Automatic along the whole line

MOBY identification system controls SIRIUS contactor assembly line in the Amberg plant

The contactor market is increasingly demanding customer-specific versions with short delivery times, but with the same high requirements regarding quality and reliability. When it comes to the SIRIUS contactor production, Amberg is fully depending on the MOBY-I identification system for optimum material flow control in the semi- and fully-automated assembly lines.

Fully automated and fast production demands the appropriate product concept. This was consequentially implemented for the contactors from the SIRIUS product family: They consist of just a few modules, whereby the number of module versions is low. But in spite of this, over 500 different contactors are manufactured using the various modules and parts.

Fully-automatic assembly line for large batch quantities

The contactor final assembly line was planned, manufactured and installed by the Siemens Specialist Center for Assembly and Test Units in Amberg (which is also responsible for external customers) as an independent project, and included all of the test equipment. It consists of 21 assembly cells which are interlinked with a unified workpiece carrier system. There are approximately 800 workpiece carriers in circulation, which are equipped on the lower side with an MDS 302 mobile data memory (2 kbyte RAM) of the MOBY-I system.
These workpiece carriers act as transport unit as well as the assembly platform for the SIRIUS contactors. A maximum of 2048 characters can be stored in the mobile data memory. This is sufficient to be able to store the test- and quality data in addition to all of the production parameters.

At the beginning of the line, the SIMATIC control writes the production-relevant data, which are made available from the higher-level PPS-system, onto the MDS of the particular workpiece carrier using a MOBY I read/write device. A MOBY-specific board (ASM 400/CM422) is used to integrate MOBY into the SIMATIC control. A maximum of 4 read/write devices can be connected to this board via a serial cable, and they can be operated in parallel. When reading or writing low data quantities into the MDS, the clock cycle time is only influenced by the mechanical design. This means that clock cycle times of just a few seconds can be realized.

**High quality and reliability**

Production parameters are contactlessly read in each individual cell before assembly. The contactor is immediately tested after being assembled. The test result is written onto the mobile data memory in the workpiece carrier via a second read/write device. This means, that the process image, generally used in the production control- and cell computers for material tracking and information input at the individual stations is eliminated. The cell- and production control computers only communicate with one another when faults occur. The reliability when using MOBY is increased as the production progress is saved in a non-volatile fashion in the mobile data memory.

The high production quality is guaranteed by numerous integrated quality checks. Further, a fully-automatic testing unit is installed at the end of the assembly line, which tests the main performance parameters of the individual contactors in a three and a half second clock cycle. The test unit receives the test data, which are of course dependent on the particular version, automatically from the MDS on the workpiece carrier using a read/write device. The type labels and device covers are then labeled using lasers. An automatic packing unit is located at the end of the fully-automatic assembly line.

For small batch quantities, from one unit and above, and special versions, the contactors are produced on a semi-automatic line without workpiece carrier. The different batches are separated using a so-called dummy contactor, whose data carrier stores all of the data required for the following devices. These are read-out at the appropriate assembly stations. This guarantees that even small batch quantities can be cost-effectively manufactured with the same quality as the fully-automatic assembly line.

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