



GF Machining Solutions

Mikron MILL E 500U-700U (5 axis)

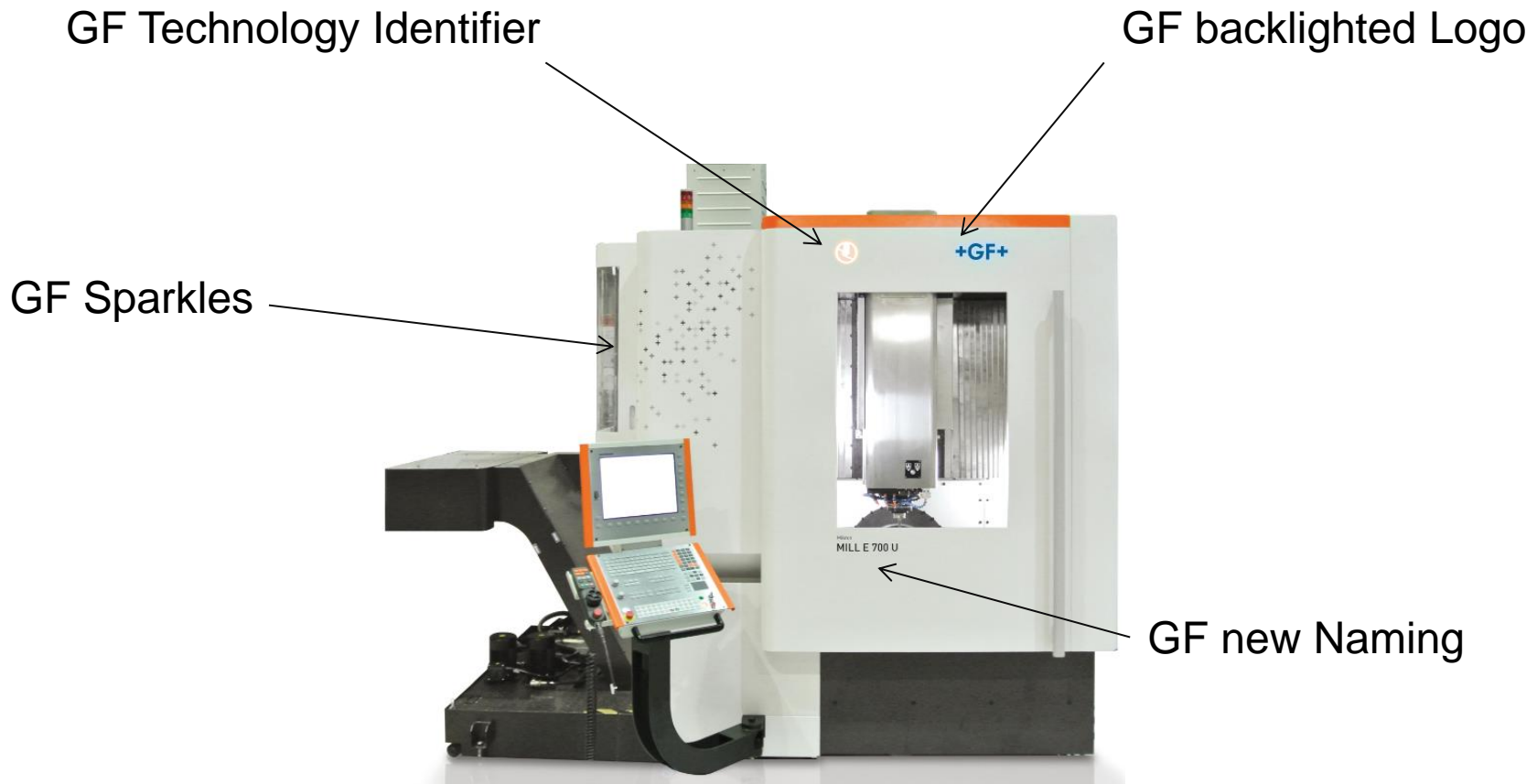
**GF has a Worldwide Footprint, 26 countries
Over 8,500 employees, #6 machine Tool
builder worldwide**

*** Holliston, MA Nearest Technical Center**

7/2018 – Ken Otzel Presentation, High Performance Machinery
I have been selling and supporting Mikron since 1997



Mikron **MILL E 5/700 U:** **A New Look!**



Milling Technology Identifier



GF MS Product Naming 101



Harmonizing the product portfolio

Technology	Application	Product level	X-travel	Specification
	MILL			
Mikron	CUT	X – Extreme		Axes (U – universal)
AgieCharmilles	FORM	S – Sensation		Feature (MillTurn/Oiltech)
Step Tec	DRILL LASER	P – Performance	Travel length (in mm)	Market (Moldtech, Tiremold)
System 3R	TRANSFORME R	E – Efficiency		
		C – Comfort		
	WORKPARTNE R			Dedicated

MILL E 500u & 700U (5 axis)
The Machine



Mikron MILL E 500/700 U



GF MS with 5-Axis high efficiency machine

Integrated tool changer
CT60 (Optional 120)

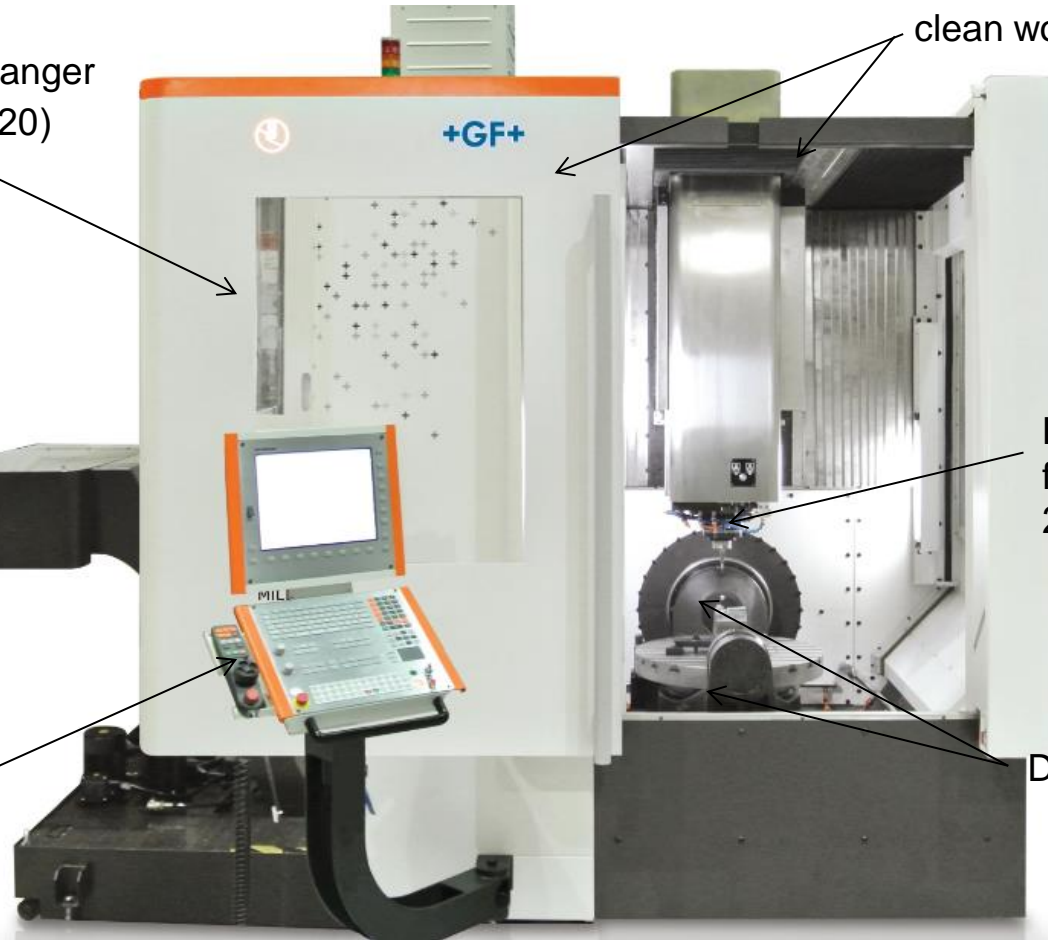
Complete machine enclosure for
clean working environment

Integrated Lift up chip
conveyor

High-Tech motor spindles
from StepTec (12,000 or
20,000)

High
performance
machine control
Heidenhain
iTNC530 HSCI

Double supported rotary table



Efficient accessibility MILL E 500 U



Easy, fast and safe operations
efficient and user-friendly control
perfect access to the part thanks
to large corner doors opening

Efficient accessibility MILL E 700 U



Perfect access from both sides,
possibility to easy load heavy parts
by crane thanks to large doors
opening

Integrated Automation

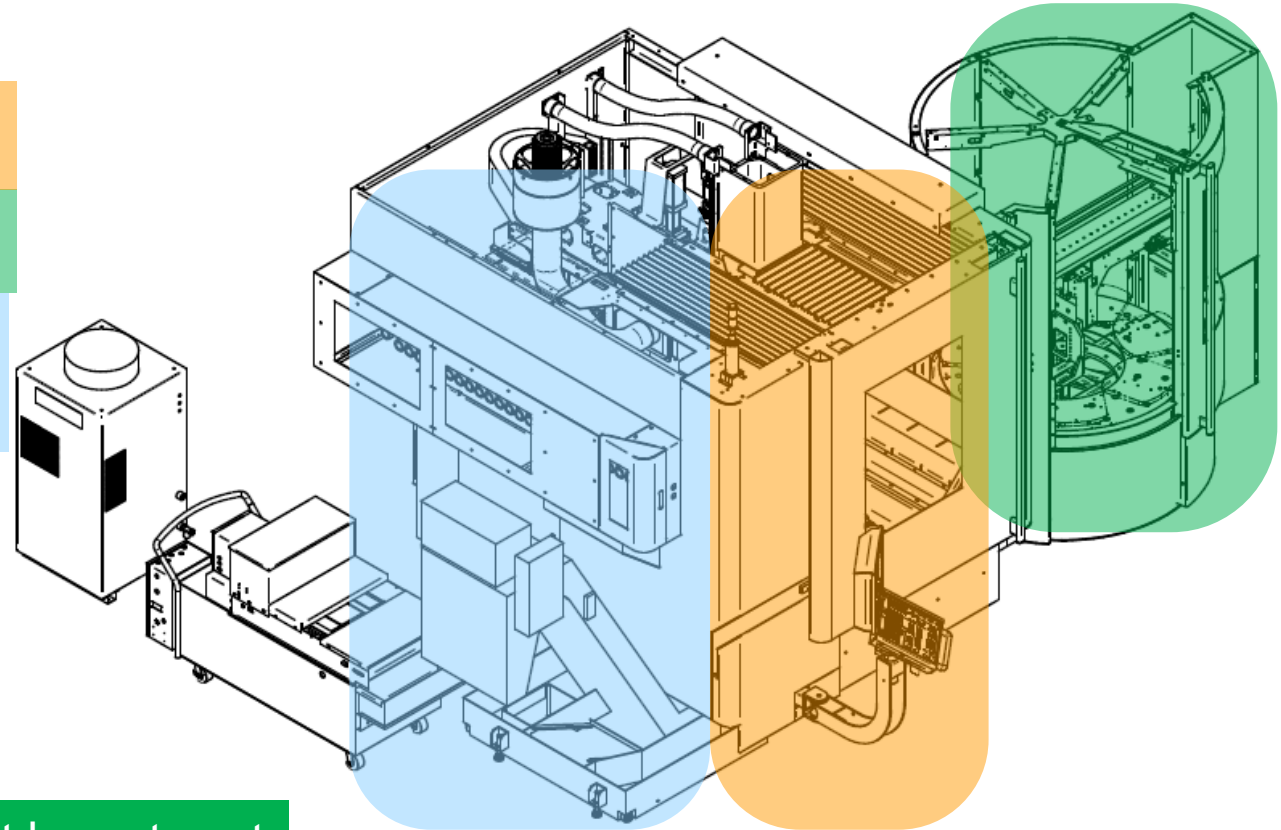


Unattended machining capabilities

Work area

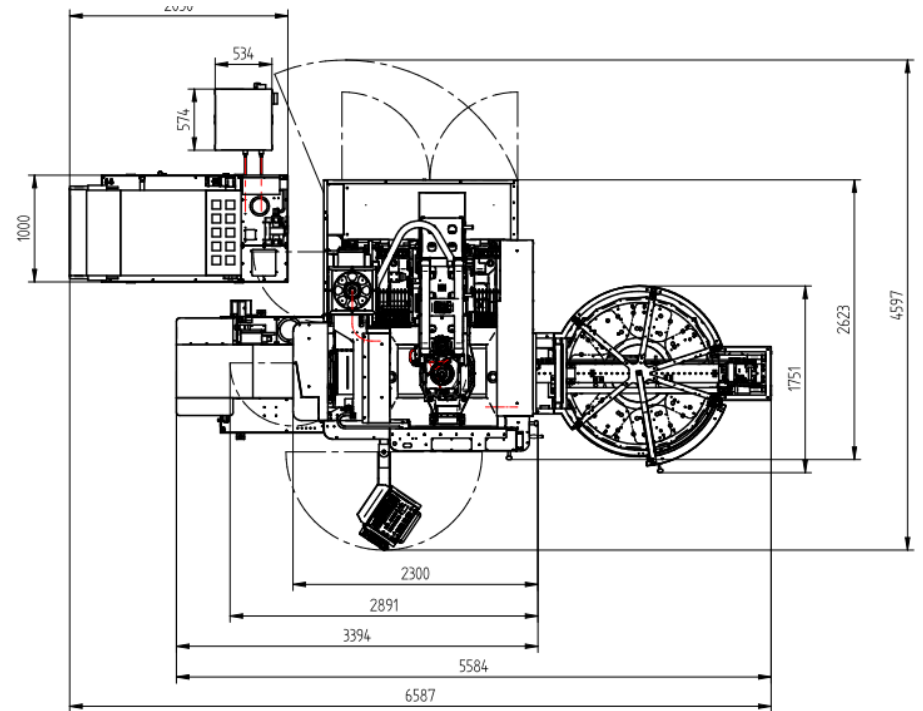
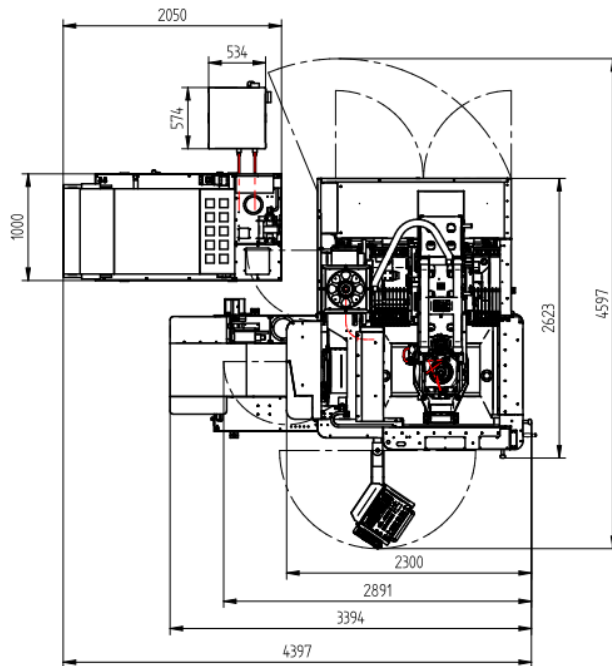
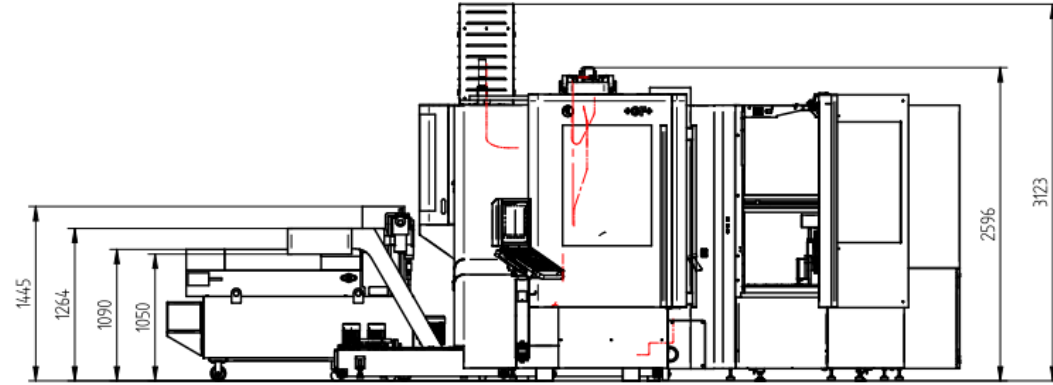
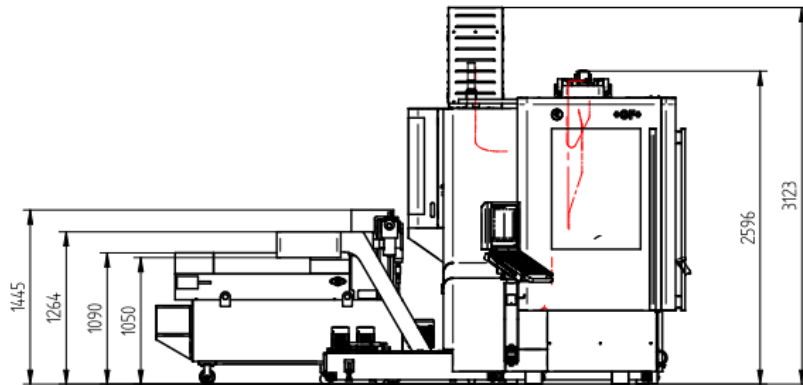
Pallet area

Tool area and electric
hydraulic / pneumatic

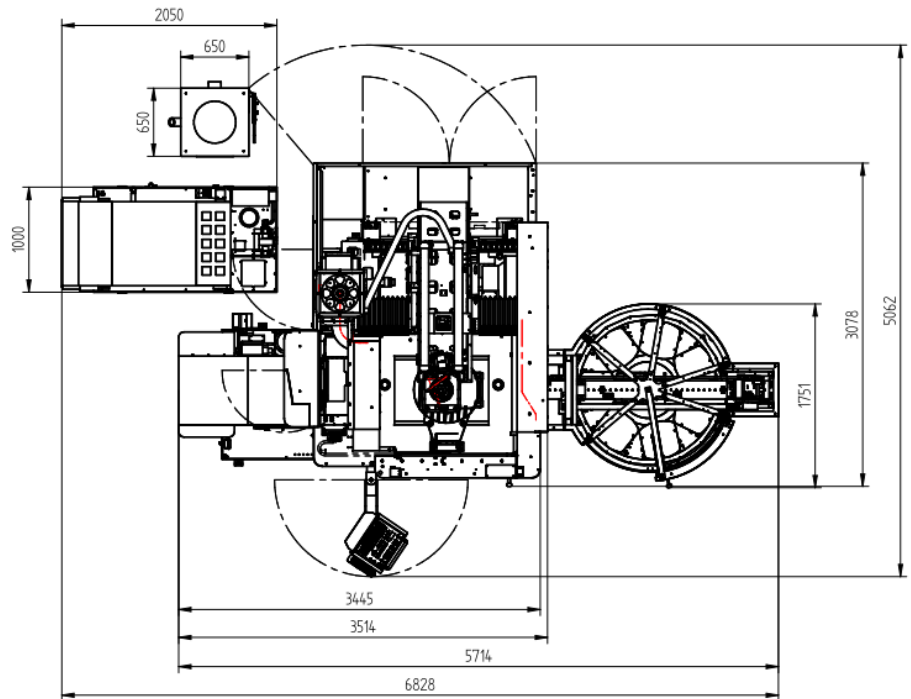
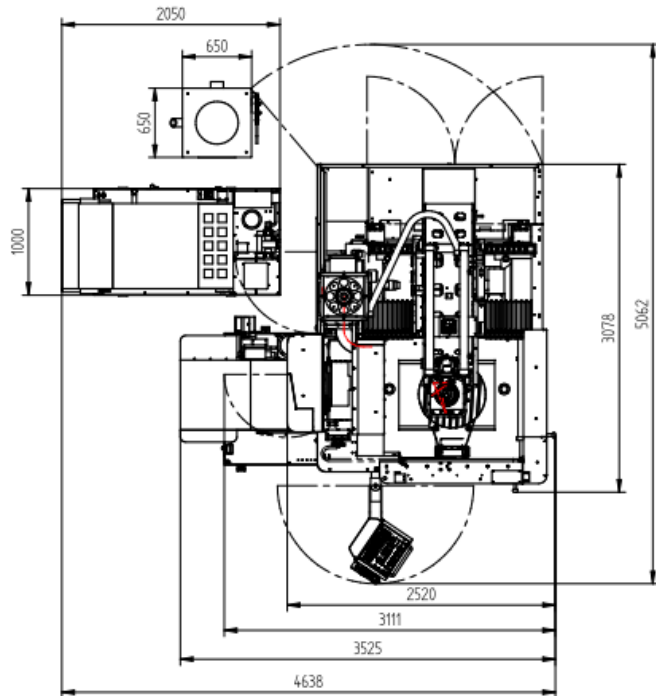
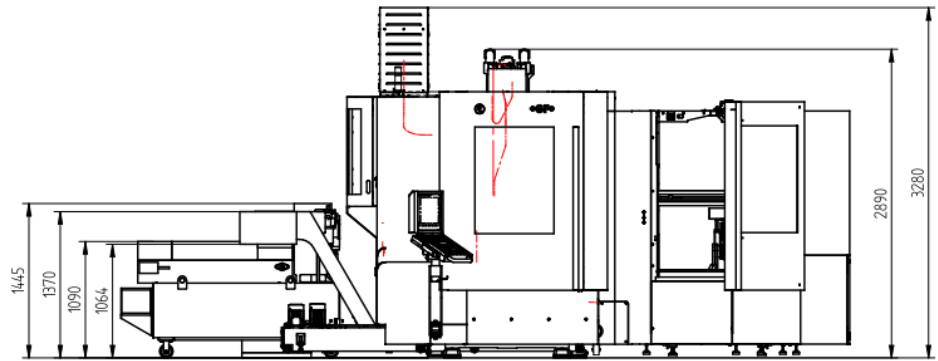
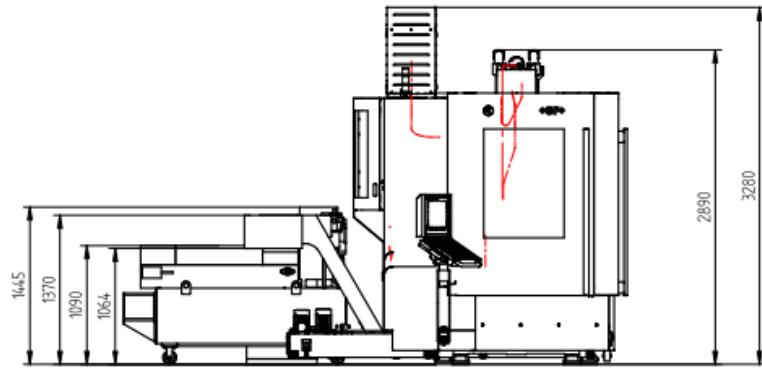


Additional autonomy at lowest cost
quick Return On Investment

Layout Mikron MILL E 500 U



Layout Mikron MILL E 700 U

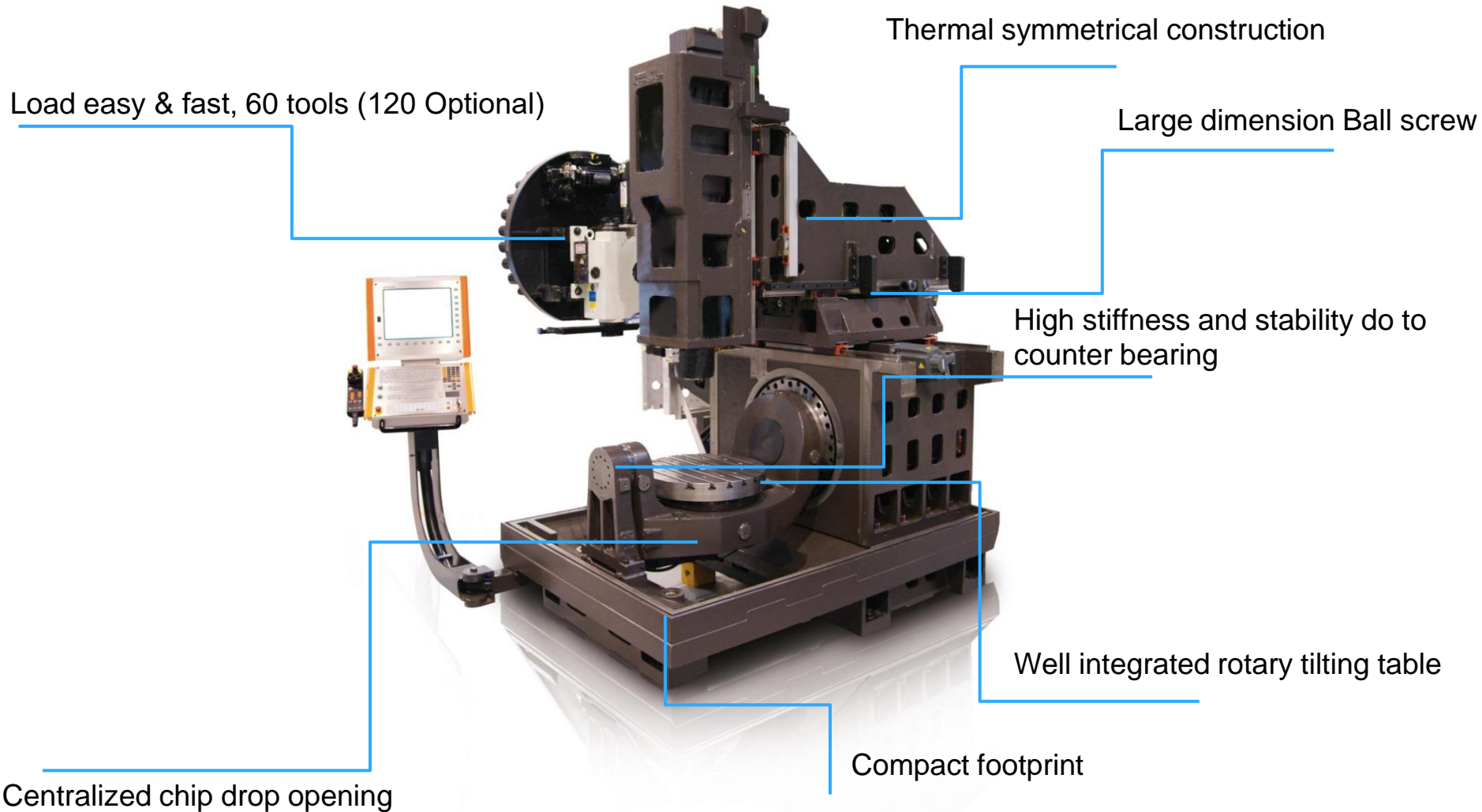


Technical Data MILL E 500u/700u

Machine			Mikron MILL E 500 U	Mikron MILL E 500 U	Mikron MILL E 700 U	Mikron MILL E 700 U				
			RTT 3+2	RTT Simultan	RTT 3+2	RTT Simultan				
Axis travel										
Lengthwise	X	mm	500	500	700	700				
Crosswise	Y	mm	450	450	600	600				
Vertical	Z	mm	400	400	500	500				
Swivel axis		°	-65 / +120	-65 / +120	-65 / +120	-65 / +120				
Rotation axis		°	n x 360	n x 360	n x 360	n x 360				
Axes			3+2	Five-axis simultaneous	3+2	Five-axis simultaneous				
Spindle										
Spindle type			In-line	Motor	In-line	Motor	In-line	Motor	In-line	Motor
Max. rotations		min ⁻¹	12'000	20'000	12'000	20'000	12'000	20'000	12'000	20'000
Max. torque		kW/Nm	20/88	36/120	20/88	36/120	20/88	36/120	20/88	36/120
Tool interface			ISO 40 BT 40 CAT 40	HSK-A63	ISO 40 BT 40 CAT 40	HSK-A63	ISO 40 BT 40 CAT 40	HSK-A63	ISO 40 BT 40 CAT 40	HSK-A63
Travel speed										
Rapid traverse	X, Y, Z	m/min	30 / 30 / 30	30 / 30 / 30	30 / 30 / 30	30 / 30 / 30				
Rapid traverse	B, C	min ⁻¹	17 / 28	32 / 112	17 / 28	32 / 112				
Automation										
Tool magazine			unit	DT 30 / CT 60	DT 30 / CT 60	DT 30 / CT 60	DT 30 / CT 60			
Pallet magazine			unit	5 Delphin 400/400 or 5 MTS 400/400 or 7 Dynafix 350/350 or 7 UPC 320/320	5 Delphin 400/400 or 5 MTS 400/400 or 7 Dynafix 350/350 or 7 UPC 320/320	5 Delphin 400/400 or 5 MTS 400/400 or 7 Dynafix 350/350 or 7 UPC 320/320	5 Delphin 400/400 or 5 MTS 400/400 or 7 Dynafix 350/350 or 7 UPC 320/320			
Pallet changing time			sec.	30	30	30	30			
Robot interface				Available	Available	Available	Available			
Rotary swivel table										
T-groove table			mm	500	500	630	630			
Workpiece weight (3/5)			kg	300 / 200	300 / 200	450 / 450	450 / 450			
Weight										
Machine weight			kg	xxxxx 6030	xxxxx 6030	xxxxxx 6030	xxxxxx 6030			
Control										
Heidenhain			12 / 20 k	iTNC 530 HSCI FS	iTNC 530 HSCI FS	iTNC 530 HSCI FS	iTNC 530 HSCI FS			
Fanuc			12 k	0i-MD	-	0i-MD	-			

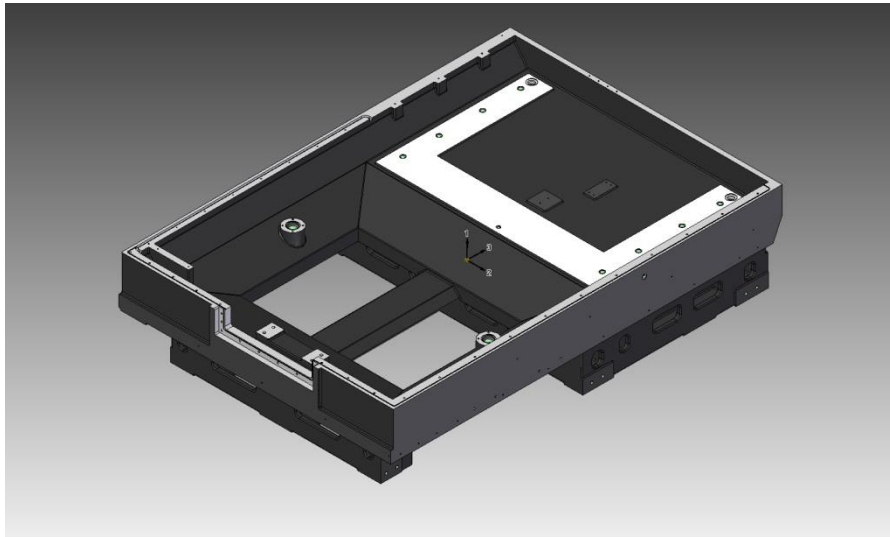
Deep Dive: Features, Options, Subassembly

Engineered by Design: Mill E Technology



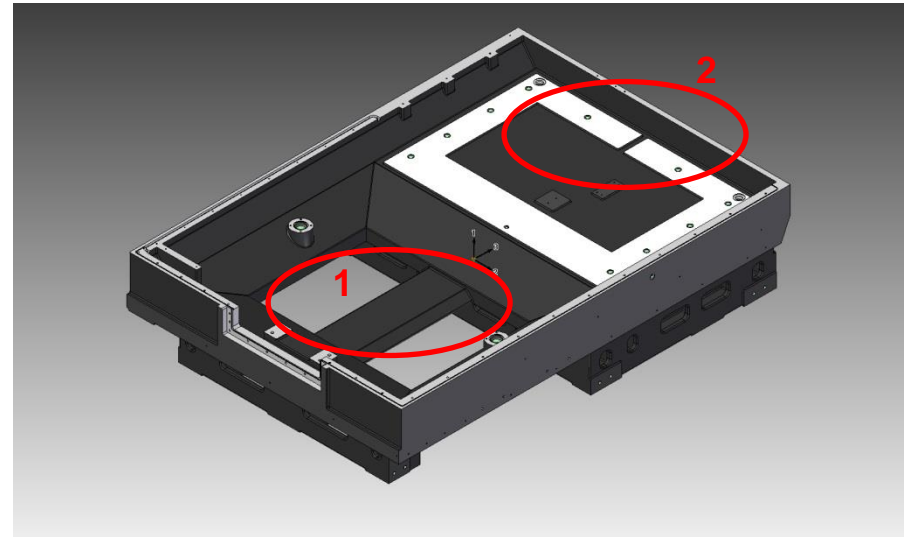
Older HEM U compared to NEW MILL E **GF+**

HEM 700 U: Base



L * W * H (mm): 2160 * 1500 * 490
Weight (kg): 1907

MILL E 700 U: Base

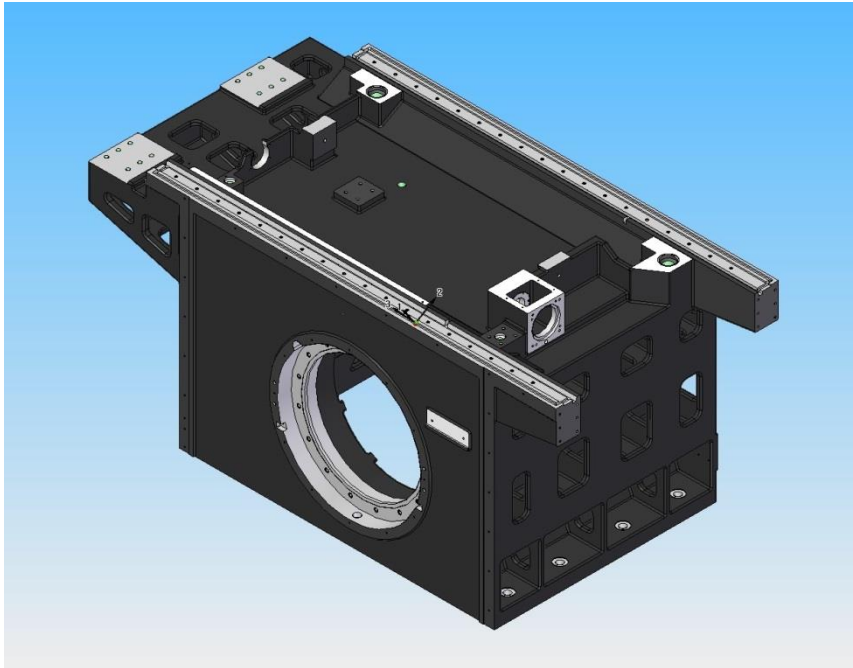


L * W * H (mm): 2160 * 1500 * 490
Weight (kg): 1952

- 1: Make the bridge stronger to strengthen the rigidity of the machine base in Y axis
- 2: Add a surface to fix the column to make the machine base is strengthened

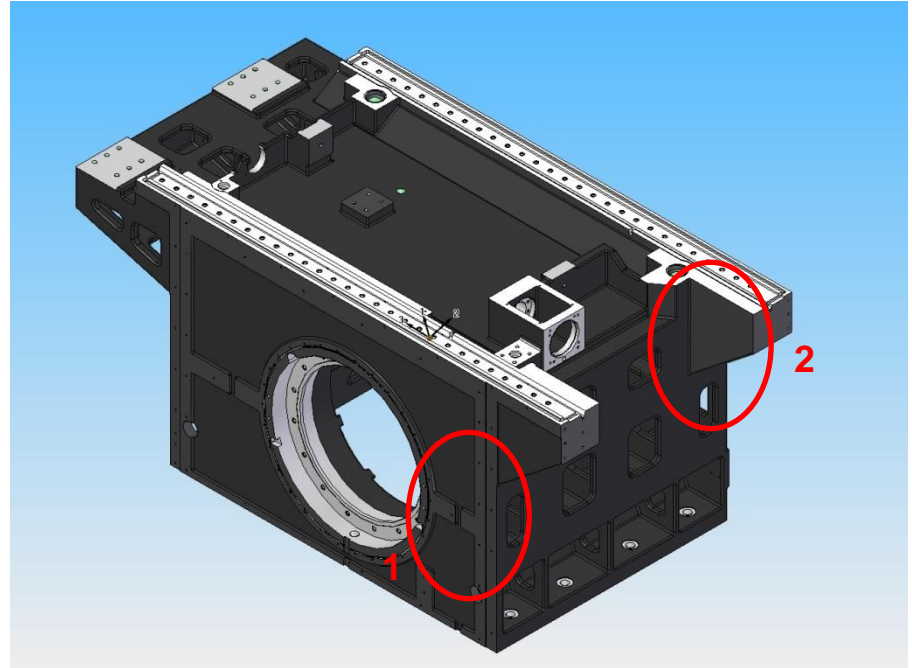
Older HEM U series compared to **NEW MILL E**

HEM 700 U: Column



L * W * H (mm): 1790 * 855 * 885
Weight (kg): 1224

MILL E 700 U: Column

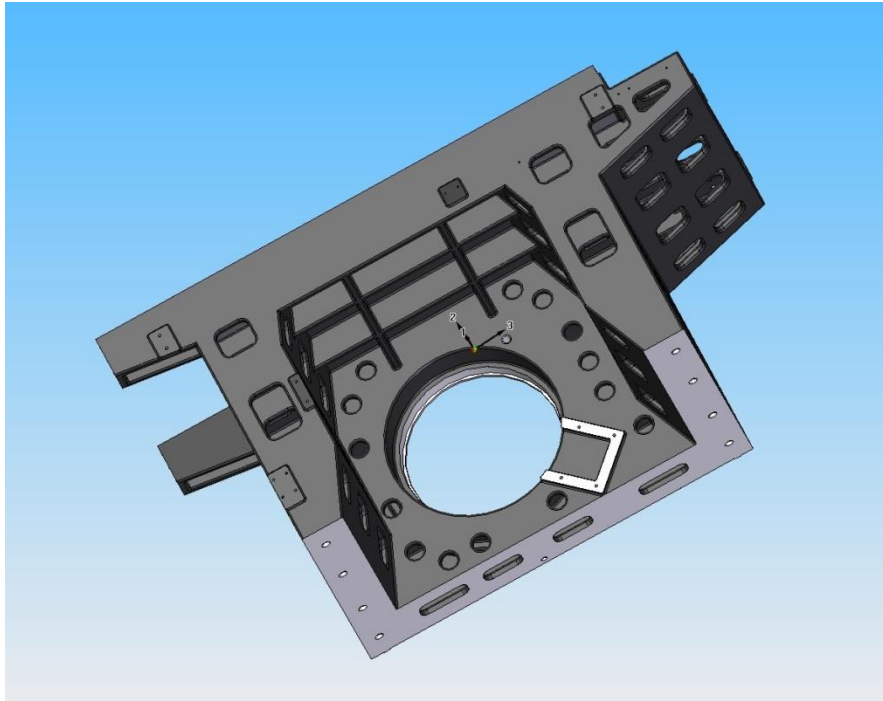


L * W * H (mm): 1790 * 855 * 885
Weight (kg): 1331

1. Make the ribs thicker and angles bigger to strengthen the stiffness of the X axis
2. Make a surface to add some sheet metal to cover the casting

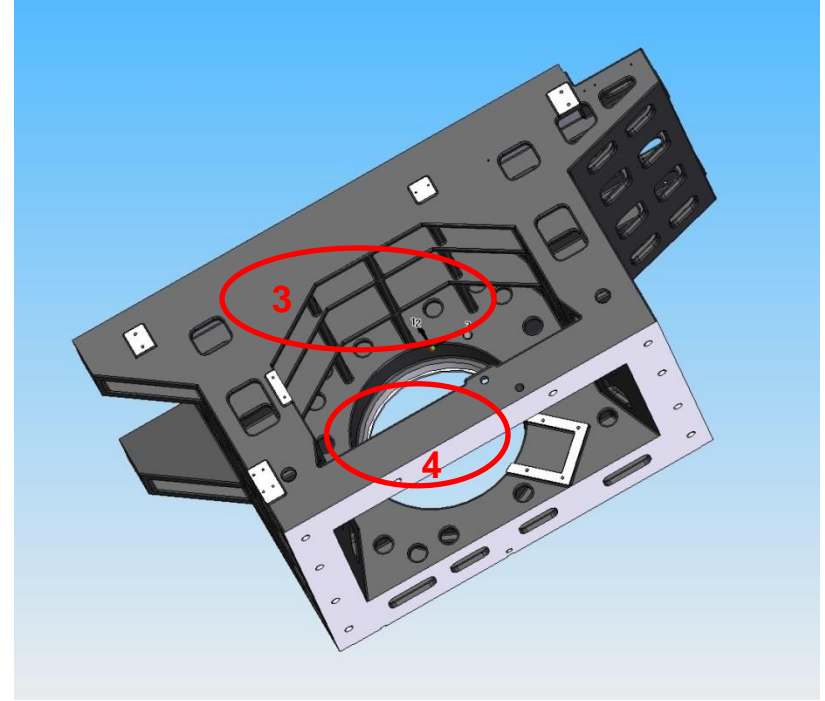
Older HEM U compared to New MILL E

HEM 700 U: Column



L * W * H (mm): 1790 * 855 * 885
Weight (kg): 1224

MILL E 700 U: Column



L * W * H (mm): 1790 * 855 * 885
Weight (kg): 1331

3: Make more ribs and add height to strengthen the stiffness of the column in X axis
4: Add rib to make the column as a whole so that the supplier can maintain quality of the column. (Note: Mill E Series is Now in 4th Generation, many enhancements made)

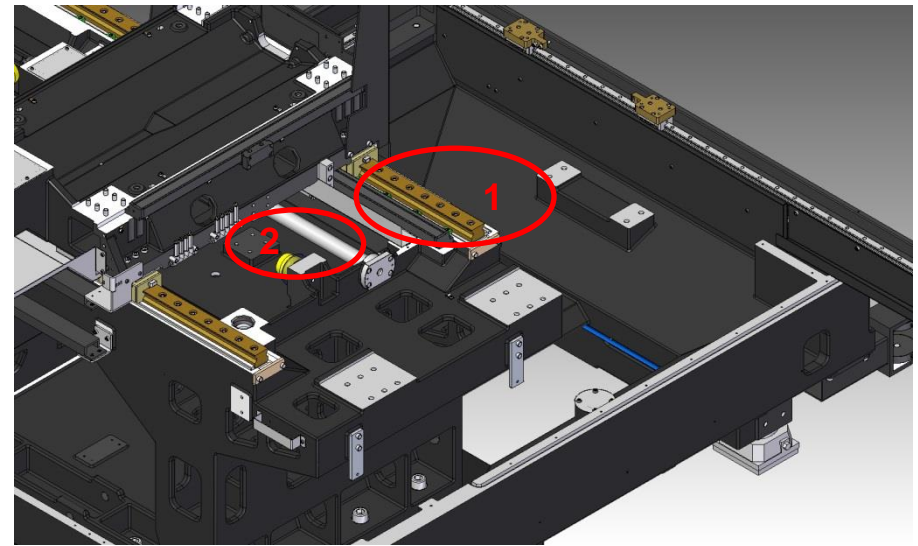
Older HEM U compared to **NEW MILL E** GF

HEM 700 U: X linear guides & ball screw



Linear guides: 35 Ball
Ball screw: 32*10
Press blocks: Yes

MILL E 700 U: X linear guides & ball screw

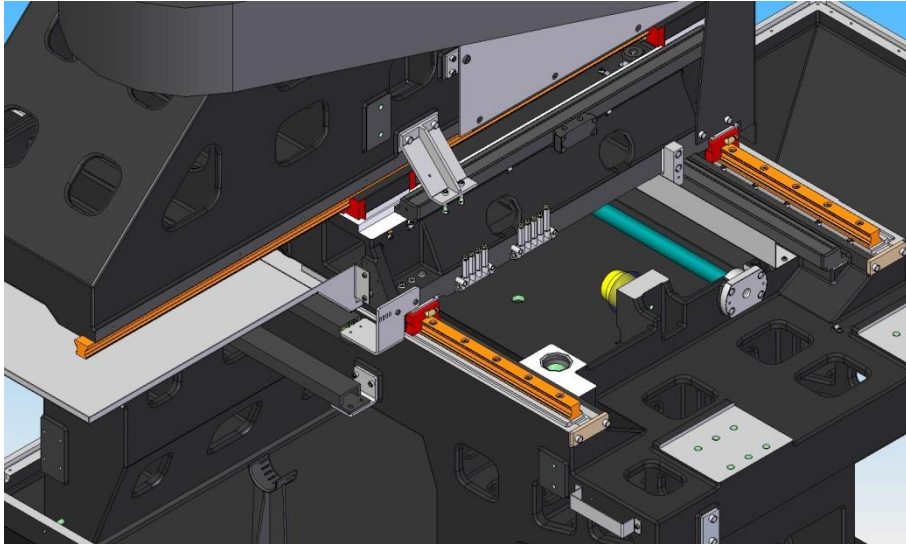


Linear guides: 45 Roller
Ball screw: 40*10
Press blocks: Yes

1. Change the linear guides from 35B to 45R to improve the stiffness of X axis
2. Change the ball screw from 32*10 to 40*10 to improve the stiffness of X axis

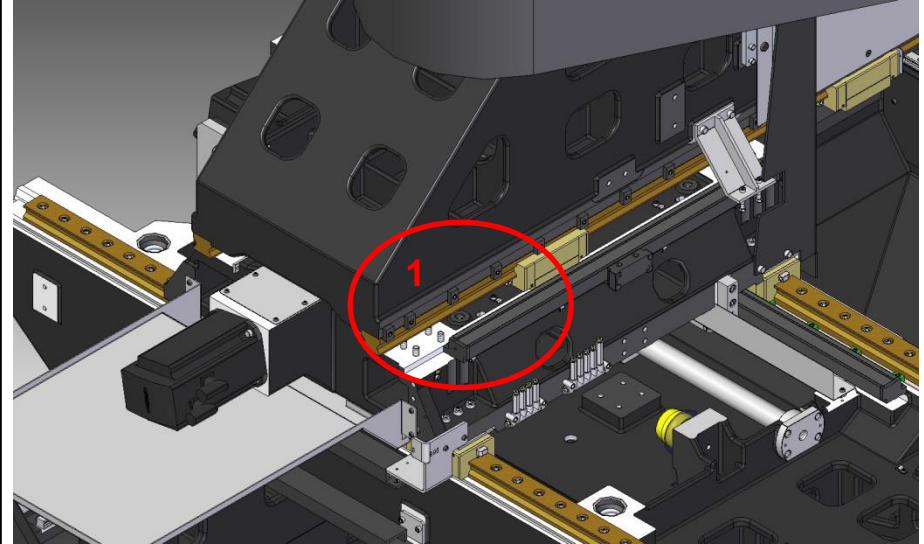
Older HEM U compared to **NEW MILL E**

HEM 700 U: Y linear guides & ball screw



Linear guides: 35 Ball
Ball screw: 32*10
Press blocks: No

MILL E 700 U: Y linear guides & ball screw

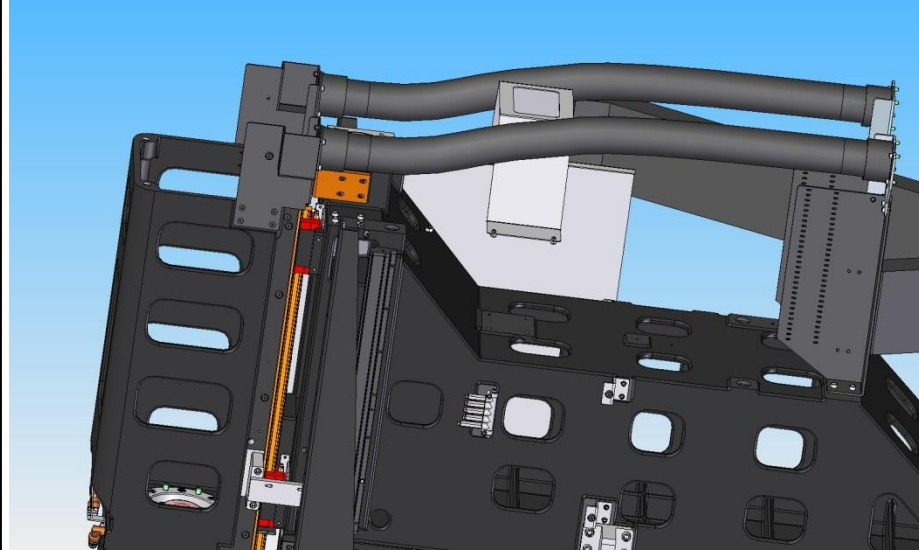


Linear guides: 45 Roller
Ball screw: 40*10
Press blocks: Yes

1. Change the linear guides from 35B to 45R to improve the stiffness of Y axis
2. Change the ball screw from 32*10 to 40*10 to improve the stiffness of Y axis
3. Add some press blocks to make the linear guides more rigid and easier to adjust the accuracy

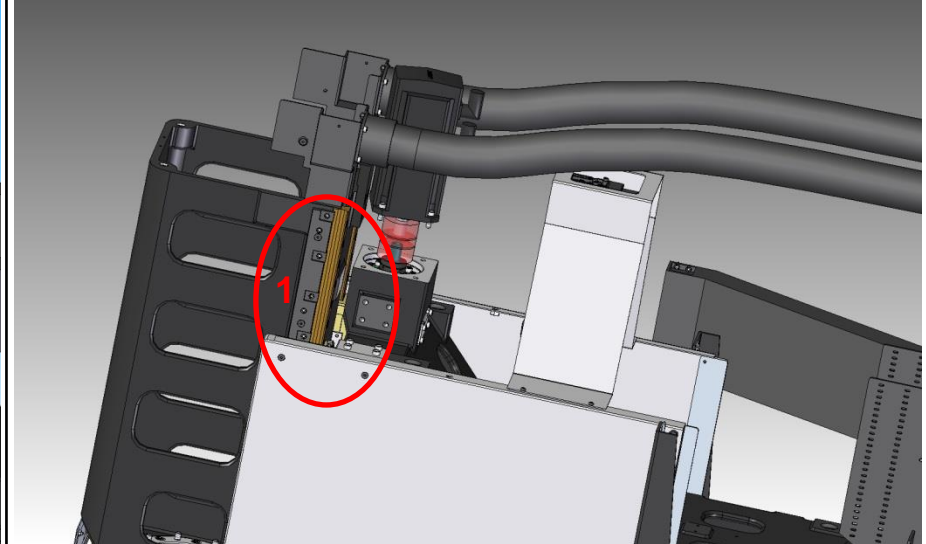
Older HEM U compared to **NEW MILL E**

HEM 700 U: Z linear guides & ball screw



Linear guides: 35 Ball
Ball screw: 32*10
Press blocks: No

MILL E 700 U: Z linear guides & ball screw

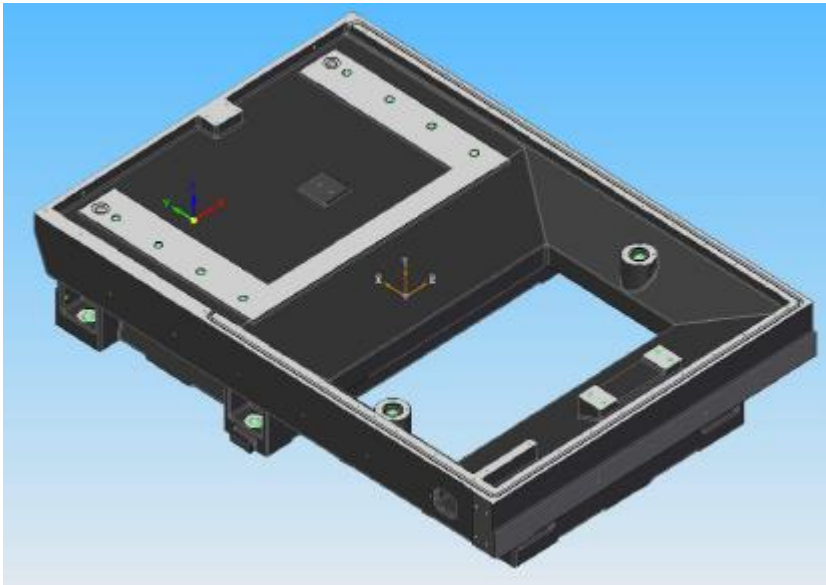


Linear guides: 35 Roller
Ball screw: 32*10
Press blocks: Yes

1. Change the linear guides from 35B to 35R to improve the stiffness of Z axis
2. Add some press blocks to make the linear guides more rigid and easier to adjust the accuracy

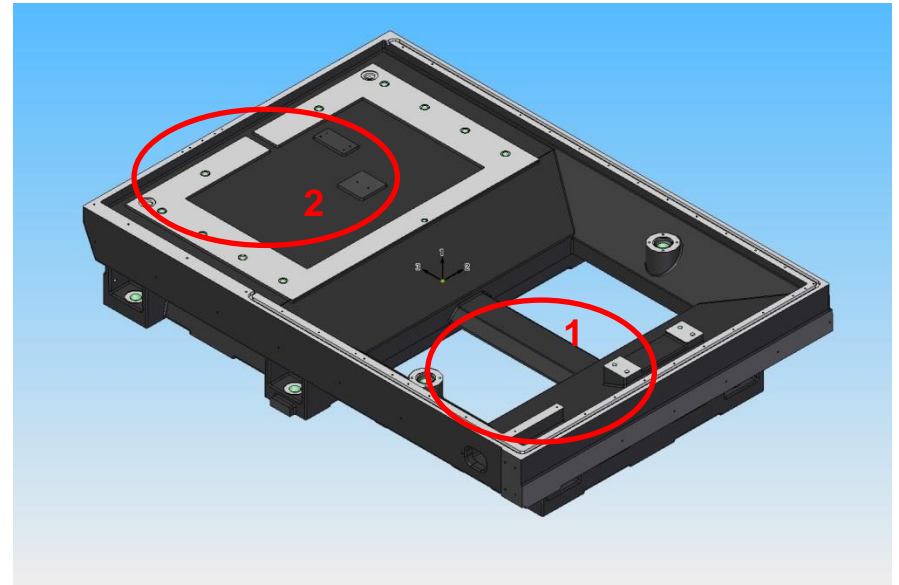
Older HEM U compared to New MILL E+GF+

HEM 500 U: Base



L * W * H (mm): 1800 * 1255 * 340
Weight (kg): 997

MILL E 500 U: Base



L * W * H (mm): 1800 * 1255 * 340
Weight (kg): 1040

- 1: Add a bridge to the base to strengthen the rigidity of the machine base in Y axis
- 2: Add a surface to fix the column to make the machine base stronger

Machine Performance



Exceptional Dynamic Properties

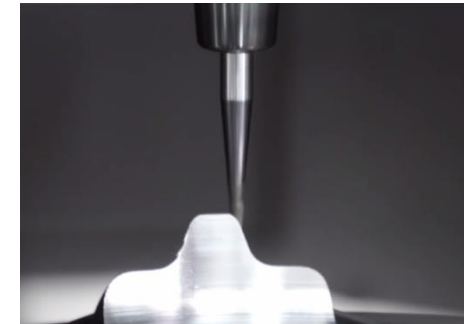
MILL E		500U	700U
Rapid feed rate	m/min	30	30
Acceleration	M/s ²	4	4
Chip to Chip time	S	7.4	7.4



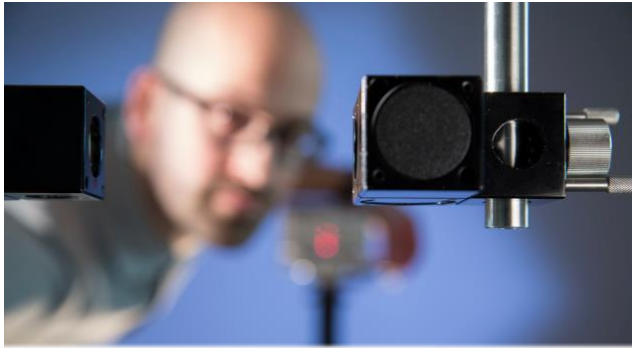
Increase process time

Spindle

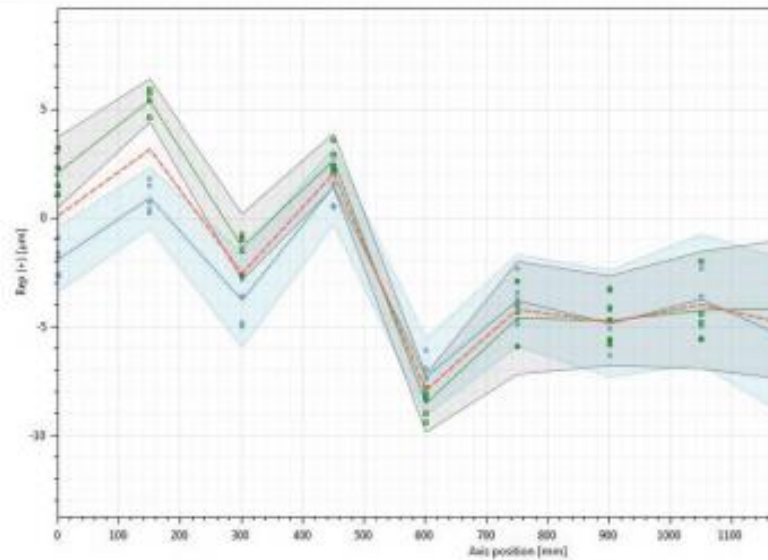
Spindle Type		Spindle - StepTec	Royal In line spindle
Speed	Rpm	20'000	12'000
Torque	Nm	120 HIGH TORQUE	75



Machine Accuracy



Positional accuracy		Target in μm	Achieved on the Prototype MC μm
Positional accuracy of X- axis			
Accuracy	A	8	2.395
Positional deviation	M	5	1.3
Reversal	B	4	0.48
Repeatability	R+/-	5	1.73
Positional accuracy of Y- axis			
Accuracy	A	8	2.047
Positional deviation	M	5	0.98
Reversal	B	4	0.62
Repeatability	R+/-	5	0.921
Positional accuracy of Z- axis			
Accuracy	A	8	2.519
Positional deviation	M	5	0.7
Reversal	B	4	0.16
Repeatability	R+/-	5	2.071
Positional accuracy of C- axis			
Accuracy		10"	1.63"
Positional deviation		5"	0.36"
Reversal		4"	0.8"
Repeatability	R+/-	5"	1.15"
Positional accuracy of B- axis			
Accuracy		14"	1.73"
Positional deviation		8"	0.41"
Reversal		5"	0.66"
Repeatability	R+/-	8"	1.08"



Spindles

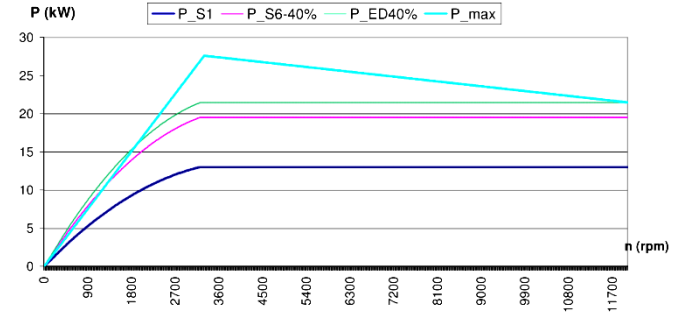
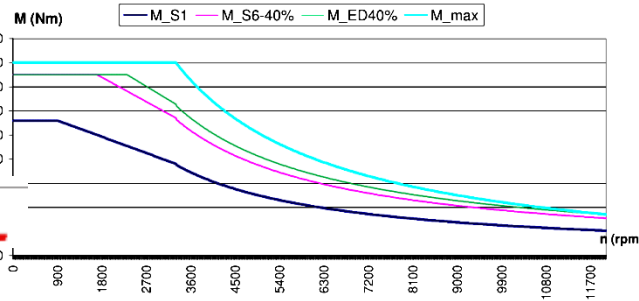
12.000rpm Inline BT/ISO 40

M S1/S6 56/75 [Nm]

P S1/S6 13/20 [kW]



ROYAL



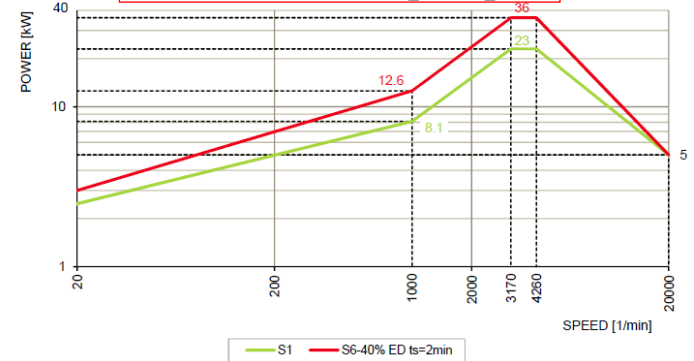
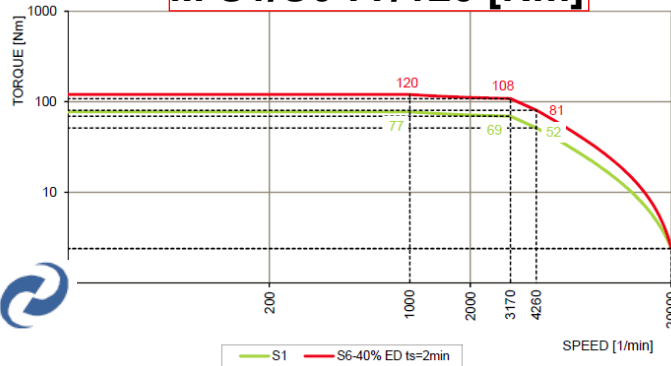
20.000rpm Motor Spindle HSK 63

M S1/S6 77/120 [Nm]

P S1/S6 23/36 [kW]



STEP TEC

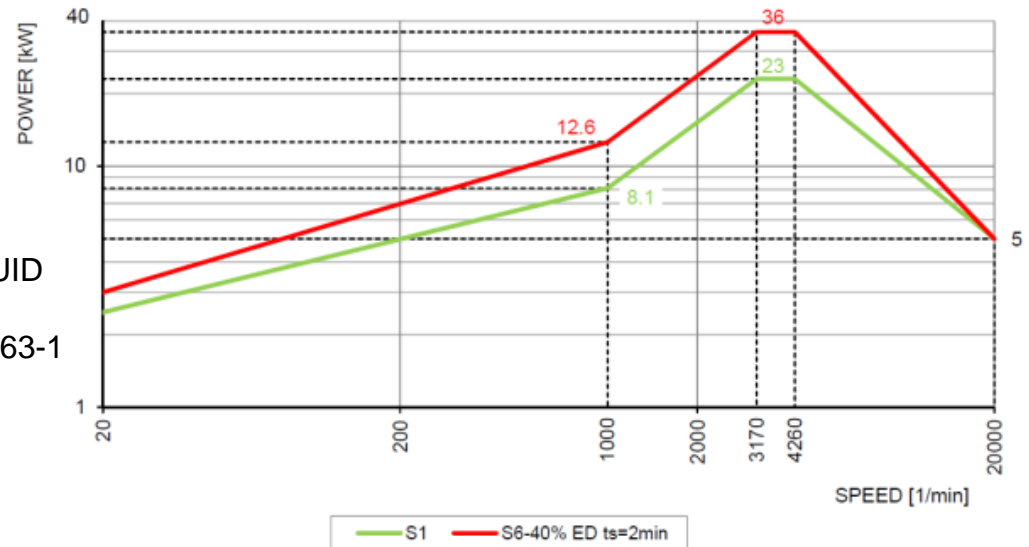


Spindles HPC 190 motor spindle 20k

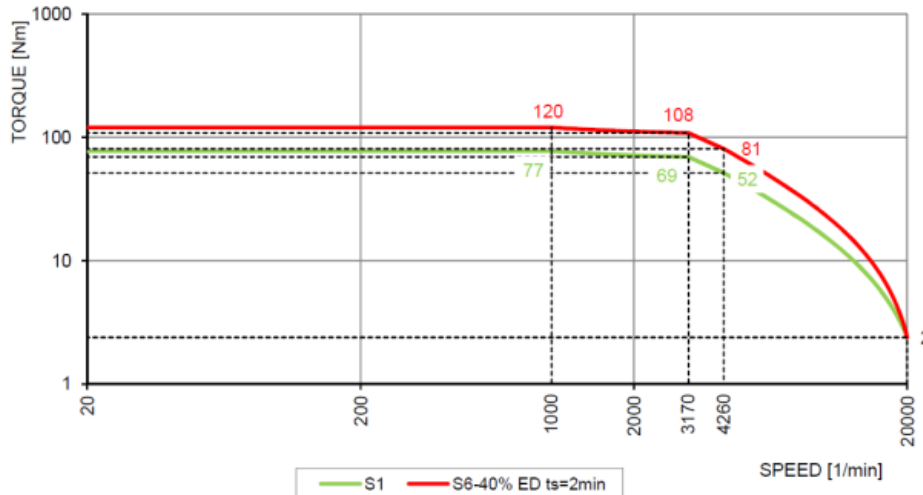


Technical data

Power (S6)	36 kW
Torque (S6)	120Nm
Speed max.	20 000 min ⁻¹
Acceleration	2.5 s
Encoder	1V pp Incr. 128
Cooling	COOL-CORE FLUID
Lubrication	Oil - air
Tool interface	HSK-A63 DIN69063-1
Unclamp hydr.	7.5 – 9.5 MPa



SDM20, Profibus / RS485 V3D Vibration measuring system



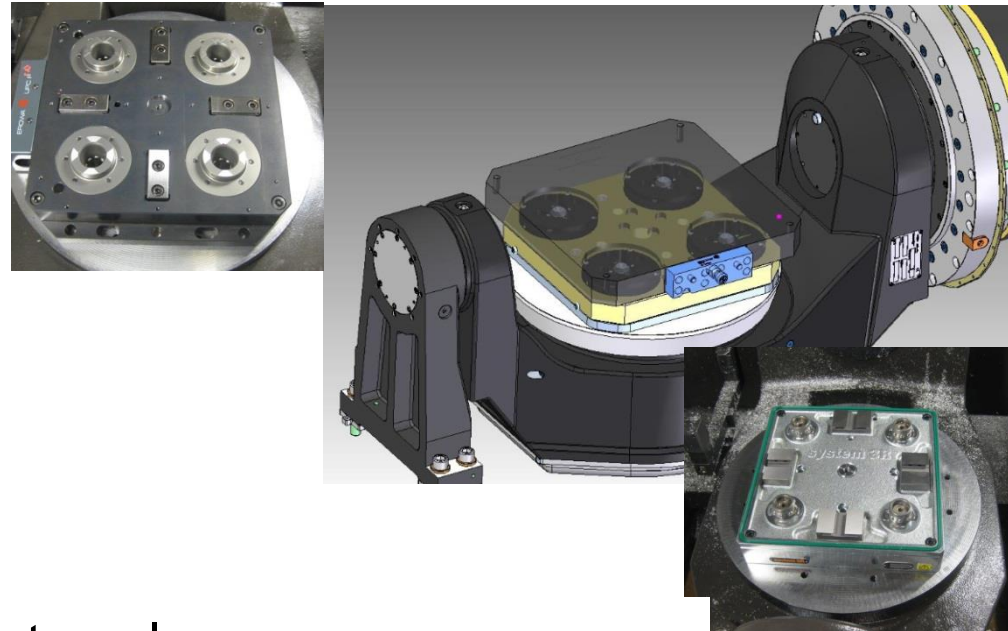
STEP TEC



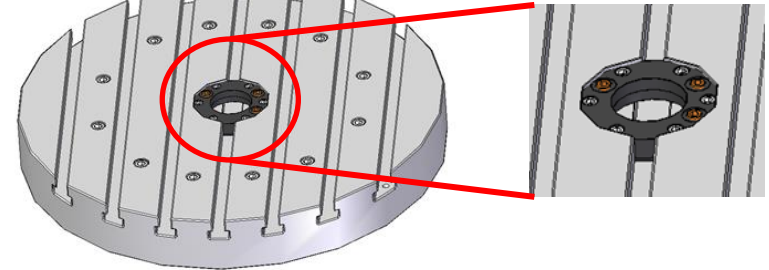
Motor Spindle

Integrated Clamping

Several Integrated Table clamping systems for simultaneous and 3+2 table **"offered as a standard"** allows excellent automation or manual pallet changing

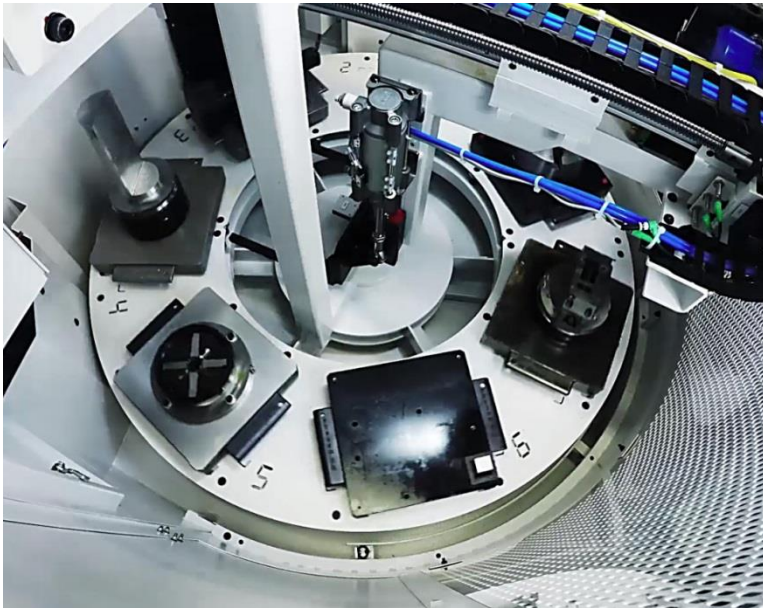


Automation can be done with a external robot system and our standard Robot interface. Thanks to Additional Rotary transmission in the centre of the table



Automation with Low Cost, Practical Solution and has a Small Footprint too!

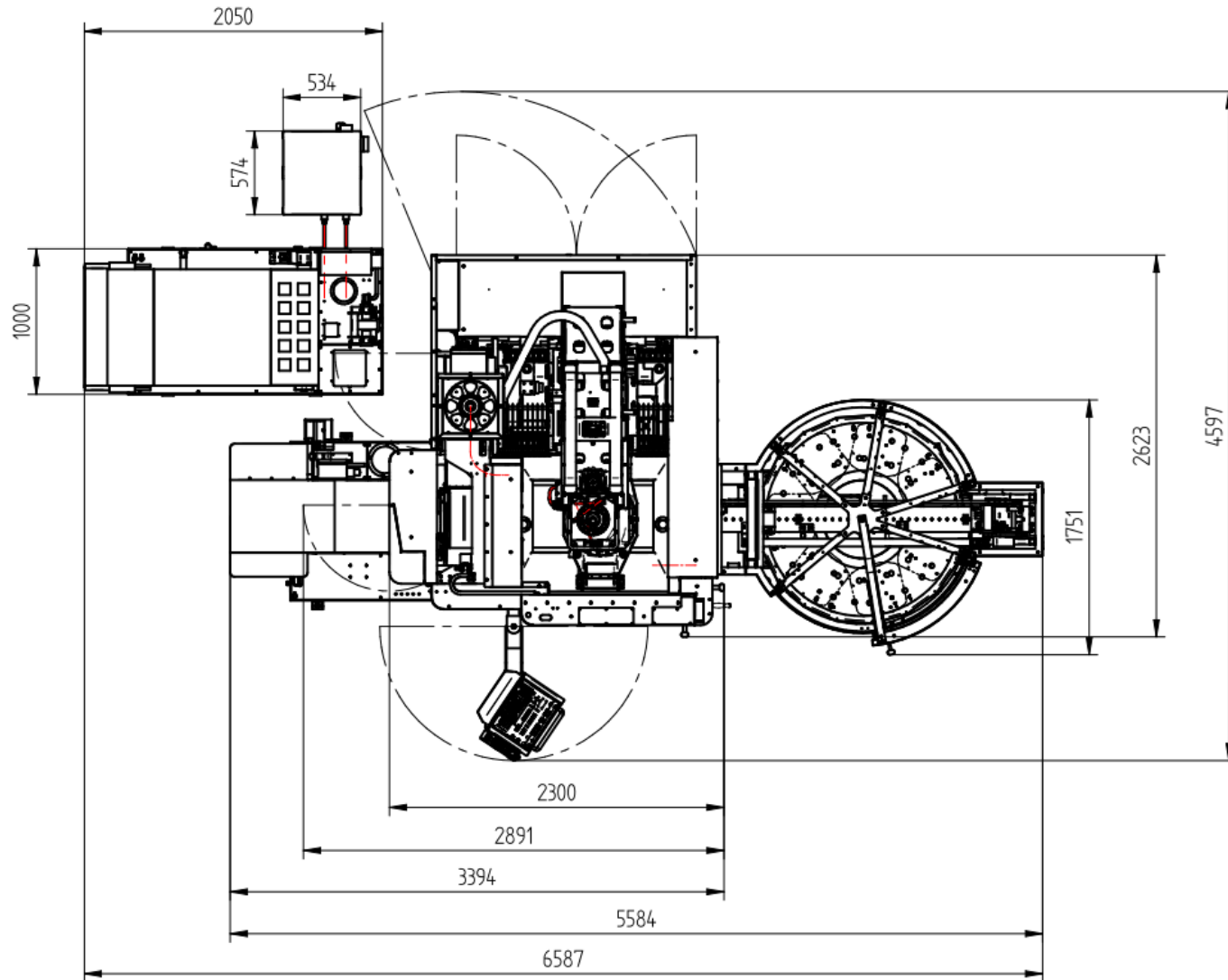
Lower your costs, increase productivity with Automation



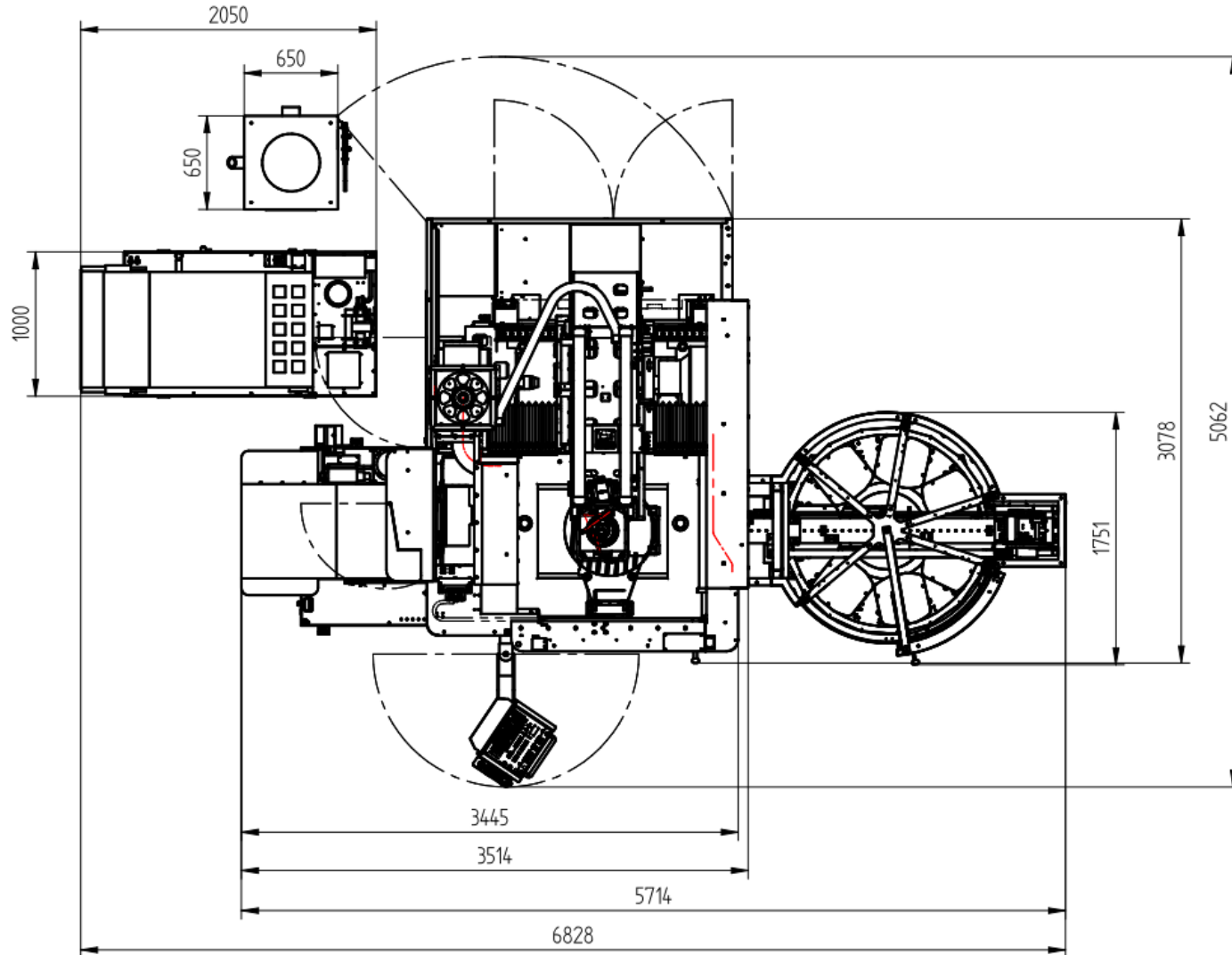
- 7* Dynafix 350*350
- 7* UPC 320*320
- 5* Delphine 400*400
- 5* MTS Erowa 400*400

Pallet Automation	pcs	7 / 5
Pallet changing time	sec	30
Max payload	kg	200

Footprint with Automation/TSC Mill E 500U



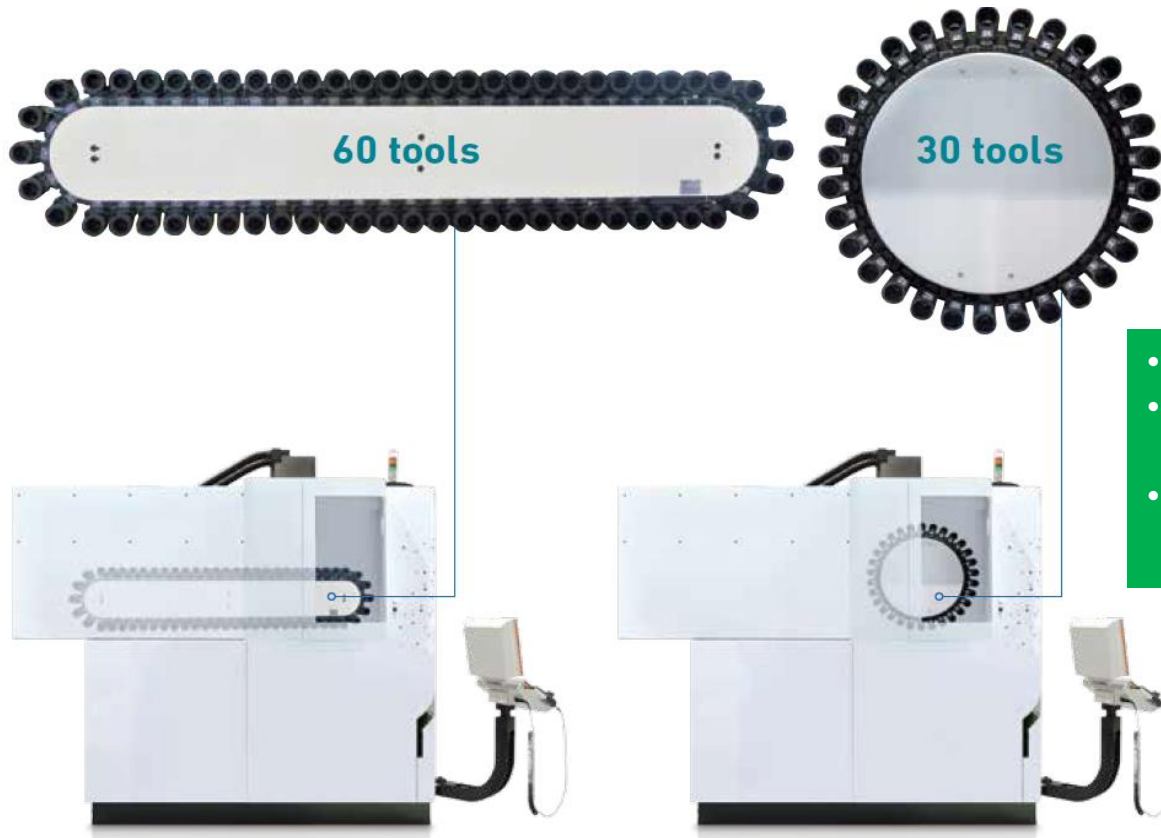
Footprint with Automation/TSC Mill E 700U



Tool changer for 30, 60 tools (Optional 120 Tooling Tower available)

*Different tool taper available HSK- A63, BT-ISO 40

*Separate tool loading door enables to load tools during the milling process



- Ergonomic and user friendly
- Ensures Productivity and Process reliability
- Parallel machining and tool loading



Adapted chip management

- **Solution for high-volume aluminum Milling chips** with slat band lift-up chip conveyor and coolant unit with fine filtration
- **Solution for high-volume steel Milling chips** with scraper lift-up chip conveyor and coolant filtration unit



Options

- Through-Spindle coolant
- Wash-down system
- Coolant thermal control
- Oil skimmer

Band filter CAC system



This unit filters the emulsion from small chips and particles with a paper band filter.

Electrical connection: 50/60 Hz
Capacity: 600 l
Filter system: Paper band

With the option of 20bar or 50/70bar



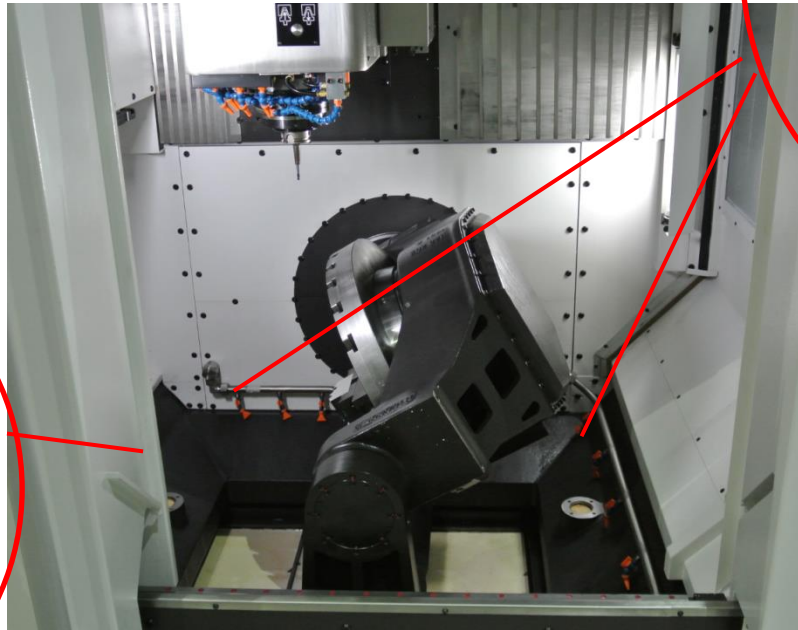
Wash down system

Wash down system in Full Direction of the machine area

Washer jets in the right side of the machining area



Washer jets in the left side of the machining area



Mist extraction unit



- The extraction system fitted on the cabin draws the air out of the working area into the filter unit.
- The extracted air flow is sucked through a prefilter (mechanical woven filter) to which large particles of liquid cling.
- The mist extraction system has two of these filter cells.

Nominal volumetric displacement 900 m³/h.



Touch probe / Tool Measuring

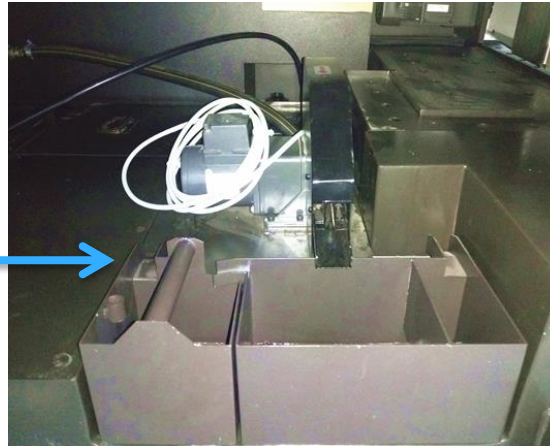
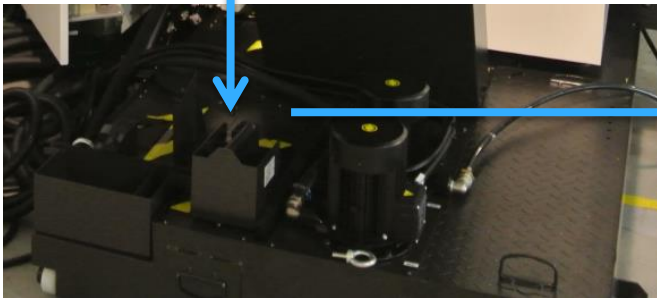


Oil skimmer



The oil skimmer consists of a disk that rotates in the cooling lubricant (emulsion). Oil that rises to the top clings to the disk. A wiper unit removes the oil from the disk. The removed oil is collected in a separate tank.

Easy to be maintained





Unleash your full potential