What's New?
RobotStudio
5.15.01

Revision:
The information in this manual is subject to change without notice and should not be construed as a commitment by ABB. ABB assumes no responsibility for any errors that may appear in this manual.

Except as may be expressly stated anywhere in this manual, nothing herein shall be construed as any kind of guarantee or warranty by ABB for losses, damages to persons or property, fitness for a specific purpose or the like.

In no event shall ABB be liable for incidental or consequential damages arising from use of this manual and products described herein.

This manual and parts thereof must not be reproduced or copied without ABB's written permission.

Additional copies of this manual may be obtained from ABB.

The original language for this publication is English. Any other languages that are supplied have been translated from English.

© Copyright 2008 - 2013 ABB All rights reserved.
ABB AB
Robotics Products
SE-721 68 Västerås
Sweden
1 What’s New in 5.15.01

Overview

This section contains information on the new features of RobotStudio 5.15.01

1.1 Integrated vision

Overview

The Integrated Vision system add-in provides a robust and easy-to-use vision system for general purpose Vision Guided Robotics (VGR) applications. The system features a complete software and hardware solution that is fully integrated with the IRC5 robot controller and the RobotStudio programming environment. The vision capability leverages on the Cognex InSight® smart camera family, with embedded image processing and an Ethernet communication interface.

RobotStudio has been equipped with a vision programming environment that exposes the full palette of Cognex EasyBuilder® functionality with robust tools for part location, part inspection and identification. The RAPID programming language has been extended with dedicated instructions and error tracing for camera operation and vision guidance.

1.2 Signal Analyzer for real robots

Overview

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

The Signal Analyzer has been available for virtual robots since RobotStudio 5.14, and starting with RobotStudio 5.15.01 it is enabled also for real robots.
1.3 SafeMove – tool zone visualization in Online Monitor

Overview

The ‘Online Monitor’ is used to visualize the current pose of the manipulators in a robot system. The Online Monitor has been extended to show the tool zones of a SafeMove system. The idea is to give the user an augmented reality of the robot cell, i.e. give the user more information than could be retrieved by watching the real physical robot.

A typical scenario is to use the ‘Online Monitor’ during failure, i.e. when the robot has made an unplanned stop. In this case the stop could be due to that the robot has entered (or left) a restricted zone and therefore stopped by the SafeMove supervision. To give the user an idea of the physical layout and which safety zone that has caused the stop, the zones can be visualized.

Note

Signal Analyzer Online requires RobotWare 5.15.01 or later.

Note

Only TCP robots will be visualized in the Online Monitor and no external axes, track motions or positioners. Track mounted robots will always be shown in the base frame position regardless of the current position of the real robot. As a consequence, the Online Monitor may show the robot in a non-violating position, even though the safety controller has detected a safety violation and stopped the robot.

1.4 Other features

Refresh button for floor size

The station floor is automatically increased in size to match the current layout. RobotStudio now offers the possibility to let the user impose a manual refresh of the floor size. It may be useful to reset the floor size when the final layout is settled and you want to prepare the station for visualization.
Additional RobotWare manuals in RobotStudio

The most commonly used RobotWare manuals are made available in RobotStudio.

| RAPID | 
|---|---|
| RAPID Overview | Contains an introduction to the RAPID programming language as well as all instructions, functions, and data types. |
| RAPID Guide | Contains a formal description of the ABB Robotics RAPID programming language (RAPID). |

Applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABB 3D Sensor</td>
<td>Contains instructions for installing and programming a RobotWare and 3D sensor system.</td>
</tr>
<tr>
<td>Displace</td>
<td>Contains instructions for configuring and programming a RobotWare Displace system.</td>
</tr>
<tr>
<td>Spot options</td>
<td>Describes the RobotWare options Spot, Spot Servo, and Spot Servo Fastpoint, and contains instructions for use of the software and configuration.</td>
</tr>
<tr>
<td>Continues Application Platform</td>
<td>Describes the Continues Application Platform (CAP) that makes development of continuous applications easier, faster, and more robust.</td>
</tr>
</tbody>
</table>

Safety Controls

<table>
<thead>
<tr>
<th>Safety Controls</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Manual</td>
<td>This manual provides information about the SafetyOne safety control of the IRC5 robot system.</td>
</tr>
<tr>
<td>ETC Help</td>
<td>The Electronic Positioning Switches (EPS) safety controller is described in this ETC manual.</td>
</tr>
</tbody>
</table>

General

<table>
<thead>
<tr>
<th>General</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conveyor Tracking</td>
<td>Describes the option for conveyor tracking, or line tracking, when the robot following a work object is required on a moving conveyor.</td>
</tr>
<tr>
<td>Integrated Vision</td>
<td>Contains instructions for installation, configuration, and daily operation of the option integrated vision.</td>
</tr>
</tbody>
</table>

ABB Force Sensor 165

The robot option **ABB Force Control Package 165** is delivered with a force sensor that is available in RobotStudio 5.15.01. The force sensor is a graphical 3D representation of the true sensor and requires no configuration. The library does not simulate the real sensor.
Current range of robots displayed in ABB Library gallery

ABB Robotics has supplied a large variety of robots for the IRC5 controller. RobotStudio supports the vast majority of the IRC5 robots ever delivered. The complete list of robot models supported is listed in section 1.2.

To clarify the current product range, the ABB Library gallery of robots has been limited to show only the robots currently available for order. Other robots can be imported using Import Library command.

1.5 New robot models

IRB 360 8 kg 1.13m

A FlexPicker in the medium size (1.13m) has been enhanced to allow for 8 kg payload and larger working range.

Note

When attaching a tool to the force sensor, you need to manually create a tooldata at the TCP of the tool.

Alternatively, you can attach the tool directly to the robot as usual. However, in this case you need to take the space for the force sensor into account when modeling the tool using Create Tool.
New payload for IRB 1600: 10kg

The IRB 1600 family of robots has been extended with 10 kg versions in addition to the previously available 6 and 8 kg versions. There is no mechanical change to the design of the robot compared to the previous versions.

IRB6660 long upper arm

The IRB 6660 family has been enlarged with a robot that is larger but takes less payload. The new version has a reach of 3.35 m and can take 100 kg payload.

IRB 6640 Lean ID

The IRB 6640 Lean ID was introduced with RobotWare 5.15 and is now also available in RobotStudio.

The IRB 6640 Lean ID robot is called IRB 6640 DP6 in RobotStudio and RobotWare.
Add IRB5400 with riser foot

The riser foot that is optionally available for the IRB 5400 is now also available in RobotStudio.

Integrate new paint rails (with left and right versions)

Both left and right side versions of the paint rails are available in RobotStudio 5.15.01. Previously only the right-hand side version was available.

Note

The calibration position of the rail can be adjusted by re-positioning the geometry of the rail in relation to the trolley according to the following procedure.

1. Import the paint rail library
2. Disconnect from library
3. Expand the rail in the Layout browser and select BasePart of link Base
4. Open the Set Position tool
5. Reposition the geometry of the BasePart in the x-direction to meet the desired calibration position
6. Save As library

1.6 ScreenMaker Usability

Overview

Several usability improvements have been made to ScreenMaker. In particular, the error handling has been improved to provide better user feedback.
Information and error messages displayed in Output window

Information and error messages related to the current ScreenMaker project will be displayed in the regular RobotStudio output window instead of in separate dialogs.

Notify user if referenced custom assemblies are not found

If a ScreenMaker project has references to custom assemblies (.dlls) that are not found, then you will be notified by a message in the output window. To resolve the problem, you need restore the file or remove the reference.

RobotWare versioning

When creating a ScreenMaker project, you can select the target RobotWare version. If the selected version does not match the target controller, you will get a warning when deploying your project.
2 What’s New in 5.15?

Overview

This section provides information about the new features in 5.15.

2.1 Usability features

Overview

The usability of RobotStudio has been improved in several ways.

Controller tab

The Online and Offline tabs has been merged into the Controller tab. It contains the controls for managing the real controller and also the controls for synchronization, configuration and tasks assigned to the virtual controller. The merged tab creates a better workflow for the new Transfer function, see below.

RAPID tab

RAPID Editor functions are available in a separate tab. The RAPID tab provides tools and functionalities for creating, editing, and managing RAPID programs. You can manage RAPID programs which are online on a real controller, offline on a virtual controller, or standalone programs which are not part of a system.

Document organization

Controller system documents are now organized in two tab rows. The top row contains the controller tabs, the the bottom row contains the document tabs of the selected controller.
Zooming in and out

Using the zoom function, you can zoom in and zoom out of the document windows. The zoom feature is present in the RAPID Tasks, Rapid Editor, Configuration Editor, Event viewer, and I/O Windows.

2.2 RAPID Editor

Overview

The integrated RAPID Editor has been enhanced compared to RobotStudio 5.14. The Editor has been equipped with knowledge about RAPID languages, which has made it possible to improve the editor in several aspects.

2.2.1 RAPID Intellisense features

Error highlighting

Red squiggly lines appear under errors in the code. All syntax errors and a subset of semantic errors are indicated in this manner. You get instant feedback on the correctness of the RAPID code as the check is run in continuously in the background.

```
MoveL p1_missing\ID:=10,vmin,z10,tWeldGun\WObj:=r2_s1;
```

Syntax highlighting

Text is highlighted in different colors depending on their token classification (such as keyword, identifier and so on). In addition to token classification, the editor also shows different colors for built-in and installed identifiers (such as MoveL) and also for identifiers declared in user code.
The colors can be customized in the RobotStudio Options.

2.2.2 Code insertion functions

Auto-completion

After typing or completing a procedure call (such as `MoveJ`), pressing the TAB button will fill in all required parameters using similar rules as the FlexPendant; the last used argument of each type is inserted. Placeholders (<ID>) will be inserted for arguments for which default argument are not relevant (such as `robtargets`).

```plaintext
MoveL <ID>, vmax, fine, tWeldGun\nWObj:=wobj0;
```

The argument list is also filled in when an instruction is selected from the Insert Instruction list.

Note

Auto-completion is only supported when RAPID modules in controller memory, not when editing RAPID files.

Snippets

Code Snippets are pieces of code which you can insert into the RAPID Editor. You can also create your own code snippets or save a section of existing code from the RAPID editor as a code snippet. The snippet feature has been extended the new feature Save Selection as Snippet that makes your selected code available in the snippet menu.
Insert instruction

You can insert a predefined instruction into the code where the cursor is placed. RobotStudio generates and inserts default arguments to the instruction, using similar rules as the FlexPendant.

2.2.3 Supporting functions

Format

Format Document and Format Selection - Auto-formats the document by arranging the spaces and tabs in the RAPID code.

Uppercase Keywords - To change RAPID keywords from lowercase to uppercase.

Convert Spaces to Tabs - Converts consecutive spaces to the corresponding number of tabs. This function operates on the current selection.

Convert Tabs to Spaces - Does the opposite of function above.

Comment and Uncomment – To comment out or uncomment selected lines

Indent and Unindent – To increase or decrease the indent of selected lines.
Find functions

The Find group, on the RAPID tab contains commands for performing Find and Replace actions on the code in the RAPID editor.

QuickFind - Finds next occurrence after current cursor position. Press <F3> to continue searching

Go to line – Moves the cursor to the corresponding line in the RAPID editor.

Jump to - The Jump To list has an item for each routine in the current program module. Click an item to move to its location in the code.

Find / Replace – Standard functionality for finding and replacing text. You can choose to search in the Current Document, Current System or in a folder on your PC (you can browse to a folder to specify it).

Go To Definition - Moves the cursor to the definition of the selected symbol.

Find All References - Searches through the entire task for uses of the same identifier.

Find Unused References in Task / Module – Lists all data declarations that are not used in the current task or module, respectively.

Go to Visualization in 3D

The Go to Visualization command is available for targets in the RAPID editor. It takes you to the 3D graphical window to show you where the target is found.
Go to Declaration

The Go to Visualization command is available for targets in the RAPID editor. It takes you to the 3D graphical widow to show you where the target is found.

Context sensitive help

Press F1 to open RAPID manual for current identifier

Collapse regions

- Certain regions of the code can be collapsed. For example, Data declarations area, routines, IF/WHILE/FOR statements and so on. Groups created for
2.2.4 Program Pointer features

**Follow Program Pointer**

The function Follow Program Pointer keeps the program pointer visible during program execution by automatically scrolling the RAPID editor window according to the movements of the program pointer.

**Edit RAPID and keep the program pointer position**

For limited changes to the RAPID code of a controller in Stopped state, the current location of the program pointer can be maintained. After such an edit you can resume program execution from where it was without having to reset the program pointer.

2.2.5 File based RAPID editing

**Single modules or complete backups**

RAPID modules can edited in the RAPID editor without connection to a real of virtual controller. You can edit standalone modules or modules that are part of a backup. Configuration files can be edited with limited support for syntax and error highlighting.
New RAPID file

You can create a new RAPID file from the File page. The new module is based on pre-defined templates (Default).

You can make your favourite templates available in the User section by copying them to the following folder

\My Documents\RobotStudio\RapidModule Templates

Replace the module file name with the text %ModuleName% to make RobotStudio give it a unique name

MODULE %ModuleName%

2.3 RAPID Data Editor

The RAPID Data Editor allows you direct access to RAPID data values, which you can view and edit.

2.4 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 watch window.
2.5 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 real controller (which is online). As part of the transfer function you can also compare the data present in the virtual controller with that present in the real controller and then select which data to transfer.

2.6 System Diagnostics
You can create a System Diagnostics data file from RobotStudio.

2.7 Filter in I/O Window
A filter has been added to the I/O Window to make it easier to the signals you are interested in.
2.8 Features for Offline programmers

**Check Reachability improvement**

The function Check Reachability has been improved. You can use the it to check whether targets are reachable or not. If you select a path for the check, then the reachability of all move instructions in the path is checked. This function provides an easy reachability check which you can use for initial positioning of the robot, its workobject, paths and targets.

**Offset position**

The new Offset position tool offers a convenient way to position objects by specifying an offset to its current position using the selected reference frame.

**Print 3D**

You can now make a print out of the station view together with the station properties such as station name, author, size, date, revision and comments.
2.9 RobotStudio 64-bit edition

RobotStudio 5.15 is available in a 64-bit edition. The 64-bit edition will be automatically installed on a PC that runs a 64-bit version of a Windows. The 64-bit edition allows larger CAD-models to be imported as it can address more memory than the 32-bit version. For limitations, see section 7 Installation information.

2.10 New robot models

The new door opener - IRB5350

The IRB 5350 door opener robot is a compact and precise robot assistant for automotive interior painting, both for stop-and-go and moving-line solutions. It is available in RobotStudio 5.15.

S4 manipulators – IRB6400R and IRB640

The S4 manipulators, IRB640 and the IRB6400R are supported by the Stand Alone Controller in RobotWare 5.15 and are now available in RobotStudio.

The corresponding controller systems can be created using the System Builder as System From Layout is not supported.
2.11 RobotApps integrated in Document Manager
You can search and browse for libraries located at the RobotApps website from the Document Manager. The website is also accessible from http://www.abb.com/roboticssoftware.

2.12 Station compatibility between 5.14 and 5.15
RobotStudio 5.14.03 is forwards compatible with RobotStudio 5.15 under certain circumstances. This means that stations and Pack&Go files created with RobotStudio 5.15 can be opened with RobotStudio 5.14.03 if the following three conditions are met.

1) if the Pack&Go file has not been password protected,

2) if there is no StopWatch added to the station. (If that is the case, it can be deleted to regain compatibility),

3) if RobotStudio has been instructed to save CAD geometry of the station using ACIS version R22 (R22 is that is version used by RS 5.14.03. RobotStudio 5.15 RC1 has a later version of the CAD engine than RS 5.14.03). Add the following line to the file RobotStudio.exe.config to let RS save using the old ACIS format.
File RobotStudio.exe.config:

```xml
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <startup useLegacyV2RuntimeActivationPolicy="true">
    <supportedRuntime version="v4.0" sku=".NETFramework,Version=v4.0"/>
  </startup>
  <appSettings file="LicenseServer.config">
    <add key="AcisSaveVersion" value="22"/>
    <add key="RssNewsUrl" value="http://www.abb.com/blog/gad00540/1DDE6.rss"/>
    <add key="SendKeys" value="SendInput"/>
    <add key="OPCServer" value="ABB.IRC5.OPC.Server.DA"/>
    <add key="BuildTag" value="Production"/>
    ...
  </appSettings>
</configuration>
```

The file is located in the folder

C:\Program Files (x86)\ABB Industrial IT\Robotics IT\RobotStudio 5.15\Bin

on a PC running English version of Windows 7 with a Complete installation of RobotStudio.
For the 64-bit version of RS, the Bin folder is called Bin64.

### 2.13 ScreenMaker

**Launch Virtual FlexPendant from ScreenMaker**

Virtual FlexPendant can be launched from the ScreenMaker Tab.

**Open standard FlexPendant Screens**

It is possible to define an action which will help the user launch standard flexpendant screens like Program Editor, Program Data, etc.

**Read and Write to application variables**

It is possible to read an application variable value and write back to an application variable and vice-versa.

**Copy Screen**

Copies of exisiting screens can be made.