Panasonic
INDUSTRY

TRACEABILITY AND PRODUCT IDENTIFICATION

The first, second and third industrial revolutions (steam engine, electricity and mass production) have paved the way to the modern scale of production and to more efficient machines. For some time now, the often-quoted buzz words “Industry 4.0” and “smart factory” have also been knocking on the door. The convincing promise of Industry 4.0 and the smart factory has attracted billion-dollar investments in research and development from established providers such as GE (Predix), SAP (Leonardo) and Siemens (MindSphere). Branch analysts are quoted who predict that the winners in the age of digital transformation will be the smart factories that can use big data for decision-making in real-time. So what can we expect to happen in the foreseeable future? Instead of big data, cloud and AI scenarios, an intermediate step towards decentralization is more likely. The development of decentralized solutions for the management of individual products in manufacturing and post-processing allows automation to be more sustainably embedded in the production process. In order to achieve this, identification using a laser marking system from Panasonic and scanning of data is the crucial precondition for every smart factory in which machines, products and systems are linked along the value-added chain. The possibility of assigning every component an unambiguous ID creates a fundamental aspect of the “production flexibility” of Industry 4.0. The unambiguous component ID allows not only reliable identification during the whole production process, but also the chance to implement more dynamic and more efficient production routes down to lot size one. Information on the origin, storage, condition and location of materials, components and products is immediately available. The possibility of storing specific information on component characteristics in a code with high information density can significantly improve the production process. The continuous tracking of marked components is ensured by the individual laser marking.

TRACEABILITY AND PLAGIARISM PROTECTION IN THE AUTOMOTIVE SECTOR

Fuel injection nozzles of motor vehicles are given a specific laser marking in order to identify model and production batch; thanks to the individual DMC or QR codes, however, individual physical characteristics and correction data can also be transmitted to allow the inherent variability and manufacturing tolerances to be compensated. As soon as the injector is installed or replaced, the new injector code can be scanned and automatically transmitted to the engine control unit in order to record the necessary correction parameters and adjust the quantity of fuel injected. Safety-relevant components such as airbags or the tongues of seat belt systems can also be continuously tracked through the use of laser marking. In the event of malfunctions in these complex systems, it is then possible to clearly determine from which batch the component used originated. With this exact identification and after a cross-check with the database, quick, precise and effective consequences can be initiated.

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INDELIBLE MARKING

A laser marking is created by focusing a weak laser beam in such a way that the physical properties or visual appearance of the target material is minimally modified. Depending on the laser characteristics (wavelength, pulse width, energy or peak power density) and the material properties of the metal or plastic, different processes such as engraving, black marking, internal foaming, carbonization or coating ablation are possible. Most of these processes involve a change in the material color.

This strong interaction between target material and laser creates a permanent mark that is tamper-proof and exceptionally resistant – even under the most extreme environmental conditions. This indelible identification with the laser mark counters attempted plagiarism, because the marked component is and remains clearly identifiable. The fact that masks or predefined patterns are not required makes laser marking extremely versatile and dynamic in the creation of codes and graphics and hence permits interaction with visualization systems, position sensors and AutoID systems. The laser process component can thus be dynamically adapted from part to part.

PRECISE MARKING ON COMPLEX COMPONENTS

The LP-ZV series from Panasonic Industry is equipped with a 3D function,to mark concave and convex surfaces. Workpieces with different heights within a range of 50mm (±25mm) can be marked with this new technology. The laser beam diameter always remains stable in the marking field, ensuring high-level marking quality. The large marking field also eliminates the need for readjustment when sending workpieces with different heights on the same production line. This feature significantly reduces set-up, installation, and construction costs.

More information on the LP-ZV marking lasers can be found here

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PANASONIC LASER MARKING SYSTEMS - BENEFIT FROM OUR VAST EXPERIENCE

Panasonic Industry has played a leading role in defining and developing the market for laser markers: The company presented the first fiber laser for industrial product marking to the international public in 1999. In the following years, Panasonic has developed further laser markers whose innovations set benchmarks even today: With the MOFPA technology – a type of post-amplifier technology to increase the pulse peak power with selective pulse width control – Panasonic Industry has improved the contrast of laser markings and made it possible to create colors on steel. The 3D laser beam deflection unit for marking complex surfaces is also one of the development steps that are regarded as milestones in the industry.