

QUASER

we cut faster



**Column Moving
Vertical Machining Center with
swing table for series production**

MK603S series

MK603S series is our third generation of MK60S production vertical machining center; Backed up 600 units world wide installations in the past 14 years (1994-2008), the MK603S series achieves:

- Largest working capacity in a compact foot print**
- Highest productivity**
- Highest reliability**



ECONOMIC MACHINE

MK 603SE

18.5 KW

Belt Spindle

- 9,000 min⁻¹, 187 N·m
 - 12,000 min⁻¹, 140 N·m
 - 15,000 min⁻¹, 112 N·m
- 32 m/min

QUASER mill i

PERFORMANCE MACHINE

MK 603SP

30 KW

Belt Spindle

- 9,000 min⁻¹, 255 Nm
 - 12,000 min⁻¹, 191 Nm
 - 15,000 min⁻¹, 153 Nm
- 32 m/min (option 48m/min with Linear scale)

FANUC 18i MB

MK 603SP

22 KW

Coupling Spindle

- 15,000 min⁻¹, 150 N·m
- 32 m/min (option 48m/min with Linear scale)

FANUC 18i MB

All equipped with the following standard equipments:

- 20 bar through spindle coolant
- Universal swarf management system Including: auto flush, chip augers, chip conveyor and full enclosures
- 2 stations swing type APC
- 48 position ATC
- Oil chiller as option on 9 / 12 belt, as standard on 15 belt & 15 coupling .



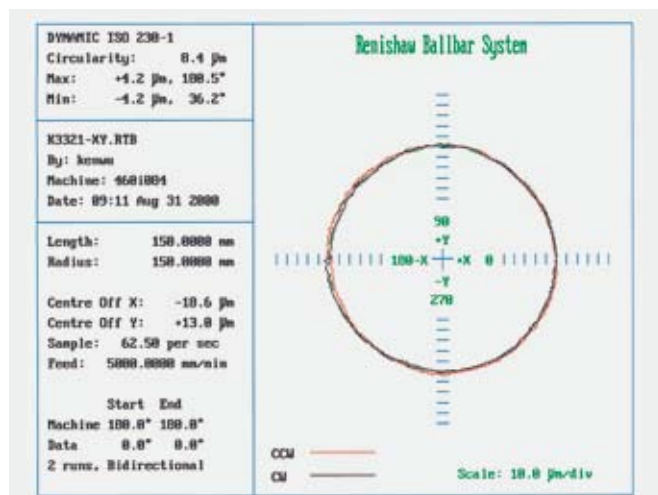
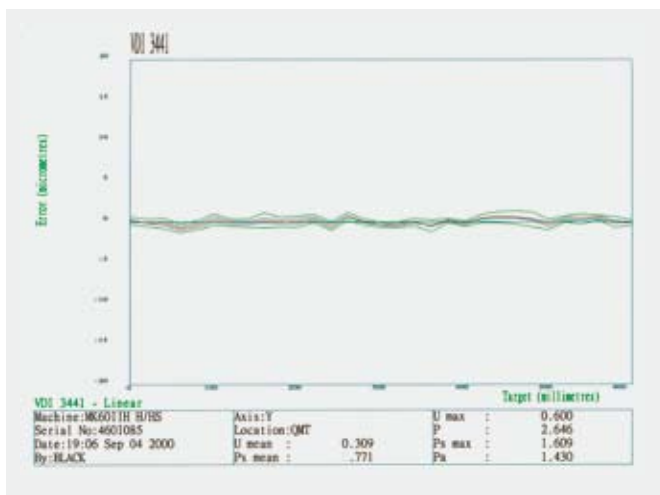
Column moving design on X/Y/Z axes, with high rigidity machine base, which provide less geometric error with different work-piece weight, and trouble free from chips and coolant.

- X axis span at 900 mm
- Y axis span at 500 mm
- Z axis span at 430 mm





Heavy duty $\varnothing 45$ mm pretensioned ball screws, directly coupled with AC servo motors , achieve consistent high accuracy.
3 axes 0.05 μ m absolute linear scales are option.



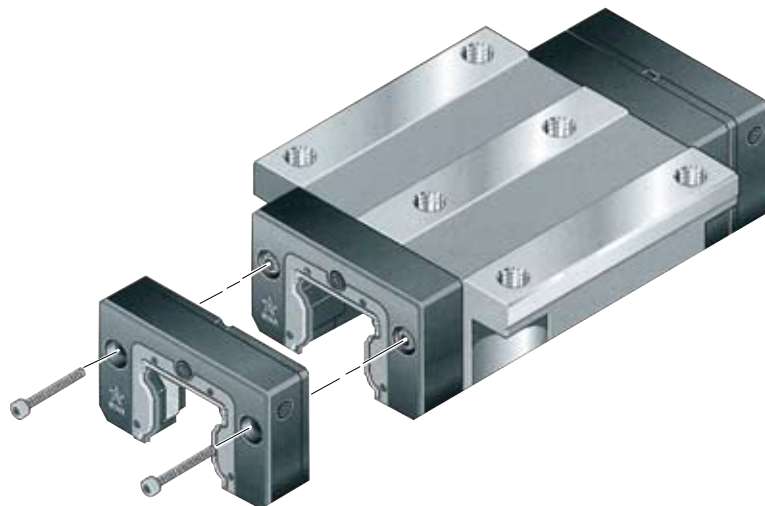
Note: The measuring results indicated in this catalog are provided as an example by random selection.

Super heavy-duty roller linear ways

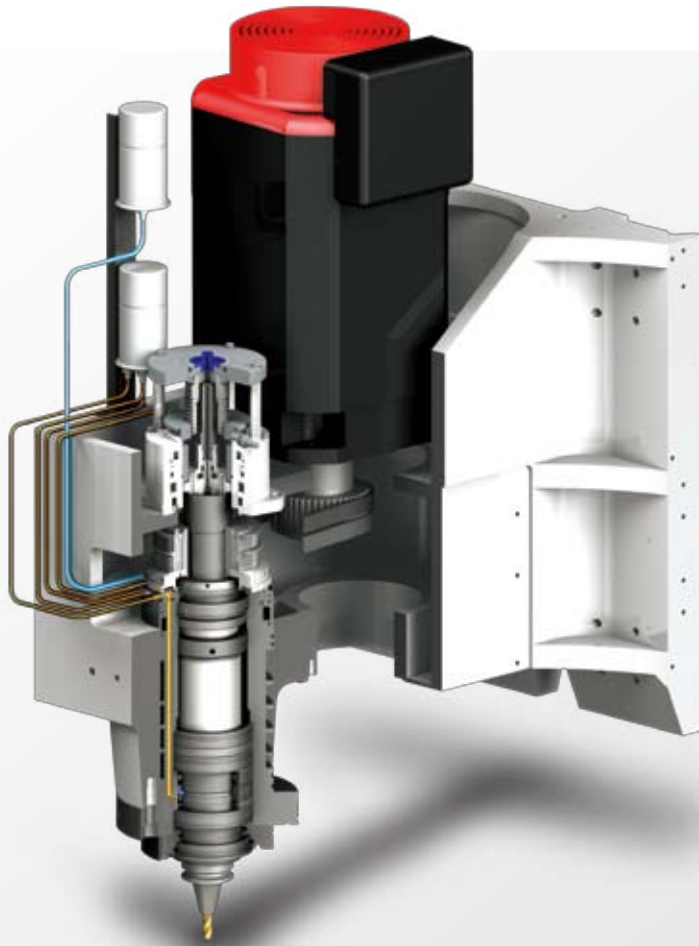
X-axis linear ways size 55

Y-axis linear ways size 55

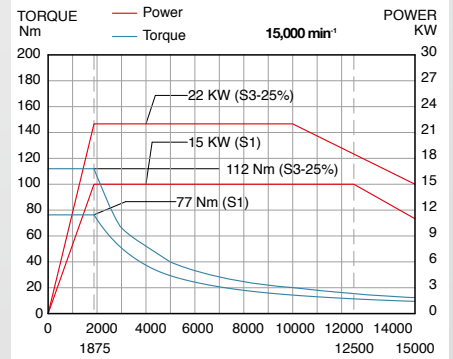
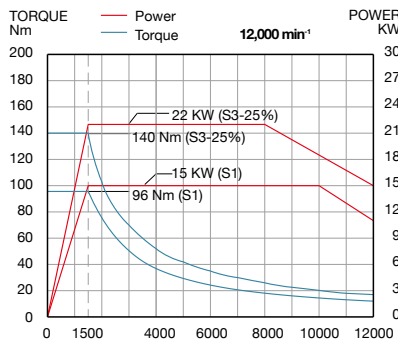
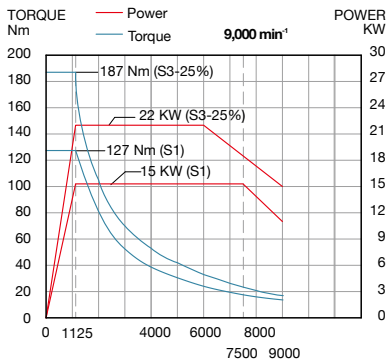
Z-axis linear ways size 45



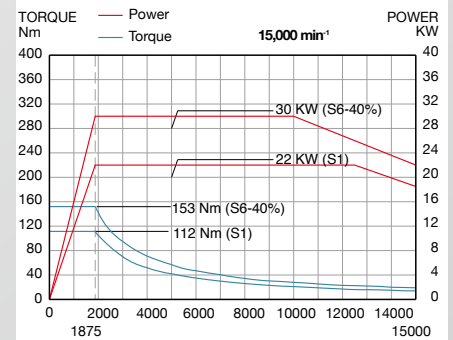
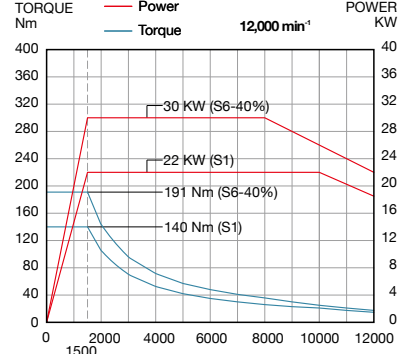
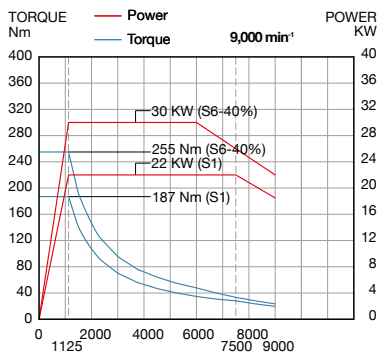
Belt Spindle WB40R



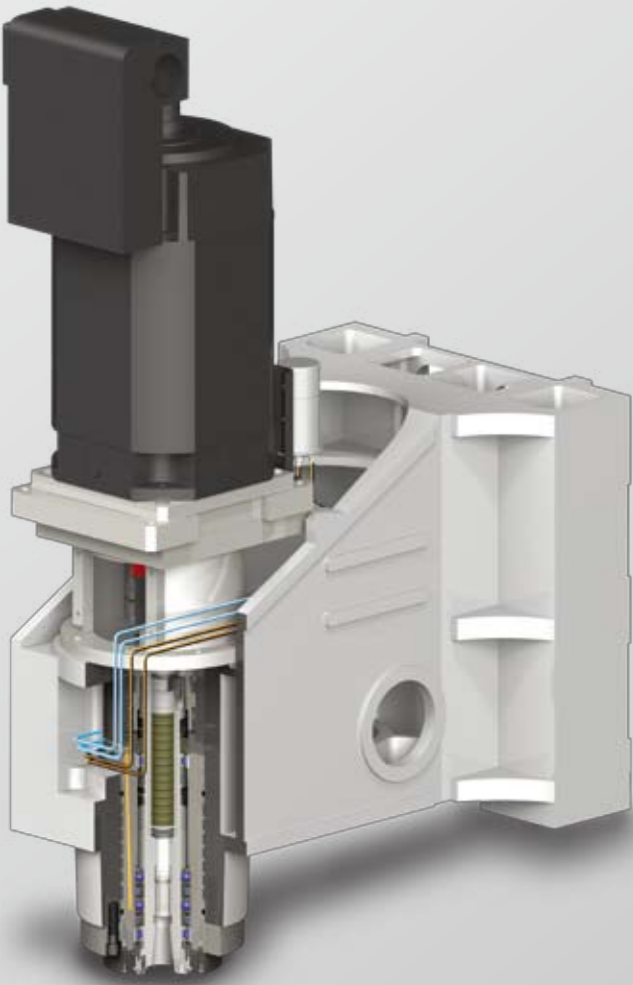
MK603SE - motor type $\alpha 15 / 12,000i$



MK603SP - motor type $\alpha 22 / 12,000i$



Coupling spindle
NC40R



Standard on all models

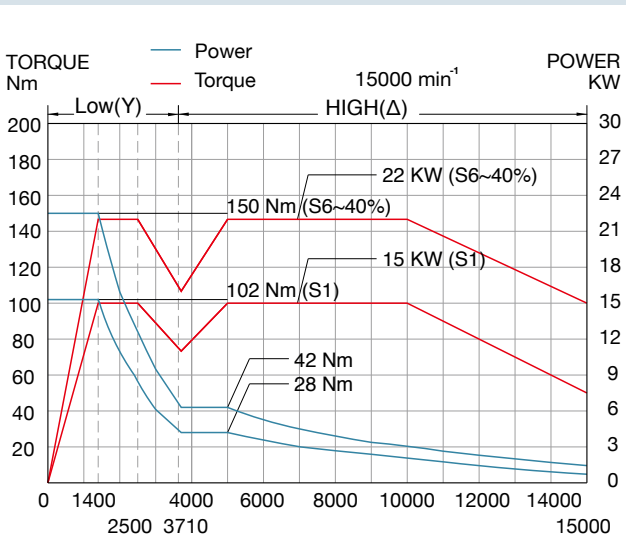
Patented Worldwide
BIG-PLUS
SPINDLE SYSTEM PAT.
SIMULTANEOUS CONTACT

Simultaneous Taper & Flange Contact

Maximum Contact

- Greater machining rigidity
- Higher cutting accuracy
- Extended cutting tool life
- Improved ATC repeatability

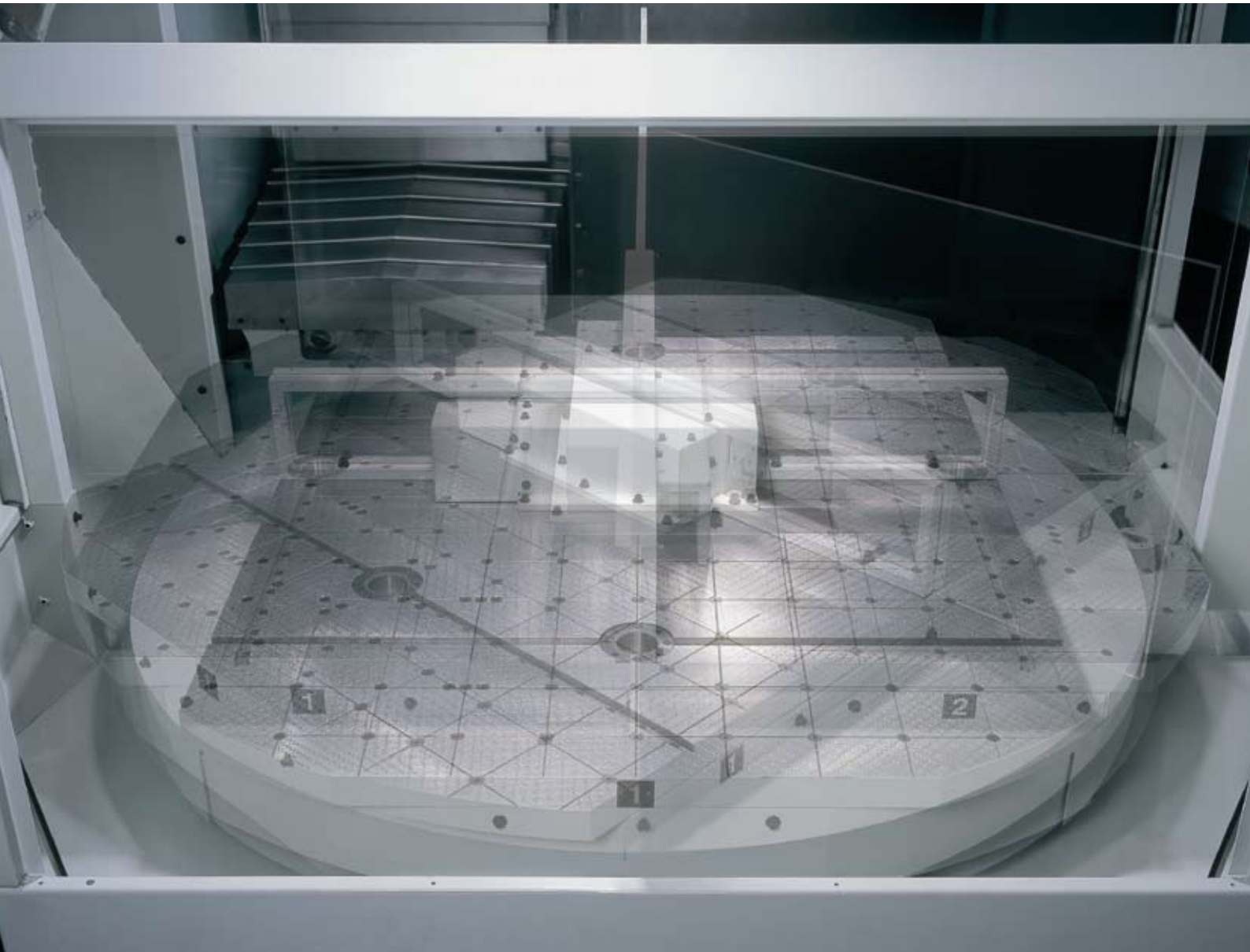
MK603SP / 15D - motor type αT15 / 15,000i



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Pallet load capacity: 300 kgs/each end
APC time: 8 seconds

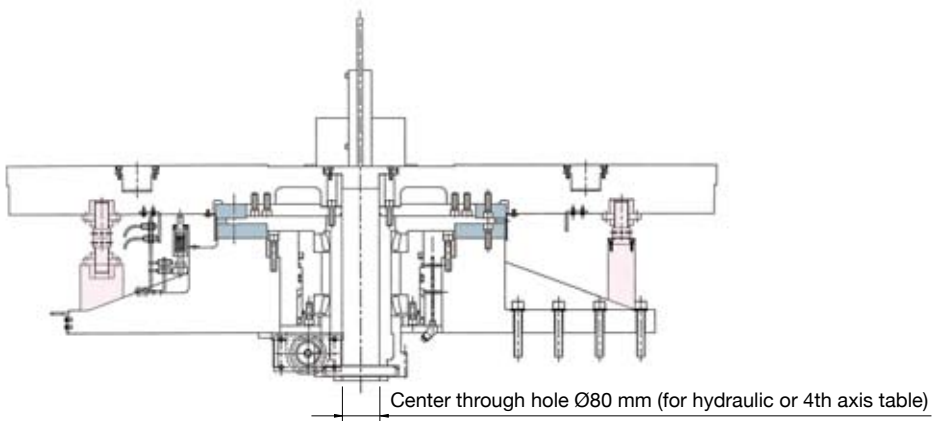


Two fourth axis table ($\varnothing 255$) with tailstocks or fixtures with hydraulic end supports can boost maximum efficiency. (optional)



The most rigid & reliable system
in the world :

- $\varnothing 600$ mm curvic coupling by 5
tons clamping force plus two
end supporters
- **NO ONE FAILURE** at 600
installations in the 14 years
period (1994-2008)



Minimum moving parts to achieve highest reliability

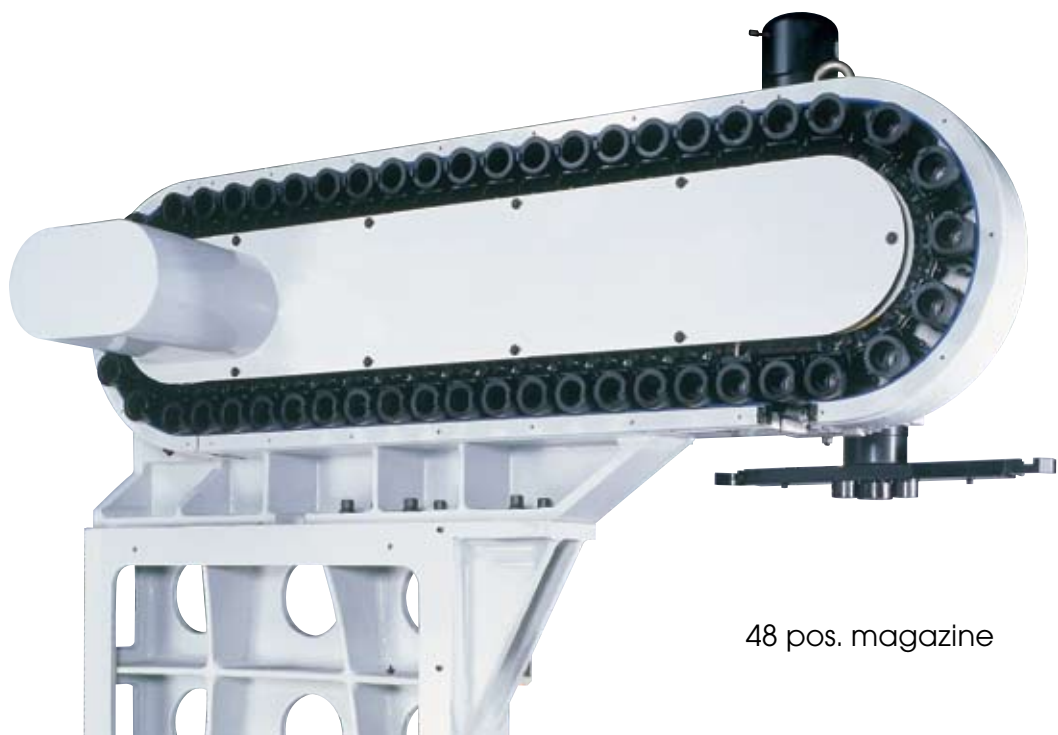
Tool to tool : 2.5 seconds

Chip to chip : 5 seconds on MK603SP

6 seconds on MK603SE



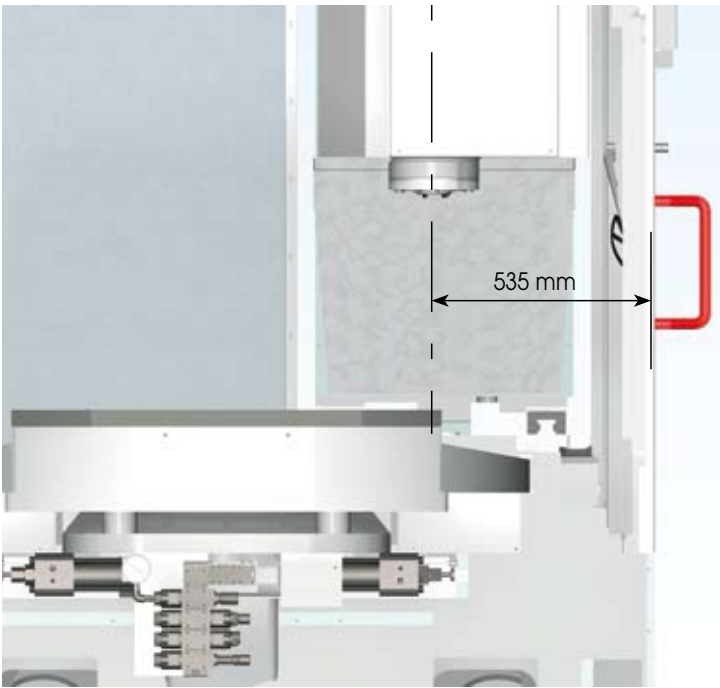
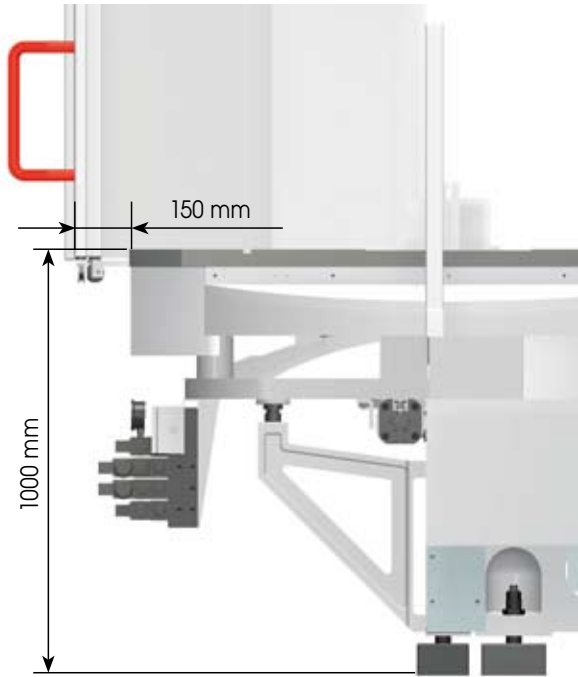
The tool magazine and cam box unit is sitting on machine base, minimize the weight and magazine rotating effect on precision machining.



48 pos. magazine

Built from operator's view,

- Ergonomic operator control panel
- Table to front - easy access at 150 mm
- Side door to spindle at convenient 535 mm for manual tool loading / unloading from spindle
- Table surface to floor at 1000 mm
- Large door opening 1000 mm



Our attention to small details shows that we care



Documentation & hand tool shelf



Tool shelf (Door removed for explanations)

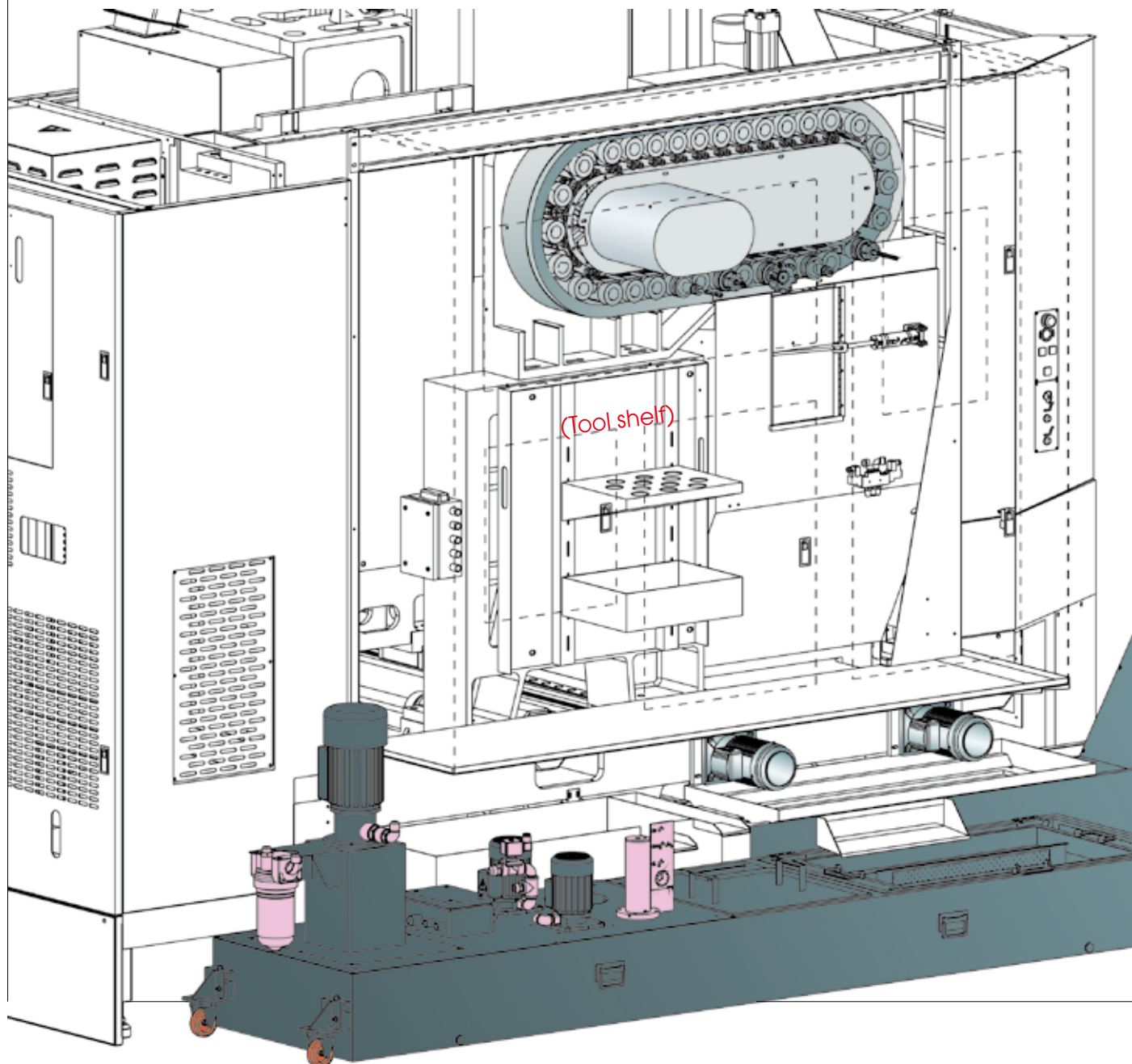


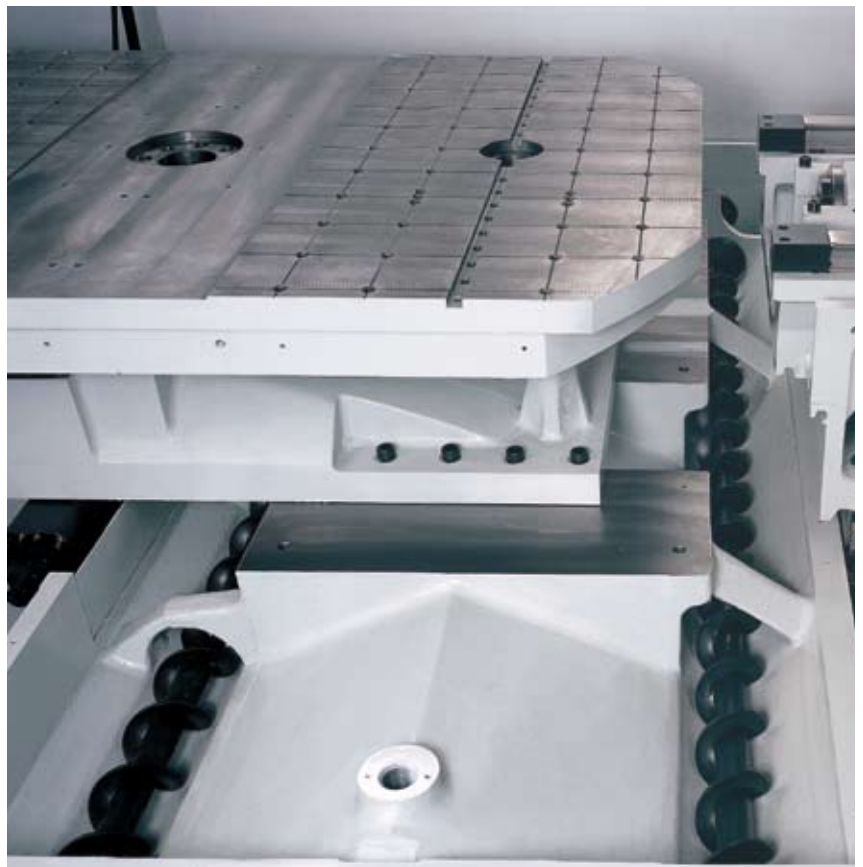
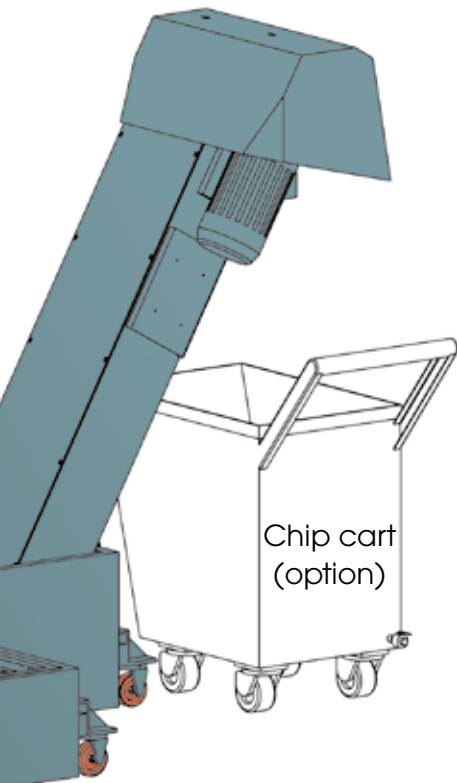
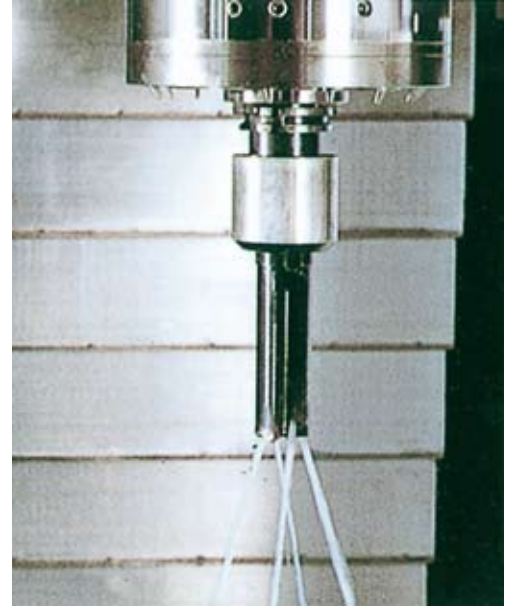
Chip cleaning during machine running

The best swarf management system with minimum floor space 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 1.5 mm & 0.5 mm filters for nozzle coolant & flushing; a final 25 µm 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.





(Some covers removed for explanations)

MK603SP / 12 (12,000 min⁻¹)

High Metal Removal Rate

FACE MILLING



ST60

ALMGS11

Tool: $\varnothing 80 \times 6$ teeth

S = 1,000 min⁻¹

S = 10,000 min⁻¹

F = 1,800 mm/min

F = 16,000 mm/min

Q = 576 c.c./min

Q = 2,610 c.c./min

END MILLING



Tool: $\varnothing 45 \times 5$ teeth

S = 240 min⁻¹

S = 640 min⁻¹

F = 84 mm/min

F = 384 mm/min

Q = 101 c.c./min

Q = 614 c.c./min

DRILLING (W/T.S.C.)



Tool: $\varnothing 54 \times 2$ flutes

S = 880 min⁻¹

S = 2,000 min⁻¹

F = 88 mm/min

F = 200 mm/min

TAPPING



Tool: M36xP4.0

S = 177 min⁻¹

S = 186 min⁻¹

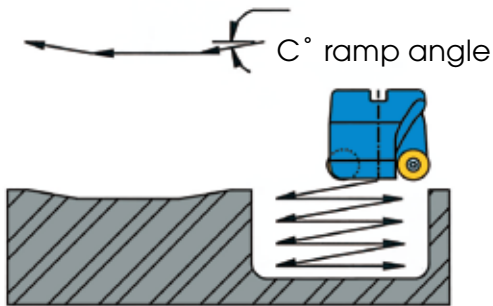
F = 708 mm/min

F = 744 mm/min

MK603SP/15 (15,000 min⁻¹)

Heavy duty :

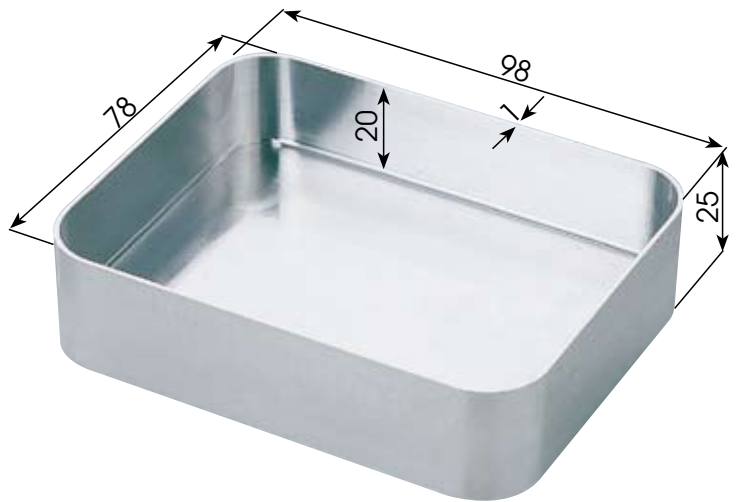
Plunge milling



Cutting example : Material : ST60
 Tool : ø80-5 teeth plunge miller
 Spindle speed : 765 min⁻¹
 Cutting speed : 192 m/min
 Cutting depth : 5 mm/path, 3 paths
 Feed : 525 mm/min

Note: "BIG-PLUS" tool shank needed

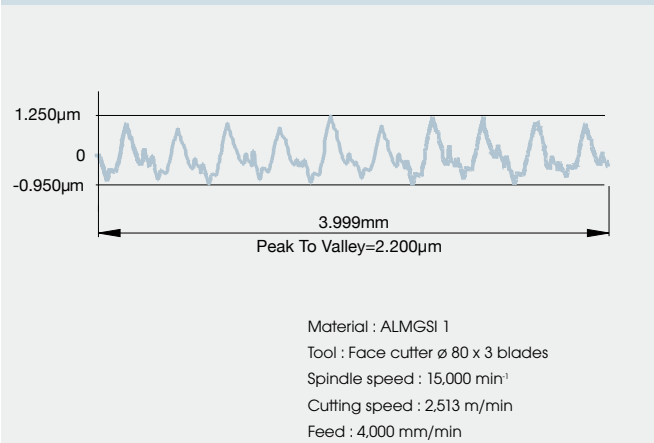
High Speed :



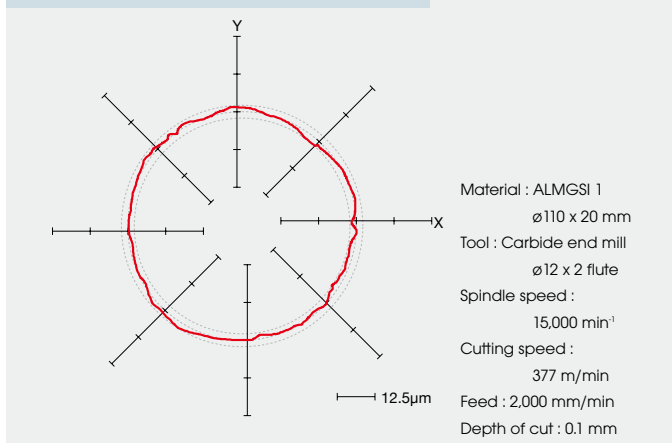
Cutting example : Material : ALMGSI 1
 Tool : ø16 mm 2 flute end mill
 Spindle speed : 15,000 min⁻¹
 Cutting speed : 300 m/min
 Feed : 6,000 mm/min
 Time : 54 seconds

High Accuracy

Surface roughness: 2.2µm (R max.)



Roundness : 4µm



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

MK603S series

Technical data

Models

MK 603 SE	MK 603 SP
Economic	Performance
MK 603 SE /9	MK 603 SP /9
MK 603 SE /12	MK 603 SP /12
MK 603 SE /15	MK 603 SP /15
-	MK 603 SP /15D

Technical data	MK603SE			MK603SP			
	/9	/12	/15	/9	/12	/15	/15D
Work range							
Pallet size (mm)	1,050 x 550 x 2						
Max. work swing diameter (mm)	ø1630						
Max. work piece height	350 ⁽¹⁾						
Table load capacity (kg)	300 x 2 (500 x 2 by reducing speed)						
Travel X / Y / Z (mm)	1,020 / 610 / 600						
Table surface to spindle nose (mm)	130~730						
Surface configuration	128 – M12 @ Pitch 100 grid						
Feed drive							
Feed force	X (N)	6,283		11,520 / 8,639			
	Y (N)	6,283		11,520 / 8,639			
	Z (N)	11,520		11,520 / 8,639			
Rapid movement	X / Y / Z (m/min)	32		32 (opt.48)			
Acceleration	X / Y / Z (m/s ²)	2.7 / 3 / 3.4		4 / 5 / 5 (3.5 / 4.5 / 4.5 on 48 m/min)			
Dia. & pitch of the ball screw (mm)	ø45 / P12		ø45 - P12 / P16				
Position accuracy							
ISO 230-3 / JIS	X / Y / Z (mm)		0.015 / 0.008				
With linear encoder	0.008 / 0.004						
Main spindle – 40 Taper							
Spindle model	40 Taper						
Spindle taper	ISO 40 or BT40						
Max. spindle speed	9,000	12,000	15,000	9,000	12,000	15,000	15,000
Spindle base speed	1,125	1,500	1,875	1,125	1,500	1,875	1,400
Spindle output kw (S6-40%)	22 ⁽²⁾			30			22
Spindle torque Nm (S6-40%)	187 ⁽²⁾	140 ⁽²⁾	112 ⁽²⁾	255	191	153	150
Spindle transmission	Belt						Coupling
Spindle diameter (mm)	ø70						
Tool changer							
Tool selection	Random						
Magazine positions	48						
Max. tool diameter / No adjacent tool (mm)	ø75 / ø125						
Max. tool length (mm)	300						
Max. tool weight (kg)	7						
Tool to tool time (sec.)	2.5						
Chip to chip time (sec.) ⁽³⁾	6			6 sec @ 32m/min; 5 sec @ 48m/min			
Pallet changer							
Number of pallet	2						
Method of pallet changer	Swing Arm type						
Pallet change time (sec.) ⁽³⁾	8						
Pallet changing repeatability (mm)	0.008						

Main spindle

MK603SE	/9 - 9,000 min ⁻¹	} Belt drive
	/12 - 12,000 mi n ⁻¹	
	/15 - 15,000 min ⁻¹	
MK603SP	/9 - 9,000 min ⁻¹	} heavy duty, belt drive
	/12 - 12,000 min ⁻¹	
	/15 - 15,000 min ⁻¹	
	/15D - 15,000 min ⁻¹	Heavy duty, direct coupling

Control

QUASER mill i (For E type)
FANUC 18iMB (For P type)

Technical data	MK603SE			MK603SP			
	/9	/12	/15	/9	/12	/15	/15D
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						
Machine size							
Height (mm)	3,300						
Floor space W x D (mm)	2,880 x 4,860						
Weight (kg)	12,000						
Connections							
Main power	400 V / 50 Hz						
Power consumption (KVA)	35			40			

Note: ⁽¹⁾ The interference area during tool changer, see page 17

⁽²⁾ S3-25%

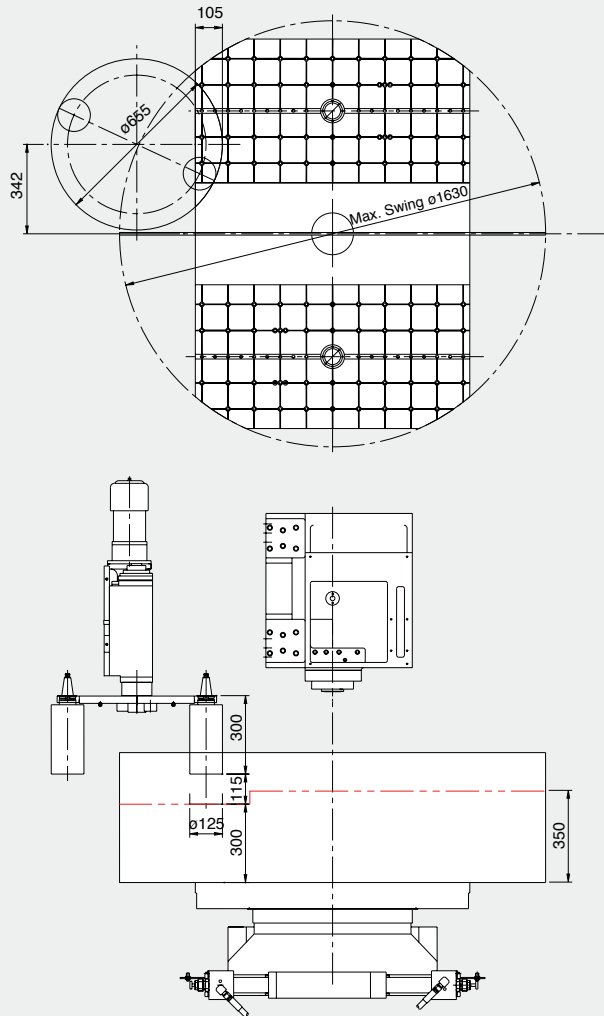
⁽³⁾ At 60 Hz

●= Standard ○=Option ✕= N/A

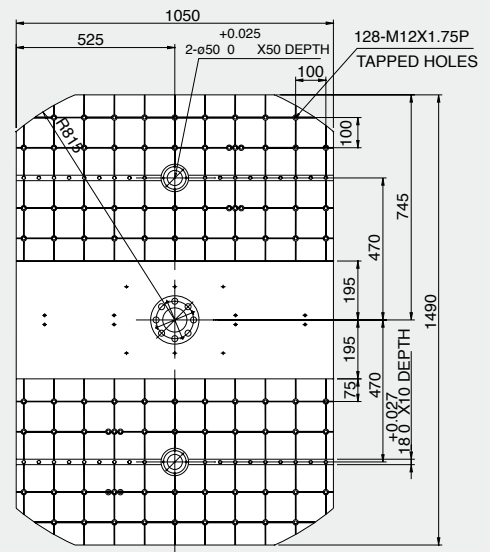
Standard / Option accessories	MK603SE			MK603SP			
	/9	/12	/15	/9	/12	/15	/15D
■ QUASER mill i	●	●	●	✕	✕	✕	✕
■ FANUC 18 iMB	✕	✕	✕	●	●	●	●
■ Spindle ECO cooler	●	●	✕	●	●	✕	✕
■ Spindle oil chiller	○	○	●	○	○	●	●
■ 48m / min rapid****	✕	✕	✕	○	○	○	○
■ 48 position tool magazine	●	●	●	●	●	●	●
■ BT tooling (QUASER supply special pull stud)	●	●	●	●	●	●	●
■ DIN tooling (69872-A)	○	○	○	○	○	○	○
■ ISO tooling (7388-B)	○	○	○	○	○	○	○
■ 2 pallet station	●	●	●	●	●	●	●
■ Tool length / breakage measurement	○	○	○	○	○	○	○
■ Linear encoder (Absolute 0.05µm)	○	○	○	○	○	○	○
■ Coolant system	●	●	●	●	●	●	●
■ 20 bar through spindle coolant	●	●	●	●	●	●	●
■ 50 bar through spindle coolant	○	○	○	○	○	○	○
■ Saddle wash down coolant	●	●	●	●	●	●	●
■ Coolant wash gun	●	●	●	●	●	●	●
■ Chip augers (2 sets)	●	●	●	●	●	●	●
■ Cutter air blast	●	●	●	●	●	●	●
■ Chip conveyor	Scrape type						
	Hinge type						
■ Work light	●	●	●	●	●	●	●
■ Machine status light	●	●	●	●	●	●	●
■ CE & EMC	●	●	●	●	●	●	●
■ Top cover	○	○	○	○	○	○	○

Note: **** The linear encoder at std. on 48 m/min rapid.

Swing table interference area

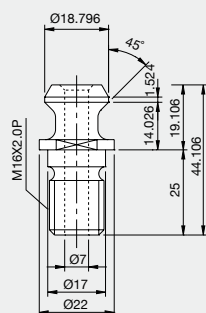


Swing table dimension

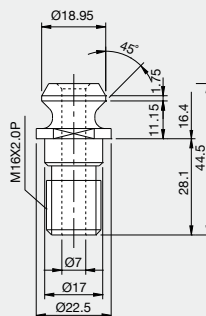


Pull stud and applicable tools

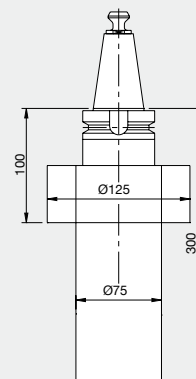
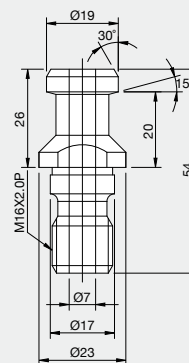
- BT40 (QUASER supply)



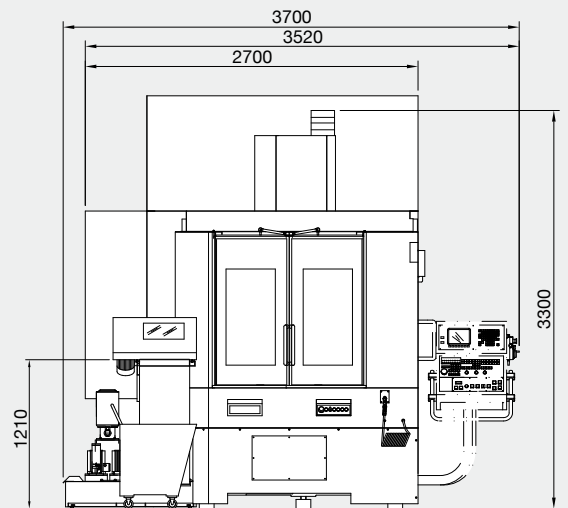
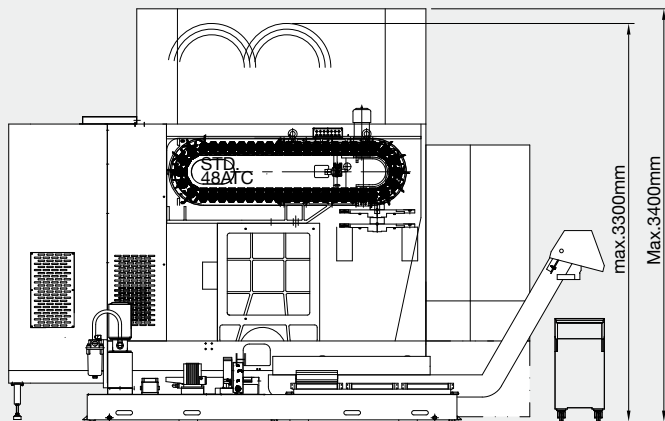
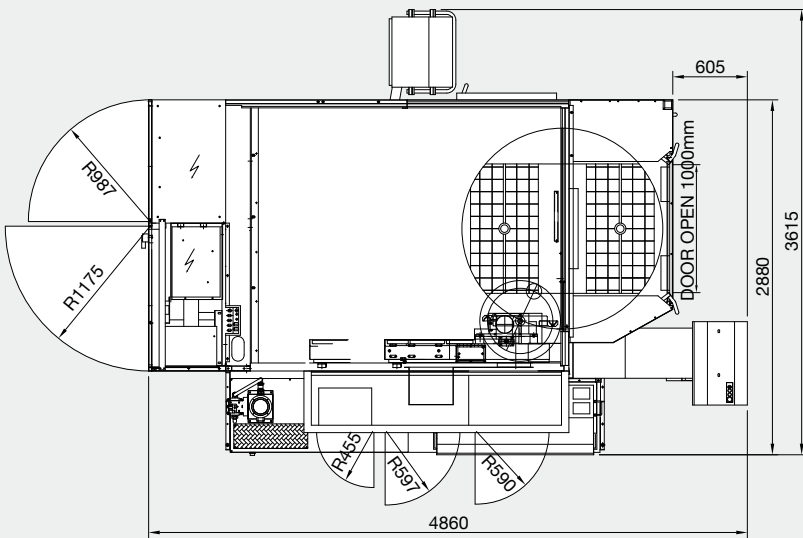
- ISO (7388-B)



- DIN (69872-A)



Installation dimension



* With top guard (option)



Option top cover for chip management



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