

FAGOR



Open
to your
world

FAGOR AUTOMATION

No. 5

June 2018 - Newsletter

www.fagorautomation.com

NEWS

Laser

Tailored Solutions





report

4 **Specific solutions for the metal LASER CUTTING**



customer

- 7 **SM System - When systematic Innovation generates continuous product innovation**
- 8 **SUZHOU LEAD - Development strategy based on technology**
- 10 **SMART PRIMA - A company born in the tide of Industry 4.0**
- 12 **SOCO - Laser has a big future**
- 13 **GOITI - Tailored to the needs of each solution**



technology

- 14 **Absolute NON-CONTACT Linear Encoders**
- 16 **Fagor Automation and Lantek, a Technological Partnership Agreement**



product

- 18 **CUTTING-EDGE Products and Services for the Sector**



news

- 19 **LASER4SURF - Industrialisation of the material surface treatment process**



Editorial

Fagor Automation is a company with over 35 years of experience in product development and manufacturing for machine automation and control. Several years ago, we specifically started to focus more on the laser market and we have developed a complete laser solution for sheet metal laser cutting. This is the reason behind our current position in the sector.

In 2017, the laser market grew at a rate in various areas and unlike anything we had ever experienced previously. There was no one single factor contributing to all of this growth, but rather it was a combination of several broadly-based factors including a strong worldwide economic demand, combined with the broad adoption of laser technologies used in and to manufacture more products than ever before. Overall, the entire 2017 laser market had a combined revenue growth of almost 20%, where fibre lasers have almost achieved a 70% share and China is still the biggest market for high-power fibre lasers. Couple all this with laser metal cutting, representing 35% of all laser revenues, and it becomes obvious why sheet metal laser cutting has now grown to be even more of a key market in the machine tool industry.

While it started out with state-of-the-art CNC hardware, Fagor Automation now adds its own exclusive features such as HSSA (High Speed Surface Accuracy), i4.0 Connectivity Pack, RTCP, Open System and Kinematics. And finally, we have developed the much-needed specific laser features that OEMs and the machine operators require to ensure that any interaction with the machine is as simple and easy to use as possible. Our Laser CNCs are the result of this.

The market changes and evolves at a rapid pace and constantly demands new solutions and because of this we are continuously upgrading our products. We have recently launched a new HMI to easily create and re-touch parts onsite from the CNC panel.

IÑAKI ANTOÑANZAS
MANAGER - LASER TECHNOLOGY



Specific solutions for the metal

LASER CUTTING

Metal laser cutting technology offers some of the most innovative, accurate and precise cutting techniques available in the industry today. Laser cutting allows designers to use CAD computer systems to guide high-powered laser beams and achieve the most exceptional levels of cutting detail on broad range of materials.

In laser cutting, high-powered light beams are reflected and focused into a finely tuned laser head that cuts through the material to very high tolerances. Laser cutting not only results in fast, efficient, operation but also leaves crisp edges and a high quality surface finishing that requires less cleaning.

More than just a laser control, Fagor's laser CNC provides top performance for both laser and machine tools. With pre-installed interfaces, the control's intelligent software not only enables highly efficient laser processing, but also the deployment of components from Fagor standard CNC technologies and CNC accessories. Fagor dedicated FPGA allows the fastest fly-cutting operation.

With a wide range of servo, linear and dedicated motors for laser applications,

Fagor provides everything you will ever need for your fibre or CO₂ laser. All Fagor drive systems are designed to provide the highest performance at the lowest rates of energy use.

Simple and intuitive data management of the cutting conditions

Putting together all the information related to materials and cutting processes organized in Technology Tables and Materials Lists, which provide simple and intuitive management of all process-related data.

Technology tables

These make possible to select optimum parameters for the cutting process specific to a profile.

The user can also select piercing conditions associated with different materials. These conditions can be modified during program execution.

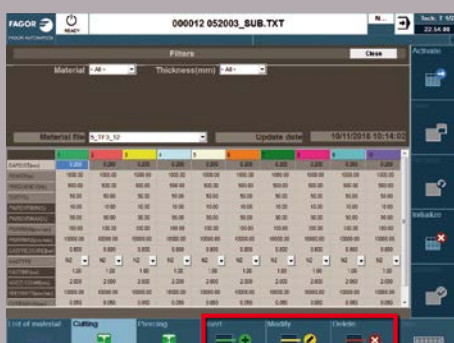
Materials lists

The common parameters associated with a material that affect the CUTTING and PIERCING processes are organized in the Materials Lists. The technological data for a specific material can be selected via the specific command in the part program.

Optimizes machine efficiency for the High Speed Cutting

High-Speed Cutting

Part laser cutting programs are usually generated through CAD/CAM programs.



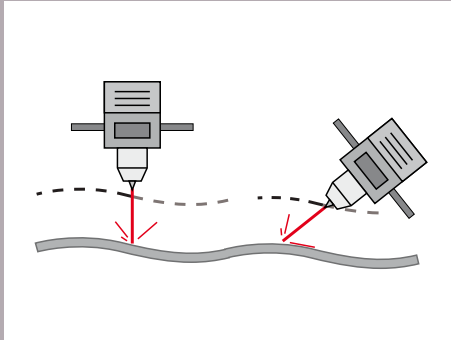
1-Technology tables



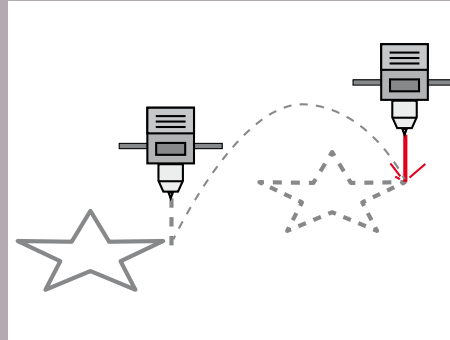
2-Materials lists



3-High-speed cutting



4-GAP control



5-Leap frog



6-Synchronized switching

Fagor CNCs optimize the captured points by smoothing the tool paths through polynomials (splines). This polynomial interpolation makes it possible to obtain fast cutting speeds by making the path smooth. The laser movements are therefore made smoothly, without abrupt accelerations or braking. Fagor CNCs assess the programmed high-speed path changes in advance, which makes it possible to adapt the dynamics of the axes to reduce stress. **Fagor's exclusive HSSA machining system** (High Speed Surface Accuracy) offers two benefits: On one hand, the mechanical stress on the machine is lower and the lifespan of its components is longer, and, on the other hand, thanks to less vibration, the movements are smoother, allowing for a faster cutting speed. This system is now offered in two levels, according to the CNC models, providing a choice between the HSSA I system in the CNC 8060 and the HSSA II system in the CNC 8070, which has more resources for faster speed.

Specific laser functions developed to maximize the potential of laser manufacturing

Control of the cutting components and the cutting peripherals:

Laser beam sources from IPG, Coherent-ROFIN and SPI Lasers. Laser cutting heads from Precitec, HIGHYAG and LaserMech.

n axes GAP control

This function ensures a specific set distance is maintained between the laser nozzle and the sheet surface (GAP).

The CNC then makes all the necessary compensations to maintain the gap

irrespective of the variation in sheet thickness.

For tracking non-planar surfaces the CNC allows programming any channel axis and the theoretical path will be modified to follow the real surface at the distance indicated in the programmed GAP.

Leap frog

During the positioning on the XY plane between different cutting positions, the Z axis moves up to prevent collision with savings or cut parts which may be protruding from the sheet surface. The trajectory of the "Leap Frog" is optimized by the CNC and dynamic behavior of the axis is maintained.

Laser path compensation

This is one of the typical functionalities on CO₂ laser machines, used to keep the overall laser path constant to prevent variations in beam dispersion at the cutting point of the sheet.

Synchronized switching

This feature permits subordinating the status of a signal (digital output) to the path type. This makes it possible to control the fast activation/deactivation of the laser cutting beam to generate parallel cutting patterns like Grid or Matrix.

PWM (Pulse-Width Modulation)

PWM is used to control an operating cycle of the laser signal (DUTY cycle and period), thus allowing the user to modify the laser beam power.

Power control

Control the laser power through an analog output, or through the PWM DUTY cycle, depending on the speed of laser nozzle path. This allows the user to maintain a homogeneous and uniform cut. ■

For tracking non-planar surfaces the CNC allows programming any channel axis and the theoretical path will be modified to follow the real surface at the distance indicated in the programmed GAP

FAGOR AUTOMATION and LANTEK have collaborated on the Lantek Expert Inside software integration for the FAGOR CNC 8060 and FAGOR CNC 8070 Laser models.

With this integration, users can enjoy improved agility, efficiency and productivity, all due to the enhanced operator controls during the management of nesting jobs from the workshop. This means the regular production demands of the user are optimized for tasks such as repeating single parts or reusing any scrap piece without the need of any intermediate procedures.

The easiest programming software to create new nesting based on DXF, DWF and Parametric files and modifying nestings that have been created by Lantek Expert.

This user-friendly interface, very suitable for touch screens, enables the review of real-time information, provides facility to answer quickly to customer demands and ensures consistency and accuracy.



Mr. Crudeli, owner and founder of SM System

SM System

When systematic Innovation generates continuous product innovation



SM System, Italian company located in Torre Canavese (Torino - Italy) was founded in 2001, with the aim of designing and building production Laser systems for welding, cutting, surface treatments, micro-machining operations and marking for many industrial sectors. After a few years, with a view to continuous growth and development, we also combined laser technology with the design of assembly and testing systems for industrial components in general.

What is SM System's innovation based on?

There is no easy answer to this question. Progress based on external factors related to market development does exist, but for SM System, being competitive among companies is closely tied to innovation and this enables a higher level of development than that of the market. Seizing on a new idea or an innovative technical solution for a product or service results in an undisputed competitive advantage. But the real challenge is to create a context within the company that can sustain systematic innovation, or rather a mentality that allows for generating continuous product or process innovation at a competitive cost and on an ongoing basis.

This innovation mentality has permitted SM System to become a highly diversified company that can develop several lines of machines, including special machines, in diverse fields. More specifically:

- Automation: production lines, transfer devices, robot islands, rotary tables
- Testing processes: dimensional analysis, fluid dynamics, electrical testing
- Laser systems (for a wide range of technologies): flat and tube cutting, additive manufacturing, surface heat treating (hardening, engraving), welding, boring

How do you see the future of the Laser industry?

As I have already said, laser is continuously expanding its field of use. On one hand ever-increasing cutting speeds make this technology more and more competitive, even for small and medium-scale production. And the option for it to replace other cutting technologies (water-jet or plasma) is growing the market as well.

The upward trend has impacted our company very positively: we are growing both in terms of production volume and research into new solutions to offer the market.

Further confirmation of this trend comes from our CNC supplier, Fagor Automation. The CNC 8070 L (laser) model has just been released; it is specific for a whole series of laser cutting machines, both flat and three-dimensional. This model offers performance that is specifically meant for controlling a laser machine. Some examples include focal distance, obstacle jumping and previewing the cutting profile (without opening the programme): it is a turnkey solution for the most common types of machines. This product flanks the historic CNC80700L (Open Line), which we use for its incomparable flexibility that enables us to use it on all the machine lines we produce, even special machines.

How important is the partnership with Fagor Automation for you?

We choose to use Fagor Automation systems for a number of reasons.

Actually, the answer is nestled in the question being asked: "partnership".

Fagor systems (CNC, drives, motors, encoders) are without doubt at the cutting edge of the most modern technology, in terms of both performance and available features.

Yet, there are other very important factors that influence the choice of numerical control. It is one thing to decide to buy a product, it is another to choose a company to partner with. We are very satisfied to have chosen Fagor Automation. The excellent support they have always provided us during the various stages, whether choosing the most appropriate configuration or creating and implementing the application, means we have found a supplier not only of a product, but of solutions. We are able to engage in constructive dialogue for the production of our current and future machines. Moreover, the flexible and open architecture of their systems offers us endless possibilities both for customising the CNC according to our needs and for integrating other devices or software necessary for our machines, which allow us to develop unique aspects that differentiate us and give us an advantage over our competitors. ■



Mr. Shenhui, Chief engineer

SUZHOU Lead Development strategy based on technology

Suzhou Lead Laser Technology Co., Ltd is a one of China's leading providers of high-power laser processing machines for the sheet metal industry. Its headquarters are located in the High-Tech Development Zone of Kunshan, a city close to Shanghai. The company has more than 200 employees and two manufacturing plants: one in Kunshan, which specializes in high-power laser machines, and one in Cangzhou, in the north of China, where most of the company's medium-power laser machines are built.

The company was founded in 2010 and has achieved sustainable growth since its establishment by continuously investing in the two pillars upon which its success has been based: R&D and field service. More than 1,000 products delivered to customers in China, Australia, India, Korea, Vietnam, Russia, France and Germany are the result of the company's philosophy of convincing the market, by developing proprietary technology and by offering high-quality products and services.

Suzhou Lead Laser has a group of leading experts in China's high-power laser technology, manufacturing affordable, reliable and competitive products for its customers, while establishing a company culture based on honesty, efficiency and creativity in the business relations with all of its partners.

As we already know, Suzhou Lead is the leading company, which produced the first 10,000 watt laser cutting machine

in China. Could you please briefly describe the advantages of the ultra-high power laser cutting machines, as compared with other machine tools?

In recent years, the laser processing market has grown very rapidly with the development of fibre lasers. The introduction and use of ultra-high wattage/super-high wattage laser cutting systems provide economical solutions for high-volume and high-precision processing of thick plates and even super-thick plates. For example, the stainless steel machining is not an effective process because of the material used. In industrial and domestic applications, physically and chemically stable stainless steel is the material of choice for many designs. With systems designed with more than 10,000 watts of laser cutting power, can achieve a thickness of 25 mm or even 50 mm in stainless steel precision processing processes. These systems were preceded by plasma cutting or water cutting systems; the

former had a poor processing accuracy and the latter had a low processing efficiency. Ultra-high power laser processing machines can also greatly improve the processing speed, thereby increasing production efficiency. For example, when cutting 10 mm-thick stainless steel or aluminium plates, the speed of using a 10 kilowatt laser cutting machine is about 3 times faster than that of a 6 kW laser cutting machine. This means that the production capacity of a 10,000 watt laser cutting system in mass production of similar products is 3 times that of a 6 kW system. The final product cost will also be greatly reduced. Therefore, we can state that ultra-high power laser processing is the trend of future developments. As an advanced processing method, it will gradually replace the original processing methods and become the mainstream system of the market.

Suzhou Lead is more than just a product supplier, it is a comprehensive solutions supplier. Service is as important as products and solutions. Can you share with your approach in relation to service aspects (Service Network, Service Efficiency, etc.)?

The Chinese market is the leading market of laser products, and it has also

steadily expanded into foreign markets in recent years. For Suzhou Lead, service quality is first and foremost. In the Chinese market, Suzhou Lead has established more than 10 service offices in China, for the distribution of its products, from which resident service engineers provide a rapid and high-quality service response. In the international market, Lead Laser is establishing a reliable agency relationship with local sales service providers to expand the service to all corners of the world. Suzhou Lead selects local agency service providers following a very rigorous and careful selection process. It is necessary to inspect the comprehensive business philosophy and current technical expertise level of these providers. Currently, our foreign agent system in South Korea, Taiwan, Europe, South America and Southeast Asia includes companies with a vast experience in the industry and an excellent customer reputation. Suzhou Lead welcomes cooperation from all sides.

Suzhou Lead has always insisted on a "zero defect" quality philosophy. Could you please share with us how you control product quality?

Suzhou Lead has a rigorous quality control system and a serious quality control department. There are quality

control nodes in every step of the entire production outsourcing assembly. We control the final quality of our products by strictly controlling the entire process.

The Chinese laser industry has maintained a steady growth in recent years. What development strategy Suzhou Lead will take in future?

Suzhou Lead has always believed in a development strategy based on technology. The company has always paid attention to the development of the industry, and constantly increased its investment and technology reserves. Leading the market with leading technology.

What kind of opportunities will smart manufacturing bring to the laser industry?

Suzhou Lead prepared technical reserves in this direction long ago. Future market development can no longer be limited to stand-alone technology. Overall factory management, big data processing, smart production arrangements, process supervision and the input and output of the overall management system is the direction of future factory solutions. Suzhou Lead is also building service cloud systems that can provide customers with a higher level of product experience. ■





Mr. Ruiyan Wang, Technical Centre Director

SMART PRIMA

A company born in the tide of Industry 4.0

Shanghai SMART PRIMA Technology Co., LTD (SMART PRIMA) is a manufacturer of comprehensive smart automation equipment and comprehensive high-power laser equipment, a company born in the tide of Industry 4.0. The company adopts group-scale operations, with a comprehensive industrial chain and an international vision.

SMART PRIMA has engaged in the development and applications of high-power laser equipment for 25 years. SMART PRIMA has produced 4500 sets of high-power laser equipment up to now.

As a major provider of laser cutting machinery, where is the current laser cutting market moving towards?

In the global laser industry, material processing still represents the largest portion of the laser industry's revenue. Based on this, the market demand for laser cutting services is growing. As laser technology continues to mature and laser equipment manufacturing costs continue to decrease, sales of laser cutting equipment have seen an unprecedented growth in recent years.

As the earliest domestic laser equipment R&D and production company, SMART PRIMA has quite a comprehensive product line. Can you share with us the features of your laser equipment line?

Shanghai SMART PRIMA is the pioneer of the high-power laser cutting industry; SMART PRIMA witnessed and was the first to

write the book about the growth and development of China's laser equipment.

SMART PRIMA's main products are smart laser equipment and related products, which are divided into three product (technology) groups:

- 1- General smart automation equipment product group, including:** Robot Application System and FMC/FMS.
- 2- Smart laser equipment product group, including:** 3D Laser printer, Laser welding production line, High-speed laser cutting machine, Special laser processing equipment.
- 3- Laser source product group, including:** Fibre lasers and CO₂ lasers.

Can you share with us the characteristics of 8th generation laser cutting machine?

SMART PRIMA leads the development of laser cutting machine technology in China. Through 18 years of hard work, China's laser cutting machines have been developed from the first generation to the current eighth generation. The 8th generation

high-speed laser cutting machine manufactured by SMART PRIMA has set a new benchmark for representing China's laser equipment industry.

- **High speed:** With a speed of 280 m/min, this is the fastest laser cutting machine in the world today.
- **High efficiency:** 30% higher than the previous generation cutting machine.
- **High processing capacity:** Thin plate cutting speed 100 m/min, 500 holes/min., extremely high thickness of cuttable plate: stainless steel 50 mm, carbon steel 30 mm, aluminium alloy 30 mm.
- **High rigidity, high dynamic performance.** The key parts are made of aerospace-grade materials. The machine has a good rigidity, good dynamic performance and acceleration performance, and exhibits "hard and light" characteristics.
- **High levels of safety and reliability.** Significantly surpassing the speed and processing capabilities of the previous generation, its safety and reliability requirements have also increased dramatically.
- **High intelligence.** The 8th generation machine adopts a smart control system, smart cutting head and the latest in external light path control technology. It can cut different materials (carbon steel, stainless steel, aluminium alloy, copper) and different thickness without manual

intervention. High-speed edge-finding and visual positioning capabilities allow operators to place any type of material. Smart information interfaces make the machine a host for the production line and a host for the information system. With the smart work piece data processing system, higher material utilisation rates, faster processing speed, and better work piece quality can be achieved.

What are the advantages of your current market leading laser products when compared to similar products? What are the success cases?

SMART PRIMA has extensive experience in fibre laser technology and gas laser technology, providing laser application solutions to more than 4,500 customers. Compared with similar products on the market, our laser equipment offers the following main advantages.

High efficiency

Thanks to a careful design, optimised structure, good dynamic characteristics, high acceleration, the efficiency is 25% higher than similar products.

Long life

The long service life of Prima's laser cutters has been achieved thanks to the optimisation of its design, strict material selection and careful manufacturing. For example, in Shanghai's Minhang District, a laser cutting machine manufactured by Prima has been used continuously for more than 13 years and is still operating

in good condition. It still maintains the precision levels at the factory.

Among thousands of our customers, there are many successful application cases, such as cardiovascular stent processing, plate heat exchanger welding, laser welding of unequal thick plates for automobiles, oil screen seam cutting, car role corner welding, Long March 5 rocket key parts manufacturing, large aircraft C919 central flange manufacturing, die board and so on.

What kind of measures will SMART PRIMA take to deal with the trends associated with automation in the laser processing equipment industry, smart, multi-functional integration and connectivity?

In the wave of Industry 4.0, Prima will step forward to act as the professional, international, and group flagship of smart equipment manufacturers. It shall continue to target key industries, such as aerospace, automobile manufacturing, shipbuilding and energy industries to provide complete laser processing solutions; research and development of laser cleaning and laser impact equipment; introduce internet technology into laser processing equipment to enhance its intelligence; research and development of laser equipment, using Interactive voice control technology that improves the man-machine interaction, making it easier and more efficient; applying Internet (cloud) technology, providing users with an efficient and immediate service. ■





SOCO

Laser has a big future

Founded in 1979, Soco is the leading global machinery manufacturer for the Tube, Pipe and Solid Bar industry. Soco's HQ are located in Taichung Taiwan, the main industrial machinery area in Asia. With several production facilities around the world, 25 branch offices and over 40 active partners in all major continents, Soco continues to pursue excellence and consolidate its leadership with the continuous support of its customers, partners and families.

Kyle Lo, General Manager

In recent years, Soco has developed laser tube cutting machines and is now introducing its cutting-edge tube and profile processing technology: the Fibre Laser Tube Cutting System. This new Laser Tube Cutting Line is the ultimate solution for joining multiple machining processes in a single system, achieving maximum flexibility, automation and performance.

When and why did Soco decide to start manufacturing Fibre Laser Tube Cutting machines?

We started developing and manufacturing fibre laser tube cutting machines because we believe lasers will play a big role in the future of manufacturing. Laser technology uses light, tooling-free system, renewable resource, to process many products and materials. It is used from holography to lasers light shows, from scanning to heat treatment, as well as cutting and welding. It is also low in maintenance and running costs, and since it does not require tooling, it is able to go from design to manufacturing in a very short time and cost.

Which were the key reasons for choosing Fagor's CNC 8070 when developing the new Fibre Laser Tube Cutting machine?

One big reason is because Fagor is well known, trusted manufacturer has been around for many years, a company with international presence. And more importantly, because we market our products in over 80 countries. Fagor is

present around the world, it has offices, services and offers assistance in all major continents. So both our company and our customers can greatly benefit from working with Fagor. In addition, the 8070 CNC control system is very flexible. Our laser machines have 5 to 6 electrical axes, and a 4 to 5 axes interpolation. Fagor 8070 CNC is very flexible and powerful in working and programming these axes.

Soco is not just a Fibre Laser Tube Cutting Machine manufacturer because you have developed functionalities to improve the performance and operation of the machine. How important is the flexibility of the CNC for you to develop this kind of applications?

We chose Fagor's CNC 8070 because of its powerful features and flexibility. The functions and the ability and flexibility to program, as we need, is very important. Since we are working with lasers, we need to manipulate light, its power and output, its spot size, its direction and focus. At the same time, we require a very powerful controller to cut with precision, speed and accuracy, while still offering flexibility to program as necessary. Fagor's CNC 8070 controllers offer this flexibility, which is a must for us. Not only for current applications, but also for future applications.

In order to design, develop and service this Fibre Laser Tube Cutting machine, what does Soco expect from a partner like Fagor Automation?

We expect to receive flexible support from Fagor Automation, not only during the design and development phase, but also in the global service and support phase. Selling and making machines is an continuous process and we must ensure that our products work properly at the customers' locations for 24 hours per day, 365 days a year. The world is big, with different time zones, long distances, etc. , we count on Fagor Automation to help us assist our customers in the nick of time. So it is very important to have a partner like Fagor Automation, traveling and working with us, in Taiwan and around the world.

Taiwan is a big player in machine manufacturing but the end user market is limited. Where is Soco focusing in relation to sales abroad?

Soco does not focus on a specific location. We sell to 81 countries, we currently have 42 agents and we have 29 branch offices around the world. Our focus is on the tube market and relevant applications. Tubes are present everywhere, from automotive parts to furniture, from sports equipment to the health industry, and even in your own home and kitchen. That is why our company theme is "Soco In your Life", because you can find tube-related products everywhere around you that are manufactured using our machines. Together with Fagor Automation, we believe we can grow for many years to come in the tube market. ■



Asier Sasiain, General Manager

The type of machine you are currently manufacturing has moved from traditional individual laser cutting, punching and folding machines to combined laser machines and flexible lines with automatic sheet metal coil feeding systems (blanking). What has been the challenge of this change for you?

The challenge was not only technical but in all areas. Firstly, we had to adapt the structure to meet this change. From a technical point of view, the main challenge was associated with the customisation requirements of each system, having to design specific utilities ranging from pure programming for the design of specific operations and the interconnection of elements and external production systems and resources, through to the creation of new screens for the HMI to control built-in peripherals.

Each customer has their own needs which require us to adapt the system.

What is the most complex model developed by GOITI in its laser machine line?

In the world of laser, the most complex solution is the laser cutting line with a sheet metal coil feeding system, which has an uninterrupted operation, using various cutting heads. Not requir-

ing the sheet metal feeding process to be stopped requires many changes compared to the traditional stationary cutting system. On one hand, the cutting heads must be compensated to adapt to the movement of the sheet metal. On the other hand, time becomes a parameter and not only a result of the programming phase, so compression in the programming parameters had to be changed and the assisted programming tools had to be modified. Some developments could not have been completed without the collaboration of Fagor Automation, which developed specific control packages.

With the fourth industrial revolution (Industry 4.0), customers are now ordering machines with connectivity, data management, predictive maintenance, etc. What features are you currently offering to your customers?

Our offering is based on a wide range of solutions. First, we have the Smart HMI, based on the Panel PC platform of the CNC8070. This is a custom HMI that is tailored to the needs of each solution, including value added functions, such as the digitisation of the preventive maintenance panel or new assisted programming applications for the machine. Another solution is our Data System, which can monitor the status of the

machine permanently, synchronising the data with any device using a data/second frequency, allowing us to gather information about its output. Different communication protocols can be developed with this platform, using the different agents of the production plant to help manage it.

GOITI works hand in hand with its own Technology Centre, Ideko, to develop unique technological solutions that allow companies to become more competitive. Fagor Automation is the supplier of the CNC Systems it installs in its machines and collaborates with both GOITI and its Technology Centre. What is the value to GOITI of having such an approachable and flexible company as Fagor Automation in the development of these solutions?

For us, as manufacturers of highly dynamic machine-tooling solutions, controlling drives is a very important aspect of our operation.

Having Fagor Automation perfectly "integrated" in GOITI allows us to transmit the needs of our customers directly and to agree on a solution that meets the productivity and feasibility requirements. Certificate for all products manufactured. ■

GOITI

Tailored to the needs of each solution

Absolute NON-CONTACT Linear Encoders

Absolute technology has been implemented into the non-contact (exposed) linear encoder range. The Fagor absolute technology with digital interface provides the position instantly after power-up, it is fast, accurate and does not require homing of the machine.

The position value is available from the moment the machine is turned on and may be requested by the subsequent electronics (CNC) at any time. The digital communication is more immune to electronic noise, allows additional data transmission between the encoder and the CNC system and reaches maximum resolution at a higher speed.

The technology is available for several digital connection interfaces such as, Panasonic, Mitsubishi or BiSS, nanometric resolution and various formats to customize the requirements of the application to the customer's specific needs.

The reader head has a single mechanical body that may be installed from the top or optional through the side and contains

all the opto-electronic components that generate the output signals. The high integration level in the reader head of specifically designed components allows that from the signal generation in a single window photoreceptor, through the signal conditioning and dynamic autoadjustment of the signals to the interpolation and output of the signals is all carried out very close to the primary signals generation. This in turn results in high quality output signals as interferences caused by noise occurring while the original signal travel through cables to the interpolation electronics are avoided.

The specifically designed components comprise the already mentioned single window photoreceptor that leads to a

large area of the track being used for the signal generation and the dynamic autoadjustment software that through a continuous monitoring of signals and power triggers the automatic compensation of the amplitude, offset and phase of the signals whenever needed. As a result, it offers, in comparison to other technologies, higher tolerance to contaminants in the measuring tape. The reader head also has an LED to assist in installation and diagnosis without the need for additional electronic devices.

Mechanically three different designs are offered. The adhesive tape with the smallest cross section for constraint spaces is glued directly onto the machine surface so recommended when the tape is under



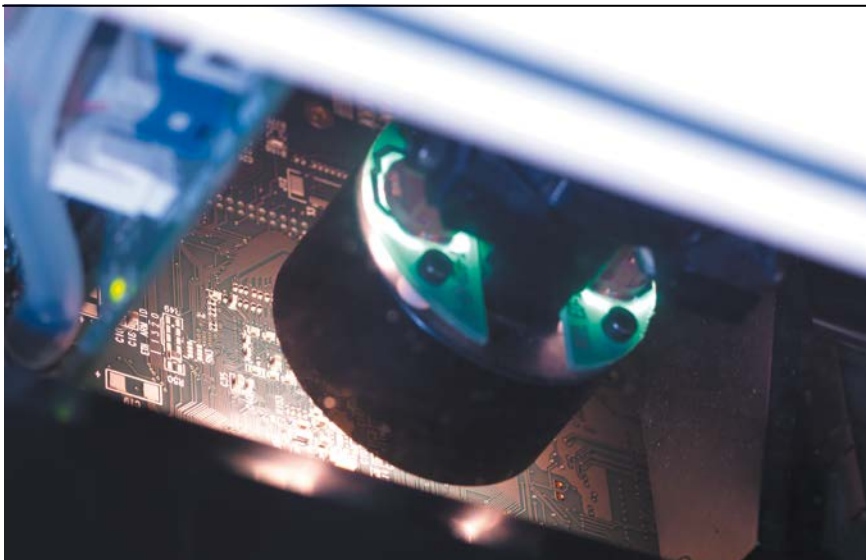
thermally stable conditions. The guided model comprises the tape that is slid in an aluminium extrusion and clamped in the mid point to the machine surface. The guided tape can expand/contract freely at its ends whereas the fixed clamp in the middle ensures repeatability, and thus, a defined thermal behaviour is assured. Finally, the tensioned model for very long measuring lengths and high accuracy comprises an aluminium extrusion glued or screwed to the surface, the tape and a tensioning system (tensor and locks). The tape is slid in the extrusion, tensioned at the ends and lock at this position. As the locks are stiffly fixed to the machine base the tape replicates the thermal behaviour of the surface.

Although not exclusively, this product range is concentrated in markets such as metrology, optics, semiconductors and electronics among many others. It is important to note that, in applications with linear motors, when using absolute technology switching is made easier without the need for additional devices of any kind. ■



Modern facilities and innovative processes

In order to ensure quality and reliability in all its products Fagor Automation utilizes the most advanced technology and testing and manufacturing facilities. From centralized computer control temperature monitoring, cleanliness and relative humidity control, a must for the feedback system manufacturing process, to laboratories for climate, vibration and EMC testing to certify the designs.

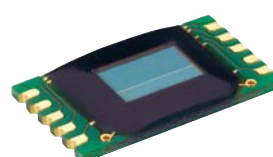


With state-of-the-art technology

Fagor Automation's commitment to this technology and quality is evident by creation of Aotek in 2002, a dedicated research center providing various technological breakthroughs. This investment has resulted in large number of patents and customized solutions in electrical, optical and mechanical fields.



SIR reference marks



Single-window scanning



Fagor Automation and Lantek sign a **TECHNOLOGICAL PARTNERSHIP AGREEMENT** to develop cutting-edge fibre laser cutting solutions

The CNC systems of Fagor Automation equipped with Lantek Inside software offer greater speed, efficiency and productivity

lantek

Fagor Automation and Lantek have signed a collaboration agreement to become technology partners and offer cutting-edge and innovative solutions to the users of fibre laser cutting machines. By virtue of the agreement signed between both companies, Lantek Inside software will be integrated in Fagor Automation's CNC systems and its users will benefit from greater speed, efficiency and productivity, thanks to greater operator control over machining operations from the workshop.

The agreement signed by Lantek and Fagor Automation will allow both companies to make progress in the development of new fibre laser cutting functions, a technology that is currently in full bloom. These machines offer a series of very interesting

advantages when compared with CO₂ laser cutting machines, such as lower maintenance costs, lower electricity consumption, a higher cutting speed and a more precise finishing.

Lantek Inside, the software on which the R&D&i team of Lantek has focused its efforts over the past five years, is integrated in the CNC systems, offering interesting new functions on-site. Therefore, this powerful software will become a very important ally for customers of Fagor Automation's CNCs.

The agreement signed by Lantek and Fagor Automation will allow both companies to make progress in the development of new fibre laser cutting functions.

With this agreement, Fagor Automation can offer its customers more advanced solutions integrated in its CNC platforms for the cutting sector and, in particular, for laser cutting machines.

After integrating all specific functions of a laser cutting machine in its own CNC machines, such as GAP CONTROL, LEAP FROG, PIERCING, technology tables, etc., Lantek Inside software can incorporate NESTING machining processes.

With the signing of this agreement, Fagor Automation continues to make progress in the optimisation of its laser cutting solutions. Fagor Automation's CNCs offer the best possible solution to its users: minimisation of cutting times, reduction of downtime and optimisation of the use of materials; all in all, an increased versatility when maximising the use of material and execution times, as well as faster production processes.

For Lantek, the agreement signed with Fagor Automation means that it will become the technology partner of a leading global company in CNC systems, with a presence in more than 50 countries. "We are very proud to become the technology partner of such an important company as Fagor Automation, which has a proven track record in the industrial sector and extensive experience in innovation, as well as a huge presence in the Machine-Tooling market", stated Francisco Pérez, Manager of Lantek's OEM Channel.

Lantek Inside has been designed for its integration with Fagor Automation's

CNCs, in the control systems of both its medium-power laser cutting machines, which focus on 2D sheet metal cutting tasks, and its high-power machines, used to cut sheet metal, tubes and 5-axis machines. Both machines have high speed and accuracy requirements.

Improved functionalities for its CNCs

By joining forces, not only will users benefit from the new partnership, but also Fagor Automation and Lantek. The integration of Lantek Inside will allow Fagor Automation to improve the functions of its CNC systems and to have access to the new advances in laser cutting technologies, thanks to Lantek's vast experience in the fibre laser cutting market. Likewise, it will allow the company to cater to the current and future needs of fibre laser cutting machine manufacturers.

Some of the new functions offered by Lantek Inside include greater control for operators over the operations of the machine from the workshop. To this end, when the order is generated, the operator can manage some of the parameters associated with changes in production. This was not possible until now, since the entire process had to be handled from the office. In other words, the operator can now generate new machining designs and edit them and add or delete parts on-site.

Fagor Automation's CNCs minimise cutting times, reduce downtime and optimise the use of materials.

In addition, the system offers the option to import previously machined part designs. Therefore, user response to common production needs is optimised, such as, for example, redoing damaged or missing parts, reusing any scrap previously created with no need for intermediate procedures such as sheet metal alignment and measurement.

All in all, versatility is increased with maximisation of the use of materials and the optimisation of execution times, as well as achieving faster production processes.

In addition, thanks to Lantek Inside, machined part information is stored in

the software, so the customer does not need to print the workshop sheets. This all results in greater speed and significant time and money savings, not only in terms of materials, but also in terms of energy.

Lantek, proprietary Business Manufacturing Intelligence software

With more than 35 years of experience in the sheet metal sector, Lantek is a global leader in the CAD/CAM market, with a presence in more than one hundred countries and a pioneer in the digital transformation of companies in the sector.

Lantek Inside software increases the functionality of Fagor Automation's CNCs, thanks to Lantek's vast experience in the fibre laser cutting sector.

Lantek was established in 1986 in the Basque Country, one of the main European hubs for the development of Machine Tool systems. It offers proprietary Business Manufacturing Intelligence solutions, which can be used to connect plants and turn them into Smart Factories. Its offering is completed with the development of CAD/CAM/MES/ERP solutions for companies that manufacture sheet metal parts, tubes and profiles with any cutting (laser, plasma, oxy-fuel cutting, water jet and shearing) and punching technologies.

Lantek is the leading company in its sector, thanks to its innovation capacity and its commitment to internationalisation. With more than 20,000 customers in over 100 countries and 20 offices in 14 countries, it has an extensive distribution network with a global presence. In 2017, 86% of its turnover were generated by its international business. ■

The users of Fagor Automation's CNCs can benefit from greater speed, efficiency and productivity, thanks to greater operator control functions when managing machining operations from the workshop.



CUTTING-EDGE Products and Services for the Sector

Fagor Automation not only offers technologically-advanced products, but it also provides flexible and comprehensive services that are tailored to customer needs.

The machine automation sector, in which Fagor Automation is present, has come to be known as an extremely competitive industry and characterized by its ever rapid and streamlined developments in technology. To remain competitive in this demanding market, it is not enough just to do things well, as it is essential to become a market leader and to provide a sound, technologically-advanced and state-of-the-art offer in terms of both Products and Services.

Being an industry leader implies providing a cutting-edge Product and Service offering for the industry in terms of product development and performance, digitization options, connectivity, open systems and customization features, etc. This is the core objective of adding further value to machines throughout their life cycle, where efficiency increases, costs are reduced and full product traceability is achieved.

To become an industry leader, besides offering a technologically-advanced and highly-efficient product, it is essential to

offer customized services that meet customer needs, whether they are focused on product optimization or to extend a product's service life.

Fagor Automation, in addition to providing the usual services to ensure the proper operation of equipment, such as on-line support, setup, assistance, repair, product exchanges and spare parts, it also offers flexible and comprehensive solutions.

Along with the typical offering, we also provide:

- **Warranty extensions**
- **Service agreements**
- **Connectivity services, monitoring, upgrades**
- **Optimization and machines calibration**
- **Activation of new software features to enhance equipment performance with the highest quality and productivity possible**

All this is possible while using the most modern remote monitoring technology, diagnosis systems and data gathering.

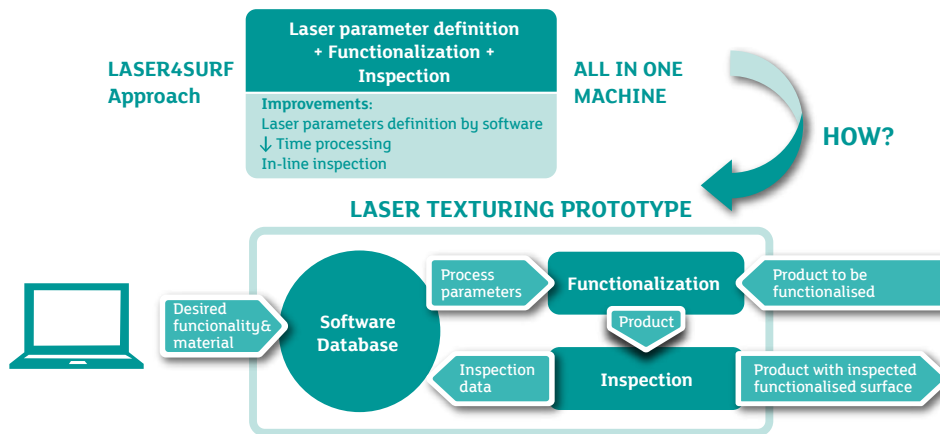
In order to complete this service catalog, it is essential to have several processes and a customer-focused structure that ensure these local and worldwide services. Fagor Automation, with its extensive presence throughout the global market, has heightened its customer awareness and has taken on an organizational structure that fosters and makes customer service its highest priority.

Efficiency has increased, costs have reduced and full product traceability has been achieved

Fagor Automation ensures its world-class level service for local machine consumption markets and for those dedicated to machine importing or exporting, with a commercial and service network that is physically present in over 50 countries through its own subsidiaries and service centers. ■

Laser4Surf

Fagor Automation, a company at the forefront of technological innovation, will collaborate in the Laser4Surf project. The aim of this project is the industrialisation of the material surface treatment process using lasers with femtosecond pulses.



Industrial sectors (e.g. automotive, aerospace, biomedical or machine-tooling) need to manufacture high value added products without increasing their costs, rationalising the use of resources and maintaining the productivity levels. One of the methods that is currently used to increase product performance is the improvement of the surface properties of the materials. In this context, surface laser texturing has a high commercial potential, since it can improve the characteristics of the product without altering the chemical composition of the surface, and without the need to add coating elements. With regards to other texturing techniques, such as those that use chemical compounds, the advantage of laser texturing techniques is their low environmental impact. In fact, they have the lowest impact on the environment.

The Laser4Surf project is developing an innovative Laser Texturing Prototype for the functionalisation of material surfaces using lasers with ultrashort pulses (lasers with femtosecond pulses). This prototype will serve as a platform for the development of a scalable technology, which will allow it to be implemented in industrial production lines.

Key aims of the project:

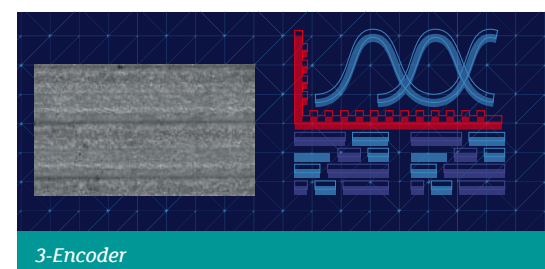
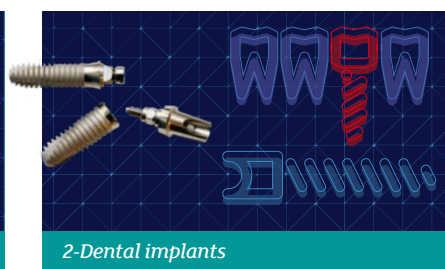
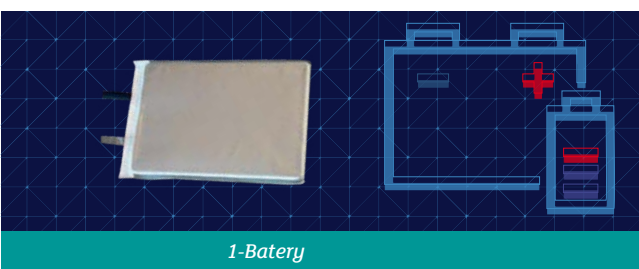
- Generating LIPSS with patterns of different sizes and multiple orientations. These structures and orientations will be combined to obtain the required functionalities
- Reducing the processing time by 95%
- Allowing the process to be inspected during the manufacturing of sub-micrometric structures
- Facilitating the definition of the process parameters

The development of this system will be tested in three different industrial sectors.

- Energy sector: to increase the efficiency of battery electrodes
- Biotechnology sector: to improve the biocompatibility of medical prostheses
- Manufacturing sector: to improve the manufacturing of position encoders

Fagor's contribution to the project focuses on this last sector. It will be one of the three end users of the technology, which will be implemented in one of its main areas of application: position encoders. In the linear and angular encoder field, this cutting-edge technology offers an advantage that is particularly important nowadays: it is an alternative to photolithographic processes. Currently, encoders are manufactured using photolithographic procedures. This industrial process requires the use of chemical products and a high consumption of water. The new laser treatment process only uses light-matter interaction, with no need for additional elements. It doesn't even generate manometric waste, as is the case in laser ablation processes.

In this way, Fagor Automation is contributing to the development of laser technologies, as well as to a more eco-friendly and sustainable future. ■





Open
to your
world

No. 5 June 2018 - Newsletter

www.fagorautomation.com

Fagor Automation shall not be held responsible for any printing or transcribing errors in the catalog and reserves the right to make any changes to the characteristics of its products without prior notice.



FAGOR AUTOMATION

Open
to your
world



Fagor Automation holds the
ISO 9001 Quality System Certificate and the
CE Certificate for all products manufactured.

Fagor Automation, S. Coop.
Bº San Andrés, 19
E-20500 Arrasate - Mondragón - SPAIN
Tel.: +34 943 039 800
Fax.: +34 943 791 712
E-mail: info@fagorautomation.es

