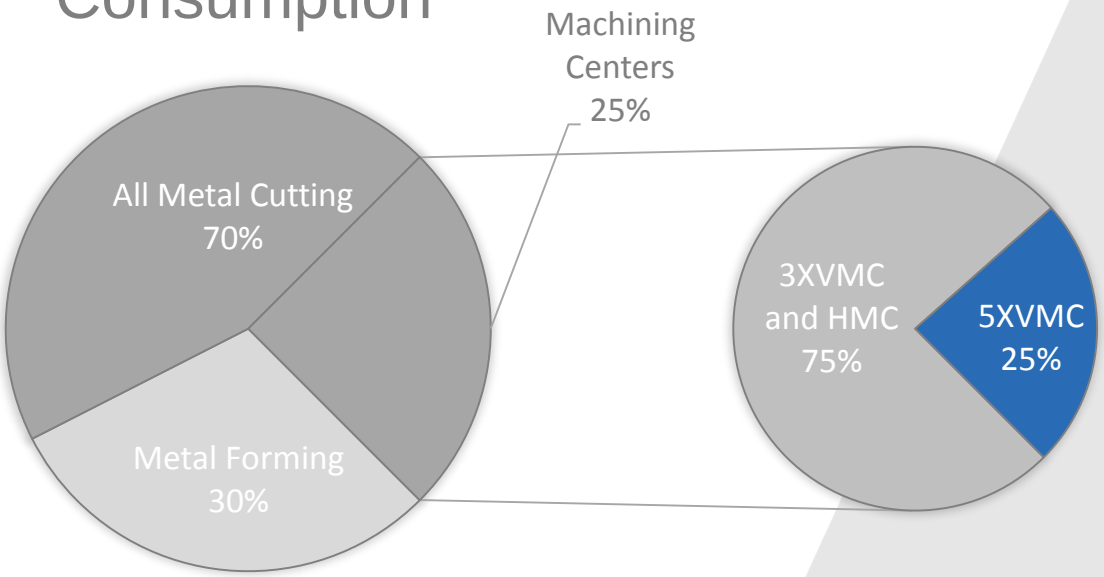
AXILE

G series competition

Buffalo Machinery Co Ltd

5X VMC market size

> European Machine Tool Consumption

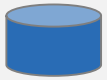
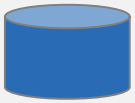
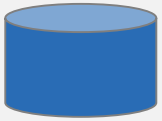
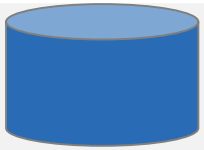


Consumption	In M€
European machine tool consumption (excluding Russia)	15.100
… Metal cutting machinery	10.600
… Machining Centers	3.800
… 5X Vertical Machining Centers	**950**

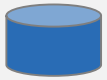
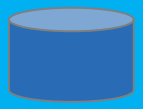
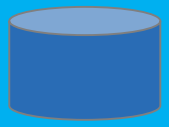
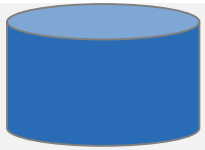
> 5XVMC consumption by country (estimation)

Country (region)	Units
Germany	1400
Italy	350
Switzerland	250
UK & Ireland	170
France	150
Spain & Portugal	110
Austria	140
Scandinavia	150
Benelux	130
Czech & Slovak	100
Turkey	100
Poland	90
Others	100
Total	**3250**

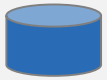
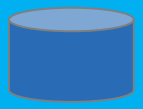
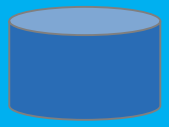
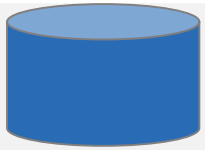
5X VMC categories definition

		Workpiece size (average)			
		Small	Medium	Large	X-Large
	Work	 ⌀ 600 x h 400	 ⌀ 800 x h 500	 ⌀ 1000 x h 600	 ⌀ 1200 x h 700
	Table	 ⌀ 400 mm	 ⌀ 600 mm	 ⌀ 800 mm	 ⌀ 1000 mm
	Load	350 kg	600 kg	1000 kg	1500 kg
Technology level (average)	Low	• Basket type rotary/tilting table with worm-gear driving system. • 3+2X or 5X capability depending on controller, but mostly 3+2X operations. • In-line spindle with low torque (< 80 Nm) and speed (< 15.000 rpm). • Low acceleration (< 0,3 G) and standard rapid feedrate (< 40 m/min). • Limited number of tools in the magazine.			
	High	• Trunnion type rotary/tilting table with direct torque-motor driving system. • 5X simultaneous capability with high-end controllers. • Built-in spindles with high torque (> 80 Nm) and speed (> 15.000 rpm). • High acceleration (> 0,5 G) and rapid feedrate (>40 m/min). • Large magazine options.			
	Innovation	• Torque driven rotary/tilting table with variable configuration. • Super high-speed built-in spindles for very precise machining (> 24.000 rpm). • Super high acceleration (> 1 G) and use of linear motors in XYZ axes. • Large magazine options and built-in automation systems. • Super high-precision			

5X VMC demand by category

		Workpiece size (average)			
		Small	Medium	Large	X-Large
	Work	 ⌀ 600 x h 400	 ⌀ 800 x h 500	 ⌀ 1000 x h 600	 ⌀ 1200 x h 700
	Table	 ⌀ 400 mm	 ⌀ 600 mm	 ⌀ 800 mm	 ⌀ 1000 mm
	Load	350 kg	600 kg	1000 kg	1500 kg
Technology level (average)	Low	10%	20%		
	High	5%	35%	15%	5%
	Innovation	5%	5%		

G series: M/L size, high-tech

Technology level (average)	Workpiece size (average)	Small	Medium	Large	X-Large
	Work	 ⌀ 600 x h 400	 ⌀ 800 x h 500	 ⌀ 1000 x h 600	 ⌀ 1200 x h 700
	Table	 ⌀ 400 mm	 ⌀ 600 mm	 ⌀ 800 mm	 ⌀ 1000 mm
	Load	350 kg	600 kg	1000 kg	1500 kg
	Low				
	High		G6	G8	
	Innovation				

G series competition

AXILE

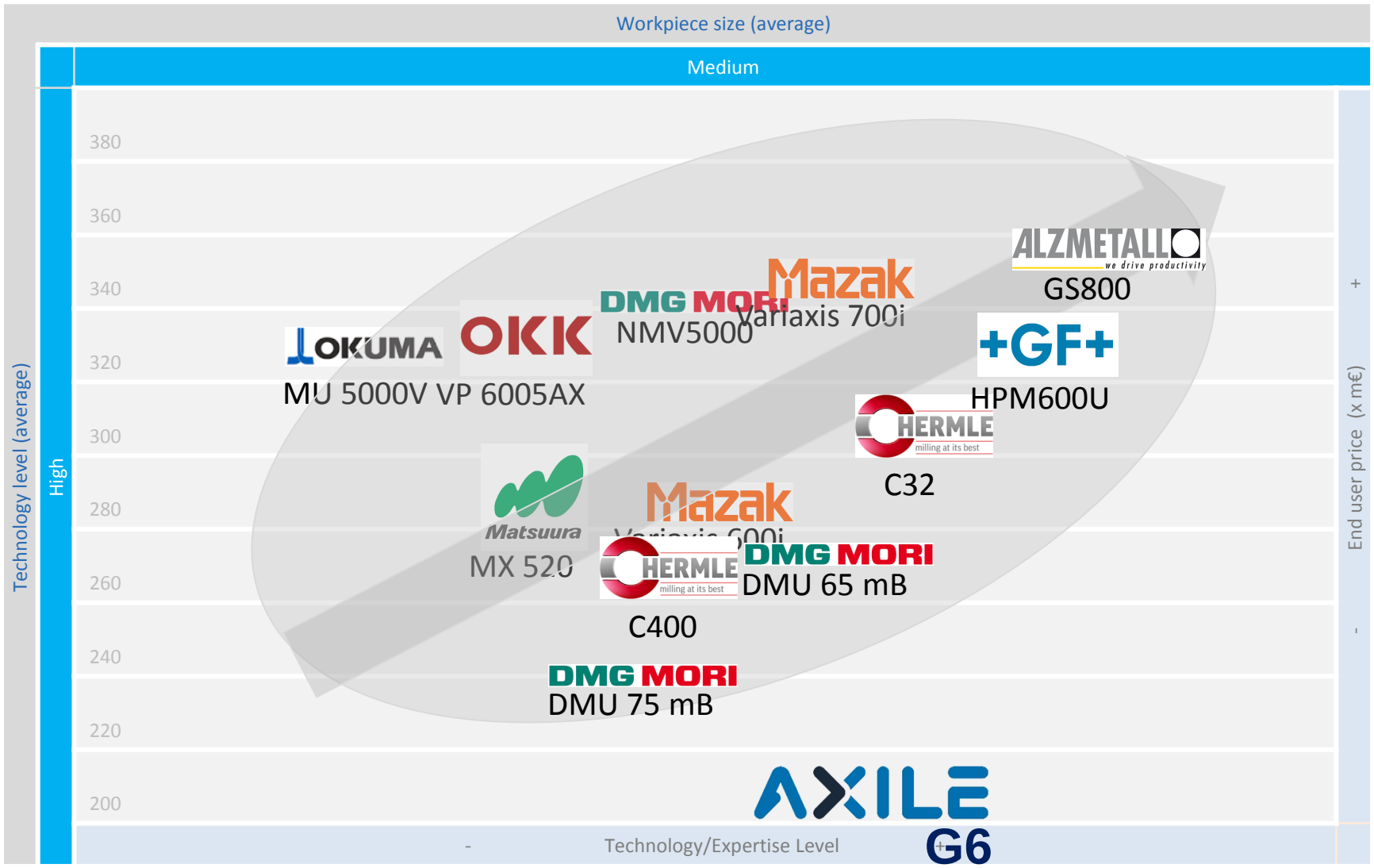
Technology level (average)	Workpiece size (average)	Small	Medium	Large	X-Large
	Work	⌀ 600 x h 400	⌀ 800 x h 500	⌀ 1000 x h 600	⌀ 1200 x h 700
	Table	⌀ 400 mm	⌀ 600 mm	⌀ 800 mm	⌀ 1000 mm
	Load	350 kg	600 kg	1000 kg	1500 kg
	Low	DMG MORI, OKUMA, +GF+, LITZ, SPINNER	DMG MORI, +GF+, LITZ, HURCO, SPINNER, Haas		
	High	DMG MORI, OKUMA, HERMLE, +GF+, Mazak, ALZMETALL, Matsuura	DMG MORI, OKUMA, HERMLE, +GF+, Mazak, ALZMETALL, Matsuura	DMG MORI, OKUMA, HERMLE, +GF+, LITZ, Mazak, MAS, ALZMETALL, Matsuura	DMG MORI, HERMLE, MAS, ALZMETALL
	Innovation	DMG MORI, HERMLE, +GF+, röders TEC, OKK, MAKINO	DMG MORI, röders TEC, OKK, MAKINO	DMG MORI, FEHLMANN, röders TEC, OKK, MAKINO	

G series competition

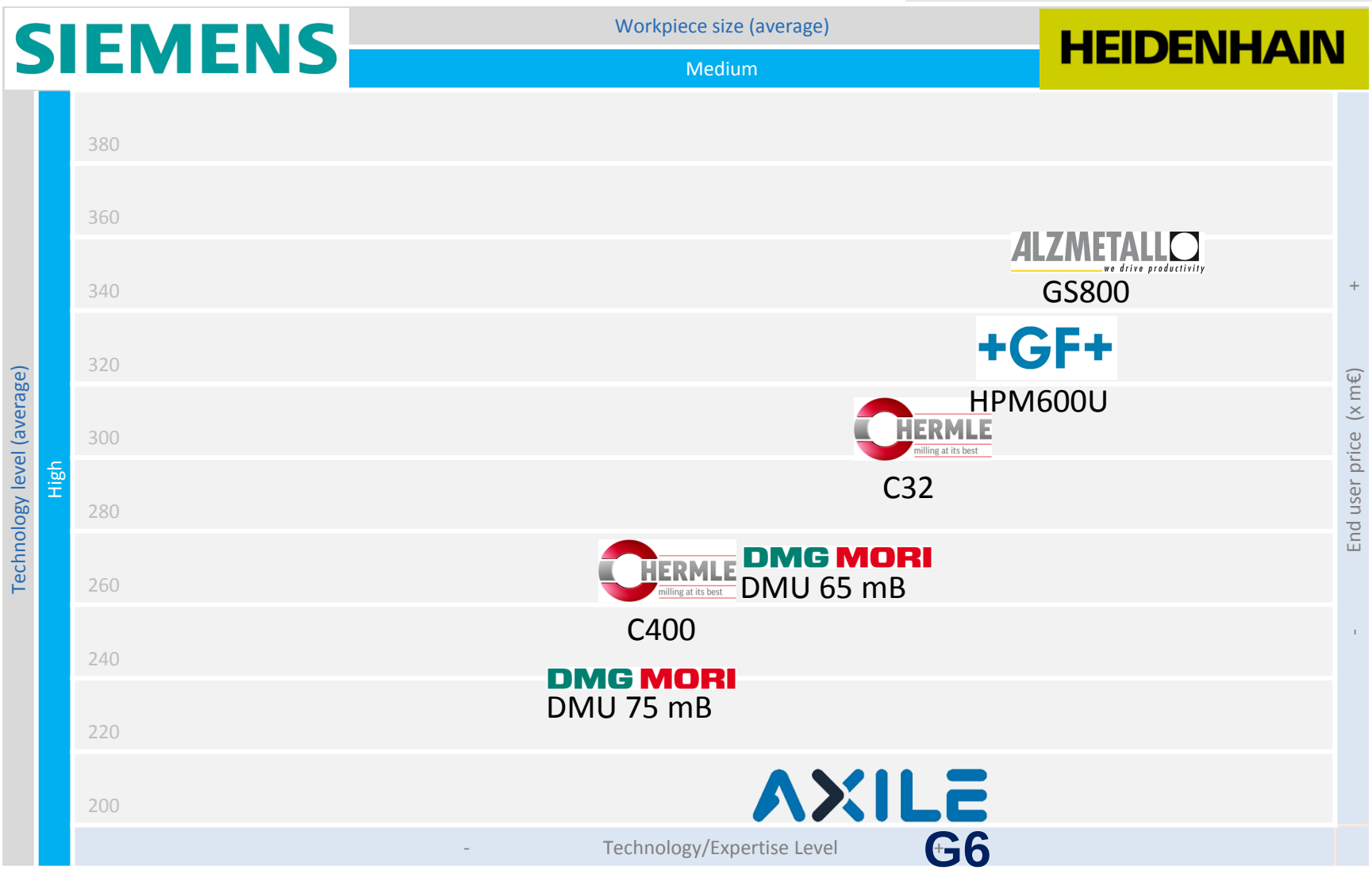
AXILE

Technology level (average)	Workpiece size (average)	Small	Medium	Large	X-Large
	Work	⌀ 600 x h 400	⌀ 800 x h 500	⌀ 1000 x h 600	⌀ 1200 x h 700
	Table	⌀ 400 mm	⌀ 600 mm	⌀ 800 mm	⌀ 1000 mm
	Load	350 kg	600 kg	1000 kg	1500 kg
	Low	DMG MORI, OKUMA, +GF+, LITZ, SPINNER	DMG MORI, +GF+, LITZ, HURCO, SPINNER, HAAS		
	High	DMG MORI, OKUMA, HERMLE, +GF+, Mazak, ALZMETALL, Matsuura	DMG MORI, OKUMA, HERMLE, +GF+, Mazak, ALZMETALL, Matsuura	DMG MORI, OKUMA, HERMLE, +GF+, LITZ, Mazak, MAS, ALZMETALL, Matsuura	DMG MORI, HERMLE, MAS, ALZMETALL
	Innovation	DMG MORI, HERMLE, +GF+, röders TEC, OKK, MAKINO	DMG MORI, röders TEC, OKK, MAKINO	DMG MORI, FEHLMANN, röders TEC, OKK, MAKINO	

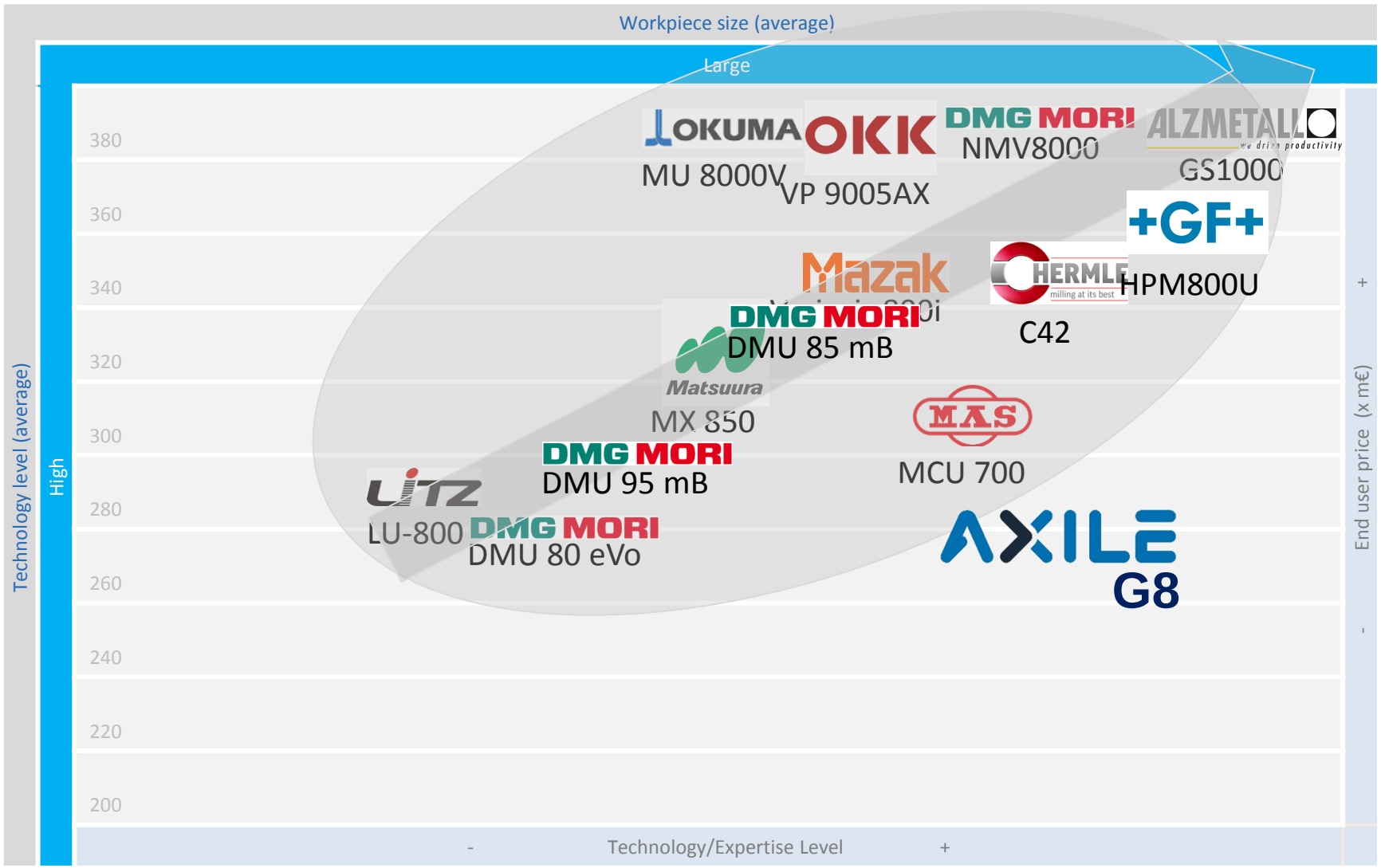
G6 competition



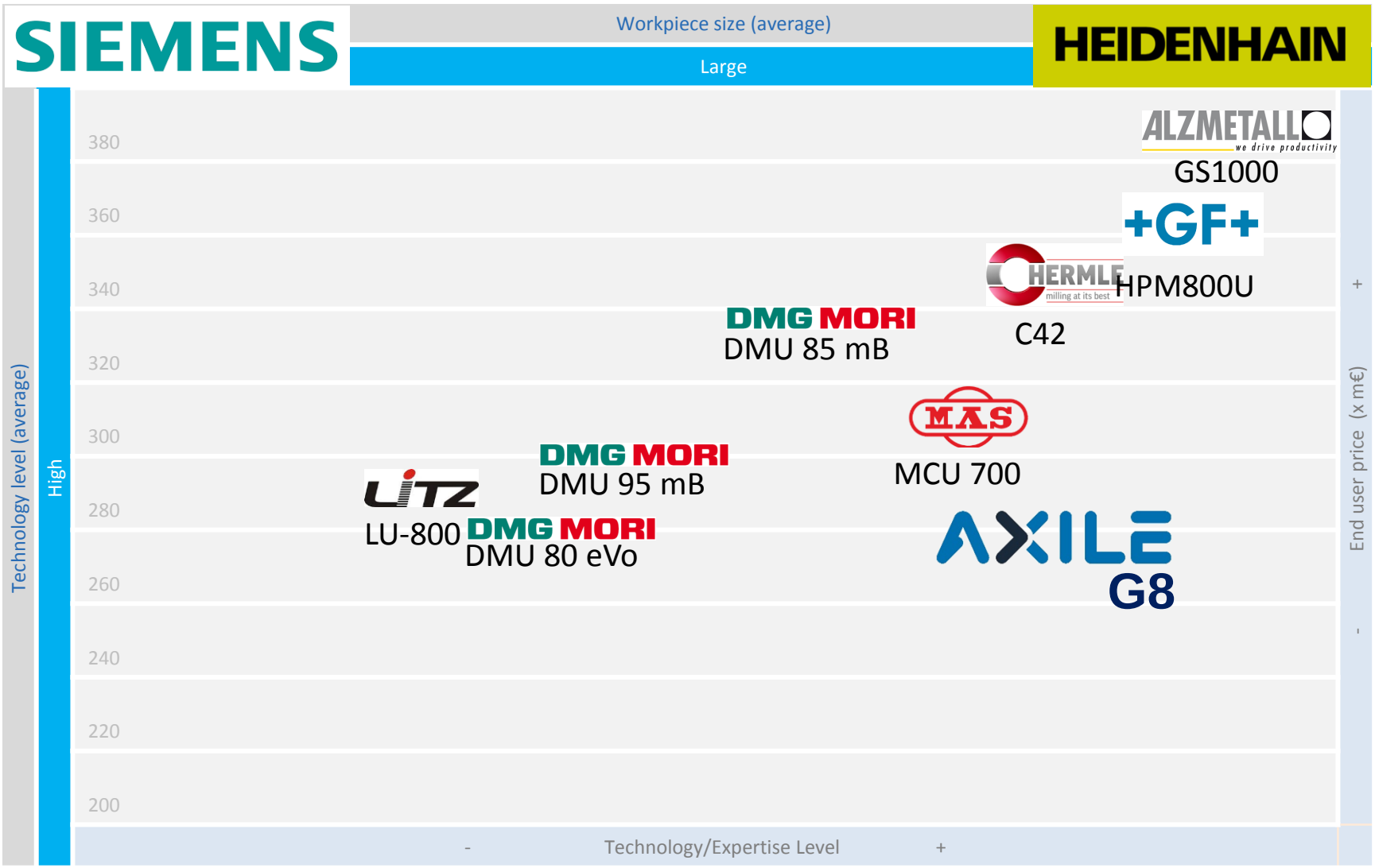
G6 competition



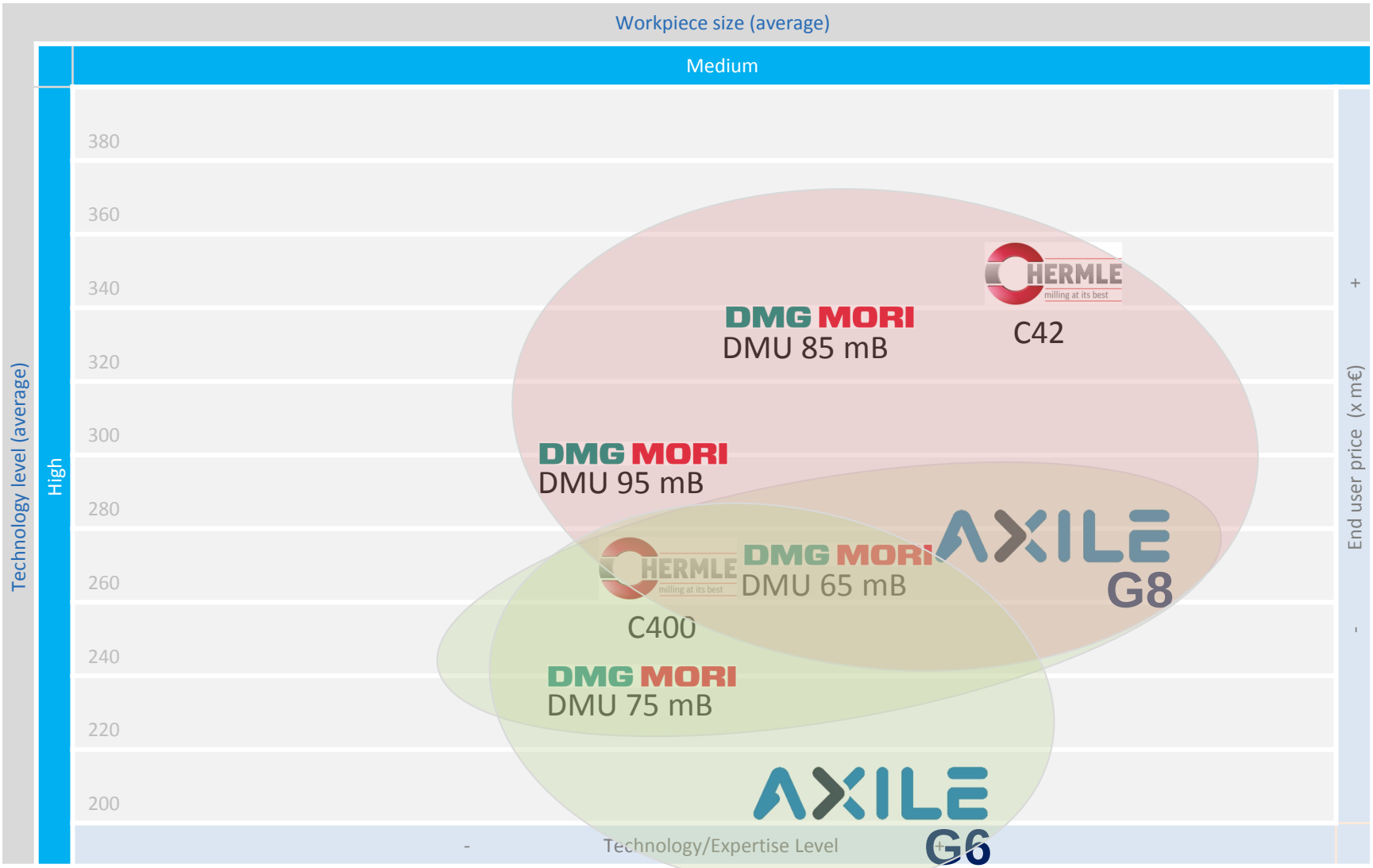
G8 competition



G8 competition



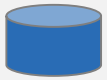
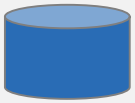
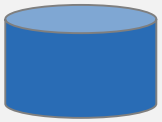
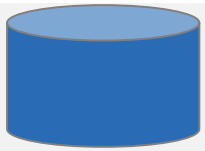
G6+G8 competition



G series competition

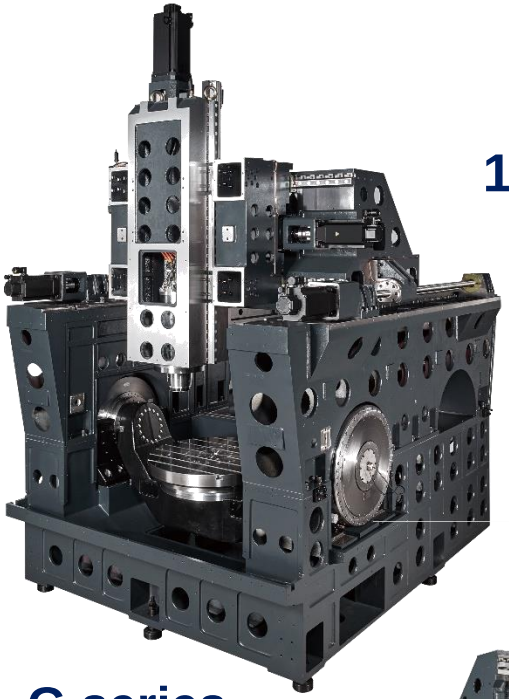
AXILE

HERMLE milling at its best

		Workpiece size (average)			
		Small	Medium	Large	X-Large
	Work	 ⌀ 600 x h 400	 ⌀ 800 x h 500	 ⌀ 1000 x h 600	 ⌀ 1200 x h 700
	Table	 ⌀ 400 mm	 ⌀ 600 mm	 ⌀ 800 mm	 ⌀ 1000 mm
	Load	350 kg	600 kg	1000 kg	1500 kg
Technology level (average)	Low				
	High	C22 C250	C32 C400	C42	C52
	Innovation	C12			

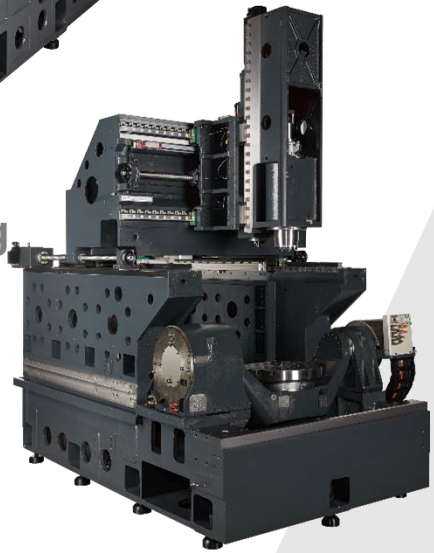
G series vs Hermle

G series vs Hermle: structure

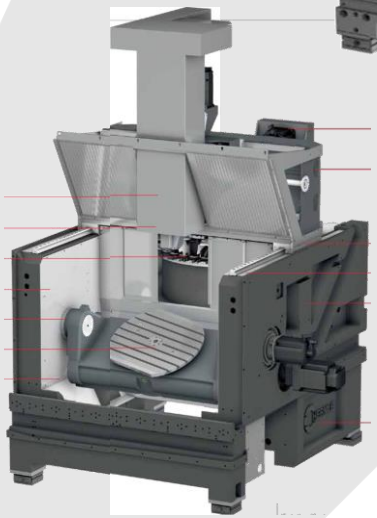


18 Tn

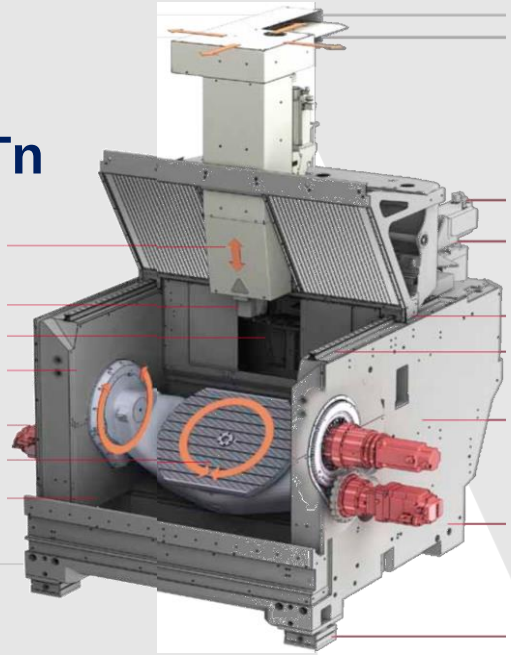
12 Tn



9,5 Tn



13,5 Tn



G series

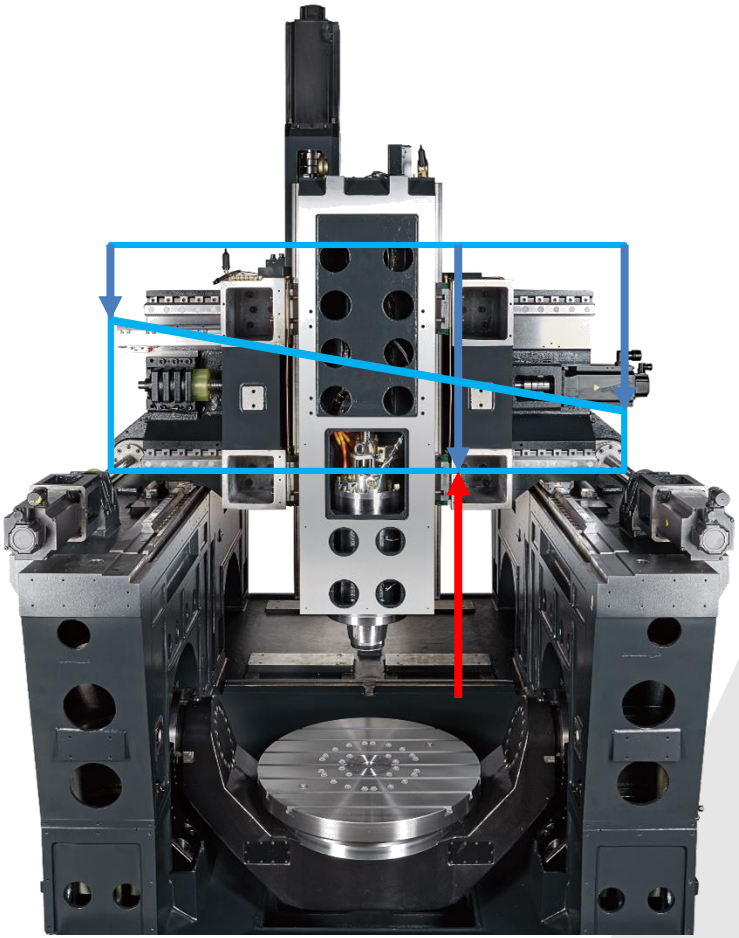
Massive casting structure. Bigger mass and **higher damping for rough milling processes.**

Hermle

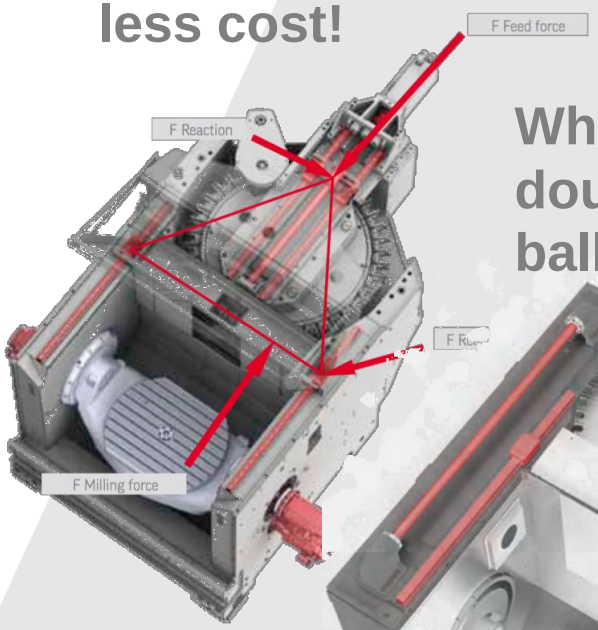
Less mass. Base in mineral casting to reduce price. Better damping but **different thermal expansion than steel**.

G series vs Hermle: gantry

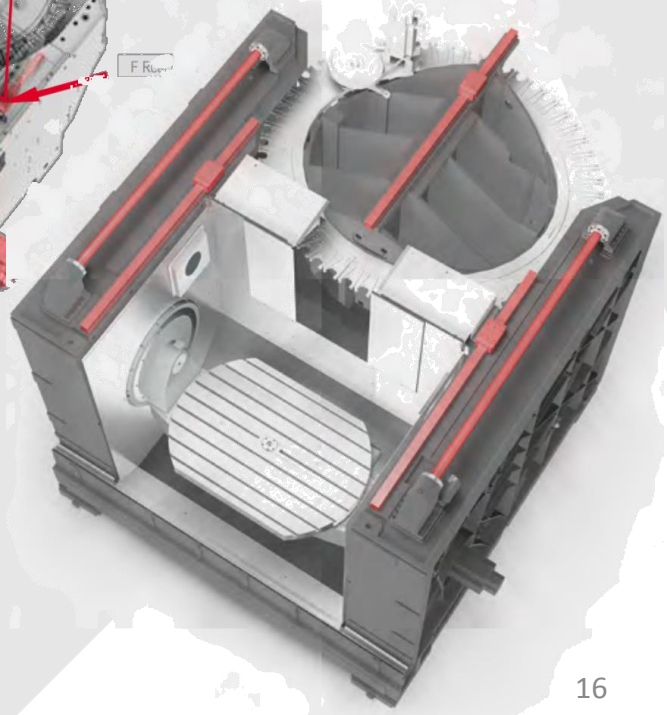
Servo compensated



C42 No better just less cost!



Why C52/62 double ballscrew?!



G series vs Hermle: table

AXILE

A gear

C400/ C42

C worm

KESSLER

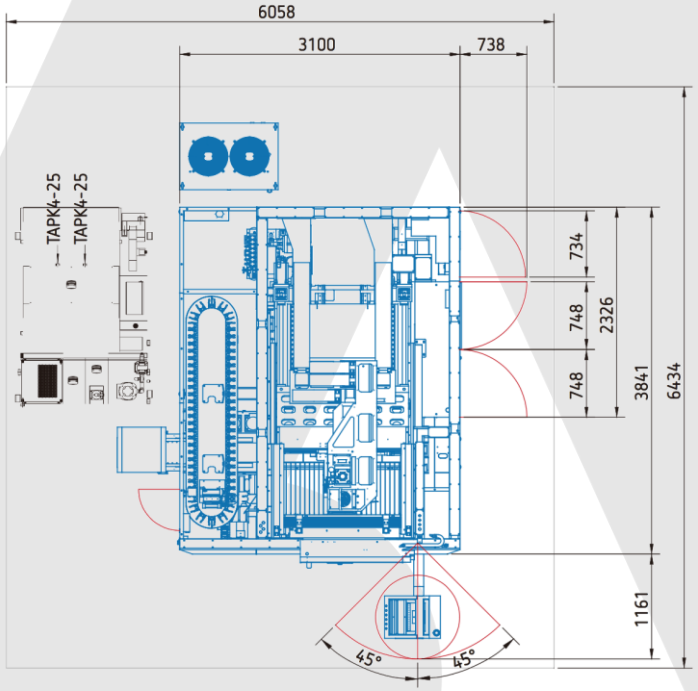
C42 option

A gear C torque A gear

G series vs Hermle: Table

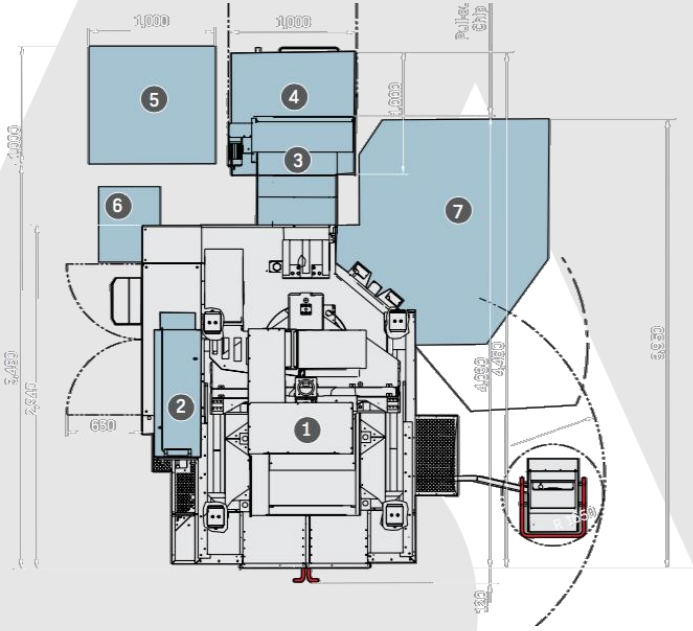
		G6	C400	G8	C42	
		Std	Std	Std	Std	Opt
Table type		trunnion	trunnion	trunnion	trunnion	trunnion
rotary	deg	360	360	360	360	360
tilting	deg	120/-120	130/-130	120/-120	130/-130	130/-130
Table size	mm	600	650x540	800	800	800
Table loading	kg	600	600	1300	850	1400
Max speed rotary	rpm	200	30	100	25	65
Max speed tilting	rpm	100	25	80	15	25
Driving type rotary		torque	worm	torque	worm	torque
Driving type tilting		torque	gear	tandem torque	gear	tandem gear

G6 vs C400: magazine



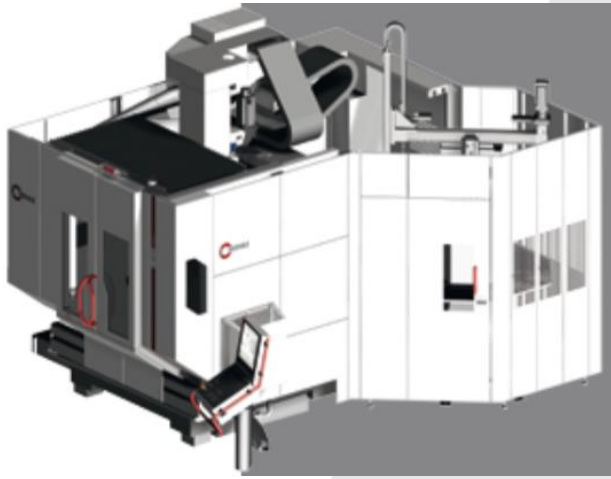
STD 60 carrousel	3.100 x 3.840 mm
OPT 60+60 carrousel	3.100 x 3.840 mm

G6 vs C400: magazine

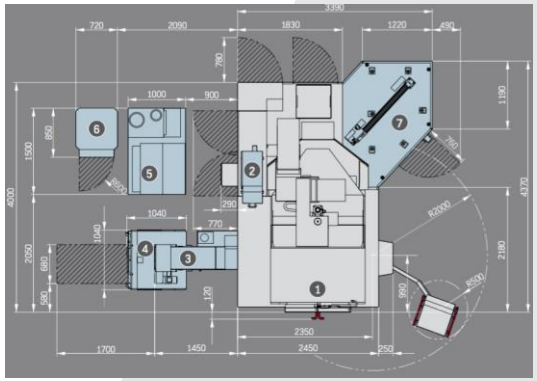


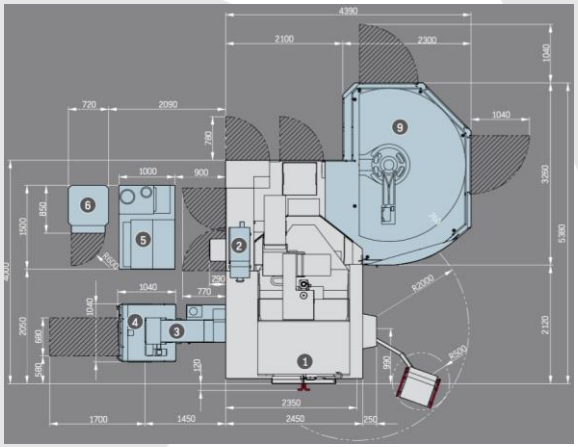
STD 36 disk	2.930 x 3.950 mm
OPT 36+87 disk	3.770 x 3.950 mm

G8 vs Hermle C42: magazine



Expansion of the tool storage capacity by:	
Additional magazine:	43 pockets
Additional magazine:	87 pockets
Additional magazine:	160 pockets
Maximum tool length:	300 mm
Maximum tool diameter:	Ø 80 mm
Maximum tool diameter with corresponding adjacent pocket allocation:	Ø 125 mm
Maximum tool weight:	8 kg

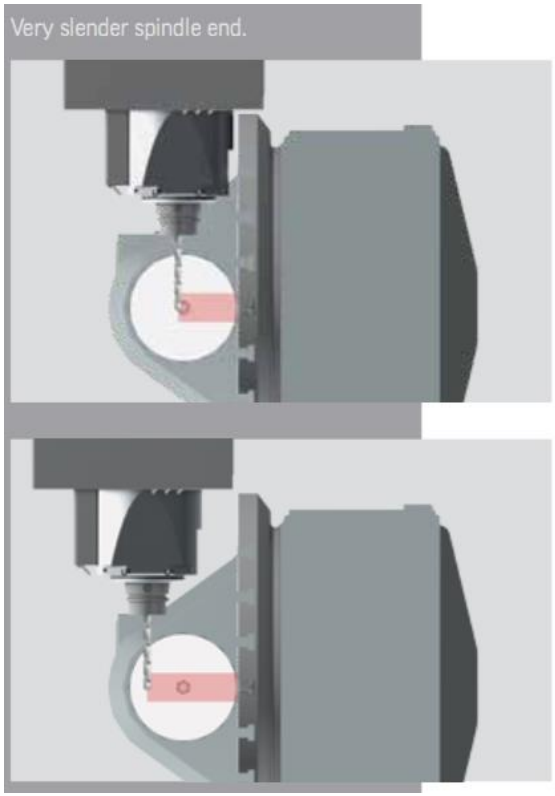




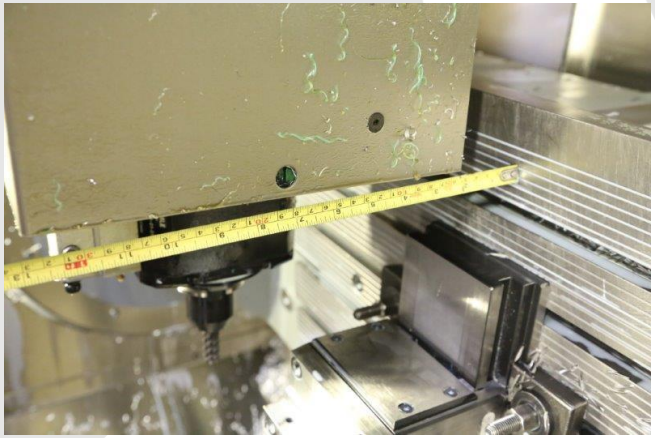
- > **Hermle C42 std magazine is 43 tools.**
  - > **Space required for 87 or 160 tools nearly doubles machine space.**
  - > **Price of option is very expensive.**

G6 vs Hermle C400

- Good design for light collision protection but:
  - Works only in Z-direction
  - Works only at low speeds



- Very slender spindle for good reach to small parts: but normally small parts need higher and bigger clamping devices!!!

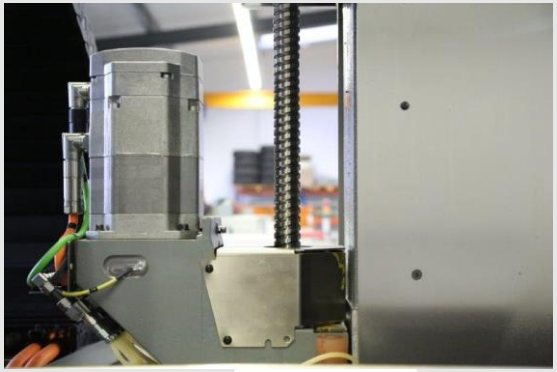


G6 vs Hermle C400

> Good ergonomy.
> Good working area cleaneness.

G6 vs Hermle C400

- Belt or gear driven motor on X and Y axis
- Linear scale is a MUST!!

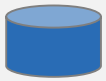
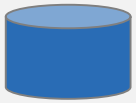
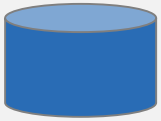
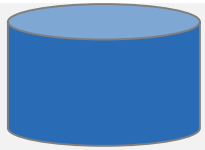


- Chip conveyor to the back! **Bad for space requirement.**
- **Y-axis linear guide without protection.**

G series competition

DMG MORI

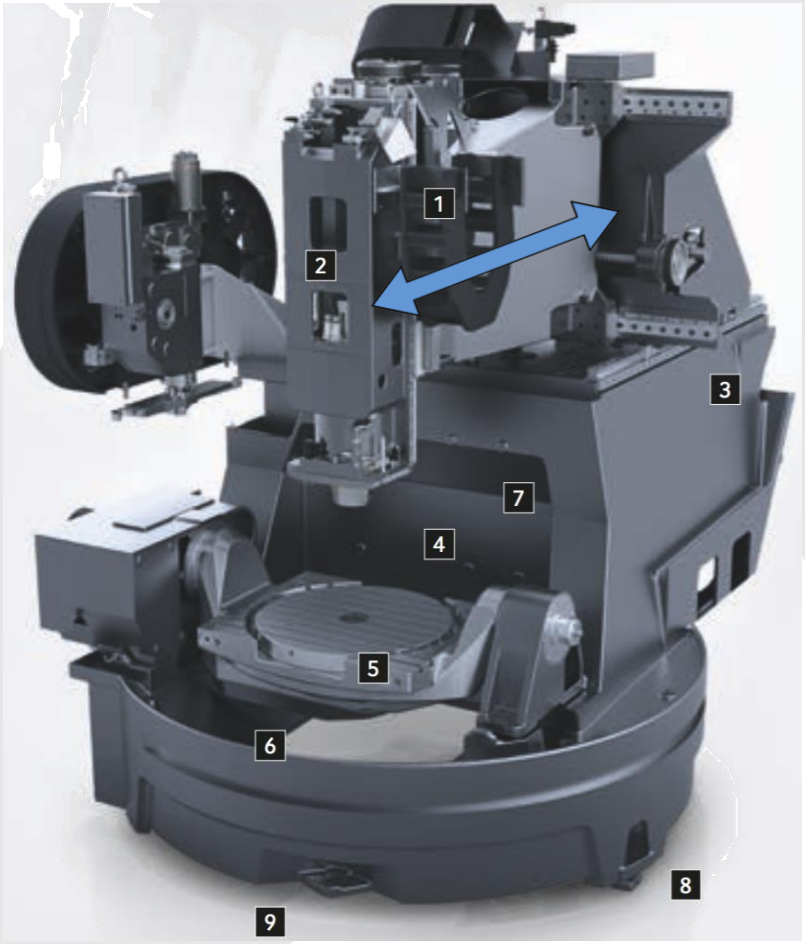
AXILE

		Workpiece size (average)			
		Small	Medium	Large	X-Large
	Work	 ⌀ 600 x h 400	 ⌀ 800 x h 500	 ⌀ 1000 x h 600	 ⌀ 1200 x h 700
	Table	 ⌀ 400 mm	 ⌀ 600 mm	 ⌀ 800 mm	 ⌀ 1000 mm
	Load	350 kg	600 kg	1000 kg	1500 kg
Technology level (average)	Low	ecoMill 50 DMU 50	ecoMill 70 DMU 70		
	High	DMU 40 eVo NMV 3000	DMU 65 monoBLOCK DMU 75 monoBLOCK DMU 60 eVo NMV 5000	DMU 85 monoBLOCK DMU 95 monoBLOCK DMU 80 eVo NMV 8000	DMU105 monoBLOCK
	Innovation	HSC 20 linear HSC 55 linear	HSC 75 linear	HSC 105 linear	

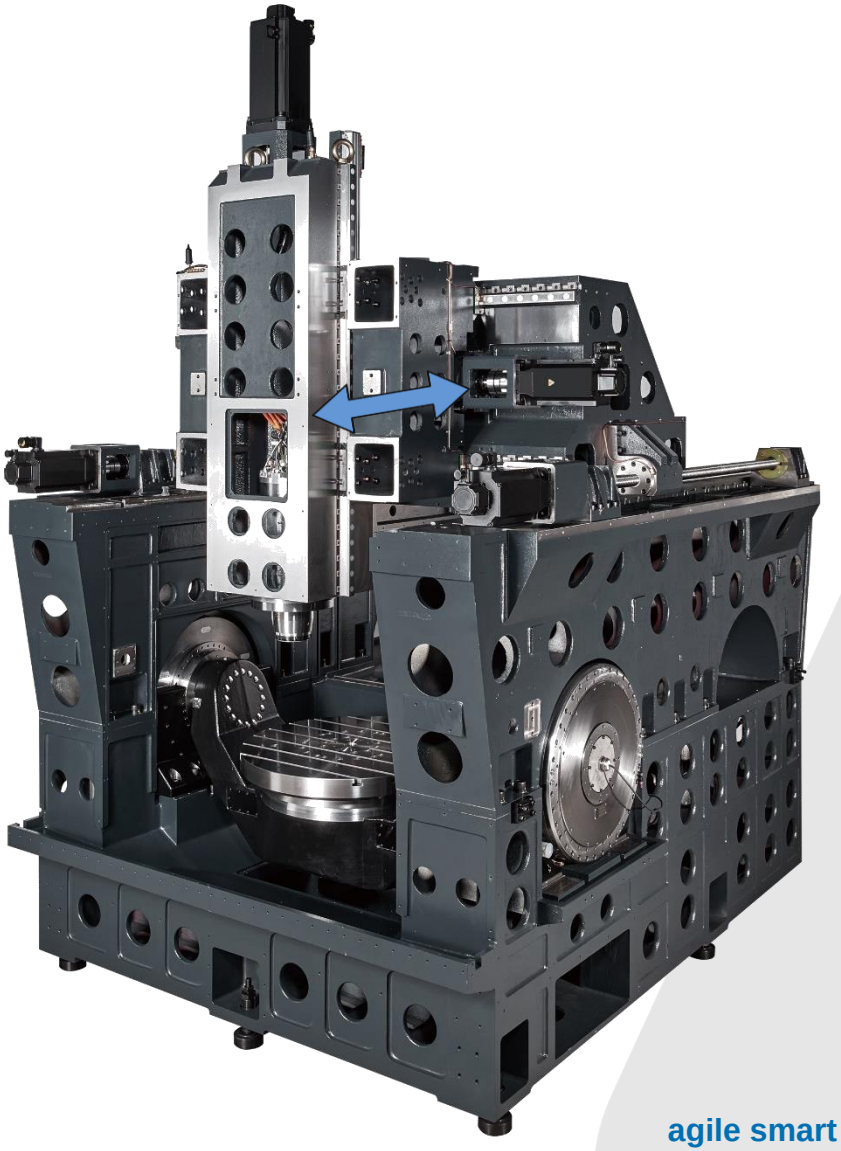
G series vs DMG 75/95 monoB

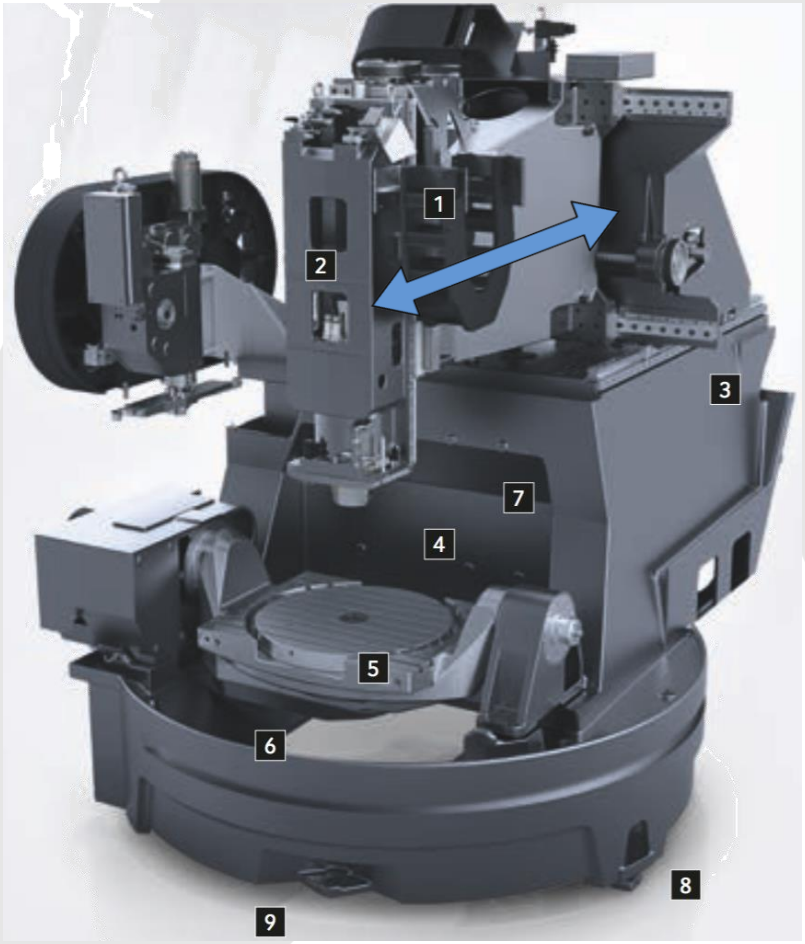
G series vs DMG 75/95 monoBAXILE

- **Small base to ground.**
- **Single-ballscrew gantry type structure.**
- **Long headstock** to gain space between spindle and table at 90.
  - Bigger distance from spindle to X-axis guideways and thus **less rigidity** during milling process due to bigger moment.
  - **Less dynamic Y-axis due to ”jumping” headstock.**



G series vs DMG 75/95 monoBLOCK

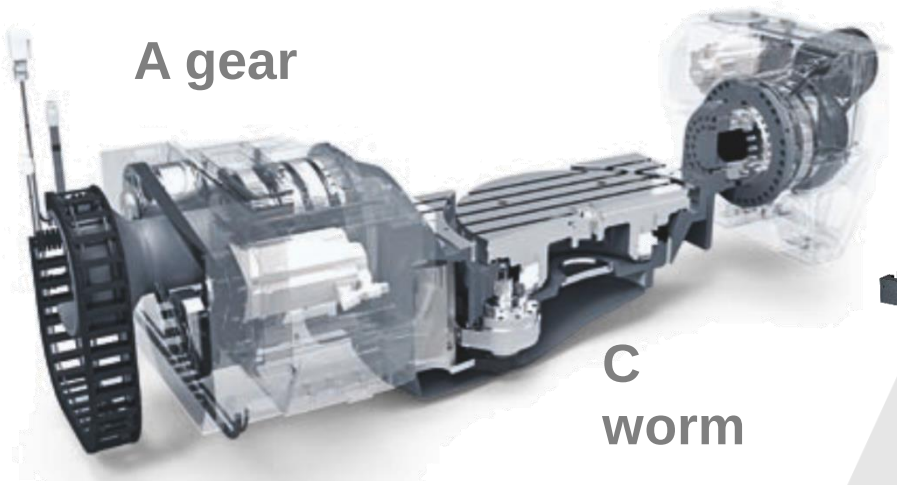




G series vs DMG 75/95 monoBAXILE

KESSLER

A gear



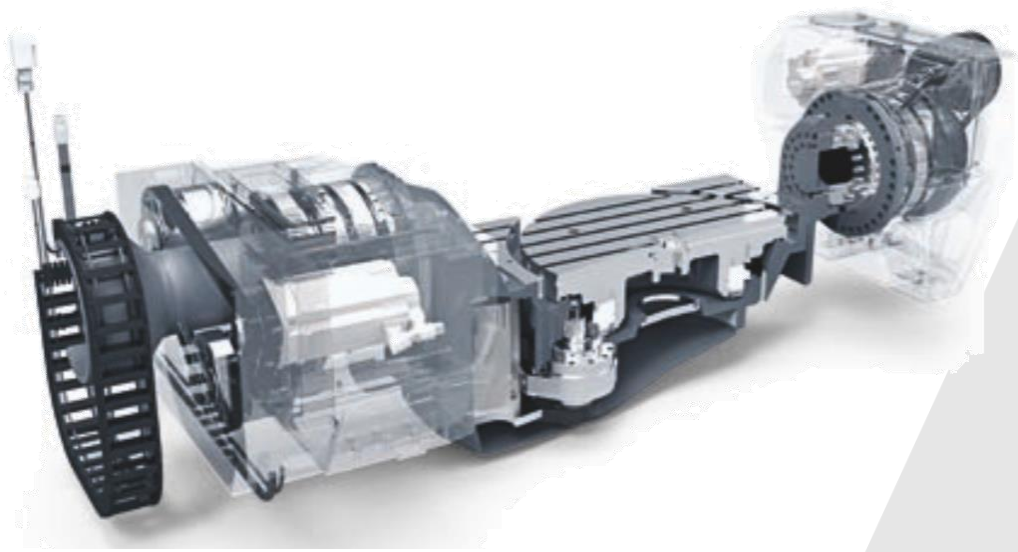
C
worm

G series vs DMG 75/95 monoBAXILE

		G8	DMU95	G6	DMU75
		Std	Std	Std	Std
Table type		trunnion	trunnion	trunnion	trunnion
rotary	deg	360	?	360	?
tilting	deg	120/-120	?	120/-120	?
Table size	mm	800	850x750	600	650
Table loading	kg	1300	1000	600	600
Max speed rotary	rpm	100	30	200	40
Max speed tilting	rpm	80	15	100	20
Driving type rotary		torque	worm	torque	worm
Driving type tilting		tandem torque	gear	torque	gear

G6 vs DMG DMU65 monoBLOCK

AXILE



Dynamic //

Direct Drive on the A and C axes

Highly dynamic Direct Drive technology on the C and A axes (tandem) for the highest levels of precision and dynamics

> Option (only DMU65!) tandem drive worm-gear table or tandem-drive torque motor table, “for the highest levels of precision and dynamics” (in their own words.

G6 vs DMG DMU65/75 monoBLOCK AXILE

		G6	DMG DMU65 monoBLOCK		
		Std	Std	Opt	Opt
Table type		trunnion	trunnion	trunnion	trunnion
rotary	deg	360	?	?	?
tilting	deg	120/-120	?	?	?
Table size	mm	600	650	650	850x750
Table loading	kg	600	600	1000	600
Max speed rotary	rpm	200	40	50	80
Max speed tilting	rpm	100	20	20	20
Driving type rotary		torque	worm	worm	torque
Driving type tilting		torque	worm	tandem worm	torque

G series vs DMG 75/95 monoB

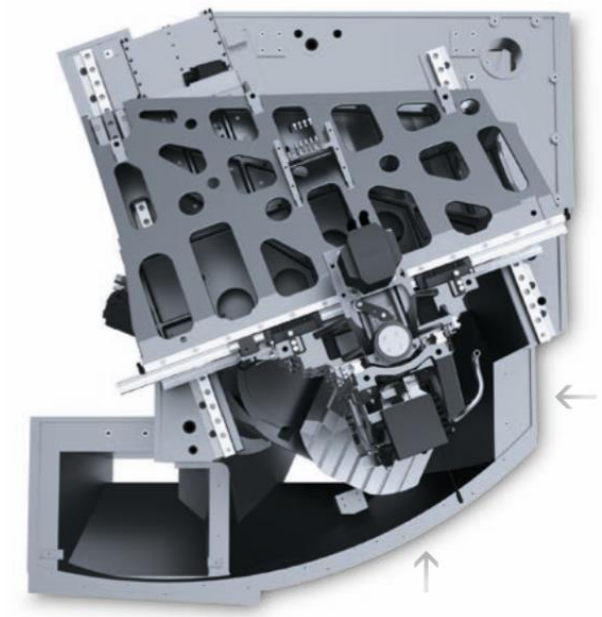
STD 60 carrousel
NO option!
Tools in horizontal

STD 60 carrousel
OPT 120 carrousel
Tools in vertical

G series vs DMG DMU eVo AXILE

G series vs DMG DMU eVo AXILE

- Clearly less rigid structure compared to our **G series**
- **Less mass**
- **Single ballscrew gantry type structure.**



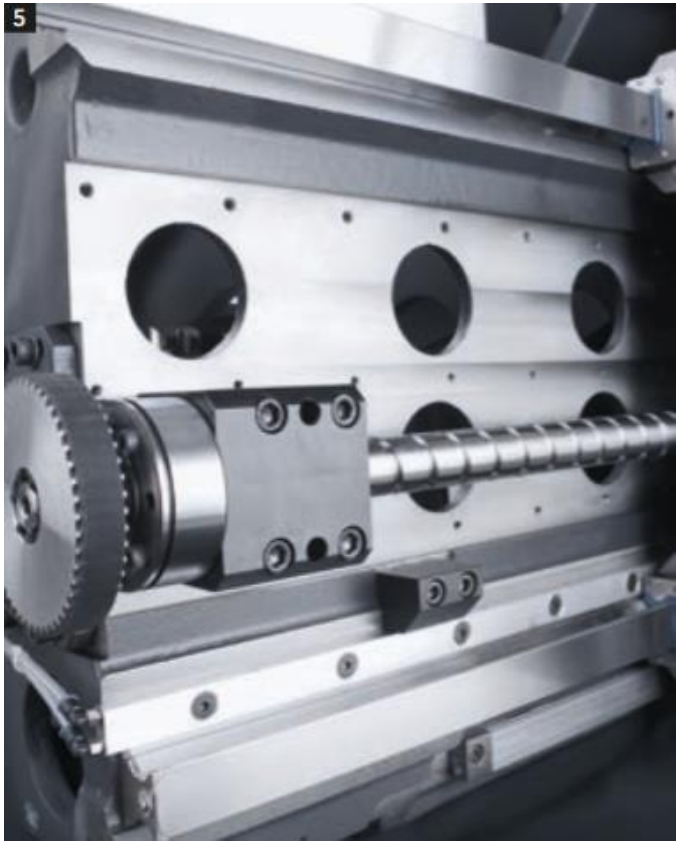
G series vs DMG DMU eVo AXILE

- Basket type table (tilting axis supported only in one-side). Very light parts only available
  - (600 kg against 1300 kg in our G8)
  - (400 kg against 600 kg in our G6)
- Torque motor driven A and C axis, hence good dynamics and accuracy (with light parts!)

G series vs DMG DMU eVo AXILE

- Horizontal carrousel for easy manual operation directly on magazine.
- 30 (std), 60 or 120 tools (option).

G series vs DMG DMU eVo AXILE

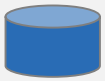
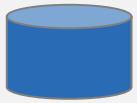
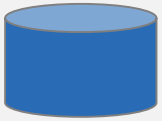
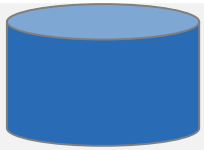


- **Belt-driven motors!! Linear scale is a MUST.**
- **Linear motors are option to up to 80 m/min and high acceleration rates.**

G series competition

AXILE

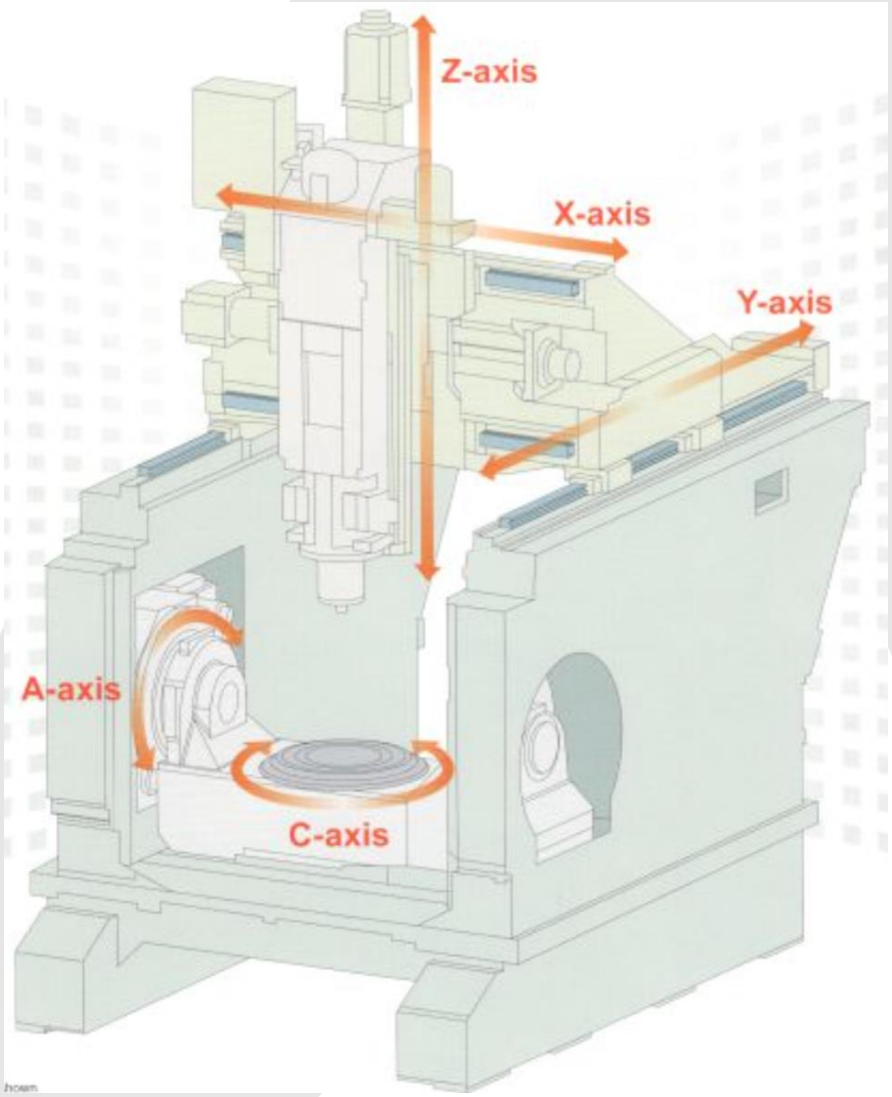
Mazak

		Workpiece size (average)			
		Small	Medium	Large	X-Large
	Work	 ⌀ 600 x h 400	 ⌀ 800 x h 500	 ⌀ 1000 x h 600	 ⌀ 1200 x h 700
	Table	 ⌀ 400 mm	 ⌀ 600 mm	 ⌀ 800 mm	 ⌀ 1000 mm
	Load	350 kg	600 kg	1000 kg	1500 kg
Technology level (average)	Low	Variaxis 500 j	Variaxis 600 j		
	High	Variaxis 500 i	Variaxis 600 i Variaxis 700 i	Variaxis 800 i	Variaxis 1000 i
	Innovation				

G series vs Mazak Variaxis

G8 vs Mazak Variaxis 800 i AXILE

- Single-ballscrew gantry type structure
- Worm-gear one-sided tilting axis (A-axis) table.
- Worm-gear C-axis.



G6 vs Mazak Variaxis 600/700i

- Different automation possibilities.
- Always in the front of the machine.
- No direct or difficult approach of operator to working area.

AXILE
agile smart machining

Thank you for your attention

www.buffalo-machinery.com