RobotStudio
Machining PowerPac
*Increased engineering efficiency*
RobotStudio Machining PowerPac

- Introduction
- Features
- Benefits
- Requirements
33 years of robotized machining

“The world’s first electrical robot sold in 1974 was for grinding and polishing of stainless steel tubes.”

ABB was an innovator and has become #1 in robotized finishing

We intend to stay as the leader

IRB 6 sold by ABB in 1974 to Magnusson in Genarp, Sweden
Why is machining not fully robotized?

- Programming time has been far too long to permit frequent product changeovers
  - Only large batch sizes have been feasible
- Difficult application with many parameters affecting the process result
- Industry tradition to use other machining methods
- Robot arms have not been suitable for all applications

**DEFINITION**

*Machining includes:*  
Grinding  
Deburring  
Polishing & Linishing  
Buffing  
Milling  
Sawing  
Deflashing  
Sanding  
Etc.
Industry with changing values and demands

- End of an era - **Manual Machining**
  - Inconsistent part quality, high scrap and reclaim rates
  - Hazardous, dirty work environment
  - High injury rate and long-term health problems
  - Low availability
  - Difficult to recruit personnel
  - Low status
  - Labor intensive and expensive operation

- Beginning of an era - **Robot Machining**
  - Consistent high product quality
  - Reduced tooling costs
  - High availability
  - Safe environment with less injuries
  - Safe environment
  - Attractive & rewarding workplace
  - Positive, high-tech image
  - Improved recruitment possibilities
  - Long-term profitability
Challenges for robotized machining

- Short production batches
  - Quick change over time is required
- Traditional programming is time consuming
- Many parameters affecting the process result
- Accuracy requirements in the process
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- Software for off-line programming of machining applications
- Contains functionality for
  - Automatic path generation on surfaces or edges
  - Path and target optimization
  - CAD import and processing
  - Experience sharing
  - Work object calibration
  - Force controlled machining

A superior offline programming tool for machining applications!
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- Reduce programming time
  - Create thousands of robot targets in seconds
  - Path and target optimization
  - Create program from CAD model
- Control of process parameters
  - Robot speed and arm configuration
  - Tool compensation and tool machining angles
  - Force control settings
- High accuracy of created path in relation to CAD model
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Supported Features

- Path programming wizard
  - Create/select surface or edge to be machined
  - Set machining process parameters
  - Pre-defined path generation patterns
  - Set path and target parameters
- Path and target optimization
- Path and target modification
- Path simulation
- Program export as RAPID or RW Machining FC
- Calibration
- Pre-defined and configurable machining templates
- Check/heal CAD models
Programming wizard

Machining Solution → Create Machining Surface → Set Machining Process Parameters → Set Tool and WorkObject Information → Select Path Generation Pattern → Preview → Set Targets and Paths parameters

Save the programming time! Includes all the steps to get an executable RAPID program.
Programming wizard

7 Steps to create a machining program!
Target and Path optimization

**Without** Target Orientation Optimization

**With** Target Orientation Optimization

- Greatly reduce the rotation of robot itself
- Improve the reachability of robot target

Play movie to show difference!
Path modification

- Machining Template
- Approach/Departing Template
- Machining Speed
- Machining Force
- Tool Compensation
- Tool Working Range
Target modification

- Path View
Path simulation

- Path view
Program Export

- Export as RAPID program
- Export as RW Machining FC interface file
Additional functions

- Calibration
- Check/Heal CAD model
- Templates
  - Machining
  - Approach Departing
  - Solution Configuration
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Reduce programming time

- Wizard based programming to set process parameters
  - Automatic path configuration and path optimization
- CAD model used as base to create path
  - Select surfaces and/or edges in a 3D view
- Easy to modify and optimize path through "Path view"
- Seamless integrated to RobotStudio
- Functions facilitating knowledge sharing
- Simulation that verify program
In control of the process parameters

- Templates for different machining processes
  - Including templates for force controlled machining
- Optimization of speed within given range
- Supporting both face- and side working tools
  - Automatic calculation of spin angle and tool compensation of tool radius
- Pre-defined path generation patterns supporting all possible machining types
- Easy creation and modification of path and target parameters
Improved path accuracy

- High path accuracy in relation to CAD model
  - Automatic calculation of tolerance and deviation angle
- Calibration function allow easy way to calibrate work object
  - All robot targets are relative to the work object.
Seamless integration with RobotWare

- Export path(s) as RAPID program
- Export paths(s) as RW Machining FC
  - Force controlled machining
  - Interface file created
Summary benefits

- Reduce programming time
  - Engineering and commissioning efficiency
  - More cost efficient handling of short batches
- In control of the process parameters
  - Easy to create and modify robot parameters
- Improved path accuracy
- Seamless integration with RobotWare
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