



## **KHL-Techna Website Print Version**

### **Your partner**

**KHL TECHNA GmbH** is a highly specialized international trading and consulting company for premium machinery and production technology.

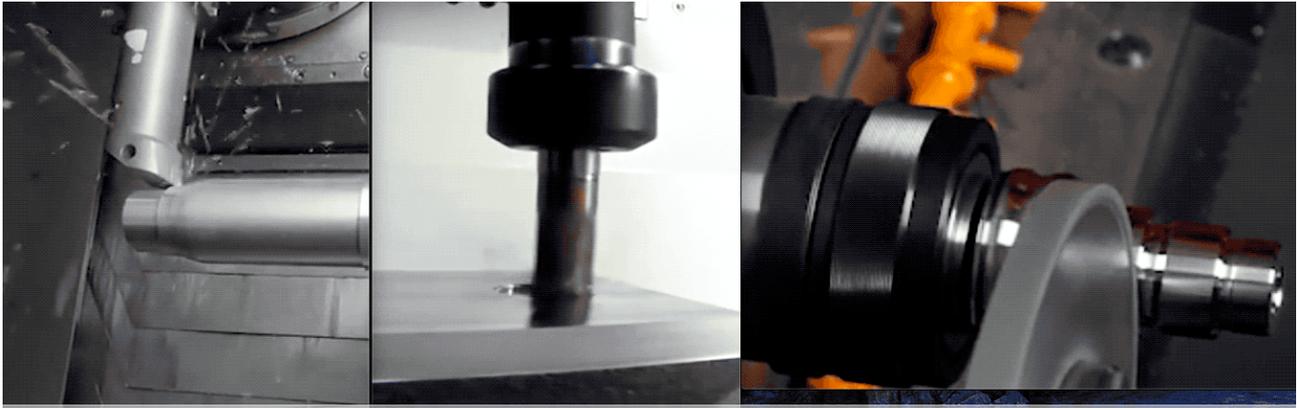
We procure and sell premium machinery, equipment and tools for production, quality assurance, testing and development in a wide range of industries.

### **We procure and trade**

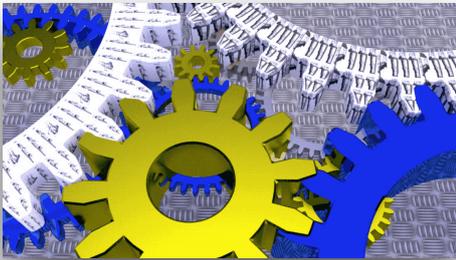
As an experienced service provider, we specialize in the procurement of machinery for the production of...

### **We consult and plan**

We offer our consulting services for customers as well as for suppliers.



## We introduce ourselves...



### **Assistance with complex tasks**

KHL TECHNA GmbH is an international trading company. Since its foundation in 1995 just outside Hamburg, Germany, we have specialized in the procurement and sale of high-quality machinery, equipment and tools for production, quality assurance, testing and development in a wide range of industries.



### **Areas of activity**

With their proximity to the automotive and automotive supplier industry, metalworking and plastics processing have always been among our most important fields of business and activity. Other important areas of activity include environmental technology (recycling, renewable energies), the aerospace industry (machine tools) as well as the food and beverage industry and the pharmaceutical industry (washing, sterilizing, dosing, filling, capping, labeling, packaging).



### **Many years of experience make for success**

We are successfully active in all major sales markets in Europe (including Russia) and Asia (Japan, South Korea, China, Thailand). Both with our own local staff and very closely with local partners. Leading manufacturers from the above mentioned industries have entrusted us with the exclusive representation of their interests and in some

cases even with the worldwide exclusive representation for special customer areas due to our long experience and our special market and customer knowledge in these countries.



## **Strong commitment**

Our strong commitment and success in various markets have earned us the trust and respect of well-known Asian companies in the automotive industry, who regularly entrust us with the implementation of many of their investment projects in Europe.



## **“Preferred Partner“**

Among others, KHL TECHNA is a "Preferred Partner" of Toyota Tsusho Europe, a subsidiary of Toyota Tsusho Corporation in Japan and part of the Toyota Motor group of companies.



## **Competent consulting**

Our consulting services, for both customers and suppliers, include:

- ✓ Export market analysis
- ✓ Identification of new sources of supply
- ✓ Project planning for new production facilities
- ✓ Support services for technical problem solving
- ✓ Establishment and coordination of domestic and international product purchasing and sales
- ✓ Assistance with documentation and transportation
- ✓ Installation assistance and after-sales service



## **Our products from different "machine and plant builders"**

In order to meet the needs of our customers in the best possible way, we maintain close contacts with well-known manufacturers in various industries. We not only offer the best solution for individual production processes, but also put together complete machine packages covering process chains.

**Let's take a look at some examples of the  
present collaborations with project partner cooperation ->**

## **AGATHON > Precision grinding machines and tools**



### **AGATHON AG**

Grinding machines and precision products from AGATHON have been used worldwide for about 90 years.

AGATHON is an independent family company, managed in the third generation by Dr. Walter Pfluger and Jürg A. Pfluger - the grandsons of the company founder Leo Pfluger.

AGATHON's two mainstays are the manufacture of specific machine tools for precision grinding as well as standard parts for punching tool construction and guide elements for injection mold, machine, apparatus and fixture construction.

The quality machines and products are developed and produced in our own factory. We hope that you too can benefit from AGATHON's many years of experience and their individual and economical customer solutions.

### **Indexable insert grinding machines**

AGATHON grinding machines, characterized by the highest accuracy, can produce complex indexable inserts of various materials and geometries.

Indexable insert grinding machines characterized by highest accuracy. AGATHON grinding machines can be used to produce complex indexable inserts of a wide variety of materials and geometries.

### **Centerless Highest precision**

Highest precision- easy operation. On the one hand, AGATHON centerless cylindrical grinding machines achieve the highest form accuracy and precision for parts with diameters from 0.1 to 15 mm and lengths up to 125 mm. On the other hand, the machines ensure high productivity.

### **Standard parts**

AGATHON standard parts for top performance. AGATHON standard parts have been meeting customers' high demands for years – thanks to the best material quality and surface finish as well as the tightest tolerances. The optimum preload and special inlet geometry on the column and bushing guarantee a long service life. The AGATHON patented caulking and the special shape of the mounting pocket ensure the exact clearance and perfect hold of the rolling elements in the cage. The simple assembly saves time, because the column and bushing are provided with a centering aid and the tolerance of the outer diameter of the bushing is very tight.

## **CARL ZEISS > High-precision and efficient quality assurance**



### **Carl Zeiss – Industrielle Messtechnik GmbH**

Carl Zeiss, founded in 1846 in Jena as a workshop for precision mechanics, is today an international technology company.

Today, Carl Zeiss Industrielle Messtechnik GmbH operates at three production sites and more than 100 sales and service centers worldwide with over 1300 employees.

The product range of the technology leader extends from gantry and horizontal arm measuring devices to measuring devices for the acquisition of form, contour and surfaces.

When it comes to measuring devices, Carl Zeiss sets new standards for use in manufacturing environments.

### **Portal Measuring Machines**

Continuous development has made scanning technology an indispensable technical production factor. Portal measuring machines from Carl Zeiss, for example with VAST and Navigator technology, not only ensure process stability to a high degree. Due to their robustness and compactness, they also fit seamlessly into harsh manufacturing environments.

### **Horizontal arm measuring devices**

PRO and PRO T horizontal arm gages are universal measuring machines for the automotive and supplier industries. They are suitable for zero series and analyses, for the first sheet metal, the first tool. They are ideal on cubing model and complete car body. The machine concept of the PRO series is based on a completely new platform strategy with modular design. And what counts above all: the very high speed combined with extreme measuring accuracy, as well as problem-free adaptation to changing production requirements.

### **Shape, contour, surface**

Highly accurate determination of surface parameters; determination of contours and shapes:

With the measuring devices Contourecord, Surfcom and Rondcom in their various designs, Carl Zeiss offers a powerful range of measuring devices. Whether with a single device or a modular overall concept, there is a suitable solution for every application.

## COTES > Most sustainable air drying in lithium-ion battery production for e-mobility and many other applications

**COTES**  
THE RIGHT WAY TO DRY



**COTES** is an independent family-owned company that designs and manufactures adsorption dehumidifiers (dry air solutions) for all types of industrial applications. We are active worldwide and focus on sustainability, efficiency and quality.

**COTES** offers the Ultradry-Air solution for battery drying rooms with COTES' patented Exergic technology\*\*, which provides massive energy savings, cost reductions and huge CO<sub>2</sub> reductions - up to 95%.



Relative humidity in battery factories must be less than 1%. Our solution is efficient, safe and ensures sustainable battery production:

- ▶ UP TO 95 % LESS CO<sub>2</sub>
- ▶ EMISSION UP TO 66 % LESS ENERGY CONSUMPTION FOR CLEAN ROOMS
- ▶ EXTREMELY LOW DEW POINT, DOWN TO -120°C – FOR MORE SAFETY AND QUALITY

### The correct drying of a cleanroom for sustainable battery production

Cleanrooms for lithium-ion battery production consume a lot of energy: up to 43% of the total energy consumption in a battery factory. This is required to keep rooms super dry with a relative humidity of less than 1 % and dew points ranging from -40 °C to -120 °C.

#### ▶ Power requirements for battery cell production

The following diagram shows the energy consumption of various processes in a typical battery factory (shown as index 100 [SOURCE] data from Yuan et al. (2017)).

### **THE MOST SUSTAINABLE ULTRA-DRY SOLUTION**

**Reduce CO<sub>2</sub> , cut emissions by up to 95 %**

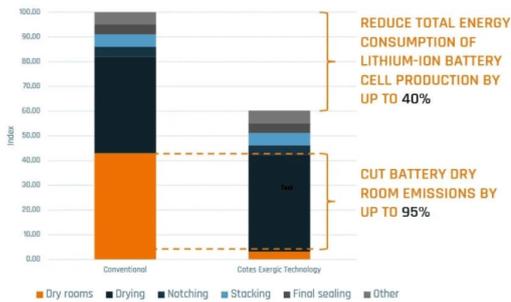
- ▶ Halve the energy consumption of ultra-dry cleanrooms.

Up to 43% of the energy used in the manufacture of lithium-ion battery cells comes from cleanroom operations. COTES' Exergic technology can reduce this energy consumption by up to 50%.

#### ▶ Sustainable energy sources

Of the remaining 50%, up to 85% can be obtained from low-temperature sources such as surplus heat, solar panels, heat pumps, etc.

### Electricity demand for battery cell production

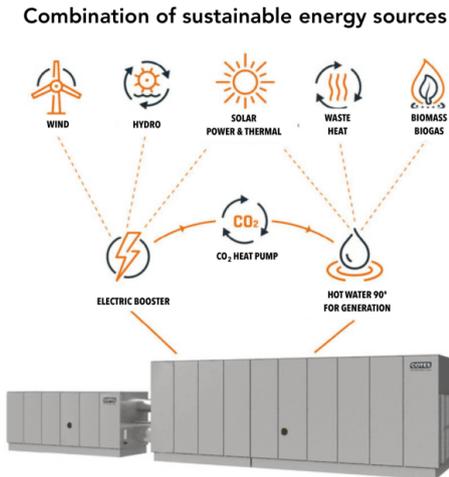


### CO<sub>2</sub>-Emission reduction

COTES' Exergic technology makes your battery more energy efficient and allows you to combine different sustainable energy sources.

### COTES EXERGIC TECHNOLOGY Choose a combination of sustainable energy sources

The problem with today's common dehumidification is the dependence on electricity and gas. Combined with inefficient air drying processes at high temperatures, this makes the process environment unstable and unsafe. COTES' Exergic technology gives you a competitive edge by reducing CO<sub>2</sub> emissions in drying rooms by up to 95% - giving you an ultra-dry system that operates at a very safe dew point of up to -120°C.



### How it works:

With **COTES' Exergic technology**, you can utilise a combination of sustainable energy sources (see illustration above) and thus achieve significant cost savings and a considerable reduction in CO<sub>2</sub>.

- **Surplus heat** (district heating or surplus heat from elsewhere in the production of lithium-ion batteries).
- **Biomass or biogas** (if available and sustainable)
- **Solar panels**
- **CO<sub>2</sub> heat pump** used for both heating and cooling
- **Electricity** (from sustainable energy sources such as wind, hydropower, solar or nuclear power)
- **Gas\*\***

\*\*COTES does not recommend using gas as an energy source due to its space requirements. We recommend using "green" energy to heat the water. However, if gas must be used, the hot water can come from a gas-fired boiler. Why use hot water? COTES' Exergic technology uses hot water because it is flexible, makes your cleanroom safer - and has low installation costs. All you need is hot water [80-90°C].

As the energy used to heat water can come from a combination of sustainable energy sources - and these can be adjusted as the price of energy changes, this makes COTES'

Exergic technology more sustainable and forward-looking. This flexibility is not possible when dehumidifiers are built specifically to use gas as a heat source.

**COTES' Exergic technology is very efficient.** We achieve a dew point of  $-120^{\circ}\text{C}$  for unmanned/automatically dry rooms and  $-70^{\circ}\text{C}$  for manned rooms. COTES' Exergic technology is less prone to toxic leakage and has a high safety margin at nominal conditions and low temperatures. The system, which works optimally at low temperatures ( $80\text{-}90^{\circ}\text{C}$ ), allows the electric booster inside the dehumidifier to increase drying capacity when needed - without compromising system efficiency or safety.

For other manufacturers using the conventional method, maximum temperatures ( $140\text{-}180^{\circ}\text{C}$ ) are required for optimum operating conditions, which makes the system susceptible to changes in humidity and drying capacity..

### **Other possible applications of adsorption dryers**

- **Dehumidification** of unheated rooms, e.g. in water-technical facilities and pumping stations to prevent condensation on pipes, storage vessels, pumps and building parts.
- **Prevention of corrosion** in electrical control centres, boiler plants, turbines and pipe systems in power plants
- **Standstill preservation of equipment and machinery for corrosion prevention** in industrial production facilities and storage rooms where low relative humidity is a prerequisite, such as in the food, dairy, pharmaceutical and electronics industries
- **Corrosion protection of ships in command and engine rooms** and of moisture-sensitive cargoes during transport
- **Prevention of corrosion in tank facilities or ship holds** in connection with sandblasting and painting work.
- **Protection of inventory and production facilities during fire and water damage restoration** (rapid air dehumidification prevents, for example, the formation of aggressive hydrochloric acid dew caused by the combustion gases of PVC and similar plastics in conjunction with the extreme humidity after extinguishing work).

# EEW-PROTEC > Huge high-speed machining centers



## EEW-Protec

EEW-Protec machining centers have a unique design and offer completely new machining possibilities for:

- Huge workpieces (the bigger, the more economical)
- High-speed machining of materials such as PU and epoxy pastes, wood, ureol, clay, carbon fiber / glass fiber reinforced plastics (CFRP/GFP), styrofoam, rigid foam, aluminum and guarantee the realization of all "normal" machining tasks (milling, drilling, grinding...), as well as waterjet cutting, plasma cutting, extruding , laminating and more.

They offer economical solutions where traditional large machining centers made of "steel and cast iron" cannot be productive enough or are simply too small and too expensive.

The EEW-Protec design looks different from that of well-known traditional heavy machining centers. One must first understand the innovative EEW concept to see its key advantages. The main machine structure consists of components made of carbon fiber material and aluminum in sandwich plates with honeycomb core and is at the same time extremely stiff and light. These are the prerequisites for maximum machining speeds (up to 150 m/min) and impressive accuracy. Thanks to the lightweight construction, there is no need for a special (expensive) foundation – which drastically reduces investment costs.

The machining centers are equipped with wear-free roller guides, servo drives and require neither a hydraulic nor a lubrication system - which in turn reduces maintenance costs. The Heidenhain control works smoothly with computer-aided styling and design (CAS/CAD) systems, such as Tebis / ProEngineer / Master Surf /Surf Cam /Unigraphs / Cathia and the like. All these features together allow EEW-Protec to offer economical solutions where normal traditional machining centers would be unsuitable.

Main application areas (among others) are:

- Wind turbines: manufacturing of rotor blades
- Shipbuilding:
  - Manufacturing of positive and negative molds for ship and boat components, as well as machining of these components
  - Manufacturing of scale 1:1 models of ship hulls
  - Manufacturing of ship models for towing tests in shipbuilding test facilities
- Aerospace industry: Manufacturing of molds for aircraft components made of carbon fiber, as well as machining of these components
- Automotive industry: Manufacturing of prototypes and of molds for design studies and wind tunnel tests.
- Foundries: Production of casting sand molds.

## ELB-SCHLIFF > Modern grinding technology



### ELB-SCHLIFF WERKZEUGMASCHINEN GmbH

ELB-Schliff Werkzeugmaschinen GmbH is producing state-of-the-art surface and profile grinding machines in Babenhausen for more than 50. Today's production program includes a wide range of conventional surface grinding machines, creep feed machines, workpiece-specific variants and special grinding machines.

Depending on the grinding task at hand, hydraulically driven surface grinding machines, high-speed stroking machines or creep feed machines with travelling table or travelling column principle are offered from the available variety.

For extremely large workpiece dimensions, gantry machines are manufactured, and for small mass-produced parts and workpieces to be ground concentrically flat, rotary table surface grinding machines. Special solutions according to customer requirements are offered on the basis of existing modules.

Since the foundation of the company the "ELB-System" is applied: Clear separation of the main movements in the X, Y and Z axes. This is a prerequisite for high continuous accuracy.

ELB-Schliff Werkzeugmaschinen GmbH was the first company to present a double spindle grinding machine according to the horizontal spindle concept for the creep feed method on the market. ELB also manufactured the first creep feed machines and developed CD (Continuous Dressing) together with customers.

ELB Schliff has proven its competence worldwide by supplying more than 30,000 grinding machines.

## **G&N > Machining machines for the semi-conductor and photo-voltaic industry**



### **G&N**

G&N G&N (Genauigkeits Maschinenbau Nürnberg GmbH) is a manufacturer of precision surface grinding machines, internal hole (ID) saws and diamond wire saws for machining metals, ceramics and in particular silicon and other semiconductor materials.

G&N is the successor of the mechanical engineering department of "Kugelmüller" in Nuremberg, with 60 years of grinding experience and more than 12,000 machines installed since 1938.

### **Machines for metalworking**

Manual bench grinders up to semi-automatic rotary table grinders up to max. 700 mm diameter for machining metal, carbide, glass, ceramics and other materials, with highest precision.

### **Machines for the semiconductor industry**

Semi-automatic grinding machines for wafer diameters from 2" to 8".

Fully automatic machines of the NANO series for automatic cassette-to-cassette grinding of semiconductor material up to 300mm.

Grinding machines for special materials wi GaAs, sapphire, silicon and technical ceramics.

### **Photovoltaic**

Machines for grinding the surfaces of polycrystalline and monocrystalline silicon ingots.

- Ingot grinding minimizes surface damage to solar cells.
- The high surface quality of the ingot reduces the breakage rate of the sawn solar cells.

### **Sawing**

Internal hole saws for cutting non-metallic materials such as semiconductor materials, glass, ceramics.

*Diamond wire saws* for cutting and sawing semiconductor materials, ceramics and the like.

## GEHRING> Innovative honing machines



### Gehring Technologies GmbH

The GEHRING Group is the world's leading group of companies in the field of honing technology. It has production and sales subsidiaries in Germany, France, USA, China and Brazil.

Customers worldwide benefit from the GEHRING Group's international technological lead in the construction of machines for honing and finishing, mainly from the vehicle manufacturing and supply industries. In addition, the company supplies the aircraft industry, hydraulic and pneumatic manufacturers, the compressor and machine tool industry, as well as manufacturers of agricultural machinery and marine engines.

#### ● Honing machines

The GEHRING Group sees itself as a system provider for the entire field of honing. The product range of the Gehring Group includes honing machines for machining bores in the range of 1 - 2000 mm diameter and bore lengths up to 24000 mm. In addition to production honing machines for medium to large series production, the Gehring Group also manufactures honing machines for individual to small series production. The main areas of application are honing machines for the machining of engine, injection pump, hydraulic and compressor parts.

#### ● Honing tools

Based on over 80 years of experience in the manufacture of honing tools, a wide variety of tools are manufactured for honing bores ranging from 1 - 2000 mm in diameter and bore lengths up to 24000 mm.

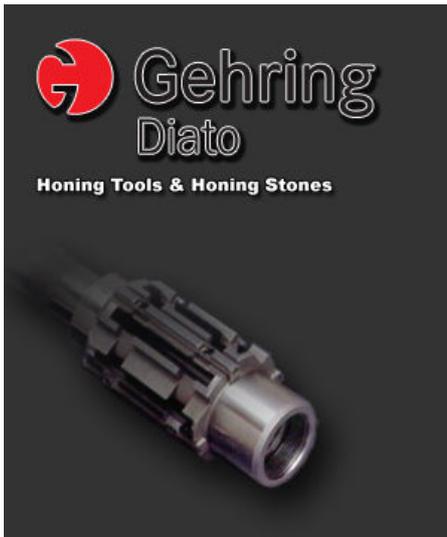
Gehring honing tools are hardened and precisely ground at all points that are important for their function. They are therefore unsurpassed in precision and service life and guarantee the greatest economy as well as the best possible bore geometry.

Universal use is ensured by the fact that Gehring honing tools can be equipped with ceramic honing stones as well as with diamond or CBN cutting edges.

#### ● Diamond and CBN cutting edges

The extreme hardness of diamond and CBN guarantees maximum service life of the honing stones - a basic requirement for any automation and for multi-shift operation. Furthermore, the extreme hardness guarantees excellent shape retention. This is reflected in the geometric accuracy of the bore to be honed. Thanks to the high cutting performance of superhard cutting materials, some preparatory work is thus superfluous.

## GEHRING DIATO > Honing tools



### DIATO GmbH

Founded in 1979 in Esslingen a. N., Diato GmbH is part of the Gehring Group and independently produces diamond and boron nitride tools.

Products from Diato meet the highest requirements for honing tools made of diamond or CBN. The extreme hardness of diamond and CBN guarantees the longest possible honing tool life – a basic requirement for any automation and for multi-shift operation.

Furthermore, the extreme hardness guarantees excellent shape retention. This is reflected in the geometric accuracy of the bore to be honed. Thanks to the high cutting performance of superhard cutting materials,

some preparatory work is therefore unnecessary.

#### ***Honing tools from Diato are used in:***

- Automotive industry in the production and machining of engines, transmissions and injection systems,
- Automotive industry in the production and machining of safety-related systems such as steering and brakes,
- Production and machining of hydraulic and pneumatic systems such as cylinders, valves, pumps and compressors,
- General tooling and mechanical machining,
- as well as in the aerospace industry.

## GEORG > Punching, forging and calibrating presses



### GEORG MASCHINENTECHNIK GmbH & Co. KG

Customer satisfaction and 40 years of experience are the basis of the special machine builder and automation specialist Georg Maschinentchnik

Dedicated and qualified employees develop and manufacture hydraulic and mechanical presses for the automotive and automotive supply industry, forging industry, mechanical engineering and plastics technology as well as automation lines for the automotive industry.

Customized development and application of technical software are as much part of Georg Maschinentchnik's scope of services as competent service.

Georg Maschinentchnik completes the innovation strategy of its customers. Customer benefit is ensured by individual solutions.

Through many years of worldwide experience, Georg Maschinentchnik offers competent solutions for many application areas.

#### **Automotive**

##### *- Drive Technology*

Ball Cage Duo Punching Machine, Ball Cage Punching Machine, Ball Cage Pressing Machine, Tools

##### *- Wheel Technology*

Valve Hole Punching Machine, Ventilation Hole Punching Machine, Round Punching Machine, Truck Wheel Assembly Line, Car Wheel Assembly Line

##### *- Punching Technology*

Hydraulic and Mechanical Presses

#### **Forging technology**

- Pre-Caulking Presses, Trimming Presses

#### **Special Machines**

- Pipe Bending Machine

#### **Service**

Press Check, Controls, Project Related Consulting, Engineering, Assembly, Service, Innovation

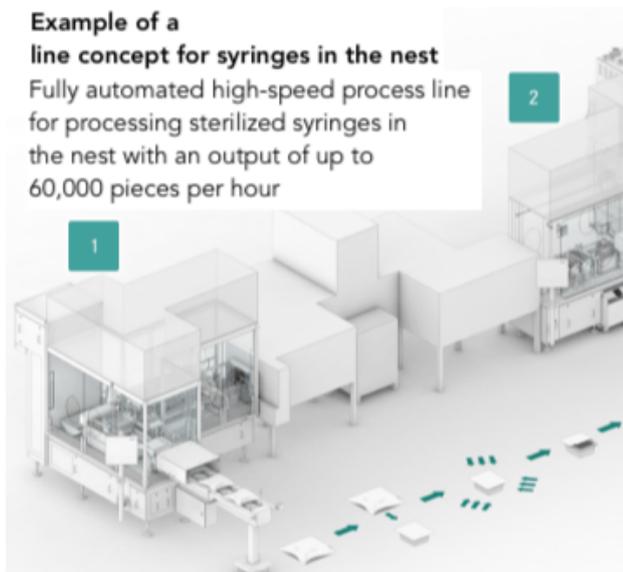
## GRONINGER > Pharmaceutical products – disposable syringes and cosmetics

### About Groninger

Filling and capping. Innovation is our everyday life.

**Groninger**, that means innovation, quality and service in special machine construction for the pharmaceutical, cosmetic and consumer healthcare industry. We have been proving this to our customers for 40 years.

For Groninger, customer orientation does not only mean meeting the needs of our customers. Rather, it is our claim to proactively meet challenges of the future through research and development and to offer innovative solutions. Almost 1,300 employees work on product solutions and optimize processes - in line with our corporate philosophy "We fill Visions with Life".



This is how Groninger has developed in its history into one of the "hidden champions" and technology leaders in special machine construction for the pharmaceutical, cosmetics and consumer healthcare industries. To be this successful, you not only have to know your customers and your industries, you have to understand them. Confidence in one's own abilities and trusting cooperation both within one's own company and with customers are the basis for filling visions with life, creating unique solutions and inspiring customers.

The experience of almost 40 years guarantees our customers safe production processes and excellent results. The competence and commitment of our employees are the basis for our so successful company development.

# MAXIMATOR

> Autofrettage and impulse testing equipment

> Testing and production equipment - H<sub>2</sub> testing equipment

## MAXIMATOR GmbH



Highest technical know-how based on German engineering, successful system developer and experienced specialist - MAXIMATOR GmbH is the leading supplier for high pressure and testing technology around hydraulics and pneumatics.



Decisive for MAXIMATOR's continuous success is the ability to implement ideas, individual and system solutions quickly and reliably. MAXIMATOR offers competent consulting, design and delivery of complex systems for the economic solution of special tasks.

### Valves, Fittings & Tubing

Piping technology for high-pressure applications places high demands on the quality and reliability of valves, fittings and tubing. MAXIMATOR sets the highest standards for high pressure applications up to 20,000 bar.



### High-pressure pumps

MAXIMATOR high-pressure pumps are air-driven reciprocating pumps capable of generating operating pressures up to 5,500 bar.



### Hydraulic units

MAXIMATOR units for oil, water or aggressive fluids are complete, ready-to-connect hydraulic units for generating operating pressures up to 5,500 bar.

### Compressed air amplifiers

MAXIMATOR amplifiers are suitable for compressing compressed air or nitrogen, making them an ideal solution for targeted pressure boosting.

### Gas Amplifiers

MAXIMATOR high-pressure amplifiers are designed for oil-free compression of gases and compressed air.

### Test benches

MAXIMATOR offers autofrettage machines with pressures up to 15,000 bar. The use of innovative technologies, such as the MAXIAMTOR proportional clamping system, enables optimal and safe machining of components.

### MAXIMATOR offers:

- Autofrettage machines
- Flushing machines
- Assembly and function testing machines
- Leakage and burst pressure technology
- Pressure pulsation testing machines

# MAXIMATOR

## Testing and production equipment - H<sub>2</sub> testing technology

Precise testing of hydrogen-carrying components provides a valuable contribution to environmentally friendly innovation in vehicle manufacturing. For automotive manufacturers and suppliers, tested components that meet legal requirements are important building blocks in the development of future technologies.

### Impact of the technology

Hydrogen is regarded as the energy carrier of the future and is already being used today as a fuel for fuel cell-powered vehicles. Hydrogen is stored either cryogenically in liquefied form (LH<sub>2</sub>, Liquid H<sub>2</sub>) or compressed under high pressure at 350 bar or 700 bar (CGH<sub>2</sub>, Compressed Gaseous Hydrogen). Due to its extreme diffusivity and reactivity, hydrogen places particularly high demands on the pressure-bearing components of this technology.

The high-pressure storage tanks, tank valves, filling nozzles, connecting elements and safety and pressure control valves used must be pressure-resistant and leak-proof. In order to prove these properties in the development phase but also in subsequent series production, reliable testing and handling technology plays a key role. Maximator meets this challenge with innovative high-pressure testing technology.

### Our testing solutions for hydrogen-carrying components

MAXIMATOR test systems meet all requirements to serve all legal test requirements for innovative fuel cell vehicles. We offer testing solutions for all hydrogen-carrying components in the automotive industry. These include strength testing, leak testing, proof of durability and burst testing. In general, hydrogen applications require precise metering. We provide automotive manufacturers and suppliers with proven gas control technology for this application area.

### MAXIMATOR equipment enables

- All tests of high pressure bearing components of hydrogen mobility such as: Pressure accumulators, tank valves, filling nozzles, pressure regulating valve, safety valve, pipelines, etc.
- Compression and "handling" of hydrogen by high pressure bearing components that meet the criterion of "hydrogen resistant" in terms of their material suitability

### Performance characteristics

- Strength tests
- Leakage tests
- Proof of durability
- Burst tests

# MIKROSA > Centerless external cylindrical grinding machines



## STUDER MIKROSA GmbH

Studer Mikrosa GmbH in Leipzig is the specialist for all applications of centerless external cylindrical grinding. With the KRONOS series, a range of flexible, precise and highly productive solutions is available.

The roots of Studer Mikrosa GmbH go back to 1878 and centerless external cylindrical grinding machines have been produced at the Leipzig site since 1949. Sophisticated precision machines in all common sizes, including automation components, are manufactured there and adapted to customer requirements. Due to competence in combination with the SCHLEIFRING Group, MIKROSA is one of the market and technology leaders in international competition. The customers include almost all well-known manufacturers from the automotive and supplier industry, from mechanical engineering as well as from the roller bearing industry.

The further development of all operational and work processes for the benefit of the customers is seen as a constant challenge. MIKROSA develops and designs in direct dialogue with the customers and thus finds specific solutions. In addition, MIKROSA cooperates in development and research with the best scientists from universities and institutes, e.g. from the Laboratory for Machine Tools and Production Engineering of the RWTH Aachen. This means that MIKROSA can always draw on the latest scientific findings. This is partnership and customer-oriented cooperation.

A leading market position is no coincidence, but the result of continuous customer- and process-oriented development. Quality and innovation in grinding - values for which MIKROSA has stood for years.

## PRODUCTS

- *Centerless grinding machine KRONOS S*

The KRONOS S is the ideal system choice for economical precision machining of small parts. Special feature of the KRONOS S: It can be converted into a 15° angular plunge-cutting machine within 2 hours. This allows applications to be machined alternately that were previously only possible between centers.

- *Centerless grinding machine KRONOS M*

With the KRONOS M, we offer a modular concept with a number of economic advantages. All machines are of course equipped with a SINUMERIK 840D CNC control. Workpieces with a maximum plunge length of 245/395 mm and up to max. 100 mm diameter can be machined.

- *Centerless grinding machine KRONOS L*

The KRONOS L stands for the machining of large workpieces. It has been specially designed and equipped for these power and volume outputs. At the same time, the machine impresses with a number of technical improvements. It brings immediate cost-cutting benefits for the user in production, such as higher metal removal rates and a further reduction in non-productive and changeover times.

## NIMAK > Welding



### NIMAK GmbH

Successful for over 40 years!

On January 1, 1965, the first step in the successful history of a German mechanical engineering company was taken. It was the day when Erich Nickel - a brilliant electrician - founded the now worldwide known company called NIMAK.

With the flexibility and dynamism of a medium-sized company, Nimak has been successfully active in the field of welding technology for over 40 years.

Its demanding customers include almost all global players in the automotive and supplier industry.

The ability to innovate, the outstanding reputation of the design, the constant willingness to improve and ensure quality have secured NIMAK's international reputation as an absolutely reliable partner in the market segments of welding guns, welding machines and welding systems.

This is backed up by over 200 highly motivated employees with their high-performance know-how, many years of experience and commitment.

This is also backed up by modernly equipped production facilities and welding laboratories, as well as technology that always meets the latest requirements.

### Industries

- *Automotive industry and suppliers*

The typical place of use for the robot welding guns is in car body construction, to enable the high degree of automation.

However, the manual version, the NIMAK manual spot welding gun, also finds its field of application there, e.g. in prototype construction.

- *White goods - household appliances*

Cleanly welded! Or maybe you've already been washing dishes with NIMAK for a long time? With the robot roll seam tongs, e.g. dishwashers are welded impermeable to water and provided with a tight seam.

- *Industrial*

Switches, sensors, connectors, wire mesh, weld nuts.... ... whatever needs to be welded - Nimak will build the right machine for you. Welded joints made of a wide variety of materials for a wide variety of tasks - we solve them!

- *Aviation*

Nimak is also getting involved here.  
The industry is flying on it

## **Products:**

- *Manual welding guns*

VariGun, ClassicGun, controls, accessories, gun carriage Milan3

- *Robot welding guns*

Spot and projection welding guns, roller seam guns, capacitor discharge welding guns RoboKES, servo technology, tool changing system SecuTES, gun test center RTS

- *Welding machines*

Spot welding machines, projection welding machines, roller seam welding machines, capacitor discharge welding machines RoboKES, controls, stud welders, Transformers.

- *Welding equipment*

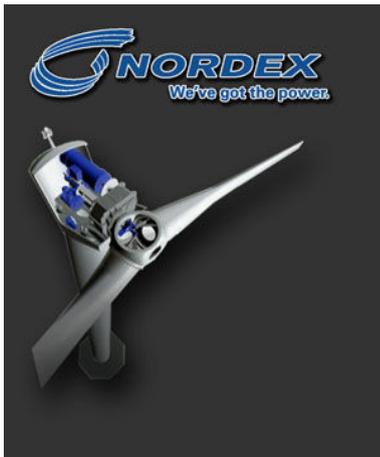
Standard machines with special welding tools, Automated equipment with arc welding, Welding cells with robots, Turntable equipment, Welding lines.

## **Service**

In the event of a malfunction, a worldwide network of representatives and service technicians provides rapid and professional assistance on site to find the cause of the malfunction as quickly as possible, eliminate it and thus minimize your downtime.

In addition, customers are advised to have the machines and lines regularly maintained and optimized by the NIMAK service team.

## NORDEX > Powerful wind turbines



### NORDEX AG

Nordex AG offers powerful wind turbines for almost all geographical regions worldwide. Hardly any other technology has made similar progress in recent years as the use of wind energy. Nordex is one of the fathers of this development.

Before the demand for wind turbines increased internationally in the first half of the 1990s, Nordex was launched in 1985. One of the founding members was today's Chief Sales Officer Carsten Pedersen. From the very beginning, Nordex focused on large, powerful turbines. Just two years after its founding, the company erected what was then the world's largest

series-produced turbine. Following the principle of small steps, Nordex has thus succeeded in building reliable turbines that operate ever more economically.

After all, Nordex has been setting standards since 1985 with the development through to series production of ever larger and thus more economical turbines: in 1995 with the world's first megawatt turbine Nordex N54 / 1000 kW in 2000 with the world's most powerful series-produced wind turbine N80 / 2500 kW.

Many years of wind energy know-how, systematic engineering and customer-oriented product development have gone into each wind turbine:

#### - **N100 (2.5 megawatts)**

The Nordex N100/2500 kW is designed especially for low-wind sites with average wind speeds of up to 7.5 m/s. The N100 is the most powerful wind turbine in the world. The outstanding features of the N100 are the 49 meter long rotor blades and the large rotor diameter of approx. 100 meters.

#### - **N90 (2.5 megawatts)**

The N90/2500 kW is the most versatile and, as it were, one of the most efficient wind turbines in the Nordex product family.

The turbine is designed for strong wind sites and low wind sites, in HS High-Speed and LS Low-Speed versions.

#### - **N90 (2.3 megawatts)**

With a rotor diameter of 90 meters, the Nordex N90 is particularly suitable for inland locations. The Nordex N90 is a variable-speed wind turbine with a rated output of 2300 kW.

#### - **N80 (2.5 megawatts)**

80-meter rotor diameter and an installed rated output of 2.5 MW make the Nordex N80 the first choice at high-wind sites in terms of cost/performance ratio.

#### - **N90 Offshore**

With the N90 Offshore, Nordex offers a version of the thoroughly onshore tested and proven machine of the 2.5 MW product family.

## RÖSLER > Surface Processing

### RÖSLER

#### Long Radius Vibrator

The long processing channel enables both batch and continuous operation.

Due to its compact design and relatively long processing channel, the "Long Radius" machine is ideal for direct connection of the finishing function to production cells. The continuously arriving workpieces are finished (deburring, edge erasing, cleaning, etc.) in a single pass through the machine in cycle times of up to 16 minutes. This simplifies logistics and reduces inventories. Of course, Long Radius machines can also be used for special finishing tasks in "batch" operation.



#### Illustrations:

*Long Radius* - coupled with spray washing station and hot air belt dryer

*Multi Channel* - continuous feeding system

## STOTZ > Pneumatic-electronic gages and control devices



### STOTZ Feinmesstechnik GmbH

STOTZ Feinmesstechnik GmbH develops and manufactures pneumatic-electronic test equipment and control units. In addition, systems are offered for the automation of production machines through closed-loop control.

Customers are manufacturers and suppliers of the tool and machine building industry as well as the automotive and aerospace industry.

The company was founded in 1952 by Otto Stotz and today can justifiably call itself a leader in measurement technology. Numerous patent applications in recent years confirm the company's reputation as a trendsetter in measurement technology and in the construction of pneumatic measuring instruments.

### Solutions for measuring systems

Together with its customers, STOTZ develops workpiece-specific solutions. Experience in the manufacture of precision gauges, single or multi-dimensional measuring devices and fully automatic measuring systems integrated into production makes STOTZ a competent partner.

### Pneumatic standard measurements

- Measurement of length and diameter
- Evaluation of geometric dimensions (parallelism, cylindricity, conicity, etc.)

### Pneumatic special measurements

- Measurement of length and diameter
- Evaluation of geometric dimensions (parallelism, cylindricity, conicity, etc.) -
- Contour scanning -
- Classification and sorting of workpieces
- Trend calculations

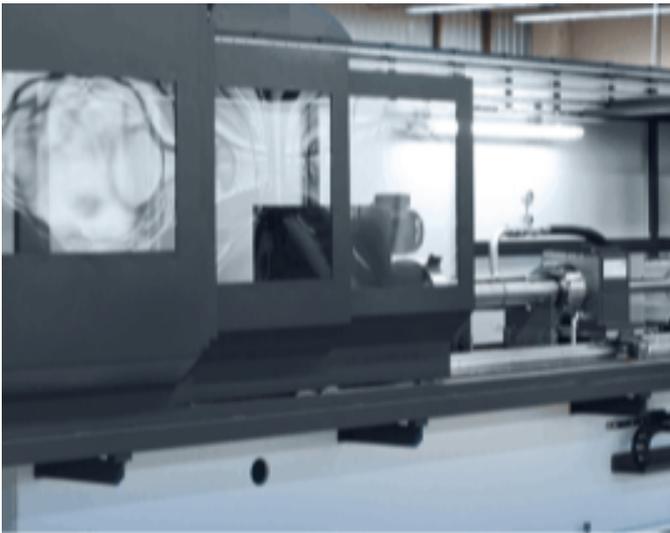
### Measuring devices

- Electropneumatic measuring and control devices for universal use
- MLS (micro-luminous column) for simple applications, e.g. diameter measurement in one plane, with one pneumatic channel and two inductive channels
- MSG (multi-position measuring and control device) for complex applications. It can be used to operate, evaluate and display up to four pneumatic channels simultaneously.

### Transducer

- Pneumatic Electronic Transducer (PEW) for the determination of length changes in the micrometer range. It is characterized by high measurement accuracy for fast measurements, negligible hysteresis and small dimensions.
- Fast Pneumatic Transducer (SPW)
- in addition to its compact design, it is particularly characterized by its fast measured value acquisition. Therefore, it is an ideal product for fast measured value acquisition and fast data transfer to a display device, especially for dynamic measurements with short cycle times.

## TIBO > Deep hole drilling systems (up to 12 spindle version)



### **TIBO.**

Deep drilling technology for round parts

- 1, 2, 3, 4, 6 spindle version
- Drill-O: 2-40mm; drilling depth up to 4.500mm

"The first choice for deep hole drilling. Worldwide."

### **TIBO-Company**

**Made in Germany - in use worldwide.**

TIBO Tiefbohrtechnik GmbH is a worldwide operating company specialized in the design and manufacture of modular deep hole drilling machines.

Founded in 1994 at our headquarters in Pfullingen, Baden-Württemberg, south of Stuttgart, we are now one of the leading suppliers of single- and multi-spindle single-lip and BTA deep drilling machines for a wide range of applications.

Embedded in a medium-sized group of companies with currently 14 holdings and more than 1000 employees, our customers benefit from the shortest response times for all matters concerning their deep hole drilling machine.

As a South German machine builder, we manufacture exclusively in our own plant at our headquarters in Pfullingen. Our suppliers also produce mainly on site, so that we can proudly claim the label 'Made in Germany'.

Quality and environmental management certified according to DIN EN ISO 9001:2015 and DIN EN ISO 14001:2015.

### **TIBO Deep Drilling Systems**

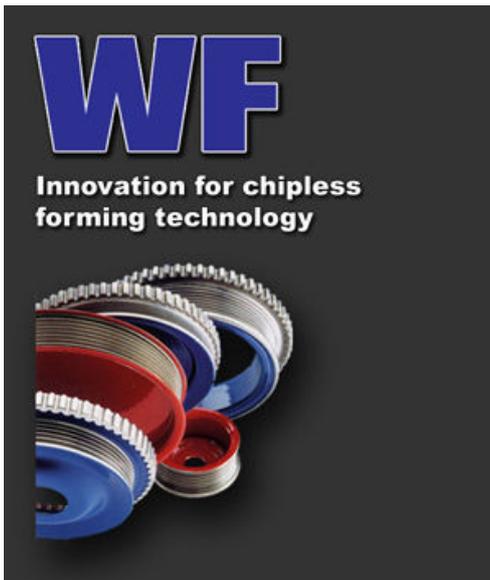
**Modular: Powerful. High precision.**

Whether single-lip deep drilling or BTA method, whether single-spindle or multi-spindle systems - deep drilling machines from TIBO impress with their precision and speed, their quality and durability, as well as their unique design consisting of modular system components that have been proven in practice many times.

The TIBO modular system allows almost unlimited configuration possibilities - from the universal standard machine to highly specific special machines. This enables us to offer each customer an optimum machine design to suit his individual drilling task.

Since all components are usually in stock, prompt project implementation is guaranteed: On average, only 4 to 6 months elapse between order placement and delivery.

## WF MASCHINENBAU > Highly-efficient chipless forming



### WF Maschinenbau und Blechformtechnik GmbH & Co. KG

From the traditional craft of metal spinning, WF has developed highly efficient technologies through chipless forming processes with CNC-controlled machines, which have become indispensable, especially in the automotive and automotive supplier industries – worldwide.

In addition to the development of machines or systems for the economical production of workpieces, WF also takes over the entire product development up to series production readiness.

When developing machine concepts, WF relies on intensive communication with the customer. In task-related exchanges, the requirements for the manufacturing process are discussed in detail on the basis of the workpiece drawings. At the end of this process, a solution is found that ensures maximum flexibility with maximum productivity.

WF builds forming machines for:

#### **Belt pulleys and vibration damper elements**

Engine and vehicle manufacturing

#### **Forming machines for workpieces with pressed hubs**

Transmission and engine manufacturing

#### **Forming machines for stretch and flow-formed parts**

Aerospace clutch and transmission manufacturing

#### **Forming machines for rim rings, wheels and wheel discs**

Car and truck manufacturing

#### **Forming machines for edge-thickened workpieces**

Engine and vehicle manufacturing

#### **Forming machines for high-pressure gas cylinders**

Gas cylinder manufacturing

# References



## AUTOMOTIVE INDUSTRY

### EUROPE

(Manufacturer, Supplier)

◆ Toyota Motor Manufacturing France (TMMF), France ◆ Toyota Motor Manufacturing U.K.. (TMUK - Burnaston, Deeside), United Kingdom ◆ Toyota Motor Manufacturing Poland (TMMP), Poland ◆ Toyota Motor Industries Poland (TMIP), Poland ◆ Toyota Peugeot Citroën Automobile Czech (TPCA), Czech Republic ◆ Toyota Motor Manufacturing Russia, Russia ◆ Denso Automotive Germany, Germany - TD Deutsche Klimakompressor, Germany ◆ Denso Manufacturing Czech Republic (DMCZ), Czech Republic ◆ Denso Manufacturing Hungary (DMHU), Hungary ◆ Aisan Bitron Czech Republic (ABC), Czech Republic ◆ Koito Czech Republic, Czech Republic ◆ Toyoda Go ◆ Aisan Bitron Czech Republic (ABC), Czech Republic ◆ Koito Czech Republic, Czech Republic ◆ Toyoda Gosei Czech (TGSSC), Czech Republic ◆ JTEKT Automotive Czech Pardubice, Czech Republic ◆ Aisin Europe Manufacturing Czech, Czech Republic ◆ AvtoVAZ / VAZ (Volzhsky Avtomobilny Zavod), Russia ◆ GAZ (Gorkovskiy Avtomobilny Zavod), Russia ◆ KAMAZ (Kamskiy Avtomobilny Zavod), Russia ◆ SKAD, Russia ◆ Zavod AvtoPRIBOR, Russia ◆ Togliatti Steel Wheel Works (TSWW), Russia ◆ Tarasov Works Inc. (TWI), Russia ◆ Kommash, Russia ◆ Solomon Alsberg, Russia ◆ K&K (Kolesa K&K), Russia ◆ MAZ (Minsky Avtomobilny Zavod), Belarus ◆ Others...

## **AUTOMOTIVE INDUSTRY**

### **ASIA**

(Manufacturer, Supplier)

◆ Denso Corporation, Japan ◆ Denso Manufacturing Kitakyushu, Japan ◆ Denso (Thailand), Thailand ◆ Siam Denso Manufacturing, Thailand ◆ Shanghai Denso Fuel Injection, China ◆ Denso (Guangzhou Nansha), China ◆ Denso (Changzhou) Fuel Injection System, China ◆ Hyundai Kia Automotive Group, South Korea ◆ Horie Kinzoku, Japan ◆ Others ◆ Daegu Polytechnic Institute, South Korea

## **AUTOMOTIVE INDUSTRY**

### **AMERICA**

(Manufacturer, Supplier)

◆ Toyota Motor Manufacturing West Virginia (TMMWV), U.S.A. ◆ Volkswagen de México, Mexico ◆ Denso do Brasil, Brazil

## **Other special references/special applications**

### **Special references**

◆ Groninger: Disposable syringes ◆ Bekum: Plastic blowing machines/chemical containers ◆ Overbeck: Food industry/canned goods ◆ OKM: Measuring devices and tools ◆ NTN: Measuring devices for bearings ◆ Samsung: Recycling of household appliances/refrigerators/dishwashers and heaters ◆ Korean Air: Milling machines for wing composite ◆ Danobat: External cylindrical grinding machines



# Imprint

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## Have we aroused your interest?

If something in our service portfolio is of interest to you, we should talk.

Or please email your inquiries and/or areas of interest. We will get back to you as soon as possible.

Questions, offers and cooperation.

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