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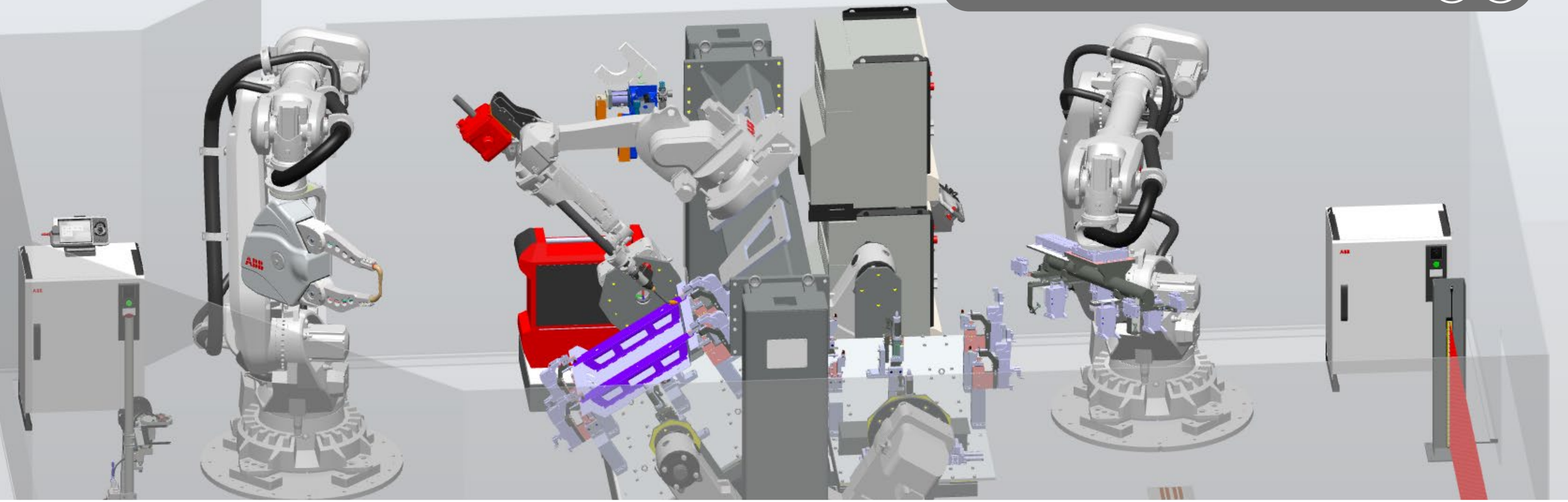

Achieving cell optimization with ABB RobotStudio®

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Introduction

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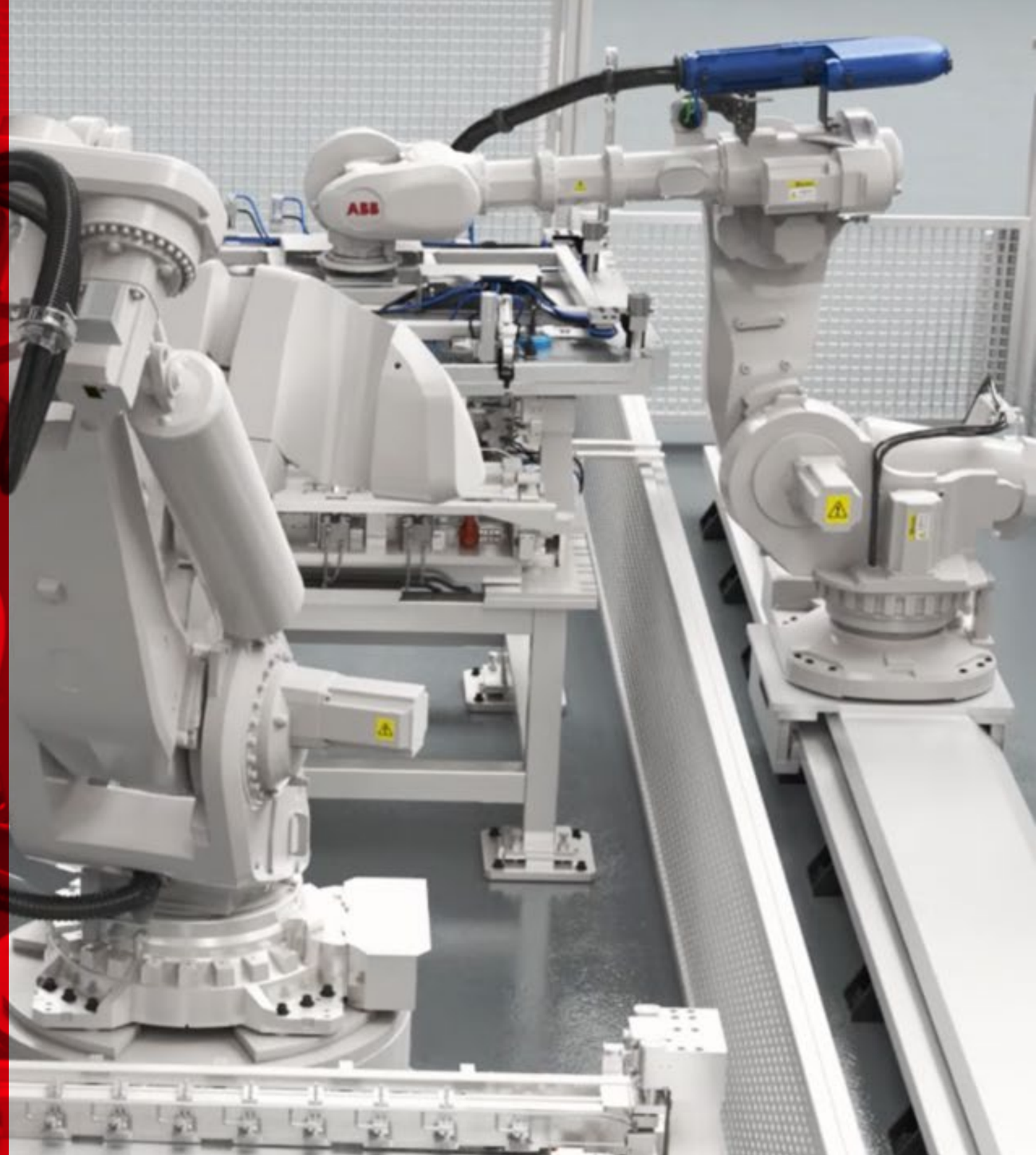


Introduction

Robotic automation offers many benefits to manufacturers. With precise, repetitive movements that ensure accuracy and quality, robots also offer a high degree of flexibility, opening new opportunities to adapt production lines to make new, personalized products while also adapting to bottlenecks in supply chains.

When engineering new robotics applications, programmers face pressure to develop and commission them rapidly. Manufacturers also need to optimize cycle time and reduce energy consumption, all without affecting quality.

There is also pressure to respond rapidly to new customer demands – yet it can be difficult and time consuming to find the safest and most optimal path.

In this ebook, we will explain how ABB RobotStudio® can help you create a new robotic solution with the best cycle time, energy consumption and quality, all in record time.

WHAT IS ROBOTSTUDIO®? >>

What is RobotStudio®?

Imagine if you could eliminate the time, cost and disruption of building, testing and commissioning a robot by doing all the work in a virtual environment. With ABB's RobotStudio®, you can do exactly that.

RobotStudio® is the world's most popular offline programming and simulation tool for robotic applications. Based on our best-in-class virtual controller technology, the RobotStudio software suite gives you full confidence that what you see on your screen exactly matches how the robot will move in real life.

Enabling you to build, test and refine your robot installation in a virtual environment, this unique technology speeds up commissioning time and productivity by a magnitude.

HOW CAN ROBOTSTUDIO OPTIMIZE YOUR ROBOT PERFORMANCE? >>

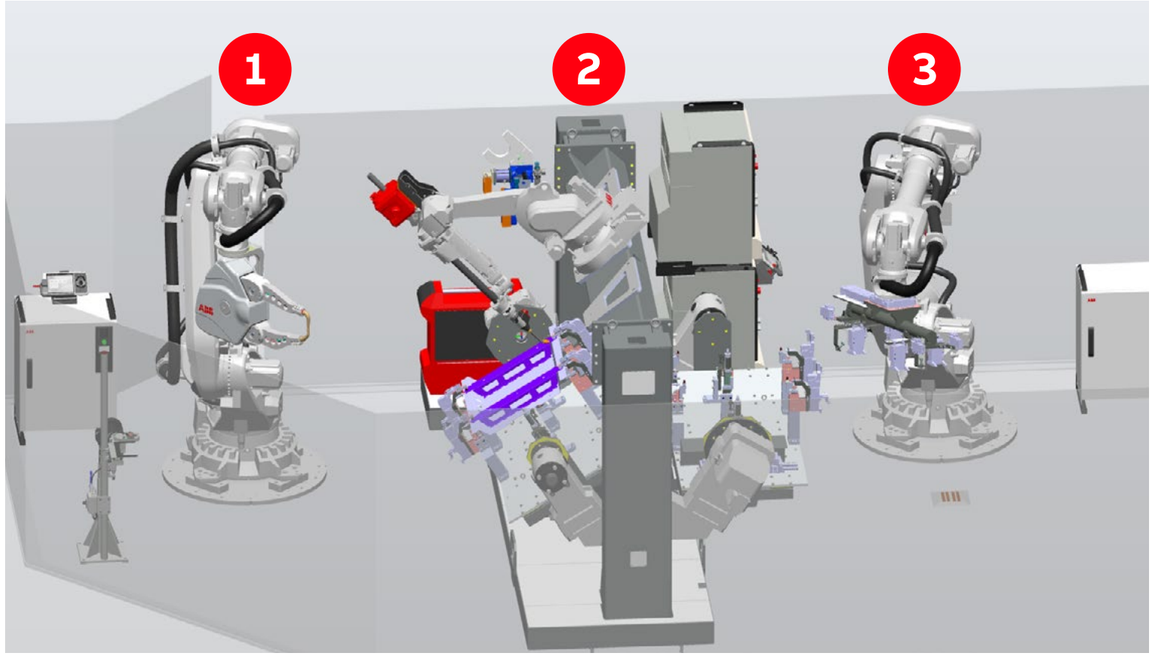
A practical cell

To demonstrate how a robot user might employ RobotStudio to achieve efficient path designs, we'll be using the example of our battery tray manufacturing cell for EV production.

As shown in the graphic, the cell employs three robots - one for spot welding, one for arc welding, and one for material handling.

The challenge is to find the optimum path for these robots - this will ensure error free movements that avoid clashes between material or the robots and which optimizes path length, cycle time, energy consumption and stress.

OPTIMIZE PERFORMANCE WITH AUTOMATIC PATH PLANNING >>



1 Spot welding
2 FlexArc Compact
3 Material handling robot

Optimize robot performance with Automatic Path Planning

ENTER >>

Automatic Path Planning - find your optimal path in a few clicks

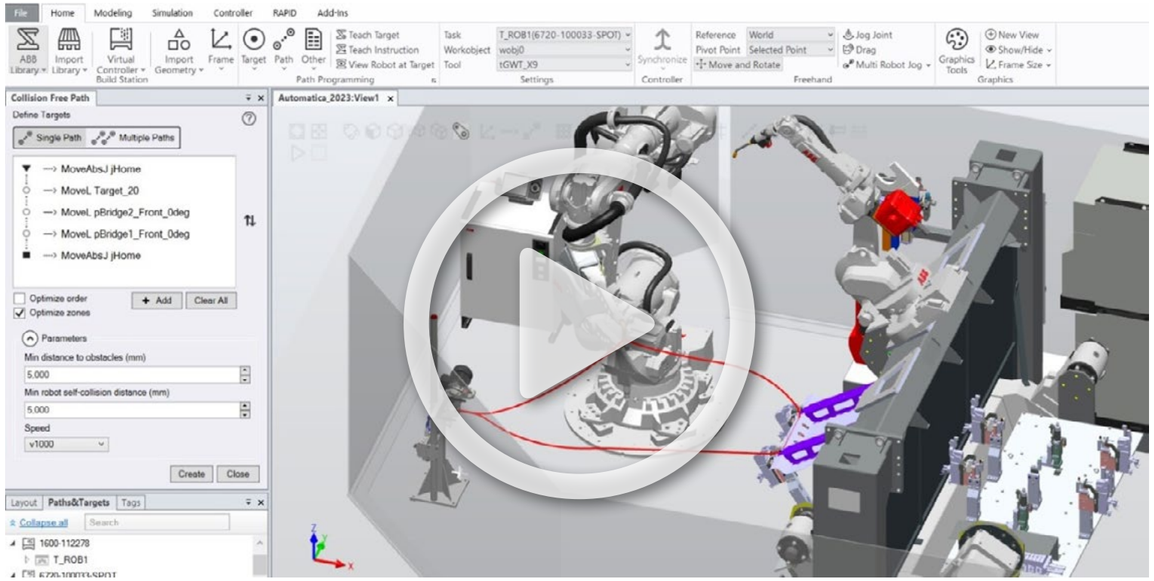
It can be difficult to find the right path for a robot to take, especially when there are several robots and other handling equipment in a cell.

With **Automatic Path Planning**, it's a simple process to set the optimum path that will reduce cycle time and energy consumption.

In tests on the example EV cell, ABB **has cut the cycle time from 9.8 seconds to 5.6 seconds** for one of the paths, **a reduction of more than 40 percent**.

Another benefit of Automatic Path Planning is discovering how changes in cycle time or action affect energy consumption – in the example EV cell, the more time efficient path **reduced energy consumption by 15 percent**, while in some circumstances, **energy use can be cut by up to 30 percent**.

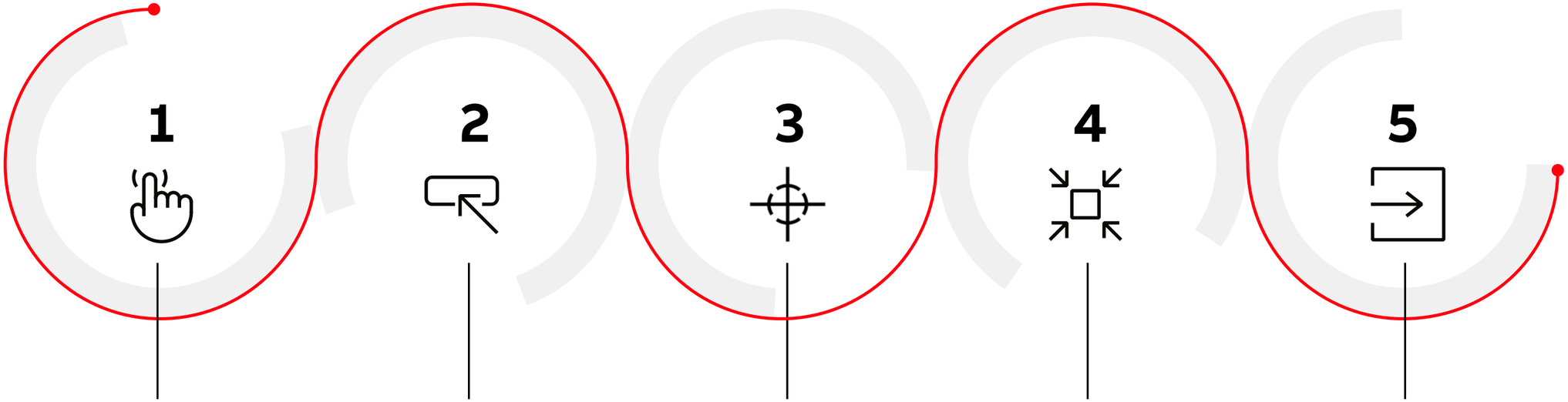
SEE HOW TO SET THE OPTIMUM ROBOT PATH IN JUST 5 STEPS WITH AUTOMATIC PATH PLANNING >>



CLICK TO WATCH THE AUTOMATIC PATH PLANNING VIDEO TUTORIAL >>

Setting the optimum robot path in just 5 steps with Automatic Path Planning

With Automatic Path Planning, setting the optimum path can be achieved in just a few simple steps.



1 Open the Automatic Path Planning feature in RobotStudio

2 Define the start position

3 Define any pick and place or action positions

4 Define the end position

5 Run the sequence to produce the calculated optimum path

Ensure fast and energy efficient performance with Signal Analyzer

ENTER >>

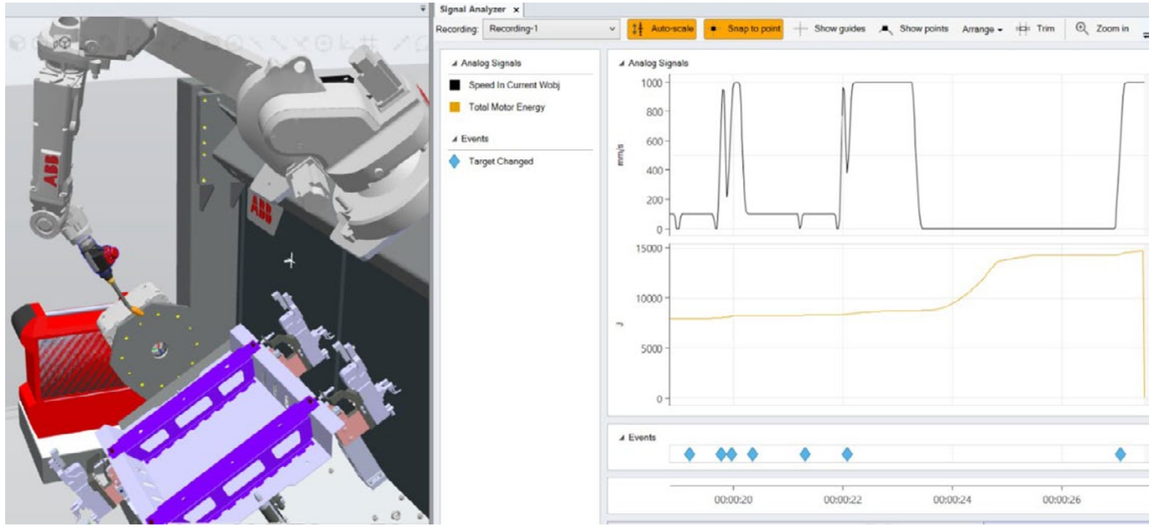
Signal Analyzer - optimize speed and energy consumption

In addition to optimizing the path, a major challenge of the robot user is to ensure the programmed speed is really being achieved. This produces a stable product quality and gives insights about how to tune and optimize the process.

The **signal analyzer** allows us to see how the process signals match up with the actual motions of the robot. It is essential to ensure the correct timing of these signals to fine tune the process. One example could be to turn on an adhesive applicator at the right time so that the bead starts at the correct position.

As well as reducing cycle time and energy use, finding the optimum speed can improve quality. Speed dependent operations such as welding a seam on a component, like the EV battery trays in our example cell, or laying down an adhesive layer with the correct thickness, can achieve a much higher quality if the correct speed is guaranteed.

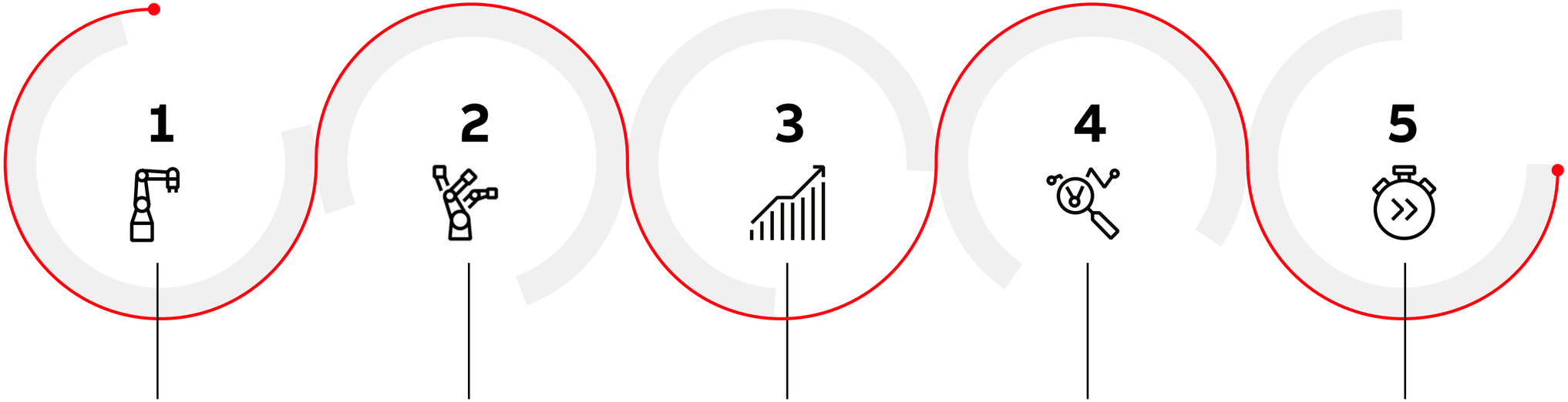
This is achieved using **RobotStudio's Signal Analyzer feature.**



SEE HOW TO OPTIMIZE ROBOT SPEED AND ENERGY CONSUMPTION WITH SIGNAL ANALYZER >>

Optimizing robot speed and energy consumption in just 5 steps with Signal Analyzer

The speed of the robot can be optimized using some simple and easy to use steps.



1 Select the Signal Analyzer feature in RobotStudio and choose the robot of interest

2 Run the sequence, which will show the robot moving through the cycle

3 A continuous graph will show the speeds of the robot at different points in the cycle

4 Troughs or dips in the graph are where speeds could be improved

5 Go to the indicated line of code and change the speed

Assess your robot’s performance with Stress Level Estimation

ENTER >>

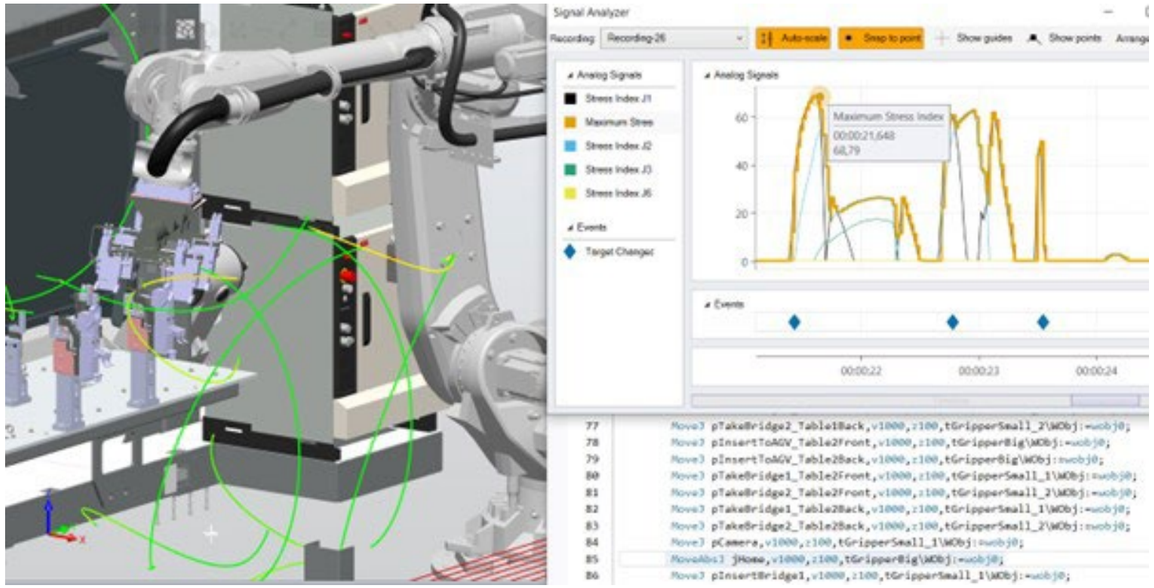
Stress Level Estimation - see how your robot is performing

When designing an automation application, it can be difficult to choose the right robot for the task in mind. The application will involve the robot lifting a certain load, a combination of the weight of the gripping tool and a possible workpiece. How far will the robot have to reach? How will this combination of weight and distance affect the stress the robot experiences?

With RobotStudio's **Stress Level Estimation feature**, you can choose a robot to see how much stress it will experience in the application - on a simple 1 to 100 scale, programmers can see if one robot will experience more stress than another, perhaps requiring more maintenance or even shortening its working life.

Stress Level Estimation can also be used once the robot is in service - as you change speed and paths to optimize production, stress levels will also change.

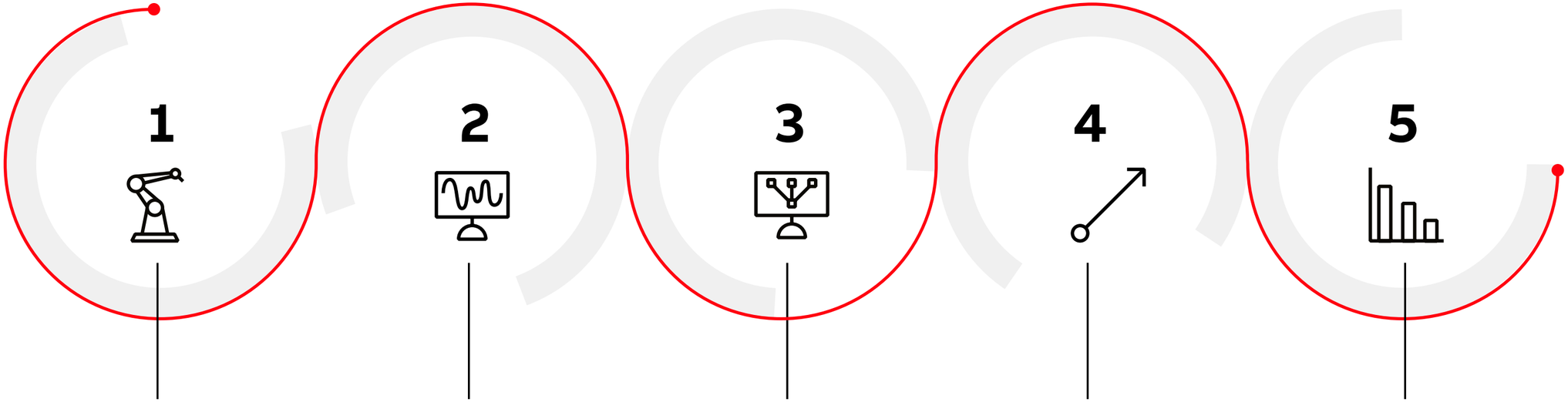
Together with Signal Analyzer, Stress Level Estimation will point out where stress peaks are being experienced. Clicking on this stress peak, you can see the corresponding instruction in the robot program, allowing you to solve the issue and reduce the stress.



STRESS LEVEL ESTIMATION FUNCTION >>

Assess robot stress in just 5 steps with the Stress Level Estimation function

With the Stress Level Estimation function, stress issues can be solved in five easy steps:



1

Load the project with the robot and program

2

Open the Signal Analyzer and choose the stress signals from the robot

3

The user can also use the Trace TCP feature to see a colour coded indication of stress levels along the robot path

4

Start the simulation and observe the result in the signal analyzer and in the Trace TCP

5

Click on the stress peaks in the graph to open up the robot program to solve any problem

Conclusion

ENTER >>

Conclusion

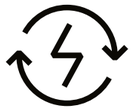
With ABB RobotStudio's advanced software features, you can be sure of achieving the best possible performance from your robots.

How RobotStudio® can help you optimize your robot cell

Reduce cycle times by up to

50%

with Automatic Path Planning



Cut your energy consumption by up to 30% with the Signal Analyzer feature

Enjoy optimum robot performance with Stress Level Estimation, enabling you to spot and solve potential issues

SEE WHAT YOU COULD DO WITH ROBOTSTUDIO® >>

Optimize your application with ABB RobotStudio®

For further resources and information about RobotStudio and its functions, or to try the software for yourself, select any of the below options:

REQUEST YOUR 30 DAY FREE TRIAL

REQUEST YOUR ROBOTSTUDIO LICENSE

VISIT THE ROBOTSTUDIO® WEBSITE