

How ZEISS and LASERplusSYSTEMS are setting benchmarks in modern

MEASUREMENT TECHNOLOGY



The customized RayMarker® Flex XXL for marking of aluminum profiles

Carl Zeiss Fixture Systems GmbH (CZFS) develops and manufactures measuring devices at its Tholey site – primarily for the international automotive industry. Since October 2007, the company with its approximately 130 employees has been a subsidiary of Carl Zeiss Industrielle Messtechnik GmbH.

In the year 2000, CZFS launched the ZEISS CARFIT system, a modular construction system based on aluminium extrusion profiles. „With this system, we create the fixtures for measuring body parts as well as plastic parts for the interior and exterior of vehicles during development. The customer uses the fixtures in the prototype and pre-series phase and later in series production,“ explains Stephan Kirsch, Head of Product Management / Design at CZFS.

ZEISS CARFIT systems are the result of decades of experience in measuring and fixture technology. The systems are permanently developed further based on the know-how from the company's own fixtures and the wide range of customer applications. In order to ensure constant adaptation to current customer requirements and innovative practice in the build of test equipment worldwide, CZFS products are consistently optimised and perfected, as the following example shows.

NEW CHALLENGES THROUGH OPTICAL MEASUREMENT TECHNOLOGY

For a fast and cost-effective production of prototypes, modern methods have been introduced in vehicle development, which make the entire quality assurance process more efficient. For some years now, this has included optical measurement technology, which allows light-

ning-fast quality inspections and is therefore increasingly replacing tactile measurement.

For fixture construction, this change in technology in the field of prototype development has created a particular challenge.

„Previously, we built the fixture, and our customers' metrology technicians placed the fixture on a tactile, conventional measuring machine, inserted the component and measured it. For some years now, however, optical metrology has been gaining ground, where robots equipped with sensors take over the measurement. This has enormous implications for the design of the fixture,“ says Kirsch.

In addition to high precision and technical functionality of the fixtures, now flexibility, simplicity and cost-effectiveness increasingly play a role. Due to various factors, optical measurement has lower structural requirements for the fixture, which means that it can be designed much more simply. A measuring fixture becomes a holding fixture, so to speak, which, among other things, has an effect on the price the customer is willing to pay.

CZFS has reacted to these changed conditions and launched a new product under the name CARFIT lite, specifically designed for the require- →

About LASERplusSYSTEMS

Since the beginning of 2020, LASERplusSYSTEMS has been a division of the Global Retool Group and, within the framework of this group, continues the work of Laserpluss AG at the Idar-Oberstein site. Until that time Laserpluss was a company of the MAPAL Group. LASERplusSYSTEMS offers new laser systems for marking, engraving and cutting of various materials and thus continues a part of the product range of Laserpluss.

Both companies are linked in a technology and service partnership. MAPAL provides support at the sales level and, in addition, has numerous products from the areas of cutting and engraving in use in its own production.



Scanner unit with optics and extraction system



Visual inspection of a lasered profile

ments of optical metrology. CARFIT lite represents in principle a simplified „good enough“ version of the conventional CARFIT system.

OPTIMIZED CONNECTING ELEMENTS REDUCE ASSEMBLY EFFORT

During the development of CARFIT lite, numerous simplifications were made, from the basic materials and the large number of elements to the connection technology of the fixtures.

A key element of the fixture is the profile system, which accounts for around 80 percent of the components of a fixture. „By using a less expensive profile with less expensive connection technology, I can significantly influence the manufacturing price of a fixture. That's why we started from there - new profile, new connection technology,“ explains Stephan Kirsch.

To facilitate positioning during profile assembly, the connection points of the profiles were previously machined at great expense. In the development of the new fixture, this time-consuming and cost-intensive process was replaced by attaching a lasered dimensional grid to the profiles, which serves as an assembly aid and has become the distinctive visual characteristic of the new profile.

CUSTOMIZED SOLUTION

After the contracting out of laser processing to an external provider was rejected for cost reasons, CZFS decided to invest in its own laser system.



A thorough introduction to the control and operation of the machine facilitates the implementation of the system

This is where LASERPLUS AG, which was still part of the MAPAL Group at the time, came into play.

„We were looking for a supplier who could deliver a system that was tailor-made for us,“ says Kirsch.

Custom-fit solutions are the special strength of LASERplusSYSTEMS. Formed in 2020 from the former LASERPLUS AG, LASERplusSYSTEMS is

now part of the powerful Global Retool Group, which, with its subsidiaries SVQ and WEMA VOGTLAND, offers an innovative range of services worldwide in the fields of retooling, welding, laser processing and automation.

„The customer knows his problem pretty well - we make this our challenge,“ says Felix Bott, department manager laser markers at LASERplusSYSTEMS. „Together with the customer, we develop a solution that is individually tailored to

his requirements with adapted automation options that are optimally aligned to his production chain."

The system designed and supplied by LASERplusSYSTEMS ensures accurate, high quality and at the same time fast, efficient and cost-effective laser marking of the profiles.

The rectangular profiles made of black anodized aluminum are marked at specified intervals to give the product its typical fine lines. In addition to a clean, durable marking with a good contrast, an accuracy of the graduation marks of ± 1 tenth is required.

Since the marking is to be done circumferentially, the machine has a rotary axis with clamping device (4-jaw chuck) and a freely movable tailstock with counter tip. Components from 25 mm in length to 3 m in length are machined, and the diameters of the parts can vary from 10 mm to 200 mm. To cover the range of profile lengths, the machine is equipped with a belt-driven X-axis with direct path measuring system to achieve absolute accuracy.

A special challenge for the programming of the system resulted from the workflow at the customer's site, as the profiles are not labeled in batches, but project-related. This means that the profiles are picked for one project in different variants and lengths and just like this placed on a trolley for the operator at the machine. At the same time however, the machine had to be quick and easy to operate, with only low potential for operator error.

This task has been solved by using two different automatic detections in the machine. On the one hand, the type of profile is recognized via the fixture mounted on the machine in each case, and on the other hand, the length of the inserted profile is determined by means of an optical length measuring system that measures the path from the rotary axis to the tailstock. Both together result in a stored machining program with all the necessary information. The operator simply inserts a profile into a fixture, presses the start button, and the program for the respective profile runs fully automatically.

The set goal of an economic production of a simple and at the same time highly effective component fixture could be achieved with the help of the system from LASERplusSYSTEMS. The system was put into operation in August 2020 and has since been running to the complete satisfaction of Carl Zeiss Fixture Systems.

In addition, the professional competence and the comprehensive consulting by the LASERplusSYSTEMS team could convince the customer. „The team addressed all problems promptly and completely and presented us with suitable solutions," summarizes Stephan Kirsch.

Since the use of optical measuring systems is becoming more and more common in the automotive industry, CZFS might soon think about a capacity expansion and thus a follow-up project for another laser system. „In that case, we would like to bring LASERplusSYSTEMS back on board," adds Kirsch.

Individual concept development together with the team of Carl Zeiss Fixture Systems



Z-axis drive unit

