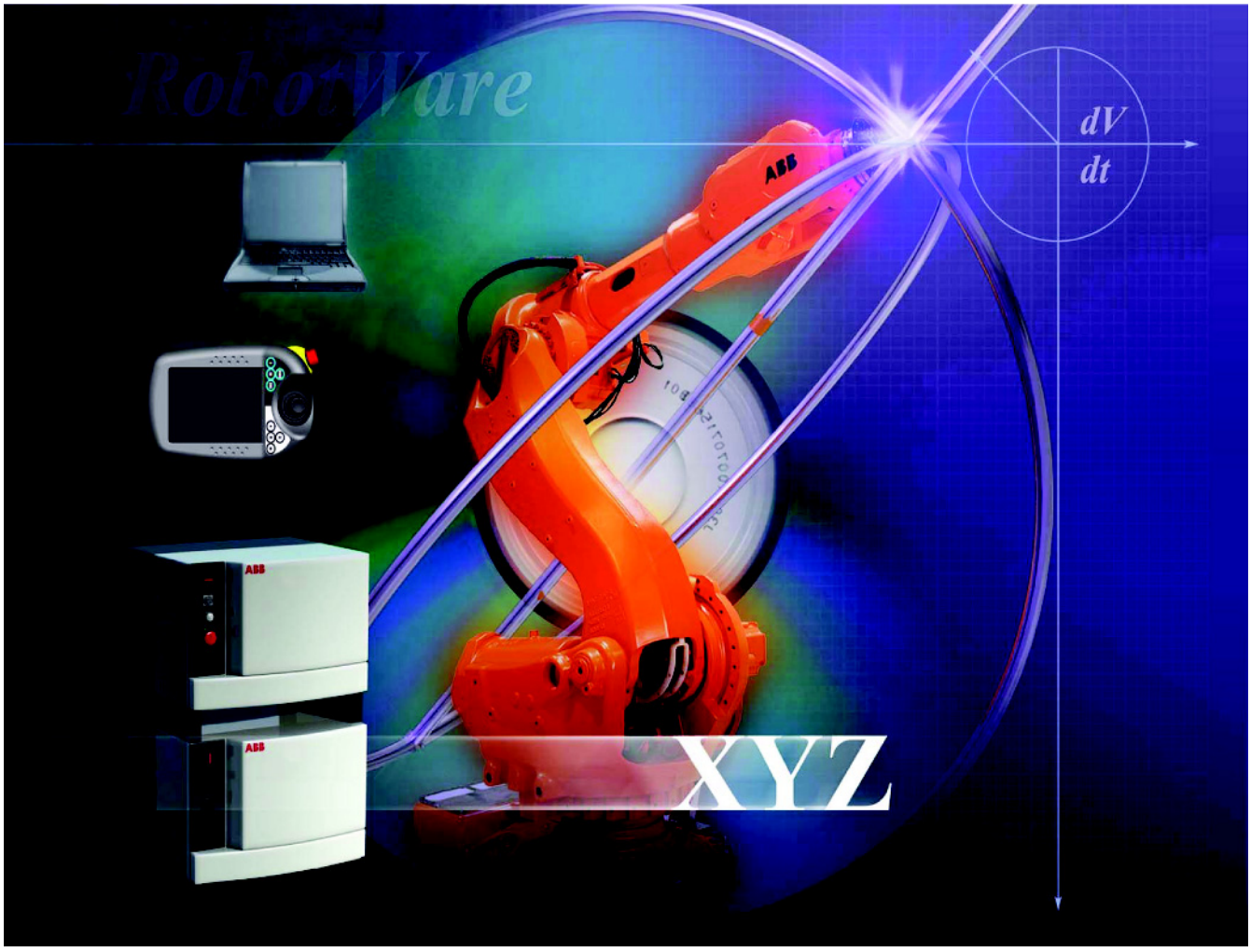
Software Installation

Arc Welding System M2004

IRC5

3HEA 801232-001 February 2005



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1 Introduction

1.1 Software

General

An arc welding system which is delivered by *ABB Automation Technologies AB* is at delivery booted with a configuration that is customized for the delivery. In most cases there is also a set of software drivers for the equipment loaded. There might still be reasons to use this installation description. Obvious examples are:

- A system is to be installed at the customer site.
- The RobotWare software is to be replaced.
- The loaded software must be replaced.
- The configuration is to be changed.
- A stalled system has to be restarted.
- To change the language.

Before the installation activity is started, the programmer must read the safety information in the *System Manual*, section *Introduction and safety*, chapter *Safety*.

Delivered system software

The following software is supplied for the arc welding system:

- Diskette ***Arc Welding System Configuration Diskette***, which contains the arc welding configuration supplied.
- CD disk containing ***RobotWare*** och ***RobotStudio****Online*

The diskettes that contain the control program must not be modified in anyway. This can result in the deactivation of safety functions such as reduced speed.

All installations

System parameters that are changed after the booting with the Arc Welding System Configuration Diskette must be saved on your own user diskette

Before the software installation is started:

	Action	Info/Illustration
1.	Position all robot and positioner axes in their zero positions.	
2.	Write down the commutation and calibration offsets for all motors. Robot and external axes.	
3.	Save all system parameters, system modules and program modules on diskette. Alternatively:	
4.	Make a backup of the system.	

See documetation for the Robot system!

1.1.1 Upgrading software installations

General

When delivered, the system is installed with configuration files and rapid modules that are adapted to suit the station in question.
On certain occasions it may be necessary to add to and modify the rapid modules, for example, when the station is customized.

Backup

To ensure that everything runs smoothly when a backup copy needs to be restored, it is a good idea to transfer one's own software to an external optional disk. If this is not done, unnecessarily long operational stoppages can occur.
See the example *"Installation of own rapid modules and configuration files" on page 3*.

Installation of own rapid modules and configuration files

Example Install.CMD

Add your own lines at the end of the file when there is a need to complement and change the rapid modules, for example, when customer adaptation of the station is made.

```
copy -from $BOOTPATH/Code/rapid.sys -to system/rapid.sys
config -filename $BOOTPATH/SYS/rapid.cfg -domain SYS
```

Figure 1. Example, install.CMD

In the example *Figure 1.*, the file copies *RAPID.SYS* to %HOME%/system/rapid, and loads the file into memory in accordance with the settings in the file *RAPID.CFG*, which should be created. See the examples *Figure 2.* of what this file can look like.

Example rapid.cfg

```
# [File: rapid.cfg]
SYS:CFG_1.0:3:0::

CAB_TASK_MODULES:

      -File "HOME:/system/rapid.sys" -ModName "myMod"
```

Figure 2. Example, rapid.cfg

When the system is started, in this example, the file *RAPID.SYS* will be loaded and ready to use in the system without having to use manual commands of the type FILE -> Load module. This ensures that the correct things are in memory when a backup is restored and minimizes the risk of mistakes by the operator.

Signal names

All signal names in RAPID programs and system modules must match the signal names in the system parameters.

If not, the signal names in the RAPID programs and system modules must be changed. The signal names in the system configuration should not be changed as these are based on a global standard.

Modules

All system modules and program modules that contain Seamdata, Welddata and Weavedata ought to be converted to XRG-format (=> XRG-files).

See documetation for the Robot system!

1.1.2 Installation and configuration

"*Arc Welding System Configuration*" Diskette

An ***"Arc Welding System Configuration"*** diskette is enclosed with each system that is delivered by ABB Automation Technologies AB.
The name of disc is:

- ***"3HEAXXX-XXXXX*** (robot number)" + revision number.

Each Arc Welding System configuration diskette is, when it is manufactured, designated for:

- one particular robot serial number or
- one particular license number.

It is not authorized to be used in any other robot system than that printed on the diskette label.

Content of the diskette

The *"Arc Welding System Configuration Diskette"* contains only options acc. to specification.
For example:

- I/O-board options.
- Addresses and names for all user signals needed for the delivered system.
- Configuration options for positioners in the delivered system.
- Configuration for arc process equipment in the delivered system.
- Configuration options for delivered sensors.
- Default configuration options for welding functions.
  See *"Arc welding configuration" on page 25*.
- Drivers, where appropriate, for positioner, operators panel and safety.

User´s configuration

In cases where there are complementary requirements, it is recommended to use make a new one and, add or change configuration components, and save the lot on a user´s configuration diskette. See *"Arc welding configuration" on page 25*.

Installation procedure

As mentioned in ABB Robotics manuals the pc application ***System builder in RobotStudio***^{Online} is used to create and download systems to the controller.

When a system is created or updated the external option can be added. The way to do it is described in *"Booting functions" on page 7*.

1.1.3 Drive unit

Combinations and connections

The table below specifies to which axis computers the selectable drive unit combinations shall be connected.

Combinations	Type	Axis computer	Art.number[1]	Positioner type
397 Ext. Axes DC4U Prepared Drives	DC4U Prepared Drives	1	DSQC 358G	IRBP L/T, RTT
397 Ext. Axes DC4U + GU	DC4U	1	DSQC 358G	IRBP A/B/D/K/R; IRBP L/T+RTT
	GU	1	DSQC 346U	

1. The corresponding article numbers can be seen on the respective drive units in the control module.

1.2 Reference document

Reference	Description	Document Id
Getting Started IRC5 and RobotStudio^{Online}	Software installation and start up information.	3HAC021564-001
Operator's manual IRC5 with FlexPendant	How to operate the robot system with a FlexPendant.	3HAC16590-1
Operator's Manual RobotStudio^{Online} (RSO)	How to install, configure and manage RobotWare on the robot's controller, as well as programming and supervising the robot, from a PC.	3HAC 18236-1
Product manual for Robot IRB	Installation instructions for hardware and controller software. Instructions for start-up and calibration.	
RAPID Overview	An overview of the RAPID programming language.	

2 Booting functions

2.1 General

Installation

The installation of the robot software is done:

- From an external PC.
- From a diskette (the robot controller need to bee equipped with a diskette drive).

From an external PC

The application handling the booting of the RobotWare is called ***System builder in RobotStudio***^{Online}.

There are two ways to establish connection with the robot:

1. The robots are connected to a local network (the LAN output on the robot) making it possible to run ***System builder in RobotStudio***^{Online} to come into contact with the hard disk of the robots from a PC connected to the same network. This is applicable when there is more than one robot at the same place.
2. From a computer with direct connection to the service output of the robot network.

2.1.1 Change active controller system

X-start

A restart must be implemented to be able to load new software.

An X-start will exit the running system, store system data on the mass storage memory, and then execute the ***BootServer*** to present the Start window. Any system stored in the mass storage memory, may then be selected.

When X-start is executed, all the saved system data is reset (in a similar way as with a warm start).

See documetation for the Robot systemet!

Option diskettes

The option diskettes required to load ***Arc Welding Products***'s configurations and software are system/station specific. The diskettes are used as storage media.

The option diskettes are created by ABB Automation Technologies AB. Drivers for calibrating and executing positioners, BullsEye, Tool Service Center, and SmarTac are loaded automatically using an option diskette(s).

2.2 System builder in RobotStudio^{Online}

General

System builder in RobotStudio^{Online} is used to create and install the controller software in the IRC5 robot controller. With ***System builder***, you can:

- Create a new system
- Update an existing system
- Down load a system to the controller using Ethernet connection
- Create Boot Disks to transfer the system to the Controller

Software key

In order to block the software and make it possible to boot only the options paid for, a special key in the form of a character string is used. The key is supplied with each robot.
This key is only to be found on the ***RobotWare*** CD supplied with each robot.

Creating a new system

Questions during the booting, are now replied to in ***System builder in RobotStudio^{Online}***.
Also our ***Arc Welding System Configuration Diskette*** is transferred to the system by way of ***System builder*** .
The following data are needed to create a new system:

- Robot serial number
- Key for software
- diskette "***Arc Welding System Configuration Diskette***"
- type of DC link, i.e. type of rectifier and drive unit.

For information, see *"Creating a new system" on page 10*

2.2.1 Backup & Restore

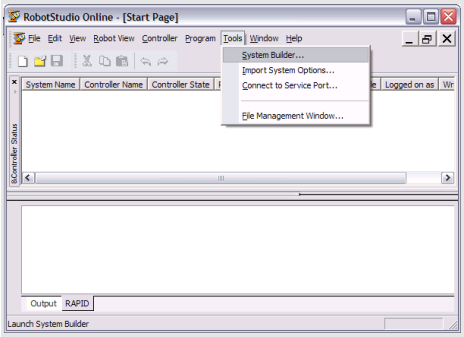
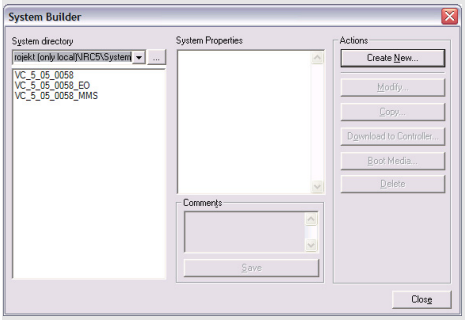
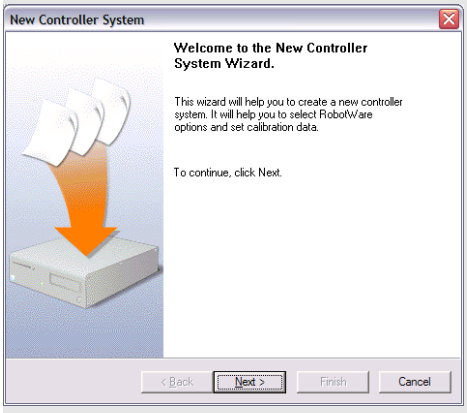
Backup is primarily intended for making backup copies of the welding programs and not of the application software. The application software should be booted according to the instructions in *"Upgrading software installations" on page 3*.
When the installation is finished and the welding programs have been created, we recommend that a backup safety copy of the system is made so that it is easy to restore the system in the event of a fault. When changes are made to the system, it is a good idea to make a backup safety copy so that the current safety copy always reflects the latest status of the station.

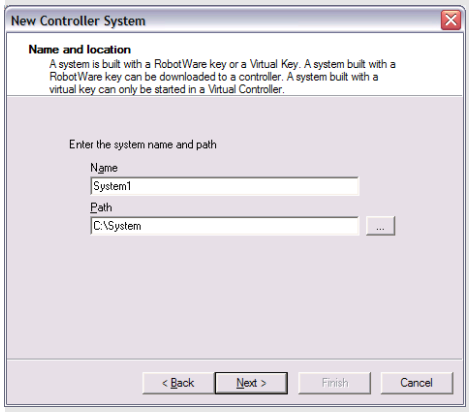
See documetation for the Robot system!

2.3 Creating a new system

2.3.1 Procedures

Following procedures details how to create a new system.

	Action	Info/Illustration
1.	Open System Builder in RobotStudio^{Online} (RSO).	
2.	Create a new system. Click on “Create New”.	
3.	Start the creation wizard by clicking “Next”.	

	Action	Info/Illustration
4.	First give your system a name and a location where you want to save it.	

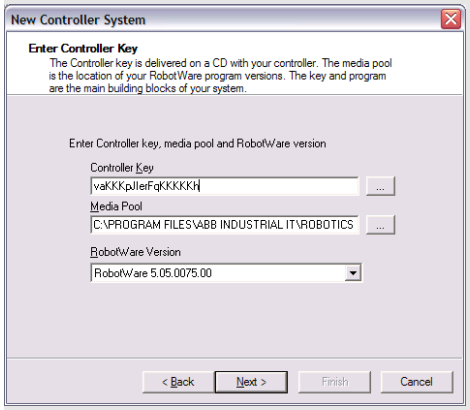
2.4 Add BaseWare Key

2.4.1 General

The Controller Key is delivered on a CD with your controller. The media pool is the location of your RobotWare program versions. The key and program are the main building blocks of your system.

2.4.2 Procedures

Following procedure details how to add the BaseWare key.

	Action	Info/Illustration
1.	Enter your controller key.	You can also select your key file by browsing the disk
2.	Select your Mediapool and the RobotWare version that you want to use. Click “Next”.	

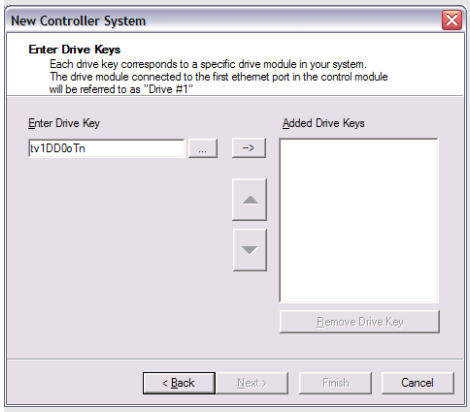
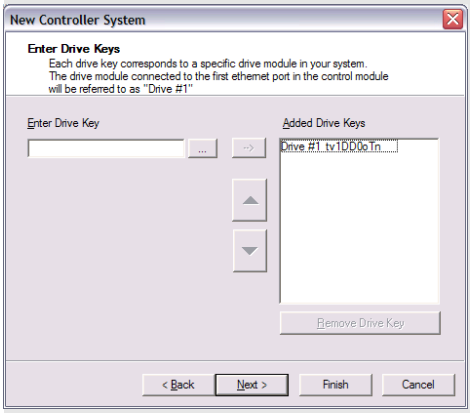
2.5 Add drive Module Key

2.5.1 General

Each drive key corresponds to a specific drive module in your system. The drive module connected to the first ethernet port in the control module will be refered to as “Drive#1”.

2.5.2 Procedure

Following procedure details how to add the drive module key.

	Action	Info/Illustration
1.	Enter your drive module key and add it to the list by clicking on the “→” button.	
	If you are installing a Multi Arc system you have to repeat this once for every drive module.	
2.	When you have added all your drive keys click “Next”.	

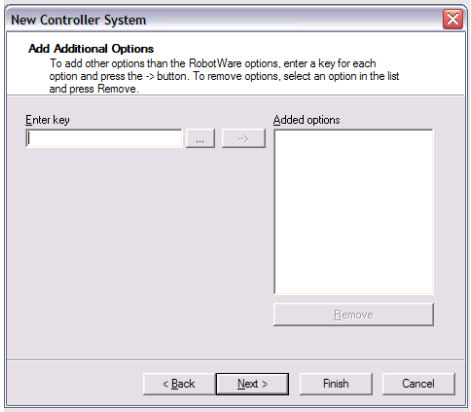
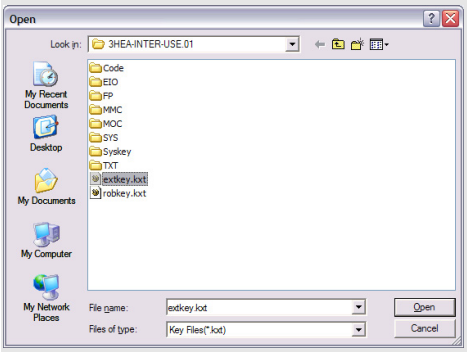
2.6 Add Additional Options Key

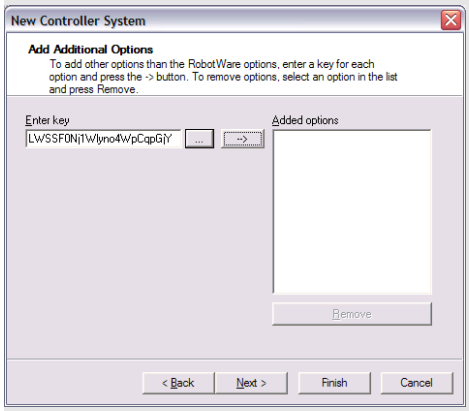
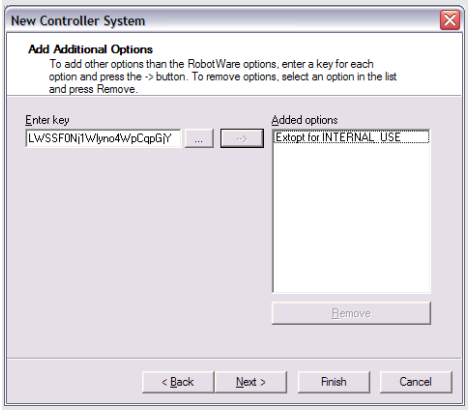
2.6.1 General

To add options other than the RobotWare options, a new key for each option needs to be entered.

2.6.2 Procedures

Following procedure details how to add the additional options key.

	Action	Info/Illustration
1.	Locate the “extkey.kxt” file in the external option disk directory in your Mediapool. Use the “…” button.	
2.	Click on the “extkey.kxt” file and then click “Open”.	

	Action	Info/Illustration
3.	Click on "→" to add in to the list.	
4.	Click "Next".	

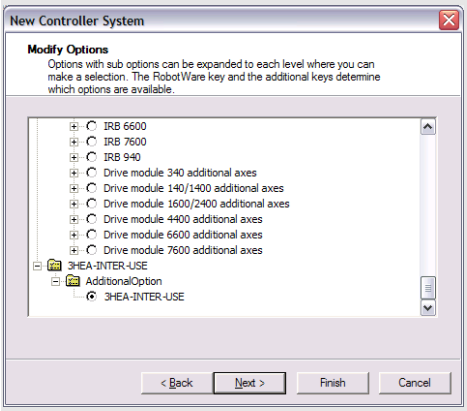
2.7 Modify Options

2.7.1 General

Options with sub options can be expanded to each level where you can make a selection. The RobotWare key and the additional keys determine which options are available.

2.7.2 Procedure

Following procedure details how to modify options.

	Action	Info/Illustration
1.	Make sure that all your options are checked and that the right robot and drive configuration is selected.	
2.	Click “Next”.	

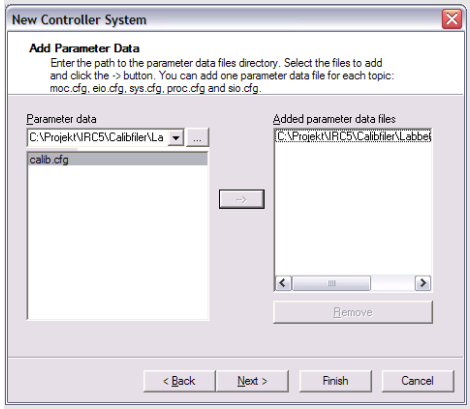
2.8 Add parameter Data

2.8.1 General

Enter the path to the parameter data files directory. Select the files to add and click the add button. You can add one parameter data file for each topic: *moc.cfg*, *eic.cfg*, *proc.cfg* and *sio.cfg*

2.8.2 Procedure

Following procedure details how to add extra parameter data.

	Action	Info/Illustration
1.	Add extra parameter data.	
2.	Click “Next”.	

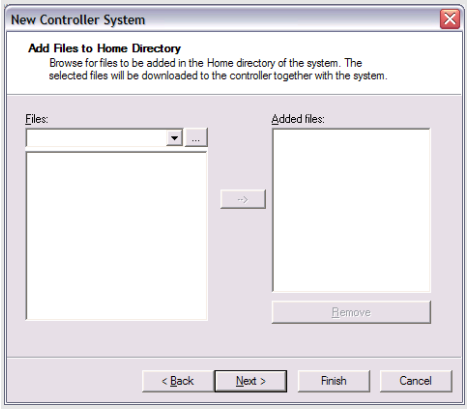
2.9 Add files to Home directory

2.9.1 General

Browse for files to be added in the Home directory of the system. The selected files will be downloaded to the controller together with the system.

2.9.2 Procedures

Following procedure details how to add files to home directory.

	Action	Info/Illustration
1.	Add files to your system “HOME”.	
2.	Click “Next”.	

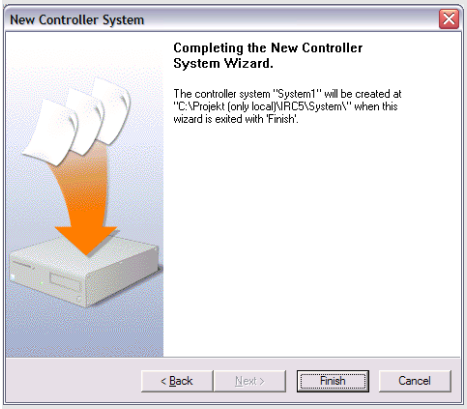
2.10 Finish

2.10.1 General

The controller system “SystemX” will be created at selected directory when this wizard is exited with “Finish”

2.10.2 Procedure

Foolowing procedure details how to finish the configuration.

	Action	Info/Illustration
1.	Click **Next** to finish the system.	

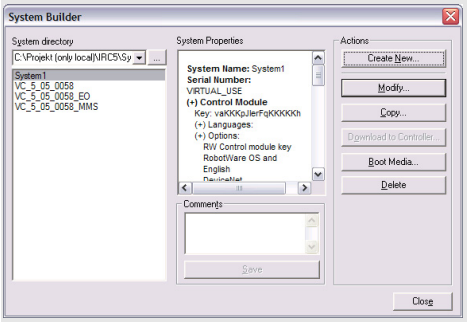
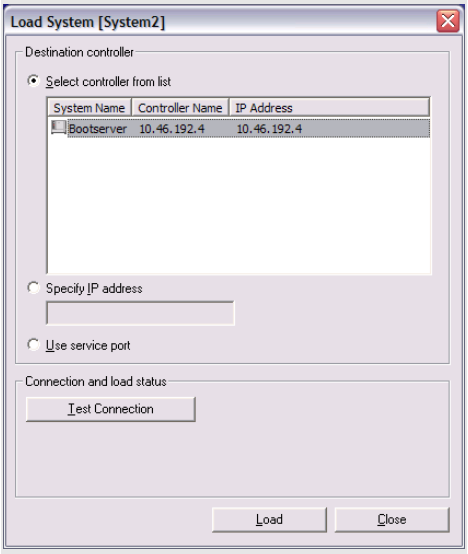
2.11 Download to controller

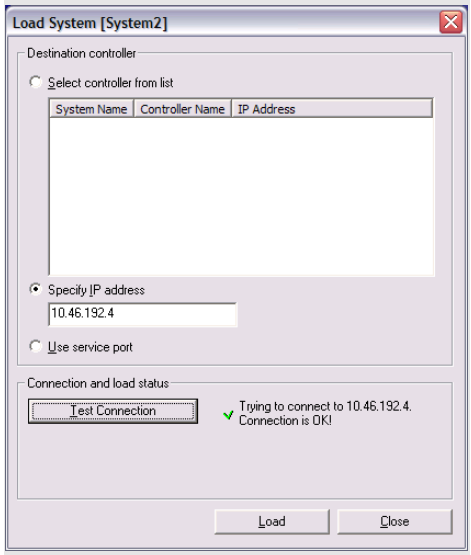
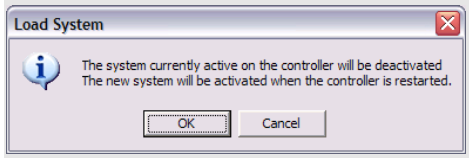
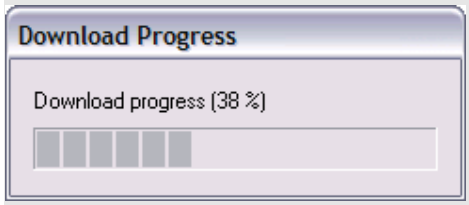
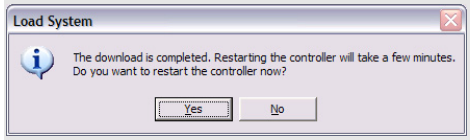
2.11.1 General

When the system is configured, the system must be downloaded to the IRC5 controller.

2.11.2 Procedure

The Following procedure details how to download the selected system to the IRC5 controller.

	Action	Info/Illustration
1.	Select the system.	
2.	Click on “Download to Controller”.	
3.	Select the controller that you want to download to.	

	Action	Info/Illustration
4.	If your controller system does not appear in the list you can specify the IP address in the textbox below.	
5.	Test the connection by clicking on **Test Connection**.	
6.	Click on **Load** to download the system if the test went **OK**.	
7.	Click on **OK**.	
8.	The download will start.	
9.	When the download is finished click on **Yes** to restart the controller.	

Procedure

3 System directory structure

3.1 MediaPool

General

System builder i RobotStudio*Online* uses a directory called *MediaPool* for storing all the different programs/options available.

The MediaPool usually used is found under:

- *c:\Program\ or \Program Files\ABB Industrial IT\Robotics IT.*

When a program is imported by way of *Import Program* the new program will automatically be stored in this file.

See documetation for the Robot system!

New RobotWare

When a new ***RobotWare*** is released from Robotics it is to be entered under the *Media Pool* used. The new version will then automatically be used when creating a new system.

This can be done in two different ways:

1. Reinstalling ***System builder*** including ***RobotWare.*** In this way you will get the new release of both the ***System builder*** and ***RobotWare*** systems.
2. Copying the new ***RobotWare*** release over to the *Media Pool*.

See documetation for the Robot system!

System

When a new system is created it will be stored in the *System* file under:

- *c:\Program\ or \Program Files\ABB Industrial IT\Robotics IT\System\+*”name of system”

To prevent the file gradually getting too big it is advisable to eliminate items now and then.

See documetation for the Robot system!

MediaPool

4 Arc welding configuration

4.1 Introduction

General

This chapter is intended to give the user some hints regarding arc welding configuration.
The user can then change the configuration in order to meet individual requirements.

- It is recommended to save this user configuration on a separate *User Configuration* disk.

Reference document

Document	Described in:	Document id
General process parameters for IRC5	Application manual	3HAC 16591-1 Revision -

About the ARCITEC IRC5 Arc welding system

There are a few arc welding functions that can be controlled by the *ArcWare* software or by the power source software. These functions are:

- Ignition
- Burnback
- Craterfill

The power source functions are to be thought of as first choice since they are easiest to program and more pre-programmed for specified purposes. They are pre-programmed as synergic relationships, which affects the static working point as well as dynamic behavior.

Reference document

Document	Described in:	Document id
Programing Arcitec IRC5	Programing manual	3HEA801234-001

Data structure

The structure of seam data, weld data and weave data must be matching the current arc weld configuration. This will always be the case when the data are created in current (=active) configuration.
If required, convert Seam data, Weld data and Weave data in system modules and program modules.

See documetation for the Robot system!