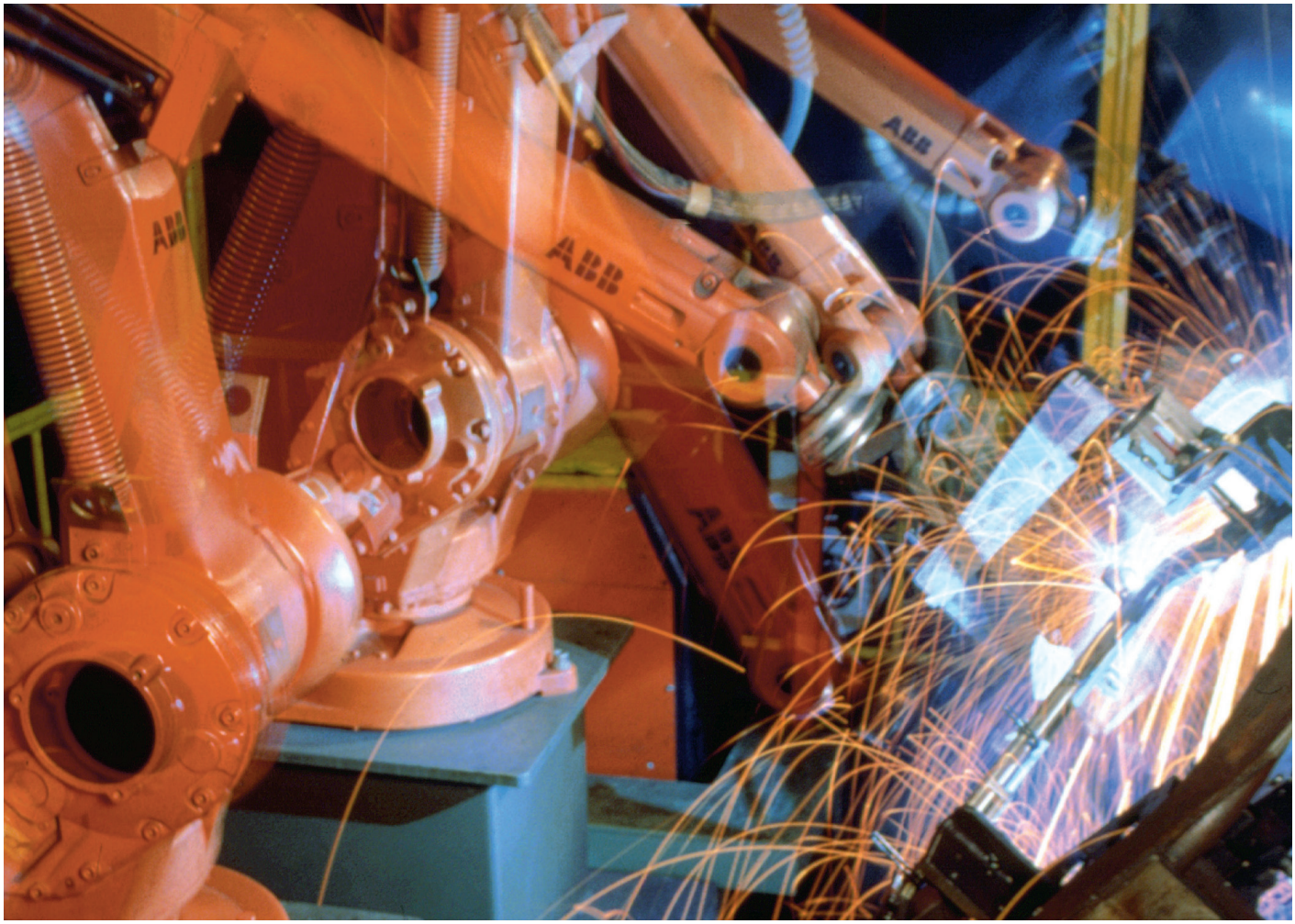
Robotics

Getting motion under control
Case study: Motion Tecnology



In the tough world of robot performance, power and speed need to be married to control and precision. Like no other major supplier of automation solutions, ABB has unlocked the mysteries of how to find the perfect fit.

Best by test – year after year

It's people like Karin Vickerius, product engineer for RobotWare software, who help promote this fundamental insight at the heart of ABB Robotics' Motion Technology philosophy. To Karin, the trend in recent years is clear: "I have seen how ABB's Motion Technology outperforms the competition's." A keen appreciation of client needs – quicker cycle times and greater production speed – has given her the opportunity to witness first hand how vital robot precision and control really are.

Man versus machines

Robots are complex machines. Anything less than perfect acceleration and deceleration – despite the obvious impact of inertia and gravitational forces – spell disaster. As Karin is quick to point out, "Working with your arms close to as opposed to stretched out from your body is a lot easier. This applies equally to robots – though clients expect perfect performance from the machines every time!" In order to cater to all the challenging and disparate market needs, ABB has had to fi nd a way of making a multitude of complex, hi-tech solutions work in unison.

Getting motion under control

“Thanks to ABB’s pioneering work in this fi eld, components like gears, motors and transmissions can be designed to give optimal performance at all times,” says Karin Vickerius, product engineer for RobotWare software, ABB.

Smart software

Path accuracy, speed profi le, cycle time, programmability and synchronization all belong under the umbrella of Motion Technology. The enhancement of these key individual parameters has enabled ABB to improve quality, boost productivity and ensure the most reliable robot performance on the market.
But the company needed to leap into the unknown to achieve its aims. The breakthrough, which has had tremendous impact on the marketplace, came with ABB’s shift of focus from purely mechanical performance to the development of smart Motion Technology functions in software. As Karin Vickerius explains: “Thanks to ABB’s pioneering work in this field, components like gears, motors and transmissions can be designed to give optimal performance at all times. A further bonus is the elimination of mechanical devices, such as collision detection systems.”

Robots with all the moves

The essence of an ABB robot’s Motion Technology is a dynamic model housed in the main controller computer. It includes all the necessary dynamic parameters, such as moment of inertia, from which the accelerations and speeds needed to follow the programmed path are calculated. This information is the basis of QuickMove, a standard on all ABB’s state-of-the-art controllers. Thanks to Quick- Move, cycle time is kept to a minimum by ensuring maximum acceleration at every moment. In fact, tests keep revealing that ABB robots outpace the competition by as much 25% in terms of cycle times.

Furthermore, TrueMove, another cornerstone of ABB’s motion control package, ensures that the path followed remains the same – regardless of speed.

In Karin Vickerius’ words, “not only does this give consistently accurate path holding, it also eliminates the need for path tuning when speed is adjusted on-line. And with the help of Absolute Accuracy, developed in partnership with BMW, the IPK Fraunhofer Institute in Berlin, Tower Automation and Volvo, clients can enjoy even greater precision in off-line programming.”

Lord of the rings

ABB is in the unique position to be able to draw on application experience gained from more than 115,000 robots installed the world over. One such case, where the client shall remain anonymous, is a colourful example of the power of ABB’s motion performance.

The customer wanted to paint oval shapes on a spherical surface, a job demanding absolute precision. Due to the angle of the robot tool, the end result saw some minute blotches (<1 mm) in the paint where the robot re-positioned itself, right at the start of the oval part of the geometrical figure. Karin sums up: “I was part of the team that found a way of developing a robot tool algorithm that eliminated unwanted blotching.” And ABB’s reputation as a great motion performer remains untainted!

FACTS

Motion technology

MultiMove allows you to controll up to 4 robots at a time each working at maximum performance. The robots can work on a common object or independently – switching dynamically.

Short cycle time with QuickMove through maximum acceleration and higher process speed.

High quality with TrueMove for perfect synchronization and accurate path holding.

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