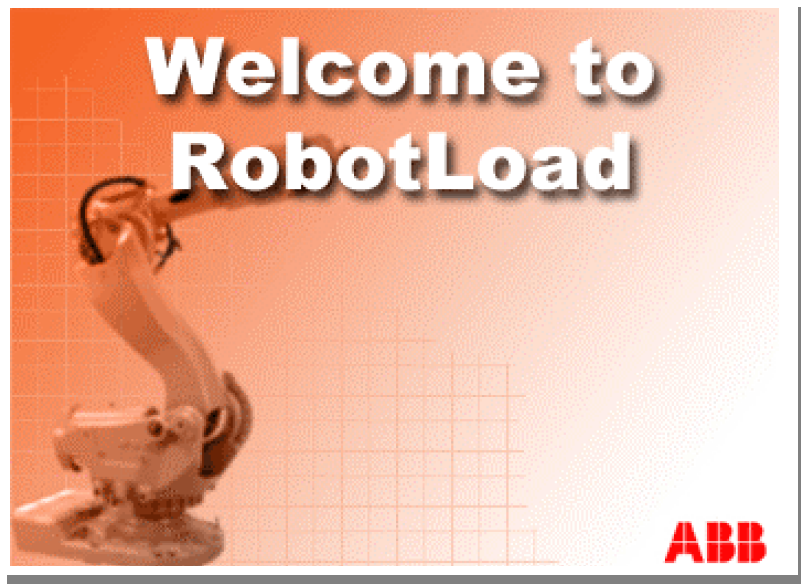


ABB RobotLoad

User Reference



Welcome to RobotLoad

History

The table below shows the history of this document:

Rev	Author	Date	Changes	Approved by
v 1.0.0	xxx yyy	2003-10-15	Initial version	

Introduction

This document presents a simple user reference when installing and running the program RobotLoad. Here we have gathered some common questions that might be of interest or help working with the program. The document consists of following chapters:

- Most frequent questions – Installing RobotLoad
- Most frequent questions – Layout
- Most frequent questions – Working with RobotLoad

The result from this software is only valid for standard robot applications. For over load cases and special applications, contact ABB for further analysis.

Supported robots are IRB6600/6650 and IRB7600.

System requirement

RobotLoad application demands:

Windows 98 /ME/2000/XP/NT4 Sp6

- 15 MB of free disk space

Recommended display settings:

- Screen resolution: 1024x768 pixels or higher
 - Color: 256 or higher
-

Software requirement

This application demands:

- Microsoft .NET Framework Version 1.1 Redistributable
 - Microsoft Excel 9.0
-

More information

To find more information about this program see the ABB website or contact Serop Product Support/SEROP/ABB. E-mail: serop.product_support@se.abb.com

Most frequent questions – Installing RobotLoad

Microsoft .NET Framework

This software is developed using .NET Framework. Due to this you might need to install the framework on your computer before running RobotLoad. The easiest way to install the framework is to go to Microsoft's website and download the latest version. When writing this paper it could be found on:
<http://www.microsoft.com/downloads/>

Step by step:

- Search for .NET on www.microsoft.com/downloads/
- Select: .NET Framework Version 1.1 Redistributable Package
- Choose Download and save the file on your hard drive.
- Install .NET by running dotnetfx.exe.

Install new release

Before installing any new release of RobotLoad it is recommended that you first uninstall current version. Running Win2000 this is done in:

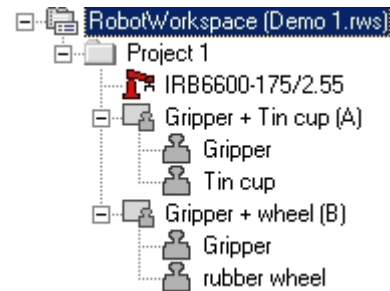
Start->Settings->Control Panel->Add/Remove Programs

Most frequent questions - Layout

Robot Workspace

The Robot Workspace is located on the top right side of program window. It shows a tree view, consisting of projects. Each Project has the following parts:

- Robot (the robot used for work)
- Load cases (in this folder you can see all loadcases)
- Loads in load cases



A Load Case consist a list of loads. To explain what a Load Case is, I will try to give you a picture: You have a robot cell where your robot is gripping a tin cup and moves it from point 1 to point 2. In this first LoadCase (A) the gripper is one load and the tin cup is the second load.

Now it turns out that the robot has some time left and during this time it is gripping a rubber wheel and moves it from point 3 to point 4. This is a new LoadCase (B) and here the first load is the gripper and the second load is the rubber wheel. To make sure that our robot is managing to lift all these loads (gripper plus the tin cup or the rubber wheel) we will have to calculate all loads working on the robot during the movements.

Properties

When clicking an item in the Robot Workspace the items properties are shown in the properties window on the lower right side. By using this you can set the items properties to new values and select robot.

In **Project Properties**. You set name, Station, robot serial number etc.

In **Robot Properties**. You browse to select robot.

In **Load case Properties**. You set the name on the load case and select if the load case is a wrist down case. Max angle from a vertical line must be set. The angle can be between 0 and 25 degrees.

In **Load Properties**. You set name and mass data on the load and. You also select type of load

Continued on next page

**Calculation
Result**

This window shows the calculated mass, center of gravity and mass moments of inertia for total handling weight (THW) and armloads. The mass moments of inertia for axes five and six are also shown as J5 and J6.

**Load Diagram
and Ratings**

This window shows the load diagram, center of gravity and ratings for actual load. Ratings are expressed as percentage of max allowed magnitude.

THW = Total Handling Weight

CoGZ = Distance to load diagram in Z-direction from center of gravity

CoGL = Distance to load diagram in L-direction from center of gravity

J5 = Total Mass moments of inertia for axis 5.

J6 = Total Mass moments of inertia for axis 6.

T6-T2 = Static torque axes 2 to 6.

**Coordinate
system**

Loads should be given in the correct coordinate system. When standing on a load node in the Robot Workspace it's possible to view the coordinate system for selected type of load, by clicking on the blue button marked with question mark in properties.

Most frequent questions – Working with RobotLoad

Create a new Robot Workspace To create a new Robot Workspace, click on new in the File menu. An empty Robot node and Project node are created.

Save Robot Workspace Saving of a project is possible in two ways:

1. Click on Save or Save As in the File menu.
2. Close the main RobotLoad program by clicking on the cross in the right top corner of the main program or click on Exit in the File menu. If you have any unsaved data in a project you will be asked if you want to save it before closing.

Open Robot Workspace Click on open in the File menu.

Close Robot Workspace Click on close in the File menu.

Add Project A Robot Workspace may have several Projects. There are three ways of adding a Project to a Robot Workspace.

1. In the Robot Workspace click with right mouse button and select Add Project and a default Project is created.
2. Click on Add Project in RobotWorkspace menu.
3. Make sure that the Robot Workspace node is highlighted. Select Import Projects in the Import menu.

Delete project To delete a project select project in the RobotWorkspace by clicking with right mouse button on the Project node or click on Delete Project in RobotWorkspace menu.

Add Load Case	<p>Since a robot project may have several load cases there is a folder in the Robot Workspace called LoadCases. There are three ways of adding a Loadcase to a Project.</p> <ol style="list-style-type: none">1. Select Project in the Robot Workspace by clicking with right mouse button on the Project node. Select Add Loadcase and a default LoadCase is created.2. Click on Add LoadCase in RobotWorkspace menu.3. Make sure that the Project node is highlighted. Select Import Loadcases in the Import menu.
Delete a LoadCase	<p>To delete a LoadCase select the LoadCase the RobotWorkspace by clicking with right mouse button on the LoadCase node or click on Delete LoadCase in RobotWorkspace menu.</p>
Add a load to a LoadCase	<p>There are three ways of adding a load to a load case. But before adding a load you must always choose a load case to add it to by clicking the LoadCase in the Robot Workspace.</p> <ol style="list-style-type: none">1. Click with right mouse button on the Loadcase node and select add Load.2. Click on Add Load in RobotWorkspace menu.3. Select Imoprt Loads in the Import menu.
Delete a Load	<p>To delete a Load select the Load the RobotWorkspace by clicking with right mouse button on the Load node or click on Delete Load in RobotWorkspace menu.</p>
Change project information	<p>A project information can be changed by clicking the on the Project node and then change the information shown in Properties window. The information is set when clicking in another box in the properties window.</p>
Change project name	<p>See <i>Change project information</i>.</p>
Select Robot	<p>In a project there is only one robot. To set what robot to use click on the Robot node in Robot Workspace and browse from the Properties window to select robots.</p>
Change the LoadCase name	<p>To change a load case name you click the load case node in the Robot Workspace and then type the name in the Properties window.</p>

Change load data in LoadCase	To change a specific load data you click the load node in the Robot Workspace.
Change load name	See <i>Change load data in LoadCase</i> .
Calculate load diagram	<p>Before you calculate a load diagram you must have a Project consisting of a Robot and at least one LoadCase. If this is fulfilled you select the load case you want to calculate and press Calculate Load Diagram in the Calculate menu. Or click with right mouse button on the Load case node.</p> <p>The Load Diagram window is shown to the left and if there were errors calculating the robot limits you will also see a message box with information. If there were errors you might not see a load curve.</p>
Print load diagram	Before printing you must have done a calculation of the load case. Then select print in the file menu. Program uses default printer and if you want to change printer, you have to change default printer in your computers printer settings.
Import Loads	Highlight a Load case. Select Import Loads in the Import menu.
Export Loads	Highlight a Load case. Select Export Loads in the Export menu. All loads in the Load case will be exported.
Import Load cases	Highlight a Project. Select Import Loadcases in the Import menu.
Export Load cases	Highlight a Project. Select Export Loadcases in the Export menu. All load cases in the Project will be exported.
Import Projects	Highlight a RobotWorkspace. Select Import Projects in the Import menu.
Export Projects	Highlight a RobotWorkspace. Select Export Projects in the Export menu. All Projects in the Robot Workspace will be exported.

Exit RobotLoad Close the main RobotLoad program by clicking on the cross in the right top corner of the main program and if you have any unsaved data in a project you will be asked if you want to save it before closing.

Type of Load A Loadcase often consist of several different Types of loads. All loads that are mounted on the robot should be defined in order to get a valid result. Tool and Pay are loads mounted on the turning disc. Four different types of armloads can be defined. Frame, Lower arm, Upper arm and tube shaft. Loads that are mounted on axes four, five and six should be defined as a Tube shaft load.

By clicking on the blue question mark in the Properties window, a figure describing the coordinate system for chosen type is shown.

Define load data The units are [kg] for mass, [mm] for center of gravity and [kgm²] for mass moments of inertia. Mass moments of inertia must be calculated in center of gravity of the load and be given in the directions of the wrist coordinate system.

Limitations This software doesn't check if maximum permitted armload on the frame is exceeded. Check Product Specification for maximum allowed extra load.

In Wrist Down mode, the software doesn't check if maximum permitted armload on any location is exceeded. Check Product Specification for maximum allowed extra load.

Armloads don't affect the ratings T2 and T3 in Wrist Down mode.