Adaptive machine technology

New flexibility in medical device assembly

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP

Situation

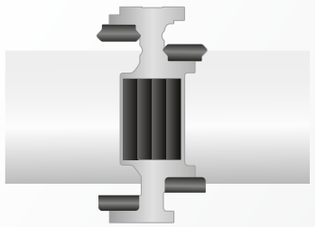
Medical advances. Changing markets. Endless pursuit of optimized outcomes.

To be successful, medical device manufacturers need to address the challenge of rapidly changing demand.

Practical challenges

- Make-to-order vs. make-to-stock
- Custom devices and kits
- GAMP compliance and serialization
- Streamlined assembly
- Instant changeover without human intervention
- Reducing operational costs and dependence on inconsistent manual labor

Adaptive machine technology



Intelligent track systems

Machine vision

Robots

Digital twins

Adaptive machines change their processes according to the devices being produced, rather than forcing the devices to conform to a rigidly sequential production process.

The ability to automate these dynamic changes efficiently has emerged from the integration of key technological breakthroughs into a single system.

The backbone of the adaptive machine

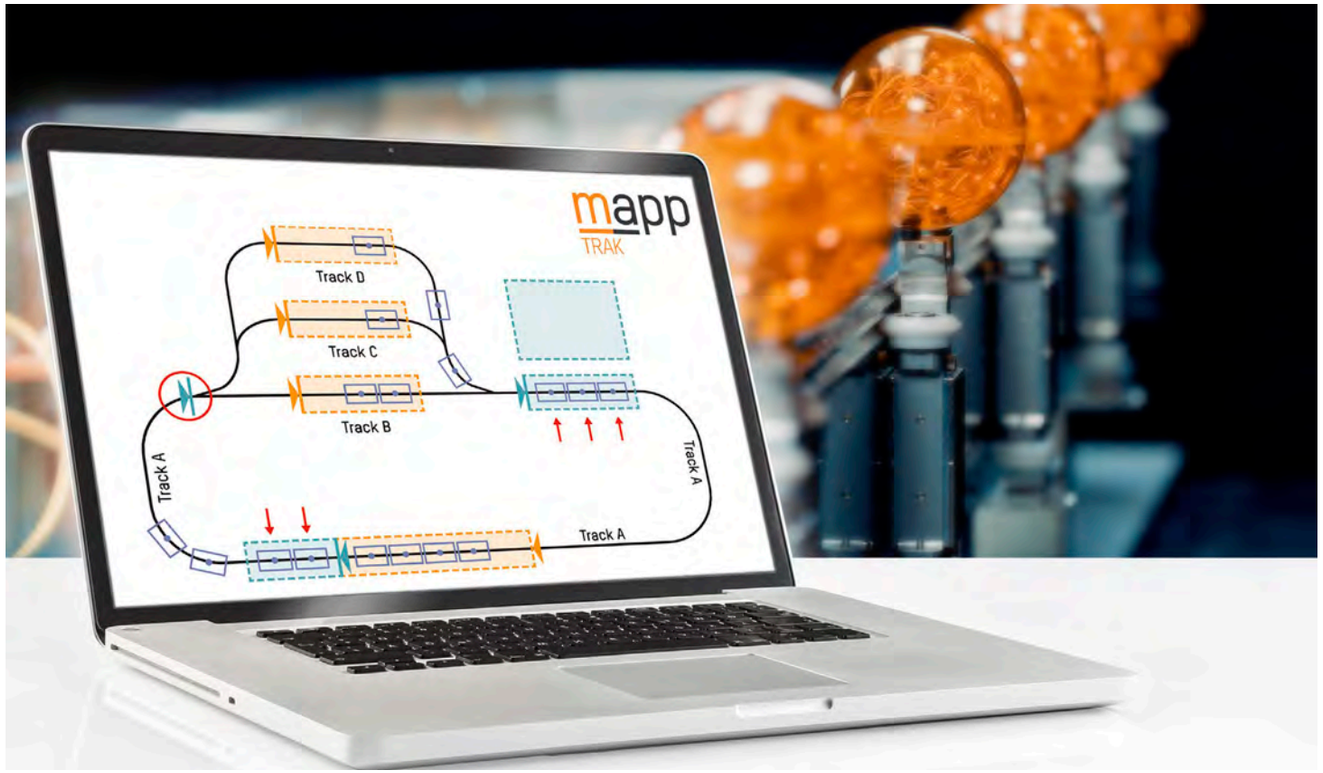
The backbone of an adaptive machine is an intelligent track system, which consists of individually controlled shuttles running on an array of electromechanical tracks. Although a track system may appear deceptively similar to a conventional assembly line at first glance, it provides the unprecedented capability to run multiple product types simultaneously.

Among the features that make this possible is the ability to divert shuttles around one workstation to another. Independently controlled shuttles each follow their own unique path through the line, skipping some stations and visiting others as needed.

Load-balanced parallel stations maximize output per square meter of floor space. Divergent flows merge on the fly to form custom kits and packs at full production speed - all perfectly orchestrated by a central control system.

In costly clean room installations, a track system can pay for itself in footprint savings alone.

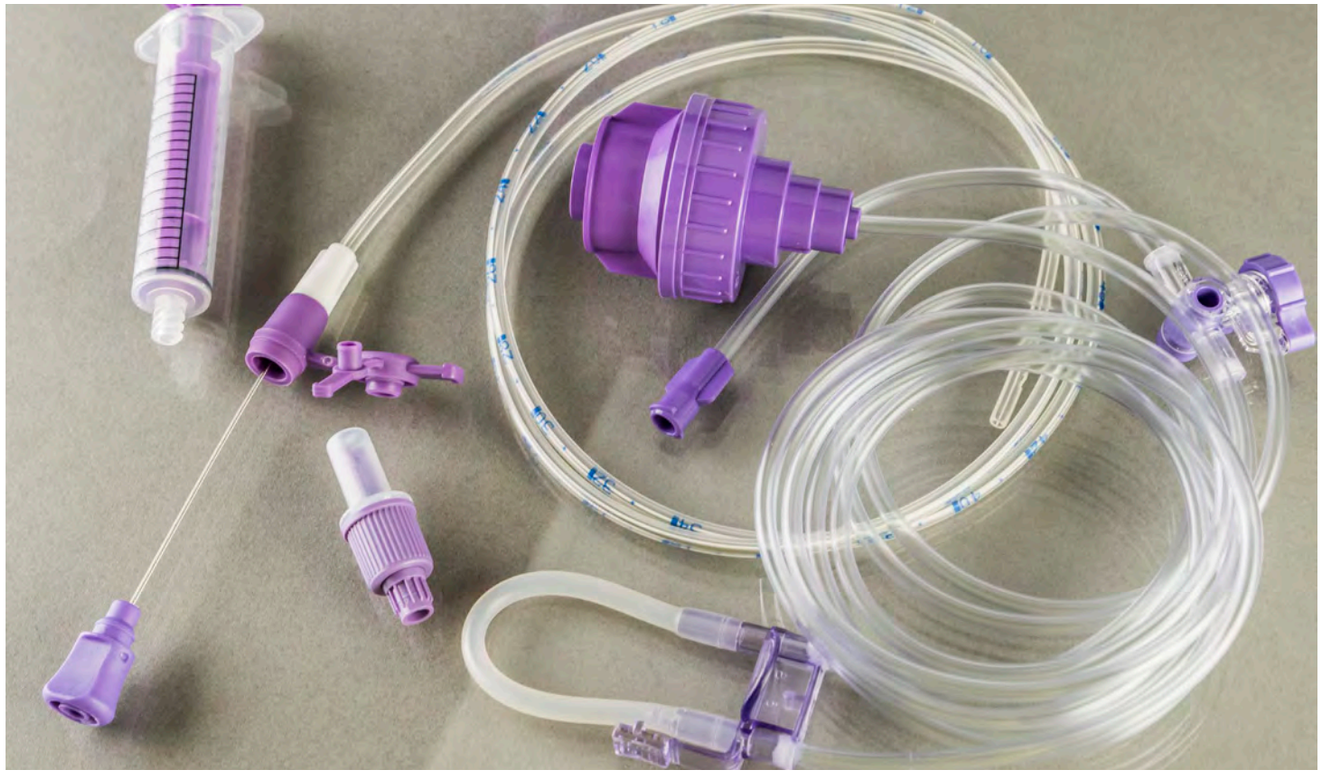
The role of the digital twin



Different shuttle configurations and track layouts can be simulated using a digital twin to optimize line performance before any commitment to capital expenditure is made. Virtual commissioning reduces total cost of engineering and time to market.

Digital twins also allow ready reconfiguration of the installed track system's modular components to quickly adapt to new applications. And, digital twins provide built-in documentation for system planning and validation.

Example: Parenterals



Parenterals are a prime example of medical devices that benefit from adaptive machine flexibility and control. Adaptive machine technology is especially well suited to personalized therapies and clinical trials, where small batches and variable dosages might otherwise require manual processes.

- Personalized therapies, clinical trials
- Self-administered, single-use, needle-free
- Pre-filled syringes, autoinjectors, simple injection
- Flexible dosing, wearables, combination products

Example: Fluid bags

Fluid dispensing and collection bags are increasingly customized for the use of combinations of pharmaceuticals, along with disinfectants, nutritionals and related fluids, making adaptive machine designs popular among suppliers and contract manufacturers alike.

- IV bags, infusion bags, dialysis bags, fluid collection bags
- Die and port tooling, boat ports, round ports, flexible tubes
- Spikes, injection ports, stoppers, special connectors
- RF welding, short runs, materials, sizes, shapes
- Mono- or multi-layer film, single- or multi-chamber bags

Applications abound

The adaptive machine has a bright future in medical device manufacturing, assembly and packaging.

Potential applications

- Implants
- Inhalers
- Orthodontia
- Orthotics
- Prosthetics
- Surgical kits

What early adopters are saying about their adaptive machines

"This will help us achieve **changeover times of less than 10 minutes** with no manual intervention."

"We will soon see **OEE over 85%** for the first time ever."

"We expect to **triple line productivity** from 40 to 120 ppm."

"**Fully automated, 100% quality control** for tasks such as checking the tightness of cartridges after friction-welding or for track & trace operations will give us a major advantage."

"**Reducing manual labor** has advantages in terms of both costs and worker recruiting."

"Implementing these new automated solutions will help us **significantly reduce our total cost of operation**."

"The adaptive machine solution **reduces the amount of space** needed in clean rooms."

"This brings us closer to our goal of **line clearance times under 5 minutes**!"

"**Automated generation** of electronic manufacturing documentation is no longer simply a pipe dream."

B&R
Industrial Automation GmbH

B&R Strasse 1
5142 Eggelsberg, Austria

t +43 7748 6586-0
f +43 7748 6586-26

office@br-automation.com
www.br-automation.com

Your local contact
www.br-automation.com/contact

MM-WP-M0-AM4-EN-01