

Software Installation

Arc Welding System M2001

504 873-102/March 2004



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1 Introduction

1.1 Software

1.1.1 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*.

1.1.2 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 *RobotWare*
- Diskette *Manipulator Parameter Disk*



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.

1.1.3 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:

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 User's Guide for the Robot system).

1.2 Upgrading software installations

1.2.1 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. 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.

The installation script of the external optional disk is encrypted. To make it possible to install one's own rapid modules and configuration files, there is a further file, *ADDAWOPT.CMD*, that should be modified with the addition of one's own files. See the example below.

1.2.2 Installation of own rapid modules and configuration files

Example *ADDAWOPT.CMD*:

```
# [File: ADDAWOPT.CMD]
# Here you can put additional options to the option disc
# from Laxå. The install file will automatic hook this
# file.

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

In the example above, 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 below of what this file can look like.

Example *rapid.cfg*:

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

CAB_TASK_MODULES:

    -File "ram1disk:/system/rapid.sys" -ModName "myMod"
```

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.

1.2.3 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.

1.2.4 Modules

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

- The RAPID converter is described in the “*S4Cplus User's Guide, System Parameters Process Ware, Arc Welding, Activating arc welding parameters*”.

1.3 Installation and configuration

1.3.1 General

See *Product Manual IRB XXXX* section *Installation and Commissioning*, chapter *Installing the Control Program*

1.3.2 “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:

- “3HEA50323088” + 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.

1.3.3 Content of the “Arc Welding System Configuration” Diskette

This 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 [section 4.1.2 About the ARCITEC arc welding system](#).
- Drivers, where appropriate, for positioner, operators panel and safety.

1.3.4 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 [Chapter 4 Arc welding configuration](#).

1.3.5 Installation procedure

As mentioned in ABB Robotics manuals the pc application **RobInstall** 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 [Chapter 2 Booting functions](#).

1.4 Drive unit

1.4.1 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	2	DSQC 358G	IRBP L/T, RTT
397 Ext. Axes DC4U + GU	DC4U	2	DSQC 358G	IRBP A/B/D/K/R; IRBP L/T+RTT
	GU	2	DSQC 346U	

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

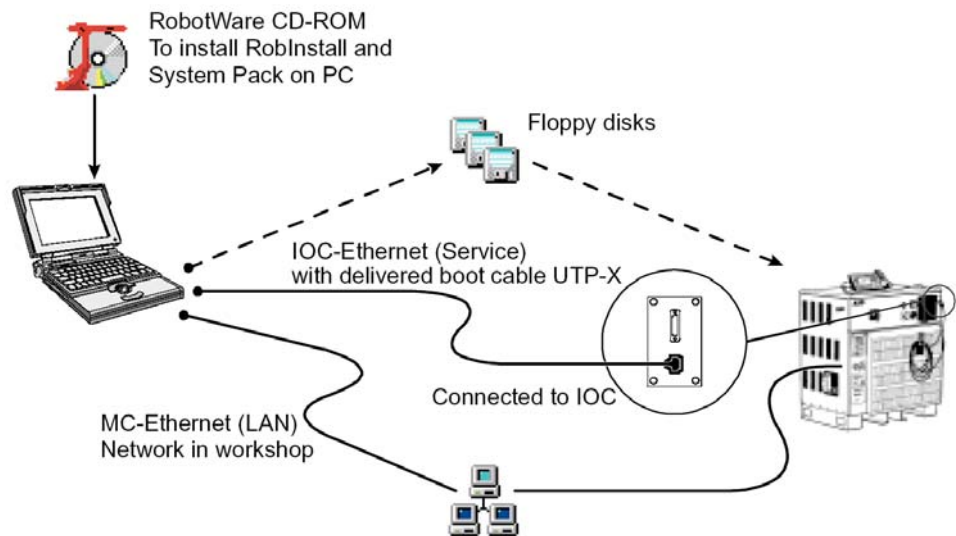
2 Booting functions

2.1 General

2.1.1 Installation

The installation of the robot software is done:

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



2.1.2 From an external PC

The application handling the booting of the RobotWare is called **RobInstall**. There are two ways to establish connection with the robot:

- The robots are connected to a local network (the LAN output on the robot) making it possible to run **RobInstall** 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.
- From a computer with direct connection to the service output of the robot network.

2.1.3 From diskette

If the robot is equipped with a diskette drive (optional), the robot control system can be transferred using a diskette. The diskette is created in the application **RobInstall**. Read more about how to create a diskette in the robot product manual, *Transferring the robot system via diskettes*.

2.2 Change active controller system

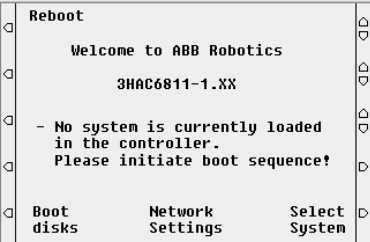
2.2.1 General

A restart must be implemented to be able to load new software. X-START is described in the case below. This means that one can change the active control system, see [section 2.2.2 X-start](#).

An X-start will exit the running system, store system data on the mass storage memory, and then execute the BootImage 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):

2.2.2 X-start

	Action	Illustration/Info
1.	Click on the "Misc" button and select the "Service" window".	Button <i>Misc</i> :  xx0100000194
2.	Select "Restart" in the <i>File</i> menu.	
3.	Write the figures: 1_5_9 (the fifth function key is changed to X-START)	
4.	Press X-START. The system is restarted and the "Start window" is opened.	

2.2.3 Option diskettes

The option diskettes required to load **ATAW**'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).

2.3 RobInstall

2.3.1 General

Robinstall is used to create and install the controller software in the S4Cplus robot controller. With RobInstall, 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
-

2.3.2 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 replaces the keydisc used in S4C systems.)

This key is only to be found on the RobotWare CD supplied with each robot.

2.3.3 Creating a new system

Questions during the booting, are now replied to in **RobInstall**.

Also our SEFAX_A option disk is transferred to the system by way of **RobInstall**.

The following data are needed to create a new system:

- Robot serial number
- Key for software
- diskette with manipulator parameters¹
- diskette “ATAW’s options disk”
- type of DC link, i.e. type of rectifier and drive unit.

1. **CalibData** shall be loaded, which should usually be done.

2.4 Installation example

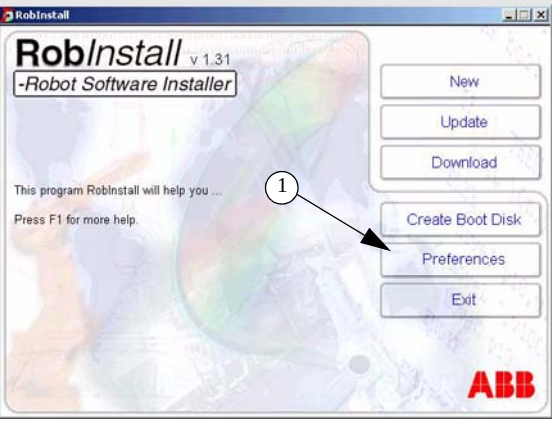
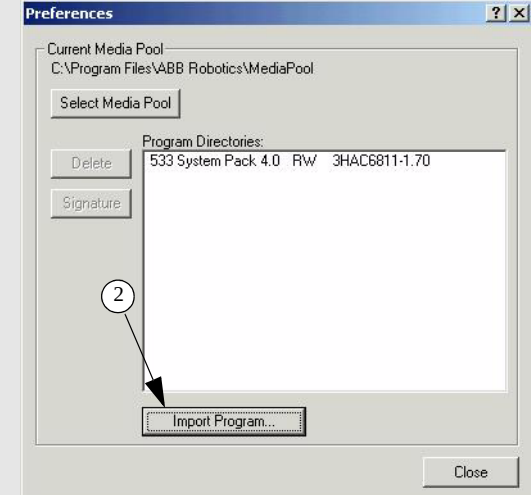
2.4.1 Preferences

Before creating a new system use the “*Preferences*” function to import the Arc Welding External Option disc delivered with the system.

- The name of options is "3HEA50323088." + the revision number.

2.4.2 Prereferences for *Robinstall*

The following instructions are an example of an update of system software.

	Action	Illustration/Info
1.	Check that Robinstall is installed. If this is not the case, install it in accordance with the instructions in section "Installing RobotWare in the computer".	
2.	Click the start button on your PC and select Program/ABB Robotics/RobInstall/RobInstall.	The RobInstall start window will open, see following picture.
3.	Click the "Preferences" button, see pos. 1.	 Start window
4.	Click the "Import Program" button, see pos. 2. All the programs available (<i>RobotWare</i> and <i>options</i>) will be displayed in the next menu.	 Create new system.

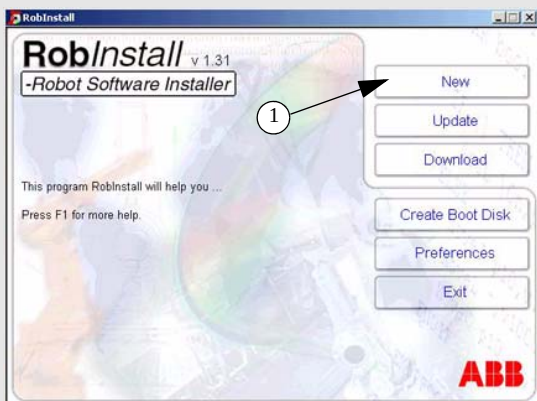
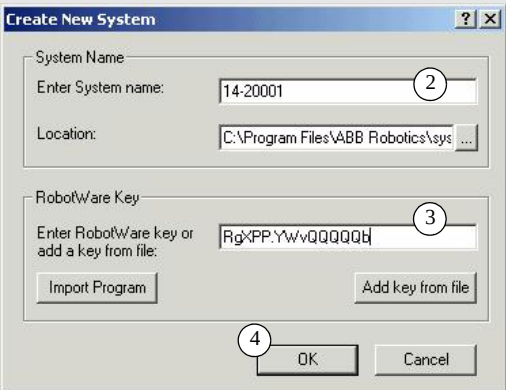
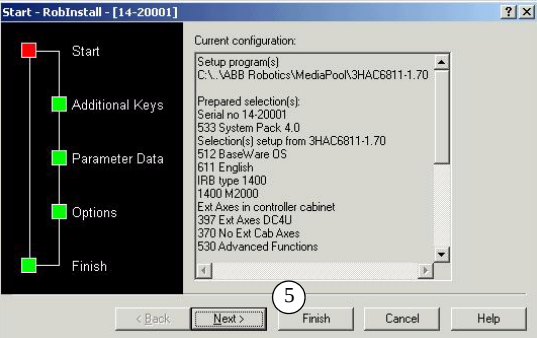


To update the option **3HEA 50323088**, the folder with the same name must be erased. There is however one exception to this, and that is when this option has just been created in the computer being used.

	Action	Illustration/Info
5.	Select the folder/option to be erased, see pos. 3.	
6.	Click on button “Delete”, see pos. 4. N.B. this operation is irrevocable.	
7.	Click the “Import Program” button, see pos. 5. The window <i>Browse for folder</i> is displayed.	
8.	Select the desired option, see pos. 6 and click OK, see pos 7.	
9.	Click the “Close” button, see pos. 8.	

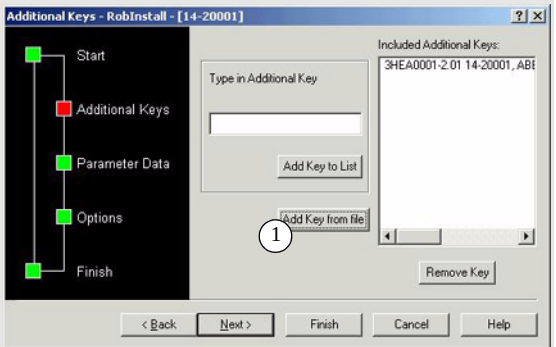
2.4.3 Create a new system

The following instructions show how to create a new control system.

	Action	Illustration/Info
1.	Click the "New" button, see pos. 1.	 Start window
2.	Enter the name of the new boot file, see pos 2. (E.g. the serial number of the robot).	
3.	Enter the RobotWare key for the robot in question, see pos 3. (The key is on the back side of the cover of the RobotWare CD).	
4.	Click the OK button, see pos. 4.	
		 Create new system.
5.	The following window shows the current configuration of the system.	 Start-RobInstall
6.	Click the "Next" button, see pos. 5.	

2.4.4 Add external option

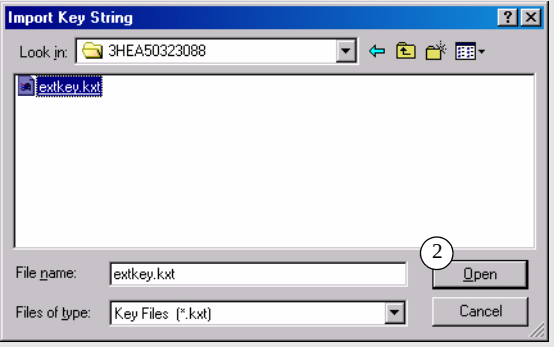
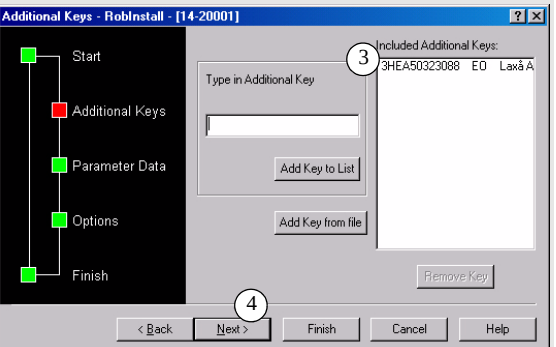
The following instructions show how to add an external option.

	Action	Illustration/Info
1.	Click the “Add key from file” button, see pos. 1.	 Additional Keys_1.

The key must be fetched from the media pool that Robinstall uses, which is normally:



- *c:\program\Abb robotics\mediapool\3HEA50323088\extkey.kxt* or *c:\program files\abb robotics\mediapool\3HEA50323088\extkey.kxt*.

2.	Select the file and click the “Open” button, see pos 2.	 Additional Keys_2.
3.	Select the external option, see pos, 3 and click the “Next” button, see pos 4.	 Additional Keys_3

2.4.5 Information about external option

You can now see that an external option called *3HEA503230880* has been entered into the system. In the *3HEA503230880* option you can also see the number of the program and which robot the option is created for. It can look as follows:

- 3HEA503230880 EO 3HEA0001-0.09 14-00000, Laxå ArcWelding Option.

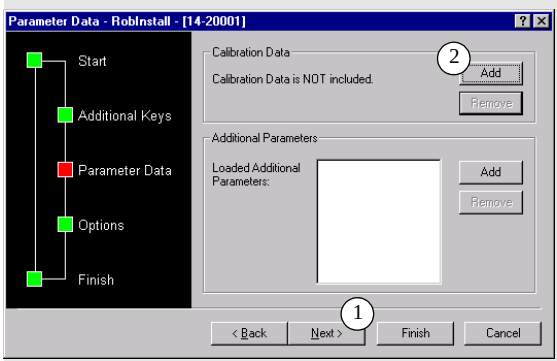
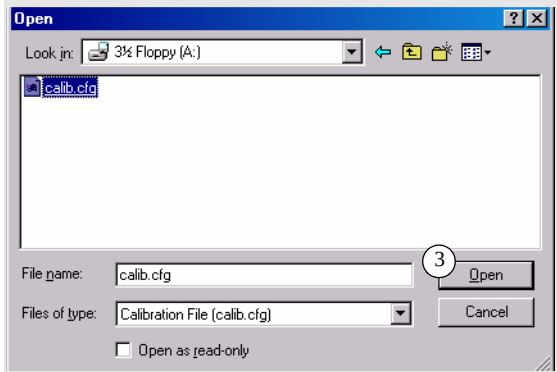
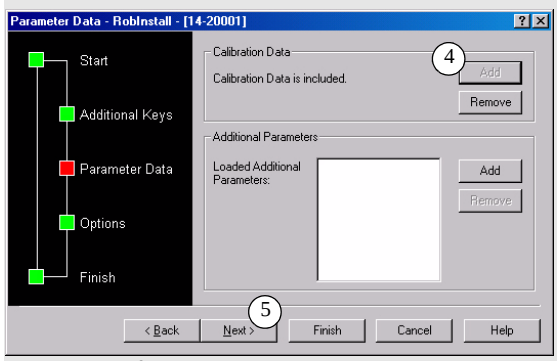


After booting, this information can be obtained via the TP function, Misc\ Service\ View\ System Info\ Product ID.

Text	Indicates
3HEA503230880	The name of the option
EO	shows an external option (not ATRO)
3HEA0001-0.093	The number and revision of the option
14-00000	The number of the robot the option was created for
Laxå ArcWelding Option	The text only tells us it is an AW option

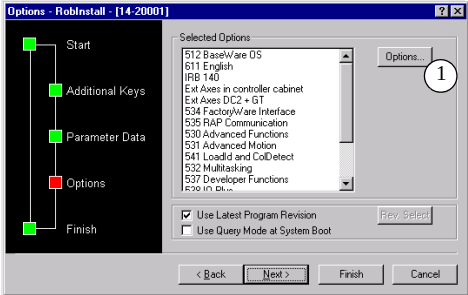
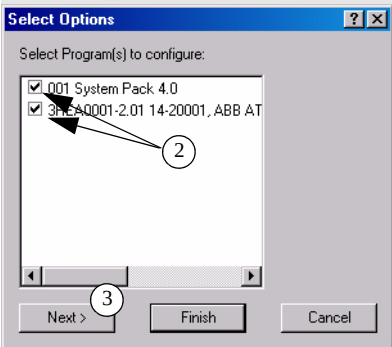
2.4.6 Add additional parameter data

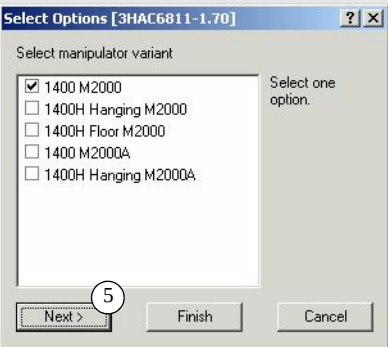
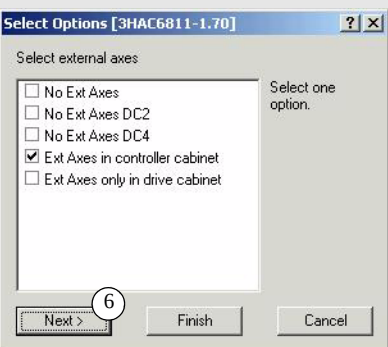
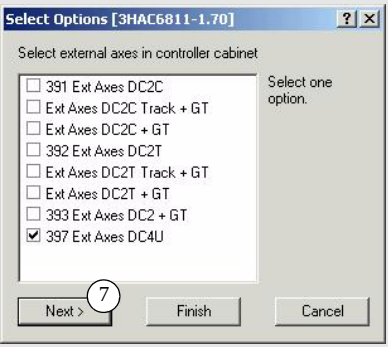
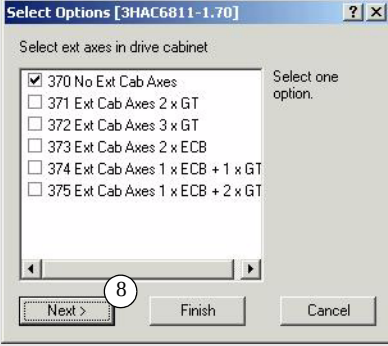
The following instructions describe how to add parameter data for the positioner.

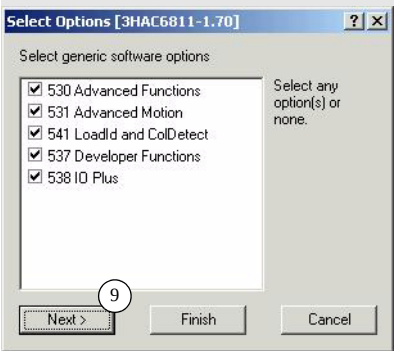
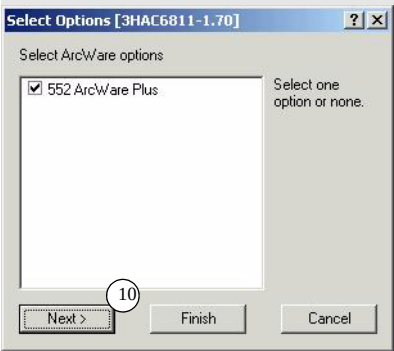
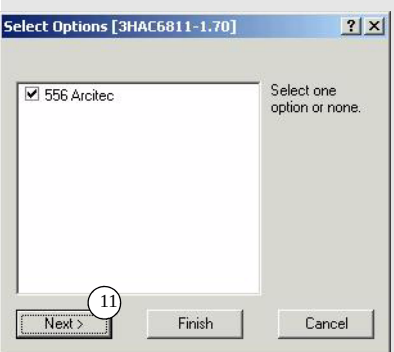
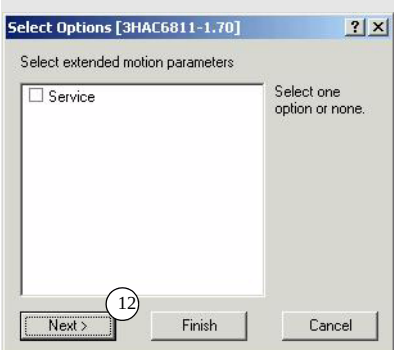
	Action	Illustration/Info
1.	Click the “Next” Button to load the Positioner parameters into the system, see pos. 1.	 Parameter menu_1
2.	Click the “Add” button in the Calibration Data window, see pos. 2.	
3.	Select the <i>calib.cfg</i> file from the diskette with <i>Positioner data</i> and click the “Open” button, see pos. 3.	 Load calib.cfg file.
4.	Now the “Add” button for <i>Calibration Data</i> should not be selectable, see pos. 4.	 Parameter menu_2.
5.	Click the “Next” Button, see pos. 5.	

2.4.7 Add options

The following instructions describe how to add alternatives to the system.

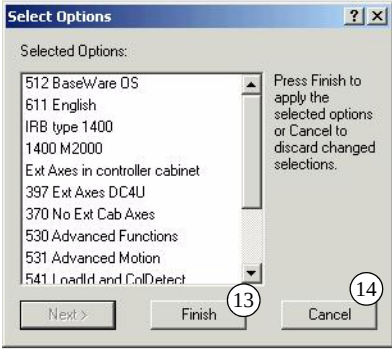
	Action	Illustration/Info
1.	Click the "Options" button to view the selected alternatives, see pos. 1.	 Option menu.
2.	Select the programs to be configured, see pos. 2.	 Select program to configure.
4.	Select a language for the programming unit and click the "Next" Button to select robot type, see pos. 4.	 Select teach pendant language.

	Action	Illustration/Info
5.	Select a manipulator type and click the “Next” button to select external axis, see pos. 5.	 Select manipulator variant.
6.	Select the chosen external axis and click on the “Next” button to select the type of drive unit, see pos. 6.	 Select external axes.
7.	Select the chosen drive unit type for the control cabinet and click on the “Next” button to select the type of drive unit in the external cabinet, see pos. 7. For more information about drive units, see section 1.4.1 Combinations and connections	 Select external axes in controller cabinet.
8.	Select the chosen drive unit type for the external cabinet and click on the “Next” button to select the <i>BaseWare</i> alternative, see pos. 8.	 Select external axes in drive cabinet.

	Action	Illustration/Info
9.	Select the chosen alternative/options and click on the “Next” button if the <i>ArcWare</i> alternative is to be loaded, see pos. 9.	 Select generic software options.
10.	Select the alternative and click on the “Next” button if the <i>Arcitec</i> alternative is to be loaded, see pos. 10.	 Select ArcWare options
11.	Select the alternative and click on the “Next” button if the <i>Extended Motion Parameters</i> are to be loaded, see pos. 11.	 Select options (Arcitec).
12.	Select the alternative and click on the “Next” button to view a summary of the selected alternatives, see pos. 12.	 Select extended motion parameters.

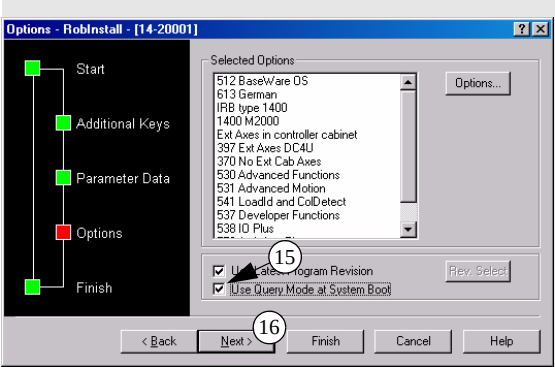
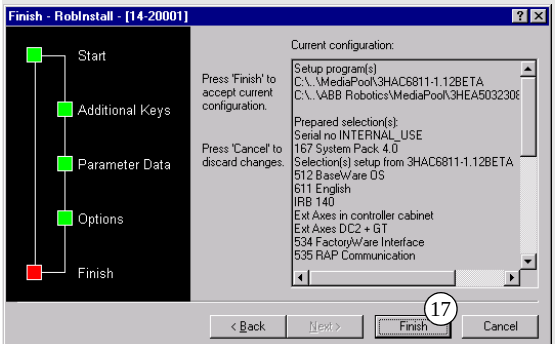


Check that the selections displayed in the window are correct (see the illustration below). It should be noted that the appearance of the display can vary depending on the contents of the key.

	Action	Illustration/Info
13.	Click the “Finish” button to confirm the selection of the alternatives, see pos. 13. Click the “Cancel” button to terminate the selection of the alternatives, see pos. 14.	



To allow certain drive units to be made available for selection, it may be necessary to use the *Query Mode*, see pos. 15 in the illustration below.

14.	Click the “Next” Button to finish the configuration, see pos. 16.	
15.	Now the configuration is finished and a summary is displayed. Click on the “Finish” button and the system will be generated, see pos. 17.	

2.4.8 Down load Robot controller system

The following instructions describe the uploading sequence with *RobInst*.

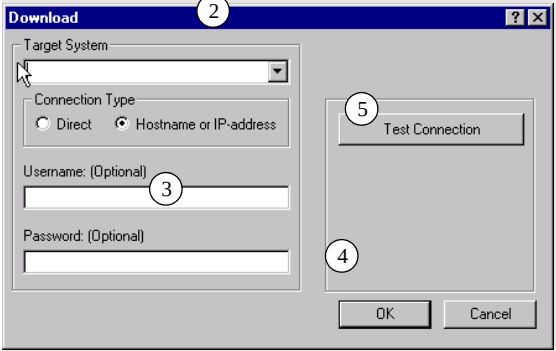
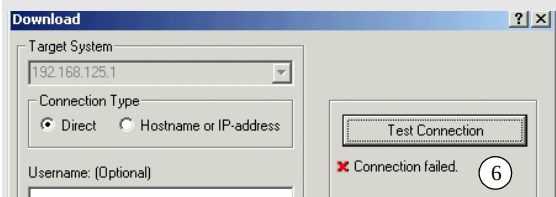
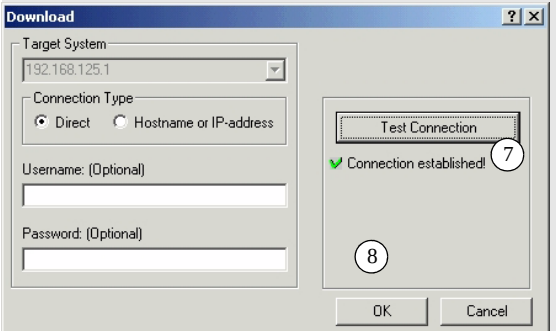


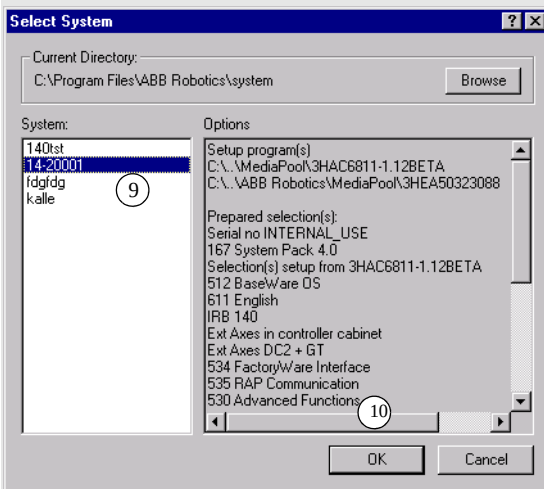
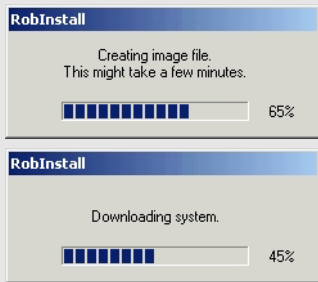
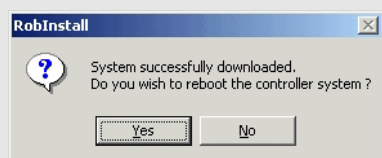
It is quite possible to start the download to the wrong robot if the wrong number has been indicated in the target system. This means that it is possible to boot someone else's system.



Before starting to down load, make sure there are at least 25 Mb free disk space on the controller mass storage memory. For information on how to perform a manual storage capacity check, see section 6.3.1.

	Action	Illustration/Info
1.	Start RobInstall, see section 2.4.3 Create a new system	
2.	Click the "Download" button, see <i>pos.1</i> .	

	Action	Illustration/Info
3.	Select the site/system to be booted from the <i>Target System</i> list, or if it is not in the list Enter new address, see pos 2. You can either indicate the IP address directly, or you can write for example <i>Test site_5</i> (only if <i>hosts</i> are edited).	
4.	A <i>User name</i> can also be added and the system can be protected with a <i>password</i> , see pos. 3.	
5.	Click the “OK” button if communications with the robot system have already been tested, see pos. 4.	
6.	Click the “ <i>Test Connection</i> ” button and communications with the Robot system will be checked, see pos. 5.	Select target.
7.	Test connection If communications with the robot system are broken, the following text is displayed: <i>Connection failed</i> , see pos 6.	
8.	If communications with the robot system are established, the following text is displayed: <i>Connection established</i> , see pos. 7	
9.	Click the “OK” button to continue, see pos. 8.	

	Action	Illustration/Info
10.	Select which system to upload, see pos. 9. Click the "OK" button, see pos. 10, to start booting.	 Select system.
11.	RobInstall now creates a system file and downloads it to the control unit, see pos. 11. It should be noted that the downloading can take a few minutes.	
12.	When the download is finished, you can restart the control unit with the new control system. Select YES, see pos. 12.	

2.5 Backup & Restore

2.5.1 General

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 [section 1.2 Upgrading software installations](#).

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.

3 System directory structure

3.1 MediaPool

3.1.1 General

RobInstall 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 Robotics\MediaPool.

When a program is imported by way of *Import Program* the new program will automatically be stored in this file. See *Product Manual for Robot Controller, System directory structure* for more information.

3.1.2 New RobotWare

When a new RobotWare is released from ATRO 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 **RobInstall** including *RobotWare* In this way you will get the new release of both the **RobInstall** and *RobotWare* systems.
 2. Copying the new *RobotWare* release over to the *Media Pool*.
-

3.1.3 System

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

- c:\'Program' or 'Program Files'\ABB Robotics\System\+"name of system".

To prevent the file gradually getting too big it is advisable to eliminate items now and then. See *Installation manual for the robot* for more information.

4 Arc welding configuration

4.1 Introduction

4.1.1 General

This chapter is intended to give the user some hints regarding arc welding configuration. The default configuration *AW FUNC* and *AW EQUIP* are obtained by the boot sequence as described in chapter [Software](#).

The user can then change the configuration in order to meet individual requirements.

- The generic S4C AW process parameters are described in *User's Guide/System Parameters Process Ware/Arc Welding*.
- It is recommended to save this user configuration on a separate *User Configuration* disk.

4.1.2 About the ARCITEC 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.

See section *Programming manual for Arcitec* in this binder for more information.

4.1.3 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. The tool for data converting is described in [sektion 4.2 About the RAPID Converter](#).

4.2 About the RAPID Converter

4.2.1 General

The number of components in the ArcWeld data (*seam data, weld data and weave data*) is a function of the current configuration.

The RAPID converter is a tool to prepare a RAPID program in the current configuration for later use and later also make it usable again in any configuration.

4.2.2 Conversion

The conversion consists of following steps:

	Action	Illustration/Info
1.	The RAPID program is saved on diskette.	(<i>Program/File/Save [As]</i>) in the original configuration.
2.	Draw up an XRG file from the PRG file in its original configuration. An XRG file is made from this PRG file, still in the original configuration.	(<i>Miscellaneous/FileManager/Options/RAPID Converters.../Add RAPID Type Info...</i>) (<i>Miscellaneous/FileManager/Options/RAPID Converters.../Add RAPID Type Info...</i>)
3.	Restore a PRG file (functioning RAPID program) from the XRG file in all future configurations.	(<i>Miscellaneous/FileManager/Options/RAPID Converters.../Use RAPID Type Info...</i>)
4.	Convert AW data in the system modules in a similar way.	SYS file -> (Add) -> XYS file -> (Use) -> SYS file.



It is not always necessary to convert the AW data from one configuration to another. When opening a program (*Program/File/Open*), mismatching AW data in the program to open is always pointed out.

It is of course always possible to convert the data *manually* in a PC editor.



Make a practice of saving a XRG version of any RAPID program that includes AW data when an 'ordinary' saving (*Program/File/Save [As]*) is done.

Besides a conversion step (=step 2 above), this gives You a way to interpret the components in the AW data. The current structures of seam data, weld data and weave data with its component identifiers are listed in the XRG file.

4.2.3 Example:

If You are unsure of the components in the AW data types when a new configuration is done:

	Action	Illustration/Info
1.	Make a simple help program in the TP, e.g. one ArcL instruction only.	For the sake of simplicity, accept the proposed names <i>sm1</i> , <i>wd1</i> and <i>wv1</i> and let all zero-components remain!
2.	Save this program, then make a XRG file and look at its AW data structure!	This would be useful when You are going to convert manually to current AW data structures.

