

**Industry: Mechanical engineering / feed systems**

**Products: Servo drives, controllers**

# A compact tray exchange system for delivering small parts to assembly lines

Automatic component feed systems play an important role in many current assembly and manufacturing lines. The German mechanical engineering firm BWM has designed a new variable tray and pallet exchange system for the telecommunications industry, with compact dimensions and very precise positioning performance. Controller and drive systems from Mitsubishi Electric ensure that the autonomous feed station operates very reliably.



The new Trayfeeder system developed by Bremer Werk für Montagesysteme (BWM) uses special part transport trays made of metal, plastic or Styrofoam, on which the fragile parts and assemblies are fed correctly and continuously to the assembly line. These trays ensure that the right number of parts of the right quality are delivered to the right place at the right time and positioned correctly for assembly. Using the trays also shifts the complex tasks of sorting and positioning the parts away from the assembly process, thus increasing productivity.

First, a stack of trays filled with parts for assembly is fed into the system. A short conveyor belt transports them into the Trayfeeder station, where each tray is picked up by a vacuum gripper or a fitted holder, depending on the individual application. The individual trays are then transported forwards to the removal station and positioned. A robot picks the parts from the trays and transfers them to the assembly line. The empty trays are then removed and stacked in a second temporary storage location in the Trayfeeder station.

The Trayfeeder system is very versatile and can be retooled for new products quickly. There is virtually no restriction on the shape of the products that can be handled. Trays of different sizes can be used to help maximise system throughput capacity. The system is fed from behind, which makes it possible to install several Trayfeeders directly next to one another. Typical applications include assembling small parts and palletising high-quality items at machine tools and plastic injection moulding machines.

High performance and minimum dimensions were the top development priority. The switchgear cabinet and controller systems are installed under the conveyor belts. Depending on application requirements, the system is fitted either with compact or modular controllers from the MELSEC FX (compact) and MELSEC System Q (modular) series. Use of MELSERVO MR-J2-Super servo amplifiers and HC-MFS servo motors from Mitsubishi Electric also helped to keep the system size down. No other manufacturer was able to deliver such a high-precision system that could be installed in such a small space.

The servo drives are connected to the controllers either directly with positioning modules or via the MR-MG30 gateway module. This module connects Mitsubishi Electric's high-speed SSCNET servo network (cycle time 0.8ms) to a Profibus-DP network, enabling up to six servo drives to be controlled on a single link. No special SSCNET programming is required. The compact design and the autonomous controllers make it possible to use the Trayfeeder either at or in assembly cells, and to install it in existing systems.

First published in August 2007 by Mitsubishi Electric, based on information provided by Bremer Werk für Montagesysteme GmbH.