Champs Inspection Technologies: Your Partner in Quality

Preface

Mechanical fasteners, such as screws, nuts, bolts, rivets, washers, fittings, forged, moulded, or turned components are widely used in many industrial sectors. Most of these components are used in special sectors such as aerospace, automotive, or electronics, where they play key roles in safety applications or functional parts.

Requirements for Safety and Automation

For these applications there are very stringent quality and performance requirements explicitly specified in International Standards which manufacturers and customers are required to refer to. If safety is the first reason why it is necessary to apply the highest quality standards, even the high degree of automation of the production plants always makes it necessary to use components without defects. Within automated lines, the assembly or welding of a single faulty fastener, even in non-critical areas, can compromise the integrity of an entire line.

OEM (original elements manufacturers)

In this context, OEMs are often required to provide products guaranteed according to stringent criteria both in terms of quality and performance of the individual component and of the overall conformity of the supply. There are international standards such as ISO 3269:2002 and UNI EN ISO 16421:2005 which respectively specify test procedures for lot acceptance and the requirements of quality assurance systems for fasteners that manufacturers and distributors can apply.

Quality: Zero Defect goal

The primary common interest for customers and suppliers converges on supplies with increasingly higher quality standards that are as close as possible to the 'zero defect' goal. For fasteners manufacturers, the 'zero defect' goal implies a continuous effort to improve production processes through a very careful management in the phases of production, in the phases of handling and storage of the components lots and, in particular, in the phases of 'in process' and finished product quality control.

Actual Conditions

If we set such a goal for ourselves, it is necessary to take separate actions to identify two categories of defects and minimize deviations: non-conformances due to systematic process characteristics (such as dimensional variations due to wear of the matrices, variations in hardness, thickness of thermal coatings) and those related to non-systematic process characteristics related to any kind of inconvenience not 'statistically predictable' in the process.

If through statistical process controls (SPC) it is possible to minimize systematic non-conformities by foreseeing their course, it is not possible to adopt statistical sampling to detect non-systematic deviations. These often-serious defects (for example cracks, lack of threads, or reverse threads, presence of burrs or dents, excess coating, accidental presence of foreign bodies, measurement defects, etc.) can only be identified using the best 100% inspection tools.

Precisely because of the presence of non-systematic non-conformities, with production lots of more than one million pieces/year,

dozens of parameters with centesimal tolerances and product acceptance thresholds that can be set at less than a dozen parts per million, the sampling checks, manual checks, or obsolete automatic checks are no longer a valid solution.

100% Inspections

In this context, 100% inspection machines, in addition to being a guarantee of safety and reliability, are no longer an option but a necessity for manufacturers.

Outstanding Inspection Performances Champs

Over the past 15 years, 100% Inspection systems have experienced a substantial increase in operating capacity and performance.
In this context, Champs has always played a pioneering role by developing the most advanced automatic inspection solutions for fasteners. With models able to reach sorting speeds of 1000 pieces per minute, analyse dozens of complex parameters simultaneously on the most varied types of components, and perform measurements with tolerances in the micron order, the company is able to meet the most complex needs.

Inspection Technologies

A complete range of inspection devices allows automatic and extremely reliable detection of flaws in dimensions or attributes on every single product component.

The Optical Inspection Units are the main method of inspection; almost every dimensional parameter linked to the geometry of the piece can be optically measured with tolerances under one hundredth of a millimetre, as well as dents and burrs, thread defects, assembly defects in composite components, etc.
Optics able to eliminate distortions or frame at 360 degrees critical parts of a fastener coupled with high-definition sensors managed by a powerful Artificial Vision software make these inspections a fast, accurate, and completely reliable methodology for a large set of defects.

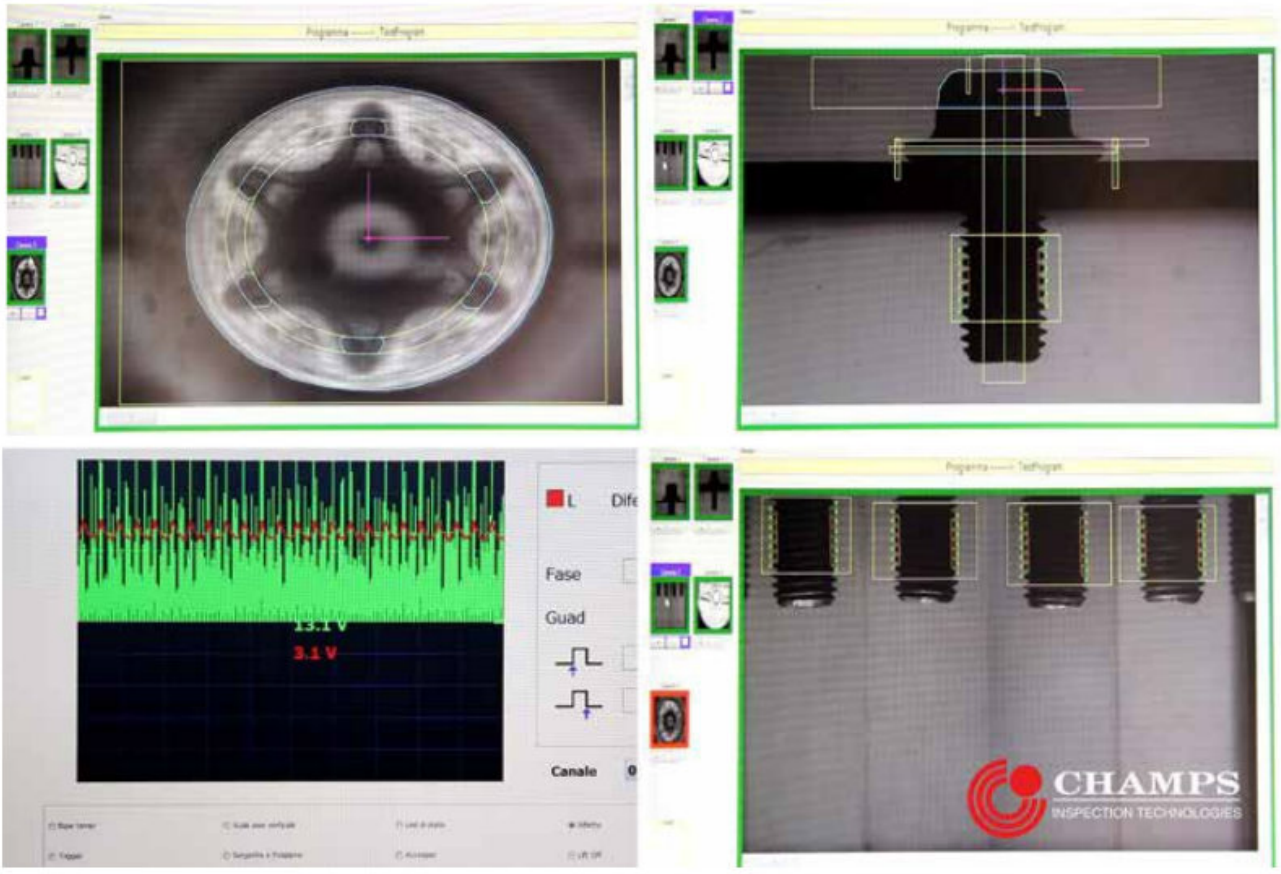
Less evident defects such as small cracks, threads, or related to the characteristics of the material, like heat treatment or hardening, are instead carried out with Induced Current Probes. For the identification of these critical defects, Champs has developed a series of units dedicated to the inspection of cracks on the head and underhead, for washers, bushings, and valves on both continuous and stepper machines.

In many cases where the shape of the piece or parts of it does not allow optical inspection, inspection units with Callipers and Mechanical Probes are used. This is the case of the inspection of deep or small-diameter threaded holes, tread and depth inspection, or measurement inspection through feelers; the latter are also used for details with tolerances in the order of few micrometres.

Laser and 3D scanning devices are other options available for dimensional and complex shapes inspection, respectively.

Albatros, New MV Software for Unprecedented working Speed and Precision

The desire to offer customers tools that incorporate state-of-the-



art Machine Vision has led Champs to develop the new image analysis software 'Albatros', which from 2019 will be installed on all our machines.
The engine of 'Albatros' is the Halcon libraries of MVTech, whose architecture allows complete elaborations in times ranging between 2 and 25 milliseconds per image. In combination with high-end hardware (optics, sensors, transfer protocols, and CPUs), they allow complex and multi-parameter image analyses, precision within one hundredth of a millimetre, and working speed of over 1000 pieces per minute combined with unprecedented reliability.

Other advantages of 100% Inspections

In addition to guaranteeing qualitatively impeccable productions, the installation of 100% Inspection machines - in line with Industry 4.0 - allows real-time monitoring of the status of the selection, a more accurate identification of any process errors, real-time statistical reports on parameters and deviations, on good waste percentages, and on the activity of the machine, and a connection with the company's ERPs.

100% inspection allows an immediate analysis of the scrap parts, carrying out internally and in much faster times the journey of 'continuous improvement' aimed at correcting process errors.

Avoid contamination with Packaging and Labelling

In order to further increase the reliability of your product upon delivery, at the end of the inspection we can provide packaging or bagging and marking solutions that are fundamental both to exclude accidental contaminations of the selected lots and to guarantee maximum precision in the traceability of each production lot.

Champs' 100% Inspection Machines

Champs offers turnkey solutions for 100% Inspections, long-term assistance and advice to achieve the highest quality standards.

A range of 7 models of 100% Inspection machines, the result of 35 years of experience, are able to fully meet the needs of a wide and varied market. Modular plug-in technical solutions are designed to easily configure the machines, making tailor-made solutions possible based on the type of component to be inspected and on the inspection needs.

Your Partner for Quality

For many companies, adopting an inspection system is an important step, an investment that often corresponds to the need for growth and repositioning on the market.

Knowing this, Champs provides to each customer, along each stage of this journey, from consultancy to testing, its sales technicians, true tutors to work with from the choosing phase to the delivery of the inspection machine. This assisted process leads both to the full satisfaction of the customer's quality requirements and to the guarantee that the investment is quickly rewarded by the market by ensuring very short amortization times. ■