



Service Profile

ALMA, an assurance of precision and quality – as a manufacturer and subcontractor

Company profile

ALMA – high-performance partner

Core competence in vacuum and drive engineering

With over 40 years of experience of high-precision metalworking, ALMA has been producing and selling products for drive and vacuum engineering for over two decades.

Thanks to steady growth, the ALMA Group now employs its workforce at several locations. Our advanced production facilities enable us to produce milled, drilled and turned parts with extreme accuracy and combine them in assemblies.



Our production location in Wertheim-Bestenheid also accommodates our CNC machining centres.



The cleanroom and assembly are located at ALMA's headquarters in Schollbrunn along with administration and sales.

ALMA's main business is the production of tailor-made components and systems for complex drive requirements that also include ultra-high-vacuum engineering.

The production range encompasses not only customised rotary feedthroughs and drives but also standardised drive solutions and basic products such as vacuum screws, securable shaft nuts and metal bellow couplings.

ALMA products are therefore put to use in special vacuum installations as well as in general machine manufacture.

Company history

- 2021 Construction of two air-conditioned measuring rooms
- 2017 Creation of an ISO 5 cleanroom and a UCA cleaning unit
- 2009 Addition of a production shop for large-volume milling
- 2004 ALMA driving elements GmbH takes over the business activities of ALMA Mechanik Metallteile GmbH
- 1999 Introduction of SAP R/3 and 3D CAD
- 1998 Opening of 2nd building in Schollbrunn (today's headquarters, component assembly, administration and sales)
- 1995 QM certification to DIN EN ISO 9001
- 1992 Opening of a new production site in Wertheim-Bestenheid
- 1979 Establishment of ALMA Mechanik Metallteile GmbH

Precision products and production services for market leaders

Leading industrial companies, e.g. from such sectors as vacuum engineering, semiconductor production, thin-film technology, lighting equipment, photovoltaics and display production, trust in the expertise of ALMA as a maker of precision components and also place orders for highly complex machining processes.

Our satisfied customers include APPLIED MATERIALS, BÜHLER GROUP, MANZ COATING, MERCK, OERLIKON BALZERS COATING, SINGULUS and VON ARDENNE, to name but a few.

Thanks to our experience of the production of precision parts, we will also be capable of meeting your requirements.

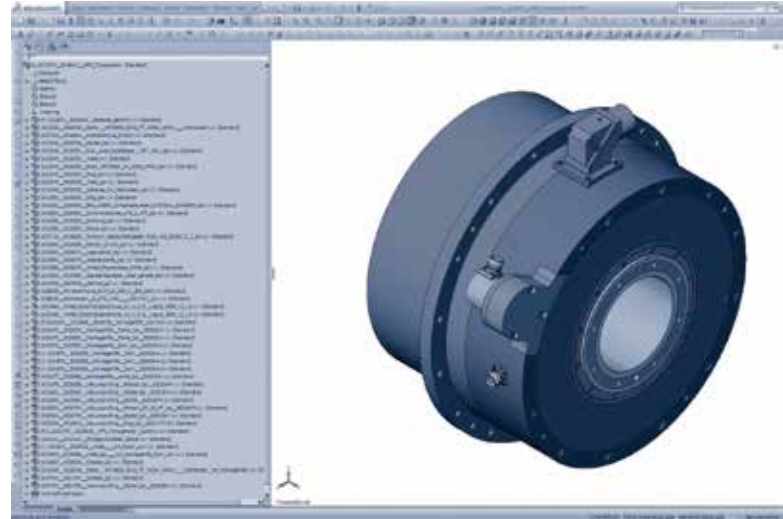
Put us to the test and entrust us with your complex design and production projects.

Design

Development services

The services of ALMA driving elements GmbH are not confined to machining. Depending on the specification, we also advise our customers on product development. We analyse the customer's requirements and, if desired, offer a complete package extending from planning, project development and design through to the production of tailor-made quality products.

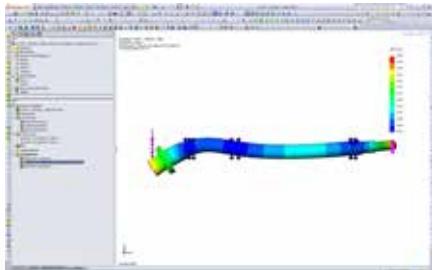
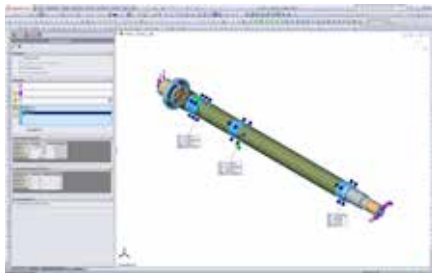
We therefore regularly invest in the latest design tools and production technologies and capacities.



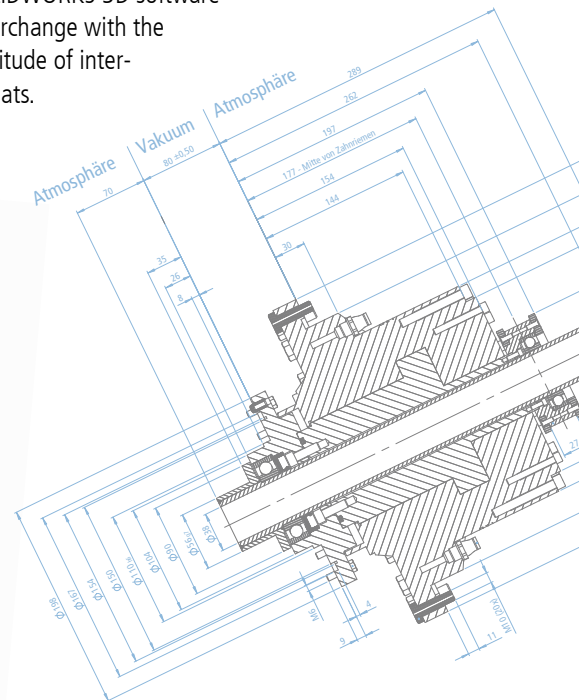
Scrupulous engineering for prototyping and mass production

ALMA's engineering services encompass the development of prototypes and components suitable for mass production in close consultation with the customer.

Our design engineers and technicians use the high-power SOLIDWORKS 3D software permitting data interchange with the customer via a multitude of interfaces and data formats.



When a shaft is designed, its flexural behaviour is also computed.

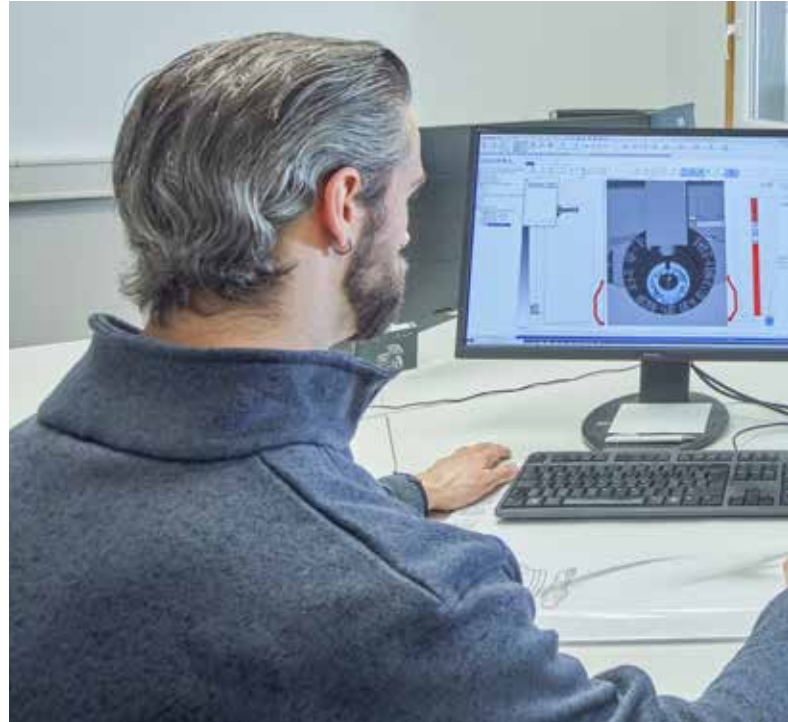


ALMA design engineering for vacuum applications: customised combination of a rotary feedthrough with direct drive.



Precision machining

CAM-programmed machining processes



ALMA driving elements GmbH mainly machines high-grade stainless steels, aluminium and copper, although brass, plastics and other special materials are also processed, depending on the requirements.

Our advanced machine park and the use of superlative-quality materials are important factors in the achievement of product quality, but not the only ones.

All our machining centres can be programmed independently of the machine via Solid-CAM, inclusive of machine simulation.

Another essential ingredient is the machining expertise of our skilled and experienced employees who ensure that workpieces are converted in a multitude of work steps into complex and high-grade precision components.

So, far from being the exception, the machining of materials to achieve ultra-precise vacuum sealing surfaces is part of the everyday routine.



Our external CAM system enables us to read in the geometry data of the blank, clamping device and end product etc. independently of the machine, so that we can assure our customers of the highest standards of both productivity and precision.



CNC turning

Our turning shop is equipped with seven CNC and various conventional lathes. They are used for producing precision workpieces with high concentricity up to a diameter of 950 mm.

Precision machining

High-performance CNC machining centres



CNC milling

ALMA has ten advanced CNC milling machines and machining centres that are designed for components ranging from the tiniest part through to workpieces weighing up to 5 t.

Our machine park is currently capable of machining workpieces with the following maximum dimensions: X 5,500 mm, Y 2,300 mm, Z 1,200 mm.

For conventional machining, CNC machining centres are available with magazines for up to 98 tools.



For example, we also have a special CNC machining centre with automatic screw drilling and milling devices with which we can carry out high-precision drilling for our vacuum screw production.

On our modern CNC machining centres, we machine components with workpiece weights ranging from a few grams to several thousand kilograms.

Joining processes

Welding and soldering



ALMA joining technologies

The employees of our welding department are examined welding specialists and mainly process steel and stainless steel using gas-shielded welding methods (MIG/MAG and TIG welding).

We also offer our customers joining technologies such as aluminium welding and the soldering and brazing of copper.

We have all the conventional welding certificates plus special skills when it comes to vacuum-tight soldering, brazing and welding work.



Warping due to welding and machining is corrected with precision on our jigs and fixtures.



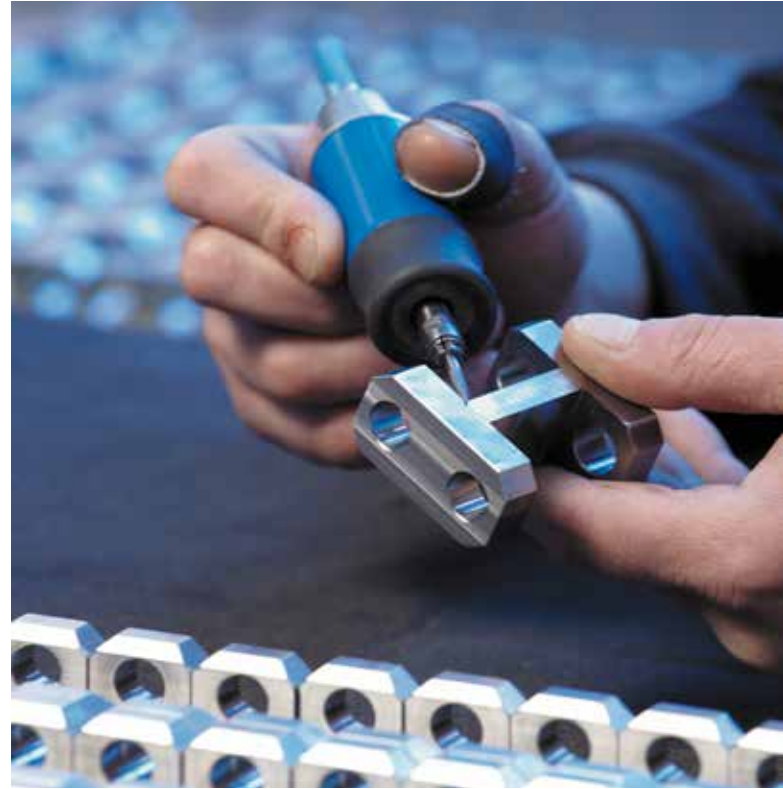
Our welding specialists are aided by a battery-powered undercarriage when applying straight welds.

Surface treatment

Blasting, fine grinding and finishing



Blasting booth



Manual finishing

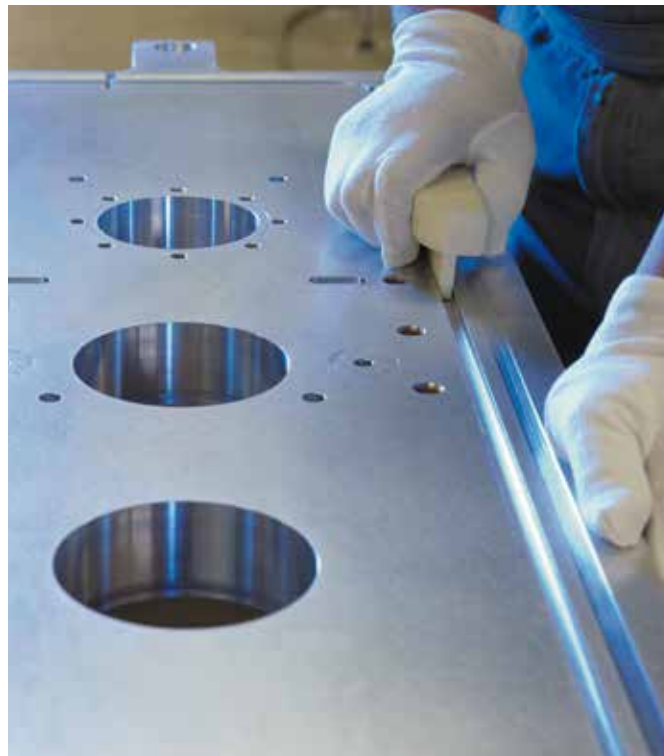
Immaculate material surfaces

To prepare the surfaces of workpieces and assemblies perfectly for a demanded surface finish, ALMA uses glass bead blasting and sand/rough blasting.

We can create any desired surface finish, e.g. painted, powder-coated, electropolished, anodised, galvanised, nickel-plated etc. – if necessary in cooperation with proficient external specialist firms.

This is also an option if your components need defined heat treatment.

Components destined for use in vacuums are subjected to meticulous manual finishing in order to achieve flawless vacuum sealing surfaces.



Cleaning services

HCA cleaning



Pre-cleaning in line with requirements

Clean components are increasingly a basic requirement for the manufacture of high-precision quality products.

ALMA already operates a cleaning line in Plant I where solid and liquid production residues (particles, oils, etc.) are removed from the components after machining.

Depending on their requirement profile, the workpieces can pass through a spray washing system, an ultrasonic cleaning bath and rinsing with osmosis water.

If fine cleaning is to take place afterwards in the cleanroom, component suitability for the cleanroom must be ensured with upstream HCA cleaning.

At ALMA, these workpieces pass through all the cleaning steps described before they are transported to Plant II, double-packed in film bags under cleanroom conditions, for further assembly (UCA).

Cleanroom-compliant cleaning

- Removal of production-related particles
- Removal of organic residues
- Cleanroom-compatible packaging



Clean components are an important prerequisite for the manufacture of precision products.



Ultrasonic cleaning bath at ALMA Plant I

Cleanroom cleaning services

Fine cleaning to UCV requirements



Cleaned components are transferred to the ISO 5 cleanroom for assembly.



Dry cleaning by baking in the vacuum oven ensures highly clean surfaces.



Wet cleaning in the class 6 cleanroom: the components are provided on entry with a badge for identification and documentation.



Multisonic cleaning bath

Cleaning processes in the cleanroom

- Ultrasonic cleaning in multisonic baths
- Ultrasound-assisted interim and final dip rinsing (both with deionised water)
- Manual pre-drying with treated nitrogen of the highest purity; residue-free final drying
- Dry cleaning by baking in a vacuum oven

Preparing components for use in the ultra-clean vacuum

Even during the planning of the ALMA cleanrooms, special care was taken to ensure that the installations were free of organic substances and that process station design complied with the relevant standards.

The result is optimum cleanroom processes, divided into infeed (ISO 7), cleaning (ISO 6) and assembly, testing and packaging (ISO 5).

On entry, all components receive a badge for identification and documentation. Where necessary, we subject the components to drying in which material surfaces are desorbed to achieve a particularly high standard of cleanliness.

Assembly services

From the workpiece and subassembly to the final product



Our hybrid assembly is carried out in a cleanroom under flow boxes equipped with powerful fan-filter modules of cleanroom ISO class 6 to minimise contamination with particles. Depending on the assembly requirements, the mobile flow boxes can be specially positioned, e.g. in parallel or in series, for an ergonomic assembly set-up.

Hybrid assembly

Components in direct contact with vacuum or at the interface between vacuum and the atmosphere in the end product require special cleaning before assembly. Most components can be assembled and packaged directly in the ISO 5 or 6 cleanroom.

However, parts that are greased, emit gases or have other unsuitable material properties can be neither fed through the ISO 6 cleaning baths nor assembled in the ISO 5 cleanroom, as they would otherwise contaminate it.

However, it is often necessary to assemble precisely these parts together with the parts specially cleaned under ISO 5 conditions and at the interface with vacuum. This challenge can be mastered with assembly in a cleanroom under flow boxes. ALMA has special expertise in the field of so-called hybrid assembly.



At our Schollbrunn site, we have set up assembly rooms where we can also perform vacuum assembly services with our skilled staff.

We offer our customers assembly services covering everything from subassemblies through to complete end products, inclusive of the pneumatics, hydraulics and electrics.



Cleanroom assembly

Ultra-clean assembly (UCA)



UCA assembly services

Having its own ISO 5 cleanroom enables ALMA to offer customers bespoke cleanroom assembly services, ranging from the assembly of UCV components to complete, tested assemblies.

Workpieces weighing up to 1,000 kg can thus undergo UCA-compliant assembly to the highest standards of cleanliness.

ALMA provides continuous training to ensure that its cleanroom personnel meet the latest UCA cleanliness standards.

In order to maintain the achieved level of cleanliness during transport and to protect the components and assemblies from fresh contamination, they are packaged under cleanroom conditions (ISO 5).

If products have to be further processed by the customer in a cleanroom, this is done by means of double packaging in an inert gas atmosphere of the highest purity, as this enables them to be reintroduced into the cleanroom without contamination.

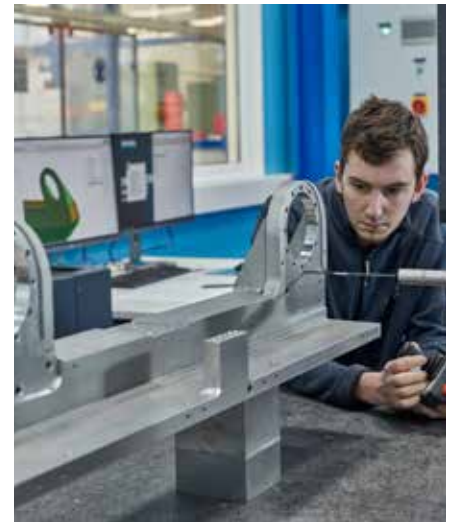
The packaged products are labelled directly on the inner film with UCA-certified labels to customer specification.

Cleanroom packaging services

- Sealing in certified PE bags or with composite films
- Use of inert N2 atmosphere of the highest purity
- Labelling to customer requirements with cleanroom-compatible materials
- Outer packaging of PE film

Measurement and documentation

Quality assurance with high-precision coordinate testing services



Air-conditioned precision measuring room

In our fully air-conditioned measuring room conforming to VDI/VDE 2627-3, we can measure components in an measuring range of up to W 2,000 x D 1,200 x H 1,000 mm and a weight of up to 2,000 kg with high precision on our advanced 3D coordinate measuring machine.

In our CAM programming unit, new measuring programs are generated concurrently with the measuring process on the basis of machine simulation, inclusive of collision checks.

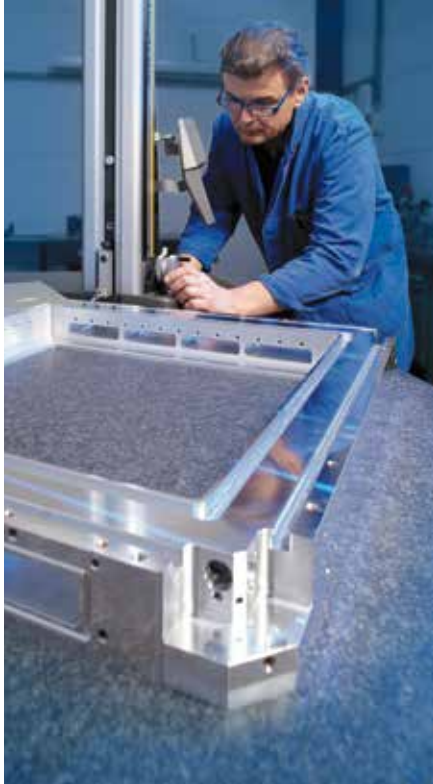
Our portal measuring machine permits the tactile scanning of straight lines, planes, circles, cylinders, cones, spheres and curves and ensures high measuring precision.

In order to achieve maximum measuring accuracy and reproducible values, the components are temporarily stored in the air-conditioned measuring room in a roughly 20 m² storage space until the measuring temperature is reached, at which point the required shape and position tolerances can be tested.



Measurement and documentation

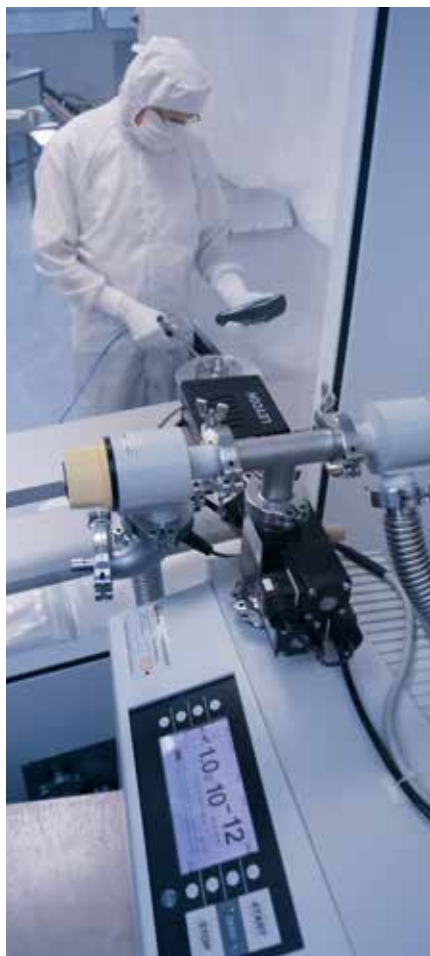
From leak testing to particle detection



To achieve the highest standards of precision, the components and assemblies we produce undergo painstaking quality control after individual production steps and during final inspection. It goes without saying that our measuring instruments and testing equipment are regularly calibrated for this.

Our customers benefit from these stringent tests by obtaining quality products that are guaranteed to meet the contractually agreed standards.

In our testing facilities with their advanced equipment, we check dimensional accuracy to within a few thousandths of a millimetre and, if necessary, carry out leak tests with our helium leak-testing facility with its detection sensitivity of $\leq 1 \times 10^{-9}$ mbar · l/s.



Helium leak tests of assemblies and end products can also be carried out in the cleanroom by intelligently arranging the leak test equipment starting in the grey room, so that contamination from the test set-up is reliably excluded.



Visual inspections for particle contamination can be performed with white or UV light as well as with a CleanoSpector or light microscope.

ALMA cleanroom testing equipment

- Visual inspection with white or UV light
- Light microscopic inspection
- Fluorescence meter
- Tensiometer
- Particle counter
- Wipe tests
- Water break tests

Quality audits to customer specification

We are constantly planning, consolidating and improving our product quality and enable our customers to carry out quality audits.

Thanks to this cooperation between external quality professionals and our trained QM staff, ALMA regularly achieves outstanding ratings.

Shipment all over the world

Secure packaging and customised orders



Secure packaging

For the best-possible product protection on the move and in the warehouse, our range of services also includes suitable packaging, e.g. single UHV packs in antistatic LDPE pouches or skin film packaging with labelling as required.

Customised orders

We develop packages adapted to consignment size, document the deliveries in detailed pack lists and have them shipped by reliable service providers.

In doing so, ALMA ensures that customer order requirements such as packaging and shipment instructions (e.g. individual markings or special packages for dispatch overseas) are carefully complied with.



Service profile

The ALMA machine park

CNC machining centres

Machine	Control	Machining range/max. work-piece dimensions (mm)	Special equipment
FP 6 NC milling machine	Dialog 11	X 1,000, Y 550, Z 500	
2 x CSK 300 machining centres	Traub MX 8F System	X 400, Y 300, Z 400	Tool changer with 16 tool pockets, max. tool Ø: 100 mm
2 x WF 650 machining centres	Heidenhain TNC 530	X 650, Y 500, Z 450	Tool changer with 20 tool pockets, indexing head centre height 160 mm
Kunzmann BA 1000 machining centre	Heidenhain TNC 530	X 1,020, Y 620, Z 610	Tool changer with 40 tool pockets, indexing head centre height 160 mm
Kunzmann BA 1200 machining centre	Heidenhain TNC 530	X 1,200, Y 700, Z 750	Tool changer with 24 tool pockets, indexing head centre height 320 mm
Hermle C50 U MT machining centre	Sinumerik 840D	X 1,000, Y 1,100, Z 750, Ø 950 x 600	Tool changer with 98 tool pockets, inclusive of rotary function
Keppler HDC 3000 machining centre	Heidenhain TNC 530	X 3,000, Y 1,500, Z 1,400	Automatic stepless milling head, tool changer with 40 tool pockets, rotary table: 1,250 x 1,600 mm
Soraluce FL 6000 travelling-column machining centre	Heidenhain TNC 530	X 5,500, Y 1,800/2,300, Z 1,200	Automatic indexing milling head: 2.5° x 2.5°, tool changer with 40 tool pockets, rotary table: 1,500 x 1,500 mm
Gildemeister CTX 500 lathe	Elektropilot	Ø 400 X 1,065 mm	
Traub/TNA 300 lathe	TX8H	Ø 275 X 450 mm	Flex IPS
Traub/TNE 300 lathe	TX8i	Ø 275 X 450 mm, Y ± 35 mm	12 driven tools, Y axis
Traub/TNE 300 lathe	TPC	Ø 275 X 450 mm	Flex IPS
Traub/TNA 400 lathe	TX8i	Ø 400 X 1,050 mm	Steady rest up to Ø 150 mm
Traub/TNA 500 lathe	TX8i	Ø 620 X 1,050 mm	
Traub/TNL 18 lathe	TX8i	Ø 20 x 1,050 mm	With automatic screw drilling and milling unit

Other machines and equipment

Machine	Workpiece dimensions/plant data
Conventional Meuser M4S lathe	Ø 730 x 1,000 mm, Max. clamping dia. 680 mm
Conventional Meuser M1L lathe	Ø 275 x 950 mm
Kasto SSB 260 VA band saw	Max. Ø 260 mm
Kasto HBA 420 AU band saw	Max. Ø 420 mm
Blasting system	W 1,300 x H 470 x D 1,000 mm Max. workpiece dimensions: L 2,500 x W 345 x H 265 mm
Blasting system	Large parts: max. length 6,000 mm
TIG/MAG welding stations	1,200 x 5,500 mm
Surface soldering/brazing unit	200 x 3,000 mm
Ultrasonic cleaning unit	
Indoor crane	Up to 5 t



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