SANGNIM
Manufacturing Solution Provider

CNC Heavy Duty Plano Miller

CNC Heavy Duty Plano Miller has a perfect combination of the up-to-date design, advanced high technology and fully skilled SANGNIM MSP's engineering. This machine consists of column, bed, table, crossrail, crossbeam, milling head, accessories and CNC control system.

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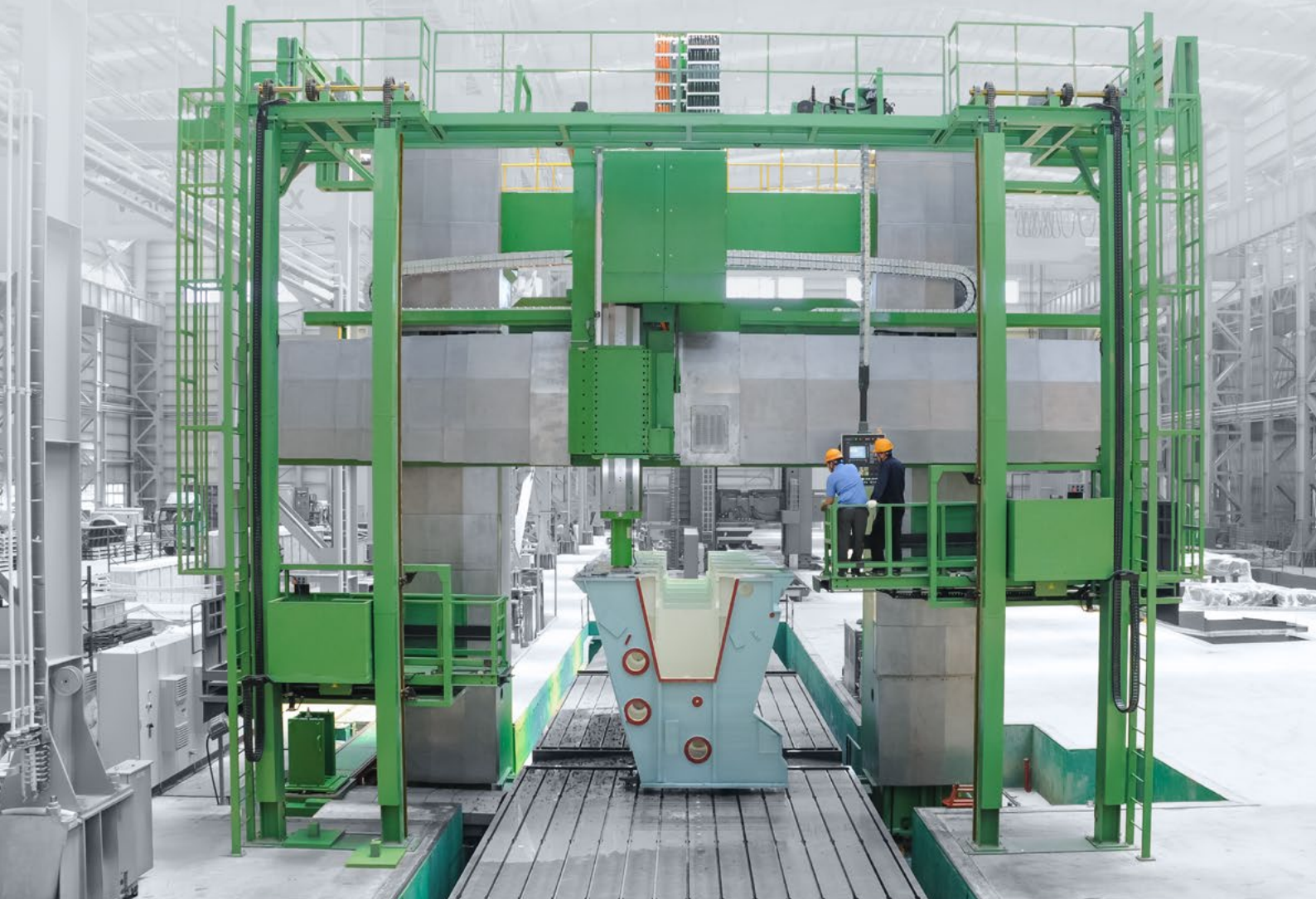
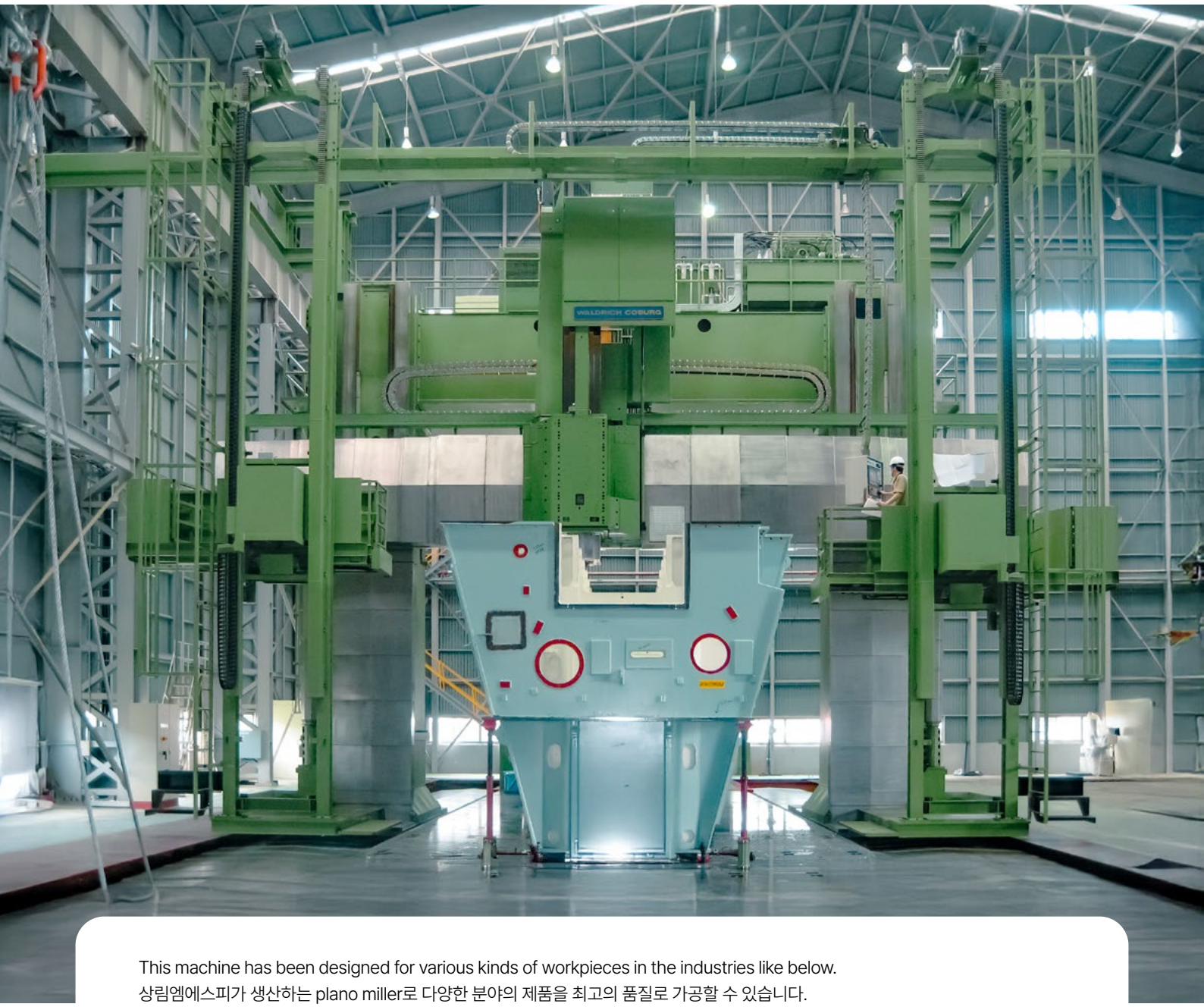




This machine has been designed for various kinds of workpieces in the industries like below.
상림엠에스피가 생산하는 plano miller로 다양한 분야의 제품을 최고의 품질로 가공할 수 있습니다.

Shipbuilding industry
조선 분야

- Marine diesel engine block parts
- Bed plate
- Frame box
- Cylinder frame

Generation industry
발전 분야

- SMR
- Stator frame
- HP / LP casing
- Inner / outer casing
- Comp. casing

Defense industry
방산 분야

- Tank body

Features

Cast Iron Structure

The main parts such as table, bed, crossrail, crossbeam, column, and milling head are made as cast iron to get rigid structure and high dimensional accuracy of the products. This stiff structure makes it possible to perform heavy duty machining.

주요 파트인 table, bed, crossrail, crossbeam, column, milling head는 주물로 제작되어 강성이 좋으며 제품의 고정밀도를 유지할 수 있고 강력 절삭에 알맞은 구조를 가지고 있습니다.

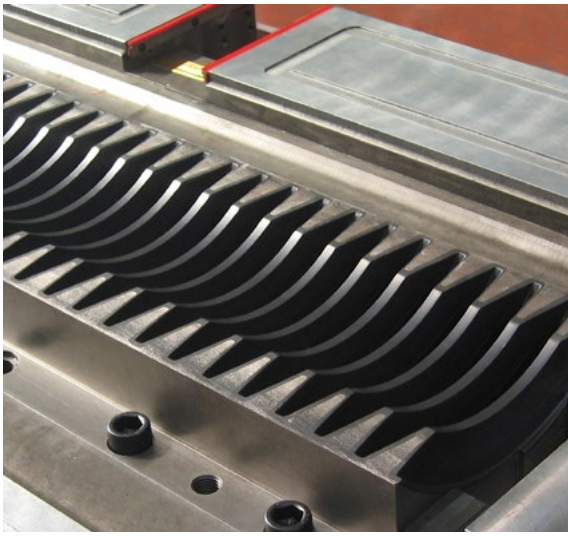
Hydrostatic Worm & Rack System

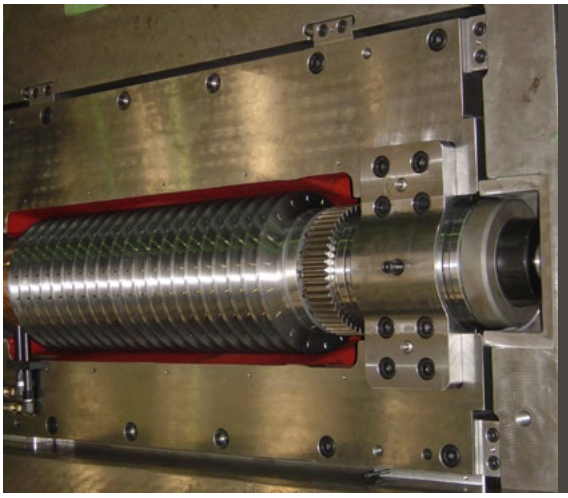
The hydrostatic worm & rack system is used for longitudinal adjustment of the table on the bed(X-axis). A stable film of oil is built up between the flanks of the worm and the rack, over which the feed power is transmitted friction-free the bed slide to the bed. Pressure monitors and gauges are built into each circuit. A lack of pressure due to a defect in the oil supply would lead to a fault message and the operation would be stopped.

In general, heavy duty cutting and high speed revolution without frictional resistance and backlash cannot be achieved easily, but hydrostatic worm & worm rack type is an ideal method which can solve all these problems.

table의 움직임(X축)을 제어하기 위해 hydrostatic worm & rack system이 사용되고 있으며, bed에 설치된 worm rack을 타고 이동하며, worm과 rack 사이에는 얇은 유막층이 형성되어 마찰에 의한 마모가 거의 발생하지 않습니다. 압력을 확인할 수 있는 monitor와 gauge가 각 회로 별로 설치되어 있으며, oil 공급에 문제가 있어 압력이 충분하지 않을 경우 fault message를 출력하고 작동이 정지됩니다.

일반적으로 강력 절삭 및 고속 회전에서 마찰 저항과 backlash 없이 가공하기는 힘들지만, 이런 문제를 해결할 수 있는 대안은 hydrostatic worm & rack 방식입니다.





Synchronized Twin-Ballscrew

Crossrail

For the vertical moving of the crossrail, feed drive equipped with two ballscrews with high hardness and accuracy, two separate feed gear boxes and AC servo motors on each column. W1&W2-axis enable to keep level continuously and to be done complete synchronization for these changing locations of crossrail through location adjusting function of NC control system.

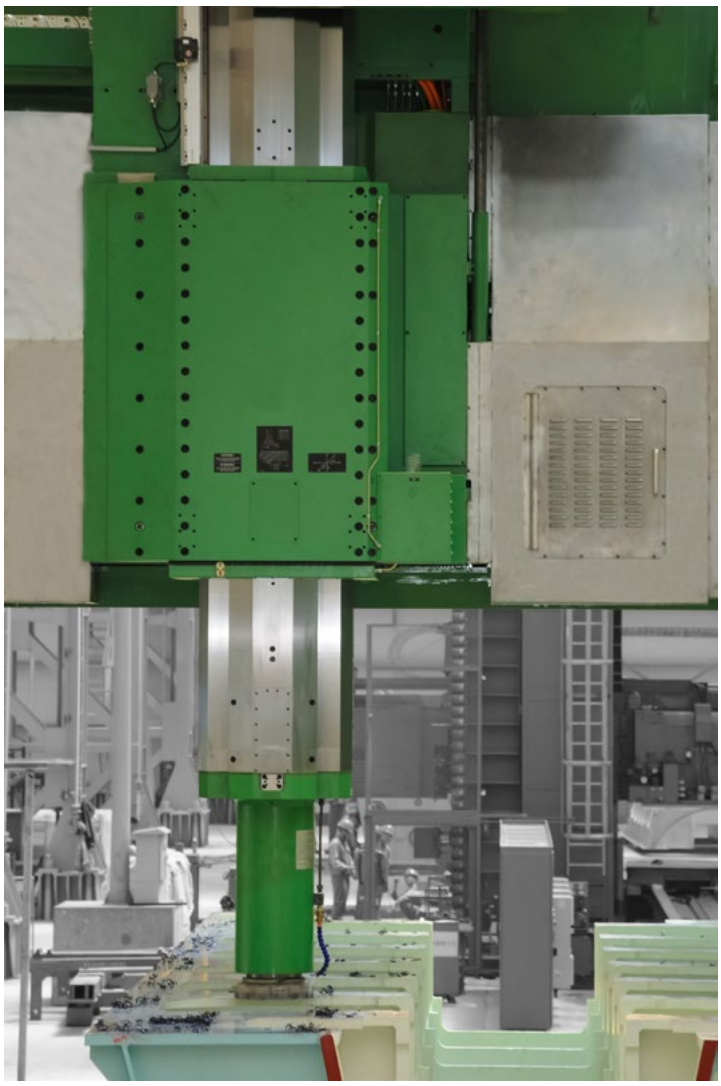
crossrail의 상하 이송은 양쪽 colum에 설치된 고정밀 고강성을 가진 ballscrew와 gear box, AC servo motor를 통해 이동합니다. W1축과 W2축은 항시 수평을 유지하고, crossrail의 위치가 변함에 따라 NC control system의 위치 보정 기능을 통해 완벽한 동기화를 구현합니다.

Crossrail moving and synchronization

Control System

Up-to-date control systems of Siemens and Fanuc are applicable.

Siemens사, Fanuc사의
최신 control system이 적용됩니다.



Features Milling Head

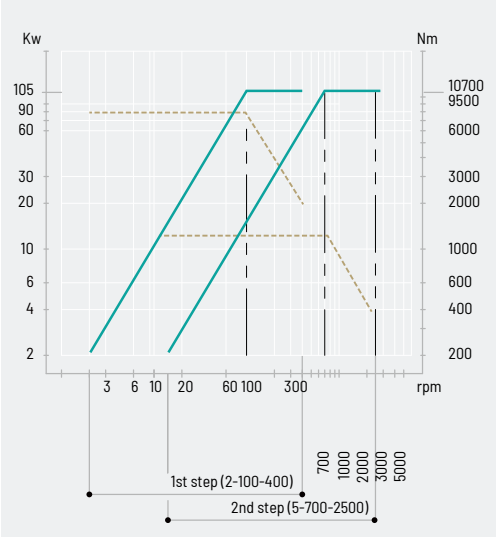
Our milling head has a special design for efficient heavy duty machining of the steel structures and parts, and guided by hydrostatic system inside of the ram housing. Ram is covered in housing to bear during heavy cutting and ram feeding executes by connected AC servo motor, spur gear and ballscrew. Double nut type ballscrew is applied in order to remove backlash and ram is designed for rapid traverse without load in spite of no counter balance cylinder(a Waldrich Coburg milling head can be attached as an option under mutual consent with Waldrich Coburg).

상림엠에스피의 milling head는 철제 구조의 강력 절삭을 효율적으로 하기 위해 디자인 되었으며, ram housing 내부에는 hydrostatic system으로 구성되어 있습니다. 강력 절삭 시 발생하는 부하를 견디기 위해 ram이 housing 안에 들어가 있으며 AC servo motor, spur gear 그리고 ballscrew로 구동 됩니다. backlash를 제거하기 위해 double nut type ballscrew를 사용하며 counter balance cylinder 없이도 부하 없이 급속 이동이 가능합니다(고객이 원할 경우, Waldrich Coburg사의 milling head를 option으로 부착할 수 있습니다).

Specification

	SPM4500 (DGPM4500)	SPM5500 (DGPM5500)	SPM6500 (DGPM6500)	SPM7500 (DGPM7500)	SPM8500 (DGPM8500)
Ram section	600 × 600 mm	600 × 600 / 630 × 630 mm			
Spindle motor power	AC 75~105 kW	AC 105 kW	AC 105~150 kW		
Ram stroke	1,500~2,500 mm	1,500~3,000 mm	1,500~4,000 mm		

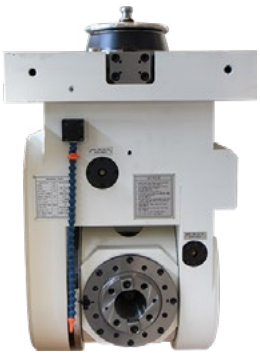
Torque Diagram



Attachment

Several types of the attachments for additional machining work in large size machine tools such as straight attachment, angle attachment, universal attachment and special attachment which is customized by the request of the customer can be supplied by Sangnim MSP.

대형공작 기계에 장착하여 부가적인 가공 작업을 하기 위한 attachment를 공급하고 있으며, 그 종류로는 straight attachment, angle attachment, universal attachment, 그리고 고객의 요구에 의해 customizing 된 special attachment도 공급 가능합니다.



2-Axis NC head

Angle head

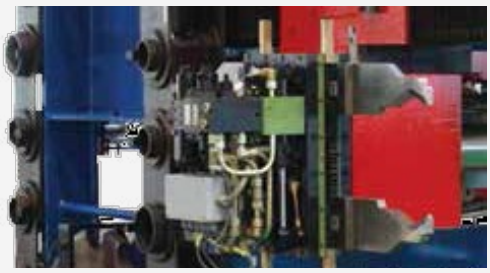
Facing head

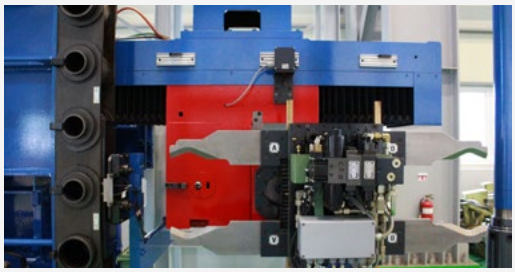
Extension head

ATC (Automatic Tool Changer)

Automatic tool changer is installed at the right or left side of the machine for efficient operating and machining, and has ISO 50 and 60 taper both. Tools can be mounted on and dismounted from tool gripper vertically and horizontally even during machining.

효율적인 장비운용과 가공을 위해 장비의 측면에 자동 공구 교환장치가 설치될 수 있으며, ISO 50과 60 taper를 사용할 수 있습니다. 가공 중에도 수평, 수직 방향에 관계 없이 공구를 교환할 수 있어 가공 중에 발생하는 시간 손실을 줄일 수 있습니다.





RTC | 로봇 공구 교환기(RTC)

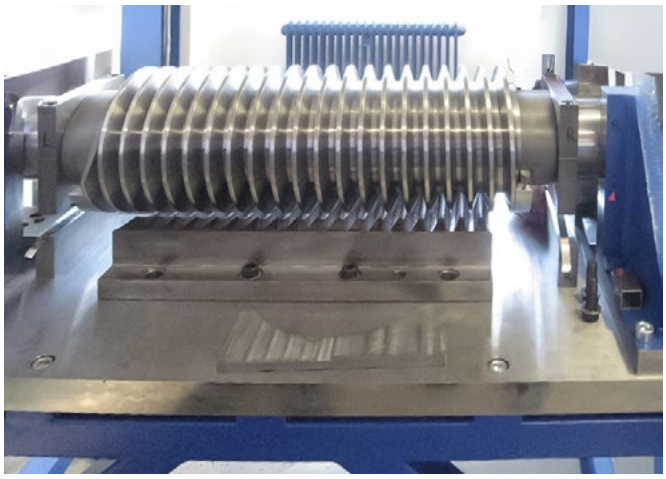
RTC takes a step closer to full automation and unmanned operation, even for large-scale machines. It enables automatic tool exchange either to the machine spindle or to the spindles of milling heads indexed at various angles. As a result, automatic tool changes become possible even for special heads that are not supported by conventional ATC systems, leading to a significant reduction in tool change time. By utilizing a tool storage system capable of holding hundreds of different tools, the RTC offers virtually unlimited tool capacity to meet diverse machining needs. In addition, RTC supports advanced auxiliary functions such as a high-speed automatic tool breakage detection system, further improving work stability and overall operational efficiency.

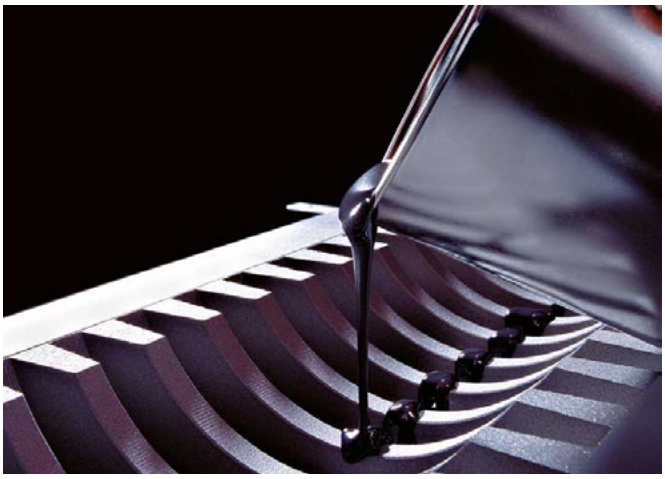
대형 기계에도 완전 자동화, 무인 운전의 기대에 한 걸음 다가가고 있습니다. RTC는 공구를 기계 주축 또는 다양한 각도로 indexing 되는 milling head의 주축에 자동으로 교환할 수 있도록 합니다. 이로 인해 ATC에서 자동 툴 교환이 불가능했던 특수한 head에도 자동 교환이 가능하며, 공구 교환 속도가 획기적으로 단축됩니다. 공구는 수백 개의 다양한 종류를 저장할 수 있는 공구 저장 영역을 활용함으로써, 사실상 무제한의 수량까지 대응이 가능합니다. 또한 RTC는 고속 자동 공구 파손 감지 system 등과 같은 부가 기능도 지원하여 작업의 안정성과 효율성을 더욱 향상시킵니다.

Worm Rack Gear Coating Service

When the coating on the worm rack is damaged or peeled off due to impact or prolonged use, the old coating is completely removed and a re-coating process is carried out.

장기간 기계 사용 중 충격이나 기타 요인으로 worm rack의 coating이 손상되거나 탈락된 경우, 기존 coating을 완전히 제거한 후 재 coating 작업을 수행합니다.

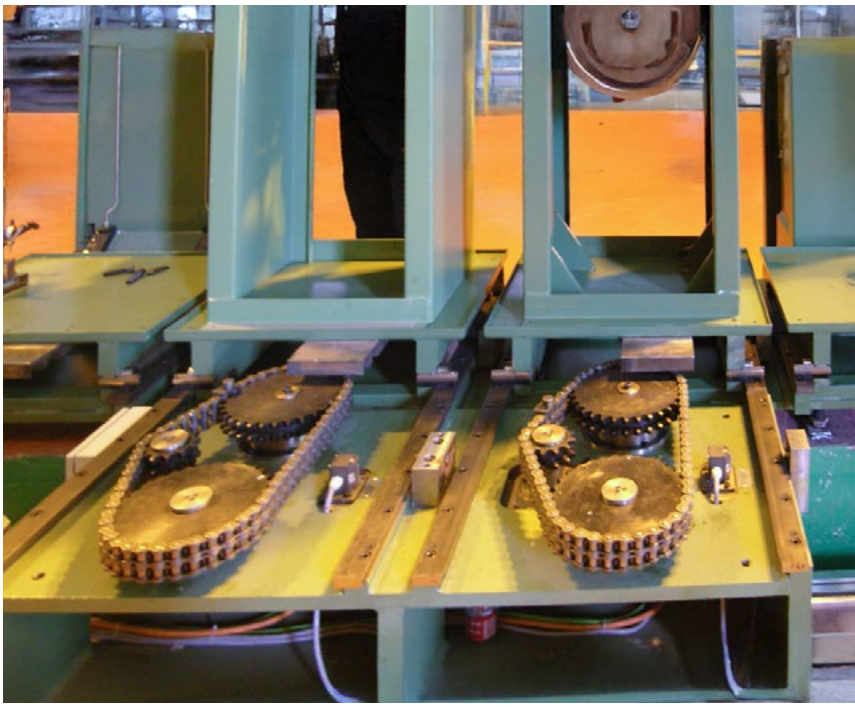




AAC (Automatic Attachment Changer)

The fully automated AAC system protects both the machine and the operator from collisions, while enabling fast and precise attachment replacement.

전자동 AAC system을 적용하여 기계 간 충돌로부터 기계와 작업자를 보호하며, 빠르고 정밀한 attachment 교체를 지원합니다.



Retrofit / Modernization

We perform not only general overhaul and leveling work but also modernization of gantry-and table-type plano millers.

gantry 또는 table 형 plano miller에 대해
일반적인 overhaul과 leveling 뿐만 아니라,
현대화(modernization) 작업도 수행합니다.

- General overhaul Leveling
- Table extension (Extension of bed, table, worm gears)
- Expansion of workpiece passage width and height (extension of columns, crossbeam, cross rail)
- CNC retrofit (conversion between Siemens and FANUC systems is possible)
- Replacement with a new headstock
- Design and supply of new hydraulic systems

Before

After

Before

After

Specification

Specification		SPM4500(DGPM4500)	SPM5500(DGPM5500)
Capacity	Distance between columns(A)	4,500 mm	5,500 mm
	Distance between table surface & spindle nose(B)	2,500~4,500 mm	4,000~5,500 mm
	Table size(C)	3,500 mm	4,500 mm
	Spindle motor power	AC 75~105 kW	AC 105 kW
	Ram section	600 × 600 mm	600 × 600 / 630 × 630 mm
Stroke	X-axis(D)	6,000~20,000 mm	8,000~25,000 mm
	Y-axis(E)	5,000~6,000 mm	6,000~7,000 mm
	Z-axis(F)	1,500~2,500 mm	1,500~3,000 mm
	W-axis(G)	2,000~3,500 mm	3,000~4,500 mm
Feed rate	X-axis	10,000 mm/min	
	Y-axis	10,000~15,000 mm/min	
	Z-axis	10,000 mm/min	
	W-axis	2,000 mm/min	
Control system		Siemens / Fanuc	
Measuring system		Haidenhain / Fagor	

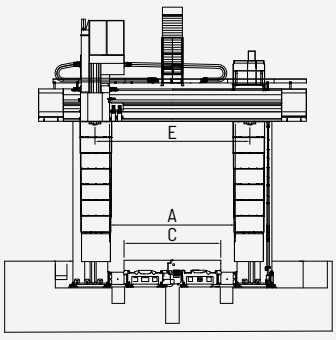
※ SPM(table type plano miller) / DGPM(gantry type plano miller)

Basic Accessories

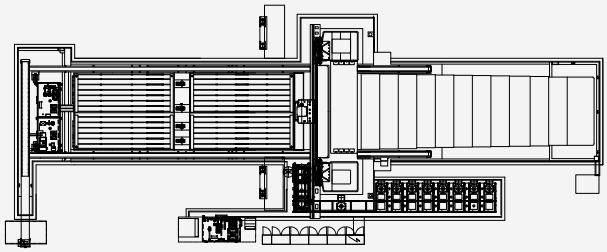
- X, Y, W-axis telescopic cover
- Work light
- Patrol lamp(red, green, yellow)
- Leveling block & anchor bolt

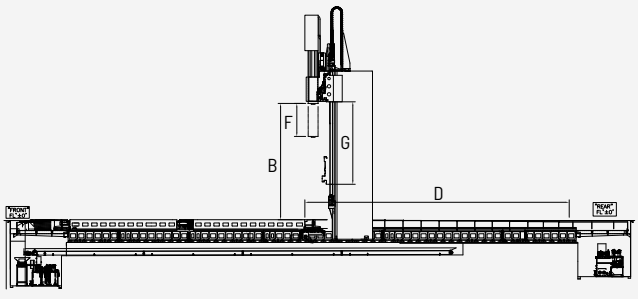
Optional Accessories

- Coolant supply unit (internal / external)
- Chip conveyor
- Automatic tool changer
- Automatic attachment changer
- Attachment
- Facing head
- Adapter
- Extractable and independent operator platform
- Renishaw probe system
- Laser tool measurement system
- Machine tools monitoring system (black box)
- Industrial camera with recorder



SPM6500(DGPM6500)	SPM7500(DGPM7500)	SPM8500(DGPM8500)
6,500 mm	7,500 mm	8,500 mm
4,000~6,500 mm	4,000~7,500 mm	4,000~8,500 mm
5,500 mm	6,500 mm	7,500 mm
AC 105~150 kW		
600 × 600 / 630 × 630 mm		
8,000~25,000 mm	10,000~30,000 mm	
7,000~8,000 mm	8,000~9,000 mm	9,000~10,000 mm
1,500~3,000 mm	1,500~4,000 mm	
3,000~4,500 mm	3,000~5,500 mm	3,000~6,500 mm
10,000 mm/min		
10,000~15,000 mm/min		
10,000 mm/min		
2,000 mm/min		
Siemens / Fanuc		
Haidenhain / Fagor		





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