

# SmartDriveComau 700L



COMAU

# Comau Machining at a glance

*We build machines and develop complete machining process to ensure productivity, flexibility and long-term quality*

- Turn-key competences including automation, ancillaries, assembly & test systems within machining processes/ lines and the related digital solutions (MES & IoT)
- Retooling expertise, for any brand of machine
- Additive technologies to improve performance & emissions (thermal spray coating PTWA)

**300+ MACHINING LINES WW**

**6500+ INSTALLED MACHINES WW**

**150+ RETOOLING PROJECTS WW**



**Detroit**



**Castres**



## *Application Fields*

**Prismatics components**



**Lightweight**



**EV components**



**Aerospace**



## Covering your production needs every step of the way



Comau provides comprehensive cross-functional services starting with a worldwide customer care network, an extensive range of spare parts and customized training programs. We also deliver professional machine maintenance and analysis in addition to retrofit and retooling solutions.

Our services cover any type of machine, regardless of the manufacturer, and include everything from set-up and commissioning to troubleshooting, testing and customized requests.

**AFTER SALES SERVICE**

**SPINDLE REFURBISHMENT CENTER**

**DIGITALIZATION**

**REFURBISHMENT & UPGRADE**



# 1. MACHINE FEATURES

*The simple way of solving manufacturing complexity*

Diverse manufacturing sectors require increasingly fast, precise and flexible machining processes. To answer these – and many other – operative needs, Comau has created the **SmartDriveComau 700L**, a powerful machine, available as a single machining center or integrated within a highly flexible production line.

High speed machining of prismatic components, customized for mass production volumes

Lower investment for higher productivity, compact footprint, low maintenance cost

Rich configurations and options to meet the different components' machining requirements

Excellent dynamic performance, high accuracy and repeatability, high stiffness

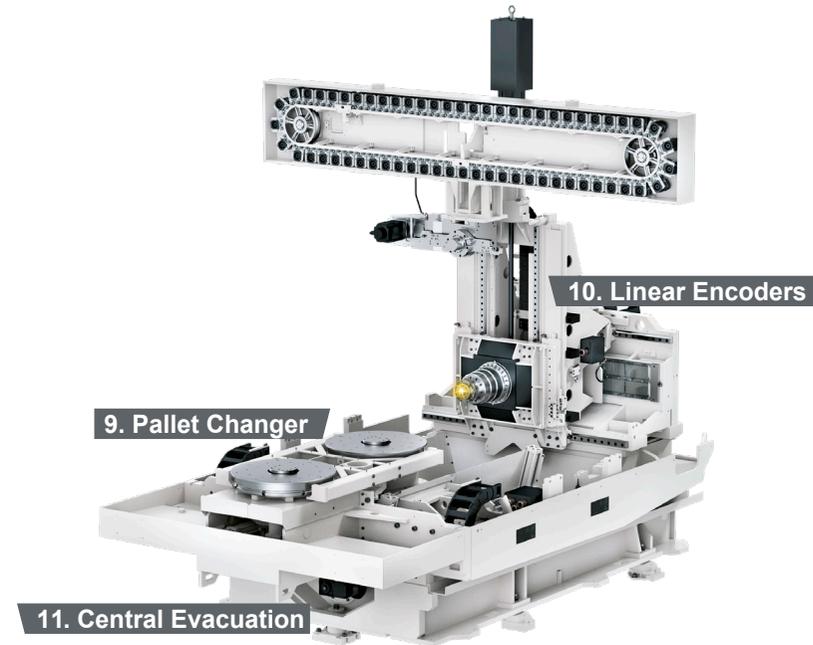
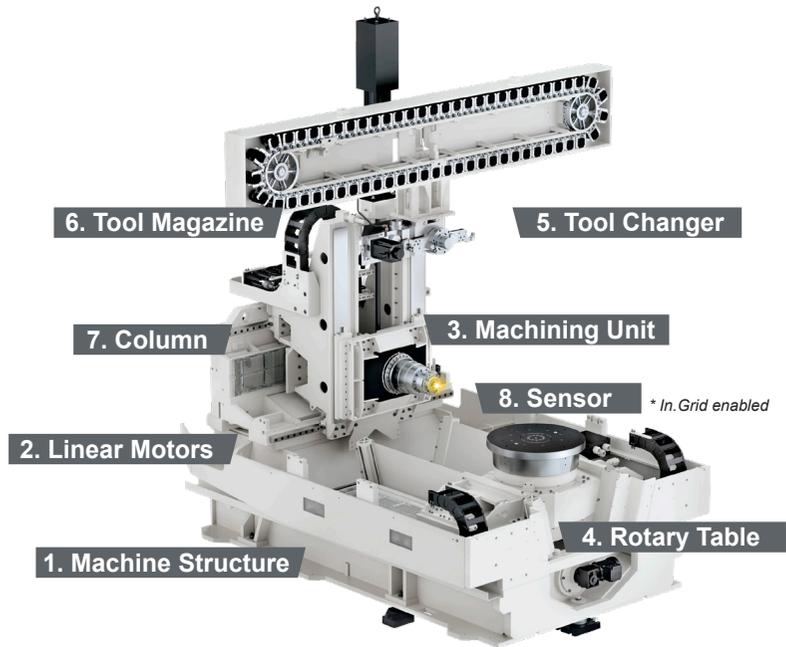
Long term stable quality and high technical efficiency

IoT native and enabled

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Internal cooling system to keep the machine temperature stable





- 1. **Machine Structure.** Robust bed made of welded steel - Symmetric machine design to ensure the best dynamic performance and stiffness - Inclined arrangement of the two X axis guides to increase the stiffness of column in Z direction
- 2. **Linear Motor or Torque Motor Driven,** high efficiency, cost saving, low footprint, low maintenance cost
- 3. **Machining Unit.** Powerful and precise machining unit
- 4. **Rotary Table.** All rotary axes are equipped with direct drive and absolute encoders
- 5. **Tool Changer.** One automatic exchange arm driven by a strong cam unit

- 6. **Tool Magazine** to meet different manufacturing needs
- 7. **Column.** X-axis designed a cast iron column
- 8. **Sensors.** IoT enabled
- 9. **Pallet Changer.** Pallet changer with two pallets for ergonomic loading
- 10. **Linear Encoders** on all axes for better positioning accuracy
- 11. **Central Evacuation** in the rear part of the machine

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The Comau digital platform that allows you to shape Industry 4.0 in line with the smart factory concept

# 2. MACHINE UNITS

*High speed & accuracy*

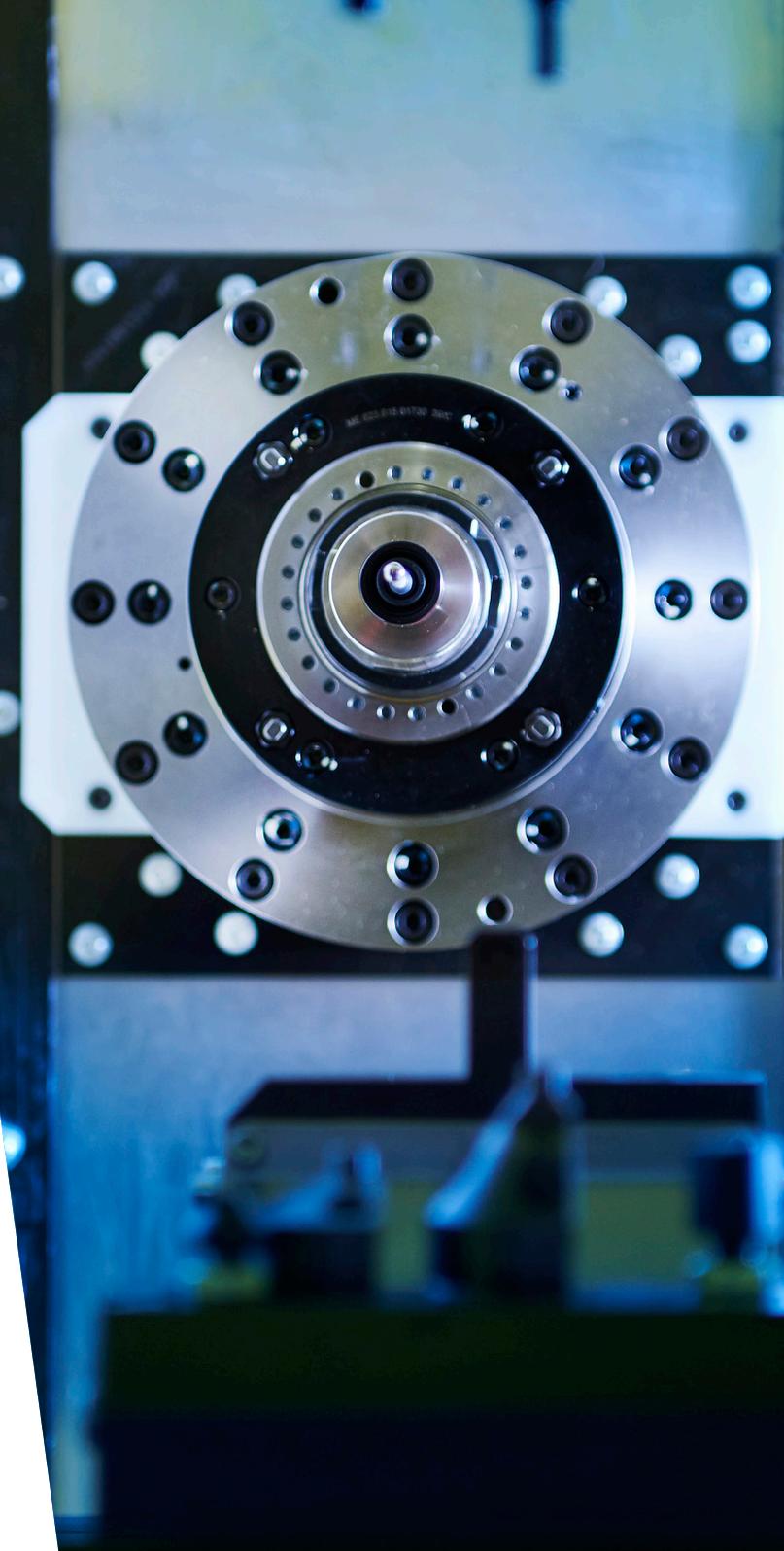
## 2.1 Linear Motors *Faster and less complicated*

We use Siemens linear motors for all the straight axes X-Y-Z.

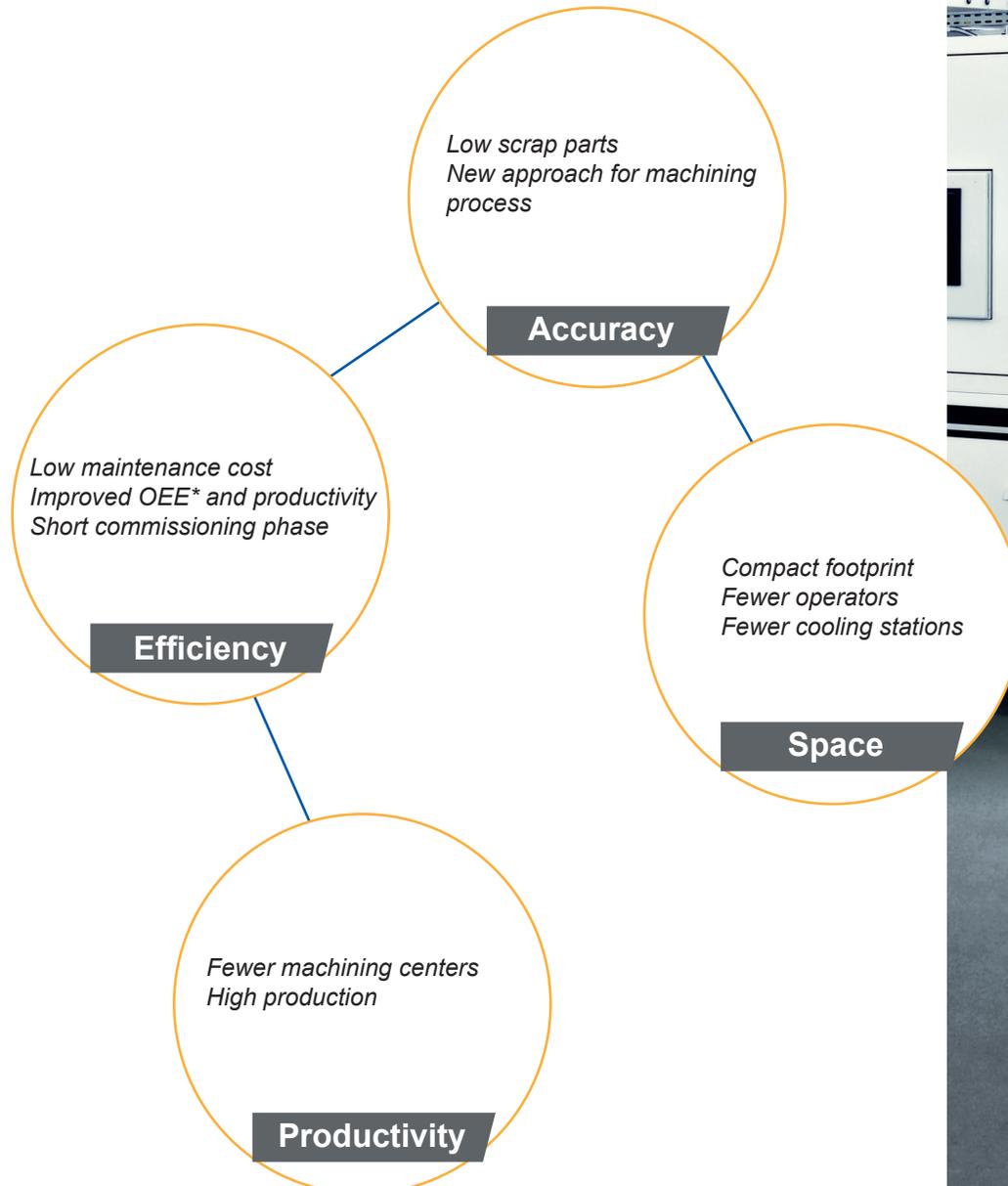
All axes and the table are equipped with linear or rotary Heidenhain absolute encoders.

The linear motor delivers moving force directly to the axis part, without any kinematics.

- High positioning accuracy and long-term repeatability
- Highest speed and acceleration capacities
- Circular interpolation for better roundness due to backlash-free
- Direct drive chain (motor element, measuring sensor, mobile moving part)
- No mechanical wear for linear motor drive unit (less maintenance)



What benefits you can get by using linear motors?

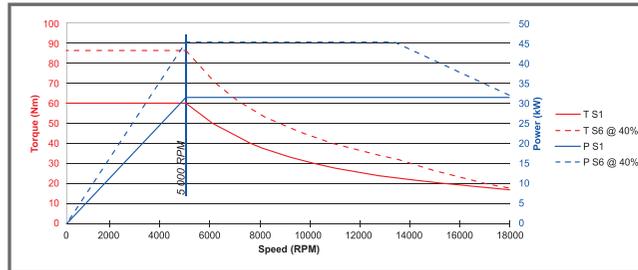


\*OEE: Overall Equipment Efficiency

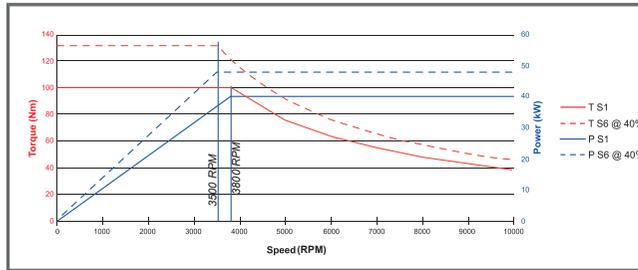


## 2.2 Electrospindles *High speed spindle for precise part quality and better cutting tool life*

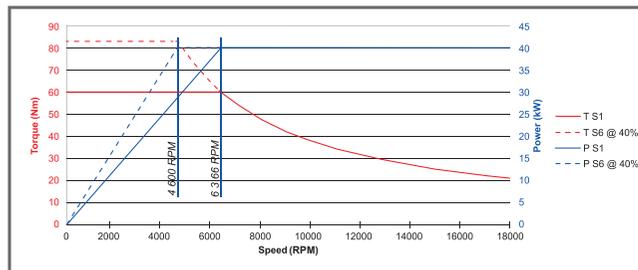
Spindle Type	Base HSK 63
Tool attachment	HSK 63 A
Splindle speed RPM	18,000
Power S1 / S6 40 % (kW)	31 / 45
Torque S1 /S6 40% (Nm)	60 / 86
Front Bearing Ø (mm)	70
Bearing Lubrication	Grease - For life
Options	Bearing monitoring



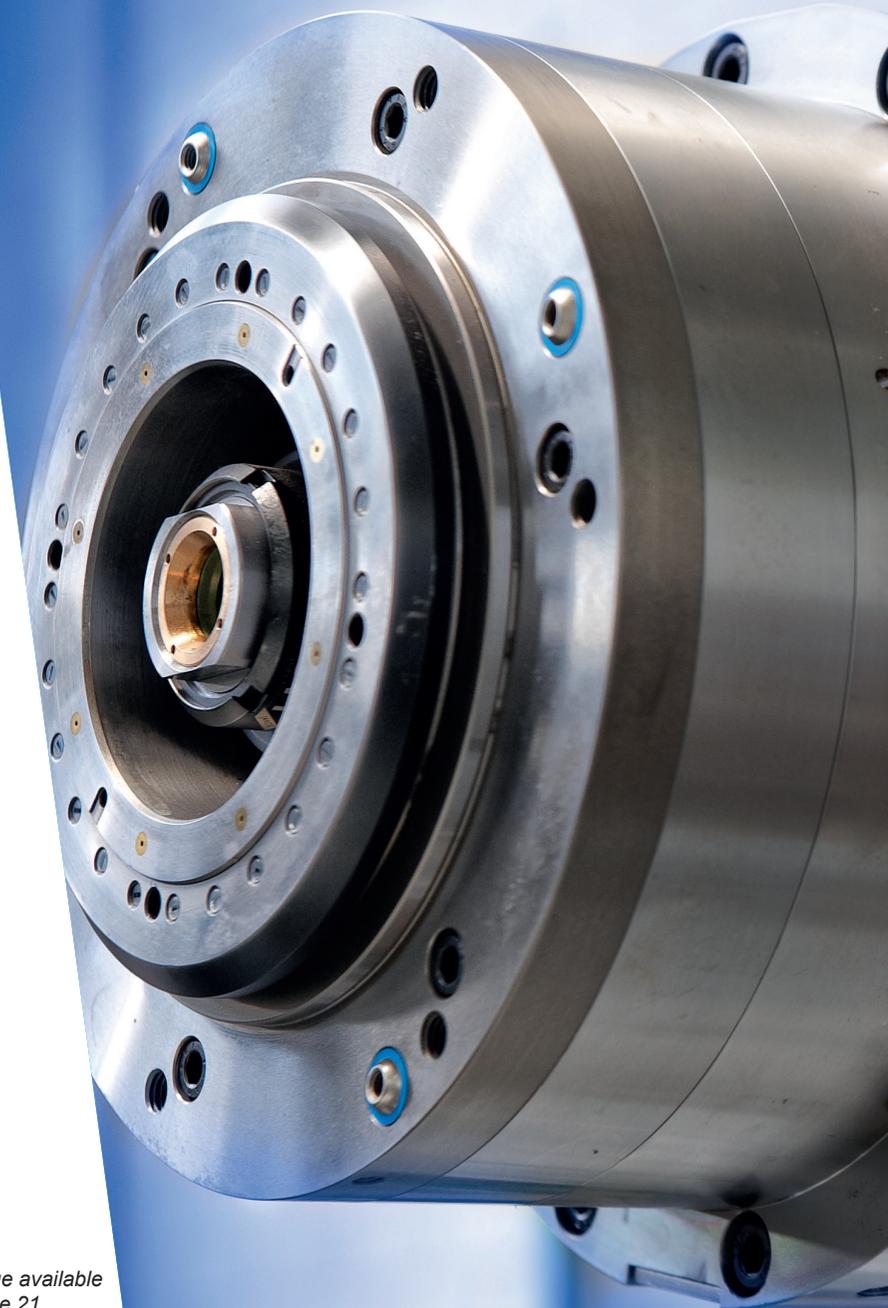
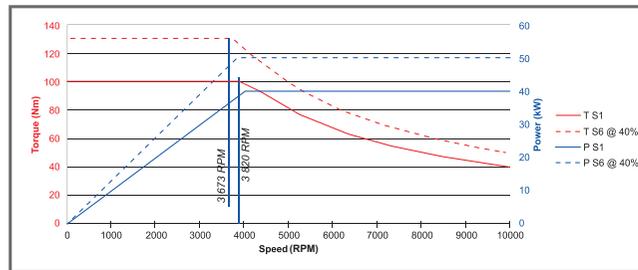
Spindle Type	Base HSK 100
Tool attachment	HSK 100 A
Splindle speed RPM	10,000
Power S1 / S6 40 % (kW)	40 / 40
Torque S1 /S6 40% (Nm)	100 / 132 (*)
Front Bearing Ø (mm)	100
Bearing Lubrication	Grease - For life
Options	Bearing monitoring



Spindle Type	Automotive HSK 63
Tool attachment	HSK 63 A
Splindle speed RPM	18,000
Power S1 / S6 40 % (kW)	40 / 40
Torque S1 /S6 40% (Nm)	60 / 83
Front Bearing Ø (mm)	80
Bearing Lubrication	Grease - For life with cartridge
Options	Bearing monitoring Cone seat detection



Spindle Type	Automotive HSK 100
Tool attachment	HSK 100 A
Splindle speed RPM	10,000
Power S1 / S6 40 % (kW)	40 / 50
Torque S1 /S6 40% (Nm)	100 / 130 (*)
Front Bearing Ø (mm)	100
Bearing Lubrication	Grease - For life
Options	Bearing monitoring Cone seat detection



\* Higher torque available  
Refer to page 21

## Spindle characteristics

- High speed (18 000 RPM)
- Dynamic stiffness
- Different types suit your needs
- Easy to use and to maintain
- Efficient in chip removal
- Stable temperature, no need to warm-up
- Compatible with all kinds of coolants
- Lifetime lubrication (grease)
- Spindle monitoring for longer lifetime

## Tool attachment cleaning

### Cleaning during tool changing:

- Washing of tool interface (face and cone) with high pressure coolant
- Air cleaning of spindle nose

### Maintenance:

- Removable nose for base HSK 63 spindle
- Removable washing ring for Automotive spindles

## Digital Way (option)

Monitor the condition of all tools used in your manufacturing process to:

- Improve machine up-time
- Reduce cycle time
- Improve tool life
- Reduce scrap production
- Protect your machine, tools and parts
- Ensure broken tool detection

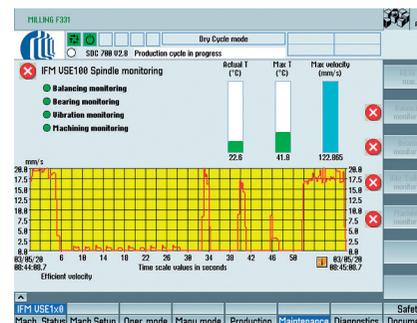
## Spindle monitoring (option)

### Data collection with vibration sensor to monitor:

- Electro-spindle balancing
- Electro-spindle global vibration
- Electro-spindle ball bearings
- Shock values
- Lubrication and pollution issues

### Benefits that you can get:

- Check and identify the critical operation status of the spindle
- Increase the lifetime of the spindle
- Monitor the working status of the spindle in real time
- Optimize the machining process
- Reduce cutting tool abrasion
- Avoid machine downtime with predictive maintenance (IoT)



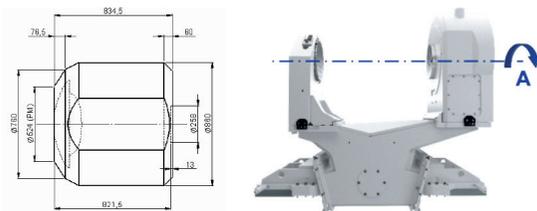
## 2.3 Rotary Tables *Long-term stable repeatability and low maintenance needs*

	Unit	A Axis -Trunnion	B Axis	A on B Axes	
				A Axis	B Axis
Rotation Speed RPM	min <sup>-1</sup>	12	100	100	100
Acceleration	rad/s <sup>2</sup>	50	30	30	30
Indexing time	s	2.6 per 180°	0.8 per 180°	0.8 s per 180°	1 s per 180°
Angular accuracy ISO 230-2	arc sec	5	5	5	5
Angular repeatability ISO 230-2	arc sec	3	3	3	3
Torque S1 / S6 40%	Nm	1 800 / 2 500	1 050 / 1 500	1 050 / 1 500	1 050 / 1 500
Axis clamping torque – option	Nm	-	3 200	3 200	3 200
Maximum table load	kg	700	700	450	-
Z Axis Speed & Acceleration	m/min – m/s <sup>2</sup>	Z: 50 m/min – 5 m/s <sup>2</sup>	Z: 80 m/min – 10 m/s <sup>2</sup>	Z: 80 m/min – 8 m/s <sup>2</sup>	-

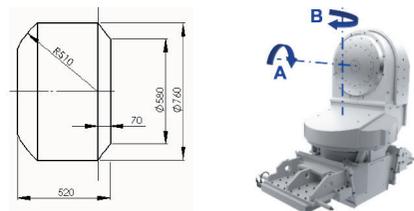
- Long-term stable accuracy and repeatability of angular positioning
- Different A and B axes combinations available to suit all process needs
- A and B axes equipped with torque motors and Heidenhain absolute encoders
- No gear kinematics eliminates wear and reduces maintenance needs

### Configuration of rotary tables

#### A Axis



#### A/B Axis



#### B Axis



B axis with pallet-changer

### Fluid supply for the fixture

The rotary table is fitted with an integral hydraulic rotary coupling (13 lines) and distribution valves for:

- Component clamp and unclamp (3 hydraulic lines)
- Part seating control (2 pneumatic lines)
- Washing of the supports (1 coolant line)
- Blowing of the supports (2 pneumatic lines)

Optional lines and distribution valves may be added according to process needs. This equipment is valid for B-, A/B- and A axis configuration.

## 2.4 Tool Magazine *Big volumes and strong performance*

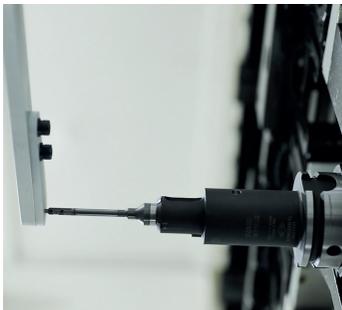


Chain tool magazine enhanced by optional tool rack magazine for storing special tools with extra diameter or length.

- Fast tool change through swiveling arm with cam box
- Ergonomic load-unload position
- Automatic door provides isolation from work area
- Loading and unloading without stopping the machine
- Automatic loading of magazine during idle time of the spindle
- Tool holder cleaning inside the tool magazine (option)

	unit	HSK 63	HSK 100
<b>Number of pockets</b>		60	40
<b>Max. tool diameter</b>			
<b>Adjacent pockets occupied / free</b>	mm	95 / 160	120 / 260
<b>Max. tool length</b>	mm	400	400
<b>Max. tool weight: unit / total in magazine</b>	kg	6 / 150	15 / 200
<b>Tool change time VDI 2852 for tool ≤ 8 kg</b>	s	3	3.5
<b>Tool change time VDI 2852 for tool &gt; 8 kg</b>	s	-	6

**Tool breakage detection device (option):**  
 HSK 63 / HSK 100  
 Electric drive managed by PLC



**Tool rack magazine (option):**

- For heavy or long tools
- Ergonomic tool loading
- Angular head with HSK 100
- Capacity: please refer to page 21



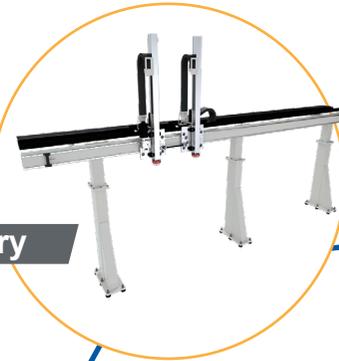
## 2.5 Loading Solutions *Flexible solutions suit your production level requirements*

Automation options are available for single machines or for interconnecting multiple machines into systems.

Facilitates the implementation of tailor-made solutions utilizing standardized devices and software packages.

### Automatic Load: Gantry

*Several configurations (cartesian, floor gantry, etc...) of carriages and arms can fit the required production level*



### Automatic Load: Robot or Robot Gantry

*Flexible and fast, the robot-gantry allows easy top-loading while operating a low roof*



### Manual Front Load

*Local HMI and ergonomic automatic front doors to ensure safe and efficient manual front loading*



### Pallet Changer

*Load/Unload the machine in masked time for more efficiency*



## B Axis with Pallet Changer (option)

Function	Unit	Values
Pallet changeover time	s	8
Total weight (parts + fixtures + pallets)	kg	2 x 630
Pallet weight	kg	150
Pallet diameter	mm	684
Time for automatic 180° pallet rotation at loading station	s	6
Elevator	-	Hydraulic
Rotation	-	Electric

## Fluid supply at loading station

Connection module (4 lines) for fixture hydraulic supply through the pallet at the load station with distribution valves:

- 1 line for hydraulic clamping – 160 bar
- 1 line for hydraulic unclamping
- 1 line for part support washing
- 1 line for air blowing or part position checking fixtures
- The fixture may be equipped with hydraulic pressure accumulator on clamping line

## 2.6 Chip Evacuation *Best solution for your needs*

The chips and coolant are evacuated from the machining cabin by means of a helicoidal chip extractor with a rear exit.

Several options are available for the chip and coolant management:

- Rear chip conveyor and pump
- Direct pump-back system (chips & coolant)
- Direct cutter pump-back

The coolant filtering station may be centralized for several machines or independent for each machine.





## 2.7 Control Unit *User-friendly and functional HMI*

### SIEMENS 840D Solution Line

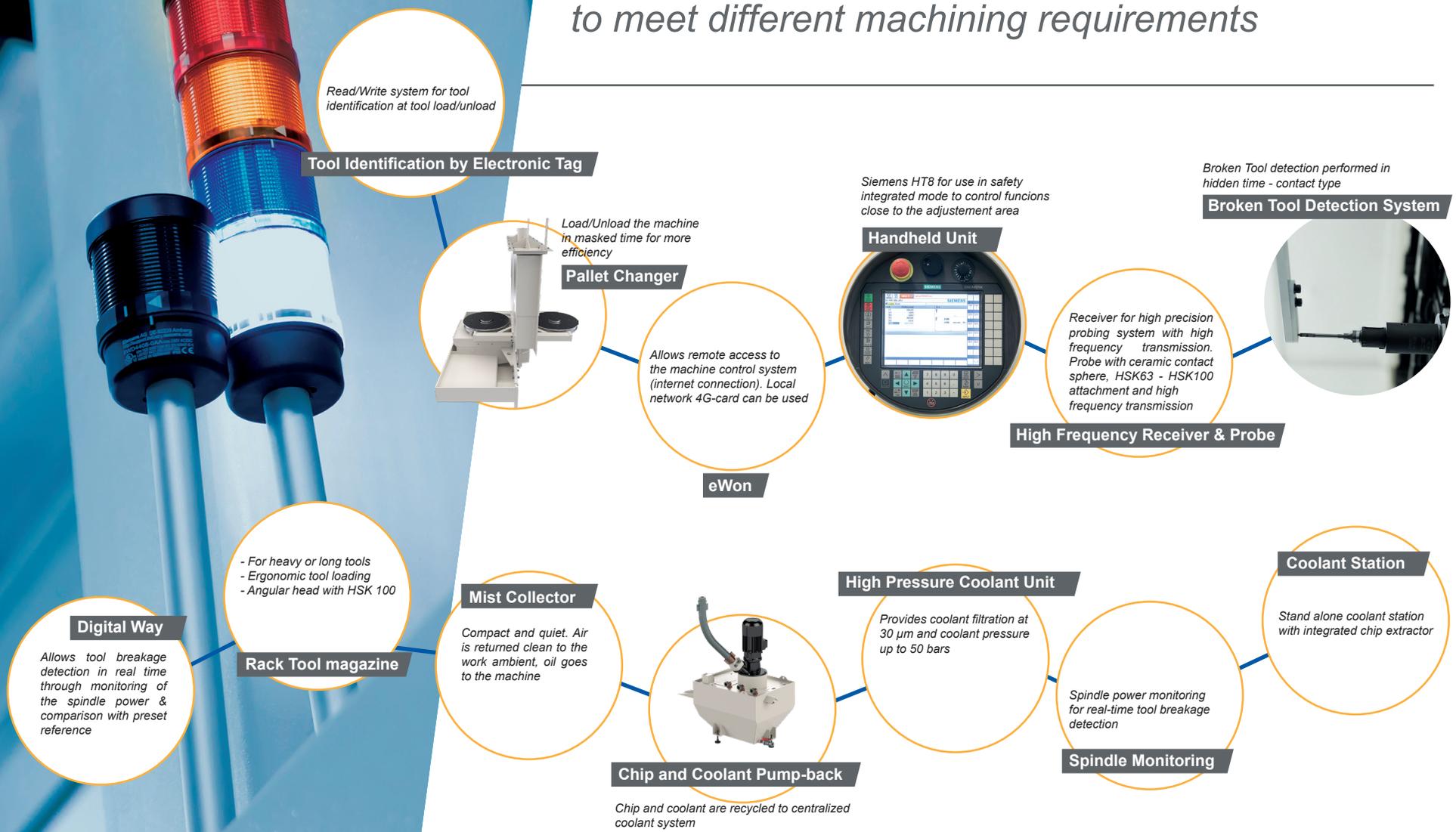
We develop and customize the HMI for each project:

- Tool management
- Checking
- Workpiece information
- Fixture function
- Part program
- Macro parameter setting
- Easy to use and maintain
- Preventive maintenance
- Diagnostic report to reduce:
  - Diagnosis time
  - Production loss
- Secure withdraw mode to return to the original position
- Multi-language software
- Energy monitoring

# OPTIONS

# 3.

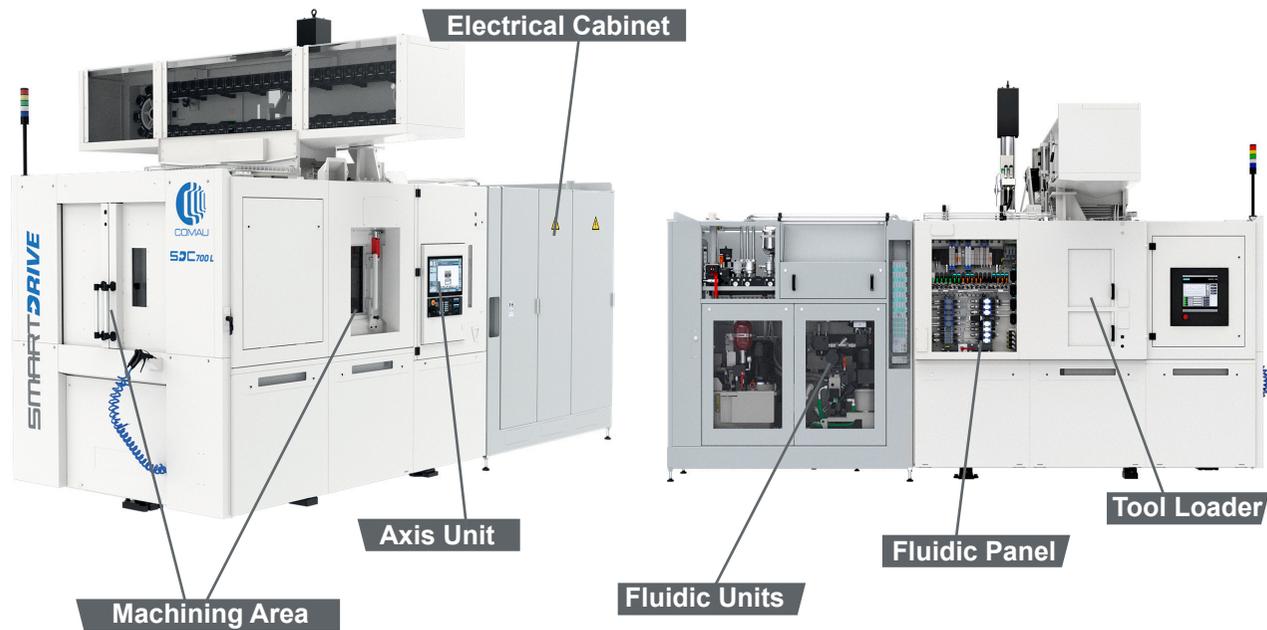
Rich configurations and options  
to meet different machining requirements



# 4. MAINTENANCE

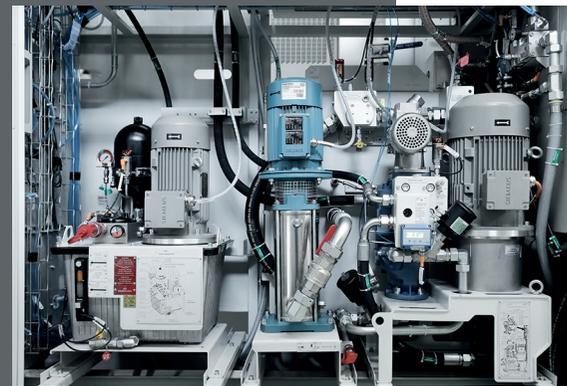
*Ergonomic accessibility  
for easy and efficient maintenance*

The latest generation of SDC 700L capitalizes on end user feedback and best-in-class features in terms of solutions for ergonomic access and efficient maintenance.





**Hydraulic panel**



**Fluidic unit**

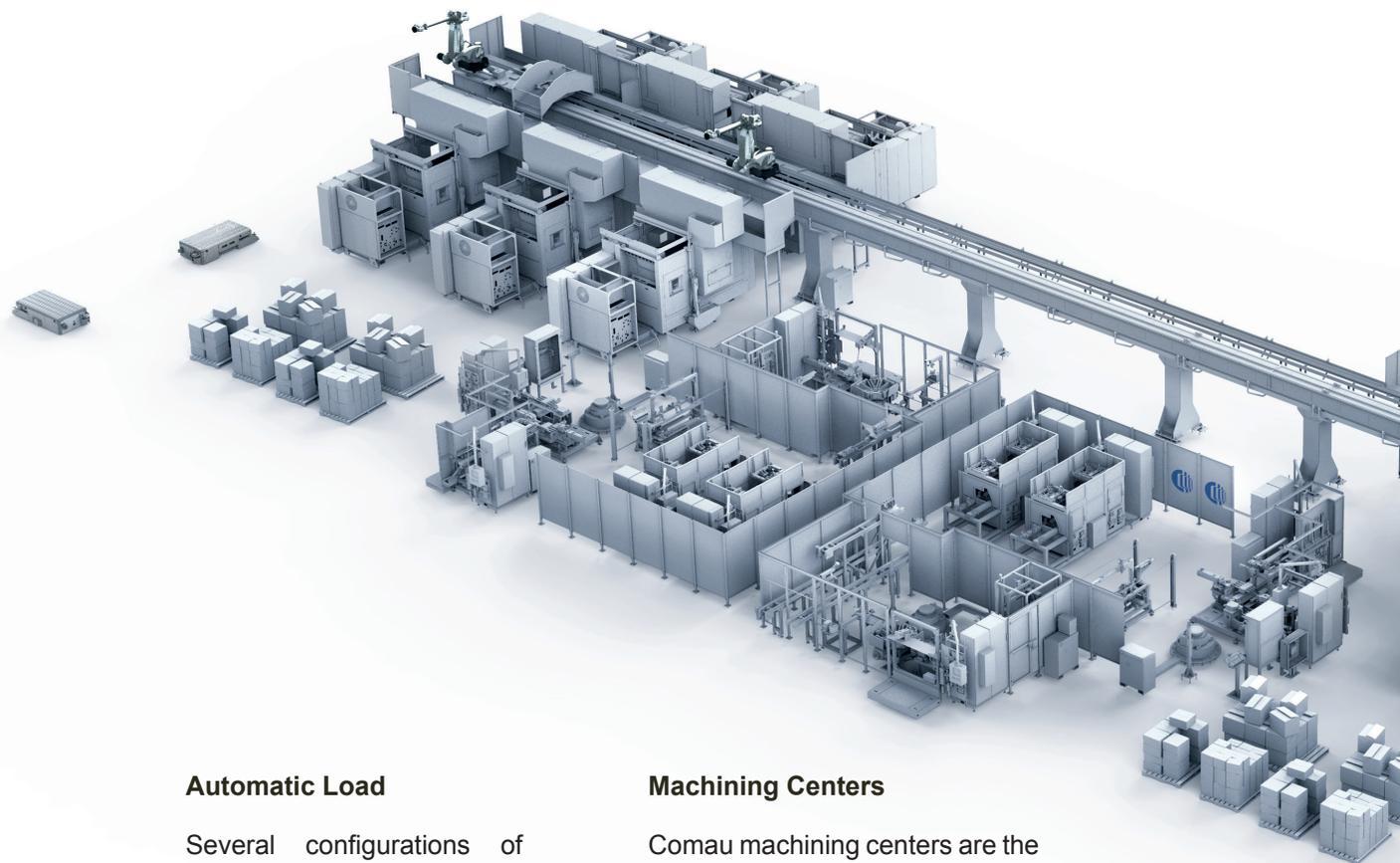


**Electrical cabinet**

# 5. ONE PARTNER FOR THE ENTIRE SYSTEM

*Expertise in System Integration*

No matter how complex your machining needs, our results-oriented methodology and systems expertise can help get you up and running fast. We have the competence to develop any machining process and can assure productivity, flexibility and long-term quality with a wide range of modular products that span the entire production chain. In particular, we offer a complete range of assembly and test equipment within the machining process to deliver increased machining & assembly process consistency across the lifetime of your equipment.



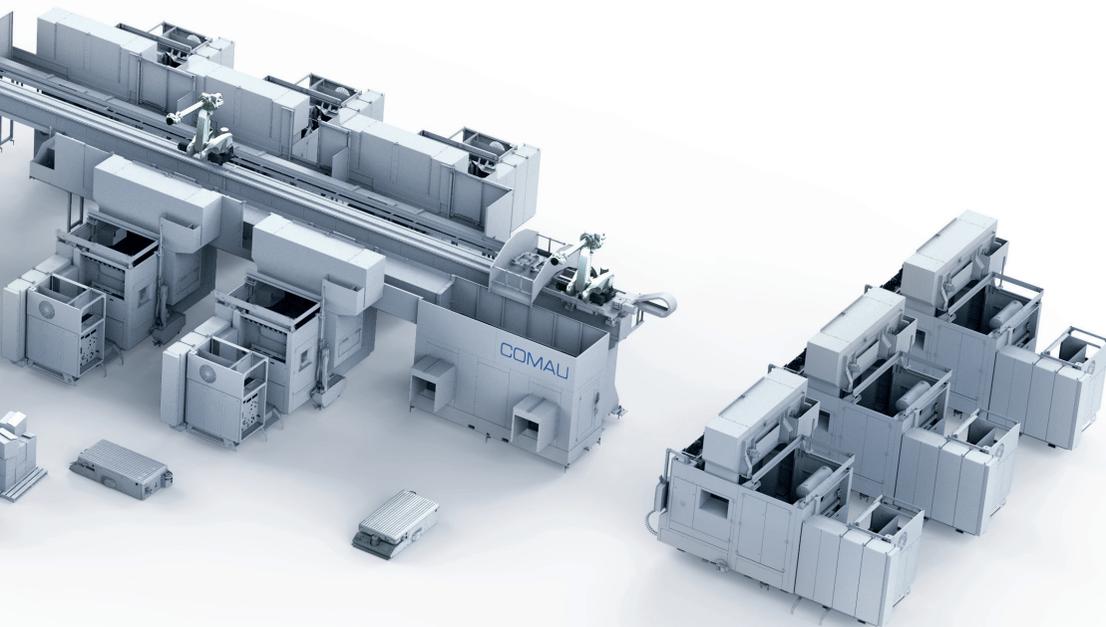
## **Automatic Load**

Several configurations of gantry carriages and arms to meet the required production level

## **Machining Centers**

Comau machining centers are the right choice wherever maximum accuracy and productivity are non-negotiable

*Our spectrum ranges from robotic cells with machining tasks to complex systems with integrated outsourced operations*



### **Ancillaries equipment**

We ensure productivity, long-term quality and continued reliability with a range of ancillaries including assembly and test equipment within the machining process.

We also perform activities ranging from marking and final inspection to handling/logistics and integrated outsourced operations to offer complete turn-key systems including honing, washing and measuring.

### **Logistics**

Designing advanced automation solutions means thinking about parts and tools logistics in a new way. We can accommodate diverse manufacturing needs, factory layouts and multipurpose applications



# 6. ENERGY EFFICIENCY

*Less consumption, better environment*

Comau is ISO 9001 and ISO 14001 certified and the design of our machines is based on optimizing energy consumption.

We obtain this through the use of:

- low energy impact
- energy saving
- coolant consumption



We are able to facilitate coolant savings:

- machining room reduction without changing the work area
- coolant consumption reduction by 50% (11 m<sup>3</sup>/h vs 18-25 m<sup>3</sup>/h)
- working area structure optimized for a quick chip removal

In addition to a more environment-friendly product, you benefit from:

- optimized filtering system investment
- pipeline work cost reduction
- coolant consumption and operation cost saving

# TECHNICAL DATA

# 7.

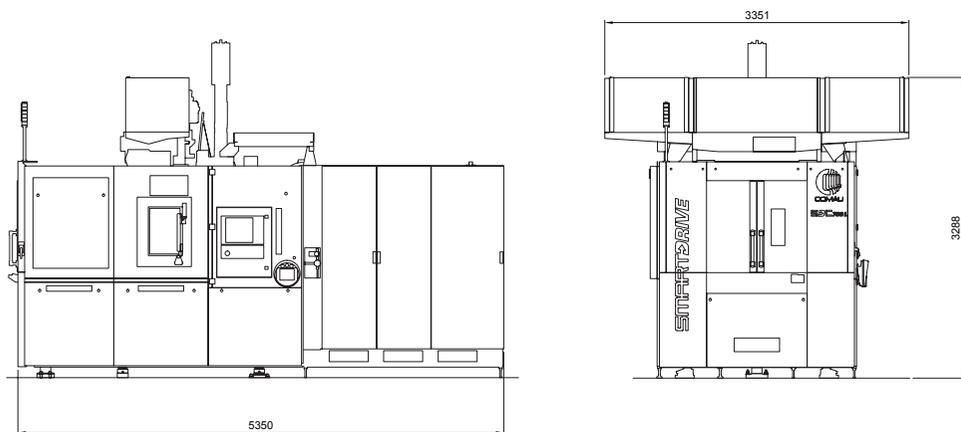
## SDC 700L - LINEAR MOTORS

Linear Axes	Working travels X-Y-Z axis	mm	700 - 700 - 800			
	Speed X-Y-Z axis	m/min	80 - 80 - 80 (*)			
	Acceleration X-Y-Z axis	m/s <sup>2</sup>	9 - 10 - 10 (*)			
	Thrust X-Y-Z axis	kN	5.2 - 3.3 - 7.8			
	Positioning accuracy all axes ISO 230-2	mm	0.005			
	Repeatability all axes ISO 230-2	mm	0 004 .			
Rotary Axes	<b>Configuration</b>		A Axis		B Axis	
	Axis speed	rpm	12		100	
	Axis acceleration	rad/s <sup>2</sup>	50		30	
	Axis table dimensions	mm	720 x 620		Ø 635	
	Other rotary axes configurations		-		A on B	
Spindle	Tool Attachment		Base HSK 63 A	Automotive HSK 63 A	Base HSK 100 A	Automotive HSK 100 A
	Speed	rpm	18,000	18,000	10,000	10,000
	Power S1 / S6 @ 40%	kW	31/45	40/40	40/48 (T+ 40/50)	40/50
	Torque S1 / S6 @ 40%	Nm	60/86	60/83	100/132 (T+ 119/161)	100/130 (T+ 130/154)
Tool magazine	Attachment		HSK 63 A		HSK 100 A	
	Number of pockets		60		40	
	Maximum tool length (HSK face to tip)	mm	400		400	
	Maximum tool diameter (adjacent pockets free)	mm	160		260	
	Maximum tool diameter (adjacent pockets occupied)	mm	95		120	
	Maximum tool weight	kg	6		15	
	Tool change time (acc. to VDI 2852)	s	3		3.5 up to 8 kg - 6 over 8 kg	
Opt.: tool rack	Attachment		HSK 63 A		HSK A100	
	Type of tool		Long Tools	Big Tools	Long Tools	Big Tools
	Maximum number of tools		4	2	3	2
	Maximum tool diameter	mm	80	220	100	283
	Maximum tool length (HSK face to tip)	mm	600	142	600	150
	Maximum tool weight	kg	18	18	25	20
Tool change time (acc. to VDI 2852)	s	11	11	12	12	

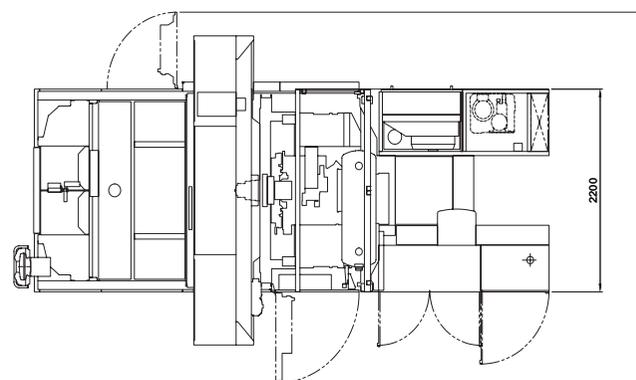
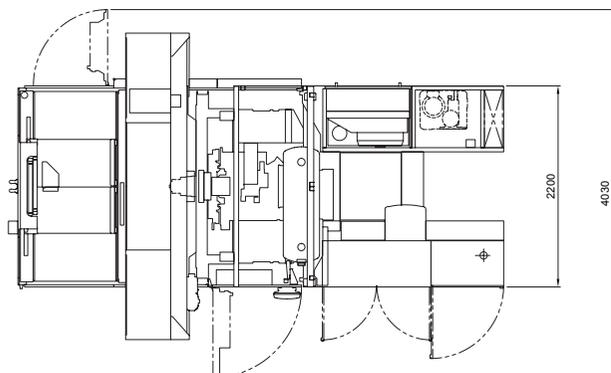
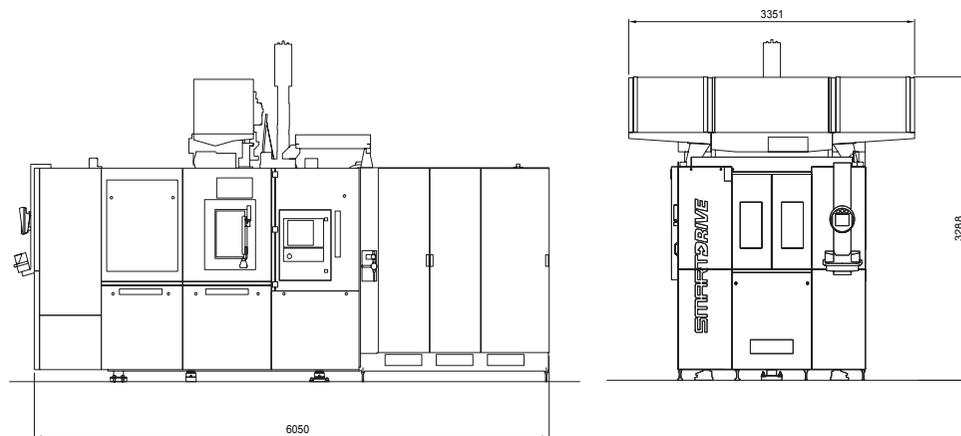
(\*) B axis configuration

# 8. MACHINE DIMENSIONS

SDC 700L - B Axis



SDC 700L - B Axis with Pallet Changer



# CONTENTS

<b>1. Machine Features</b>	<b>4</b>	<b>3. Options</b>	<b>15</b>	<b>7. Technical Data</b>	<b>21</b>
<b>2. Machine Units</b>	<b>6</b>	<b>4. Maintenance</b>	<b>16</b>	<b>8. Machine Dimensions</b>	<b>22</b>
2.1 Linear Motors	6	<b>5. One Partner for the Entire System</b>	<b>18</b>		
2.2 Electrospindles	8	<b>6. Energy Efficiency</b>	<b>20</b>		
2.3 Rotary Tables	10				
2.4 Tool Magazine	11				
2.5 Loading Solutions	12				
2.6 Chip Evacuation	13				
2.7 Control unit	14				



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