ROBOTICS

# Product specification

## RobotStudio

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# Product specification
# RobotStudio

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# Overview of this specification

## About this product specification

This product specification describes the RobotStudio product.

RobotStudio helps you program, configure, and commission ABB robots. You can use the product offline with virtual robots, and online with real robots.

## Users

This document is intended for:

- Industrial engineers
- Purchasing agents

## References

| Reference | Document ID |
|---|---|
| *Operating manual - RobotStudio* | *3HAC032104-001* |

## Revisions

| Revision | Description |
|---|---|
| B -T | Updated for RobotStudio 5.x and 6.x |
| U | Updated for RobotStudio 2019.1 |
| V | Updated for RobotStudio 2019.5 |
| W | Updated for RobotStudio 2020.1 |
| X | Updated for RobotStudio 2020.2 |
| Y | Updated for RobotStudio 2020.3 |
| Z | Updated for RobotStudio 2020.4 |
| AA | Updated for RobotStudio 2021.1 |
| AB | Updated for RobotStudio 2021.2 |
| AC | Updated for RobotStudio 2021.4 |
| AD | Updated for RobotStudio 2022.2 |
| AE | Updated for RobotStudio 2022.3.1 |
| AF | Updated for RobotStudio 2022.4 |
| AG | Updated for RobotStudio 2023.2 |
| AH | Updated for RobotStudio 2023.3 |
| AI | Updated for RobotStudio 2024.1 |
| AJ | Updated for RobotStudio 2024.2 |
| AK | Updated for RobotStudio 2025.1 |

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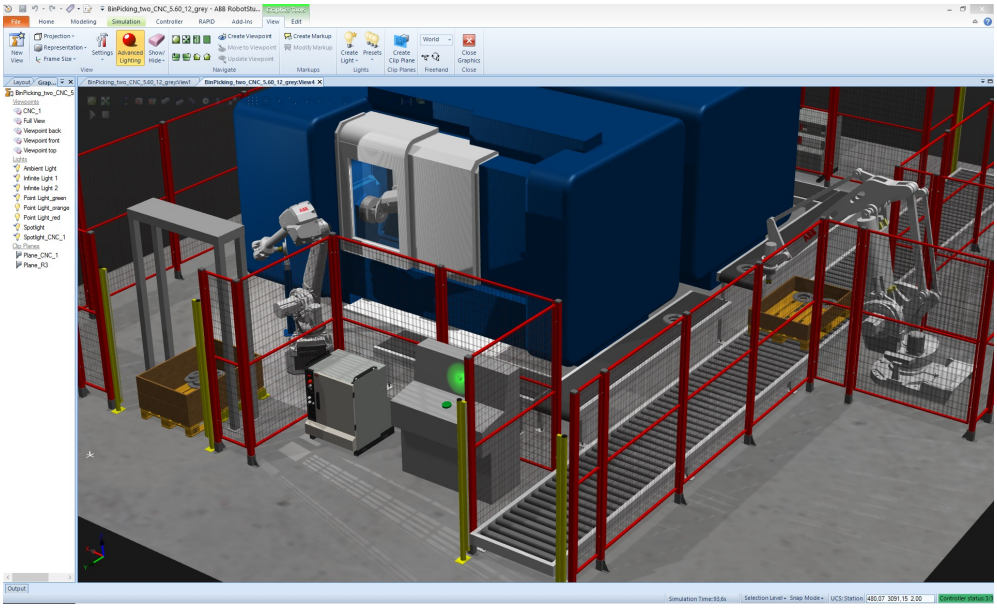
# 1 Introduction

## Overview

There is increasing competitive pressure on the industrial market. Higher efficiency in production is required to reduce cost and to increase quality. Allowing robot programming to add time to the manufacturing start of new products is unacceptable today as is shutting down ongoing production to program new or modified parts.

Taking the risk of manufacturing tooling and fixtures without first verifying reach and accessibility is no longer an option. The modern production site verifies the manufacturability of new parts during the design phase. When programming your robots offline, programming can take place in parallel with the system build. By programming the system at the same time as it is manufactured, production can start earlier, reducing time-to-market. Offline programming reduces system risk by visualizing and confirming solutions and layouts before the actual robot is installed and generates higher part quality through the creation of more accurate paths.

RobotStudio is an engineering tool for configuration and programming of ABB robots, both real robots on the shop floor and virtual robots in a PC. To achieve true offline programming, RobotStudio utilizes ABB VirtualRobot™ Technology.



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# 2 Features of RobotStudio

## 2.1 Basic and Premium Functionality

### Overview

The features of RobotStudio are split into Basic and Premium functionality. The Basic functionality can be used free of charge whereas the Premium functionality requires a paid subscription.

### Basic

The Basic functionality includes the necessary features to start up an ABB IRC5 or OmniCore industrial robot on the shop floor, and to do simple text-based programming. The same functionality is also available for virtual controllers running on a PC.

The Basic functionality also includes the ability to open existing stations and Pack&Go files, run a simulation and watch the result in the graphical 3D view. In addition, you can import the ABB range of industrial robots, run them on the virtual controller and jog them around. The Go Offline feature will let you create a virtual replica of your connected robot controller.

**Note**

You need to have the RobotWare feature **[3119-1] RobotStudio Connect** for OmniCore or **[616-1] PC-Interface** for IRC5 on your robot controller to allow RobotStudio PC to connect through the WAN. The feature is not required for management port connections.

### Premium [1100-1]

The Premium functionality includes productivity features for efficient commissioning and programming. Tabular editing of RAPID data, and a comparison tool for viewing program differences are examples of Premium functionality. Program debugging is enabled by the RAPID Watch window, RAPID breakpoints, and the Signal Analyzer. Using the ScreenMaker, you can create custom user screens for the FlexPendant on IRC5. In addition, offline programming, simulation and 3D functions are all part of the Premium package.

| Feature | Basic | Premium |
|---|---|---|
| Necessary features for commissioning a real or virtual robot[1], such as:<br>• System Builder<br>• Event Log Viewer<br>• Configuration Editor<br>• RAPID Editor<br>• Backup / Restore<br>• I/O Window<br>• Jogging tool for IRB 910 INV | Yes | Yes |

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## 2.1 Basic and Premium Functionality

*Continued*

| Feature | Basic | Premium |
|---|---|---|
| RAPID features, such as:<br>• RAPID Compare<br>• RAPID Data Editor<br>• RAPID Watch<br>• RAPID Breakpoints | Yes | Yes |
| Productivity features, such as:<br>• Adjust robtargets<br>• Signal Analyzer<br>• Stop position simulation<br>• MultiMove tool<br>• ScreenMaker[1,2]<br>• Jobs | | Yes |
| Elementary offline features, such as:<br>• Open station[4]<br>• Unpack & Work[4]<br>• Run Simulation[4]<br>• Robot jogging tools<br>• Gearbox heat prediction<br>• ABB Library of robots | Yes | Yes |
| Advanced offline features, such as:<br>• Graphical programming<br>• Save station<br>• Pack & Go<br>• Go Offline<br>• Import / Export Geometry<br>• Import Library<br>• Create station viewer and movies<br>• Transfer<br>• Collision Free Path<br>• AutoPath<br>• VR<br>• 3D operations | | Yes |
| RobotStudio® Cloud | | Yes |
| Add-Ins[3] | Yes | Yes |

*1. Requires the RobotWare feature* **RobotStudio Connect** *for OmniCore (or* **PC-Interface for IRC5**) on the robot controller to enable WAN communication. The option is not needed for connection via the Management port or for virtual controller.

*2. Requires the RobotWare feature* **FlexPendant Interface** *on the IRC5 robot controller.This feature is not available in OmniCore. ScreenMaker is noFlexPendant Interfacet available for OmniCore.*

*3. Add-ins which does not use the Stations API can be loaded in Basic mode.*

*4. Smart Components included in the station that are using the Station API or having physics behaviour will not be simulated in basic mode.*

## 2.2 General features

### Microsoft Office Fluent User Interface

RobotStudio has adopted the Microsoft Office Fluent User Interface. The Office Fluent UI is also used in Microsoft Office. As in Office, the features of RobotStudio are designed in a workflow-oriented way.

### Developer tools

With add-ins, RobotStudio can be extended and customized to suit your specific needs. Add-ins are developed using the RobotStudio SDK. With the SDK it is also possible to develop custom SmartComponents which exceed the functionality provided by RobotStudio's base components.

To create custom PC applications for communication with a real or virtual robot, ABB offers the PC SDK. Users who want to customize the FlexPendant on IRC5 can use ScreenMaker, a Premium feature of RobotStudio.

### RobotStudio® Cloud

With RobotStudio® Cloud web application, you can:

- Edit, visualize and verify robot programs.
- Store and manage RobotStudio projects.
- Track and manage changes to projects using Version Control.
- Stay connected to your project repository and edit from anywhere.
- Share projects and collaborate with others.

**Note**

RobotStudio Premium license includes the RobotStudio® Cloud subscription. To activate the subscription, user must have an account in the myABB Business Portal, *www.abb.com/myABB*.

## 2.3 Features for both robot and virtual controllers

**ScreenMaker for IRC5**

ScreenMaker is a tool in RobotStudio for developing custom screens on the IRC5 controller. It is used to create customized FlexPendant GUIs without the need to learn the Visual Studio development environment and .NET programming.

**RAPID Editor**

The integrated RAPID editor enables you to view and edit programs loaded into a controller, both robot and virtual. The editor is useful for editing all robot tasks other than robot motion. With the RAPID editor you can edit the RAPID code of the program modules and system modules. Each module you open appears in an editor window of its own, where you can add or edit RAPID code.

The RAPID editor's features include:

- Syntax and error highlighting
- Find and Replace operations
- Tooltips for information on symbols, arguments, function calls and so on.
- Automatic insertion of arguments
- Context-sensitive help for RAPID code
- Line numbers for the RAPID code lines
- Editing RAPID modules in controller memory and in files

**RAPID Data Editor**

The RAPID Data Editor allows you to edit RAPID data in a table that you can view and edit.

**RAPID Path Editor**

The paths of a real robot can be viewed and edited graphically without the need of a virtual controller or running a simulation. You can load a workpiece to see the path in relation to the part geometry. By enabling the tool visualization, you can clearly see the target orientation. The property window allows you to tune multiple robtargets in a single operation.

**RAPID Debugging**

RobotStudio supports RAPID Debugging. Breakpoints can be set and the RAPID program can be stepped through when pinpointing the possible cause of a fault. These breakpoints are listed in a separate window which provides the overview and quick access, double-click on any item in the list to access the corresponding code.

**RAPID Call Stack**

Use the RAPID Call Stack window, to view the function or procedure calls that are currently on the stack. This is useful while debugging a robot program for understanding the sequence of routine calls that led to the current location of the program pointer.

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The RAPID Call Stack window displays the name of each routine and additional information, such as module name and line number.

**Adjust Robtargets**

The Premium feature Adjust Robtargets allows programs that has been programmed with the wrong TCP (tooldata) or work object (wobjdata) to be corrected. The joint angles of the robot will remain the same.

**Event Log**

You can view and save the Event Log of the controller from RobotStudio.

**I/O Viewer**

You can view and set input and output signals from the I/O System.

**System Builder**

With the System Builder, you can create, build, modify and copy RobotWare 5 systems to run on virtual and robot controllers. These systems can be converted to boot media and downloaded to a robot controller.

**Modify Installation**

The **Modify Installation** function is the tool for building, installing and modifying RobotWare 6 and 7 on an IRC5 and OmniCore controllers, respectively. It can be used for both virtual and robot controllers.

**I/O Engineering Tool**

The I/O Engineering tool is used to configure PROFINET. It is also required to configure safe I/O modules.

**I/O Configurator**

I/O Configurator is used to manage configuration of various fieldbus devices. It is also required for configuring generic and safety I/O devices.

**Configuration Editor**

From the Configuration Editor you view and edit the system parameters of a specific topic in a controller. You can also load pre-defined configuration files to the controller and save current configuration to file.

**Safety Controller Configuration**

Configuration of parameters for the safety functions SafeMove and Electronic Positioning Switches (EPS) can be done using the configuration tools Visual SafeMove and EPS Wizard, respectively.

**Backup and Restore**

Controller data can be backed up and restored from RobotStudio.

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**Transfer**

The transfer function allows easy transfer of offline-created RAPID programs to the real robot on the shop floor. This means that you can transfer data from a virtual controller (which is offline) to a robot controller (which is online). As part of the transfer function you can also compare the RAPID data present in the virtual controller with that present in the robot controller and then select which data to transfer.

You can also use the transfer function to transfer data from a virtual controller to another virtual controller.

**RAPID Watch Window**

You can view and edit the RAPID data of the variables in the RAPID Watch window, both during program execution and when the controller is stopped. However, you can only view, but not edit, I/O signals in the RAPID Watch window.

**Signal Analyzer**

The Signal Analyzer functionality helps in displaying and analyzing signals from a robot controller. Using the Signal Analyzer, you can optimize the robot program.

Signals to be analyzed are defined in the Signal Setup tool for viewing and analyzing the Signal Analyzer. The tool allows robot performance tuning and signal debugging. In addition to I/O signals of the station and the robot controller and the controller EventLog, motion signals such as TCP position, speed, acceleration and motor power can be recorded, analyzed and exported to Microsoft Excel.

## 2.4 Features for robot controllers

**FlexPendant Viewer**

The FlexPendant Viewer takes a snapshot of the FlexPendant of the connected physical robot controller and displays it in RobotStudio. The Viewer is updated at a user-defined interval.

**Online Monitor**

The Online Monitor can be described as a virtual web camera that monitors the connected robot and visualizes its movements. The graphical view that shows the robot model is updated with the true robot position every second. If the robot is in a singular position or at a joint limit you will get an indication in the view.

**File Transfer**

You can transfer the files and folders between the PC and a controller through the File Transfer window.

**User Authorization**

The data, functionality, and commands of a controller are protected by the User Authorization System (UAS). The UAS defines the access rights for the individual users of the robot controller and can be configured from RobotStudio.

**Controller and System Properties**

The properties of a connected controller and its system can be viewed using the Controller and System Properties tool. The name, date and time of the controller can also be viewed and modified.

**Device Browser**

The Device Browser displays the properties and trends of the hardware and software devices in a robot controller.

**Go Offline**

This feature creates a new RobotStudio station with a virtual robot similar to the connected real robot. This enables a robot technician to work Offline, when it is not possible or convenient to continue working on a real robot.

**Jobs**

The Jobs feature allows you to perform certain actions on a large population of robot controllers. A Job is defined by a Device list and an Action. The Action will be carried out for all controllers in the Device list. Examples of Actions are Backup, Update UAS, Save assessment data and SetTime.

## 2.5 Features for virtual controllers

**VirtualRobot Technology**

VirtualRobot Technology enables robot systems to run on a PC using the same software that drives the real robots. It is possible to run several robots at the same time on your PC.

**TrueMove™ Path Visualization**

The ABB controller features TrueMove that implies minimal deviation from the programmed path. TrueMove ensures that the motion path followed is the same irrespective of the speed. It also obviates the need for path tuning when speed parameters are adjusted online.

When creating robot programs offline, RobotStudio takes advantage of TrueMove and it directly displays the resulting path that the robot will follow in the graphics viewer. The TrueMove Path Visualization applies to linear and circular move instructions.

**Smart Components**

Smart Components offers a way of creating simulations by adding behavior to the simulated objects. It brings life to the graphical component libraries by the addition of so-called Base Smart Components for basic motion, signal logic, arithmetic, parametric modeling, sensors and so on.

**Virtual Time**

RobotStudio uses virtual time to synchronize the virtual robots of the station with each other and the surrounding equipment during simulation in the virtual environment. To save valuable engineering time, the simulation time can be accelerated to run as fast as the PC hardware permits.

**Collision Detection**

By selecting the objects concerned, RobotStudio will monitor and indicate whether they will collide when a robot program is executed. The Collision Detection computation makes use of multiple CPU cores available and uses the SSE (Streaming SIMD Extensions) instruction set for best performance.

**Stop position simulation**

The final stop position of the robot and tool when *stop category 0* or *stop category 1* occurs can be visualized as semitransparent graphics. These stop positions can be used for measurements and collision detection.

**Swept volume**

It is possible to create and export the swept volume of a part which represents the approximate total volume of the robot and tool movement along the path from a recording. This can be used in assessing collisions between the environment and the volume.

*Continues on next page*

**Mechanism Modeler**

With the Mechanism Modeler, you can model your own tracks, tools or grippers for use in RobotStudio simulations.

**RAPID Synchronization**

You can work with your existing RAPID program from the real robot on the shop floor by loading it to a virtual robot in RobotStudio and synchronizing it to the station to allow it to be viewed and modified in the graphical view. When programming is completed you can generate RAPID code by synchronizing it back to the virtual robot. The resulting RAPID program can be saved to file and loaded to the real robot.

**Virtual FlexPendant**

This is a graphical representation of the real FlexPendant, powered by the VirtualRobot.

**Check reachability**

AutoReach analyzes reachability and lets you move the robot or the work piece around until all positions are reachable. This allows you to verify and optimize the work cell layout.

**Document Manager**

The Document Manager allows you to search and browse RobotStudio documents like libraries and geometries. You can add your own galleries to the RobotStudio user interface showing the content of your folders of interest. Files and folders related to your RobotStudio project can be linked or embedded in the station and packaged into the Pack and Go file.

**FlexPendant Operator Window**

The FlexPendant Operator Window is available in RobotStudio. It will display in Offline mode the same output as displayed on the Virtual FlexPendant Operator Window.

**Auto Configuration**

The Auto Configuration feature helps you to automatically define the robot configuration (confdata) for a complete path.

**Collision Free Path**

The Collision Free Path feature helps to create a path between two targets, joint targets or move instructions avoiding obstacles in the environment. It is possible to find the optimal robot placement (devoid of collision) within the defined Search area using this feature.

Collision Free Path supports robot moved by a single axis track.

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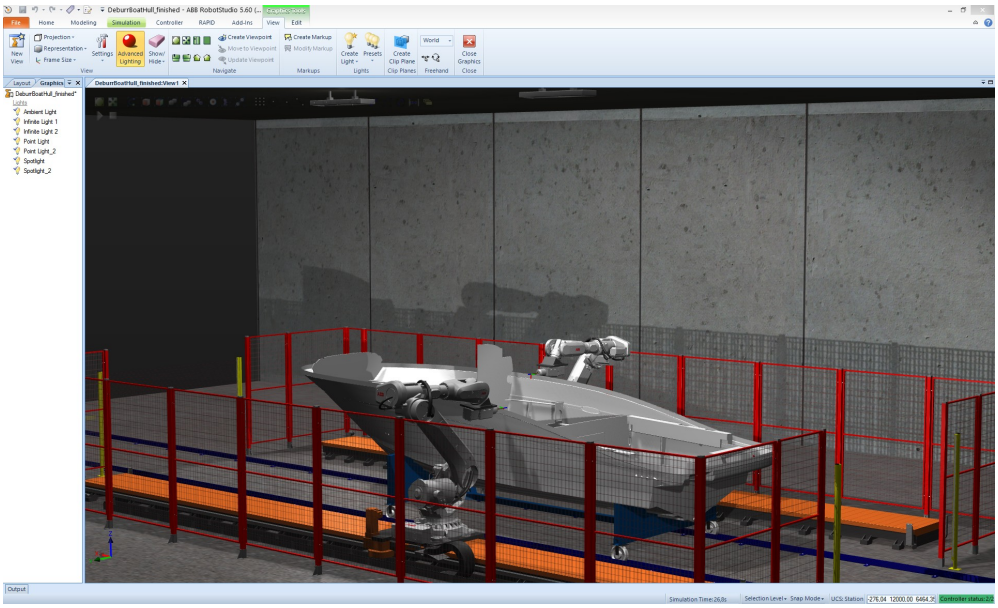
### AutoPath

By using a CAD-model of the part to be processed, it is possible to automatically generate the robot positions needed to follow a curve or edge of the geometry.



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### MultiMove

From the infinite number of possible solutions to splitting a job between several robots in a MultiMove system, RobotStudio can generate a path for each robot that results in the shortest combined joint motion, taking restrictions such as joint limits or tool orientation constraints into consideration.

### Working Envelope

In RobotStudio, you can visualize the working envelope for a robot in the graphical view.

### Instruction templates

The instruction templates enable RobotStudio to recognize and program any RAPID instruction. RobotStudio comes with predefined templates for the most common RAPID instructions and you also have the possibilities to create and share templates for your own custom processes and instructions.

### Replace Robot

With the Replace Robot feature, it is possible to replace the current robot model in a station with another without changing the controller data such as RAPID modules, motion and signal configurations.

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**Station Viewer**

RobotStudio can create a 3D interactive movie packaged in a standalone executable for showing and sharing a RobotStudio simulation to others that do not have RobotStudio installed. These files can also be stored in *glTF* format which can be viewed in a Web browser. During replay, the speed can be adjusted to run faster or slower than real-time. A slider can be used to jump directly to the simulation highlights.

**Screen Recorder**

Simulations can be recorded by the Screen Recorder. The Recorder may create movies in virtual time, independent of your simulation hardware. Movies recorded in this mode are replayed in real time, which will show the true robot performance. Your favourite codec can be used to record movies in the AVI format.

**Markups**

A markup is a text box displayed in the 3D graphics. It can be used to highlight areas of interest. Markups become part of the Station Viewer.

**View Points**

A Viewpoint stores the location and direction of the virtual camera in the 3D environment. Viewpoints can be used to store points of interests in a station and to create camera movements during simulation.

**Linked Geometry**

The Linked Geometry feature allows the user to load geometry from a shared repository and let RobotStudio remember the source location. If the source file is updated, you can order an update of the RobotStudio station whereby the new version of the geometry file will be loaded to replace the old one.

**Transparent Textures**

Textures can be added to your station parts to enhance the realism even further. Transparent textures can be used to simplify fence modeling, for example.

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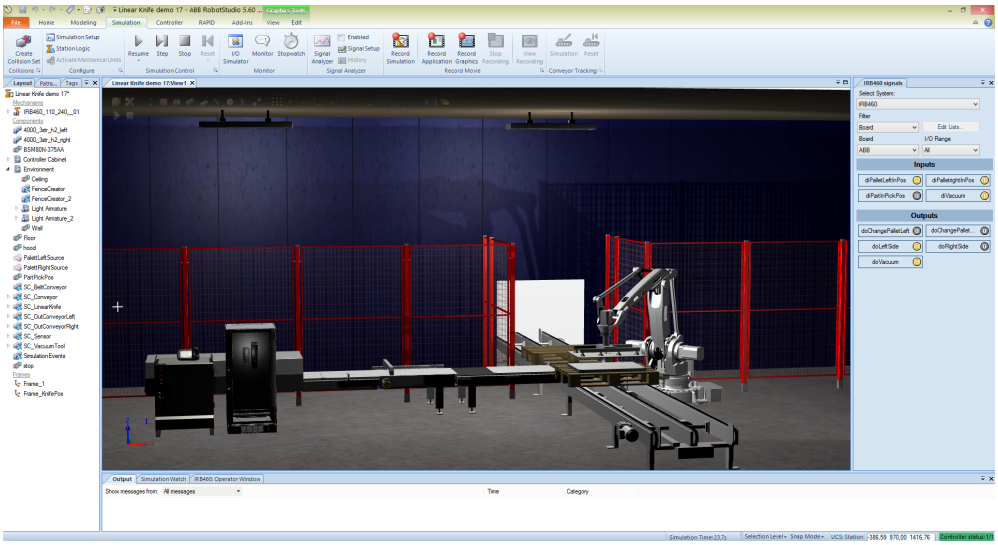
2.5 Features for virtual controllers
*Continued*

### I/O Simulator

The I/O Simulator displays the current state of input and output signals during program execution. It also allows the user to change their values.



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### Lights, Shadows and Materials

The DirectX 11 based 3D graphics engine in RobotStudio enables the user to customize the light setup by adding and tuning the light sources available: ambient light, infinite light, spotlight and point light. The shadows cast by the objects in combination with the built-in material library gives a realistic touch to the visualization of your result.

### Tags

Tags feature provides a way to structure your station content such as robots, parts, paths, targets and other 3D objects. You can control the visibility of the tagged objects by hiding or showing them independent of objects with a different tag.

### Conveyor Tracking

RobotStudio supports programming and simulation of robot systems that are equipped with the RobotWare option **Conveyor Tracking**. In Conveyor Tracking, the robot Tool Center Point (TCP) will automatically follow a work object that is defined on the moving conveyor. One or more robots can be combined with one or more moving conveyors.

### Virtual Reality Meeting

In a Virtual Reality Meeting, several participants can share the same virtual room from multiple locations . You can see avatars of each other, talk, draw, and make annotations in a live RobotStudio simulation. Virtual Reality provides an accurate perception of dimensions, ergonomics, and accessibility for cleaning and servicing of equipment. The VR Meeting function helps in design reviews and to correct errors at an early stage. This results in significantly shorter installation and start-up phase.

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**Virtual Reality Lead-Through Programming**

Virtual Reality allows robot programs to be created in an intuitive way by guiding the robot through the process and simultaneously recording the motion. Lead-through programming efficiently lowers the threshold and allows non-robot experts to do the motion programming as hands-on lead-through programming is not possible in reality due to various limitations such as safety, availability of equipment, work environment, and ergonomics. VR Lead-through programming guarantees Reachability since the robot manipulator itself is used to teach the path.

**Virtual Commissioning**

RobotStudio supports virtual commissioning of robot cells that include PLCs supporting OPC UA protocol. It is also possible to communicate with SIEMENS PLC using the SIMIT Simulation Platform.

**Version Control**

RobotStudio's version control functionality allows you to manage and keep track of changes made to your RobotStudio project. It also enables you to work on parallel versions of a RobotStudio project by creating branches.

**World Zone**

World Zone is a defined programmed zone within a station. It supports all geometrical shapes and can be is used for homing, service and interlocking.

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# 3 PowerPacs and options

## 3.1 Introduction

**Overview**

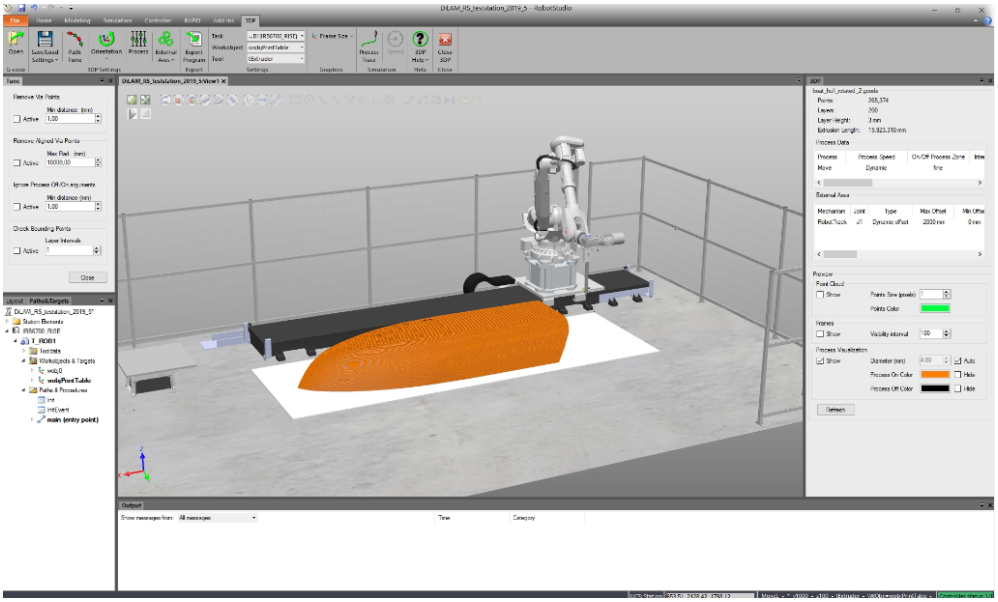
A PowerPac is an optional addition to RobotStudio for certain application specific tasks.

## 3.2 3D Printing PowerPac [1571-1]

### Overview

The new 3D Printing PowerPac is a RobotStudio add-in that extends RobotStudio with 3D printing functionality. This add-in performs offline programming and simulation of 3D printing with robots, a task that was impossible before.

Printing objects in 3D involves unlimited numbers of points and trajectories to program. Now with the 3D Printing PowerPac, you can automatically convert code (G-code) from slicer and specialized 3D printing software into RAPID code for ABB robots with adequate process support.



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In order to handle 3D printing specific processes in the robot controller, the coordinate data is read dynamically without affecting the robot motion. The RobotStudio 3D Printing PowerPac as such includes a RobotWare Add-In to support useful processes such as :

- DispenseWare
- Dispense lean (simplified dispense functionality for 3D printing)
- ArcWare
- ExtrudeWare (for granules extruder controlled as an integrated external robot axis)

The 3D Printing PowerPac supports the following External Axes:

- Interpolation of coordinated robot track.
- Interpolation of coordinated rotational axis (can be combined with coordinated robot track).
- Granules extruder that is controlled as an integrated rotational axis. The 3D Printing PowerPac calculates the extruder rotation based on a set of selected process parameters.

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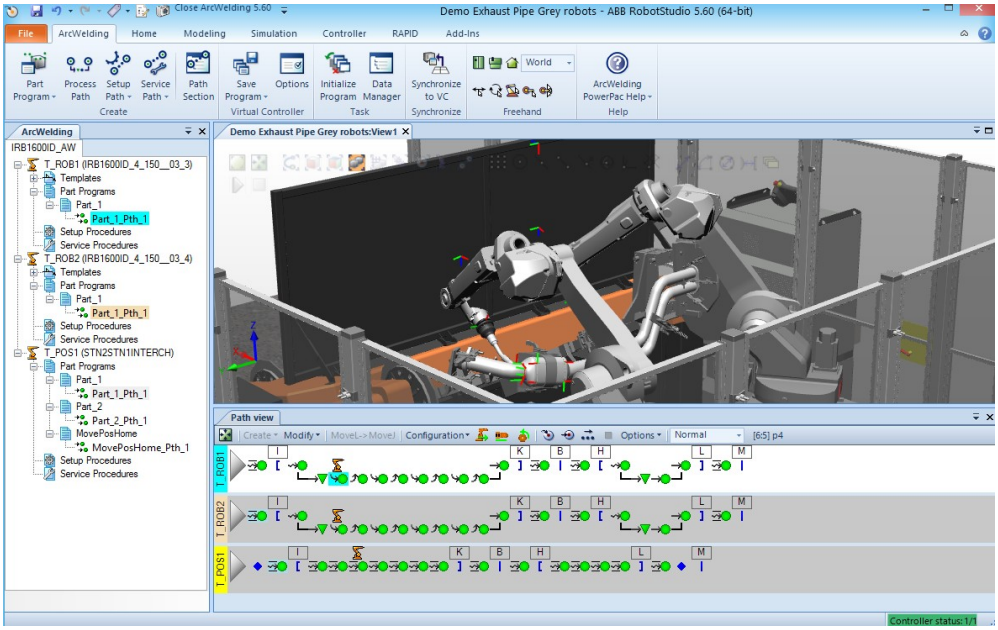
- Nozzle controlled as an integrated rotational axis that is aligned along the path(in the direction of path).

## 3.3 ArcWelding PowerPac [1108-1]

### Overview

ArcWelding PowerPac is a geometry based off-line programming tool for generating arc welding programs. The programmer defines weld locations on the CAD geometries and the system creates robot positions in relation to that geometry, including approach and departure positions.

ArcWelding PowerPac complements the basic RobotStudio functionality of generating programs from geometry. The programmer can create welding and process templates and then define weld locations on CAD geometries. This results in a complete program including approach and departure positions, as well as searching instructions for tactile sensors.

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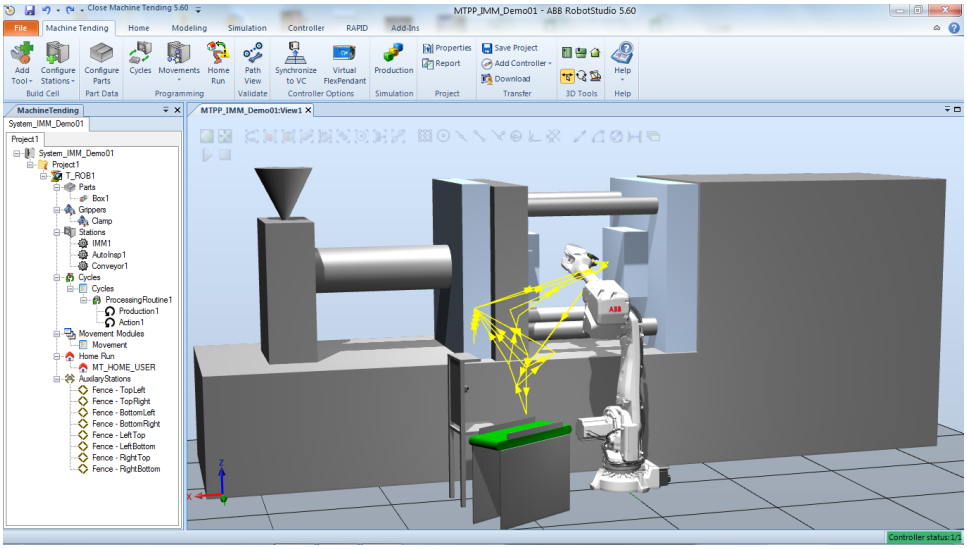
## 3.4 Machine Tending PowerPac [1109-1]

### Overview

RobotStudio Machine Tending PowerPac is an add-in that provides a platform for creation and modification of machine tending robot cells in a 3D virtual environment. The basic concept is that the basic programming and configuration of machine tending cells are done through graphical user interfaces. For more advanced features, the users have the possibility to use standard RAPID programming.

Programming is typically done in a sequence of steps, where it is easy to go back and forth between the steps. First one defines parts, grippers and stations used in the machine tending cell. The software provides templates and examples with in-built logic available. Second, the user interactively defines cycles and movements between stations. Third, the user defines the automatic and safe HomeRun strategy. And finally, the program can be simulated, validated and optimized before deployment to the ABB robot controller. Throughout the programming and configuration, the user has the possibility to configure the user interfaces that are used on the ABB controller device.

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The main features are described below.

| | |
|---|---|
| Define parts | Define and configure parts being produced in the cell. Create part or use CAD drawing. Connect program, part and gripper to confirm combination. |
| Define grippers | Define and configure the grippers used by the robot. Select from gripper libraries and templates, or create your own gripper. Set up signal interface. |
| Define stations | Define and configure stations in the cell. Select station type and template programs or create your own. Set up signal interface |
| Define movements between stations | Interactively create robot movement between stations. Grid system support defining movements between stations |
| Define HomeRun strategy | Define strategy to automatically and safe move the robot to home position if problems occur. Graphical representation of robot movement. |

*Continues on next page*

3.4 Machine Tending PowerPac [1109-1]
*Continued*

| | |
|---|---|
| Define cycles | Define different production cycles; start-up, production, empty, etc. Interactively define logic for each cycle. |
| Simulation, validation & optimization | Simulation of complete machine tending cycles. Validation of robot reach and prevent collisions. Optimization of movements to shorten cycle time. |
| Deployment and documentation | Deploy the generated robot program to the robot controller. Automatically generate project documentation. |

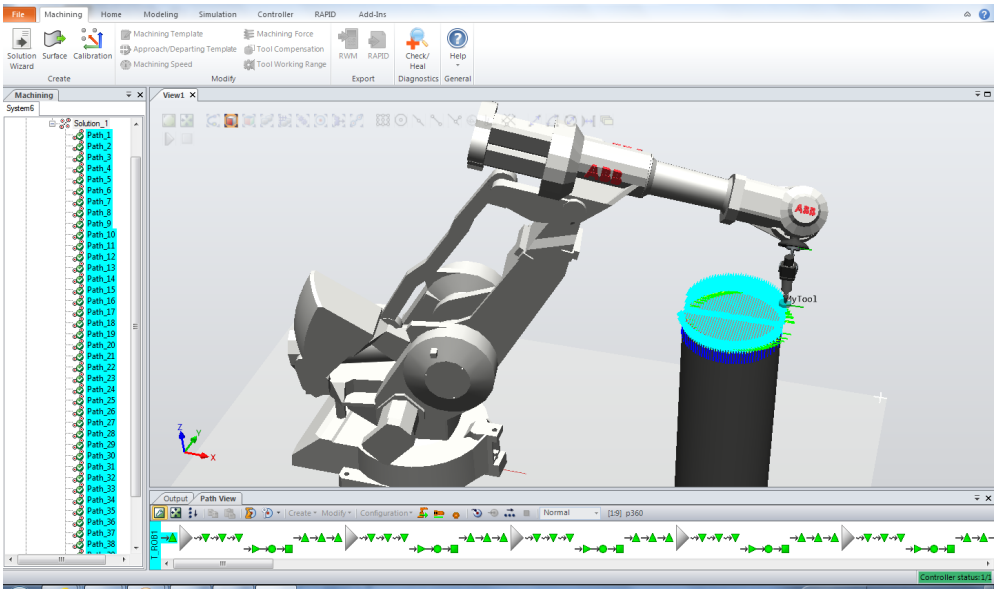
**Related product – RobotWare Machine Tending**

RobotWare Machine Tending is a controller software for deployment and operation of ABB robots that must be used together with RobotStudio Machine Tending PP. RobotWare Machine Tending software provides a programming framework supporting the offline programming. It also contains a customizable graphical user interface via ABB's FlexPendant control device.

## 3.5 Machining PowerPac [1110-1]

### Overview

For an imported CAD model, the Machining PowerPac can guide a user to create targets and paths from surfaces and edges. Pre-defined path generation patterns are provided. Process settings such as tool width, overlap rate, and machining angles can be defined.

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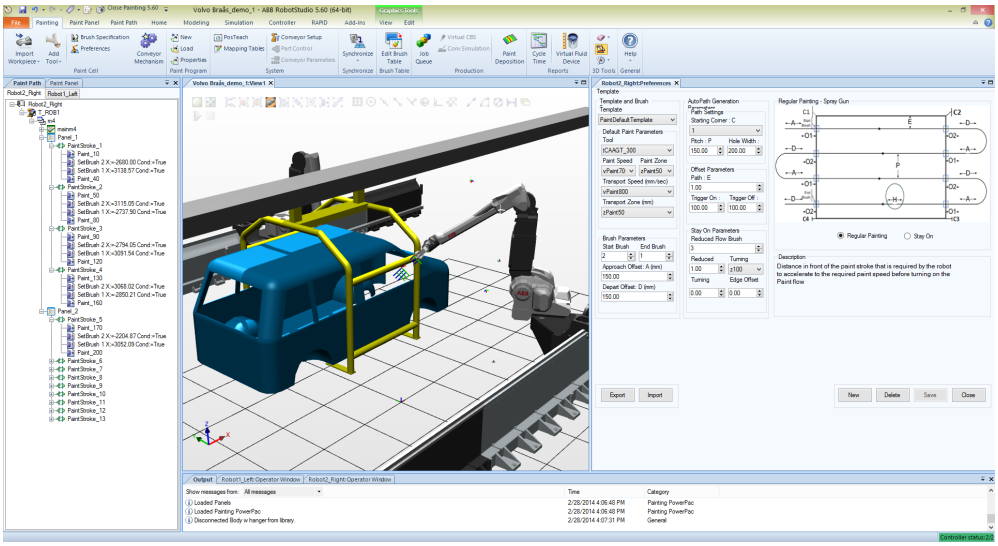
## 3.6 Painting PowerPac [1112-1]

### Overview

Painting PowerPac demonstrates the ability of ABB robotics in painting applications. With Painting PowerPac you can simulate and run a paint cell with multiple robots, including conveyor tracking. You reduce the risk by confirming layouts and solutions before the robots are installed. Paint strokes are easy to create and edit. Paint instructions are automatically created and robot positions for acceleration and deceleration distances calculated automatically. Painting PowerPac comes with CAD models of IRC5 Paint robots and ABB's applicators included.



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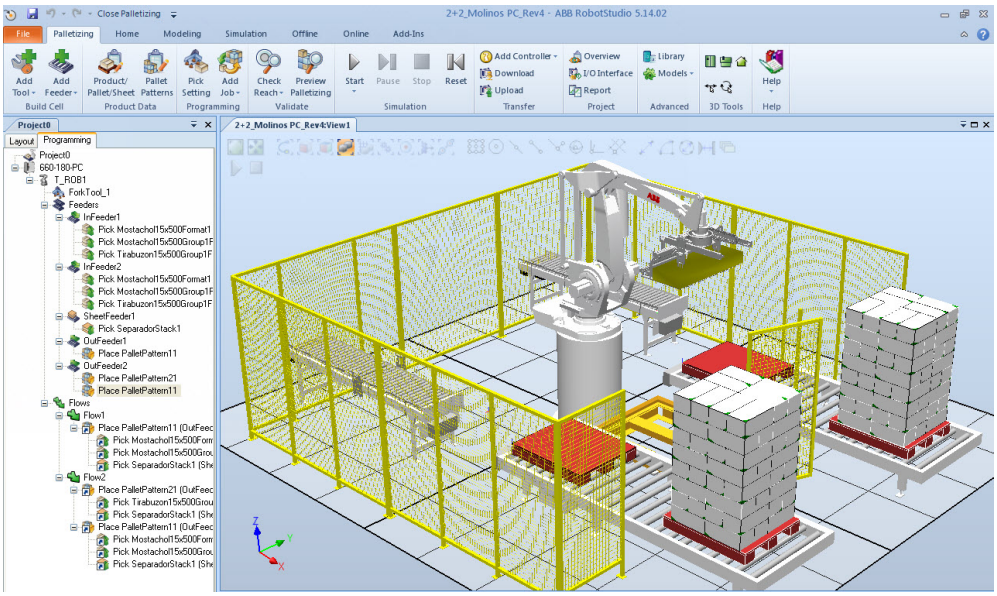
## 3.7 Palletizing PowerPac [1115-1]

### Overview

The Palletizing PowerPac is a software for palletizing applications. It is based on the proven palletizing solution of PickMaster 5 and PickWare. Palletizing PowerPac enables users to get a quick valid solution without having to write any code.

The Palletizing PowerPac supports all ABB palletizing robots and three types of ABB grippers. Users can test different pallet patterns, grippers and feeders using plug-and-play components. With the easy-to-use *Check Reachability*, *Preview*, and *Simulation functions*, users can get a thorough estimation of the cell throughput before actually investing in real production.

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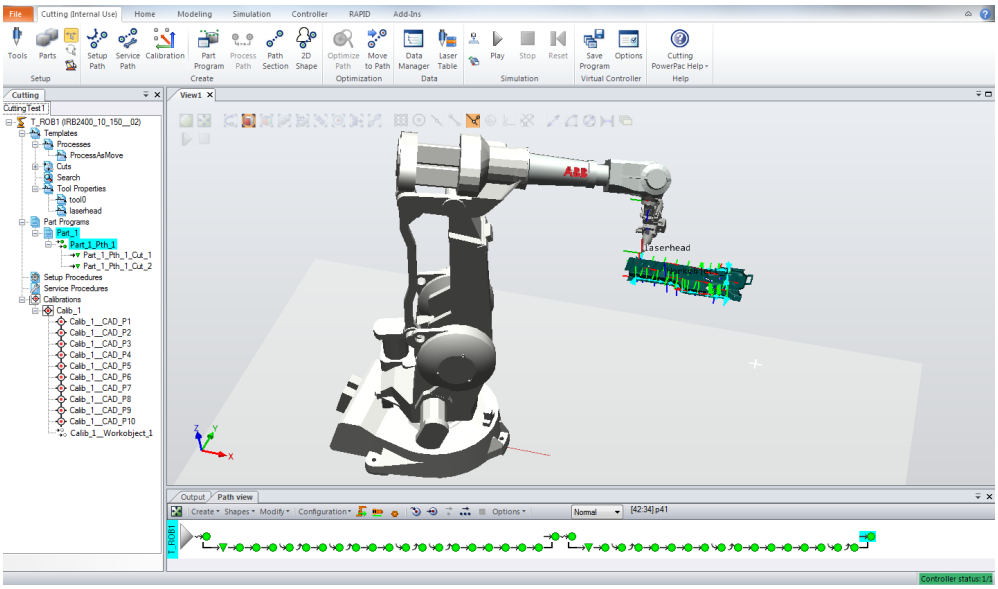
## 3.8 Cutting PowerPac [1120-1]

### Overview

RobotStudio Cutting PowerPac is an add-in tool to generate cutting programs based on CAD models. Using this tool you can generate 2D instructions for shape cutting, based on geometry features. The tool provides predefined cutting instructions for holes, slots, rectangles, hexagons and CAD shapes. The tool also supports free-form path generation from geometry edges (that is, free-form cutting instructions) which are typically used for trimming edges.

The Cutting PowerPac contains features that can be used for process analysis and optimization. A cutting program can be analyzed to improve cutting performance. The simulation tool indicates improvement points, where you can change tool parameters to keep the cutting speed constant. You can also optimize the relation between the laser's power and the speed of the cutting head, thereby improving the quality of cutting and also optimizing the performance.

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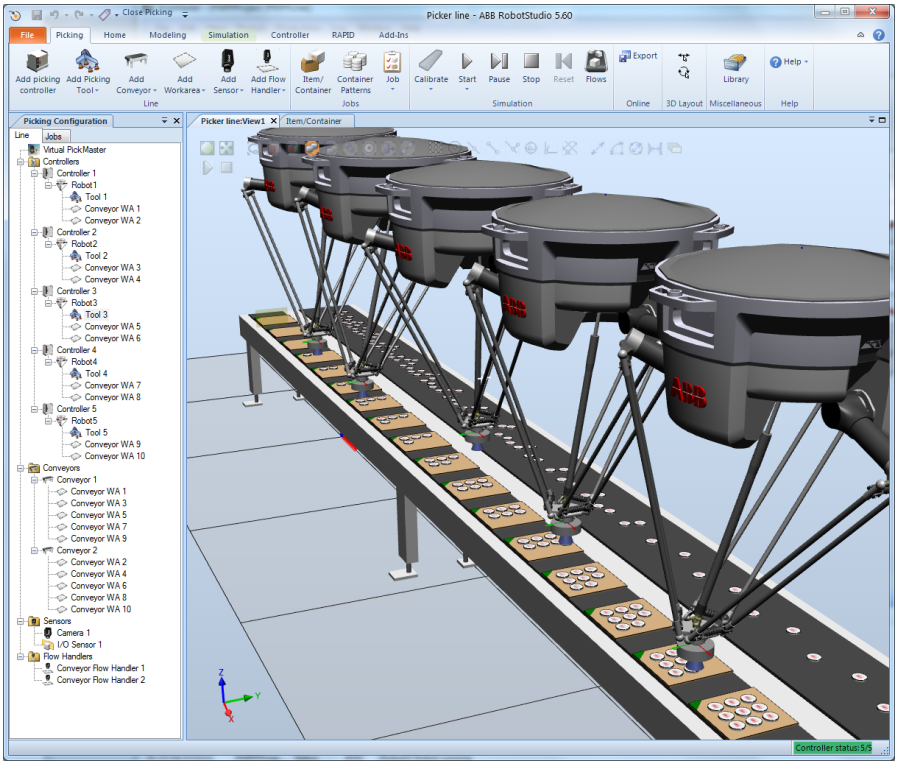
## 3.9 Picking PowerPac [1121-1]

### Overview

The Picking PowerPac is a RobotStudio add-in that extends RobotStudio with picking functionality, which enables offline programming and simulation of PickMaster 3 controlled picking lines. Included features and functions are one to one with the picking software PickMaster 3, which has been the market leader picking software for over 15 years. Picking PowerPac greatly simplifies line creation and programming with an intuitive step-by-step setup procedure. A line setup can be simulated and improved until optimum efficiency has been reached. Product flows can be setup and fluctuated to verify different production scenarios.

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## 3.10 Dispensing PowerPac [1252-1]

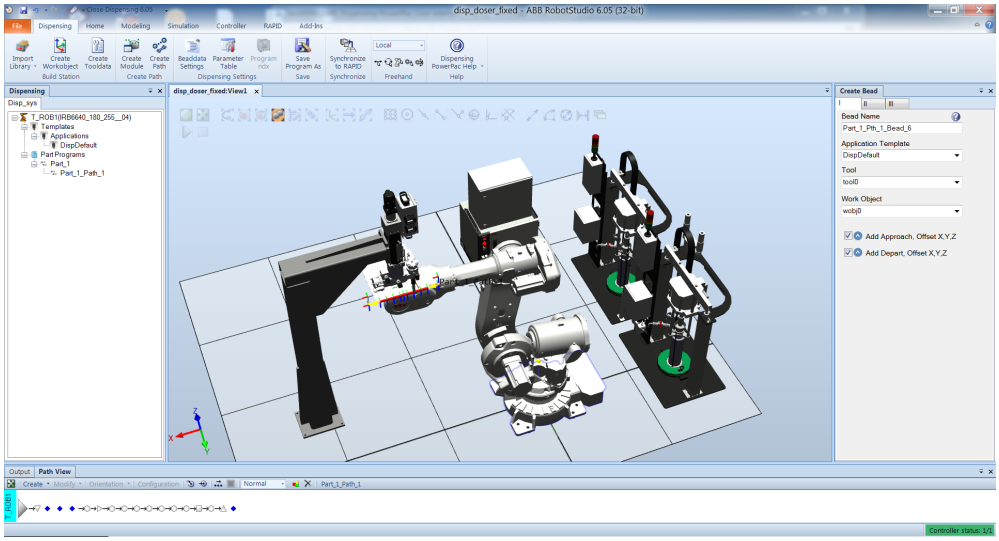
### Overview

Dispensing PowerPac is a RobotStudio Add-in that provides tailored functionality for programming of dispensing applications. It builds on the RobotWare Add-in Integrated Dispensing Function Package (IDFP). Dispensing PowerPac is a geometry based offline programming tool for defining cell layouts, creating the programs, and for running simulations.

The PowerPac contains a 3D component library of dispensing equipments that can be used when creating the cell layout. The path view gives an overview of each path and related process instructions. By testing the path using the virtual controller, you can fine tune the path and verify cycle time. This program can be loaded into the robot controller.

### Main Features

| Feature | Description |
|---|---|
| Import Library | Supports auto and manual import of libraries for station layout. |
| Beaddata Setting | Independent window to organize bead data. |
| Parameter Table | Interconnects and synchronizes system parameters between station and controller |
| Bead Path Generator | Creates precise bead paths easily for complex geometric models. |
| Bead Path Visualizer and Editor | For visualizing and editing complex bead path. |
| 3D Bead Path Configurator | For configuring 3D beads with precision. |
| Plug-in Tutorial | Includes online help and tutorials with interactive instructions. |

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## 3.11 PickMaster PowerPac [1570-1]

### Overview

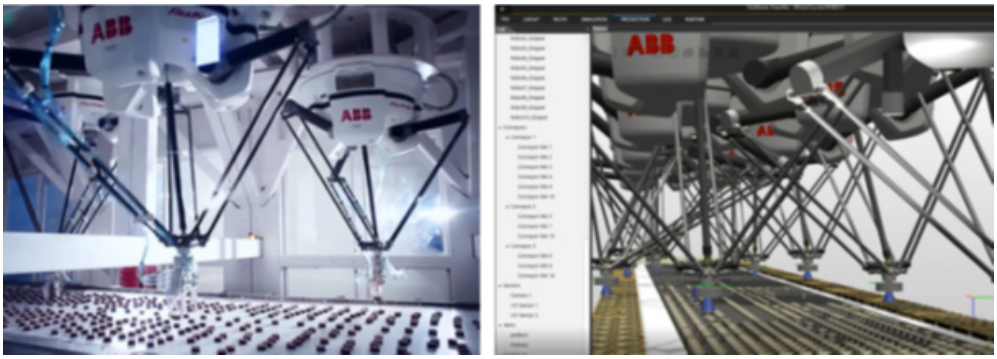
PickMaster PowerPac is the engineering software of the PickMaster® Twin product consisting of PowerPac, Operator, and Runtime. PickMaster Twin supports a multitude of configurations and can work seamlessly with all ABB robots - virtual and physical. Coupled with the inherent user-friendly software, PickMaster Twin is best-suited for factories and production lines where higher output, faster response times and quick changeovers are vital.

PickMaster Twin now offers greater flexibility and visualization of all complicated robotic maneuvers designed for flow-wrapping, tray loading, case and carton packing, and handling applications.

Digital twin technology allows customers to test out PickMaster configurations on virtual production lines before physical lines are built. When using digital twin technology, the simulated station can be directly connected to the running production, allowing simultaneous optimization of the picking process in the virtual world in real time while the real process acts accordingly.

Enabling offline programming of picking and packing tasks means users can create, simulate, and test a complete robot installation in a virtual environment without having to disturb their actual production line.

PickMaster PowerPac is powered by RobotStudio, but it launches as an independent software without the need to start RobotStudio.



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## 3.12 CAD Import options

**Overview**

RobotStudio can optionally import and export data in major CAD formats. The native 3D format of RobotStudio is ACIS (.sat) and the current version is 2022.1. Support for additional CAD formats are provided as options.

*Continues on next page*

## 3.12.1 CAD Converter IGES [1101-1]

**Reader**

This option enables import of the following formats and their versions into RobotStudio.

| Format | File extension | Version |
|---|---|---|
| IGES | .igs, .iges | up to 5.3 |

**Writer**

This option enables export of the following formats and their versions from RobotStudio.

| Format | File Extension | Version |
|---|---|---|
| IGES | .igs, .iges | 5.3 |

## 3.12.2 CAD Converter STEP [1102-1]

**Reader**

This option enables import of the following formats and their versions into RobotStudio.

| Format | File Extension | Version |
|---|---|---|
| STEP | .stp, .step | AP203, AP214, AP242 |

**Writer**

This option enables export of the following formats and their versions from RobotStudio.

| Format | File Extension | Version |
|---|---|---|
| STEP | .stp, .step | AP214 |

## 3.12.3 CAD Converter VDAFS [1103-1]

**Reader**

This option enables import of the following formats and their versions into RobotStudio.

| Format | File Extension | Version |
|---|---|---|
| VDA-FS | .vda | 1.0 – 2.0 |

**Writer**

This option enables export of the following formats and their versions from RobotStudio.

| Format | File Extension | Version |
|---|---|---|
| VDA-FS | .vda | 2.0 |

## 3.12.4 CAD Converter CATIA [1105-1]

### Reader

This option enables import of the following formats and their versions into RobotStudio.

| Format | File extension | Version |
|---|---|---|
| 3DXML | .3DXML | 4.0 – 4.3 |
| CATIA V5 | .CATPart, .CATProduct, .CGR | V5 R8 to V5–6 R2021 |
| CATIA V6 | .CATPart, .CATProduct, .CGR, CATDr | Exported from up to V6 R2019x |
| CATIA V4 | .model, .exp, .session | 4.1.9 – 4.2.4 |

**Note**

3DEXPERIENCE (CATIA V6) does not natively use the file system, so it does not have any file format of its own. 3DEXPERIENCE (CATIA V6) users must export their database objects as CATIA V5 CATParts, CATProducts, cgr, or 3DXML, which can then be imported into RobotStudio.

### Writer

This option enables export of the following formats and their versions from RobotStudio.

| Format | File extension | Version |
|---|---|---|
| CATIA V5 | .CATPart | V5 R15 – V5–6 R2021 |
| CATIA V4 | .model | 4.1.9 |

## 3.12.5 CAD Converter Inventor [1106-1]

**Reader**

This option enables import of the following formats and their versions into RobotStudio.

| Format | File Extension | Version |
|---|---|---|
| Inventor | .ipt | V5–6 R2023 |
| | .iam | V11 – V2023 |

## 3.12.6 CAD Converter Creo [1107-1]

**Reader**

This option enables import of the following formats and their versions into RobotStudio.

| Format | File extension | Version |
|---|---|---|
| Pro/E/Creo | .prt, .prt.*, .asm, .asm.* | 16 – Creo 9.0 |

## 3.12.7 CAD Converter DXF/DWG [1122-1]

**Reader**

This option enables import of the following formats and their versions into RobotStudio.

| Format | File extension | Version |
|---|---|---|
| DXF/DWG | .dxf, .dwg | 2.5 - 2019 |

## 3.12.8 CAD Converter JT [1123-1]

### Reader

This option enables import of the following formats and their versions into RobotStudio.

| Format | File extension | Version |
|---|---|---|
| JT | .jt | 8.x, 9.x, 10, 10.2 and 10.7 |

## 3.12.9 CAD Converter NX [1124-1]

**Reader**

This option enables import of the following formats and their versions into RobotStudio.

| Format | File extension | Version |
|---|---|---|
| NX | .prt | NX 2206 |

## 3.12.10 CAD Converter Parasolid [1127-1]

**Reader**

This option enables import of the following formats and their versions into RobotStudio.

| Format | File extension | Version |
|---|---|---|
| Parasolid | .x_t, .xmt_txt, .x_b, .xmt_bin | 9.0.x – 35.0.x |

## 3.12.11 CAD Converter Solid Edge [1128-1]

**Reader**

This option enables import of the following formats and their versions into RobotStudio.

| Format | File extension | Version |
|---|---|---|
| Solid Edge | .par, .asm, .psm | V18 – ST11 |

## 3.12.12 CAD Converter SolidWorks [1129-1]

**Reader**

This option enables import of the following formats and their versions into RobotStudio.

| Format | File extension | Version |
|---|---|---|
| SolidWorks | .sldprt, .sldasm | 2003 – 2023 |

## 3.13 Other 3D Formats

### Reader

The following formats and their versions can be imported into RobotStudio Premium without any additional option.

| Format | File extension | Version |
|---|---|---|
| ACIS | .sat | R1 – 2023 1.0.0 |
| 3DStudio | .3ds | |
| COLLADA | .dae | 1.4.1 |
| OBJ | .obj | |
| STL | .stl | ASCII |
| VRML | .wrl | 2 |
| LDraw | .ldr, .ldraw, .mpd | 1.0.2 |

### Writer

The following formats and their versions can be exported from RobotStudio Premium without any additional option.

| Format | File extension | Version |
|---|---|---|
| ACIS | .sat | R1 – 2023 1.0.0 |
| COLLADA | .dae | 1.4.1 |
| OBJ | .obj | |
| VRML | .wrl | 2 |
| DirectX | .x | |
| FBX | .fbx | 7.5 |
| glTF | .glb | |

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# 4 Pricing and licensing

**Pricing**

RobotStudio is available at a low annual fee. Customers can thus, without a high up-front investment, equip all their users with RobotStudio.

**Licensing**

RobotStudio is licensed to customers for use on a particular PC for a particular time period. It is protected from unauthorized use though its Activation procedure.

Activation

When you sign up for a RobotStudio subscription, you receive an Activation Key which unlocks the premium functionality of RobotStudio on one PC for the duration of the subscription period.

**Network license**

RobotStudio also offers network license to include a flexible licensing mechanism. The multi-user network license allows a number of users on the same network to share access to RobotStudio licenses. Contact ABB local sales team for more details.

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# 5 System requirements

### System requirements for RobotStudio

Software requirements

| Operating system | Edition |
|---|---|
| Microsoft Windows 10 Anniversary Edition or later | 64-bit edition |

**Note**

The Windows Firewall will try to block features necessary to run RobotStudio. Make sure to unblock these features when asked (Industrial Robot Discovery Serve, RobotStudio StudioAppFramework module, Virtual RobotController (all published by ABB)). The blocking state of a certain program can be viewed and changed at Start/Control Panel/ Windows Firewall.

For more information on Windows Firewall, visit *www.microsoft.com*.

Hardware requirements

High-performance desktop or laptop workstation, with the following requirements:

| Part | Requirement |
|---|---|
| CPU | 2.0GHz or faster processor, multiple cores recommended |
| Memory | 8 GB minimum.<br>16 GB or more if working with large CAD models. |
| Disk | 10+ GB free space, solid state drive (SSD) recommended. |
| Graphics card | High-performance, DirectX 11 compatible, gaming graphics card from any of the leading vendors. For the Advanced lightning mode Direct3D feature level 10_1 or higher is required. |
| Display settings | 1920 x 1080 pixels or higher resolution is recommended. |
| Mouse | Three-button mouse. |
| 3D Mouse [optional] | Any 3D mouse from 3DConnexion.<br>See *http://www.3dconnexion.com*. |

RobotStudio supports RobotWare 7.0.1 down to RobotWare 5.07 including subrevisions. See RobotStudio Release Notes for any compatibility limitations.

The RobotWare feature **3119-1 RobotStudio Connect** for OmniCore (or **616-1 PC-Interface for IRC5**) is required to connect RobotStudio to IRC5 or OmniCore over Ethernet. This option is not required while connecting to the Management port of the robot controller.

The RobotWare feature **FlexPendant Interface** is required to run the ScreenMaker application, or a FlexPendant SDK application on IRC5 robot controller.

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### System requirements for RobotStudio® Cloud

Cloud hardware and software requirements:

- Application is designed for an optimal screen resolution of 1920x1080.
- 13-inch screen and upwards needed with a minimum resolution of 1366x768.
- Requires keyboard and mouse.
- Browsers: Google Chrome, Microsoft Edge, Mozilla Firefox, Safari.
- This application works on smaller screens, but responsive design has not been implemented in this version, hence the experience and functionality will be limited.

Projects:

- Projects larger than 2GB cannot be opened by the web application.
- Maximum storage size allotted is 15GB per user.
- Maximum 5 devices can be used per every user account.

RobotWare:

- RobotWare 6.x and 7.x are supported.

# 6 Supported Languages

**RobotStudio**

RobotStudio supports the following languages:

- English
- French
- German
- Italian
- Spanish
- Japanese
- Chinese (simplified)
- Czech

**RobotStudio® Cloud**

RobotStudio® Cloud supports English.

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