



**Horizontal
Machining Center**

MK603H series

From : Oct. 2004

QUASER

we cut faster

MK603H series Horizontal Machining Center is the successor of our highly successful MK60II series over 280 units installed in Europe during the period of 1998 - Jun. 2004.



ECONOMIC MACHINE

MK603HE

18.5 kW

SKF Spindle

- 9,000 min⁻¹ , 157 N·m

- 12,000 min⁻¹ , 118 N·m

- 32 m/min

Fanuc 0iM-C

Performance Machine

MK603HP

30 kW

SKF Spindle

- 10,000 min⁻¹ , 191 N·m

- 48 m/min

Fanuc 18iM-B

HIGH SPEED + HEAVY DUTY MACHINE

MK603HPD

30 kW

SKF Direct Coupling Spindle

- 15,000min⁻¹ , 350 N·m

- 48 m/min

Fanuc 18iM-B

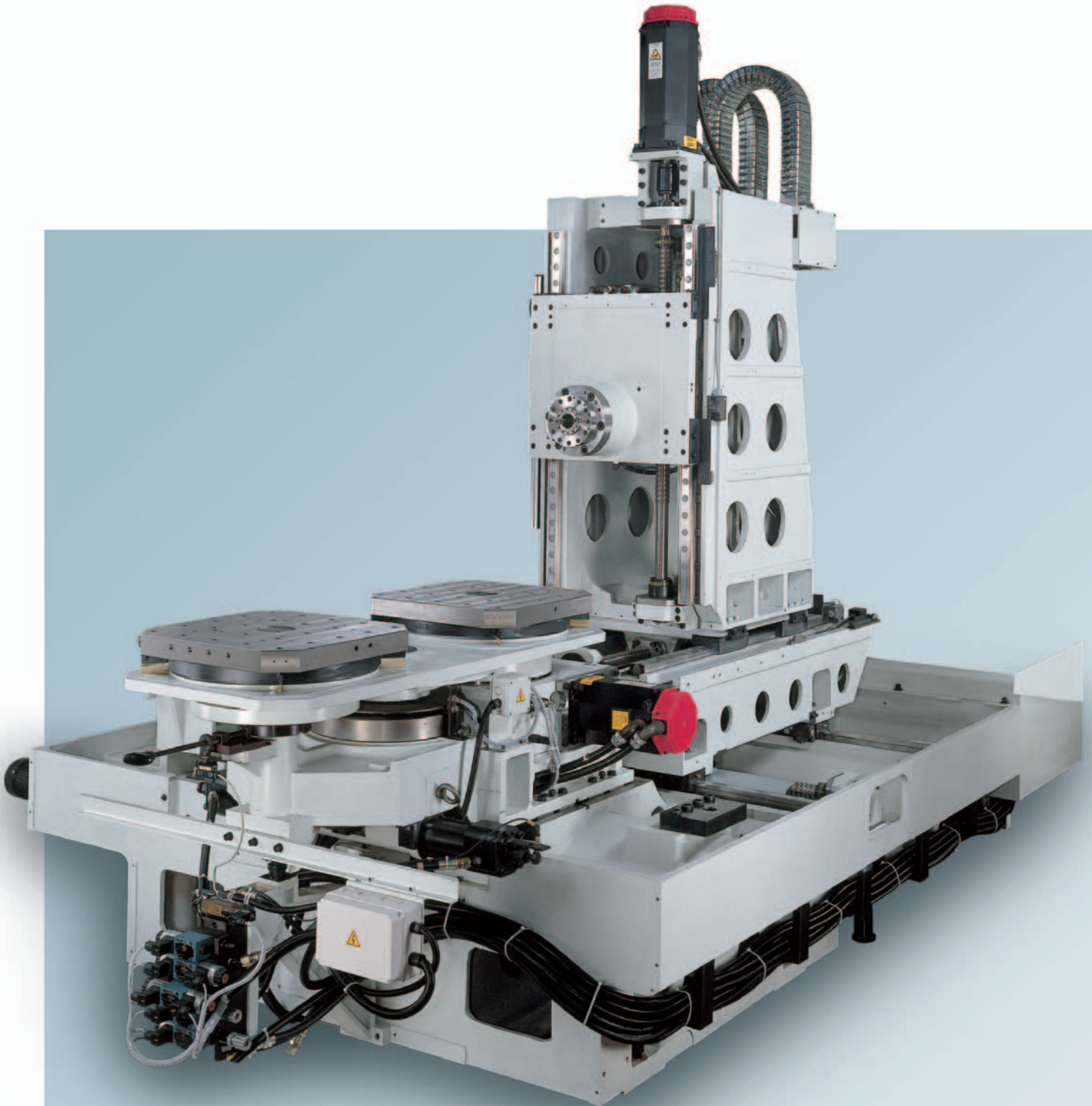
ALL equipped with the following standard features:

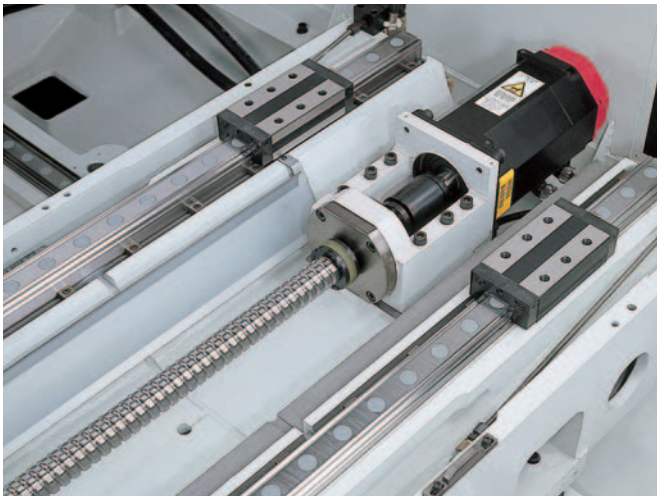
- Full C axis
- 20 Bar through spindle coolant system
- Universal swarf management system, including : auto-flush, ceiling wash down, chip augers & chip conveyor.
- 60 Positions ATC
- 0.1 μm absolute type linear encoders on X,Y & Z-axis (MK603HP & HPD)



Extremely heavy duty cast iron construction

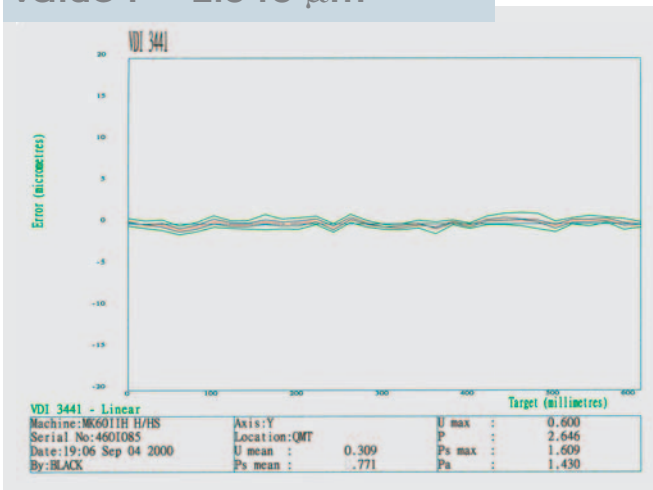
- X axis span at 900 mm
- Y axis span at 495 mm
- Z axis span at 500 mm
- C axis only rotating, no linear motion



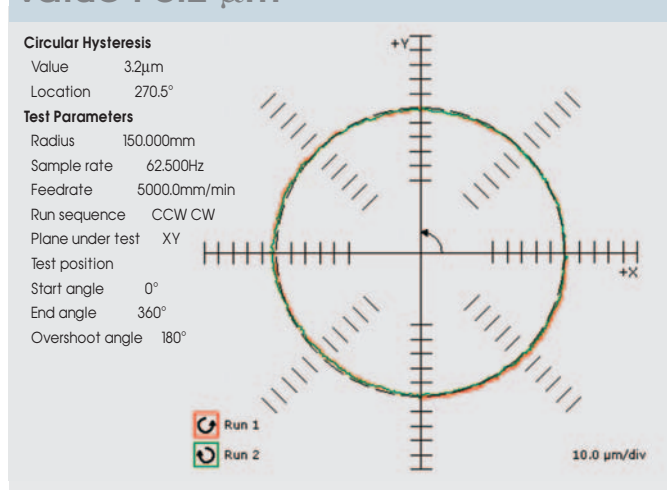


Heavy duty $\varnothing 45$ mm pretensioned ball screws, directly coupled with AC servo motors , achieve consistent high accuracy.
 3 axes $0.1 \mu\text{m}$ absolute linear scales is standard on MK603HP and MK603HPD .

**VDI3441 Laser measuring
 Y axis positioning
 Value P = $2.646 \mu\text{m}$**



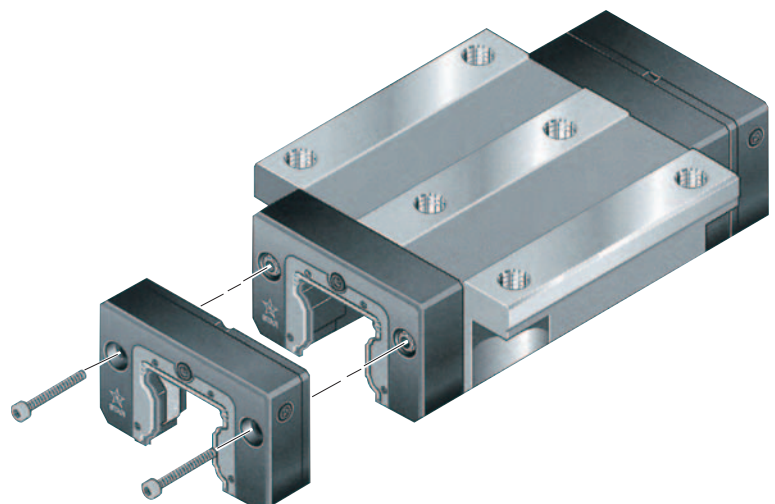
**Double ball bar measuring
 ISO Feedrate : 5000 mm/min .
 Value : $3.2 \mu\text{m}$**



Note : The measuring results indicated in this catalog are provided as an example by random selected.

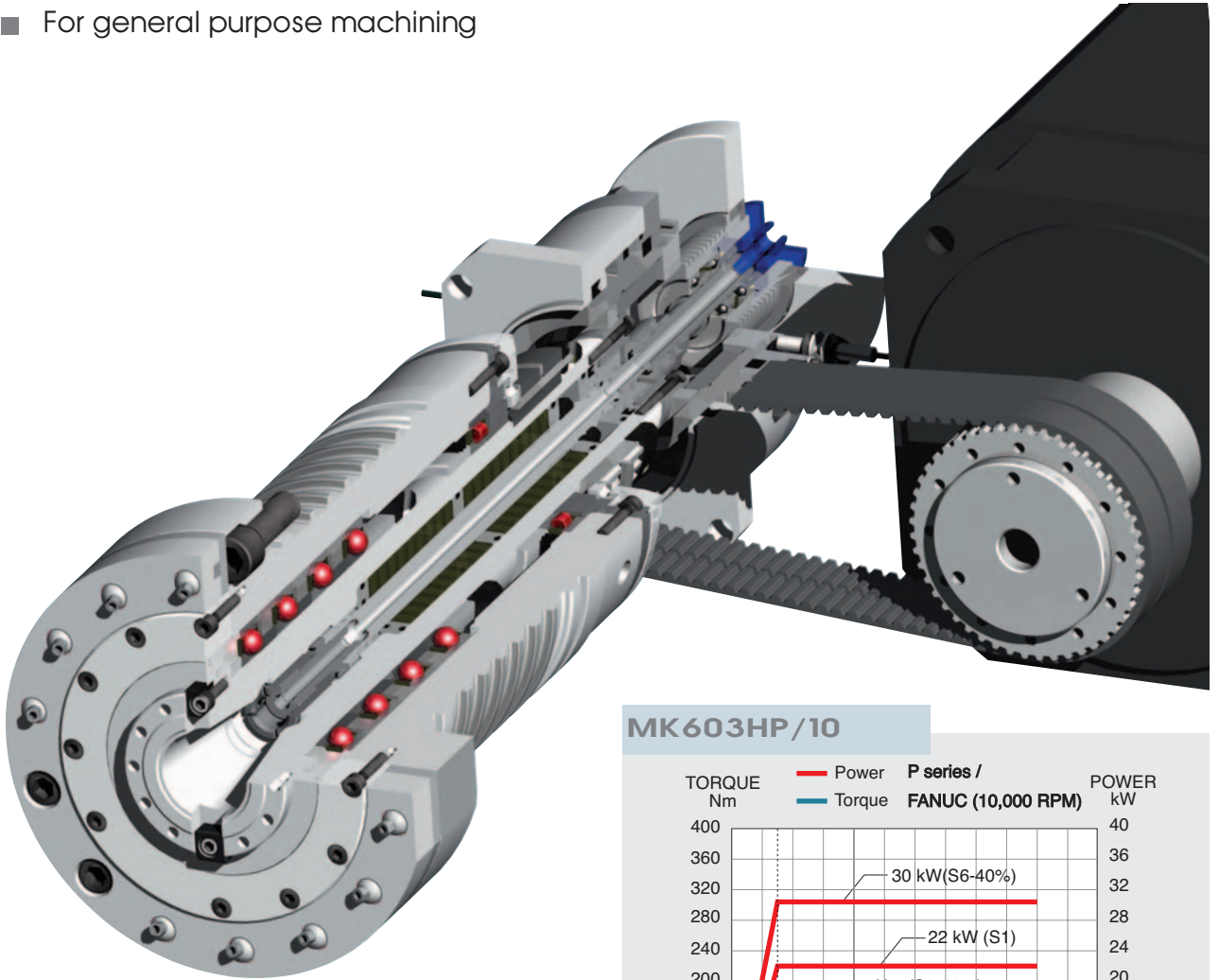
Super heavy duty linear ways
 X axis linear ways size 55/Roller type*
 Y axis linear ways size 45/Ball type
 Z axis linear ways size 55/Roller type*

* Ball type linear ways on " E " model

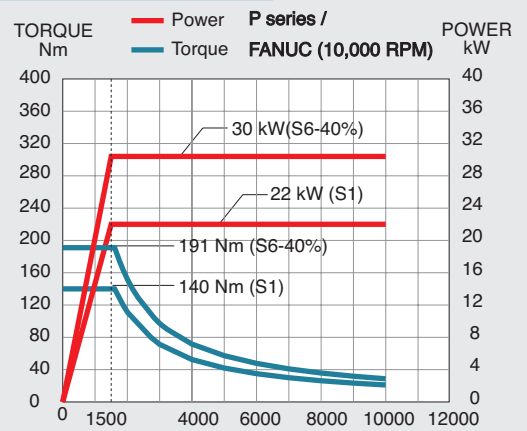


SKF made Belt Spindle on MK603HE & MK603HP

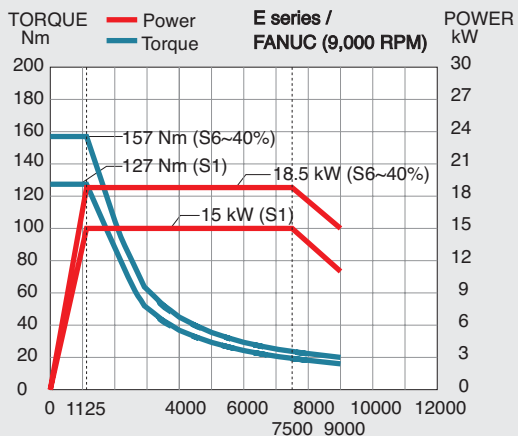
- For general purpose machining



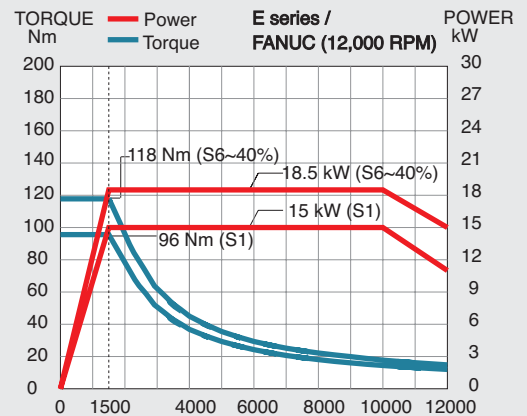
MK603HP/10



MK603HE/9

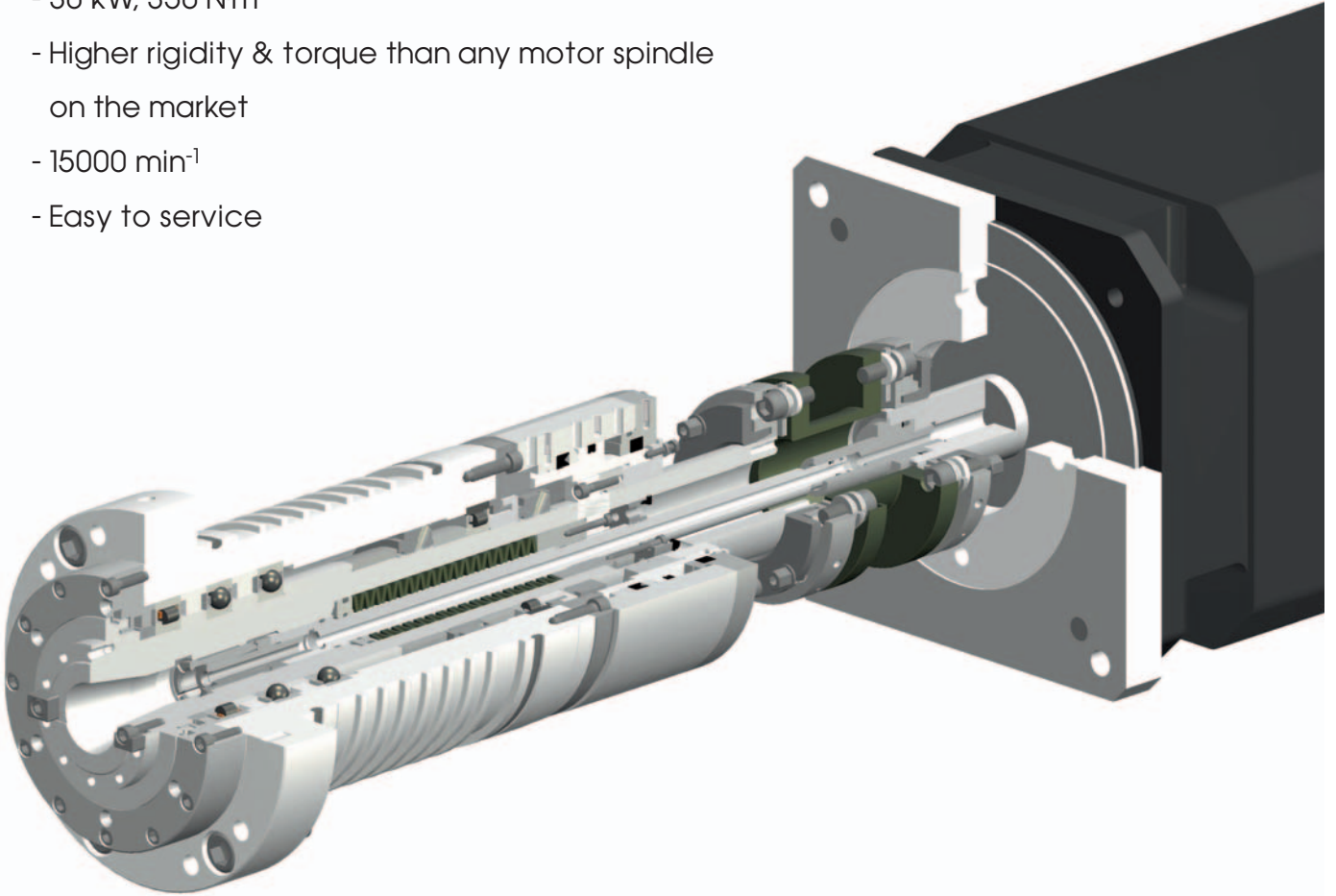


MK603HE/12

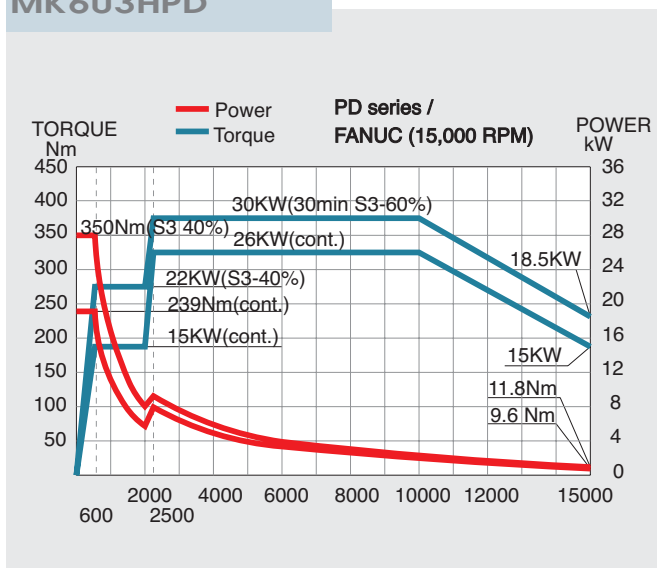


SKF made Coupling Spindle on MK603HPD

- For high speed & heavy duty :
 - 30 kW, 350 N·m
 - Higher rigidity & torque than any motor spindle on the market
 - 15000 min⁻¹
 - Easy to service



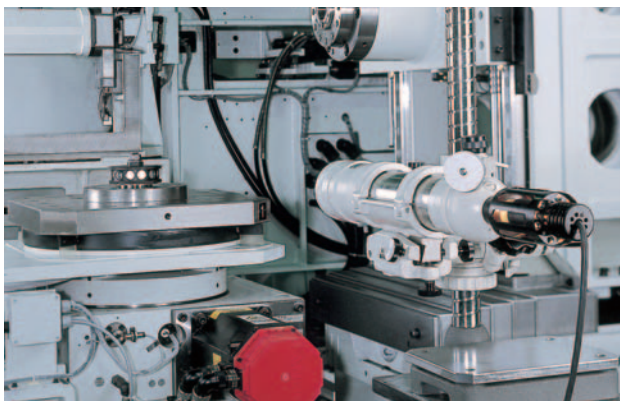
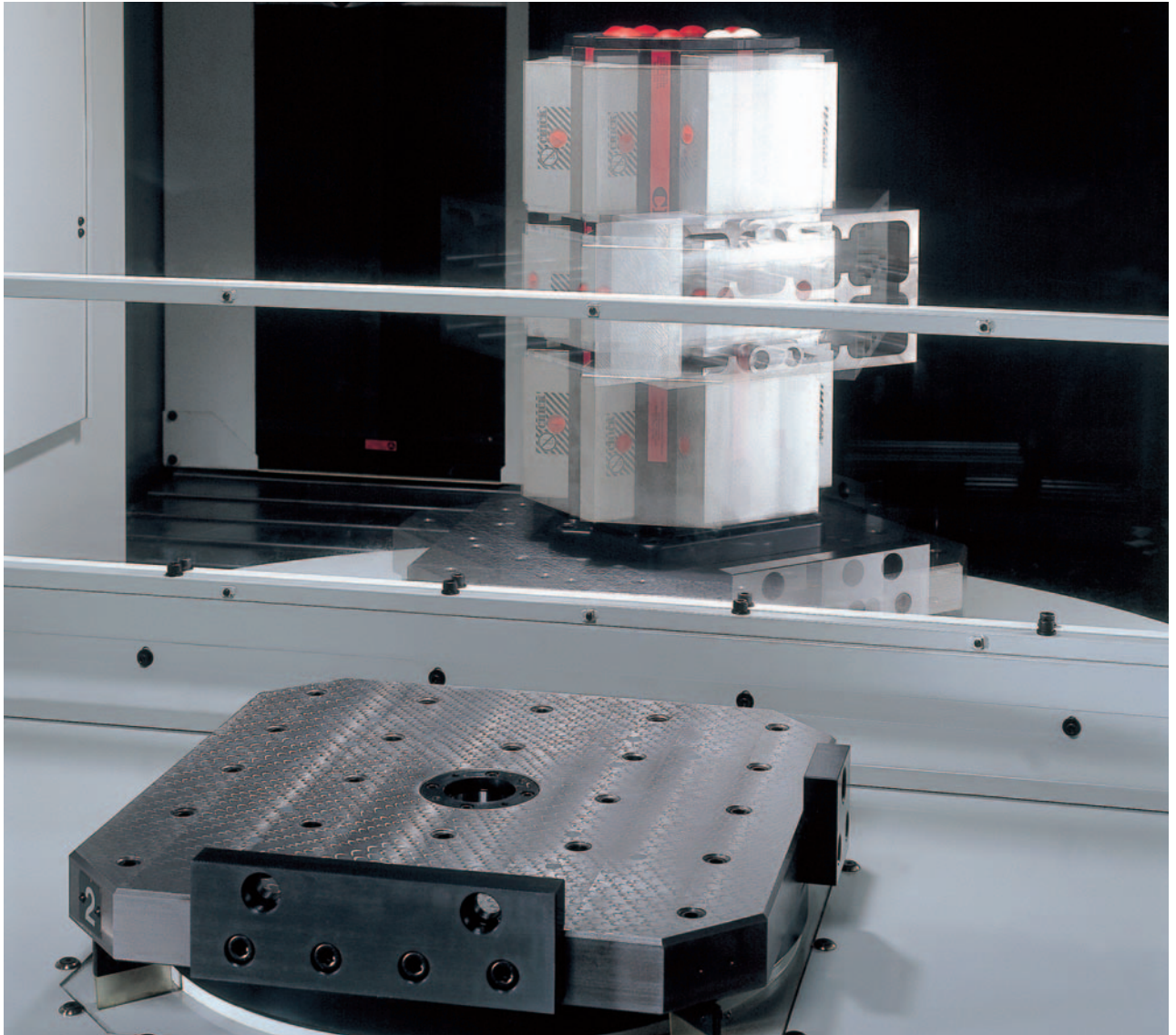
MK603HPD



Standard on all models



Speed : 33.3 min⁻¹
0° ~ 90° : 0.6 second (w/o clamping) /
1.2 second (w/clamping)

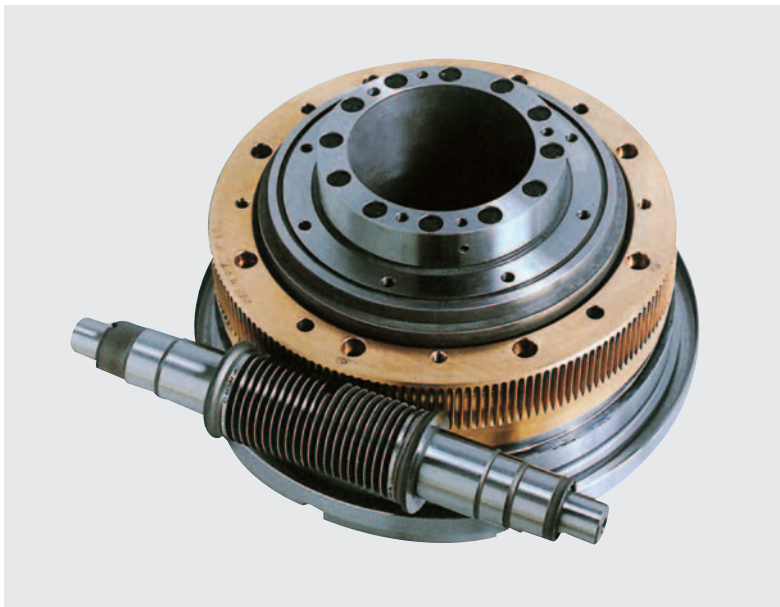


Final calibration by oscilloscope

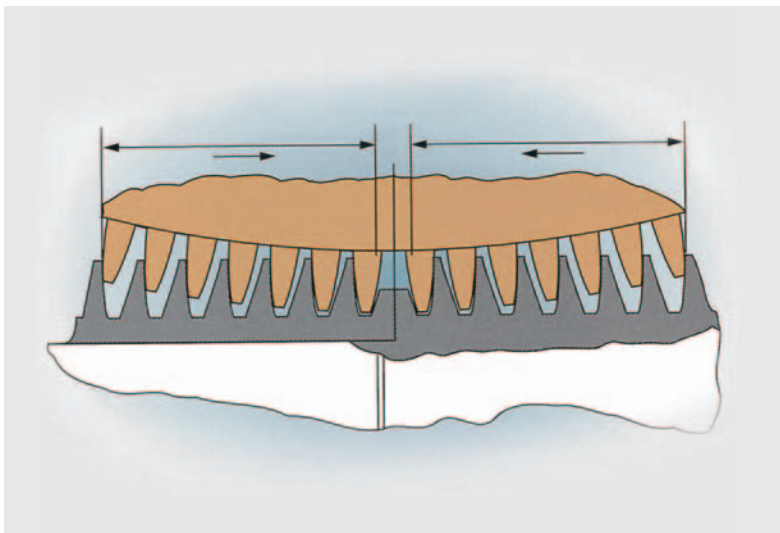


Load cell test to guarantee the rigidity

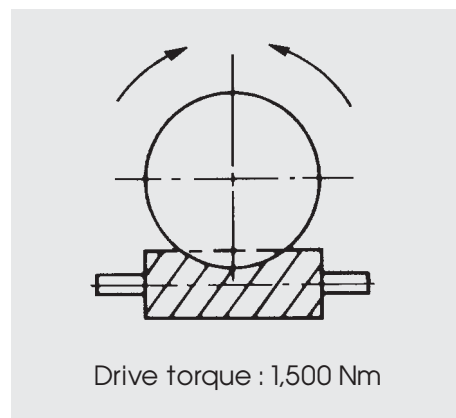
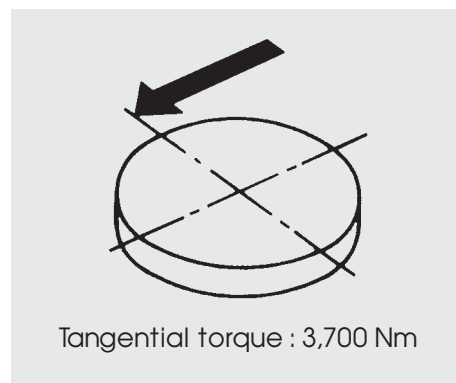
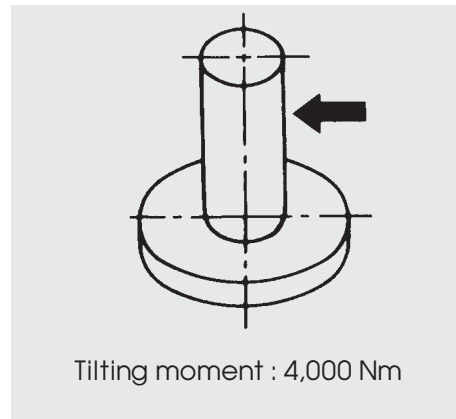
Unique MATSUMOTO-OTT worm gear system



Durability of 25,000 hours continuous cutting at 1,500 Nm torque.

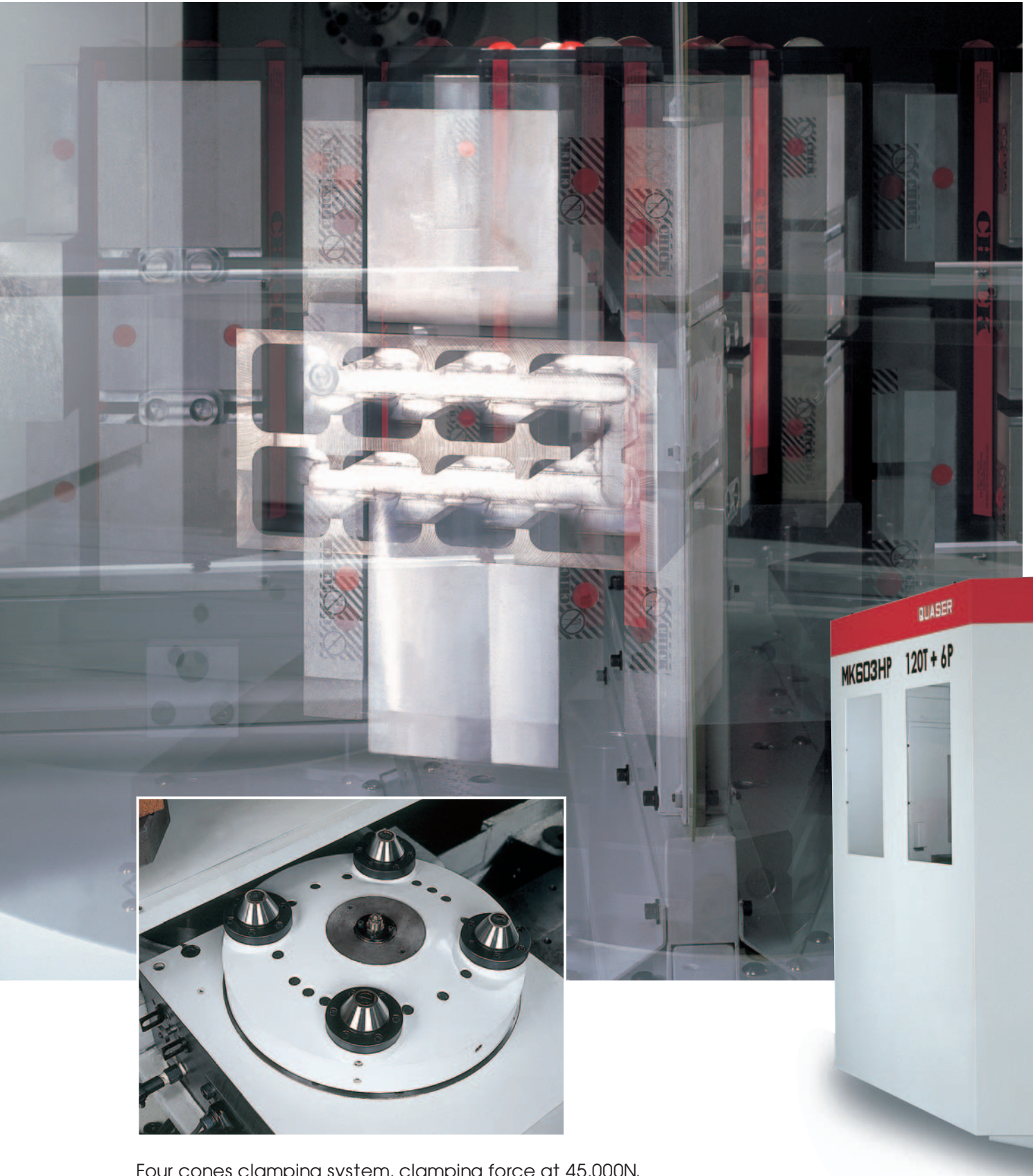


Nearly zero backlash : 3 μ m - 8 μ m plus easily adjustable .



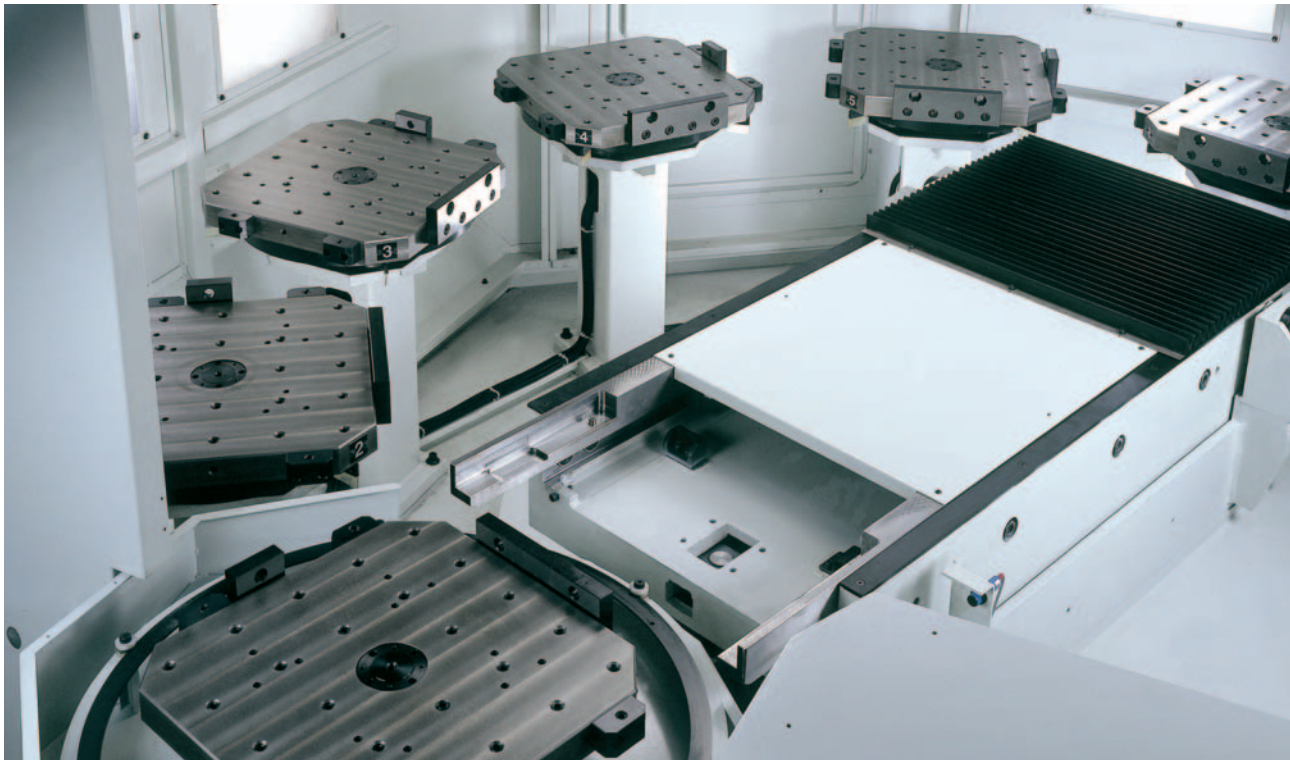
Accuracy
Positioning : 8 arc sec
Repeatability : ± 2 arc sec

Pallet load capacity : 500 kgs/each
APC time : 8 seconds



Four cones clamping system, clamping force at 45,000N.

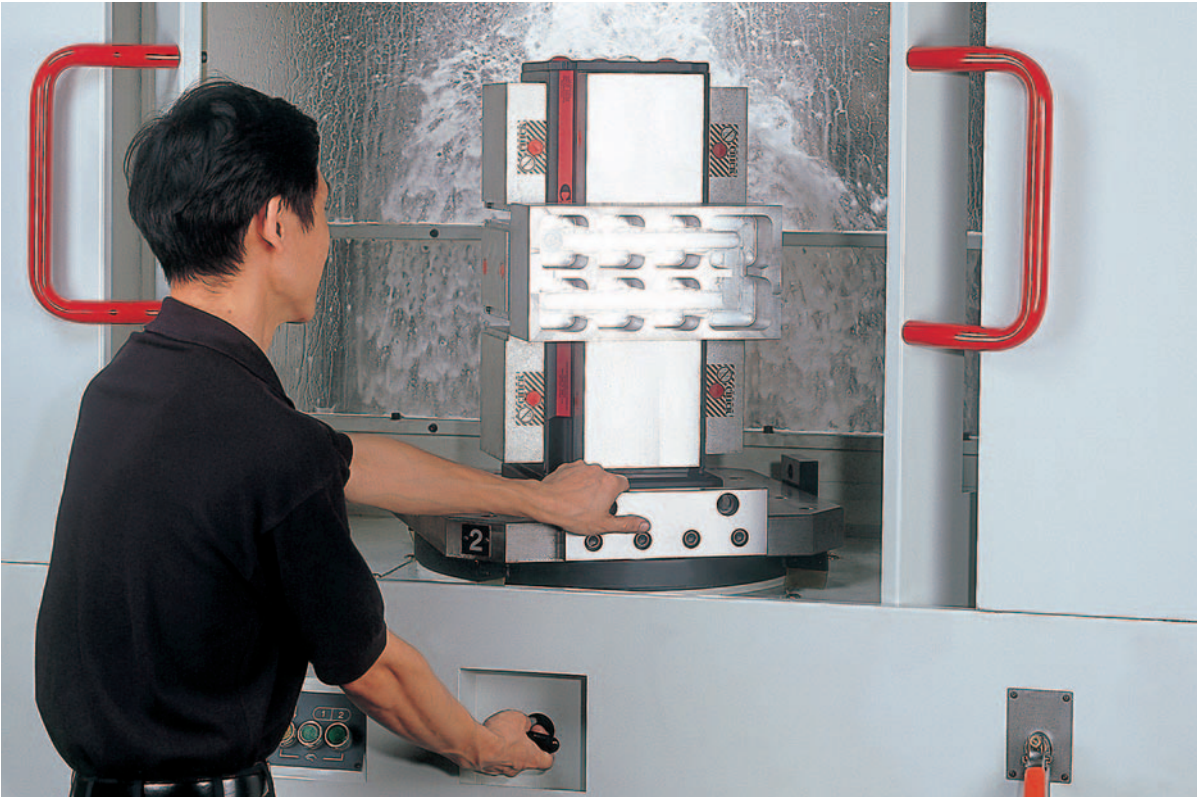
APC time : 1 min 27 sec. ~1 min 44 sec.



Shown : MK603HP /10, 120T + 6APC

Ergonomic operator control panel





Front manual pallet rotation

Our attention to small details shows that we care



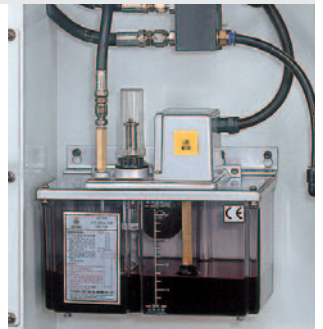
Documentation & hand tool shelf



Powerful wash gun, 2.5 bar



Chip cleaning during machine running



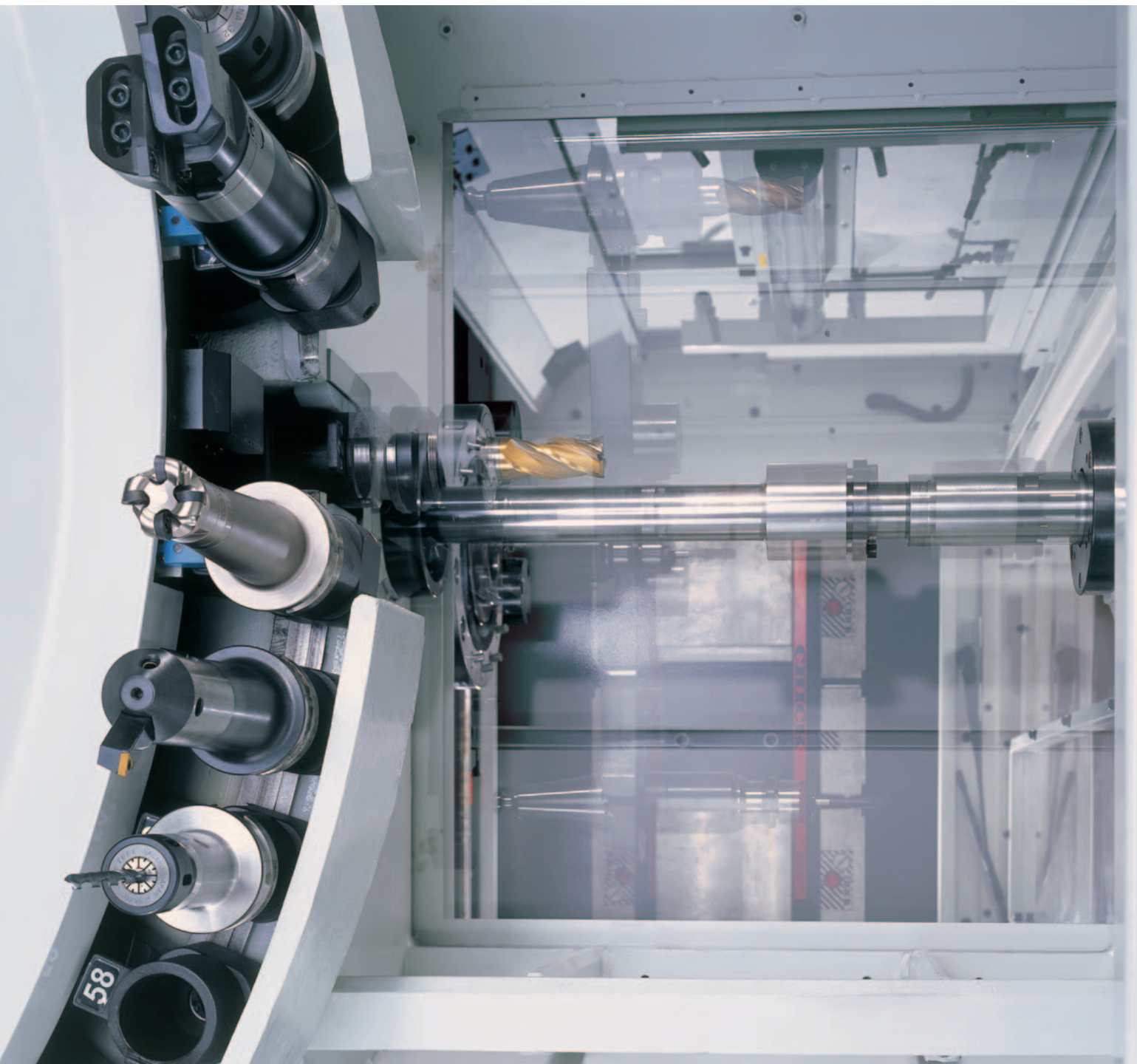
Large lubrication tank (4L)

Minimum moving parts & highest reliability

Tool to tool : 1.5 seconds*

Chip to chip : 4.9 seconds on MK603HP & MK603HPD

5.8 seconds on MK603HE

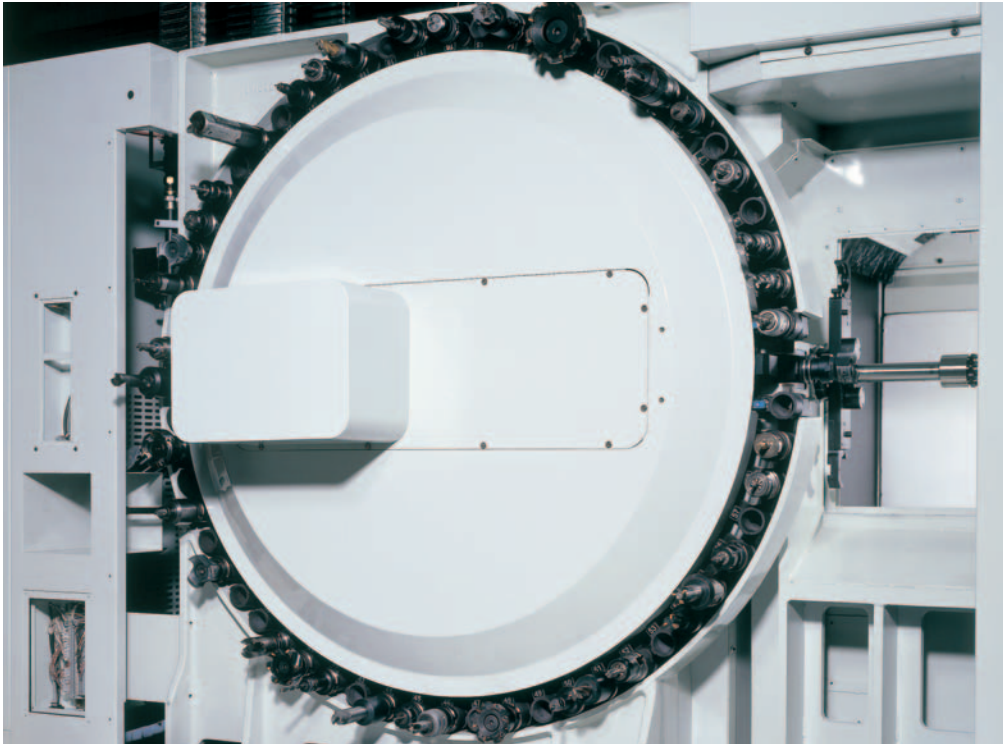


* Tool weight under 6 kgs

(some covers removed for explanation)

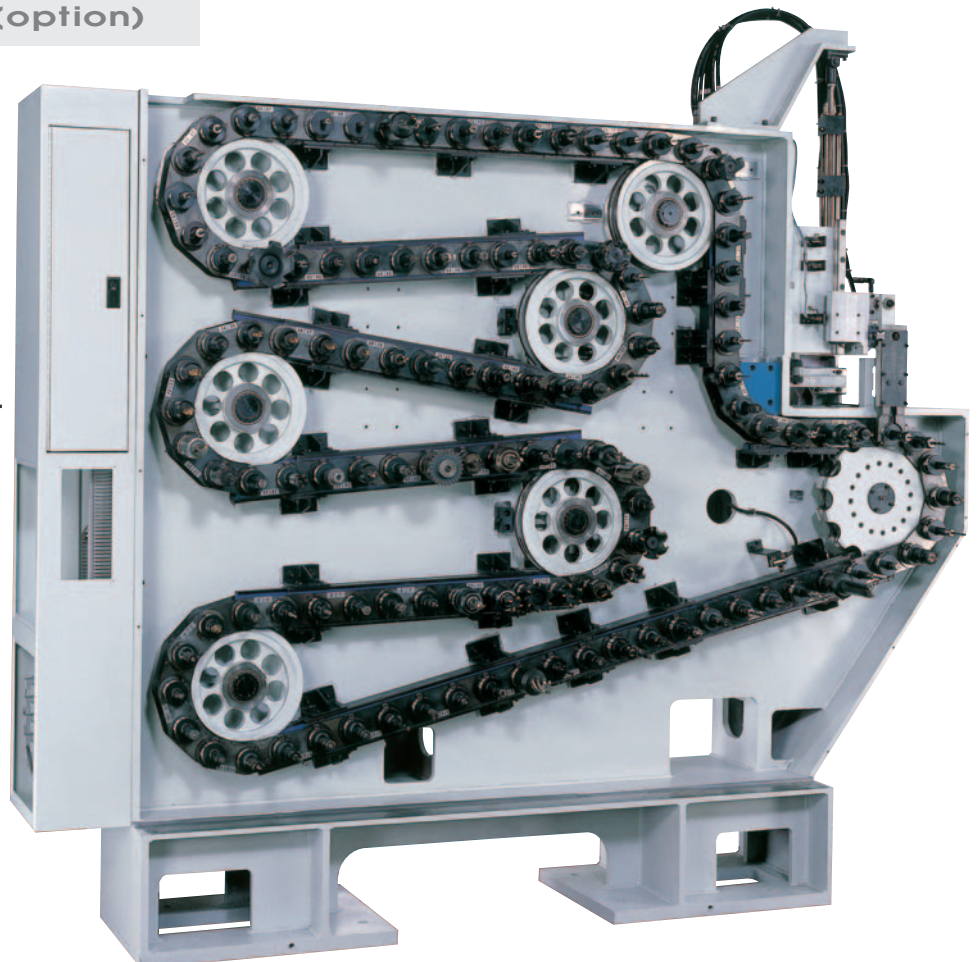
* 60-position magazine

Standard 60-position random selection magazine



120-position magazine (option)

- Factory installed only.
- Driven by AC servo motor and planetary gear reducer
Line speed = 30 m/min
No. 1 pocket to No. 61 pocket
= 12 sec.
- It's a stand alone unit on the floor.

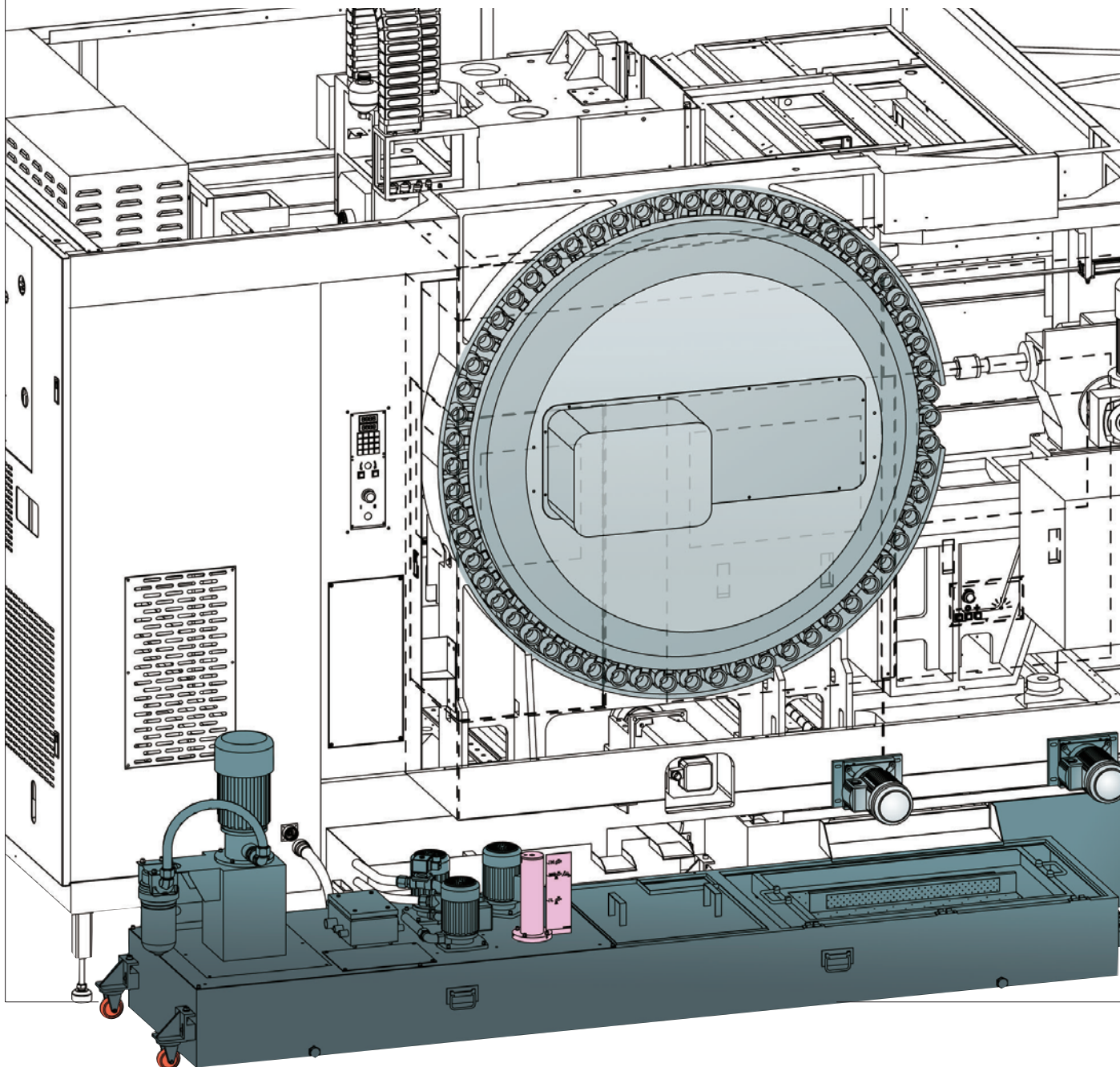


(some covers removed for explanation)

The best swarf management system available when compared with competitive machines in the same price range.

Principles

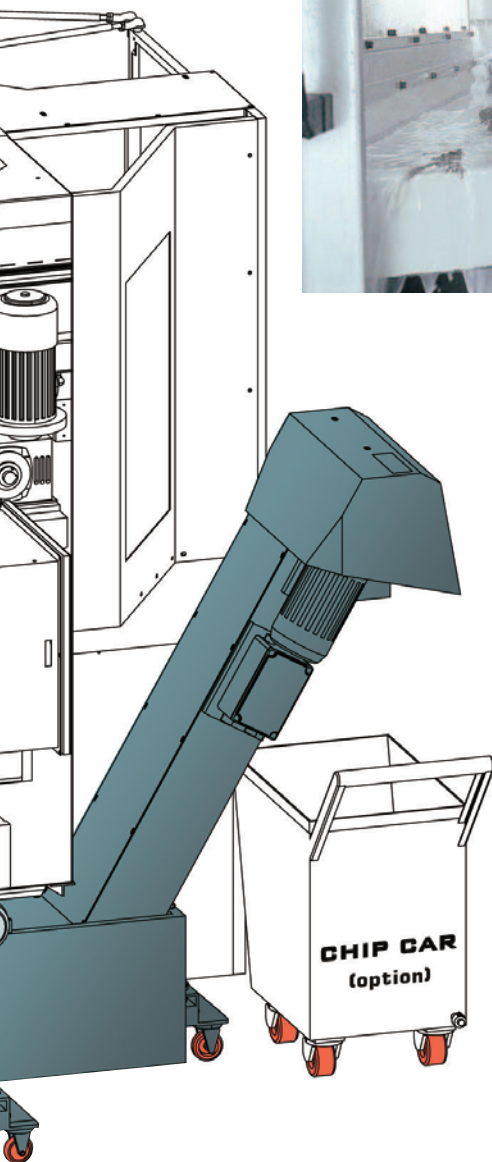
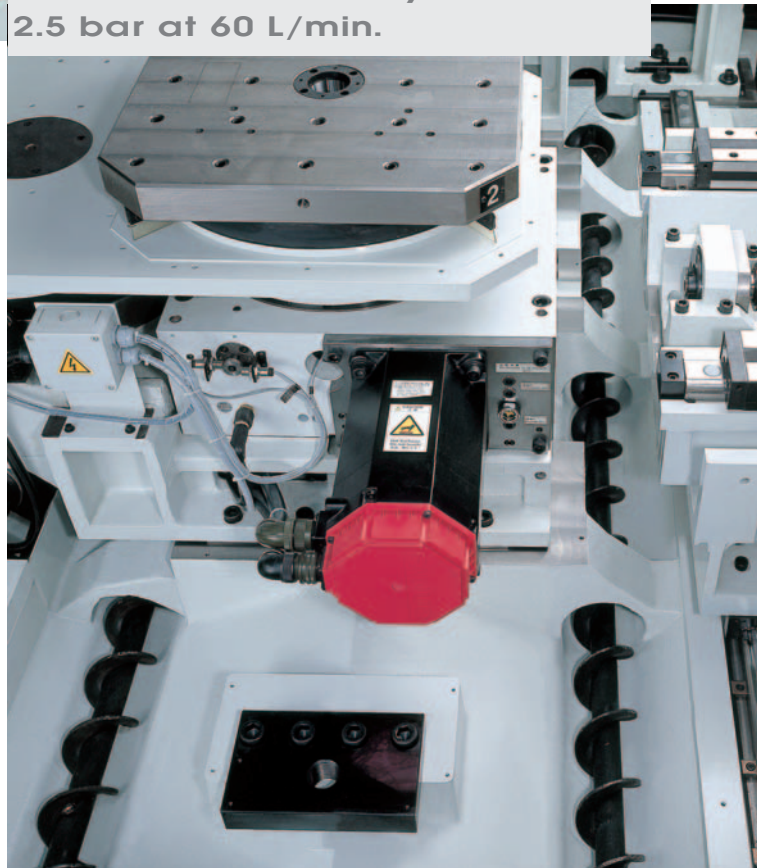
- Heavy swarf carried by drag type chip conveyor.
- Light & small swarf overflow through 1.0 mm & 0.5 mm filters for nozzle coolant & flushing; a final 25 μ m filter with alarm signal for 20 Bar T.S.C.
- No need to worry about coolant balance between tanks; to compensate for coolant evaporation top up by checking against an easy to read gauge.



Standard pallet wash system
(Ceiling wash down)
0.8 bar at 60 L/min.



Standard two chip augers &
saddle wash down system
2.5 bar at 60 L/min.

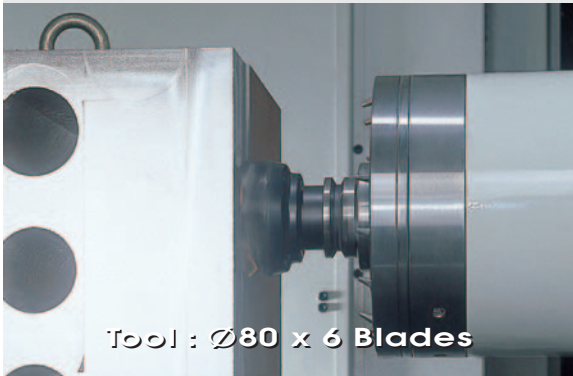


(some covers removed for explanation)

MK603HP/10

High Metal Removal Rate

FACE MILLING



ST60

ALMGSI 1

S=1,000 min⁻¹

S=7,000 min⁻¹

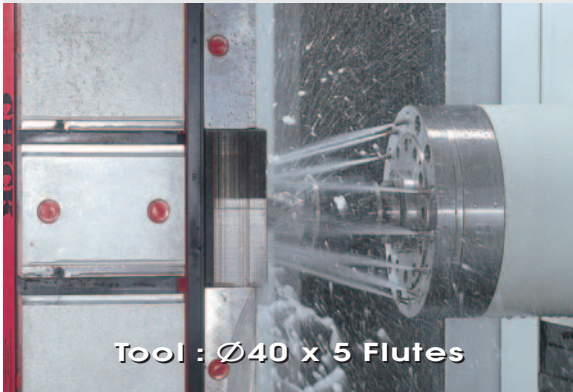
F=1,800 mm/min

F=10,000 mm/min

Q=320 c.c./min

Q=3,000 c.c./min

END MILLING



Ø40 W: 25

D: 50

S= 240 min⁻¹

S=640 min⁻¹

F=101 mm/min

F=500 mm/min

Q=126 c.c./min

Q=625 c.c./min

DRILLING (W/T.S.C.)



S=880 min⁻¹

S=2,000 min⁻¹

F=180 mm/min

F=380 mm/min

Q=412 c.c./min

Q=870 c.c./min

TAPPING



S=177 min⁻¹

S=186 min⁻¹

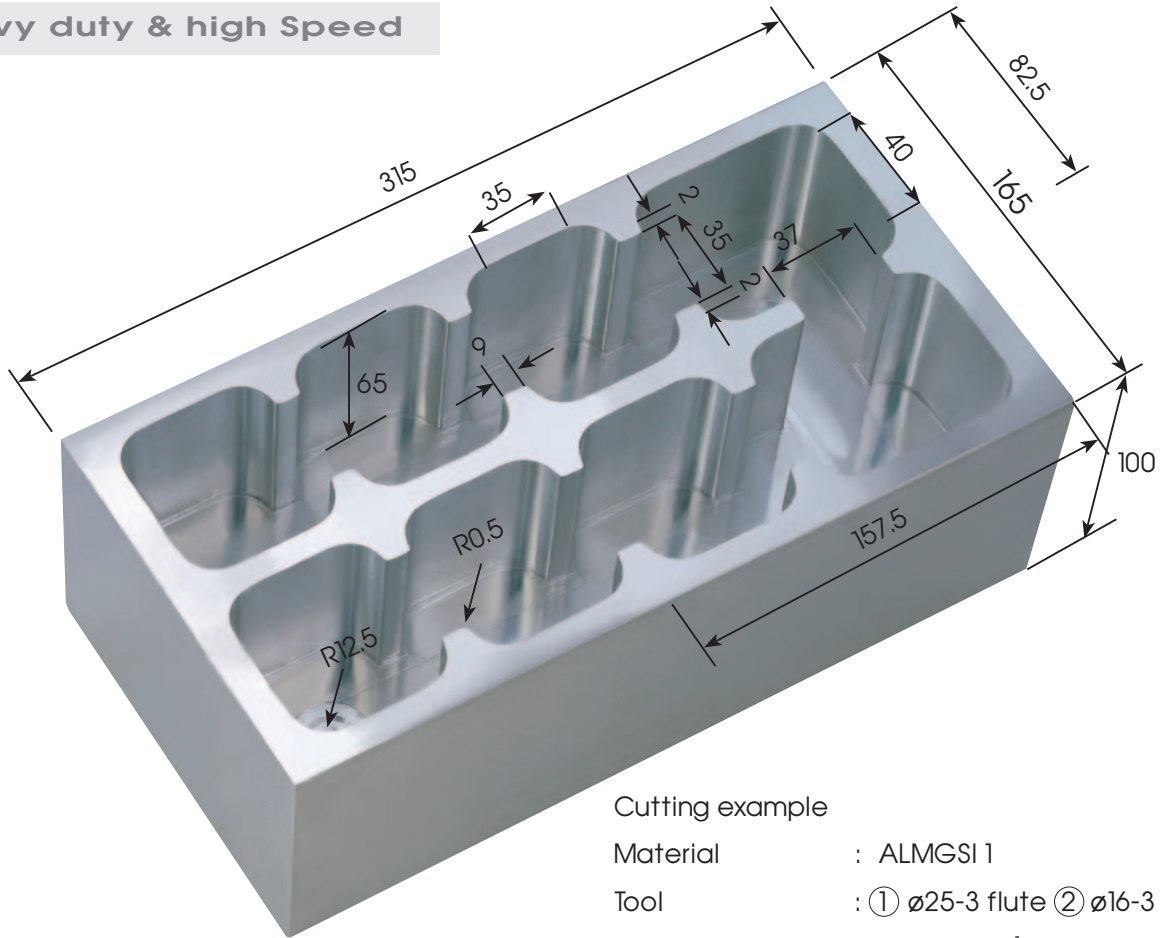
F=708 mm/min

F=744 mm/min

NK603HPD

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Heavy duty & high Speed

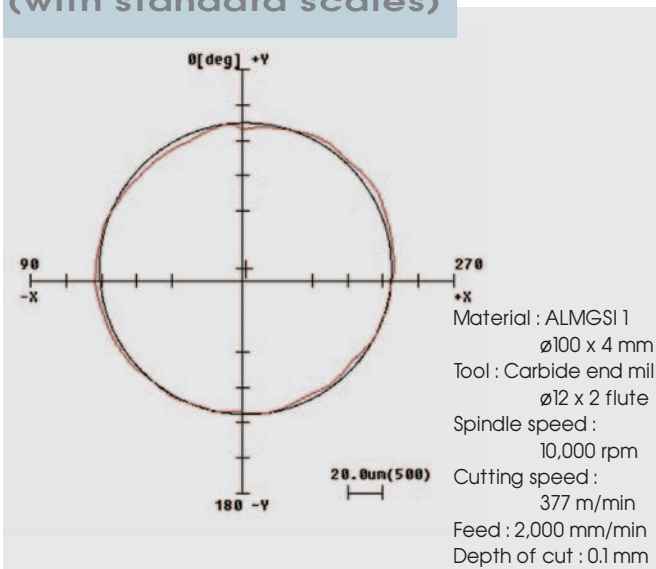


Cutting example

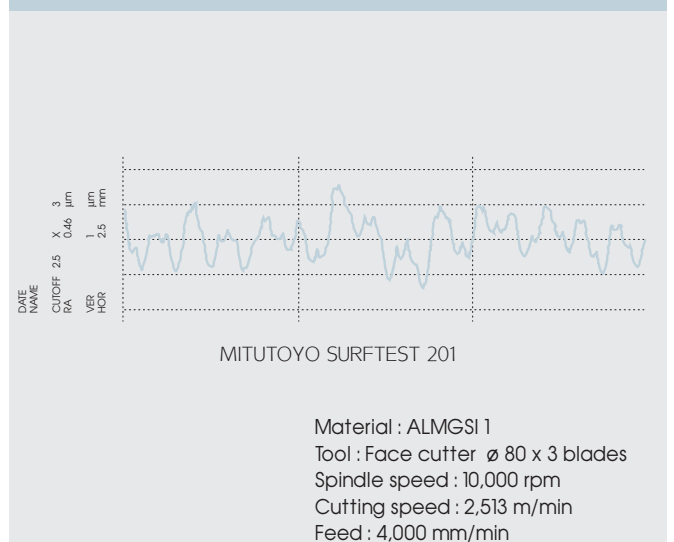
- Material : ALMGSI 1
- Tool : ① $\varnothing 25$ -3 flute ② $\varnothing 16$ -3 flute
- Spindle speed : 15,000 min⁻¹
- Cutting speed : 1,178 m/min
- Feed : 6,500 mm/min
- Time : 7.5 min

High Accuracy

Roundness : 4 μ m
(with standard scales)



Surface roughness : 2.2 μ m (Rmax.)



Models

MK603H series

MK 603 HE	MK 603 HP	
Economic	Performance	High Speed & Heavy Duty
MK 603 HE /9	MK 603 HP /10	MK 603 HPD
MK 603 HE /12		

Technical Data	MK 603 H			
	E / 9	E / 12	P / 10	PD
Work range				
Pallet size (mm)	500 x 500			
Max. work swing diameter (mm)	Ø680 (Ø760 ⁽¹⁾) (Ø680 / Ø730 for 6 APC system)			
Max. work piece height	710			
Table load capacity (kg)	500			
Travel X / Y / Z (mm)	710 / 610 / 610			
B minimum indexing (degree)	0.001			
Table surface to spindle center (mm)	85 ~ 695			105 ~ 715
Surface configuration	24- M16 @ Pitch 100 grid			
Feed drive				
Feed force X (N)	6,283		8,639	
Y (N)	11,520		8,639	
Z (N)	6,283		8,639	
Rapid movement X/Y/Z (mm/min.)	32		48	
C (sec. / 90 degree)	1.4		1.2	
Acceleration X/Y/Z (m/s ²)	3 / 4 / 4		4 / 5 / 6	
Dia. & pitch of the ball screw (mm)	Ø45 / P12		Ø45 / P16	
Position accuracy				
ISO 230-3 / JIS X/Y/Z (mm)	0.015 ⁽²⁾ / 0.008			
With Linear encoder	0.008 ⁽²⁾ / 0.004			
Main spindle - 40 Taper				
Spindle taper	ISO 40 or BT 40			
Max. spindle speed	9,000	12,000	10,000	15,000
Spindle base speed	1,125	1,500	1,500	600
Spindle output kW/ torque Nm (S6-40%)	18.5 / 157	18.5 / 118	30 / 191	30 / 350
Spindle speed / Transmission	Belt			Coupling
Spindle diameter (mm)	Ø70			
Tool changer				
Tool selection	Random			
Magazine positions	60			
Max. tool diameter w/o adjacent tool (mm)	Ø80 (Ø150)			
Max. tool length (mm)	350			
Max. tool weight (kg)	10			
Tool to tool time (sec.)	1.5			
Chip to chip time (sec.)	5.8		4.9	
Pallet changer				
Number of pallet	2			
Method of pallet changer	Swing Arm type			
Pallet change time (sec.)	8			
Pallet changing repeatability (mm)	0.008			

Main spindle

MK603HE /9 - 9,000 min⁻¹ - belt drive
 MK603HE /12 - 12,000 min⁻¹ - belt drive
 MK603HP /10 - 10,000 min⁻¹, heavy duty belt drive
 MK603HP /D - 15,000 min⁻¹, direct coupling
 SKF Heavy duty & high speed

Control

FANUC
 0iM-C (For E type only)
 18iM-B (For P & PD type)
 (Heidenhain iTNC 530 also available
 see separate sheet)

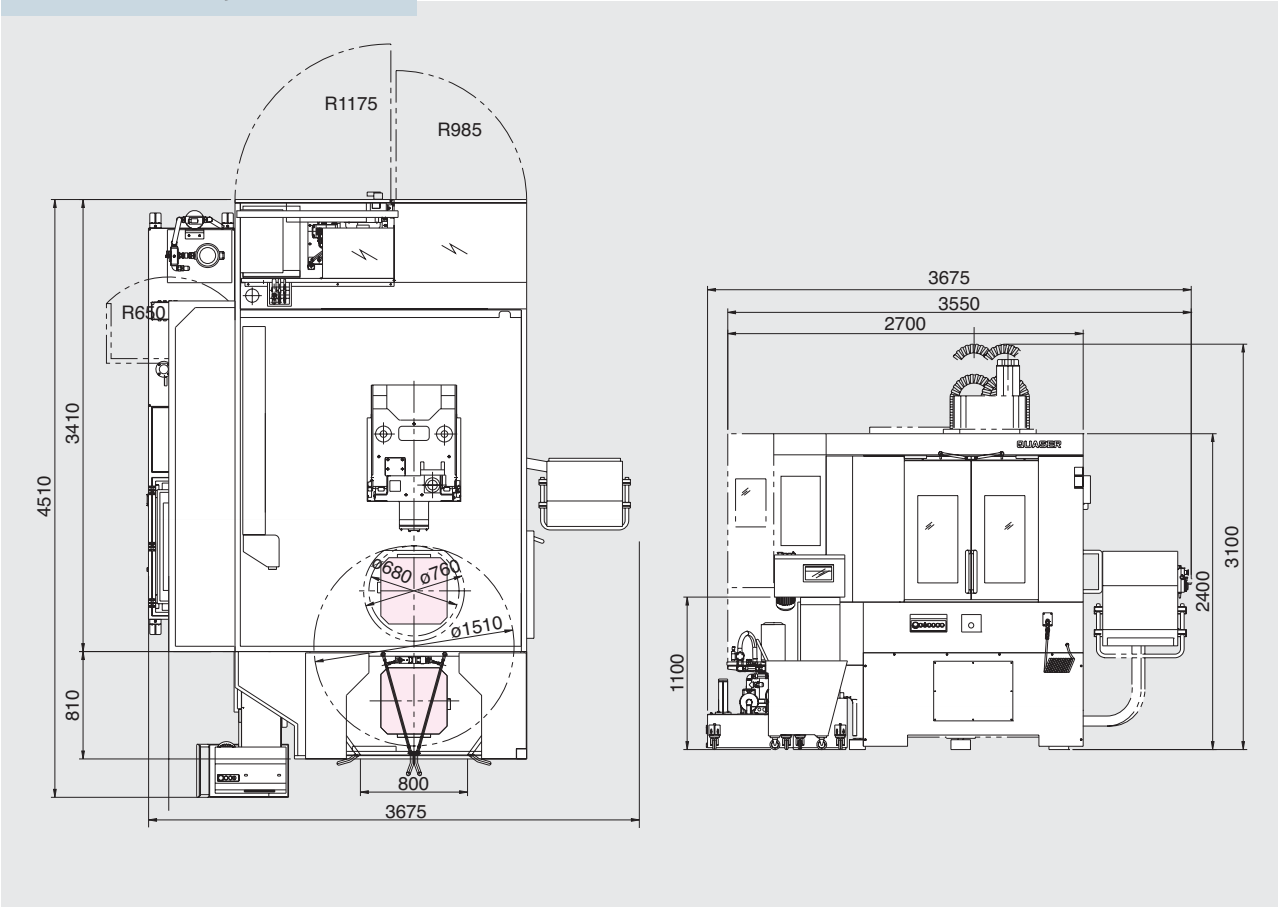
Technical Data	MK 603 H			
	E /9	E /12	P / 10	PD
Coolant system				
Coolant tank capacity (Liter)	580 (200+380)			
- Nozzle coolant pump capacity	60 L/min			
- Through spindle coolant pump capacity	25 L/min. , 20 bar			
- Wash down pump capacity	60 L/min.			
- Ceiling wash down pump capacity	60 L/min.			
Machine size				
Height (mm)	3,100			
Floor space W x D (mm)	3,675 x 4,510			
Weight (kg)	13,000			
Connections				
Main power	400 V / 50Hz			
Power consumption (KVA)	35		40	45

*Note : (1) : Depend on work shape. (2) : Feed at 3m/min.

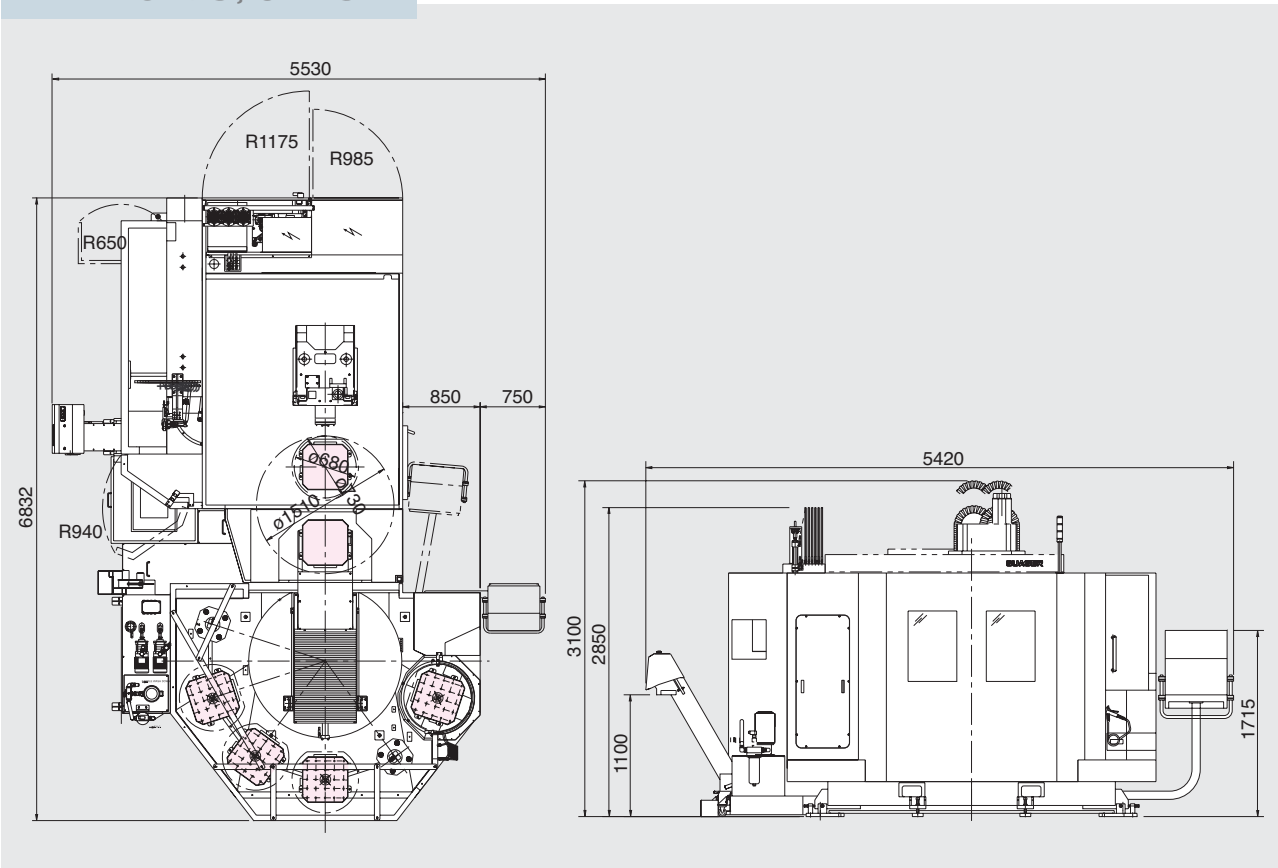
● = Standard ○ = Option × = N/A

Standard / Option accessories :	Std. / Opt.			
	E		P	
	/9	/12	/10	D
■ FANUC 18iM-B	×	×	●	●
■ FANUC 0iM-C	●	●	×	×
■ Spindle oil chiller (CO-12)	●	●	●	●
■ 60 position tool magazine	●	●	●	●
■ 120 position tool magazine	○	○	○	○
■ Pull stud for BT tooling system	●	●	●	●
■ 2 pallet station	●	●	●	●
■ 6 pallet station + Robot style changer	×	×	○	○
■ Linear encoder (Absolute 0.0001mm)	○	○	●	●
■ Tool length / breakage measurement	○	○	○	○
■ Coolant system	●	●	●	●
■ 20 bar through spindle coolant	●	●	●	●
■ 50 bar through spindle coolant	○	○	○	○
■ Ceiling wash down coolant	●	●	●	●
■ Base, Saddle wash down coolant	●	●	●	●
■ Coolant wash gun	●	●	●	●
■ Chip augers (2 sets)	●	●	●	●
■ Chip conveyor	●	●	●	●
■ Work light	●	●	●	●
■ Machine status light	●	●	●	●
■ CE & EMC	●	●	●	●

With 60ATC, 2 APC



With 120ATC, 6 APC





QUASER
we cut faster

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