In Syntegon Technology's food and pharmaceutical packaging lines, robotics – in this case pick-and-place robots – are seamlessly integrated into the control technology using TwinCAT software.

TwinCAT Motion for system-integrated robot control

Robots are freely programmable motion machines with multiple axes, which typically perform handling tasks, but can also perform manufacturing processes. TwinCAT Motion software products provide programmable logic control functions for robotics, as well as kinematic transformation functions, which are independent of actual robot mechanics.

TwinCAT Kinematic Transformation (TF511x) provides a large and continuously expanding selection of parameterizable kinematics as well as the option of implementing customer-specific kinematics. As a result, machine builders can adapt the robot's mechanics to the task at hand, in addition to the option of using robot mechanics from the market. Individual kinematics can also result from mechanically coupled movers of the novel XTS and XPlanar transport systems (p. 30).

Robot movements are typically programmed in Cartesian coordinates, for which the standard function blocks in TwinCAT NC PTP (TF50x0) can be used. For handling tasks, users should program smooth and overall consistent path movements to achieve high cycle rates, gentle robot operation and safe product handling. For this purpose, the TwinCAT extension Motion Pick-and-Place (TF5420) with Coordinated Motion offers special procedures for looping over motion commands as well as cycle-time-optimized processing of motion commands in synchronized interaction with conveyor systems (Conveyor Tracking). These tools allow application-oriented programming of handling tasks with little effort.

With TwinCAT Motion, tasks such as the setting of glue beads, waterjet cutting and profile machining, which were previously mostly reserved for processing machines, can be performed by robots. The modular principle of TwinCAT Motion enables the execution of G-code (DIN 66025) with TwinCAT NC I (TF5100), and cam plates in combination with kinematics with TwinCAT NC Camming (TF5050). A wide range of functions are available for synchronizing robots with each other and with other movements, from simple axis couplings to flying saws (TF5055).

For the integration of conventional robots, specific libraries – such as TwinCAT Robotics mxAutomation (TF5120) and TwinCAT Robotics uniVAL PLC (TF5130) – can be integrated into TwinCAT, enabling commands from the PLC. Stäubli robots can also be integrated directly into TwinCAT via the uniVAL drive solution and programmed via TwinCAT Motion. Consequently, TwinCAT Motion enables the complete integration of robots into the universal TwinCAT system resulting in the control of a complete manufacturing line with just one controller. TwinCAT's robotics functionality will continue to expand to include even more advanced functions, such as workspace monitoring.

Left: Klaus Bernzen, Product Manager TwinCAT, Motion Control and Robotics
Right: Marlene Arntz, Product Manager TwinCAT, Motion Control and Robotics

More information:
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