

LARGE AREA 3D PRINTERS

CNC DESIGN PTY LTD

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LARGE AREA 3D PRINTERS

We manufacture the largest 3D printers
in the APAC region.

Company profile

CNC Design proudly presents our state-of-the-art solution for Additive Manufacturing of large parts, precisely tailored to cater to the unique requirements of industries such as Construction, Aerospace, Mining, Defence, and more. Our VSF gantry-based systems have gained worldwide acclaim as some of the largest 3D printers, integrating unparalleled capabilities in Additive Manufacturing and 5-Axis Machining into a single machine.

Who We Are?

Established in 2016, the VSF brand has firmly established itself as a trusted name in the industry. Our comprehensive range of gantry-based robots for 5-Axis machining, 3D printing, and robotic handling and coating applications have become the preferred choice for businesses seeking advanced manufacturing solutions.

As a leading supplier of the largest 3D printers in the APAC region, VSF stands at the forefront of delivering cutting-edge technology and manufacturing excellence. Our Virtual Smart Factory platform seamlessly merges the power of Industry 4.0 with 5-Axis machining for large-sized parts, offering exceptional performance at a cost-effective price point.

With a high-speed spindle operating at 24,000 RPM, the VSF system is meticulously optimized for rapid 5-Axis milling of large components crafted from soft materials such as composites, wood, fiberglass, and foam. Boasting an expansive work window spanning 4-15 metres in X, 4.5 meters in Y, and 1-1.6 meters in Z, our system perfectly suits a wide range of industry sectors.

At the core of the Virtual Smart Factory lies our meticulously engineered Cartesian Gantry Robot, designed to deliver high precision across a very large working area while minimizing spatial requirements. Constructed using standardized components, our modular and expandable sizes ensure scalability to accommodate diverse manufacturing demands.

To explore how our innovative solutions can revolutionise your manufacturing processes, we cordially invite you to contact us at VSF@cncdesign.com.au. For a comprehensive overview of VSF and our extensive range of services, please visit our website at www.cncdesign.com.au





The VSF large-scale 3D printing solution offers a fully digital production process designed to enhance productivity and shorten production time.

Ideal for applications such as jigs, plugs & moulds, and structural or decorative end-parts, this solution serves multiple industries.

Utilising a wide range of reinforced thermoplastic materials, it is engineered to meet diverse application requirements.

VSF 3D Printing Solution

Hybrid System

The VSF system combines Large Scale 3D printing with 5-axis high speed milling in a single integrated Manufacturing Centre.

Pellet Extrusion

VSF uses extrusion based Additive Manufacturing with a large print bead width from 5 mm to 50mm. Fiber-reinforced thermoplastic polymer pellets are melted and extruded in precise-layers to form a unified structure.

5-Axis Machining

3D printed parts are machined to precision tolerances and high surface finish, the printed near net shape component. VSF is a high performance 5-axis milling system.



Aerospace



Marine



Defence



Construction



Automotive



Design



Renewable Energy

KEY ADVANTAGES

VERSATILITY

Tailor the VSF System to match your specific needs. Whether you require a 6x6m printer or a 22m dual bridge hybrid system, we provide configurations to suit your application perfectly.

FLEXIBILITY

With the ability to print vertically and at 45°, and compatibility with a variety of materials, including PA, PP, PESU, PEI, PET, ABS, and beyond, the VSF system offers unparalleled flexibility in operation.

QUICK ROI

Thanks to its high print speeds, ultra-energy-efficient material dryer, and low maintenance costs, the VSF System assures a swift return on investment. Its speed, efficiency, and cost-effectiveness make it a valuable asset in your operation.

01 – Milling Bridge

- High Precision
- High Dynamic
- Big Working Volume

02 – Swarf Extraction

- Composite Milling Dust and Swarf Removal

03 – Milling Head

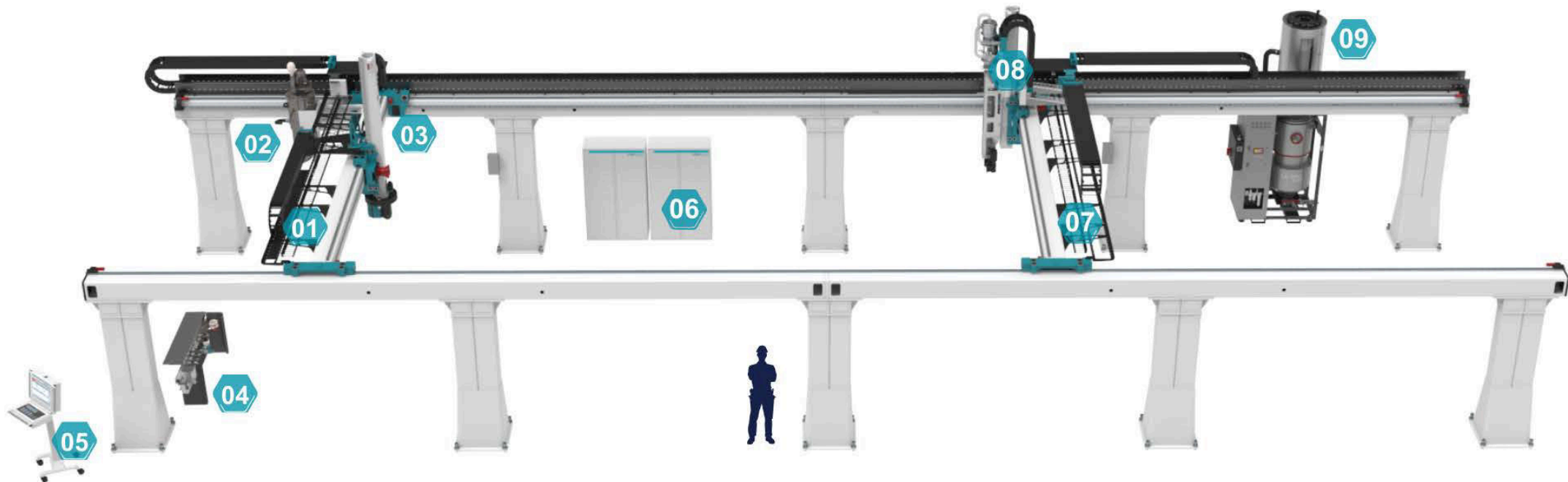
- 5-Axis Machining
- High Precision and Dynamic
- High Quality Machining

04 – Tool-Rack

- Automatic Tool-Change
- Minimal Setup and Down-Time

05 – Operator Stand

- Intuitive Operation



06 – Control Cabinet

- SINUMERIK ONE
- leading-edge CNC system
- Digital Twin

07 – Printing Bridge

- High Dynamic
- Big Working Volume

08 – Extruder

- Wider Range of Materials
- Super-Fast Print-Speeds
- Process Control and Monitoring

09 – Plastics Pellet Dryer

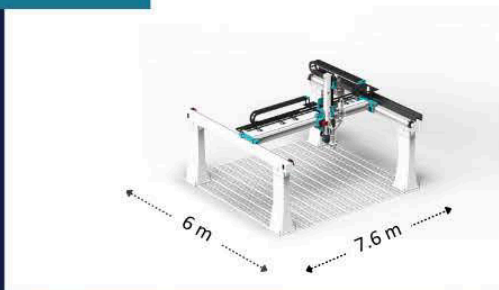
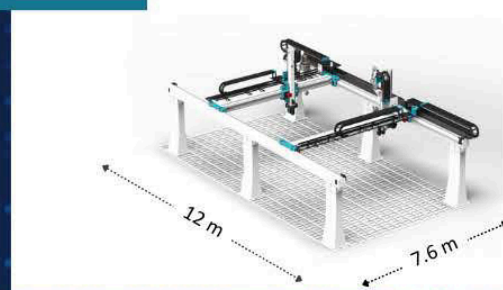
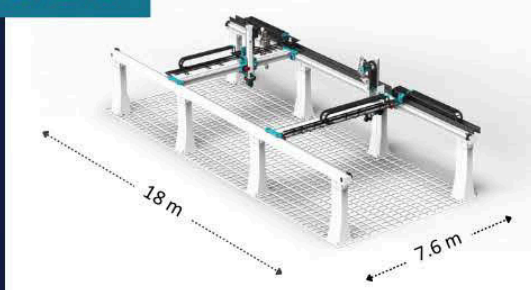
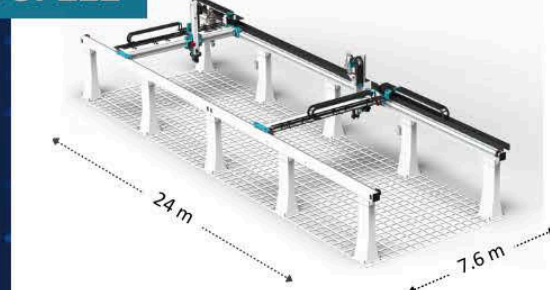
- Energy efficient Vacuum Technology
- Very low Drying Cost
- Minimal Maintenance

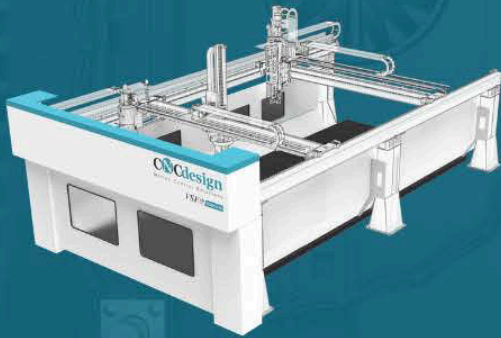


VSF 3D printers are high-performance gantry-based machines, combining high dynamics with high precision. For the drive train ground racks and low backlash planetary gearboxes are used to ensure precision, dynamics and reliability along with minimal maintenance effort. The VSF machine is modular and can be configured to precisely meet your application requirements.

MACHINE	VSF105	VSF210	VSF216	VSF222
Print Area	5m x 5m	10m x 5m	16m x 5m	22m x 5m
Max Print Hight	1.6m			
Maximum Speeds	X: 60m/min, Y:60m/min, Z: 40m/min			
Axis Repeatability	X/Y/Z: 0.1 mm			
Configuration	Single Bridge Printing/Milling	2 Bridges for simultaneous Printing & Milling		
Combined Bridge Printing/Milling	Standard	Optional		
Printing Bridge	Optional	Standard		
Milling Bridge	Not available	Standard		

Single and Dual Bridges Systems

VSF105

VSF210

VSF216

VSF222




The fencing around our large-scale 3D printers is configurable to align with your overall factory layout and part logistics. We include sliding doors for convenient access and windows in the panels for external monitoring of the printing- or milling process, aiming to create a balanced work environment combining highest safety standards with operational efficiency.

Front Access Configuration

The **Front Access Configuration** features a vertical sliding panel at the front and/or the back, offering access for setup and moving parts in or out of the machine.

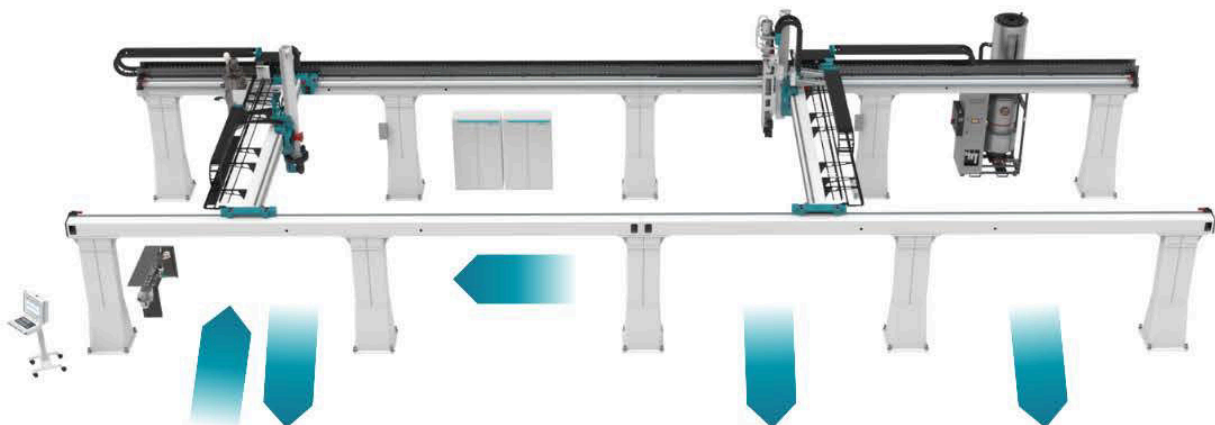


Side Access Configuration

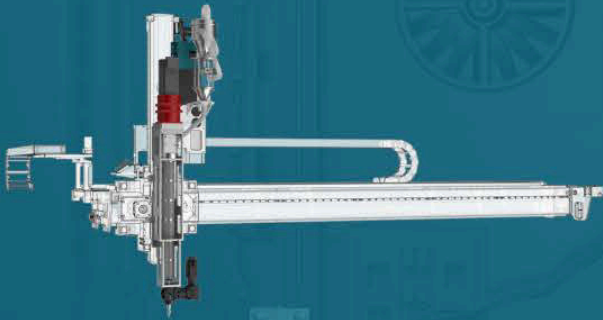
The **Side Access Configuration** allows for the efficient movement of parts through sliding side panels, facilitating seamless transitions in your workflow.

Additionally, the machine is designed to shift parts internally from printing to milling, streamlining multi-stage operations.

To further enhance productivity, we offer the option to establish multiple safety zones. This feature enables parallel operation and setup, allowing you to fully capitalise on the machine's capabilities.



Customized Fencing and Access to Streamline Material Flow Into, Out of, and Within the Machine



Our VSF 3D printing technology features a high-performance pellet extruder capable of handling a wide range of different materials.

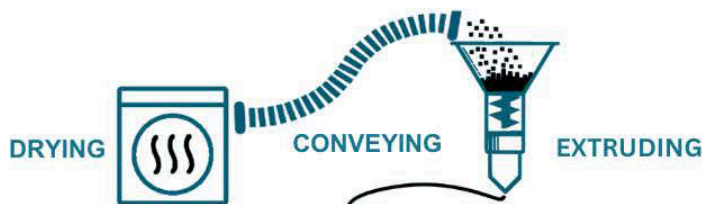
With super fast printing speeds and accurate process control and monitoring, this system is designed to significantly enhance productivity and reduce production time across various applications and industries.

VSF-Extruder

High performance pellet extruder for a wide range of different materials

- Super-fast print speeds for efficient production
- Perfect for mid-sized to large prints
- Multiple, individually accurately controlled heat zones. Parameters set up based on recipes for a given print strategy and material (see VSF Print Assistant)
- Accurate process control and monitoring for high-quality printing (see VSF Print Cockpit)

Material Conveying System



Extruder	VSF-E3	VSF-E6
Max Throughput	45kg/hr	150kg/hr
Screw Size	30mm	60mm
Heating Zones	3 for Barrel + 1 for 45° Nozzle	6 for Barrel + 1 for 45° Nozzle
Cooling Zones	1 for feed-cooling	
Melt Pump	None	Optional
Temperature Range	up to 420° C	
Nozzles	3-15mm	5-30mm
Rotary Compression Roller	Optional	

VSF Material Dryer

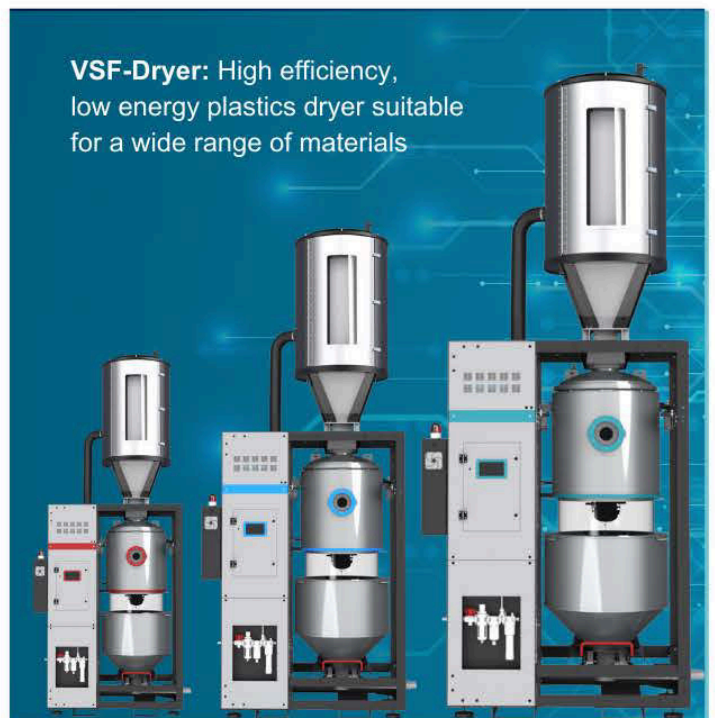
Many materials used for printing are hygroscopic and need drying prior to the print to ensure first class results. VSF machines integrate an energy efficient vacuum drying technology that guarantees excellent results for a big range of materials covering different drying requirements. Depending on the required capacity, different models are available.

Key benefits:

- Unique energy efficient vacuum drying technology
- Fast return on invest due to very low drying costs
- Faster drying, faster start-up, minimal maintenance

DRYER	VSF-D70	VSF-D120	VSF-D340
Sizes	Suitable for E30	Suitable for E30	Suitable for E60
Principle	Quick and Energy Efficient Vacuum Drying		
Capacity	50kg/h	100kg/h	300kg/h
Start-Up Time	4-10 times faster compared to Desiccant Dryer, dep. on Material		
Max Temperature	176°C		
Hopper Volume	70L	120L	340L

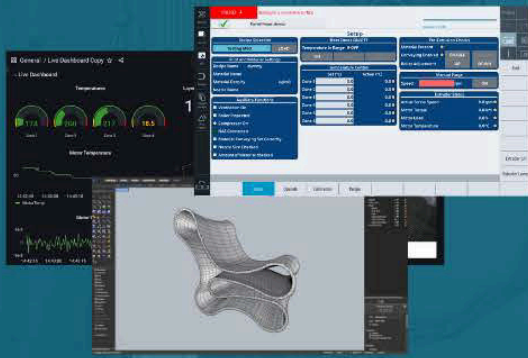
VSF-Dryer: High efficiency, low energy plastics dryer suitable for a wide range of materials



The design of VSF 3D Software Tools are based on the principles:

- **Ease of Use** - best user experience, eliminate operator errors
- **First Time Right** - Identify and eliminate problems prior to print
- **Minimise Waste** of Time, Energy, and Material

Guaranteed Quality - Predictable and Repeatable Prints
Process Monitoring and Quality Assurance
Easy to master Workflow from Design to Production



Large scale 3D printing is a complex technology that requires many process parameters to play together accurately to guarantee high quality prints. Drawing from years of expertise, we've crafted VSF Recipes, which are sets of proven process parameters. VSF Recipes are seamlessly integrated into our user-friendly SW Tools supporting your workflow from Design to Print for ease of use.

The use of VSF Recipes reduces complexity and leads to high-quality prints at ease.

VSF Recipes are an open platform and allow modification by the user. This ensures you have a dedicated location to save your constantly growing experience.

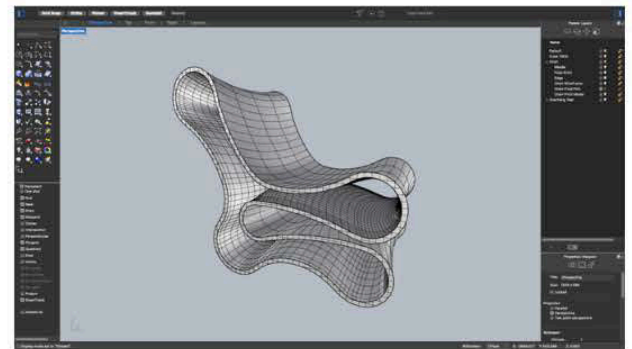
VSF CAM & Print Assessment

VSF Programming uses Rhino3D CAD as the front end, which enables to read a wide variety of file types.

Rhino3D also allows to design or modify parts.

The CAD model is the turned into CNC program cycles for 3D printing and 5 axis machining with our VSF CAM system software.

Additional tools are provided to asses the parts and mark areas of critical overhang to judge the printability of the part.



VSF Print Assistant

Given a CAD model, the VSF Print Assistant performs a quick pre-print assessment of parameters relevant to your print.

The assessment includes: Printing Time, Material Usage, Feasibility of the Print and Cost estimate based on print time and material usage

The assessment is performed based on a chosen VSF Recipe.

The later use of this recipe for the setup of the VSF printer guarantees that printing is executed according to pre-print optimization and at the best achievable quality.

Print Strategy		Recipe: ABS 4.5/15.8	
Material		GRF ABS	
Density [kg/m3]	1280		
Cost per kg [AUD]	8		
Part Dimensions			
Min Layer Length [mm]	1650		
Max Layer Length [mm]	1650		
Average Layer Length [mm]	1650		
Height [mm]	1500		
Number of Layers	333		
Print Speed			
Layer Time [s]	60		
Feed-Rate [mm/min]	1650		
Flow-Rate [cm3/min]	137.0		
Output-Rate [kg/h]	9.0		
Print-Time [h]	5.6		
Material Volume [cm3]	38985		
Part Weight [kg]	49.9		
Material Cost [AUD]	399		
Print Cost			
Machine Cost [AUD/h]	130		
Labor-Cost [AUD]	0		
Print Cost [AUD]	9		
Total Cost [AUD]	408		
Beam			
Nozzle Diameter [mm]	9.5		
Nozzle Orifice Area [mm2]	70.9		
Head			
Extrusion Override (don't touch)	100%		
Height [mm]	4.5		
Width [mm]	15.8		
Print Validation	Value	Limit	Margin
Max Print Speed	1650.00	6000.00	✓ 0.73
Min Print Speed	1650.00	100.00	✓ 15.50
Max Overhang (straight)	0	30.00	✓ 1.00
Max Overhang at positive R=50	0	50.00	✓ 1.00
Max Overhang at negative R=50	0	10.00	✓ 1.00
Max Overhang at positive R=100	0	40.00	✓ 1.00
Max Overhang at negative R=100	0	20.00	✓ 1.00
Max Overhang at positive R=200	0	15.00	✓ 1.00
Max Overhang at negative R=200	0	25.00	✓ 1.00
Print OK			✓ 0.73
Max Overhang at positive R=xx Curvature is supporting Overhang -> cone			
Max Overhang at negative R=xx Curvature is countering Overhang -> inver			

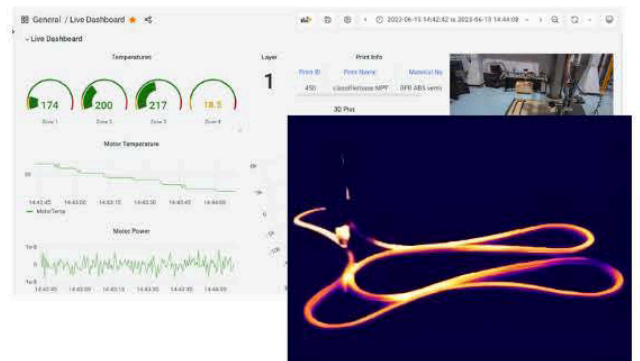
Process Monitoring & Data Logging

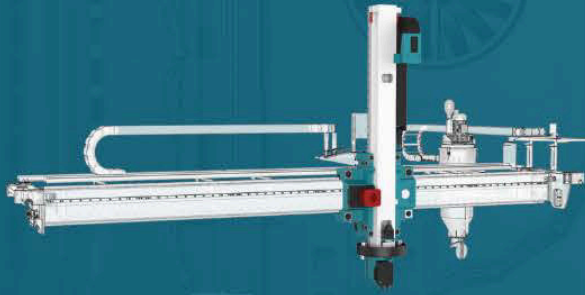
To track print-quality, relevant process data is continuously logged.

VSF Print Cockpit: Web-based live dashboard of relevant process parameters including the integration of web-cams

VSF Print Report: A summary of process parameters for one print to support quality assurance

VSF Temperature Grabber (optional): Integration of thermal camera. Definition of frames of special interest and logging of temperature for defined frames





VSF is a high performance 5 axis CNC milling system.

The use of HSD high speed milling spindles and 5 axis milling heads in combination with leading-edge Siemens SINUMERIK ONE CNC controls leads to outstanding machining performance.

Options include tool changers, part and workpiece probing and swarf and dust vacuum systems.

Siemens SINUMERIK ONE's **Digital Twin** technology, offers a cutting-edge solution in CNC systems by harnessing the power of digitalisation and simulation to boost manufacturing productivity and effectiveness. It fully supports part program simulation, evaluation, and refinement, in addition to providing operator training on a virtual platform. The efficiency is backed by precise and rigid 5-Axis head, complemented by a range of tools and options tailored to suit your application requirements.



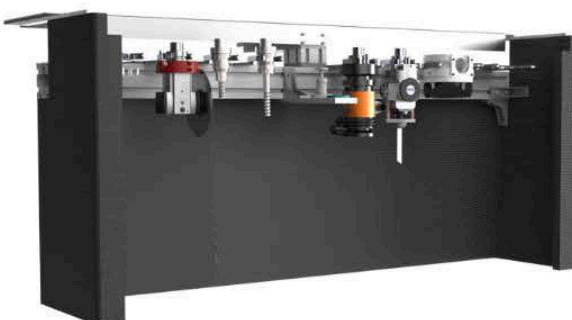
Milling Head, Tools and Tool-Rack

5 Axis Milling Head HS673	A-axis		C-axis
Travel	±120°		±360°
Positioning Accuracy	60 arcsec		60 arcsec
Max Speeds	135°/s		135°/s
Max Torque	1030Nm		1030Nm
Spindle ES779	10 kW	15 kW	22 kW
Spindle Speed	24,000 RPM	24,000 RPM	24,000 RPM
Spindle Power	10kW	15kW	22kW
Toolholder	HSK63F	HSK63F	HSK63F
Swarf Extraction 7kW	Optional	Optional	Optional



Rack for automatic tool-change for 4 to 8 pockets. incl. Touch Probe and Tool Setting Probe

ATTACHMENTS (OPTIONAL)



ROTARY BLADE
SAW



RECIPROCATING
KNIFE



ORBITAL SANDING
HEAD

Service and local Presence



Our services, including field service, spare parts, repair, and retrofit, are designed to ensure seamless operation of your manufacturing processes.

With a strong local presence, we provide timely and focused support, reinforcing our commitment to your success.

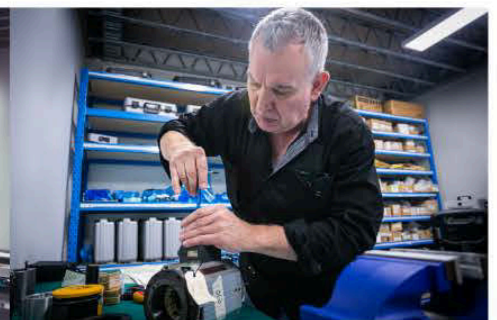
Our technicians are by your side all over the world



★ Head Office

◆ Partners

● Company Branches



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