

Project Information

Topic: **Concept and realisation of innovative series manufacturing for fuel cell systems for the manufacturing location Burbach.**

Applicant: Rittal RSB Schaltschrank-System-Bau GmbH & Co. KG
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Project description:

The fuel cell technology is currently undergoing the transition from a pacemaker to a key technology. The demand for fuel cell applications is enormous and continues to grow. One problematic aspect, however, is the present price/performance ratio of fuel cell applications compared to conventional energy generation and energy backup systems. The reasons are complex. Alongside the relatively high market prices for the fuel cell stacks, there are further significant cost factors which arise from the manufacturing technologies for the overall application. In most cases, prototypes are set up under laboratory conditions and brought onto the market as test installations.

Within the framework of this R&D project, and thus for the first time, a flexible and innovative concept for series manufacturing is to be elaborated, implemented and accompanied through to optimum market maturity in trial operation.

A further aim of the project is to develop a manufacturing system capable of satisfying the demands expressed by the market with regard to the scope of variants to be produced.

The concept of innovative flexible manufacturing envisaged by Rittal for fuel cell systems is geared to achieving the highest possible quality at favourable manufacturing costs, especially against the background of small batch sizes and constantly changing configurations of the most varied components. One particular innovation is the use of the latest information technologies to support the individual process steps and stages of the production workflow. Alongside augmented reality¹ displays to assist assembly, the whole logistics chain is to be enhanced by way of data matrix² and RFID solutions³.

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In addition to the actual manufacturing technology, special importance is to be attached to the necessary conditions for the safe handling of highly volatile fuels such as hydrogen and biogas. Furthermore, a concept for a storage and supply infrastructure for the fuels is to be implemented. Other fuels, e.g. methanol and ethanol, similarly play a significant role.

From the very beginning, the manufacturing cell is to be set up by the team which will later test series production. Consequently, appropriate training measures are to be organised with regard to both the technology itself and the handling of hazardous substances. The know-how gathered within the framework of the project is to be made available to other staff by way of a knowledge management system.

¹ **Augmented reality**

The fitters in the assembly area are provided with additional information on the required assembly sequence and the execution of individual assembly steps by way of an augmented reality headset. This information also takes into account the relevant system type, the corresponding components and any changes to the standard system configuration.

² **Data matrix**

Data matrix labels are attached to all significant components and modules. They carry the serial number of the component and further information on its purpose and type. The computer on which these data are stored is synchronised with the computer which writes the data to the RFID chip of the overall system.

³ **RFID**

The RFID chips are attached to the complete systems and carry all relevant information on the fuel cell system concerned. This information can then simply be read out at downstream process stages (e.g. storage, transport, delivery, maintenance, servicing), and any changes to the system status can be recorded on the RFID chip.