

HxGN SMART QUALITY

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An intelligent approach to quality data and measurement resource management

The concept of HxGN SMART Quality forms an essential pillar of the Hexagon Manufacturing Intelligence strategy. This strategy is about the vision to put smarter manufacturing into practice. This article has a closer look at HxGN SMART Quality and examines some of its fundamental aspects.



WHAT IS HxGN SMART QUALITY?

At first glance, the answer to this question seems to be a simple description of the software's functionality. However, this description would be too short as it would neglect the main idea and customer benefit. However, we would like to

start with a brief product description: HxGN SMART Quality is an integrated, web-based software platform combining tools for the statistical evaluation of quality-relevant features with a rich toolset for managing all the resources involved in measurements, such as coordinate measuring machines (CMMs).

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There are two areas that will challenge us in the industrial production in the future. From the customer’s perspective, greater personalisation and customisation of the products are required leading to increased quality requirements. The second challenge is the technological development we will have to face. Smart and connected devices or machines and the “Internet of Things“ (IoT) will characterise this development.

To enable our customers to meet these new challenges, HxGN SMART Quality consists of three core areas: Connectivity, Statistics and Resource Management.

Connectivity



Connectivity is the first step towards building a “smart factory”. This is the reason why HxGN SMART Quality offers an extensive set of tools for connecting a wide range of measuring instruments, ranging from handheld measuring instruments to CMMs and even to production machines in the future. As an integrated platform, one main goal is to continually expand this connectivity to steadily increase the number of supported vendors as well as the amount of available data from the measurement devices. The advantage is clear: connecting the greatest possible number of measuring instruments and storing data centrally in a single database.

Statistics



A key feature of a “smart factory“ is that quality data is both available and used for production and product development. This could be implemented through a user-specific formatting and representation of data, or by a direct inclusion of quality-relevant data in production. This is also referred to as “intelligent feedback loop”. HxGN SMART Quality is completely compatible with Q-DAS statistical software products for this very purpose. The platform thus optimally embraces the new importance of quality data.

Resource Management



Delivering products of the required quality means expenditure. Measurements must be taken regularly occupying personnel and measuring instruments. It has long been perceived that these expenses do not directly add value to the final product. The aim of the resource management toolset of HxGN SMART Quality is to consider these efforts and to optimise the utilisation and the processes. In the end, this will also have a positive effect on costs. HxGN SMART Quality thus reconciles the quality requirements for products and the costs incurred to assure product quality.

QUALITY HAS ITS PRICE

This statement does not just mean that high-quality products cost more, but that it also requires costly effort to generate and maintain a product’s quality. Achieving quality requires different measuring instruments and trained personnel. Both resources are often perceived as not directly adding value to the product. HxGN SMART Quality offers a solution to optimise these “non-productive“ expenses.



The Resource Management of HxGN SMART Quality helps increase the efficiency, effectiveness and capacity of the applied measuring resources. On the one hand, unplanned downtime can be reduced by real-time monitoring of the measuring devices. On the other hand, the reporting functionality allows detailed analysis of the collected machine data for continuous optimisation of the workload.

Many unscheduled standstills are caused by unspecified processes, for example if a part is measured using an outdated measuring routine. For this reason, HxGN SMART Quality offers an integrated workflow concept to accompany users step by step through defined and customer-specific processes to achieve the desired results. The current status of all running workflows is shown clearly including various additional information such as current step, progress or assignee information, and additional text information about the step. The software sends an automatic note in a timely manner to inform the workflow owner about an open unsigned step or send assignment information to the assigned staff.

Likewise, the current status of the measuring device is clearly displayed using the integrated dashboard. This means that if a measuring device stops unexpectedly – say due to a forklift collision – measures can be taken to reduce the downtime.

HxGN SMART Quality is even able to reproduce the organisational structure of a company, starting with the entire factory, then subdividing by individual sub-plants and breaking it down even further into individual measuring instruments. This allows measuring room managers to focus on their own measuring instruments while contributing to the optimisation of processes in the entire plant and thus driving productivity.

Besides the availability of pure measurement data, the number of data sources is now extended to include environmental data, such as temperature, humidity, pressure, etc. Another new data source is the measurement system itself, which tracks the utilisation continuously and helps customers make decisions about their assets. Both new data sources can be used in different time frames. For instance, in the short-term they can be used to reduce unplanned downtime, or for maintenance or asset management in the long-term. These previously unused data sources and the actionable insights they provide are essential for organisations to streamline operations, drive productivity and work towards achieving the principles of Quality 4.0.

DATA AS A KEY TO OPTIMISATION OF COSTS AND REDUCTION OF EXPENSES

After all, it is not only newly obtained data (measurement system data and environmental data) that help to positively influence the balancing act between quality and the costs that arise to ensure this quality. Of course, the pure measured values, in addition to the identification of the quality of a component, also have an appreciable influence on the optimisation potential of the quality costs.

In this area, HxGN SMART Quality builds on the standard DFQ file format developed by Q-DAS with the Advanced Quality Data Exchange Format (AQDEF) – a worldwide, industry-proven standard for handling measurement system ratings. Because of the extensive experience that Q-DAS has in this field, many different measurement systems are already able to natively offer this file format. Suitable converters are simple to develop, so there is hardly any measurement system that cannot generate DFQ files and thus be usable for HxGN SMART Quality. This fact underlines the claim of HxGN SMART Quality to be an open platform to a considerable extent.

But how can the data gained help to reduce or optimise the necessary effort? Data can even support customers in fields that go beyond the classic applications of measurement data, such as the management of quality control charts or the determination of quality indices (e.g. C_p and C_{pk}). Already today, these methods are used to reduce the number of samples and features to be measured under certain circumstances, namely when the statistically determined index has the required values and the characteristic can be regarded as “stable”. Most of these data are stored locally and used for optimisation locally and manually.

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HxGN SMART Quality provides all the data obtained centrally, regardless of the product, machine or standard, and thus offers the opportunity to centrally evaluate and process them. HxGN SMART Quality thus analyses all incoming and historical data and determines differentiated recommendations for each individual product, either to reduce the number of subgroups or, of course, to increase it again when it has a negative impact. If necessary, the platform may even “comment out” individual measurements from the measurement program. The respective information is presented in a simple and well-directed way to the user. In addition, HxGN SMART Quality offers the ability to start a suitable workflow directly based on the discovered potential and thus to exploit this potential. Both measures have considerable potential for savings, especially in terms of time, but ultimately even in terms of costs.

HxGN SMART Quality is even able to use the collected data directly. It shows the measurement data in a simple green/red display on a dashboard. Deviations from specifications are immediately identified and displayed in red. With the help of drill-down functionalities, users access further detailed information and, if necessary, are able to take additional measures immediately and centrally for a local effect.



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