

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⁻¹, 212 N.m
 - 12,000 min⁻¹, 159 N.m
 - 32 m/min
 QUASER mill i

Performance Machine

MK 603SP 35 KW Belt Spindle - 9,000 min ⁻¹ , 297 N.m - 12,000 min ⁻¹ , 223 N.m - 32 m/min (option 48m/min with Linear scale) FANUC 31i B	MK 603SP 26 KW Coupling Spindle - 15,000 min ⁻¹ , 177 N.m - 20,000 min ⁻¹ , 125 N.m - 32 m/min (option 48m/min with Linear scale) FANUC 31i B
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All following items are standard::

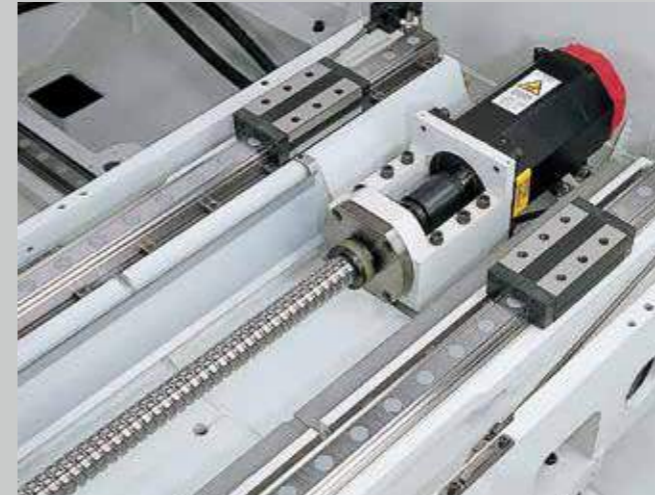
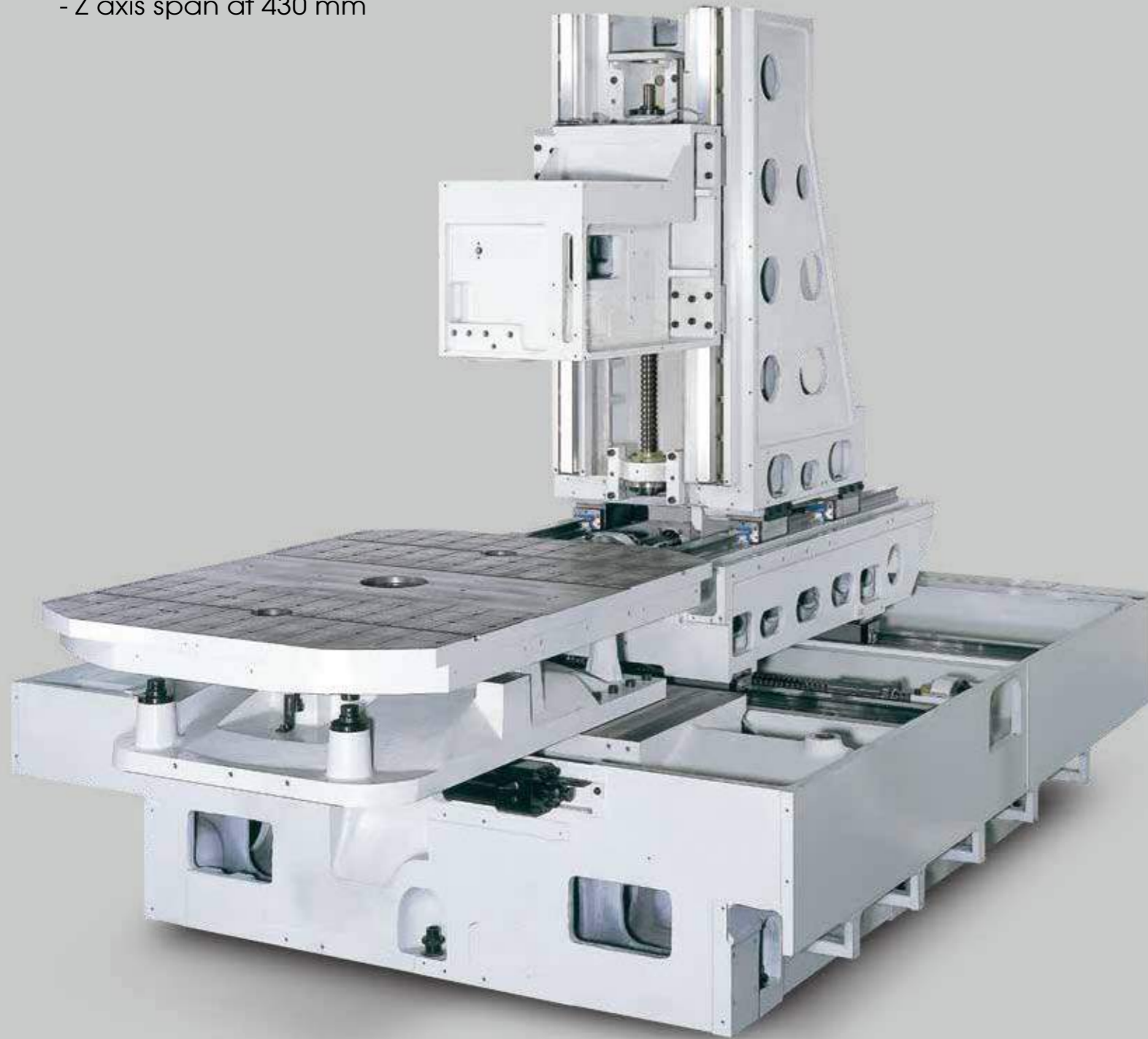
- 20 bar coolant through spindle
- Swarf management system including: auto flush, chip augers, chip conveyor and full enclosures
- Dual-pallet swing type APC
- 48 position ATC



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

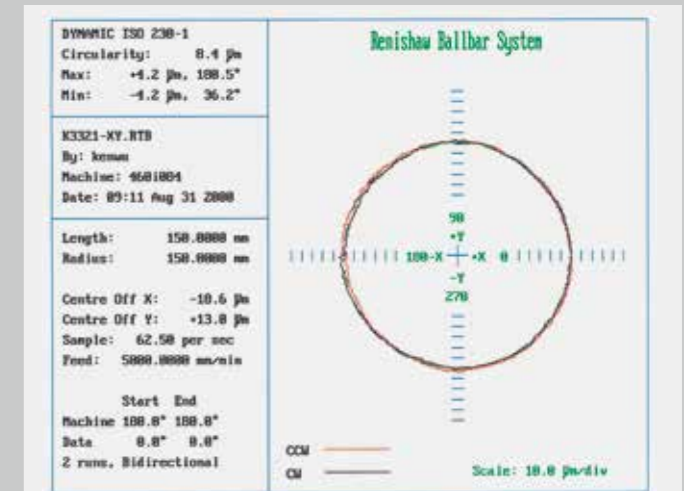
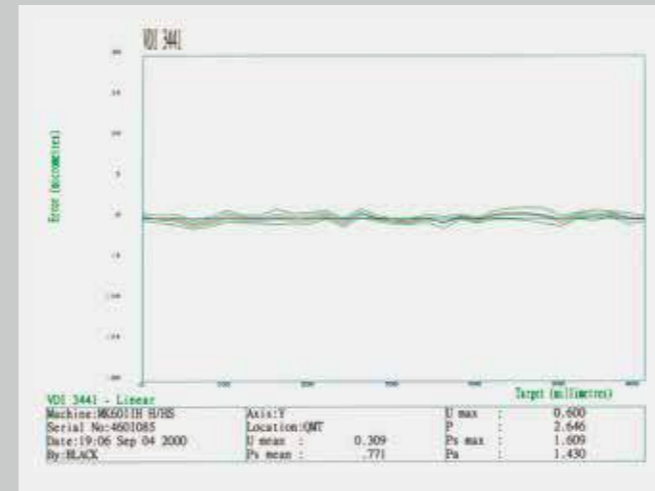
Column moving design on X/Y/Z axes, with high rigidity machine base, which provide less geometric error with different work-piece weight, and trouble free from chips and coolant.

- 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.

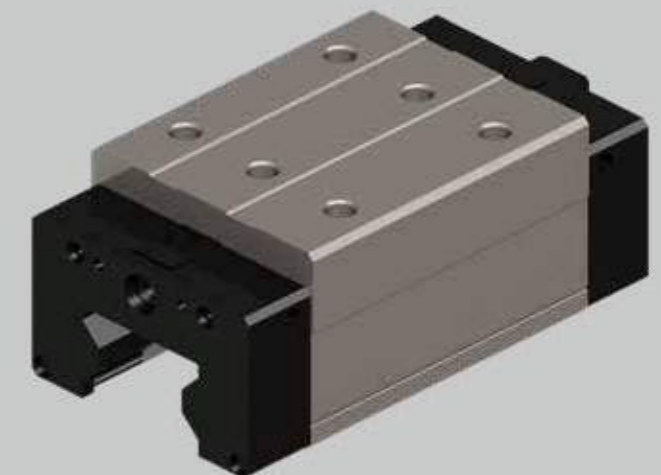
Motor	MK603SE	MK603SP
X / Y / Z (kW)	3 / 3 / 4	4 / 4 / 4



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

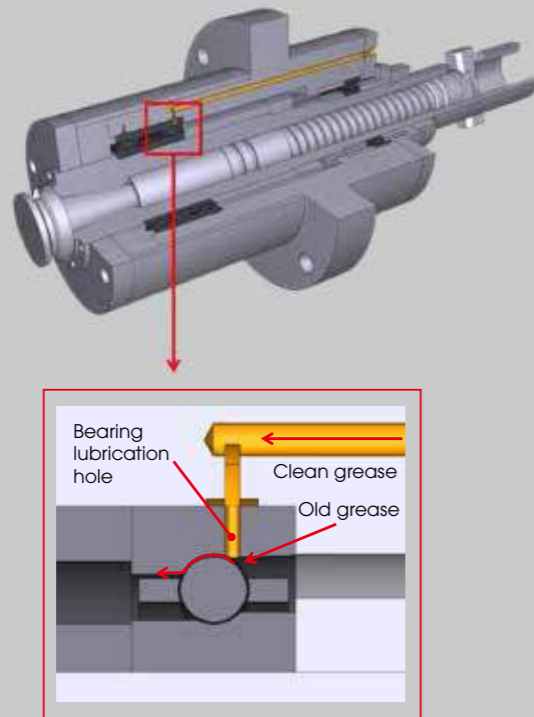
Super heavy-duty roller linear ways

- X-axis linear ways size 55
- Y-axis linear ways size 55
- Z-axis linear ways size 45

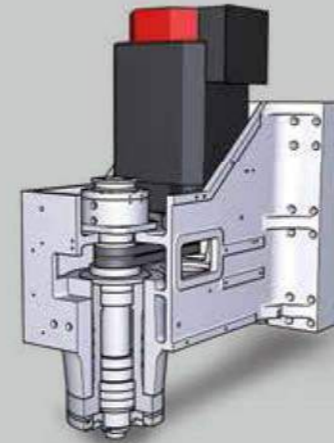


Spindle System

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

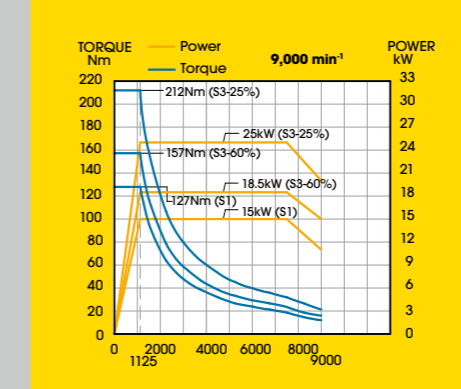


- Standard on all models

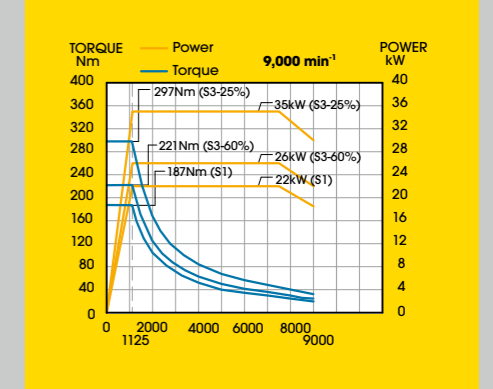


MB-4.0

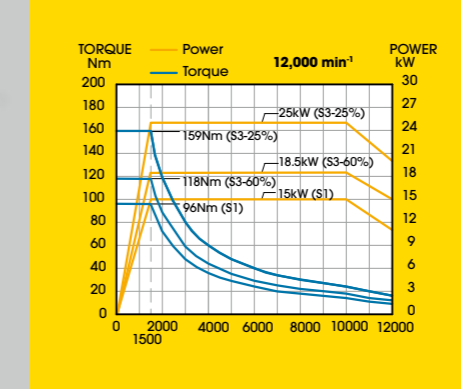
Belt
Motor type: αil15 / 12,000 (SPM22)



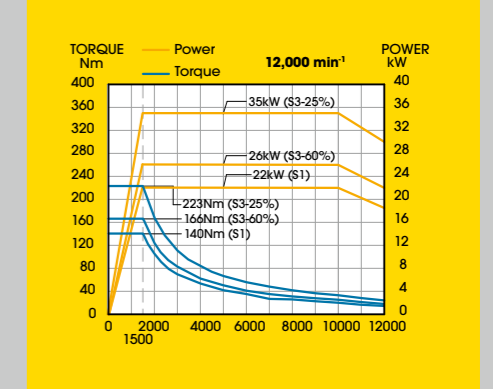
Belt
Motor type: αil22 / 12,000 (SPM26)



Belt
Motor type: αil15 / 12,000 (SPM22)



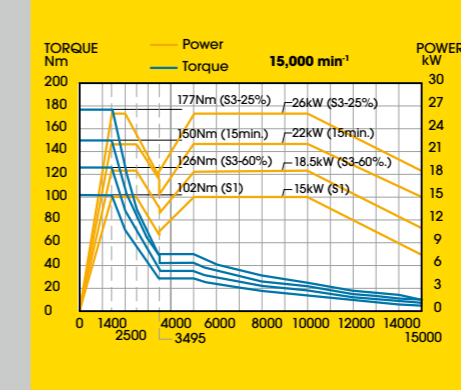
Belt
Motor type: αil22 / 12,000 (SPM26)



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	αil15/12,000 (SPM22)		αil15/15,000 (SPM30)	α8/20,000iL (SPM30i)
Spindle Speed	9,000	12,000	15,000	20,000
FANUC				
Spindle base speed	1,125	1,500	1,400	1,150
Spindle output power kW (S3-25%)	25	25	26	15
Spindle output torque Nm (S3-25%)	212	159	177	125
CTS Availability	●	●	●	●
Available NC	FANUC = ●			
MK603SE	●	●	-	-
MK603SP	-	-	●	●

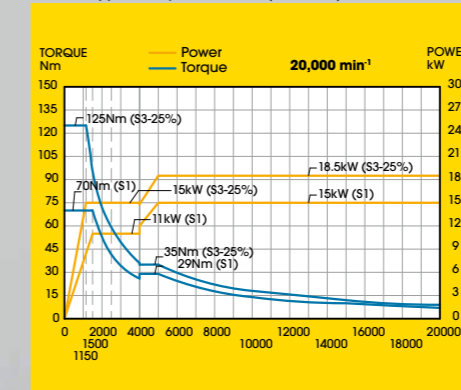
MC-4.1R

Coupling
Motor type: αilT15 / 15,000 (SPM30)



MC-4.0R

Coupling
Motor type: α8 / 20,000iL (SPM30i)



Pallet system

Pallet load capacity: 300 kgs/each end

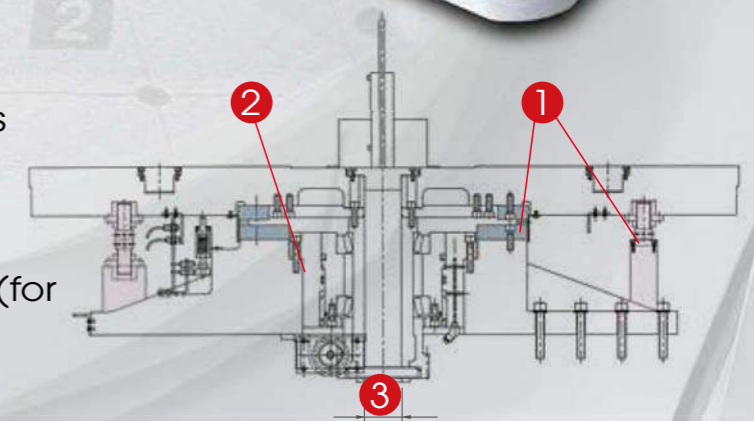
APC time: 8 seconds



Two fourth axis tables ($\varnothing 255$) 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

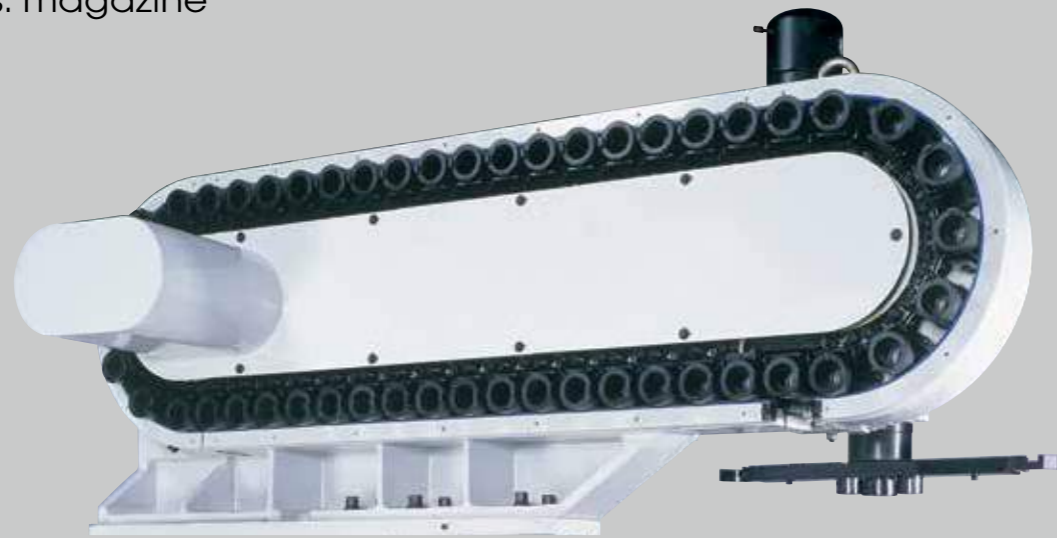
Tool to tool : 2.5 seconds

Chip to chip : 5 seconds on MK603SP

: 6 seconds on MK603SE



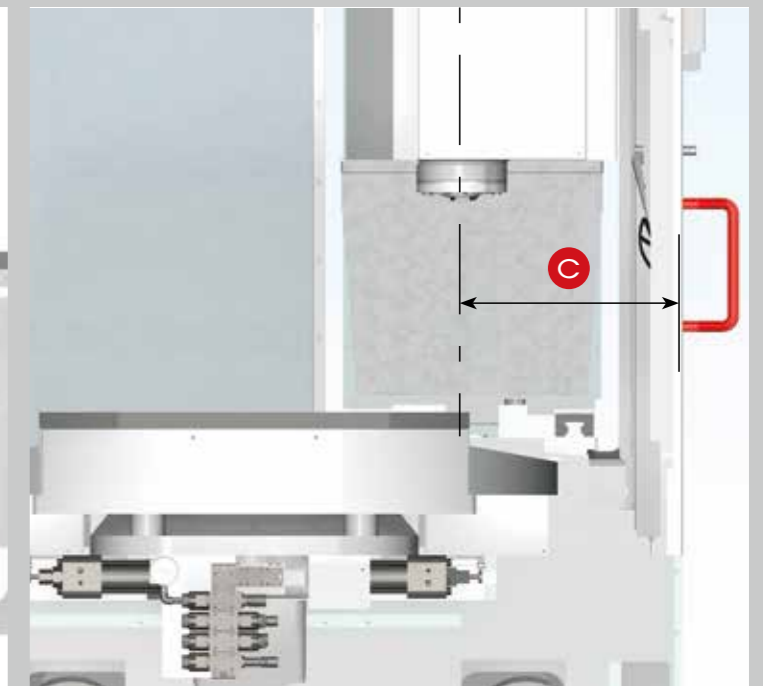
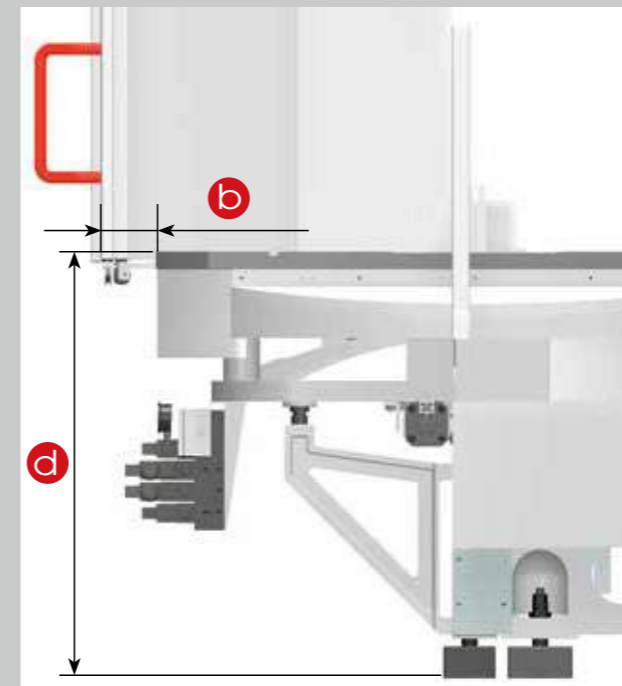
48 pos. magazine



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

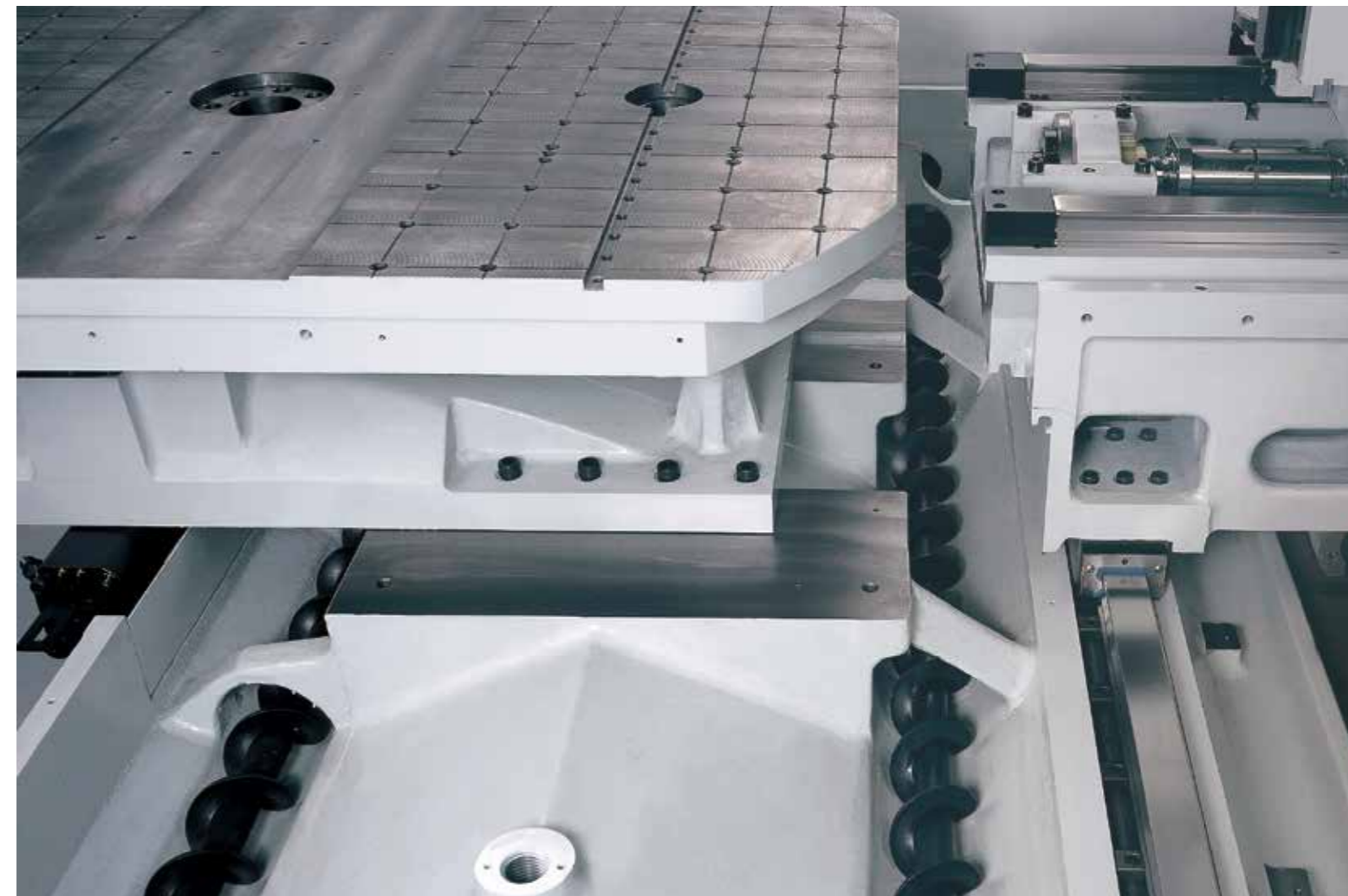
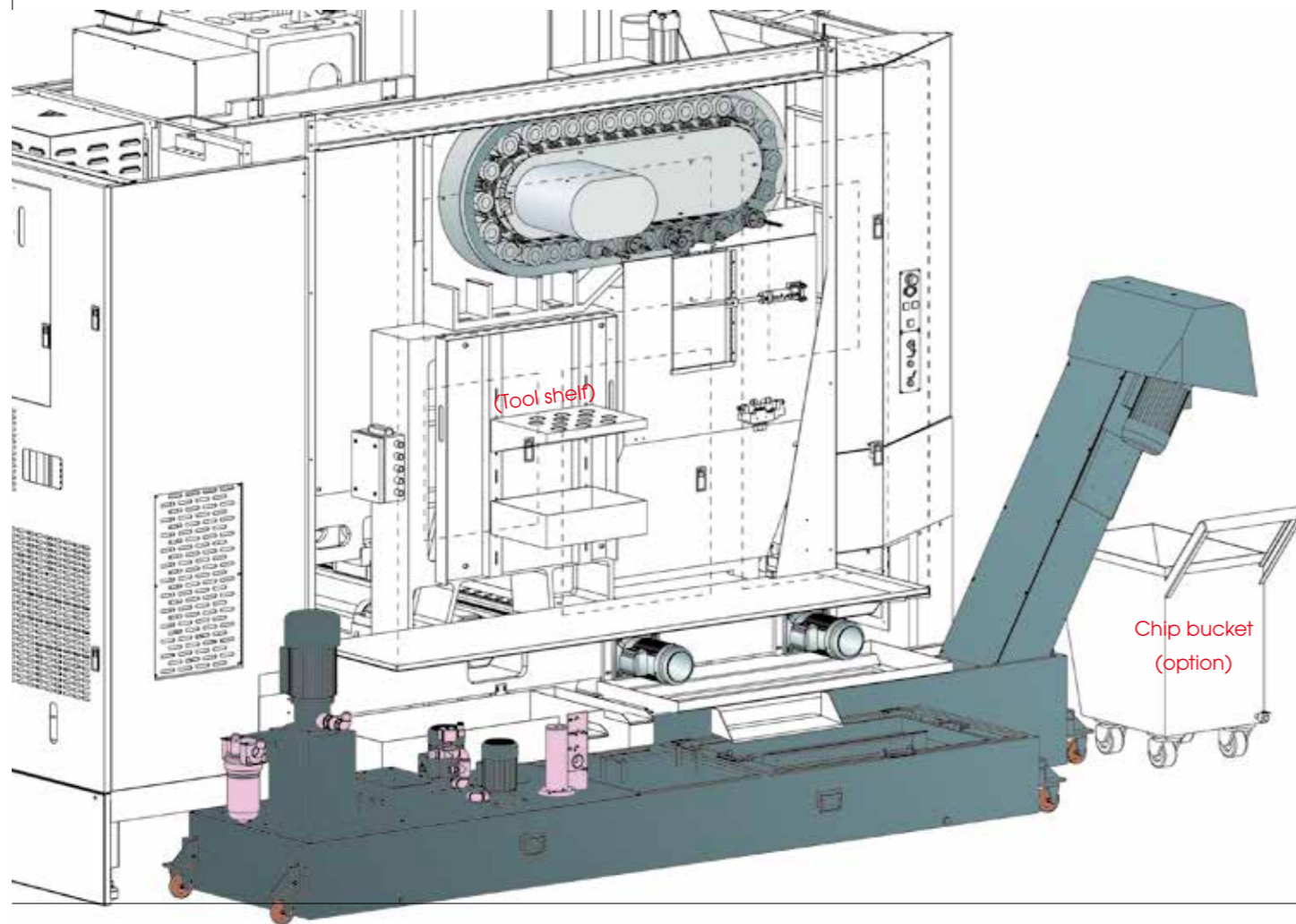


Coolant system & Chip management

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

Principles

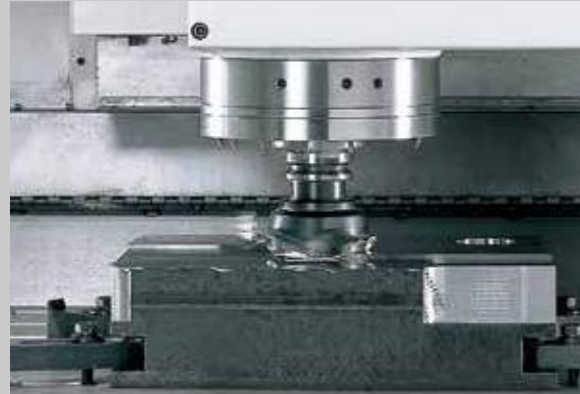
- Heavy swarf carried by drag type chip conveyer.
- Light & small swarf overflow through 1.5 mm & 0.5 mm filters for nozzle coolant & flushing; a final 25 μm filter with alarm signal for 20 Bar C.T.S.
- No need to worry about coolant balance between tanks; to compensate for coolant evaporation top up by checking against an easy to read gauge.



(Some covers removed for explanations)

Cutting data

FACE MILLING



MK603SP (12,000 min⁻¹)

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

END MILLING



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

DRILLING (W/C.T.S)



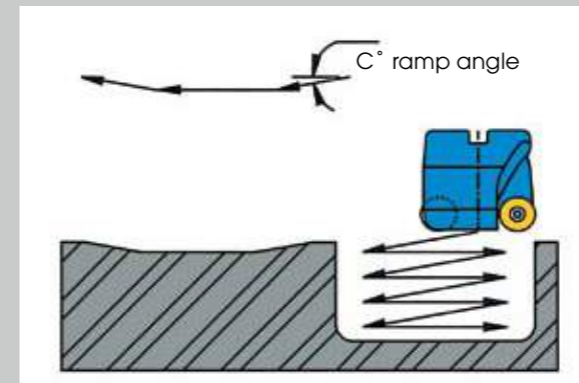
Tool	ø54x2 flutes	
Spindle speed	880 min ⁻¹	2,000 min ⁻¹
Feed rate	88 mm/min	200 mm/min

TAPPING



Tool	M36xP4.0	
Spindle speed	177 min ⁻¹	186 min ⁻¹
Feed rate	708 mm/min	744 mm/min

Steel material: heavy-duty milling

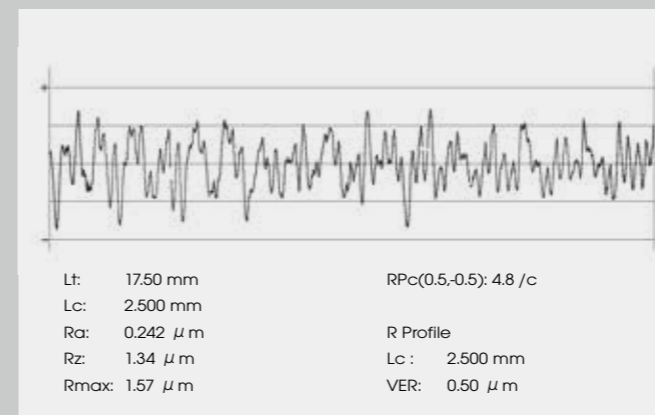


MK603SP (15,000 min⁻¹)

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

Note: "BIG-PLUS" tool shank is needed

High Accuracy
Surface roughness : 1.57µm (R max.)

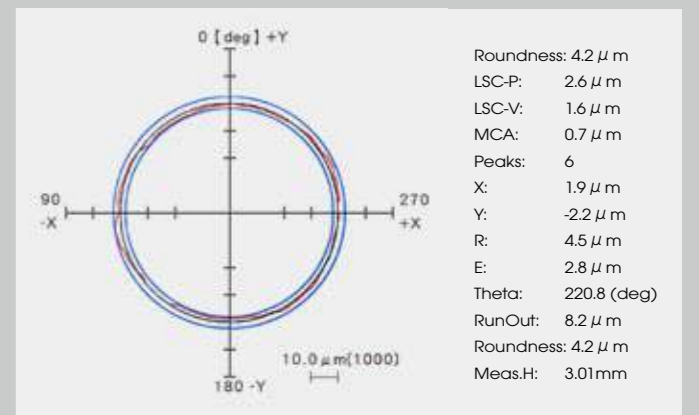


Aluminum material: high speed milling



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

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

● = Standard ○ = Option × = N/A

Technical data	MK603SE		MK603SP			
	Economic		Performance			
Spindle code	9B	12B	9B	12B	15C	20C
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		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/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 / P16			
Accuracy Positioning / Repeatability						
ISO 230-3 / JIS	0.008 / 0.004					
JIS 6338 (300mm)	±0.003 / ±0.002					
VDI 3441	0.008 / 0.004					
Main spindle						
Spindle taper	BBT40					
Tool changer						
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.) ⁽²⁾	6		6 sec @ 32 m / min; 5 sec @ 48 m / min			
Pallet changer						
Number of pallet	2					
Method of pallet changer	Swing Arm Type					
Pallet change time (sec.) ⁽²⁾	8					
Pallet changing repeatability (mm)	0.008					
Coolant system						
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					
Machine size						
Height (mm)	3,300					
Floor space W x D (mm)	3,700 x 4,795					
Weight (kg)	12,000					
Connections						
Main power	400 V / 50 Hz					
Power consumption (KVA)	35		40			

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

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 ⁽³⁾	×	×	○	○	○	○
■ 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) ⁽⁴⁾	●	●	●	●	●	●
■ Work light	●	●	●	●	●	●
■ Machine status light	●	●	●	●	●	●
■ CE & EMC ⁽⁵⁾	○	○	○	○	○	○
■ Top cover	○	○	○	○	○	○

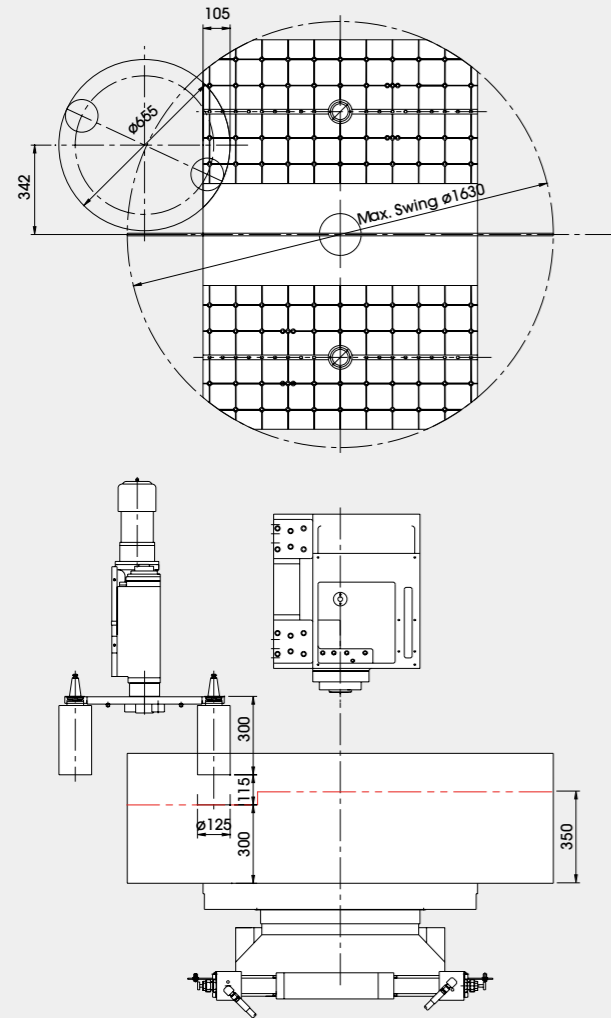
Note: ⁽³⁾ The linear encoder is standard item for rapid traverse as 48 m/min model. ⁽⁴⁾ Paper documentation is option

⁽⁵⁾ Standard for Europe area.

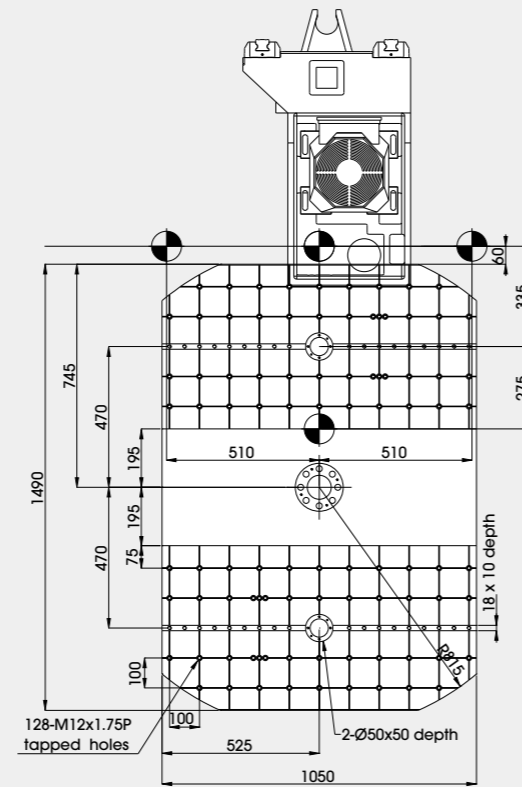
- Machine specification might be different from the catalog if there is any specification update.

Machine size

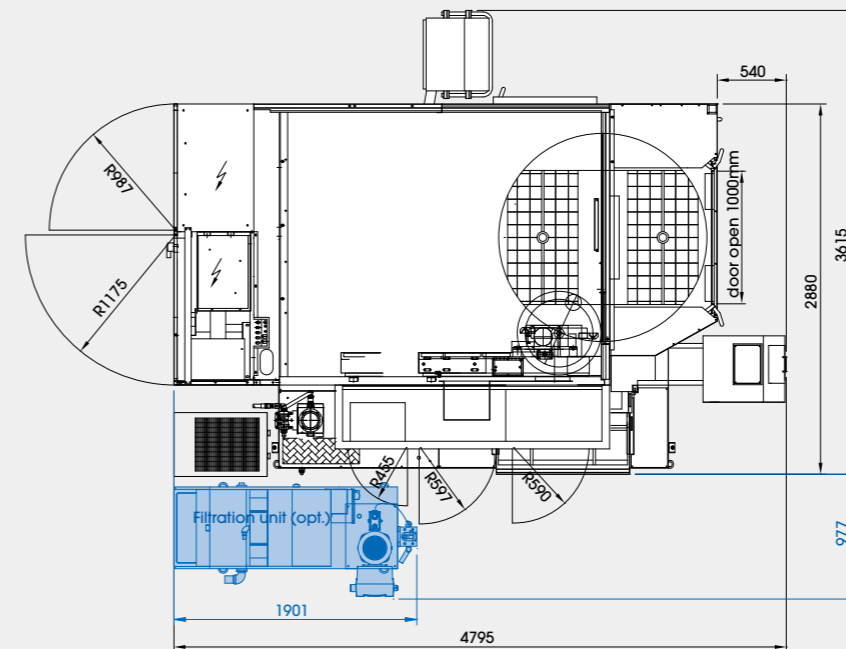
Swing table interference area



Swing table dimension



Installation dimension

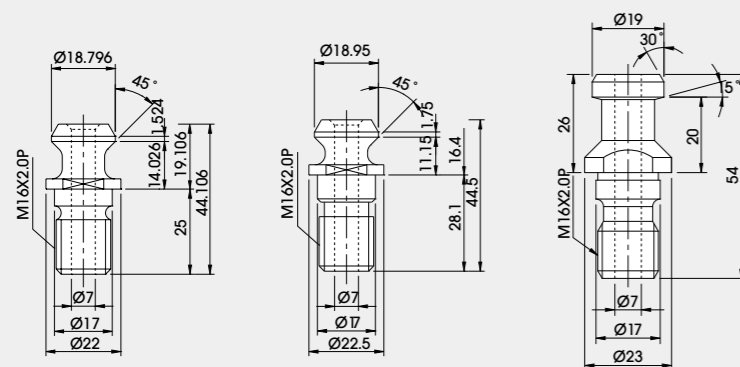


Pull stud and applicable tools

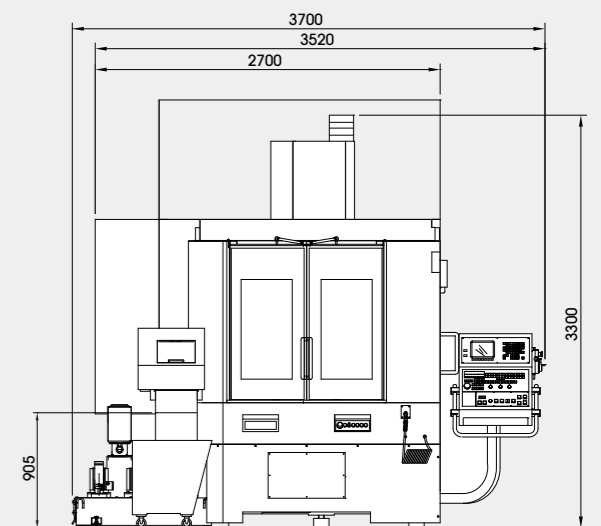
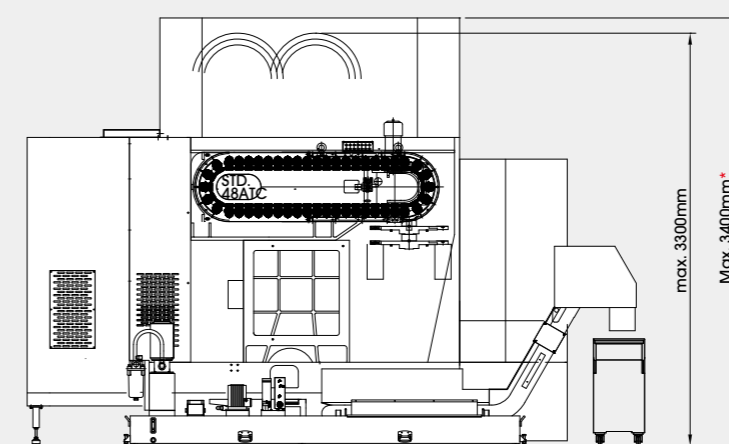
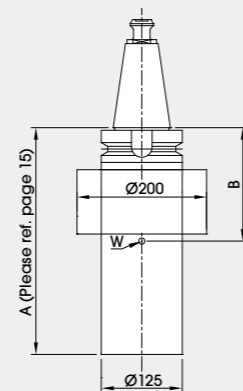
BT 40 (QUASER supply)

ISO (7388-B)

DIN (69872-A)



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



* With top cover (option)

QUASER

we cut faster

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