul>

- Restriction straps, wheels and guides are optional based on speed and weight requirements.
- With synchronize mechanism, speed can reach to 200M/min, 3G



## Material / Technology / Features

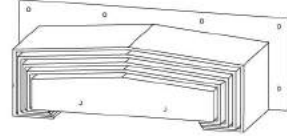


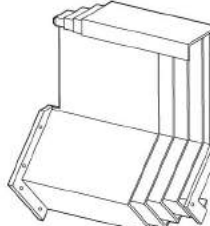
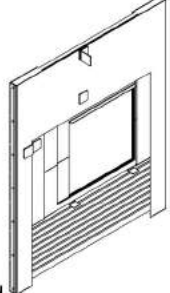
### Integrated Planning :

- 3D module design, shortens design lead time.
- Dynamic simulation software, ensures design optimization.
- Multi-products integrated planning, fast delivery.

### Core Technology :

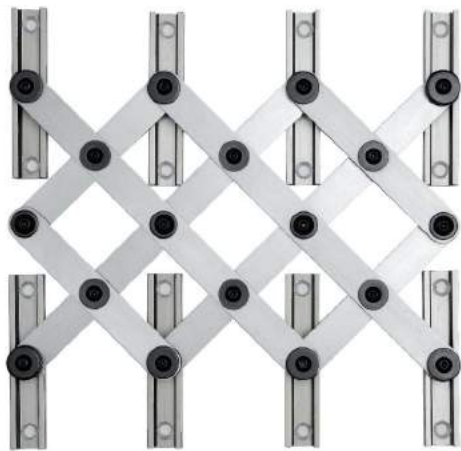
- Pin orientation, high precision, zero deviation.
- Various wiper design with selective configuration and material, 100% oil and chip removal.
- Full range developing and manufacturing ability, provide full integration solutions.

## Specifications

Configuration	Specification	Adaption	Features
 Standard	Triple Side Protection. Horizontal/Vertical Moving Speed: 60m/min ↓	VMC X/Y/Z Axis HMC Z Axis	<ul style="list-style-type: none"> <li>■ Speed up to 200M/min, 3G could be reached by applying patented Synchronize Mechanism.</li> </ul>
 Large Size	Triple Side Protection. Horizontal Moving Speed: 24m/min ↓	Double Column Machining Center X Axis	<ul style="list-style-type: none"> <li>■ Patented aqueduct design, best water resistance solution.</li> </ul>
 Frame	Front Protection. X/Horizontal Moving Y/Vertical Moving Speed: 120m/min ↓	HMC X/Y Axis	<ul style="list-style-type: none"> <li>■ Integrated design, easy maintenance.</li> </ul>
 N Type	Front Protection. Horizontal Moving Speed: 48m/min ↓	Horizontal Lathe/ Multi-Tasking Lathe Z Axis HMC Z Axis	<ul style="list-style-type: none"> <li>■ Inserting device structure, great wiping effect.</li> </ul>
 Integrated	Front Protection. Horizontal/Vertical Moving Speed: 36m/min ↓	Multi-Tasking Turning Machine X/Y Axis	<ul style="list-style-type: none"> <li>■ Minimum 35/ motion travel 220mm. High minimum &amp; travel ratio.</li> <li>■ Total thickness 35mm, requires smaller assembly space.</li> </ul>

## More than 117 patents over 18 countries.

Patents over 18 countries - ROC, Japan, Germany, England, France, Italy, Switzerland, Austria, Turkey, Poland, Czech, Spain, America, China, Korea, Russia, India.

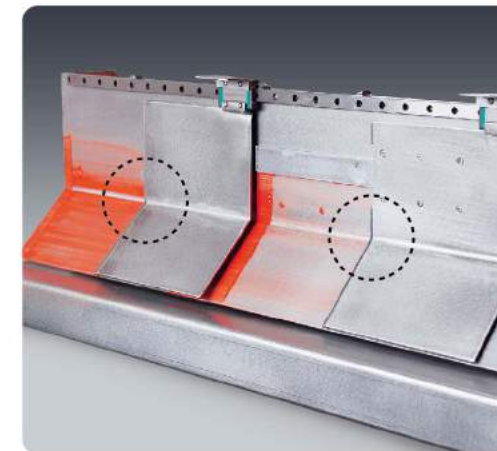


### CSPM

Material / Technology / Features

#### Stable & Parallel Moving :

- Cover sheets can move synchronously, avoid knocking noises from moving sheet by sheet.
- Under bad width/length ratio, cover can still function well.
- Speed can reach 200M/min, acceleration 3G.



### Inserting Device

Material / Technology / Features

#### Description :

- Smoothly running in max stroke.
- Improving support of N type cover.

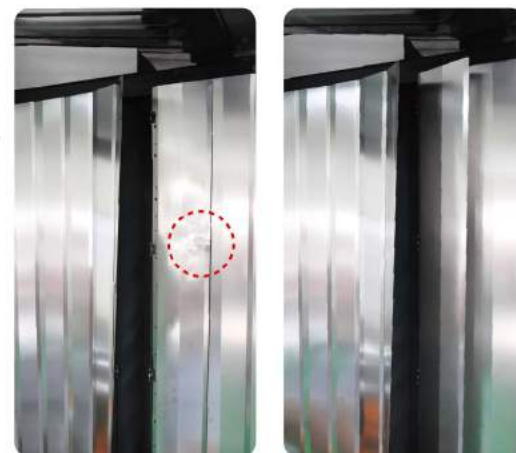


## Replaceable Lamella

Material / Technology / Features

#### Description :

- Single sheet replaceable.
- Without professional technician & tool, everyone could do the replacement.
- Ingenious design and reliable replacement repair covers as new one.



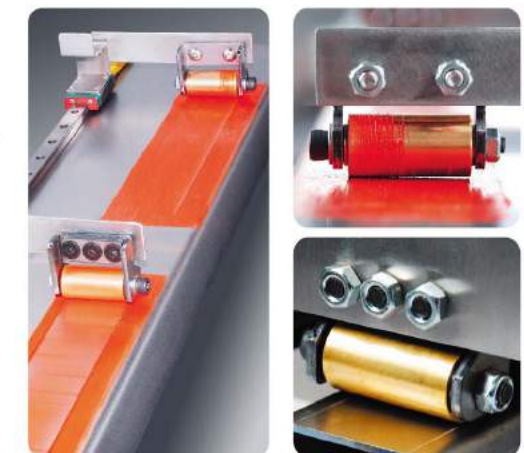
Single sheet damage    Single sheet replaceable

## Swing Roller

Material / Technology / Features

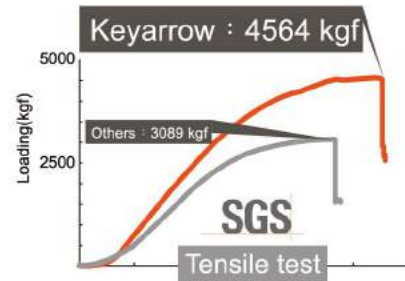
#### Description :

- Equal contact on the guide way path.
- Instead of point contact which leads to roller or guide way damage easily.
- Internal bearing design helps rolling efficiently and reduce motor load.



## Standard Type

Material / Technology / Features

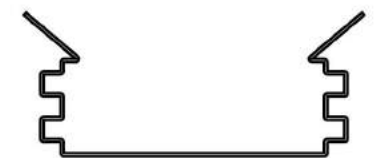
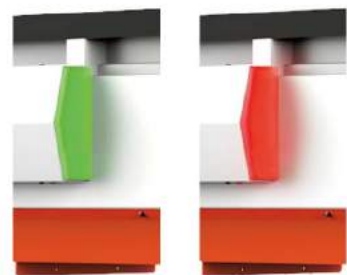


### 1 Weld-Free Belt (Patent design)

- Eco-friendly.

### 2 Maximum Belt Strength

- Tensile strength to 4564kg, 1.47 times higher than welded one.



### 3 Observation Window (Patent design)

- Safe and easy real-time status inspection.

### 4 Real-time Display

- LED light machine condition monitoring.

### 5 Hidden Cables (Patent design)

- Hidden cable, safe and elegant.

### 6 Foldable Support Leg

- Create more space, easy to clean.

### 7 Aesthetic Wheel

- Aesthetic appeal goes with any machine center.

### 8 One-Piece Weld-Free Body

- Enhance body structure.
- Lower 52% of welding.

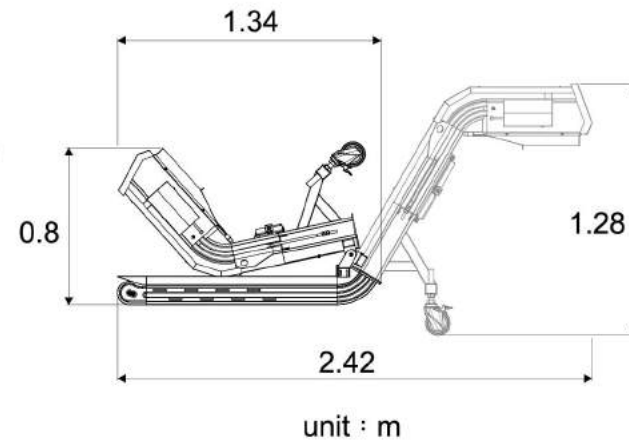


## Folding Version (Patent design)

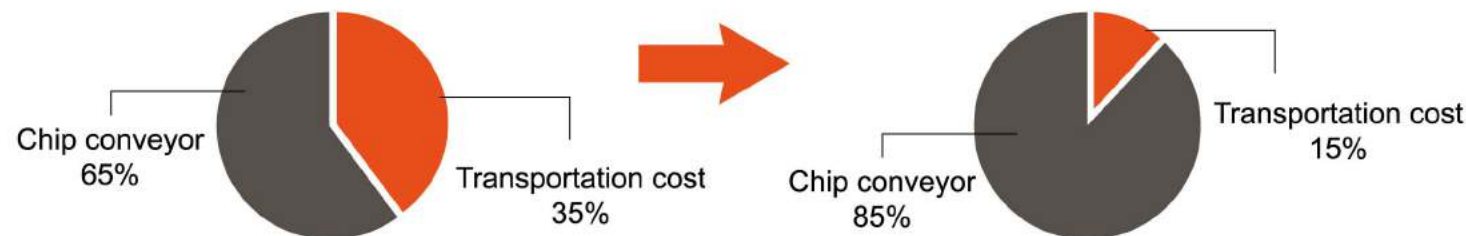
### Material / Technology / Features

#### Folding Mechanism :

- Motor and belt removal are not required during folding process, can be operated by any mechanist.
- Innovative folding design, resume machine operation in 5 minutes.
- Unfold : 2.42m x 1.28m=3.1m<sup>2</sup>
- Fold : 1.34m x 0.8m=1.1m<sup>2</sup>
- For individual machine : volume reduction of 66%.
- Volume reduction, save 50% transportation cost.
- Decrease cost structure from 35% to 15%.



### Cost structure



## Specifications

Configuration	General info /Item no.	Adaption	Features
Standard Type	Capacity (0.44~1.78m <sup>3</sup> /hr) Max Length (10m~30m)	Long, Curly, Fluffy Chips Conveying	<ul style="list-style-type: none"> <li>Patented appearance, functional and aesthetic.</li> <li>Foldable support leg, hidden cables and observation window.</li> </ul>
Folding Version	Angle of Climbing (60°)	Chip Sizes: 70~500mm	<ul style="list-style-type: none"> <li>Patented folding mechanism, easy &amp; quick fold.</li> <li>Volume reduction.</li> </ul>
Scraper		Short, Thin, Powder Chips Conveying Chip Sizes: ↓ 70mm	<ul style="list-style-type: none"> <li>High strength scrapers, stable &amp; quiet operation, smooth chip removal.</li> </ul>
Filter Frame		General Filtering Filter Fineness: 500μm	<ul style="list-style-type: none"> <li>Changeable filtering frame, easy to replace and maintain.</li> <li>General filtering, 500μm filter fineness.</li> </ul>
Magnetism-Scraper	Capacity (0.03~1.2m <sup>3</sup> /hr) Max Length (10m~30m)	Short, Thin Magnetic Chips Conveying Chip Sizes: 10~70mm	<ul style="list-style-type: none"> <li>Magnetic attract chips accumulate to 100mm high. Effectively remove chips from cutting fluid.</li> </ul>
Filter Drum	Angle of Climbing (45°、60°、70°)	Suitable for Conveying Short, Thin and Powder Chips (Chip Size Under 70mm)	<ul style="list-style-type: none"> <li>Able to filter above 100μm of chips.</li> <li>Automatic back wash system maintains filtering efficiency.</li> </ul>
Integrated		Suitable for Conveying All Kinds of Chips (Chip Size Under 500mm)	<ul style="list-style-type: none"> <li>Convey different kinds of mixed chips.</li> <li>Medium filtering, with 100μm filter fineness. A must have helper for CTS (Coolant Through Spindle) machine.</li> <li>Automatic back wash system maintains filtering efficiency.</li> </ul>
Screw		Suitable for Conveying Short, Thin and Powder Chips (Chip Size Under 70mm) Suitable for Limited Space.	<ul style="list-style-type: none"> <li>Slim design for limited space. Strong structure, stable &amp; quiet operation.</li> <li>Bearing connection, reduce motor output loading.</li> </ul>
Crushing Conveyor	KAC-200SA · SS KAC-300SA · SS KAC-400SA · SS	Aluminum Copper Chips	<ul style="list-style-type: none"> <li>Crush chips, prevent fluffy chips stuck and damage conveyor.</li> </ul>
Compactor	KAP-140/100	Aluminum (Density < 2.7g/cm <sup>3</sup> ) Copper Chips (Density < 8.9g/cm <sup>3</sup> )	<ul style="list-style-type: none"> <li>Minimal space requirements.</li> </ul>
	KAP-140/70	Steel, Stainless Steel Chips (Density < 7.8g/cm <sup>3</sup> )	<ul style="list-style-type: none"> <li>Chips volume ↓ 87%</li> </ul>



Material / Technology / Features

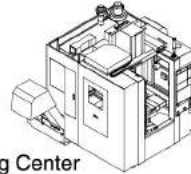
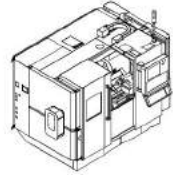


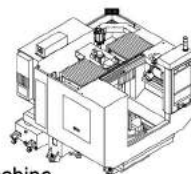
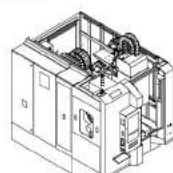

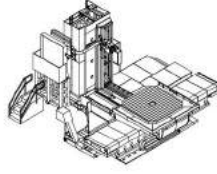
Aesthetic Design :

- Integrate customers' overall CIS to present enterprise image.
- Complex material and universal design shorten 20% assembly time.
- Ergonomic design; 100% safety protection.
- Chips evacuate and labyrinth design, 100% water/chip-proof.

Exquisite Techniques :

- Round corner bending technique creates unique appearance.
- Rigid structure, 100% shock resistant.
- Captive design, compliance with CE norms of EU regulations.
- Lightweight design in collaboration with convex hull, strengthens body structure, decrease costs.

Specifications

Configuration	Option Modular	Selective Design
Vertical Machining Center 	Hermetic Guards	■ Selection for different controller insertion.
Turning Machine 	Spindle (Head) Guards	■ Tool Magazine set up size.
Horizontal Machining Center 	Tool Magazine Guards	■ Door opening handles.
Double Column Machining Center 	Controller Box	■ Full range of controllers & wiring.
Vertical Lathe Machine 	Front Automatic Door	■ Sliding Door selection. (Single/Double/Triple/Synchronize)
Bridge Type Machining Center 	Side Door/Window	■ Door & Window opening selection. (Lift/Insert/Pull)
Multi-Tasking Machine 	Working Table Guards	■ Chip & Oil resistance protections.
Boring Machine 	Electronic Box	■ Full range of controllers & wiring.
	Neat Back Guards	■ Deco design & parts disassemble selection.
	Oil/Water Tank	■ Chip & Oil evacuating selection.



▲ Mist Spraying Preprocess System

- Adopting automotive level PARKER agent; with excellent stability to form unified and delicate Zinc Phosphate coating/film in 3 minutes; enhance perfect adhesive quality.

Dust-Removal System before Coating ▶

- 100% Sheet metal surface quality guarantee after dust-removal.



◀ Cyclone, and Filtering Tube Coating System

- Portable coating spray booth meets Machine Tools requirements--small-volume & various colours. 5 minutes speedy colour change enhance coating efficiency.
- Non-chimney, non-powder leak indoor exhaust system meets environmental protection regulations.
- The coating spray booth adopts negative pressure, rapid displacement ventilation 16000m<sup>3</sup>/hour to ensure coating quality.
- Adopting antistatic spray gun from Switzerland ensure stable coating film quality.



◀ Baking System

- Every 30 minutes has one batch of baking finish in accordance with the takt time.
- 90 seconds auto delivery system; baking finishes leave furnace automatically within 90 seconds. Decrease 40% furnace temperature loss. It is a system of environmental protection, energy saving and carbon reducing.



◀ Inspection

- Inspect every details with eyes, hands, and the hearts, same standard as inspecting vehicles.
- Painting quality assurance-Cross-Cut Method, 2H/1Kg and above pencil hardness test, and chromatic aberration examination (compared with standard colour plates) guarantee the coating quality.

## Application

### The Expert of problem solving

Full range products integration, provide customers the most suitable protective solution.

### Stable and Reliable quality

Noise reduction, light-weight movement, achieve high precision request.

### Professional Design

KEYARROW, the chips solution.

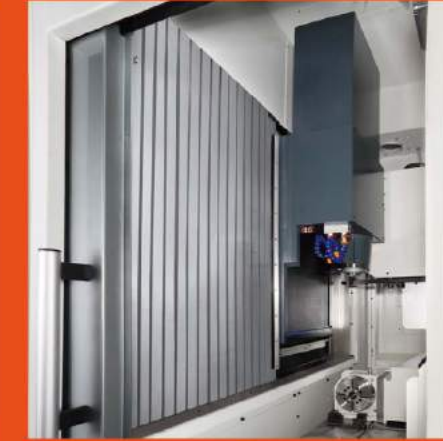
--From chips guarding to recycling.

KEYARROW holding the greatest enthusiasm and insistency; a creator of machine guards manufacturing and design.

Our goal is to integrated innovation techniques on your products, enhance market competitiveness and earn widely customers trust and preference.



5 Axis Machining Center  
Covers for all axis Patio Bellows



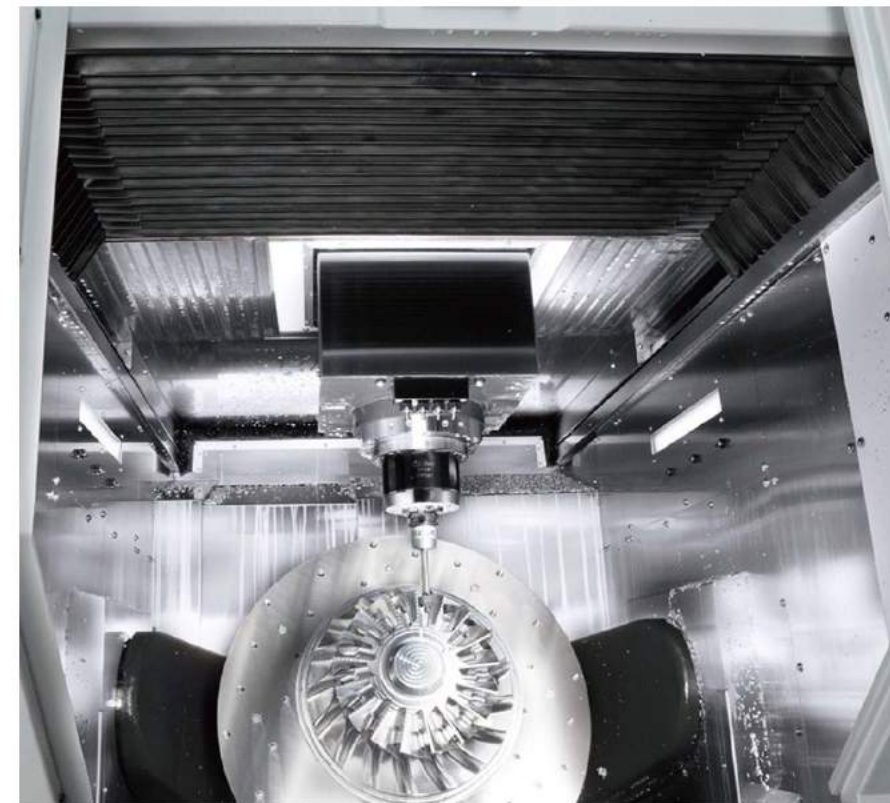
Sliding Column Machining Center  
X axis - Bellows with Lamella



Tapping Center  
Z axis - Bellows with Lamella



▲ 5 Axis Machining Center





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