



starragheckert
the milling experts



Transport STC 800 Machine
SIP 5000 Power Generation
Training HEC 1000 SIP 7000
STC 1600 LX Series Service
FMS HEC 400 RCS Dynamic
Series Athletic Series CPE
PSI+ SIP 5000 SAM Turbine
Blades HEC 500 Virtual Black
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Supplier to the Transport Market

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In the innovation-driven automotive, agricultural machinery and road-building sectors, StarragHeckert is the ideal partner, offering high-performance horizontal machines for pallet sizes ranging from 400 to 1800 mm. These are perfectly suited to the machining of high-precision engine, gearbox and chassis parts. StarragHeckert focuses on tailor-made product development for application-specific precision manufacturing, enabling the customer to concentrate on developing, producing and selling their vehicles and machinery.



Leaders choose StarragHeckert for...

- Unbeatable production know-how
- Unrivalled flexibility in providing continuous customisation
- Ultra high-precision components
- Decreasing unit costs by around 20%
- Considerably shortening processing times



Supplier to the Precision Machinery Market



Market demand for dynamic manufacturing concepts is growing rapidly, in direct proportion to the strong trend towards increasingly complex workpieces and intensified engineers' endeavours to design optimised machine elements. StarragHeckert machining centers fulfil these requirements in every aspect thanks to their 5-sided machining capability integrating five highly dynamic controlled axes. An intelligent Tool Management System facilitates fast tool and pallet changing and extendable work-piece handling.



Leaders choose StarragHeckert for...

- Efficient machining of particularly complex workpieces that are not machined at right-angles
- Component machining at any angle in one setting
- Massively reduced fixturing costs
- Significantly shorter cycles times
- Increased flexibility and efficiency teamed with the guarantee of top quality



Supplier to the Aerospace Market



StarragHeckert supplies all leading aerospace manufacturers with turnkey technology to produce both complex integral structural components for airframes and aircraft engine parts such as blisks, impellers and casings. The product spectrum ranges from the heavy-duty machining of high-tensile titanium and Inconel alloys, to the high-speed cutting of light alloys. Unrivalled specialist experience and precision satisfy customers from helicopter manufacturers, right through to the producers of the expendable space launch system, Ariane 5.



Leaders choose StarragHeckert for...

- Over 25 years of experience in blisk manufacture
- Flexible machining systems for 24/7 production
- High rigidity and stiffness machine structure enabling exceptionally high metal removal rates through the utilisation of the proprietary designed high power and high torque double-sided supported gearbox spindle
- Global service and parts infrastructure with strategically placed service centers, tailored to individual customer needs and operated by factory-trained personnel with local market and language knowledge
- Dedicated rigid machine concepts for milling challenging materials and complex structures



Supplier to Power Generation Leaders



StarragHeckert has over 50 years of experience in supplying turnkey technology for the manufacturing of complex 5-axis precision turbine blades for the gas and steam turbine industries and for aviation jet engines. The configuration of the 5-axis machines, with a unique arrangement of the spindle and axis, enables the complete machining of a turbine blade in a single set-up. All leading OEM turbine manufacturers and subcontractors choose StarragHeckert to benefit from the continuous optimisation of the latest technology.



Leaders choose StarragHeckert for...

- Reduced cycle-times with superior geometric accuracy and surface finish to meet the specific demands of the new generation of turbine designs
- Integrated flexible manufacturing system and customised automated solutions for 24/7 production
- Turnkey solutions with application specific process optimisation, CAM software, cutting tools and milling technology
- Global technological support, production and process optimisation consultancy, service and parts infrastructure
- Unrivalled 5-axis blade milling know-how resulting in high productivity through an optimal machine concept with very high dynamics, stiffness and rigidity



HEC 400 D / HEC 500 D / HEC 500 D XXL



The HEC 400 D is a 4-axis horizontal machining center with a choice of three different configurations to suit the relevant application – heavy-duty (power), light metals (dynamic) and universal (flexible). The dynamic configuration for example is ideal for automotive component manufacturing with its extremely short positioning times resulting in reduced cycle times, while the power option is geared to the heavy-duty machining of alloy steels and cast iron.

Customers gain a leading edge with...

- Excellent productivity with reduced idle-time and unit costs thanks to accelerations of up to 1.5 g and rapid traverse rates up to 100 m/s
- Choice of stand-alone functionality or integration into a Flexible Manufacturing System (FMS) for ultimate automated manufacturing efficiency
- Compact design with large interference in diameter and working envelope allowing for multiple-part set-ups on a single fixture
- Superior reliability and ease of serviceability due to fixed plate covers
- Optimal machine concept for environmentally responsible dry-machining

		HEC 400 D
Pallet clamping surface	mm/inch	500 x 400 / 19,69 x 15,75
Workpiece swing diameter	mm/inch	750 / 29,55
Max. workpiece weight	kg/lbs	600 / 1,326
Max. working feed rate X / Y / Z	m/min / ipm	100 / 3,937
Max. number of tool pockets		320
Length x Width x Height	mm/inch	5700 x 2800 x 2870 / 187 x 110 x 113



The HEC 400 D and the HEC 500 D XXL are 4-axis horizontal machining centers designed primarily for the automotive industry and the automotive subcontracting market.

Particularly the HEC 500 D XXL allows multiple parts to be clamped on to one fixture per set-up.

Customers gain a leading edge with...

- A reduction in the number of operations per machine
- Minimised machine investment costs
- Increased productivity with twice as many workpieces being clamped on the pallet



HEC 500 D	HEC 500 D XXL
630 x 500 / 24,8 x 19,69	500 x 500 (630 x 500) / 19,69 x 19,69 (24,8 x 19,69)
850 / 33,46	1000 / 39,37
700 / 1547	800 / 1,768
100 / 3,937	100 / 3,937
320	320
5900 x 3150 x 3000 / 231 x 124 x 118	5900 x 3500 x 3000 / 231 x 137 x 118

Compact Series
HEC 500 / 630 / 800

Modular Series
HEC 1000 / 1250 / 1600 / 1800



These mid-range horizontal machining centers integrate the latest technology with thermo-symmetrical bed designs and new generation control technology. They are ideal for the heavy duty machining of diverse metal types and supplied to the leaders in the automotive and machine tool building sectors. Optional 5-sided machining in a single set-up is also a feature. The compact machine centers are designed for precision machining workpieces weighing up to 2000 kg, from light alloys through to materials that are hard to cut.

Customers gain a leading edge with...

- Long-term production precision thanks to the thermo-symmetrical bed
- A wide range of options to suit specific requirements
- High-precision packages approaching jig-boring quality
- Ultimate flexibility for the implementation of extremely long tools and those with a large diameter – all versions have an optional H/V spindle and HEC 800 has an optional quill
- Process stability, even at a high metal removal rate, through optimal cutting flow
- Long-term machine precision through hand scraping of all critical and mating mounting surfaces such as those for the linear guideways

		HEC 500	HEC 630	HEC 800
Pallet clamping surface	mm/inch	500x500 (630x500)/19,69x19,69 (24,8x19,69)	630x630 (800x630)/24,8x24,8 (31,5x24,8)	800x800 (1000x800)/31,5x31,5 (39,37x31,5)
Workpiece swing diameter	mm/inch	1150/1000 45,28/39,37	1400/1250 55,12/49,2	1600/1400 62,99/55,12
Max. workpiece weight	kg/lbs	1000 / 2,205	1500 / 3,315	2000 / 4,420
Max. working feed rate X / Y / Z	m/min / ipm	60 / 2,362	60 / 2,362	60 / 2,362
Max. number of tool pockets		320	320	320
Length x Width x Height	mm/inch	7300x5200x4150 / 287x205x164	7800x5350x4150 / 307x211x164	8300x5500x4150 / 327x217x164

The modular Athletic machining centers are ideal for high-precision and high-value parts, predominantly for workpieces measuring from 1900 mm to 3300 mm. Leaders in wind turbine technology, machine tool manufacturing, specialist engine and gearbox manufacture favour this center.



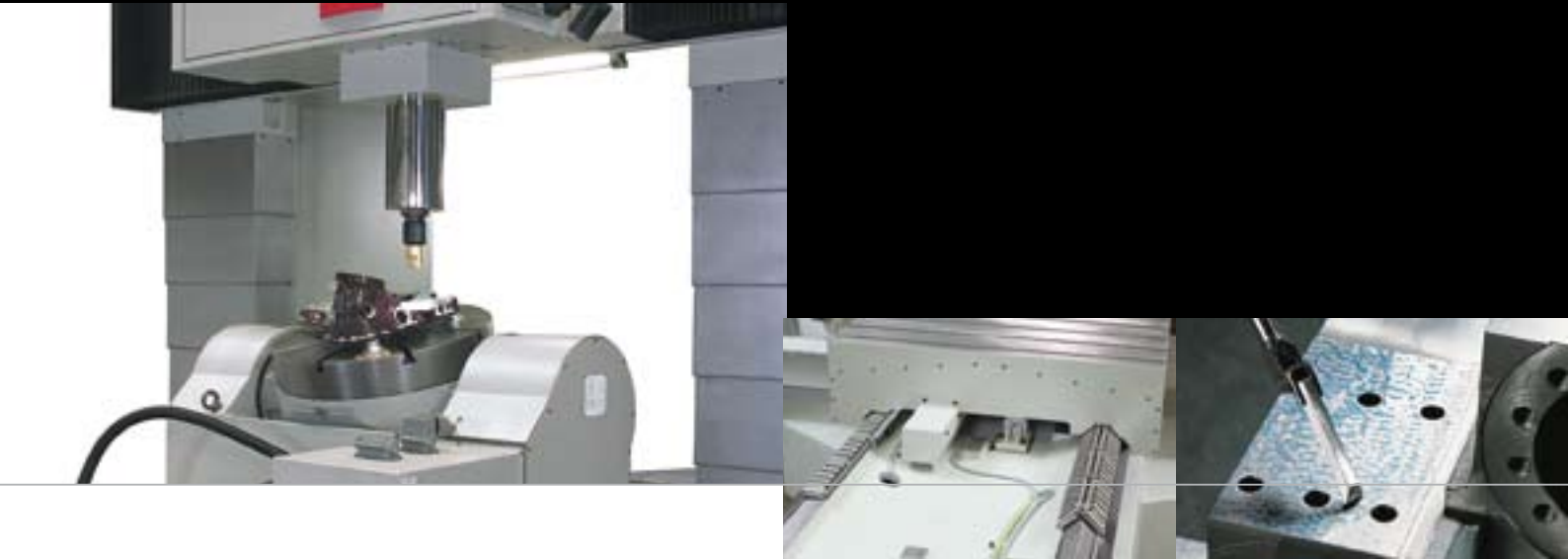
Customers gain a leading edge with...

- A uniquely designed large quill that reduces the number of set-ups, thus improving the accuracy of the workpieces
- High torque and power programmable by the extension of the thermally stable 750 mm quill representing a quantum technological leap
- Suitability of shorter, less expensive tools due to the unique quill design bringing process stability
- Flexibility through choice of double or quadruple pallet changer or integrating into linear pallet systems
- Option of 5-sided machining



HEC 1000	HEC 1250	HEC 1600	HEC 1800
800x1000 / 31,5x39,37	1000x1250 / 39,37x49,2	1250x1600 / 49,2x62,99	1250x1800 / 49,2x70,9
1900 / 74,8	2400 / 94,49	3000 / 118,11	3300 / 129,97
4000 / 8,840	5000 / 11,050	8000 / 17,680	13000 / 28,730
40 / 1,575	40 / 1,575	40 / 1,575	35 / 40 / 40 1,378 / 1,575 / 1,575
320	320	320	320
9500x7500x3800 / 374x295x150	10000x8500x4100 / 394x335x162	11500x9500x5200 / 453x374x205	15500x11100x6400 / 610x437x252

SIP 5000 / 7000



From the early years of the Society for Precision Instruments (SIP), the Geneva-based company, founded in 1862, has been considered the benchmark for ultimate precision in machine tool engineering. Today SIP machines have a presence in all traditional machining centers, whatever their precision needs and the customer requirements for dimensional tolerance. The unique SIP design is applied to both vertical and horizontal machines.

Customers gain a leading edge with...

- Long-term accuracy
- Over a century of proven mechanical design
- A unique guideway design and manufacturing process
- Perfect geometry for machine assembly
- In-depth understanding and management of the thermal factor

Accuracy Statement based on VDI / DGQ 2441

	SIP 5000/5	SIP 5000/6	SIP 5000/7	SIP 7000/7
Positioning Accuracy	2 µm	2,2 µm	2,4 µm	3,0 µm
Positioning Scatter	1 µm	1,5 µm	1,5 µm	1,5 µm
Reversing Error	0,5 µm	0,5 µm	0,5 µm	0,5 µm

		SIP 5000/5	SIP 5000/6
Pallet clamping surface	mm/inch	900 x 700 / 35,4 x 27,5 (3 axes)	1200 x 900 / 47,2 x 35,4 (3 axes)
Workpiece swing diameter	mm/inch	4 axes 850 / 5 axes 400 33,46 / 15,75	4 axes 1250 / 5 axes 550 49,21 / 21,65
Max. workpiece weight	kg/lbs	1200 / 2640 (3 axes)	2500 / 5500 (3 axes)
Max. working feed rate X / Y / Z	m/min / ipm	12 / 12 / 8 472 / 472 / 314	12 / 12 / 8 472 / 472 / 314
Max. number of tool pockets		30 (60)	30 (60 / 120)
Length x Width x Height	mm/inch	3650 x 6400 x 3300 / 143,7 x 252 x 129,9	4500 x 6800 x 3370 / 177 x 267,7 x 132,7

SIP 7000/7 (4 and 5-axes)

The SIP horizontal applications prove that ultra-high precision is no myth. Customers choose them because transmission gearbox, spindle head and 2-axis rotating table manufacturing typically require more attention than a conventional machining center can offer.



SIP 5000/5 /6 /7

This vertical SIP product line is a must for all high added value workpiece manufacturers. It achieves unrivalled ultra precise positioning and high dimensional tolerance of bores and milled surfaces.



SIP 5000/7	SIP 7000/7 4A	SIP 7000/7 5A
1700 x 1200 / 66,9 x 47,2 (3 axes)	1000 x 1000 / 39,3 x 39,3	800 / 31,5 (diameter)
4 axes 1550 / 5 axes 690 61,02 / 27,17	1800 / 70,87	1000 / 39,37
4000 / 8800 (3 axes)	4000 / 8800	1000 / 2200
12 / 12 / 8 472 / 472 / 314	12 / 8 / 12 472 / 314 / 472	12 / 8 / 12 472 / 314 / 472
40 (60 / 120)	40 (60 / 120)	40 (60 / 120)
5110 x 7250 x 3610 / 201,2 x 285,4 x 142	6500 x 6500 x 3910 / 255,9 x 255,9 x 153,9	6500 x 6500 x 4300 / 255,9 x 255,9 x 169,3

STC 800 / 1000 / 1250 / 1600



These modular 5-axis horizontal machining centers have been developed to machine complex structural components with long cycle-times and high value and offer a wide range of customer-specific options. With their proven, highly reliable nodding head, these centers are perfect for the heavy duty machining of titanium and Inconel in the aerospace and power generation sectors.

		STC 800	STC 1000
Pallet clamping surface	mm/inch	800 x 800 (800 x 1000)/31,5x31,5 (31,5x39,4)	800x800 (800x1000)/31,5x31,5 (31,5x39,4)
Workpiece swing diameter	mm/inch	1400 / 55,1	1700 / 66,92
Max. workpiece weight	kg/lbs	2000 / 4410	3000 / 6615
Max. working feed rate X / Y / Z	m/min / ipm	60 / 2362,2	40 / 1574,8
Max. number of tool pockets		320	320
Length x Width x Height	mm/inch	8930 x 5410 x 4520 / 352 x 213 x 178	9500 x 7800 x 4550 / 374 x 307 x 180



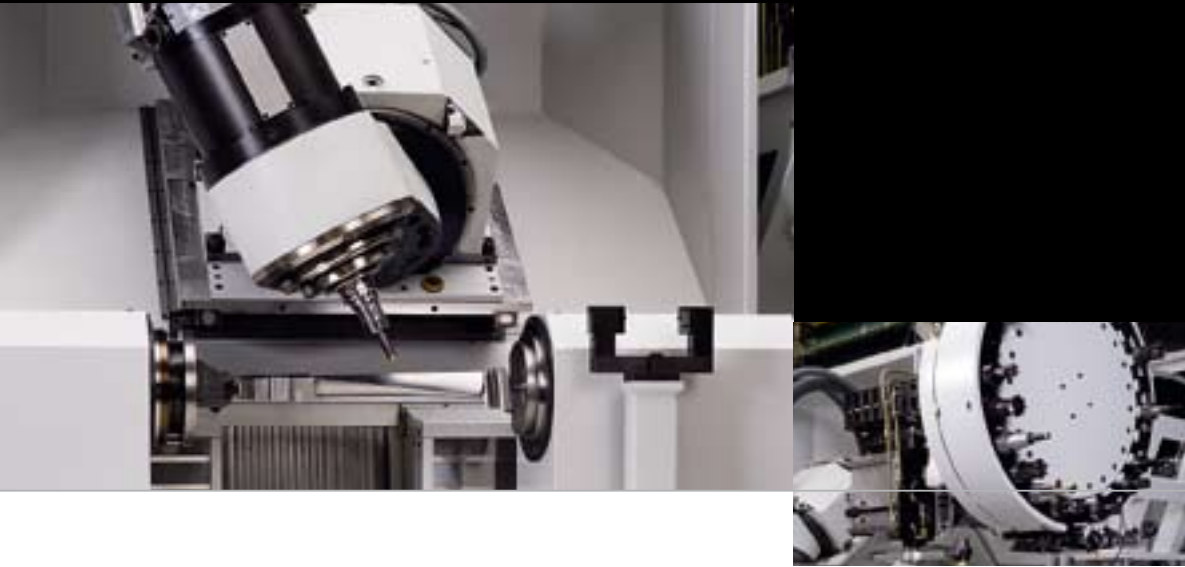
Customers gain a leading edge with...

- Long-term process stability as a result of rigid machine concept and build
- Reduction in process times because of the need for less set-ups
- Simplified logistics and machine support infrastructure
- Less clamping operations necessary leading to significant cost reductions



STC 1250/130	STC 1250/150	STC 1600
1000x1000 (1000x1250)/39,4x39,4 (39,4x49,2)	1000x1000 (1000x1250)/39,4x39,4 (39,4x49,2)	1250x1250 (1250x1600)/49,2x49,2 (49,2x62,9)
2200 / 86,61	1950 / 76,77	2800 / 110,23
5000 / 11025	3000 / 6615	8000 / 17640
40 / 1574,8	40 / 1574,8	40 / 1574,8
320	320	320
11400 x 8300 x 5450 / 449 x 327 x 215	14300 x 10200 x 5450 / 563 x 402 x 215	14500 x 9800 x 5450 / 571 x 386 x 215

LX Series



The patented technologies in the StarragHeckert LX 5-axis blade milling series bring a spectrum of benefits to customers in gas and steam turbine and jet engine manufacturing. The modern Duropol® mono-block bed design is geared to the precise and cost-effective manufacture of a full range of blades.

		LX 051
Center Distance	mm/inch	565 / 22,2
Workpiece Swing Diameter	mm/inch	400 / 15,7
Max. workpiece weight	kg/lbs	30 / 66,1
Max. working feed rate X / Y / Z	m/min / ipm	50 / 2
Max. number of tool pockets		60
Length x Width x Height	mm/inch	5500 x 2800 x 3000 21,6 x 11 x 11,8

Customers gain a leading edge with...

- High cutting performance due to extremely short mechanical moment forces between workpiece and machine
- Increased process stability through the elimination of thermal influences due to excellent vertical swarf flow

And with the LX 151 and LX 251 machines, also

- Elimination of unnecessary x-axis compensation movements thanks to the patented StarragHeckert B-axis, with the center of pivot positioned at the tip of the tool achieving surface finish accuracy of Ra 0,4 μ
- Optimised mass distribution in the machine concept's unique, patented axis configuration bringing high dynamism to reduce processing times



LX 151		LX 251	
930 / 36,6		1355 / 53,3	
400 / 15,7		400 / 15,7	
80 / 176,4		80 / 176,4	
50 / 2		50 / 2	
24 (62)		24 (62)	
6100 x 2800 x 2800	240 x 110 x 110	7130 x 2800 x 2800	281 x 110 x 110



Our global representatives

Europe: Benelux, Denmark, Germany, Finland, France, UK, Italy, Austria, Poland, Russia, Sweden, Switzerland, Spain, Czech Republic, Slovakia

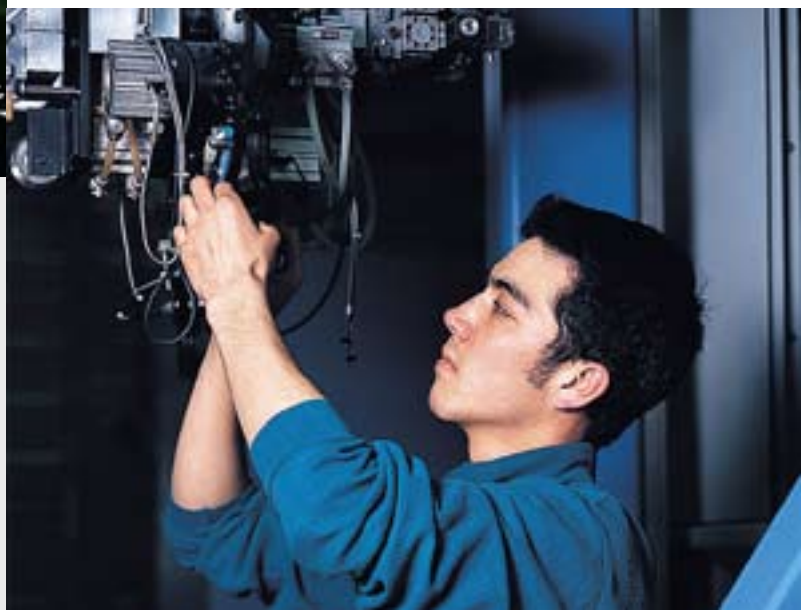
The Near East: Israel, Turkey

America: USA, Canada, Mexico

Asia: China, India, Indonesia, Japan, Korea, Malaysia, Singapore, Thailand, Taiwan

Oceania: Australia, New Zealand

Africa: Egypt, South Africa



Customer Services



The StarragHeckert service spectrum is dedicated to the continuous improvement of productivity. Its foundations are a fast growing service force, located close to customers' facilities all over the world, and a global distribution network. StarragHeckert understands that improving productivity means much more than ensuring the availability of parts and engineers.

As such, its services also include trend control with component maintenance prior to the end of their life or their failure, excellently trained operator and maintenance teams, the analysis of parts failures from the entire installation integrating feedback to the designers, as well as customised improvement programmes for customers.

Customers gain a leading edge with...

- Global presence with trained engineers and distribution centers
- Hotline support and remote diagnostics
- Pro-active preventive maintenance
- Operator and maintenance training
- Superior components

Training



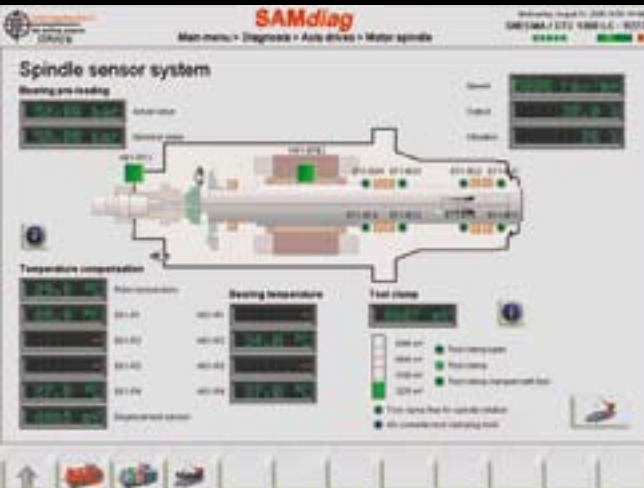
Equipment integrating the latest technology can only achieve its full potential when implemented if users have knowledge and understanding to match. StarragHeckert therefore offers a comprehensive range of standard modular training courses, with content covering processing, installation and software programming, plus refreshers on all topics. Customised courses can also be designed to meet specific requirements.

Customers gain a leading edge with...

- Fast return on investments made in new machining centers or the introduction of CAM software
- Hands-on knowledge acquisition direct from the manufacturer
- Training tailored to individual needs
- Flexibility of attending courses at StarragHeckert facilities or at customer locations, all with dedicated instructors

SAM

Service Assistant Module

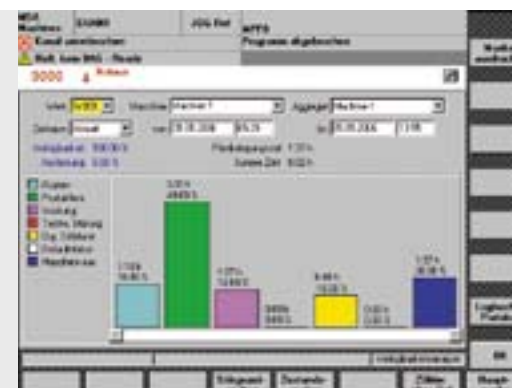


The StarragHeckert Service Assistant Module (SAM) is an innovative visualisation system, ideally suited for use with the HEC, STC and LX machine series. It provides the user with all relevant information on the current status of both the machine and the control system at the touch of a button.

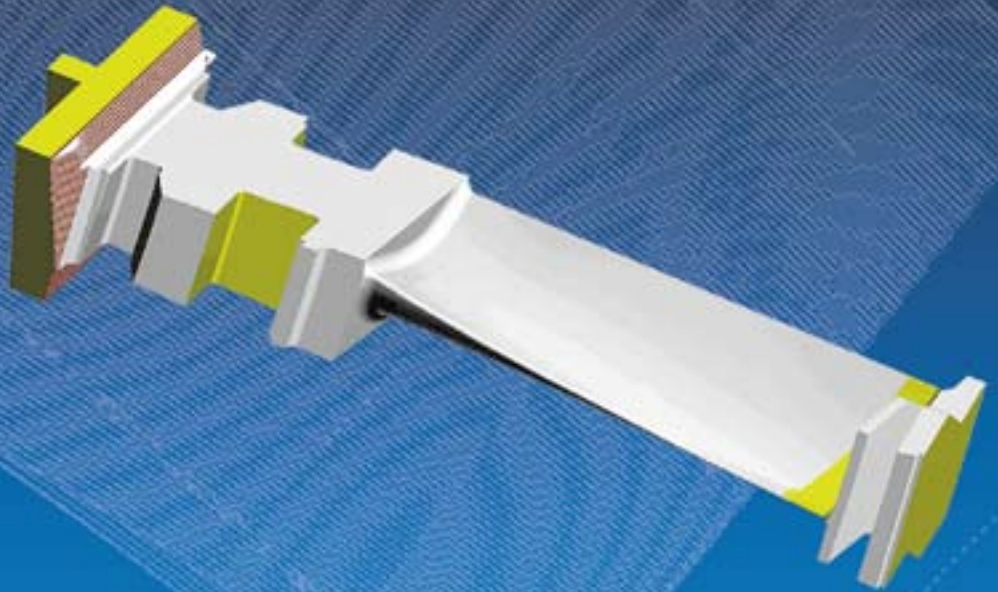
SAM facilitates the efficient planning and supervision of all service and maintenance activity, while the StarragHeckert developed remote online diagnosis system ensures the maximisation of machine uptime.

Customers gain a leading edge with...

- Optimal use of resources reducing overall production costs
- Reliable real-time analysis employing direct access to machine documentation
- Rapid service response integrating immediate troubleshooting and diagnosis



Software



The precision and efficiency of turbine blade machining is highly dependent on the performance capability of the accompanying CAD/CAM programming software. StarragHeckert therefore integrates its own software packages and simulation tools into its product offering, giving customers easy, direct access to over 30 years of development and implementation experience.

Customers gain a leading edge with...

- Synergies through a wide range of tools from one source
- Leading-edge, sophisticated technology dedicated to the product
- User-friendly, easily adapted solutions with a modular structure



RCS is high-performance CAM software that StarragHeckert has specifically developed for the 5-axis high-speed machining of steam and gas turbines and aircraft engine blades. It brings efficiency to all types of blade machining, regardless of blade size and material. The parametric input structure allows entire families of blades to be programmed quickly and accurately.

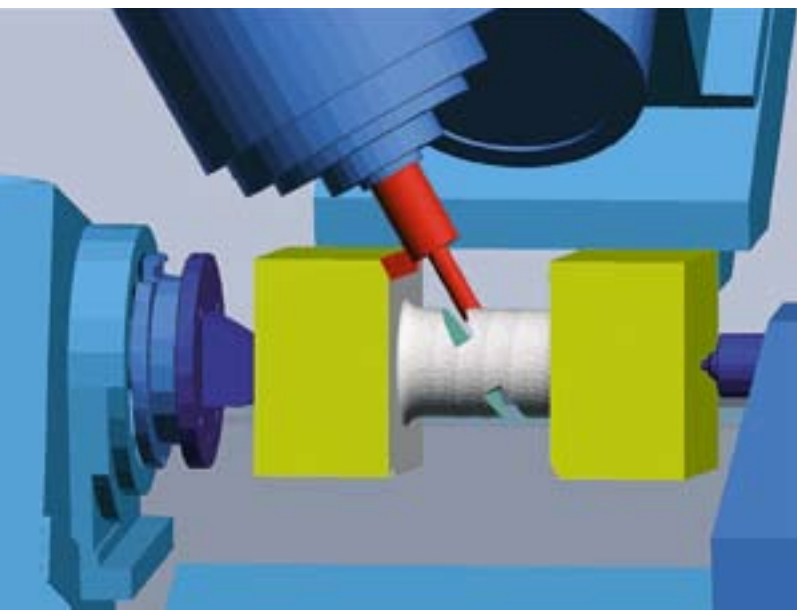
PSI+ constitutes dedicated CAD/CAM software designed for the efficient programming and therefore milling of multi-blade components such as impellers, blisks, bladed rotors, diffusers, compressor and pump wheels and even nozzle guide rings. The milling strategies have been developed specifically for these types of component and are therefore ideal for the generation of highly efficient roughing and finishing tool paths for workpieces of all sizes and materials.



Virtual Blade Machining represents a sophisticated simulation program for StarragHeckert blade machining centers. It enables RCS CAM software users to simulate, verify and optimize complex blade machining processes one to one on their computer screen.

Virtual Blade Machining is available for the STC series and for the control models.

Adaptive Machining Technology from the StarragHeckert company, TTL, is proprietary 5-axis adaptive machining software achieving accuracy to an incredible 20 microns. This technology is primarily used for highly efficient blade repair for compressors, turbines and aircraft jet engines and is also suitable for work on blisks, impellers and turbine casings. This revolutionary software eliminates the previously highly labour-intensive repair methods and brings drastically reduced scrap rates and turnaround times in a fully automated, quantifiable and highly repeatable process.



Center of Production Excellence (CPE)

StarragHeckert offers customers the services of its state-of-the-art Center of Production Excellence (CPE) for their testing or subcontracting needs. Located in Rorschach, Switzerland, this 2000 m² facility is equipped with state-of-the-art 4- and 5-axis machines to carry out tasks such as single and multi-blade machining, structural components and aero engine components. The extensive range of services includes heavy-duty machining of high-strength titanium alloys and high-speed cutting of light alloys in surface finishes up to class IT 5 quality at competitive prices.



Customers gain a leading edge with...

- State-of-the-art technology to increase productivity
- The ability to accommodate seasonal peaks without investment in new machinery
- The facility to produce pilot and small batches cost-effectively
- Reduced ramp-up time of machine investments
- Simultaneous and concurrent engineering

Engineering

StarragHeckert teams its leading technology with sophisticated process services. These draw on over 30 years of experience in tailor-making manufacturing solutions for leaders in their sectors, in close cooperation with fixture suppliers. The comprehensive knowledge spectrum integrates the in-house development of new materials and fixture concepts, innovative cutting tools, as well as the optimisation of cutting data. This activity is complemented by cooperation with leading research establishments to ensure that solutions created for clients integrate the very latest manufacturing technology.



Customers gain a leading edge with...

- Professional advice and optimal solutions for the most demanding manufacturing needs
- Increased productivity thanks to tailor-made advice
- Machine tools and services from one source
- A unique package of machine capability, tooling, software and knowledge-transfer
- Expert support in the implementation of the solution if required

Process Services

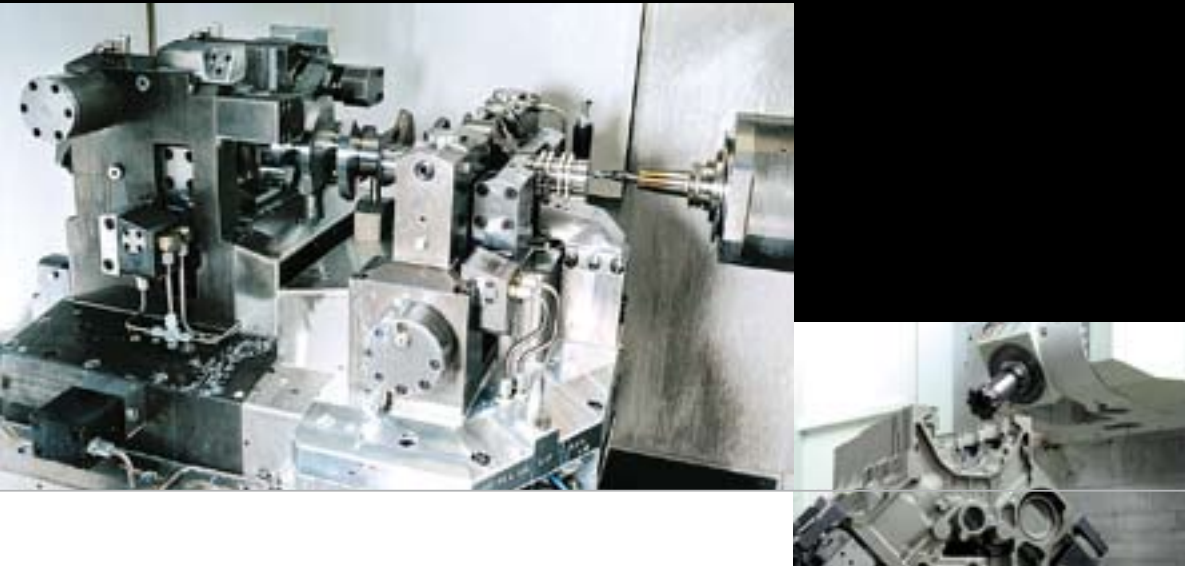
Tools

StarragHeckert offers high-precision cutting tools materials such as titanium, inconel and aluminium, tailored to its milling applications and manufactured from high-quality materials.

The tools are individually manufactured to meet specific customer demands and delivered to deadlines. The range of tools on offer includes solid carbide milling cutters, featuring various coatings and dimensions; taper ball nose cutters, cylindrical ball end cutters, high-performance torus cutters and cylindrical end mills.

Customers gain a leading edge with...

- Increased productivity through ongoing development
- Excellent concentricity and top surface finish quality for complex workpieces and difficult-to-machine materials thanks to tools with specific contours, angles, and radii
- Reduction of waiting time through the inhouse development and manufacture of milling cutters bringing shorter “time-to-market” from the design idea to its realisation
- Optimal implementation of modern manufacturing technology



StarragHeckert offers turnkey solutions integrating state-of-the-art jig and fixturing technology. This intelligent technology is founded on decades of experience and the expertise of highly qualified technical staff. The resultant solutions, embracing mechanical, automated, hydraulic, vacuum and magnetic possibilities, maximise the availability and productivity of customers' machinery.



Jig & Fixturing Technologies

Mechanical jig and fixturing solutions give customers the edge with...

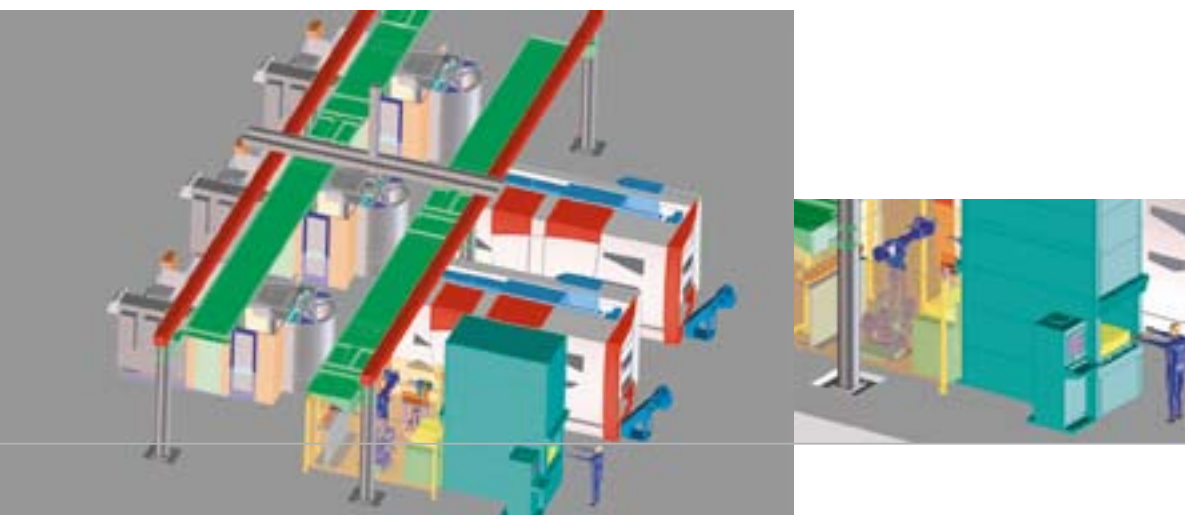
- Clamping fixtures for high-precision workpieces
- Cost-effective multiple-component clamping fixtures



Automated, hydraulic and magnetic solutions give customers the edge with...

- Intelligent hydraulic jigs and fixtures with position and orientation control, CNC programmable variable clamping force for both manually loaded and fully automated loaded fixtures resulting in high long-term process stability
- Jigs and fixtures for fully automated workpiece clamping via a handling system or robot for complete machining, eliminating manual re-clamping within the machining process requiring the operator to simply control and monitor

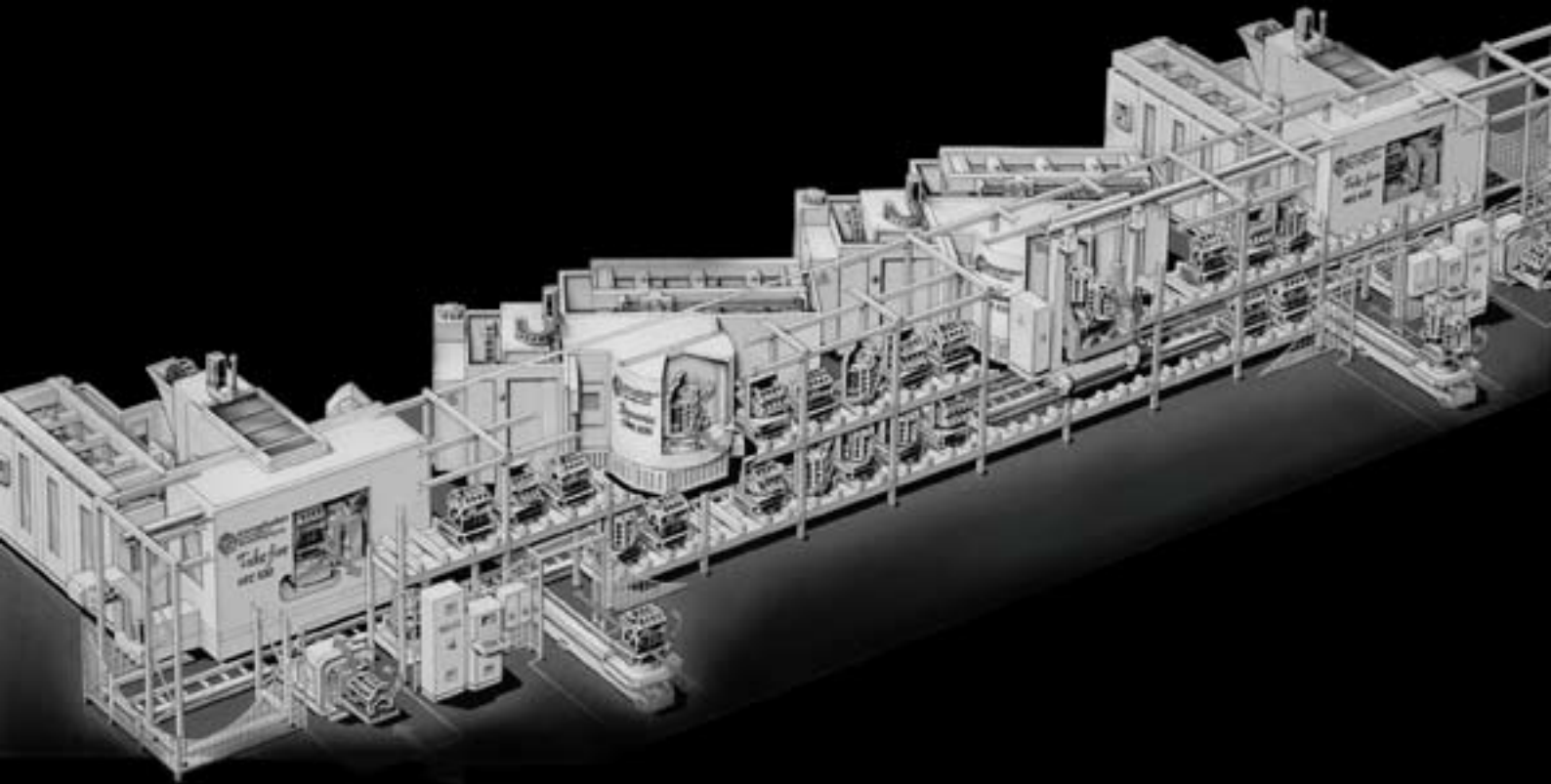
FMS Flexible Manufacturing Systems



Leaders such as Daimler and Alstom feature on the StarragHeckert reference list for complete turnkey technology solutions. Each of these tailor-made packages embraces the provision of all fixtures (proprietary and third party), tooling and programming infrastructure.

This is teamed with comprehensive consultancy from the very first stages of development on the customer side right through to after-sales technical support.





Customers gain a leading edge with...

- Reduced manufacturing costs and increased production efficiency thanks to the integration of unrivalled product and process know-how from day one
- Product changes that do not require expensive and time-consuming changes of the manufacturing system
- Improved long-term production reliability, flexibility and achievement of time schedules
- Extension of FMS to include additional machines in the case of rising production output





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