

**QUASER**

***we cut faster***

# **MK603S SERIES**

**MK603S series is our third generation of MK60S vertical machining center.**

**The MK603S series achieves:**

- Large work area configuration with compact foot print
- High efficiency
- High reliability



## Economic Machine

MK 603SE

25 KW

Belt Spindle

- 9,000 min<sup>-1</sup>, 212 N.m

- 12,000 min<sup>-1</sup>, 159 N.m

- 32 m/min

QUASER mill i

## Performance Machine

MK 603SP

35 KW

Belt Spindle

- 9,000 min<sup>-1</sup>, 297 N.m

- 12,000 min<sup>-1</sup>, 223 N.m

- 32 m/min (option 48m/min  
with Linear scale)

FANUC 31i B

MK 603SP

26 KW

Coupling Spindle

- 15,000 min<sup>-1</sup>, 177 N.m

- 20,000 min<sup>-1</sup>, 125 N.m

- 32 m/min (option 48m/  
min with Linear scale)

FANUC 31i B

### All following items are standard::

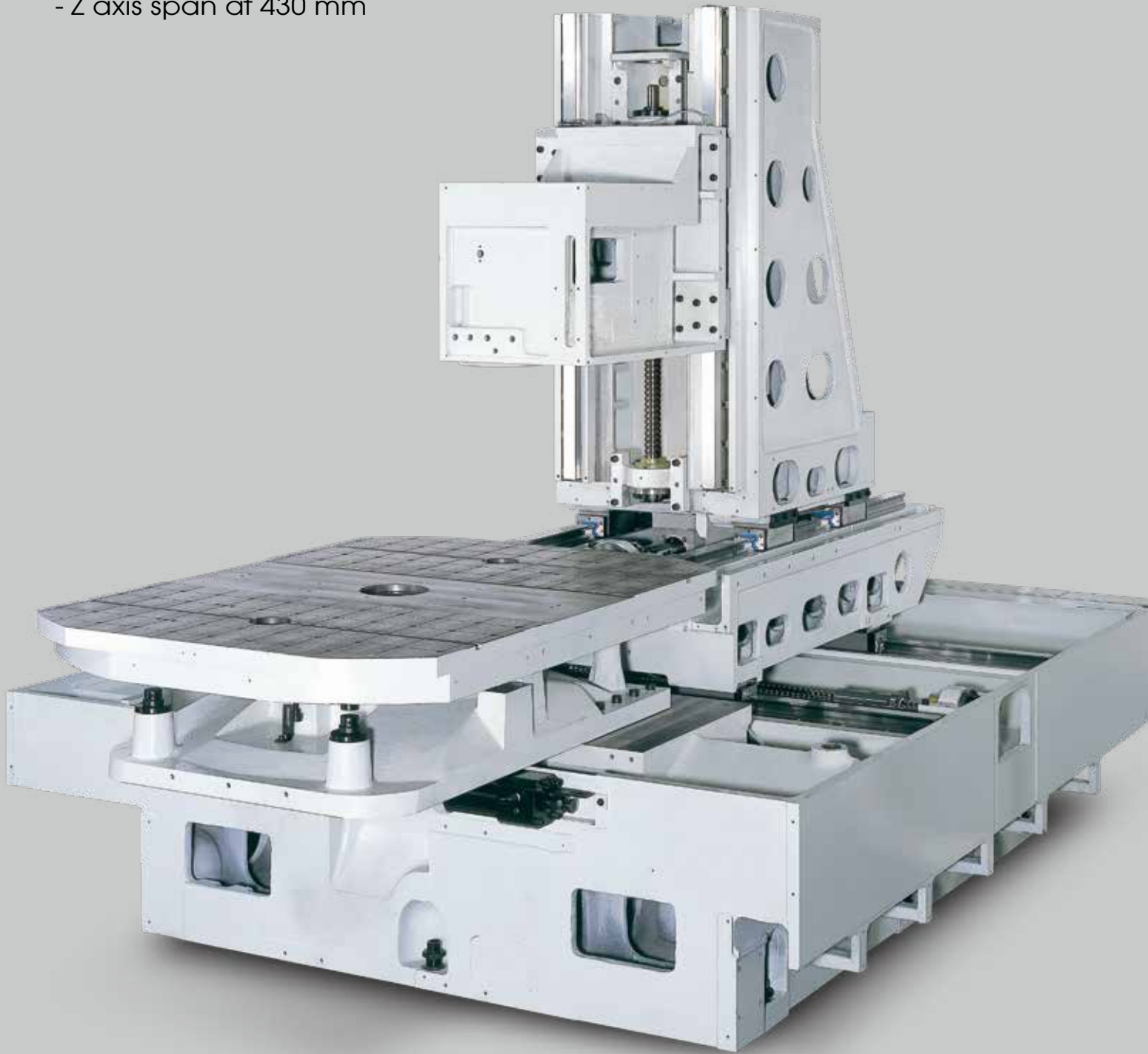
- 20 bar coolant through spindle
- Swarf management system including: auto flush, chip augers, chip conveyor and full enclosures
- Dual-pallet swing type APC
- 48 position ATC



Note: The object might be different from the photos of catalogue if there is any specification update.

**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

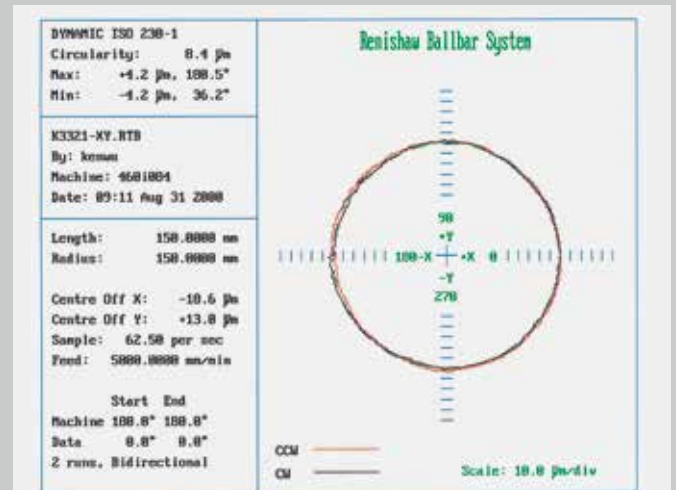
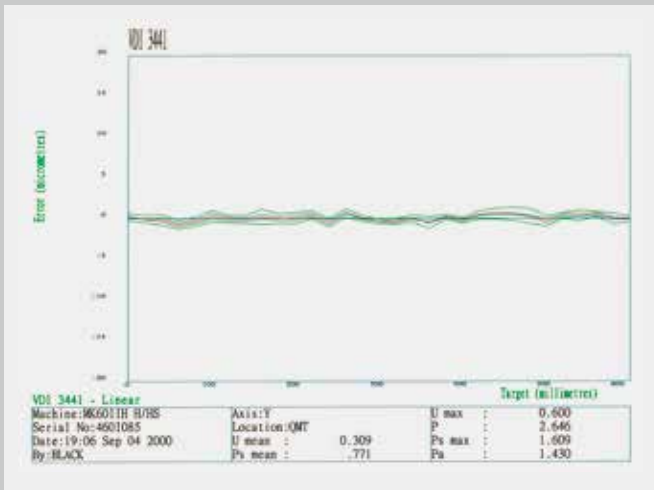




Heavy duty  $\varnothing 45$  mm pretensioned ball screws, directly coupled with AC servo motors, achieve consistent high accuracy.

3 axes  $0.05 \mu\text{m}$  absolute linear scales are option.

Motor	MK603SE	MK603SP
X / Y / Z (kW)	3 / 3 / 4	4 / 4 / 4



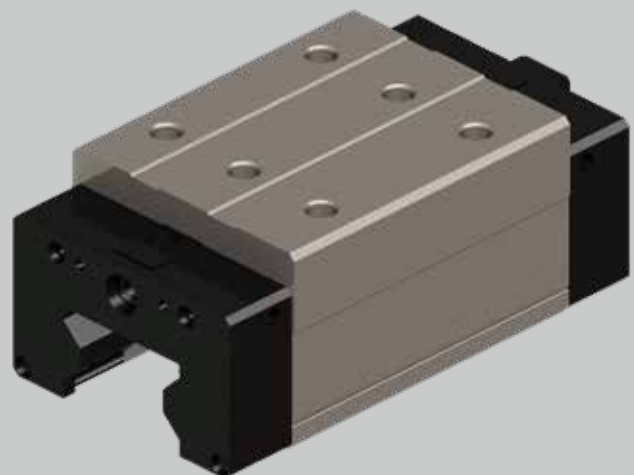
Note: The measuring results indicated in this catalog are provided as an example by random selection.

## Super heavy-duty roller linear ways

X-axis linear ways size 55

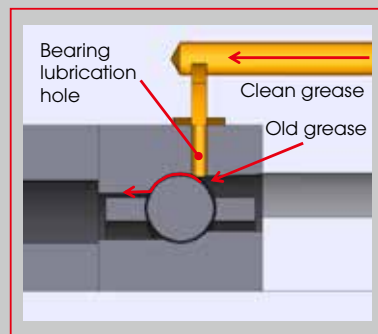
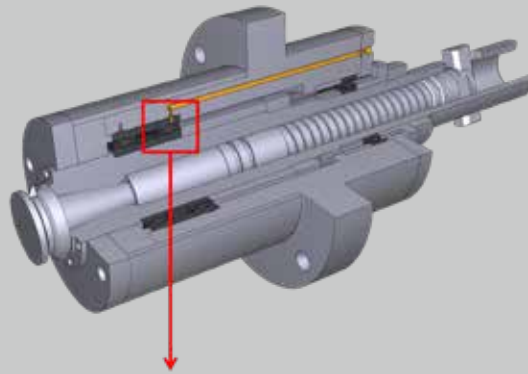
Y-axis linear ways size 55

Z-axis linear ways size 45



# Spindle System

- Grease supply system is designed to be stable and eco-friendly by supplying new grease intermittently to the bearing during the high speed rotation.



- Standard on all models



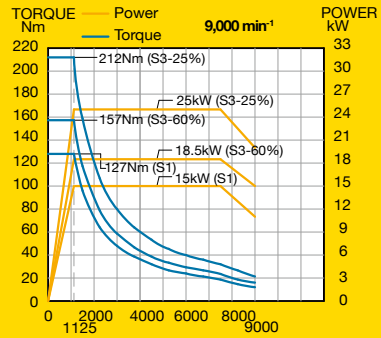
New spindle code	MB-4.0				MC-4.1R	MC-4.0R
Shaft diameter	Ø70 / Ø65				Ø80 / Ø65	Ø70 / Ø60
Spindle Taper	ISO-40				ISO-40 / HSK A63	
Bearing arrangement	< > =				< > =	< > =
Ball bearing type	Ceramic				Ceramic	Ceramic
Roller bearing type	Steel				Steel	Ceramic
Bearing lubrication	Grease packed				Re-Grease	Re-Grease
Transmission	Belt				Coupling	Coupling
Spindle motor	α i115/12,000 (SPM22)		α i122/12,000 (SPM26)		α i115/15,000 (SPM30)	α 8/20,000iL (SPM30i)
Spindle Speed	9,000	12,000	9,000	12,000	15,000	20,000
<b>FANUC</b>						
Spindle base speed	1,125	1,500	1,125	1,500	1,400	1,150
Spindle output power kW (S3-25%)	25	25	35	35	26	15
Spindle output torque Nm (S3-25%)	212	159	297	223	177	125
CTS Availability	●	●	●	●	●	●
Available NC	FANUC = ●					
MK603SE	●	●	-	-	-	-
MK603SP	-	-	●	●	●	●



## MB-4.0

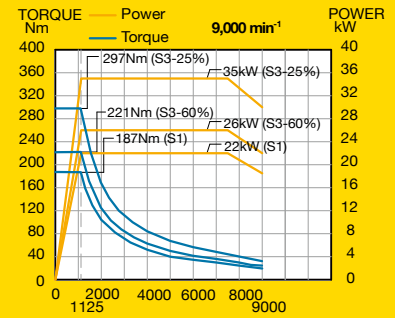
Belt

Motor type:  $\alpha$ 115 / 12,000 (SPM22)



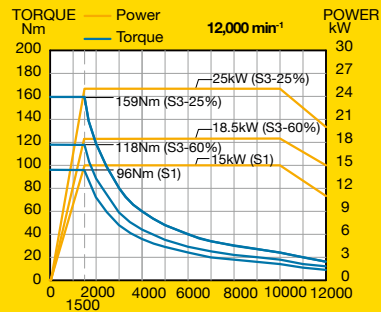
Belt

Motor type:  $\alpha$ 122 / 12,000 (SPM26)



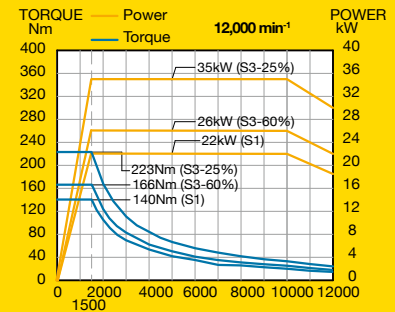
Belt

Motor type:  $\alpha$ 115 / 12,000 (SPM22)



Belt

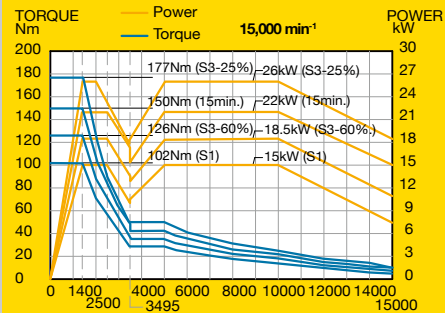
Motor type:  $\alpha$ 122 / 12,000 (SPM26)



## MC-4.1R

Coupling

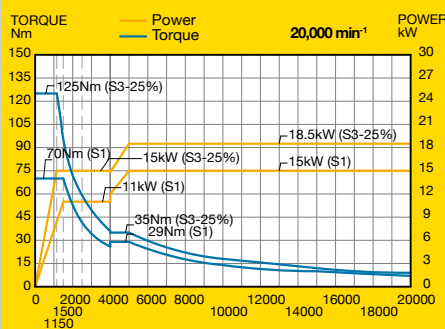
Motor type:  $\alpha$ IT15 / 15,000 (SPM30)



## MC-4.0R

Coupling

Motor type:  $\alpha$ 8 / 20,000iL (SPM30i)



# Pallet system

**Pallet load capacity: 300 kgs/each end**

**APC time: 8 seconds**



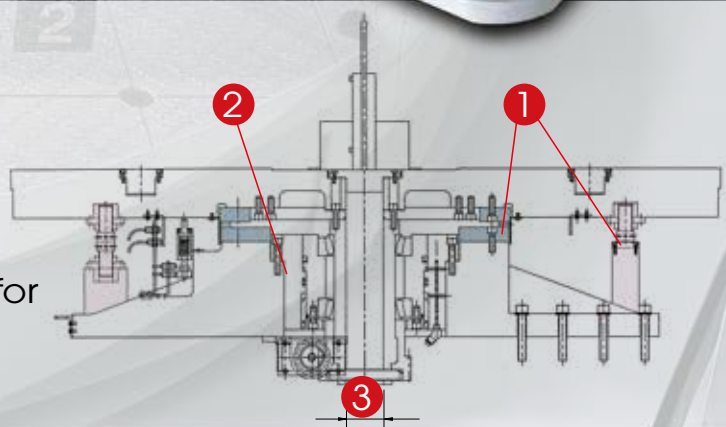
Two fourth axis tables (ø255) with tailstocks or fixtures with hydraulic end supports can boost maximum efficiency. (option)





Rigid & reliable system

- ①  $\varnothing 600$  mm curvic coupling plus two end supporters
- ② 50,000 N clamping force
- ③ Center through hole  $\varnothing 80$  mm (for hydraulic or 4th axis table)



# ATC system

## Minimum moving parts to achieve highest reliability

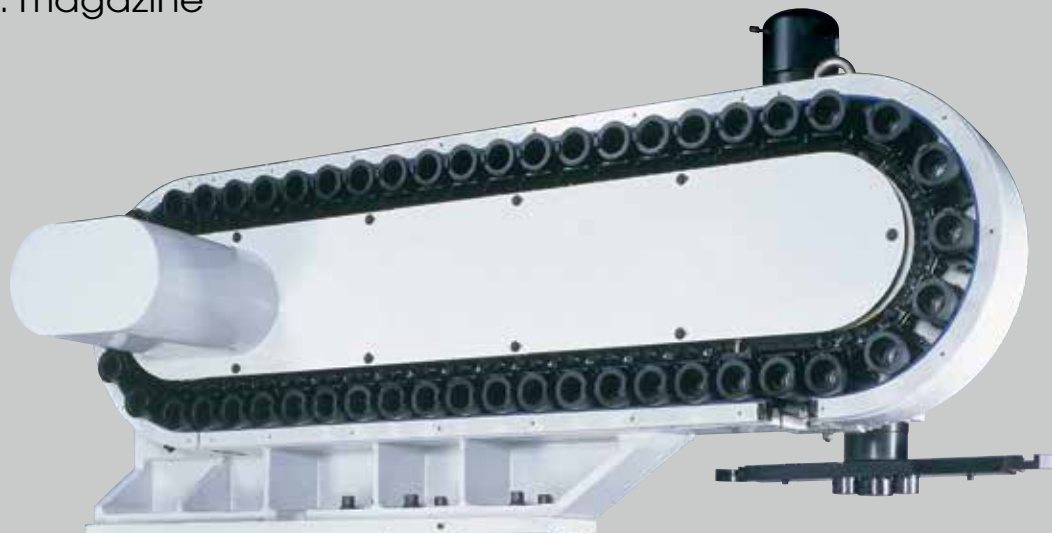
Tool to tool : 2.5 seconds

Chip to chip : 5 seconds on MK603SP

: 6 seconds on MK603SE



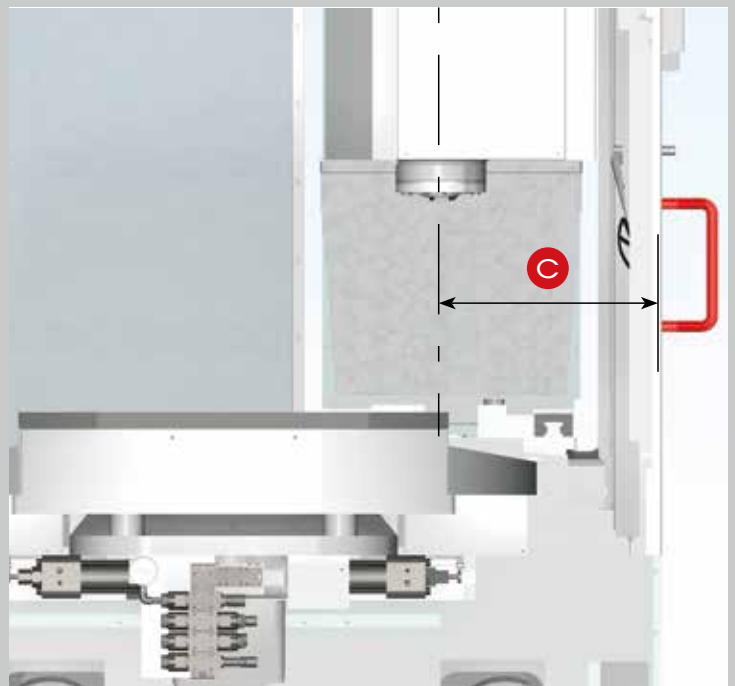
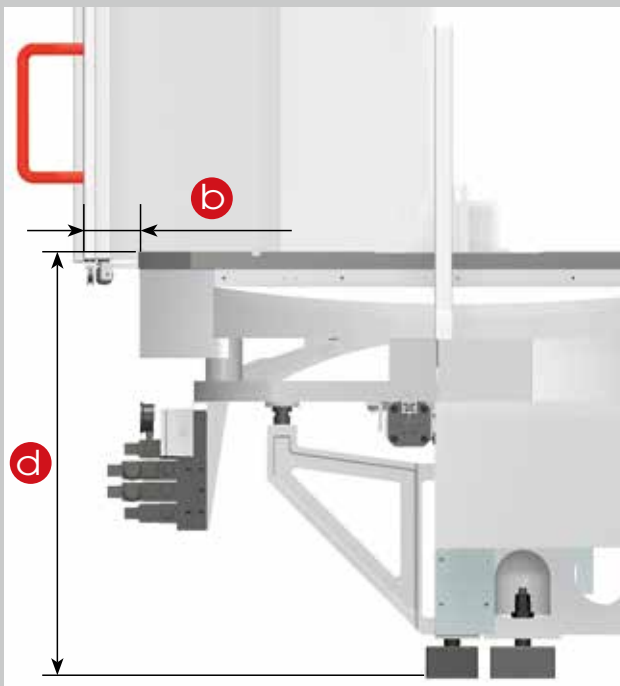
48 pos. magazine



# Ergonomic and Space-saving design

## Built from operator's view

- a** Ergonomic operator control panel
- b** Good accessibility from edge of table to operator- minimum distance 150 mm
- c** Side door to spindle is 535 mm  
Allows convenient access for manual tool loading/unloading from spindle.
- d** Table surface to floor at 1000 mm  
- Large door opening 1000 mm
- e** Documentation & hand tool shelf
- f** Tool shelf



## Our attention to small details shows that we care



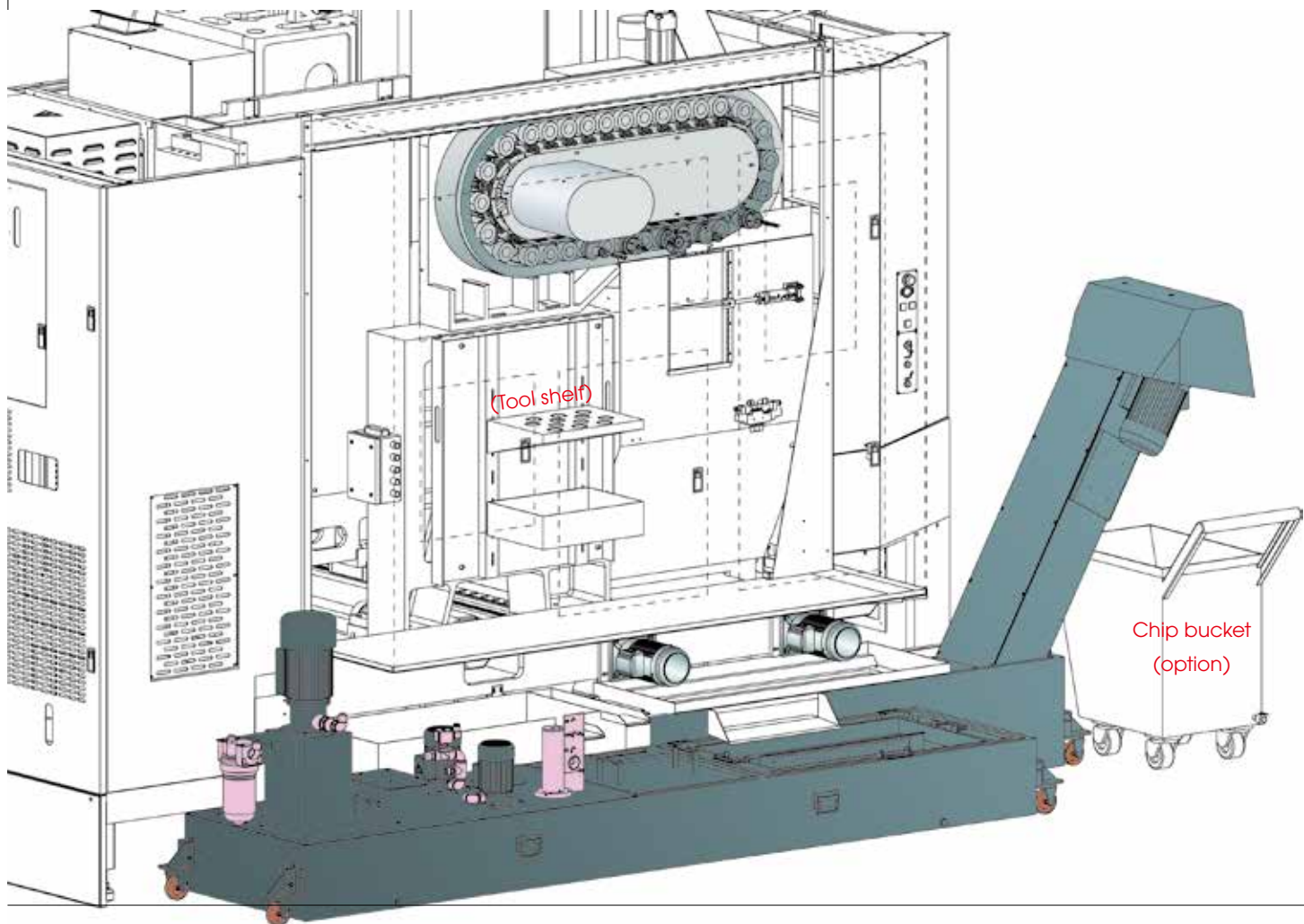


# Coolant system & Chip management

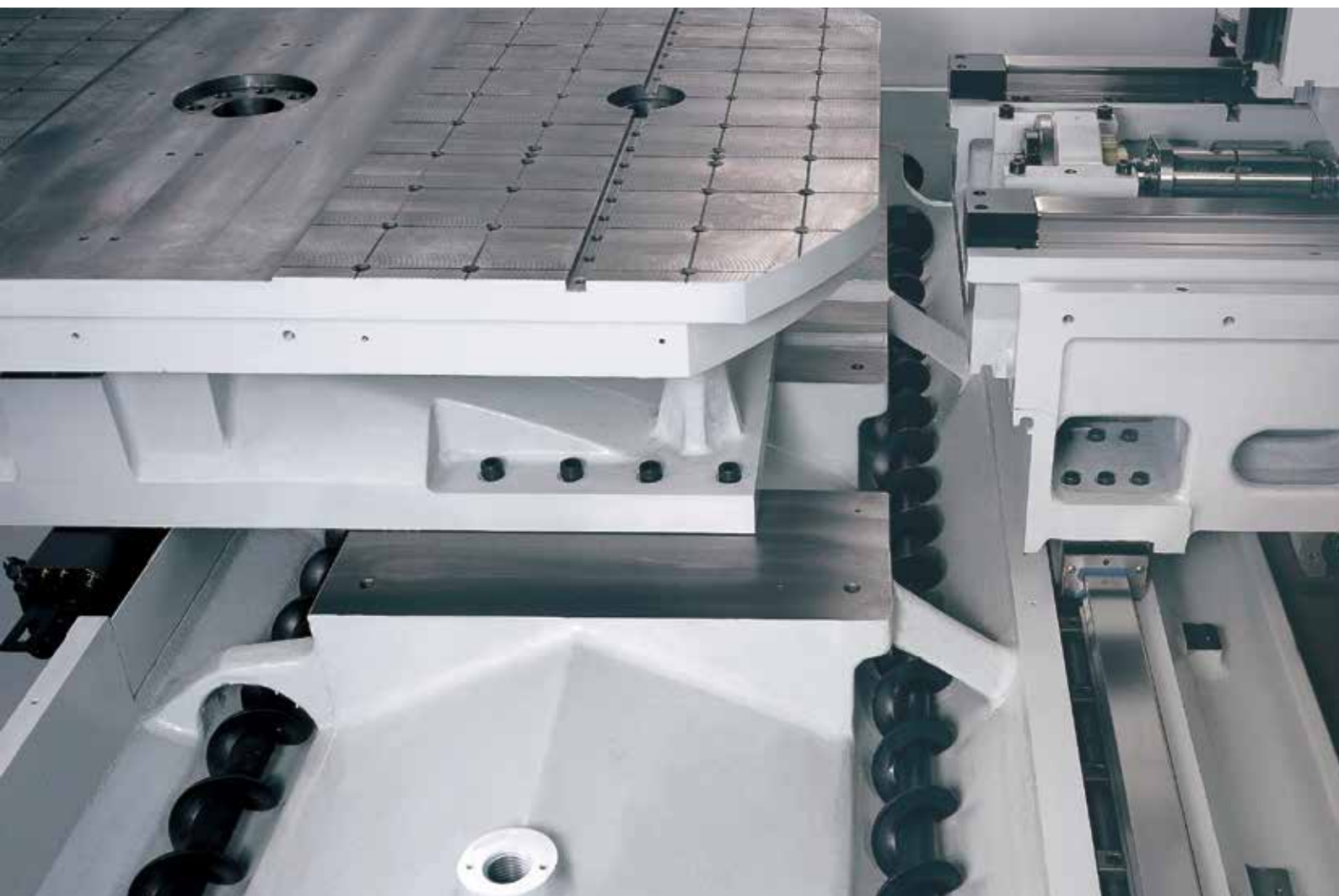
**The best swarf management system with minimum floor space required when compared with competitive machines in the same price range**

## 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 C.T.S.
- 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)

# Cutting data

## FACE MILLING



MK603SP (12,000 min<sup>-1</sup>)

material	ST60	ALMGSI1
Tool	ø80x6 teeth	
Spindle speed	1,000 min <sup>-1</sup>	10,000 min <sup>-1</sup>
Feed rate	1,800 mm/min	16,000 mm/min
Metal removal rate	576 cm <sup>3</sup> /min	2,610 cm <sup>3</sup> /min

## END MILLING



Tool	ø45x5 teeth	
Spindle speed	240 min <sup>-1</sup>	640 min <sup>-1</sup>
Feed rate	84 mm/min	384 mm/min
Metal removal rate	101 cm <sup>3</sup> /min	614 cm <sup>3</sup> /min

## DRILLING (W/C.T.S)



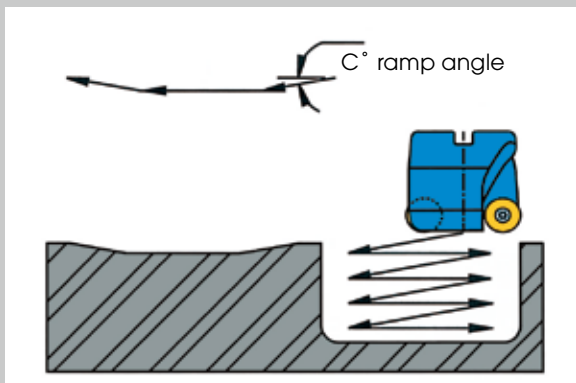
Tool	ø54x2 flutes	
Spindle speed	880 min <sup>-1</sup>	2,000 min <sup>-1</sup>
Feed rate	88 mm/min	200 mm/min

## TAPPING



Tool	M36xP4.0	
Spindle speed	177 min <sup>-1</sup>	186 min <sup>-1</sup>
Feed rate	708 mm/min	744 mm/min

## Steel material: heavy-duty milling



MK603SP (15,000 min<sup>-1</sup>)

Material	ST60
Tool	ø80-5 teeth plunge miller
Spindle speed	765 min <sup>-1</sup>
Cutting speed	192 m/min
Cutting depth	5 mm/path
Feed rate	525 mm/min

Note: "BIG-PLUS" tool shank is needed

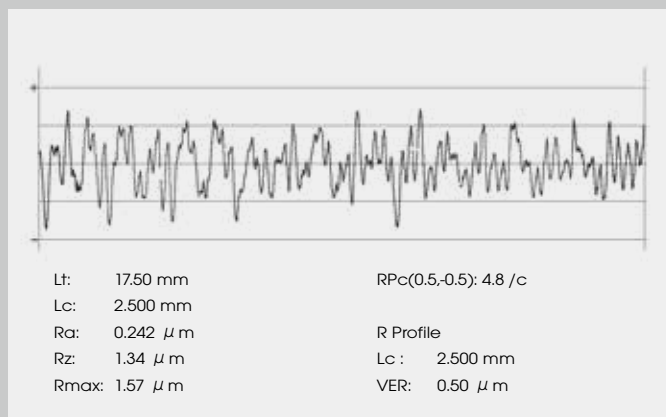
## Aluminum material: high speed milling



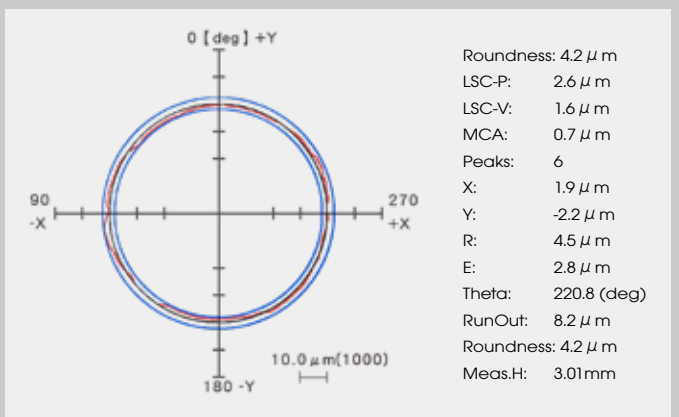
Material	ALMGSI1
Tool	ø16 mm 2 flute end mill
Spindle speed	15,000 min <sup>-1</sup>
Cutting speed	300 m/min
Cutting depth	6,000 mm/min
Time	54 seconds

## High Accuracy

Surface roughness : 1.57µm (R max.)



Roundness : 4.2µm



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

Main spindle : Heavy duty, belt drive = B Heavy duty, direct coupling = C

Technical data	MK603SE		MK603SP			
	Economic		Performance			
Spindle code	9B	12B	9B	12B	15C	20C
<b>Work range</b>						
Pallet size (mm)	1,050 x 550 x 2					
Max. work swing diameter (mm)	Ø1630					
Max. work piece height	350 <sup>(1)</sup>					
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					
<b>Feed drive</b>						
Feed force X (N)	6,283		8,639			
Y (N)	6,283		8,639			
Z (N)	11,520		8,639			
Rapid movement X / Y / Z (m/min)	32		32 (opt.48)			
Acceleration X / Y / Z (m/s²)	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 / P16			
<b>Accuracy Positioning / Repeatability</b>						
ISO 230-3 / JIS	0.008 / 0.004					
JIS 6338 (300mm)	±0.003 / ±0.002					
VDI 3441	0.008 / 0.004					
<b>Main spindle</b>						
Spindle taper	BBT40					
<b>Tool changer</b>						
Tool selection	Random					
Magazine positions	48					
Max. tool diameter / No adjacent tool (mm)	Ø76.2 / Ø125					
Max. tool length (mm)	300					
Max. tool weight (kg)	7					
Tool to tool time (sec.)	2.5					
Chip to chip time (sec.) <sup>(2)</sup>	6	6 sec @ 32 m / min; 5 sec @ 48 m / min				
<b>Pallet changer</b>						
Number of pallet	2					
Method of pallet changer	Swing Arm Type					
Pallet change time (sec.) <sup>(2)</sup>	8					
Pallet changing repeatability (mm)	0.008					
<b>Coolant system</b>						
Coolant tank capacity (Liter)	580					
- Nozzle coolant	75 L / min; 3 bar					
- Coolant through spindle	25 L / min, 20 bar					
- Wash down	75 L / min; 3 bar					
<b>Machine size</b>						
Height (mm)	3,300					
Floor space W x D (mm)	3,700 x 4,795					
Weight (kg)	12,000					
<b>Connections</b>						
Main power	400 V / 50 Hz					
Power consumption (KVA)	35		40			

Note: <sup>(1)</sup> The interference area during tool "change, please see page 17." <sup>(2)</sup> At 60Hz



● = Standard ○ = Option ✕ = N/A

Standard / Option accessories	MK603SE		MK603SP			
	Economic		Performance			
Spindle code	9B	12B	9B	12B	15C	20C
■ QUASER mill i	○	●	✕	✕	✕	✕
AICC I	○	●	✕	✕	✕	✕
■ Mold machining pack (R660)	○	○	✕	✕	✕	✕
AICC II (Lock-ahead 200 blocks)	○	○	✕	✕	✕	✕
Smooth tolerance control	○	○	✕	✕	✕	✕
Jerk control	○	○	✕	✕	✕	✕
Machining quality level adjust function	○	○	✕	✕	✕	✕
FANUC – data server	○	○	✕	✕	✕	✕
■ FANUC 31iB	✕	✕	○	●	○	○
AICC II (Lock-ahead 200 blocks)	✕	✕	○	●	○	○
FANUC – data server	✕	✕	○	○	○	○
FANUC – high speed processing (Lock-ahead 600 blocks)	✕	✕	○	○	○	○
■ Oil chiller	●	●	●	●	●	●
■ 48 m / min rapid <sup>(3)</sup>	✕	✕	○	○	○	○
■ 40 Taper 48 position tool magazine	●	●	●	●	●	●
■ Tooling - BT40	●	●	●	●	●	●
- ISO40	○	○	○	○	○	○
- DIN40	○	○	○	○	○	○
- HSK A63	✕	✕	✕	✕	○	○
■ Pull stud for BT tooling	●	●	●	●	●	●
■ Balance tooling for spindle warm up	●	●	●	●	●	●
■ BBT spindle attachment (Double contact)	●	●	●	●	●	●
■ 2 pallet station	●	●	●	●	●	●
■ Tool length / breakage measurement	○	○	○	○	○	○
■ Linear encoder	○	○	○	○	○	○
■ Coolant system	●	●	●	●	●	●
■ Coolant through spindle 20 bar	●	●	●	●	●	●
■ Coolant through spindle 50 bar	○	○	○	○	○	○
■ Saddle wash down coolant	●	●	●	●	●	●
■ Coolant wash gun	●	●	●	●	●	●
■ Chip augers	●	●	●	●	●	●
■ Cutter air blast	●	●	●	●	●	●
■ Chip conveyor	●	●	●	●	●	●
■ Filtration unit	○	○	○	○	○	○
■ Documentation (CD-ROM) <sup>(4)</sup>	●	●	●	●	●	●
■ Work light	●	●	●	●	●	●
■ Machine status light	●	●	●	●	●	●
■ CE & EMC <sup>(5)</sup>	○	○	○	○	○	○
■ Top cover	○	○	○	○	○	○

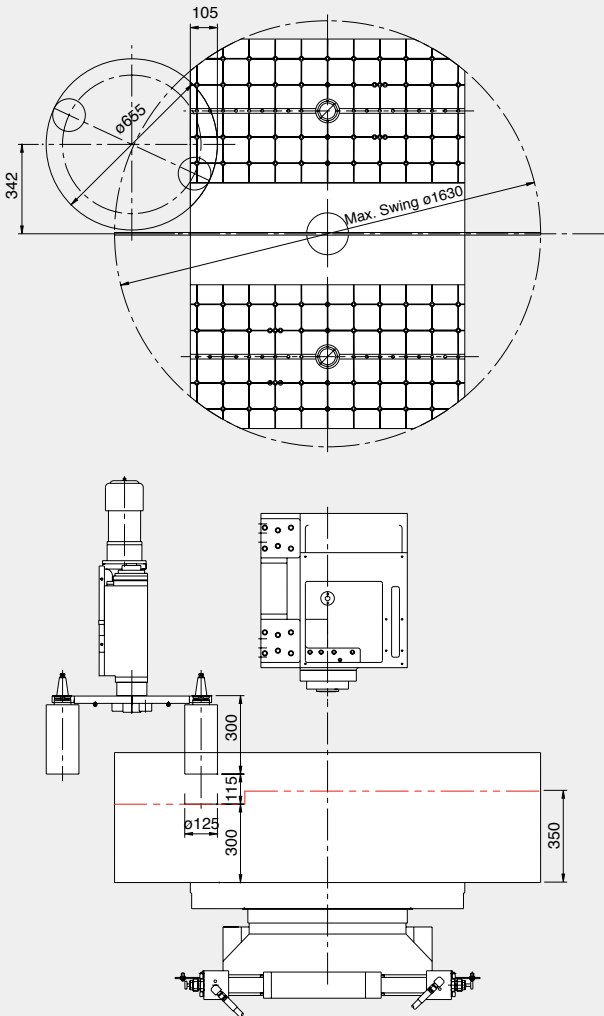
Note: <sup>(3)</sup> The linear encoder is standard item for rapid traverse as 48 m/min model. <sup>(4)</sup> Paper documentation is option

<sup>(5)</sup> Standard for Europe area.

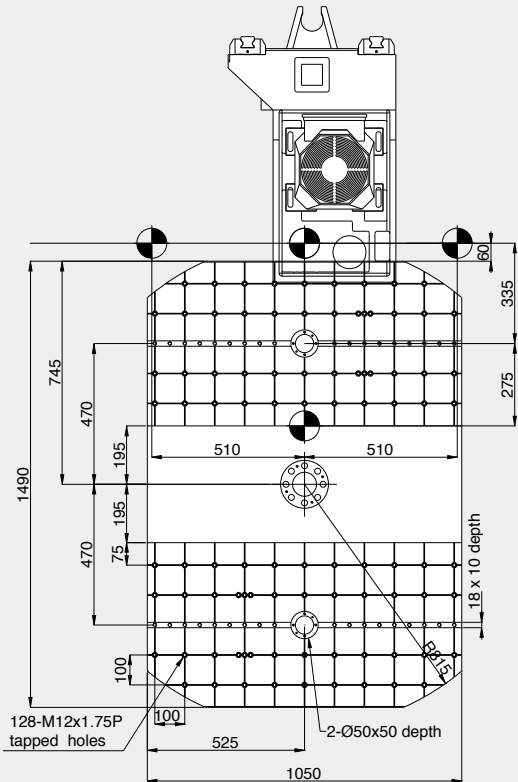
- Machine specification might be different from the catalog if there is any specification update.

# Machine size

Swing table interference area



Swing table dimension

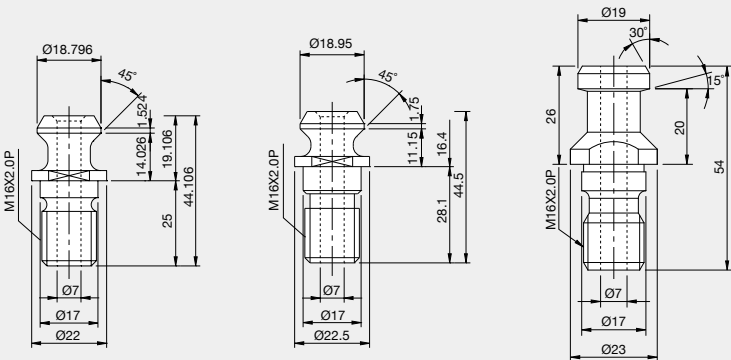


Pull stud and applicable tools

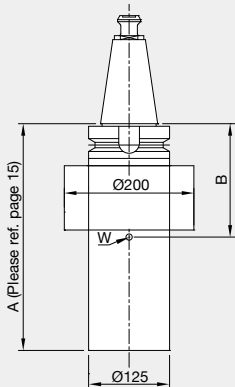
BT 40 (QUASER supply)

ISO (7388-B)

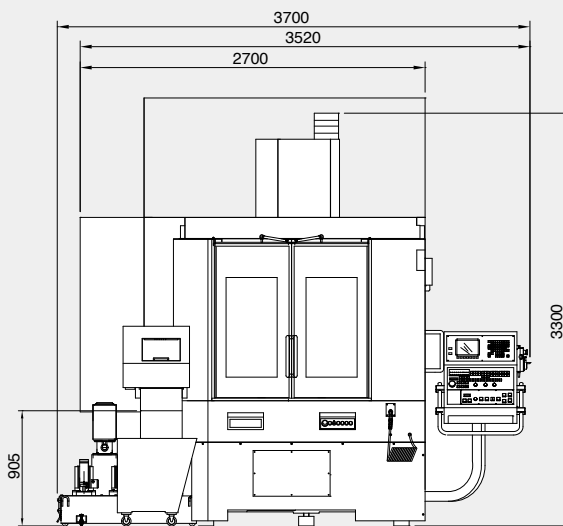
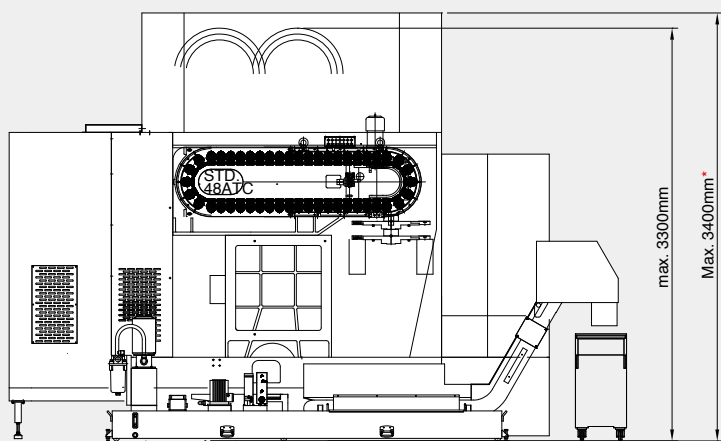
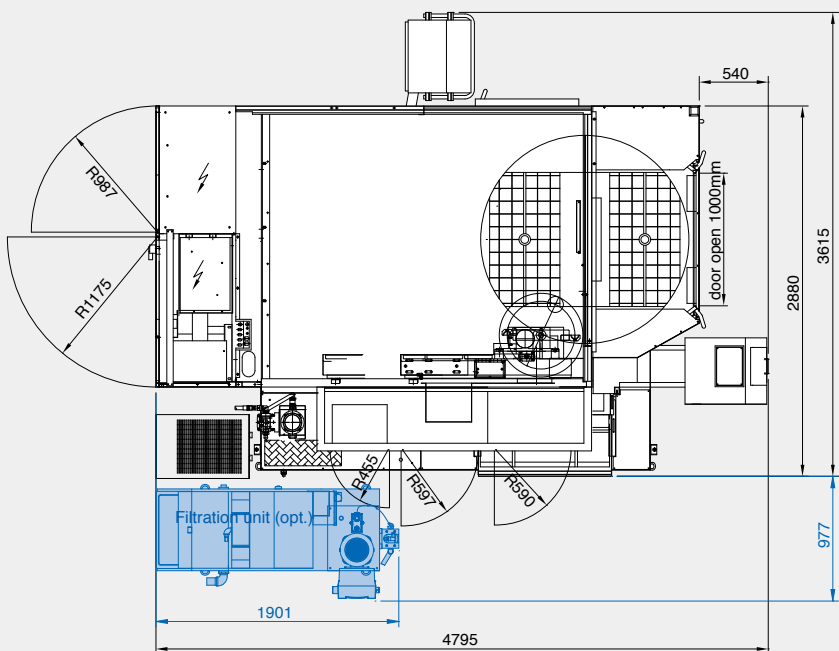
DIN (69872-A)



<b>B</b>	tool median point distance
<b>W</b>	tool weight
<b>MOMENT=W*B( ≤ 10.29N-m)</b>	



## Installation dimension



\* With top cover (option)



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