

Lenze Operations GmbH: „A quantum leap forward“

Laser marking system with type plate handling in the manufacture of gear boxes



Ytterbium fiber laser system with fume extractor

It all started with a ball pen. This has been laser marked in the course of visiting a Trade Show in 2002. And convinced. As specialist in drive and automation technology, Lenze meanwhile relies on this technology not only at the German location.

There are various laser systems which realize the marking of about 1000 type plates per day for all different gear boxes and geared motors – fast, automated and individual. Linked to the company's data base there are no longer incorrect entries.

"We have a wide-ranging variety of markings", tells Jens Niebuhr (M.Eng.), production manager at Lenze Operations GmbH in Extertal. „In the past we embossed all the type plates for our gear boxes and motors letter by letter. Then, as a first step to simplify work we started working with pin markers (engraving

systems). But, they also have quite a few disadvantages, like difficulties in scaling fonts and no option to create barcodes. As a result, our staff needed to generate each type plate via a relevant entry form quasi individually by hand that led to a great number of errors and finally to problems with quality which needed to be eliminated for the long term."

World-wide SAP data base connection

Today, the type plates are available in excellent reading quality. After having visited the Trade Show in 2002 Lenze decided to use laser technology for the type plate handling. Since the end of 2003, cab laser marking systems are used. „And the investment has paid off for us. So, the error ratio could be considerably reduced," Niebuhr explains. „Tendency towards zero“. Meanwhile, a total of ten laser marking systems for the type plate marking is used at the Lenze production plants in Germany, France and the USA. All of them have proved their value, right from the first day.

The typeplates are marked by means of different laser marking systems of cab Produkttechnik GmbH & Co. KG, in Karlsruhe. These marking systems are working with high resolution, precise and fast and are used for applications in the field of tracking and tracing, DPM (Data Position Measurement), HIBC (Health Industry Barcodes) und UID (User Identifier). The diode-pumped YAG laser marking systems and particularly the diode-pumped, air-cooled Ytterbium fiber laser system FL20 with typeplate handling THS4 demonstrate their great abilities. Markings are made on steel, aluminum, various plastics and a lot more materials with high beam quality and a pulse peak power of up to 20W. Control is done via cablase software with graphic surface in real time or COM interface for custom-designed programming. Specialized in the field of identification cab also offers solutions for the integration into production lines, safety housings for single markings as well as label and typeplate marking systems.

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Jens Niebuhr (M.Eng.), production manager at Lenze Operations GmbH

At Lenze, the cab laser marking systems were connected to the SAP data base right from the beginning and world-wide. However, it did take much preparation work to finish a custom-designed concept. Meanwhile, six laser markers in all are used in the gear box assembly at the Extertal plant.

Solution partner for customers

Lenze has more than 60 years experience in drive technology and is known as one of the most innovative companies in this field. Based on this, the company has steadily developed to become a provider for customer orientated drive and automation solutions. The Lenze Group employs 3000 people world-wide, 300 of them are working in the research and development. Besides the head office in Hameln, Lenze is represented in 60 countries all over the world with own sales offices, research and develop locations, manufacturing plants and a network of service partners. And meanwhile, the company has changed into a Public Limited Company under European Law (SE = Societas Europaea).



During assembly the typeplate is protected by adhesive



Well readable typeplate on the gear motor

"We understand ourselves as solution partner for our customers", Jens Nieburg explains the company's philosophy that means offering a wide range of services, well-prepared solutions, complete systems and innovative products. A one stop service for the customer, from the electro-mechanics, the drive technology to control and visualization. The product range covers gear boxes and geared motors, frequency converters, servo drives, industrial PCs, control systems, I/O systems, HMIs, visualization, industrial communication, engineering software and a lot more. As one of the first specialists in drive technology Lenze integrated not only control but also safety technology into the drives. The service program includes, among others, consulting, engineering, set-up, plant engineering and after-sales-service.

150 000 variations

Incoming orders are entered into SAP at the central order processing center. Then, the appropriate working documents, parts lists, and so on are printed out at single work places in the gear box assembly. „We get several hundred production orders per day“, tells Peter Mantik from the assembly planning for gear boxes. „And each order covers several customer-specific drives“. The components are all compatibly matched to be able to meet every specific requirement. Every customer gets his system solution which accordingly means a numerous range of variation. Presently, there are about 150 000 possibilities. „We are producing up to 1 000 drives per day, all labelled with minimum one type“, so Jens Niebuhr.



Marked typeplate

Each production order has a barcode to be scanned. Via this barcode the respective order data are automatically entered into a mask and passed to the laser. The laser then marks the typeplate according to the predefined specifications. Once the order is entered into the data base the typeplate can be called up just a few minutes later. "We have an overall typeplate including all motor and drive data. However, the SAP system provides different standard masks. There is a standard mask for standard motors. There is another mask for e.g. UL motors. There is

the so-called C86 Code for the motec series where certain data are automatically imported", so Peter Mantik. The customer has the possibility to provide specific information – like barcodes, fonts or logos. Everything can be individually controlled by the help of the respective masks. "Thanks to the laser technology we remain absolutely flexible and get the marked typeplate within a very short time and with perfect reading contrast. And we get a positive feedback from our customers", summarizes Jens Niebuhr. Whereas the YAG lasers need about one minute to produce a plate, the new fiber lasers do not even need half the time. "This remarkably increased cycle time enhanced to further improve productivity in the manufacturing process!"

Express delivery

The lasers generally mark on anodized aluminum. And in case the motors and gear boxes need to be produced for outdoor use or the chemical industry the appropriate steel plates are simply laser marked. Changes are made very easily and without great effort for changeover. Plates out of stainless steel have their own input mask. Only parameterization and speed will change. Even the size of the plate can be individually specified. If so, a changeover of the laser system is done without great effort. Only the layout of the mask in the SAP system must be adapted in size and the handling system be set up accordingly. Fast and easy!

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Jens Niebuhr (M.Eng.)

The assembly is made in two shift operation. Generally aimed delivery time is less than two weeks. But some orders have to be ready for shipment within 24 up to maximum 48 hours. For these orders, Lenze has a so-called express order stack. „When things need to move fast we use a special software feature“, Peter Mantik explains. „This allows processing certain individual orders“. The software enables to interrupt currently ongoing processes and to separate single plates by the help of a slide.

World-wide support



Typeplate handling module following the FIFO principle

All typeplates are managed on the German server. All know-how is invested in the database connection. The YAG and also the fiber lasers draw their data from that software written by cab according to the Lenze requirements and specifications and always adapted to new jobs to steadily increase system availability.

The various lasers take the data by docking to an adapting element in the SAP system. Data communication follows. „We have no reading, but language problems“, says Peter Mantik. The laser in France gets e.g.

another keyboard that needs to be kept on file in the SAP system.

All lasers have been configured on site in Extertal, where all accesses are opened and closed, too. Basic masks are equal - worldwide. The local installation only requires clarifying some technical details. cab as specialist in the identification is working globally and can therefore, if necessary, give support all over the world and without great effort or expense. This provides high system safety. The good cooperation means team work since the project began with main focus on the database programming that had to run. The result was

customer-specific laser systems which have meanwhile developed to perfected serial systems for laser marking.

All advantages in short

The laser systems run fully automatically. Another particular technical feature is the feeding technique that can be adjusted to different dimensions in just a few simple steps. For this, stacking magazines are used. The magazine is filled with blanks once in the morning. They are processed in the course of the day following the FIFO principle and finally fall into a box provided. That process is running without any interruption. The typeplate handling system is especially designed for the industrial use and the marking of serial products in large quantities.



from the left: Peter Mantik, Assembly Planning Gear Boxes, Jens Heidel cab Sales Manager North, Jens Niebuhr, Production Manager Gear Boxes

The advantages of laser technique speak for themselves: Typeplates that excel not only in excellent readability, but also in a remarkably longer lifetime. They are easy to clean and do not oxidize. Almost every kind of information can be marked. Thanks to the fact that there are no restrictions to material or size the laser systems remain efficient and flexible in everyday operation.

The software can be adapted to specific modifications without high follow-up costs. The laser systems are robust and almost maintenance-free. And notably, the new-generation diode-pumped Ytterbium fiber lasers have, compared to the YAG lasers, a

much longer lifetime despite a far higher working speed. "We are realizing a boosting productivity", Jens Niebuhr concludes. "Thanks to the laser marking systems we are in a position to meet all internal and external demands. And we have made a quantum leap forward in the type plate marking!"

Jens Heidel, sales leader Germany north, laser marking systems, cab Produkttechnik GmbH & Co KG, Karlsruhe

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