

Laser Marking +
Engraving Solutions

FOBA[®]
Laser at your service

Focusing on custom-tailored solutions for laser marking and laser engraving

Portfolio of products and services



Laser Marking + Engraving Solutions

At FOBA we have concentrated on marking and engraving with lasers for decades. This technological focus and one of the broadest product ranges in the market allow us to offer our customers optimal and custom-tailored solutions for their identification applications. Our solutions include OEM laser markers for integration into production systems and lines, laser marking workstations for stand-alone operation, and highly-precise laser engraving machines; they range from standard to customer solutions. Depending on the requirements, we integrate different laser technologies, add value-creating accessories and options such as vision systems, and deliver system and machine solutions that are perfectly designed for the marking or engraving task in question. And we deliver these to Shanghai, Bremen or Ottawa.



Basic laser marking systems

for integration into production systems, special machines or FOBA laser marking and laser engraving machines



Laser marking machines

turn-key, customer-specific configured manual workstations or special machines for laser marking



Laser engraving machines

highly-precise manual workstations and tool machines for laser engraving



Software

Software programs for a fully-automatic, smooth production flow



Vision systems

focused on precision, economy, and marking and engraving quality without compromise



Accessories

extensive options for more flexibility and broader application possibilities

Laser at your service.

FOBA represents the greatest technological laser and application expertise and its name is synonymous with innovative customer-specific solutions. FOBA provides expert advice and first-class customer service all around the world; it is laser at your service.

Our focus is on much more than first-class laser products for marking and engraving. The FOBA focus combines products, customer requests, and customer support. This makes the motto "laser at your service" an attitude across the board, an attitude that is also a promise to our customers worldwide.

Service | Customer benefits

→ We define service holistically at FOBA. It begins with the first advising appointment, continues during application development, becomes concrete during installation, and does not end with customer service and maintenance. Service is an all-around package at FOBA, a package that can be called upon at any time and from anywhere in the world.

Laser | Power

→ The laser is the impulse provider and technological basis of our marking systems and engraving machines. Its power is where everything at FOBA begins, it is that which identifies and marks us. Laser power is what motivates us again and again and inspires us.

Expertise | High-tech

→ Just as laser light is bundled in the lens focus of our devices, the greatest technological and application expertise and many years' experience are bundled in our development locations. These are highly-effective focal points where innovative system and machine solutions for laser marking and engraving arise.

Relationships | People

→ Fruitful relationships result from connections forged between people who engage in a productive dialogue with one another; this is how our worldwide employees and customers interact. Without our customers' requests, which challenge us and spur us on, the system solutions that we develop would not be conceivable.



Focused on a holistic solution

"Our customers are our customers because they get more from us than high-tech solutions for their marking and engraving applications. For FOBA does not just deliver the finished machine; it assists customers and develops the entire process – naturally always taking into consideration the customer in question – as well as market requirements. For this, advising, application, product development and configuration, as well as installation, maintenance, and service go hand in hand. And our customers get a complete solution from a single source." Hermann Klein, CEO

Making our mark: Experts in laser marking and engraving

Experience makes experts. And this is also true at FOBA: For more than 20 years, we have focused on the laser as a tool for material processing. Whether marking or edge lettering; 2D, 3D, deep or micro-engraving; whether smoothing, frosting or surface structuring; from standard systems to individual customers solutions. Our engineers are the E-team for laser engraving, laser marking, and mechanical engineering: they are true experts. Patented technologies, one of the broadest product ranges, extensive service, and worldwide availability are the basis for perfect customer solutions. Our systems and machines therefore distinguish themselves through much more than just the label "Made in Germany." FOBA has been a world leader since 1985 and is recognized as a manufacturer and supplier of sophisticated precision solutions for marking and engraving with lasers.

Specializing in demanding applications and custom-tailored solutions

The past and present are closely interlocked at FOBA. Today's successes would not be possible without the achievements of the past. This is why we have become one of the market leaders in our area, because we have focused on demanding applications since the very beginning. The challenges that we set ourselves have always distinguished us: whether in grayscale or image marking for ID cards and security documents; day and night design for painting on high-quality plastic parts for automobile interiors; or in deep engraving for the mint industry and mold and tool-making.

Personal partner and solution pioneer

We have worked hard to earn our market leadership. For decades, we have been researching and developing laser material processing. We have made a name for ourselves as pioneers in deep engraving – and we have maintained the research and development spirit for this up to the present. Similarly our special position as one of the very few manu-

facturers with a worldwide training, service, expert, and sales network. FOBA is a technological leader even beyond Europe, Africa, Asia, and North and South America. FOBA is on-site everywhere as your personal partner, who speaks the customer's language. This guarantees short reaction times and the greatest availability.

In use worldwide: 5,740+ custom-tailored systems

The systems that we develop have convinced our customers worldwide that we understand their processes and speak their language. More than 5,000 of our systems and machines are used today in demanding production processes. In the automotive, machine, tool, and mold-making sectors; in the mint and electronics industries; and in medical, security, and ID technology. FOBA delivers more than just the machine. We assist you and develop the entire process.



FOBA focus industries:
 Automobile industry
 Tool, metal, and mold-making
 Mechanical engineering
 Mint industry
 Medical technology
 Security and ID technology
 Measurement engineering
 Electrical industry
 Plastic processing industries
 Watch and jewelry industry

Machining procedures:
 Laser marking
 Edge lettering
 2D, 3D, deep engraving
 Micro-engraving
 Smoothing
 Frosting
 Surface structuring

Focused product development for countless applications

„Would this have occurred to you? Everybody has a product marked by FOBA. Clever FOBA technology puts a wide variety of content on all possible components and products, day by day, worldwide, in countless industries. Think about the cow that moos at you from the edge of the road; her yellow ear tag is marked with FOBA’s LP100 marking laser. Or consider the switches and buttons in your car, which were marked so that you can see them day or night. And the artificial hip that was implanted in Grandma recently, or the surgical pin that was used to put Oscar’s knee back together. Take a look at the cards in your wallet: surely one or another of them was marked with FOBA’s DP30FGS. Then take a look in your coin purse: FOBA’s engraving machines produce coin dies that are used to make coins and medals. And the fittings of your lamps and window and door profiles at home also bear our handwriting. And then there are the countless “invisible” applications for which FOBA systems mark all the tiny components that are inside electronic devices and entertainment devices. That’s a lot of applications. And that’s not nearly all.”

Christoph Schmelnik, Manager R&D Software



Focus on good integration: Laser system solutions for marking and engraving



Characteristic variety in outstanding quality: FOBA’s high-performance marking and engraving lasers handle nearly all marking and engraving tasks – and set standards that persuade with their brilliance, permanence, protection against forgery, and precision. In numerous industries, they put a wide range of content on countless materials – from organic materials to ceramics and plastics on through to metals.

For integration into production systems, special machines or FOBA workstations, we offer diode and lamp-pumped solid-state laser markers as well as CO₂ marking lasers. They all have their permanent place in industry and are among the preferred systems when the concern is flexible, fast, and high-quality product and material identification. They work economically because they are reliable, low-maintenance, and they function essentially without consumables, and they are flexible because they can be used in many ways, integrated well, and used for both moving and static marking tasks.

Thanks to numerous options, individual configuration knows hardly any limits:

Various focusing lenses offer marking fields of different sizes, four wavelength ranges allow a wide range of applications, beam deflection units and protection classes ensure optimal integration, and numerous languages are available for users around the world.

AVAILABLE LASER TECHNOLOGIES

Laser type	Power in Watts	Wavelength in nm
Gas laser (CO ₂)	10, 30, 50	10,600
Fiber laser (Yb)	9, 18, 27, 48	1,060 – 1,070
Fiber laser (Yb) cw	5, 10	1,070
Vanadate laser (Nd:YVO ₄)	2	355
Vanadate laser (Nd:YVO ₄)	10	1,064
Nd:YAG	50, 100	1,064
Nd:YAG	2, 8	532, 1,064



Focus on customer applications: Laser marking machines made to measure

For stand-alone operation in laser protection class 1, we offer turn-key and custom-tailored laser marking solutions as manual workstations or special machines. Our flexible marking machines adapt with various lasers and powers and thus always allow the most economical and optimal configuration for the requirement in question. A variety of loading concepts ensures optimal incorporation into the production environment and axis systems can also be selected according to your needs. Options such as different rotary table sizes, turning devices, camera systems, and customer-specific implementations make standardized machines into customer solutions made to measure.

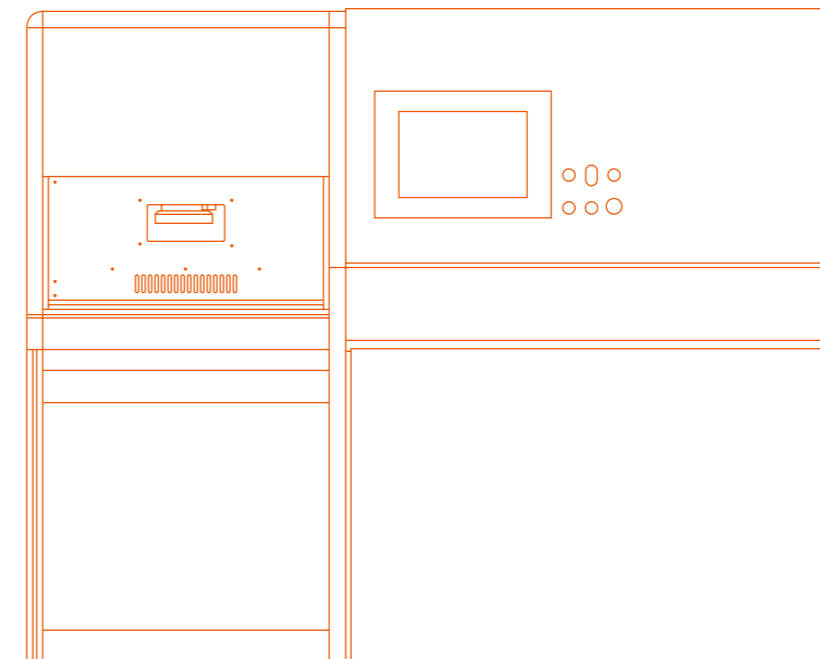
FOBA's laser marking machines in the Vario series are constructed in modular fashion and, depending on the customer requirements in question, they can be combined with different workspaces and laser sources, exactly as your marking task requires. While the flexibility of the machine concept allows a wide variety of applications, the ergonomic machine design takes the user's needs into consideration.

The compact fiberhome table workstation does its work with FOBA's small fiber lasers. This small yet complete workplace solution for marking metals and plastics and composites of all types is well-suited for the processing of single parts and small series.

FOBA's laser marking machines and the fiberhome workstation are complemented by a selection of accessories and options as well as the user-friendly high-performance marking software FOBA MarkUS™.



LASER MARKING MACHINES				
Vario S	Vario RD	Vario S compact	Vario RD compact	fiberhome
Manual workstation with motor-adjustable Z-axis (software-controlled), expandable to max. 3 axes				Motorized Z-axis with 250 mm hub
Work table, pneumatic door	Rotary table, turning bulkhead wall	Work table, pneumatic door	Rotary table, turning bulkhead wall	Small contact area 420x320 mm
Max. 100 kg	Max. 16 kg	Max. 100 kg	Max. 16 kg	–
With CO ₂ laser markers, grayscale laser marker DP10GS and Nd:YAG marking lasers DP50 and LP100		With fiber laser markers DP10F, DP20F, DP30F, DP50F		With fiber laser markers DP10F, DP20F
Laser class 1				



Vario S laser marking machine for side loading. Can be configured with different laser technologies, fixed worktable, and pneumatic safety door.



Works hard, produces reliably: Laser engraving machines with guts and brains

If you produce circulating money, coins, complicated tools and dies or technical medical products and expensive objects, you make no compromises. The final product and the tool must be absolutely secure. Unlimited attention to detail and (repetition) accuracy are indispensable for templates and microapplications. Direct markings require the highest resolutions. Production processes should be lean and efficient. Solutions require system and the power of innovation. Technology is especially important, however, in order to handle hard materials. Laser-based die and tool production and direct product processing with our system and process solutions offer numerous advantages as compared to classic processes and have proven themselves in more than two hundred installations.



A) Coining die of the Royal Canadian Mint
B) FOBA coin with frosting

Precision finishing – precisely to the micrometer

FOBA is the leading supplier for 3D and laser deep engraving. More than two hundred of our technologically-advanced laser engraving centers in the G-series do their duty reliably and precisely for customers around the world. They engrave, smooth, frost, refine, mark. With the G-series, you can create three-dimensional surface structures such as bulges or hollows as well as various frostings, textures, and optical effects on coin dies or marking and edge lettering on coins, jewelry or implants.

Production is highly precise in the micrometer range. Defined engraving depths and relief heights are adhered to precisely thanks to the online depth control. Areas to be processed are detected automatically and worked accurately using a patented process. Thus, even the smallest and filigree areas can be processed easily and exactly. Everything is much more precise, repeatable, and economical than with traditional methods.

Guarantors of precision

IMP vision alignment system	Online deep engraving
<ul style="list-style-type: none"> → Patented IMP camera system: intelligent mark positioning → Detects positions of areas and components to be worked and aligns engraving, frosting, and marking exactly → Predestined for the repeat accuracy required for automated series production 	<ul style="list-style-type: none"> → Comparison with the target engraving depth → Recalculation of the remaining abrasion → Automatic adaptation of the laser parameters → Abrasion of the next engraving layers <p>The engraving depth is checked down to the micrometer in order to adhere precisely to defined relief heights.</p>



FOBA G10 laser engraving machine

Works hard

Whether 2, 2.5 or 3D engraving – the laser works hard – without hardness limitations for ceramics or steel – on hardened material. In contrast to conventional processes, even materials of high grade hardness (>65 HRD) can also be processed.

Lean and efficient

Stamp, tool, and die production is much more efficient with our solutions: the entire process is software-controlled; time-consuming manual steps are no longer required; costs due to the wear or breaking of tools are reduced.

Laser engraving machines

	G3	G5	G10	GP9000
Laser type	1,064 nm, 10–50 Watts	1,064 nm, 10–100 Watts	1,064 nm, 16–100 Watts	
Equipment	Rotary table or X/Y table		X/Y table	
Work piece weight	up to 50 kg with X/Y table, up to 8 kg with rotary table	up to 200 kg (100 kg with X/Y table)	up to 100 kg (50 kg with X/Y table)	up to 400 kg
Axes	Up to 5 axes (X, Y, Z, swivel axis, mantle turning unit)			
Protection class	Laser class 1			



Simple input, precise output: Intuitive and high-performance software for laser marking and engraving

A broad and especially customer-specific configurable product portfolio requires high-performance software that makes use of all possibilities, remains flexible, and makes life easy for the user. Our user interfaces for engraving and marking, FOBA EMC and FOBA MarkUS™, are such programs. They offer user-friendly, flexible, and always traceable handling and round out our system and machine solutions.

FOBA MarkUS™ is the modern, fast, and easy-to-operate graphic design interface and high-performance control and operating interface for most FOBA systems and thus the control center for all marking (2D) applications. The software can be equipped optionally with the IMP and Point & Shoot™ camera systems and includes axis control.

FOBA EMC is the brain of the G-series and thus the central control software for all engraving (3D) applications. The FOBA 3D* software, axis control, the IMP** camera system for automated position detection and engraving alignment, the online deep engraving control** as well as the monitoring of peripheral devices run together here as in a control center.

FOBA 3D is a 3D software for the import of data and its conversion into a layer model for 3D and deep engraving. FOBA 3D is an integral part of FOBA EMC.

- *Secure*: various freely-selectable, password-protected user/access levels
- *Custom-tailored*: customer and application-specific special software modules
- *Productive*: remote access options for more automation and productivity (TCP/IP, Profibus, serial communication)
- *Gray*: integrated support of gray levels in MarkUS™ for impressive grayscale markings
- *Archived*: MarkUS™ archive function – job data format for easy archiving and restoring of work orders in any locations (includes marking data, layout positions, parameters, etc.)

In addition, other modules such as CAD programs for marking and engraving applications and a remote diagnosis tool are available.

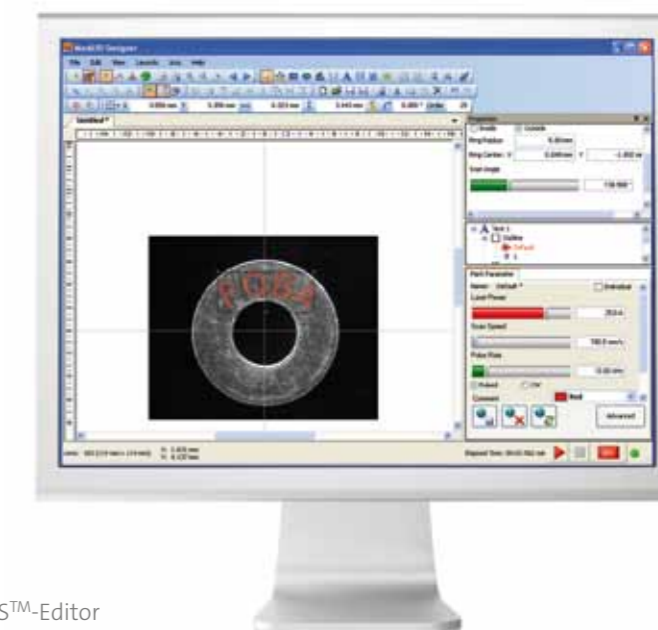
* included in the EMC full version

** option

Precision is perfection down to the smallest detail

„Work in the application lab is true development work. It represents the first and often the most important step toward the final customer solution. Usually, the challenges with which our customers present us for their demanding applications are overcome here. Even the smallest details can clinch it. Together with our sales colleagues and development engineers, we bring out the best in our systems in order to adhere to the promise of quality without compromise. For this, the “guts” of materials, system and software are tested until we find the perfect configuration for the application in question.”

Stephan Scheide (right), Manager Application Laboratory Lüdenschied, Germany, with Frank Rehmus (left), European Sales Manager



FOBA MarkUS™-Editor



Vision(ary) systems: Focused on precision

The silent service providers for our promise of precision are IMP (Intelligent Mark Positioning) and Point & Shoot™, two camera systems that ensure ultimate precision and repetition accuracy. In addition to drastically-reduced product scrap, the added value that these systems generate also includes greater economy and productivity.

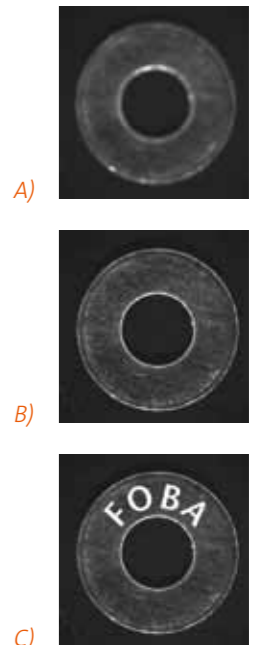


Machine workspace with marking head, IMP lighting, and component. Examined and tested in more than one hundred installations, IMP detects the position of parts and components and automatically and precisely specifies the geometry data that is required for laser marking and engraving.

The patented high-speed IMP camera system detects work pieces and their position automatically and aligns the marking or engraving precisely for great repetition accuracy. IMP thus ensures a consistently-high marking quality and a measurable reduction of product scrap. Manufacturers in the aerospace, automobile, and electronics industries, as well as those in tool, machine, and metal construction and medical technology will profit by using this economical system that increases productivity and reduces production costs.

- **Less product scrap and fewer mistaken markings**
Thanks to optical control of the exact component geometry and automatic position and alignment detection before processing, IMP guarantees that only components that are present and intended for this are processed. The camera system thus ensures that the laser processing is done accurately – regardless of how the products are positioned. Components with unexpected properties such as significant defects are rejected and not marked at all.
- **Automatic component alignment**
IMP adjusts automatically to changes in the component and the component position. Customers in special markets such as medical technology or the pharmaceutical industry are bound to strict adherence to defined processes. Possible changes to accepted marking templates must therefore be documented in detail. In that the IMP vision alignment system detects changed component positions and defective or flawed components automatically and aligns the marking relative to these, it is no longer or only very seldom necessary to adapt marking jobs and thus existing processes.
- **More economy and greater productivity**
With IMP, our customers save valuable work time since production is speeded up greatly. The costs for product acceptances and due to product scrap are thus reduced drastically.
- **Constantly high processing quality** and precision without compromise

Our customers must – also according to the applicable legal regulations and industry standards – mark products and components perfectly at all times and so that they can be traced without compromise. Laser marking, laser engraving, and FOBA's integrated IMP vision system are the keys to success here.



With Point & Shoot™ marking contents are placed manually on the products to be marked, which is why this process is especially well-suited for the processing of high-quality work pieces and individual parts.

Point & Shoot™ application on a flat washer, camera view in the FOBA MarkUS™ operating interface

Practical additional benefits:
The Point & Shoot™ camera image can also be used for focusing:
A) Blurry/not focused correctly
B) Focused correctly
C) Marked perfectly

The Point & Shoot™ camera focuses (through the lens) on the marking field*, creates an image of the component, and displays it in the MarkUS™ user interface. The user creates the marking and places it (via drag & drop) precisely where it should be applied on the product.

Camera-guided laser marking with Point & Shoot™ thus ensures less scrap, more economy, and increased productivity since marks are applied where they are required and thus exactly, as defined in advance.

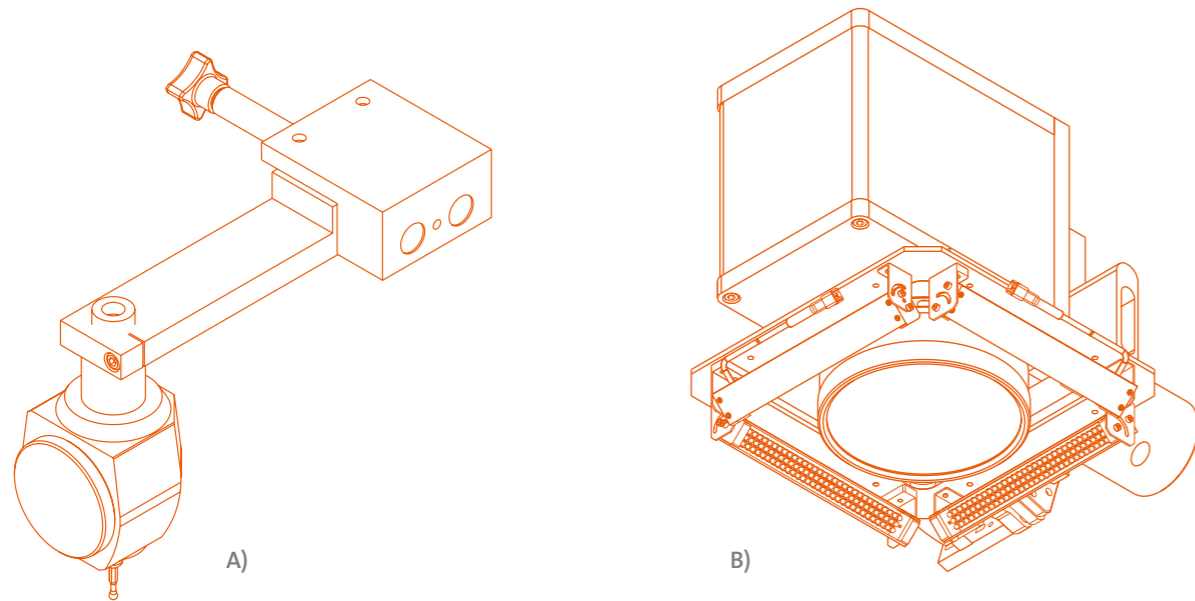
* The visual field of the camera depends on the configuration of the marking head used

Tools for precision and repetition accuracy without compromise

IMP	Point & Shoot™
→ Automatic visual component detection and marking/engraving alignment, especially for automated series processing	→ Manual visual component detection and marking/engraving alignment, especially for high-quality work pieces and individual part production

Optical inspection for the validation of the final marking and checking of whether all information to be included has been marked

Both image-based processes allow an advance verification of marking and marking position and thus help to avoid expensive production stops and time-consuming trial-and-error processes

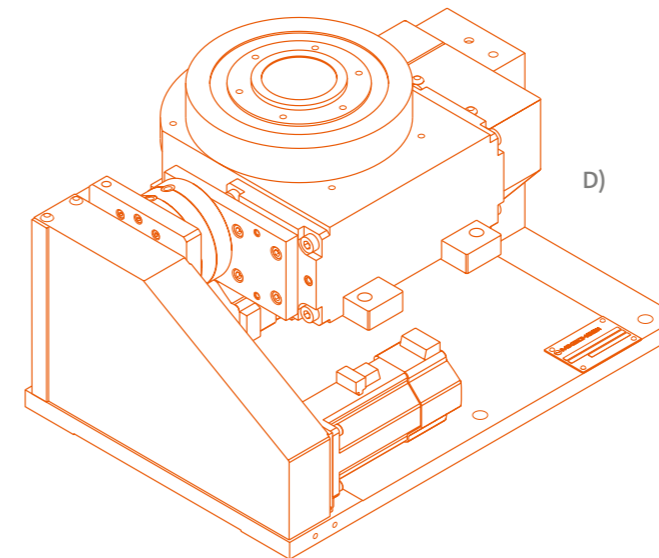
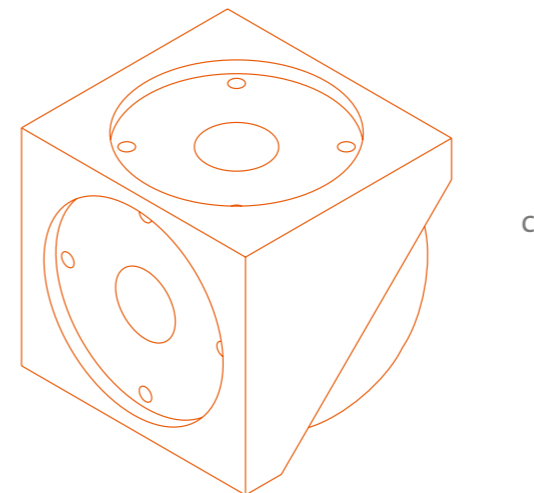


A lot of variety for more individuality: Value-adding accessories and options

When we ask our customers what they especially like about us, we consistently get two answers, which in our opinion are closely linked to one another: our customer-specific solutions and our broad range of products. This feedback pleases us and makes us proud, for FOBA offers standard solutions but also creates individual special solutions without a fuss. We owe this to our extensive and adaptable assortment of accessories.

Depending on the requirement and the application, in addition to the various laser types, our engineers integrate numerous options and accessories that offer true added value and make complete special systems into individual customer solutions:

- Suction systems for every application case
- Axes for linear and rotary movements
- Rotary tables and cross tables
- Height-adjustable work piece supports
- Safety windows for examining processing
- Marking heads for maximum marking flexibility and optimal application results
- Focus options for various marking fields
- Double heads (beam dividers and beam deflectors)
- Beam deflectors for marking of one/several components from different sides with just one laser and for the patented swing-free creation of flip images (Multiple Laser Images – MLI, Changeable Laser Images – CLI)
- Additional beam deflection units
- Pilot laser
- Touch probe
- Tactile probe
- Camera systems
- Inputs/outputs
- External order selection
- Profibus interface/TCP/IP
- Focus finder
- Focus shifter
- Online deep engraving for micrometer-precise adherence to specified engraving depths and defined relief heights
- Customer-specific software solutions
- Marking in motion: MOTF (Marking on the Fly)



A) Tactile probe
Allows highly-precise component alignment as in a CNC or tool machine.

B) FOBA IMP camera system
Detects the position of areas/components and aligns the material processing precisely according to this.

C) Deflecting prism
Guarantees easier integration of the laser and better accessibility of an additional/another marking area.

D) Turn/swivel unit
Allows the 3D marking/engraving of 3D components such as tools and can be combined with the IMP camera system.



Focus on partnership

„In every aspect, we work closely with our customers. Frequently we even become part of their team. They are looking for a reliable partner not just a machine.“

Andreas Melzer, Service Technician Germany

At your service: From Chicago to Beijing

Reliable product quality is one of the primary characteristics that distinguish FOBA. Our service, which begins long before the purchase of your marking or engraving laser, is like no other. Despite the greatest system availability, we strive for our customers' complete satisfaction, beginning with product and application advising, to installation and training, on through to the technology and spare parts service. And this in advising, service, and application locations around the world with engineers and technicians who speak our customers' language.

→ Advising

Good advice, great benefits. Our key to your success

Long-term advice is one of our key capacities on the path to implementing the appropriate system or machine solution. That which begins in the first conversation continues through selection and customer-specific system configuration and does not even stop with the training and technical customer service.

→ Application advising

Applied expertise

Specific marking, engraving, and material tests are required in order to determine the appropriate system. Together with our customers, FOBA's application experts and sales engineers find the optimal solution, because it is the one custom-tailored to the application in question. State-of-the-art application laboratories are available worldwide.

→ Service & support

Unlimited, fast, and reliable

Our customers are at home around the world. And our experienced service technicians are always quick to arrive because they are usually on-site or right nearby. They are expert contact people when it comes to repair and spare parts service or the installation and maintenance of your devices on request.

Various, individually-designed maintenance and inspection plans that include the service and repair of system components guarantee the smooth operation of your laser and reduce downtimes, both preventatively and in the long run. We make repairs using a standardized RMA (Return Materials Authorization) process. And the products in our extensive spare parts range are available quickly and on short notice thanks to our warehouses in locations around the world.

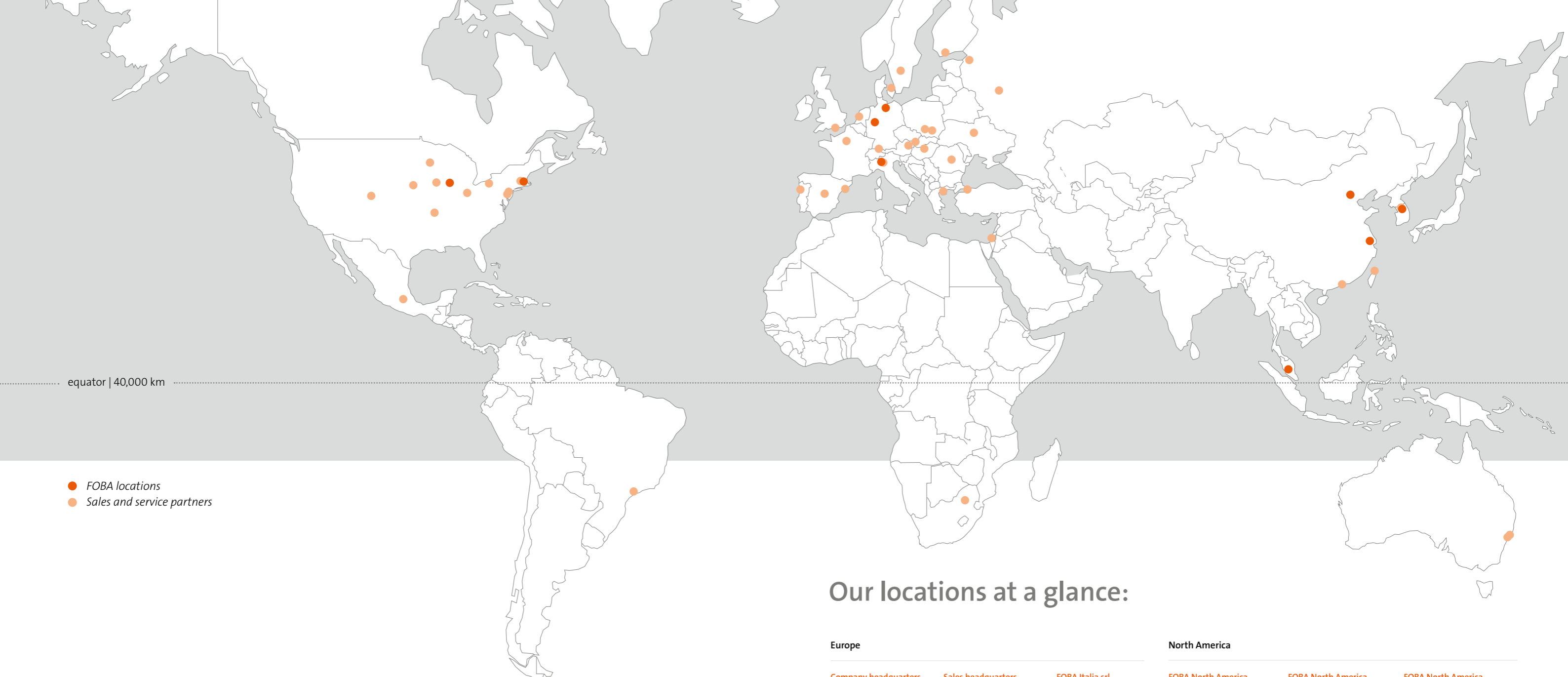
→ Training

Our knowledge. Your advantage

In individually-tailored and consistently practical seminars, we introduce our customers to their devices and machines and to the handling of their systems. In our international training centers and on the premises of our worldwide partners, and naturally also on our customers' premises.



Laser at your service. This dedication can be measured. And we are pleased to let ourselves be measured by this! With first-class product quality, thousands of installed systems, and hundreds of satisfied customers – from Chicago to Beijing.



- FOBA locations
- Sales and service partners

Focal points for the best advising and quick service: 40,000 km

We at FOBA always go that extra mile, not just when it comes to product development and customer solutions that are necessary to satisfy the requirements of our customers worldwide; we also keep a pair of seven-league boots on hand. But we do not usually need these, for our sales and application engineers and our service technicians are already on-site. Our global presence is complemented by a network of strong sales and service partners.

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Page 9 (Day-night component)
With the friendly approval
of Preh GmbH
Page 10 (Coin die)
With the friendly approval of
the Royal Canadian Mint