

Rexroth IndraLogic XLC IndraMotion MLC 13VRS Project Conversion

R911336366
Edition 02

Application Description



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Edition 01	06.2012	First edition for 13VRS										
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Table of Contents

	Page
1 About this Documentation.....	5
1.1 Validity of the Documentation.....	5
1.2 Documentation Structure.....	5
1.3 Required and Supplementing Documentations.....	6
1.4 Information Representation.....	11
1.4.1 Safety Instructions.....	11
1.4.2 Symbols Used.....	11
1.4.3 Terms and Abbreviations.....	12
2 Important Instructions on Use.....	13
2.1 Intended Use	13
2.1.1 Introduction.....	13
2.1.2 Areas of Use and Application.....	13
2.2 Unintended Use.....	14
3 Safety Instructions for Electric Drives and Controls.....	15
3.1 Definitions of Terms.....	15
3.2 General Information.....	16
3.2.1 Using the Safety Instructions and Passing Them on to Others.....	16
3.2.2 Requirements for Safe Use.....	16
3.2.3 Hazards by Improper Use.....	17
3.3 Instructions with Regard to Specific Dangers.....	18
3.3.1 Protection Against Contact With Electrical Parts and Housings.....	18
3.3.2 Protective Extra-Low Voltage as Protection Against Electric Shock	19
3.3.3 Protection Against Dangerous Movements.....	20
3.3.4 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting.....	21
3.3.5 Protection Against Contact With Hot Parts.....	22
3.3.6 Protection During Handling and Mounting.....	22
3.3.7 Battery Safety.....	22
3.3.8 Protection Against Pressurized Systems.....	23
3.4 Explanation of Signal Words and the Safety Alert Symbol.....	23
4 Introduction.....	25
5 IndraWorks Release Upgrade within 13VRS.....	27
6 IndraWorks Versions Upgrade from 12VRS to 13VRS.....	29
7 Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS.....	31
7.1 Overview.....	31
7.2 Conversion of the Control and Axis Configuration.....	31

Table of Contents

	Page
8	Converting IndraLogic 1.x to IndraWorks 13VRS IndraLogic XLC..... 45
8.1	Overview..... 45
8.2	Creating an IndraLogic XLC Project..... 45
8.3	Converting the PLC and the Field Buses..... 45
9	Step Description..... 51
9.1	Creating a Control..... 51
9.2	Creating a Function Module..... 58
9.3	Creating the Control Version..... 61
9.4	Exchanging XLC/MLC Firmware..... 64
9.5	XLC/MLC Deleting Memory..... 67
9.6	PLC Libraries Update..... 68
10	Changes from Version 12VRS to 13VRS..... 75
10.1	IndraWorks..... 75
10.2	Control..... 76
10.3	Drives..... 76
10.4	Operation Modes..... 77
10.5	RobotControl..... 77
10.6	Field Buses..... 77
10.7	HMI..... 78
10.8	Safety Technology..... 78
10.9	PLC Libraries..... 78
10.10	GAT..... 79
10.11	Parameters..... 80
10.12	Documentation..... 81
11	Changes between IndraLogic 1.x and IndraLogic 2G..... 83
11.1	PLC..... 83
11.1.1	General Information..... 83
11.1.2	Enums..... 83
11.1.3	Array Initializations..... 83
11.1.4	Bit Access..... 84
11.1.5	Action Calls..... 84
11.1.6	Variable Initialization with Constants..... 85
11.1.7	Typ Definitions..... 85
11.1.8	Processing Status in SFCs..... 86
11.1.9	Storage System Layout of Structures..... 86
11.2	Changes to the Task Configuration..... 86
11.2.1	Task Priorities..... 86
11.2.2	MotionTask..... 87
11.3	Changes to PLC Libraries..... 87
11.3.1	Library Dependencies..... 87
11.3.2	Library Assignment..... 87
11.3.3	Axis Interface (ML_TechInterface)..... 87

Table of Contents

	Page
11.3.4 Cyclic Data Channels (ML_TechBase).....	87
11.4 Changes to the Visualization.....	88
11.4.1 Placeholder.....	88
11.5 Symbol File Changes.....	88
11.5.1 Creating the Symbol Configuration.....	88
11.5.2 configuration.....	88
11.5.3 Storage location.....	88
11.6 VI-Composer.....	89
11.6.1 Importing Graphics.....	89
11.6.2 Changes to the Symbol File.....	89
11.6.3 VCPxx.1 Devices with IndraLogic 2G Projects.....	89
11.6.4 Retaining the Variable Assignment (Converting *.xml Symbol File to Extended *.sym).....	89
11.6.5 Retaining the Variable Assignment (Pragma "attribute namespace").....	90
12 Service and Support.....	91
Index.....	93

1 About this Documentation

1.1 Validity of the Documentation

This document describes the project conversion of IndraWorks version 07VRS projects with IndraLogic 1.x to IndraWorks version 13VRS with IndraLogic 2G.

It especially focuses on changes in the field of Motion and PLC.

Overview on target groups and product phases

In the following illustration, the framed activities, product phases and target groups refer to the present documentation.

In the product phase "Engineering", the target group "programmer" can execute the activity "programming" using this documentation.

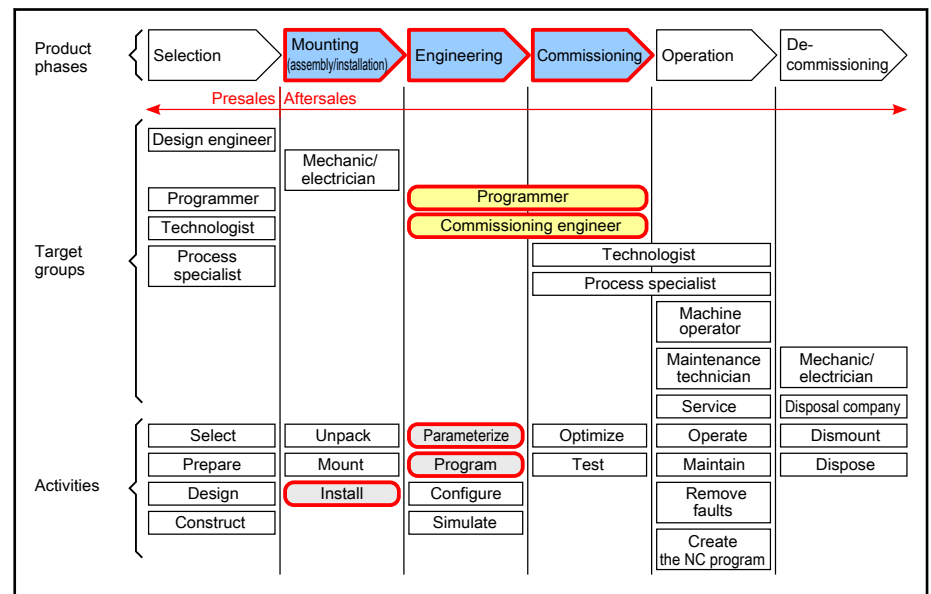


Fig. 1-1: Assigning this documentation to the target groups, product phases and target group activities

1.2 Documentation Structure

The first part of the document provides important instructions on use and safety ([chapter 2 "Important Instructions on Use" on page 13](#) and [chapter 3 "Safety Instructions for Electric Drives and Controls" on page 15](#)).

[chapter 4 "Introduction" on page 25](#) contains a brief introduction to this documentation.

[chapter 5 "IndraWorks Release Upgrade within 13VRS" on page 27](#) describes the IndraWorks release upgrade within a version 13VRS.

[chapter 6 "IndraWorks Versions Upgrade from 12VRS to 13VRS" on page 29](#) describes the IndraWorks versions upgrade from 12VRS to 13VRS.

[chapter 7 "Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS" on page 31](#) describes the conversion of an MLC 04VRS project, created with IndraWorks 07VRS, to IndraWorks 13VRS.

[chapter 8 "Converting IndraLogic 1.x to IndraWorks 13VRS IndraLogic XLC" on page 45](#) contains information about the conversion of an IndraLogic 1.x project under IndraWorks 07VRS up to IndraWorks 12VRS to IndraLogic 2G under IndraWorks 13VRS.

[chapter 9 "Step Description" on page 51](#) describes the individual steps.

About this Documentation

[chapter 10 "Changes from Version 12VRS to 13VRS" on page 75](#) contains information about the changes from version 12VRS to 13VRS.

[chapter 11 "Changes between IndraLogic 1.x and IndraLogic 2G" on page 83](#) describes the differences between IndraLogic 1.x and IndraLogic 2G.

[chapter 12 "Service and Support" on page 91](#) provides information on the Bosch Rexroth customer service help desk.

1.3 Required and Supplementing Documentations

Documentation titles with type codes and parts numbers

IndraWorks		MLC	XLC
/36/	Rexroth IndraWorks 13VRS Software Installation DOK-IWORKS-SOFTINS*V13-CORS-EN-P, R911336880 This documentation describes the IndraWorks installation.	X	X
/5/	Rexroth IndraWorks 13VRS Engineering DOK-IWORKS-ENGINEE*V13-APRS-EN-P, R911336870 This documentation describes the application of IndraWorks in which the Rexroth Engineering tools are integrated. It includes instructions on how to work with IndraWorks and how to operate the oscilloscope function.	X	X
/20/	Rexroth IndraMotion MLC 13VRS Functional Description DOK-MLC***-FUNC****V13-APRS-EN-P, R911336295 This documentation describes wizards, context menus, dialogs, control commissioning, device configuration and functionalities of the IndraMotion MLC.	X	
/20/	Rexroth IndraLogic XLC 13VRS Functional Description DOK-XLC***-FUNC****V13-APRS-EN-P, R911336352 This documentation describes wizards, context menus, dialogs, control commissioning, device configuration and functionalities of the IndraLogic XLC.		X
/7/	Rexroth IndraWorks 13VRS CamBuilder DOK-IWORKS-CAMBUIL*V13-APRS-EN-P, R911336291 This documentation describes the basic principles and operation of the CamBuilder, the cam editing tool.	X	X
/37/	Rexroth IndraLogic XLC IndraMotion MLC 13VRS Automation Interface DOK-XLCMLC-AUT*INT*V13-APRS-EN-P, R911336356 This documentation describes the script-based access to IndraWorks project data via the interface of the Automation Interface.	X	X
/38/	Rexroth IndraWorks 12VRS FDT Container DOK-IWORKS-FDT*CON*V12-APRS-EN-P, R911334398 This documentation describes the IndraWorks FDT Container functionality. It includes the activation of the functionality in the project and working with DTMs.	X	X

About this Documentation

IndraWorks		MLC	XLC
/29/	Rexroth IndraLogic XLC IndraMotion MLC 13VRS Project Conversion DOK-XLCMLC-PROCONV*V13-APRS-EN-P, R911336366 This documentation describes the project conversion of IndraLogic 04VRS and IndraMotion MLC04VRS on IndraWorks version 12 with IndraLogic 2G. Changes with regard to Motion and PLC are described in detail.	X	X
/28/	Rexroth IndraMotion MLC 13VRS Commissioning DOK-MLC***-STARTUP*V13-CORS-EN-P, R911336308 This documentation describes the steps to commission and service the IndraMotion MLC system. It includes checklists for frequent tasks and a detailed description of the steps.	X	

Tab. 1-2: XCL/MLC documentation overview

Motion		MLC	XLC
/23/	Rexroth IndraLogic XLC IndraMotion MLC 13VRS PLCopen Libraries DOK-XLCMLC-FUNLIB**V13-LIRS-EN-P, R911336360 This documentation describes the function blocks, functions and data types of the RIL_Common-Types, ML_Base and ML_PLCOpen libraries for the IndraLogic XLC/IndraMotion MLC. It also includes the error reactions of function blocks.	X	X
/27/	Rexroth IndraLogic XLC IndraMotion MLC 13VRS Generic Application Template DOK-XLCMLC-TF*GAT**V13-APRS-EN-P, R911336370 This documentation provides a structured template to the IndraLogic PLC programmer. This template can be used to add and edit the PLC programming code. It includes the template, the template wizard and example applications.	X	X
/31/	Rexroth IndraMotion MLC 13VRS RCL Programming Instruction DOK-MLC***-RCL*PRO*V13-APRS-EN-P, R911336297 This documentation provides information on the RobotControl. The programming language RCL (RobotControl Language) is focused. The program structure, variables, functions, motion statements and the required system parameters are described.	X	
/21/	Rexroth IndraLogic XLC IndraMotion MLC 13VRS Parameters DOK-XLCMLC-PARAM***V13-RERS-EN-P, R911336364 This documentation describes the parameters of the XLC/MLC systems as well as the interaction between parameterization and programming. It includes the axis parameters, control parameters, kinematic parameters, touch probe parameters and programmable limit switch parameters.	X	X
/10/	Rexroth IndraDrive Firmware for Drive Controllers MPH-, MPB-, MPD-, MPC-07 DOK-INDRV*-MP*-07VRS**-FKRS-EN-P, R911328670 This documentation describes all functional properties of the IndraDrive firmware in the variants MPH-07, MPB-07, MPD-07 and MPC-07.		
/11/	Rexroth IndraDrive MPx-17 Functions DOK-INDRV*-MP*-17VRS**-APRS-EN-P, R911331236 This documentation describes all functional properties of the IndraDrive firmware in the variants MPB-17, MPM-17, MPC-17 and MPE-17.		

Tab. 1-3: XCL/MLC documentation overview

About this Documentation

Field Buses		MLC	XLC
/4/	Rexroth IndraWorks 13VRS Field Buses DOK-IWORKS-FB*****V13-APRS-EN-P, R911336872 This documentation describes the supported field buses and their diagnostic function blocks.	X	X
/4a/	Rexroth IndraWorks 13VRS Field Buses Libraries DOK-IWORKS-FB*LIB**V13-LIRS-EN-P, R911337857 This manual describes the field bus libraries: RIL_ProfibusDP_02, RIL_ProfibusDP Slave, RIL_Profine-tIO, RIL_ProfinetIODevice, RIL_EtherNetIPAdapter, RIL_MappingList, RIL_SERCOSIII, RIL_Inline including their diagnostics and error reactions of the function blocks.	X	X
/63/	SERCOS System Manual for I/O Devices DOK-CONTRL-ILS3*****-APRS-EN-P, R911333512 This documentation describes the configuration, parameterization, commissioning and diagnostics of I/O devices with a SERCOS interface.	X	X

Tab. 1-4: XCL/MLC documentation overview

HMI		MLC	XLC
/8/	Rexroth IndraWorks 13VRS HMI DOK-IWORKS-HMI*****V13-APRS-EN-P, R911336874 This documentation describes the functions, configuration and operation of the user interfaces IndraWorks HMI Engineering and IndraWorks HMI Operation.	X	X
/6/	Rexroth IndraWorks 13VRS WinStudio DOK-IWORKS-WINSTUD*V13-APRS-EN-P, R911336882 This documentation describes the installation of the software, working with WinStudio and the creation and operation of applications.	X	X
/50/	Rexroth IndraLogic XLC IndraMotion MLC 13VRS HMI Connection DOK-XLCMLC-HMI*****V13-APRS-EN-P, R911336362 This documentation describes the visualization systems supported by the IndraLogic XLC and IndraMotion MLC and their connection.	X	X

Tab. 1-5: XCL/MLC documentation overview

PLC		MLC	XLC
/3/	Rexroth IndraWorks 13VRS IndraLogic 2G Programming Instruction DOK-IWORKS-IL2GPRO*V13-APRS-EN-P, R911336876 This documentation describes the PLC programming tool IndraLogic 2G and its use. It includes the basic use, first steps, visualization, menu items and editors.	X	X
/33/	Rexroth IndraWorks 13VRS Basic Libraries IndraLogic 2G DOK-IL*2G*-BASLIB**V13-LIRS-EN-P, R911336285 This documentation describes the system-comprehensive PLC libraries.	X	X

Tab. 1-6: XCL/MLC documentation overview

About this Documentation

Technology		MLC	XLC
/30/	Rexroth IndraMotion MLC 13VRS Technology Libraries DOK-MLC***-TF*LIB**V13-LIRS-EN-P, R911336324 This documentation describes the function blocks, functions and data types of the "ML_TechInter-face.library", "ML_TechMotion.library", "RMB_TechCam.library" and "ML_TechBase.library". It also includes libraries for the winder functionality, register controller functionality and CrossCutter functionality.	X	
/60/	Rexroth IndraMotion MLC 13VRS RegisterControl (Library) DOK-MLC***-REGI*CO*V13-LIRS-EN-P, R911336306 This documentation describes the inputs and outputs of the individual function blocks and provides notes on their use.	X	
/62/	Rexroth IndraMotion MLC 13VRS RegisterControl (Application Manual) DOK-MLC***-REGI*CO*V13-APRS-EN-P, R911336304 This documentation describes the application of the integrated register control for a rotogravure printing machine. The components of the mark stream sensor, the HMI application and the error recovery options are described. This instruction provides information on how to operate the register control, react to errors and query diagnostics. This documentation is written for machine setters and machine operators.	X	
/49/	Rexroth IndraMotion MLC 13VRS Winder Function Application DOK-MLC***-TF*WIND*V13-APRS-EN-P, R911336326 This application-related system documentation describes the application of the winder technology functions.	X	

Tab. 1-7: XCL/MLC documentation overview

Hardware		MLC	XLC
/1/	Rexroth IndraControl L45/L65/L85 Control DOK-CTRL-ICL45L65L85-PRRS-EN-P, R911332116 This documentation describes the IndraControl L45/L65/L85 controls.	X	X
/2/	Rexroth IndraControl L25 DOK-CTRL-IC*L25*****-PRRS-EN-P, R911328474 This documentation describes the IndraControl L25 controls.	X	X
/24/	Rexroth IndraControl Lxx 13VRS Function Modules DOK-CTRL-FM*LXX**V13-APRS-EN-P, R911336283 This documentation describes all function modules of the Lxx controls including engineering and diagnostics.	X	X
/12/	Rexroth IndraDrive Drive Controllers MPx-02 to MPx-07 DOK-INDRV*-GEN-**VRS**-PARS-EN-P, R911297317 This documentation describes all parameters implemented in the firmware for drive controllers of the IndraDrive family. It supports the parameterization of the drive controllers.		

About this Documentation

Hardware		MLC	XLC
/13/	Rexroth IndraDrive MPx-02 to MPx-07 and HMV DOK-INDRV*-GEN-**VRS**-WARS-EN-P, R911297319 This documentation describes all diagnostics implemented in the following firmwares: - Drive controller firmwares from MPx-02 to MPx-08 and - firmwares of the supply devices of the type "HMF". It supports the operating crew as well as the programmer at troubleshooting.		
/35/	Rexroth IndraDrive Drive Controller Control Sections CSB01, CSH01, CDB01 DOK-INDRV*-CSH*****-PRRS-EN-P, R911295012 This documentation is a project planning manual to select and use the control sections CSB01, CDB01 and CSH01 for drive controllers of the product families Rexroth IndraDrive M and Rexroth IndraDrive C.		

Tab. 1-8: XCL/MLC documentation overview

Diagnostics and service		MLC	XLC
/26/	Rexroth IndraWorks 13VRS IndraMotion Service Tool DOK-IWORKS-IMST****V13-RERS-EN-P, R911337707 This documentation describes the IndraMotion Service Tool (IMST). It is a web-based diagnostic tool to access the control systems IndraMotion MLC L25, L45 or 65 as well as the MLP via an Ethernet high-speed connection. The IMST allows OEMs, end users and service engineers to access and remotely diagnose a system. A PC with Internet Explorer version 6 or 7 is required.	X	X
/22/	Rexroth IndraLogic XLC IndraMotion MLC 13VRS Diagnostics DOK-XLCMLC-DIAG****V13-RERS-EN-P, R911336358 This documentation includes all control parameters implemented in the control systems IndraLogic XLC and IndraMotion MLC.	X	X

Tab. 1-9: XCL/MLC documentation overview

System Overview		MLC	XLC
/48/	Rexroth IndraMotion for Printing 13VRS System Overview DOK-IM*PR*-SYSTEM**V13-PRRS-EN-P, R911336289 This documentation describes the product IndraMotion for Printing. It introduces the control systems, drive systems and I/O systems as well as the commissioning and programming.	X	
/48/	Rexroth IndraMotion for Packaging 13VRS System Overview DOK-IM*PA*-SYSTEM**V13-PRRS-EN-P, R911336287 This documentation describes the product IndraMotion for Packaging. It introduces the control systems, drive systems and I/O systems as well as the commissioning and programming.	X	
/9/	Rexroth IndraMotion MLC 13VRS System Overview DOK-MLC***-SYSTEM**V13-PRRS-EN-P, R911336310 This documentation provides an overview on the hardware/software components of the automation system IndraMotion MLC in the mentioned version. It helps assembling a system.	X	
/9/	Rexroth IndraLogic XLC 13VRS System Overview DOK-XLC***-SYSTEM**V13-PRRS-EN-P, R911336354 This documentation provides an overview on hardware/software components of the automation system IndraLogic XLC in the respective version. It helps assembling a system.		X

Tab. 1-10: XCL/MLC documentation overview

First Steps		MLC	XLC
/25/	Rexroth IndraMotion MLC 13VRS, First Steps DOK-MLC***-F*STEP**V13-CORS-EN-P, R911336293 This documentation describes the first steps of the IndraMotion MLC and the RobotControl. It includes the hardware and software prerequisites as well as the creation of a project.	X	
/25/	Rexroth IndraLogic XLC 13VRS, First Steps DOK-XLC***-F*STEP**V13-CORS-EN-P, R911336350 This documentation describes the first steps of the IndraLogic XLC. It includes the hardware and software prerequisites as well as the creation of a project.		X

Tab. 1-11: XCL/MLC documentation overview

1.4 Information Representation

1.4.1 Safety Instructions

If there are the safety instructions in the documentation, they contain certain signal words ("Danger", "Warning", "Caution", "Notice") and sometimes a safety alert symbol (according to ANSI Z535.6-2006).

The signal word draws attention to the safety instruction and indicates the risk potential.

The safety alert symbol (triangular safety reflector with three exclamation marks), preceding the signal words "Danger", "Warning", "Caution" indicates hazards for persons.

The safety instructions are represented as follows in this documentation:

DANGER

In case of non-compliance with this safety instruction, death or serious injury **will** occur.

WARNING

In case of non-compliance with this safety instruction, death or serious injury **can** occur.

CAUTION

In case of non-compliance with this safety instruction, minor or moderate injury can occur.

NOTICE

In case of non-compliance with this safety instruction, material or property damage can occur.

1.4.2 Symbols Used

Note Notes are represented as follows:



This is a note for the user.

Tip Tips are represented as follows:

About this Documentation



This is a tip for the user.

1.4.3 Terms and Abbreviations

Term	Explanation
OEM	Original Equipment Manufacturer
IndraMotion MLC	Compact Motion Logic systems with Motion, Robot and Logic Control functionalities
IndraLogic XLC	Compact PLC system with integrated Motion functionality
IndraWorks Engineering Framework	Project planning and commissioning tool of Bosch Rexroth
IndraDrive	Drive control unit
sercos	Automation bus (sercos → serial real-time communication system)
XML	Extensible Markup Language (XML). It is a markup language to represent hierarchical structured data as text data
IEC	International Electrotechnical Commission
SFC	Sequential Function Chart
ST	Structured Text
GSDML	Generic Station Description Markup Language XML-based device description language for Profibus and Profinet devices
OPC-UA	OLE for Process Control Unified Architecture. Protocol standard for industrial communication
API	Application Programming Interface Program part that is provided to other programs for system connection by a software system
UTC time	UTC stands for Universal Time Coordinated. Previous official name: GMT (Greenwich Mean Time)

Tab. 1-12: Names and abbreviations used

2 Important Instructions on Use

2.1 Intended Use

2.1.1 Introduction

Bosch Rexroth products are developed and manufactured according to the state-of-the-art. The products are tested prior to delivery to ensure operating safety and reliability.

WARNING

Personal injury and damage to property due to incorrect use of products!

The products have been developed for the use in an industrial environment and may only be used as intended. If they are not used as intended, situations occur that can result in damage to property and injury to persons.



Bosch Rexroth as manufacturer shall not assume any warranty, liability or payment of damages in case of damage resulting from a non-intended use of the products; the user shall solely bear all risks arising from unintended use of the products.

Before using the Bosch Rexroth products, the following requirements have to be met must to guarantee the intended use of the products:

- Anybody dealing with Bosch Rexroth Products in any way is obliged to read and consent to the relevant safety instructions and the intended use.
- Hardware products may not be altered and have to remain in their original state; i.e., no structural changes are permitted.
- The decompilation of software products or the alteration of source codes is not permitted
- Do not install or operate damaged or faulty products
- It has to be ensured that the products have been installed as described in the relevant documentation

2.1.2 Areas of Use and Application

The products IndraLogic XLC/IndraMotion MLC of Bosch Rexroth are intended for Motion/Logic applications.



The IndraLogic XLC/IndraMotion MLC must only be used together with the accessories and attachment parts given in this documentation. Components that are not expressly mentioned must neither be attached nor connected. The same applies for cables and lines.

The operation must only be carried out with the component configurations and combinations that were expressly mentioned and with the software and firmware indicated and specified in the respective functional description.

The IndraLogic XLC/IndraMotion MLC has been developed for Logic applications as well as for the use in single and multi-axes drive and control tasks.

Important Instructions on Use

To allow for application-specific requirements of the IndraLogic XLC/IndraMotion MLC, various device types with different performance and interfaces are provided.

Typical areas of application of the IndraLogic XLC/IndraMotion MLC are:

- Handling and mounting systems
- Packaging and food machines
- Printing and paper-processing machinery
- Machine tools
- Presses
- Foundry and rolling technology
- Conveying engineering
- Building automation and control
- Special-purpose machines
- Wood working machinery

The IndraLogic XLC/IndraMotion MLC may only be operated under the mounting and installation conditions, position and ambient conditions (temperature, degree of protection, moisture, EMC, etc.) specified in this documentation.

2.2 Unintended Use

Usage of the IndraLogic XLC/IndraMotion MLC in applications areas other than those specified or described in the documentation and technical data is considered as "unintended".

The IndraLogic XLC/IndraMotion MLC must not be used if

- they are subjected to operating conditions not corresponding to the specified ambient conditions. Operation under water, under extreme temperature fluctuations or under extreme maximum temperatures or in explosion-prone areas is prohibited.
- the intended applications have not expressly been released by Bosch Rexroth. Therefore, please read the information given in the general safety instructions!
- the machine or system is provided with an unsecure internet connection. The Ethernet interface of the IndraLogic XLC/IndraMotion MLC is not securely protected against unauthorized access. Thus, only use the control in secure networks (security). Otherwise, malfunctions or a control failure can be caused due to unauthorized accesses

The operation is prohibited according to the following standards and guidelines:

- Lifts (Directive 95/16/EC)
- ATEX (94/9/EC)
- Burner control systems (EN 298)
- Pressure equipment (EN 764-7:2002/AC)

Furthermore, the use as safety-relevant part of controls according to DIN EN ISO 13849 is considered as unintended use. The functional safety has to be ensured by additional safety-relevant certified components.

3 Safety Instructions for Electric Drives and Controls

3.1 Definitions of Terms

Application Documentation	Application documentation comprises the entire documentation used to inform the user of the product about the use and safety-relevant features for configuring, integrating, installing, mounting, commissioning, operating, maintaining, repairing and decommissioning the product. The following terms are also used for this kind of documentation: User Guide, Operation Manual, Commissioning Manual, Instruction Manual, Project Planning Manual, Application Manual, etc.
Component	A component is a combination of elements with a specified function, which are part of a piece of equipment, device or system. Components of the electric drive and control system are, for example, supply units, drive controllers, mains choke, mains filter, motors, cables, etc.
Control System	A control system comprises several interconnected control components placed on the market as a single functional unit.
Device	A device is a finished product with a defined function, intended for users and placed on the market as an individual piece of merchandise.
Electrical Equipment	Electrical equipment encompasses all devices used to generate, convert, transmit, distribute or apply electrical energy, such as electric motors, transformers, switching devices, cables, lines, power-consuming devices, circuit board assemblies, plug-in units, control cabinets, etc.
Electric Drive System	An electric drive system comprises all components from mains supply to motor shaft; this includes, for example, electric motor(s), motor encoder(s), supply units and drive controllers, as well as auxiliary and additional components, such as mains filter, mains choke and the corresponding lines and cables.
Installation	An installation consists of several devices or systems interconnected for a defined purpose and on a defined site which, however, are not intended to be placed on the market as a single functional unit.
Machine	A machine is the entirety of interconnected parts or units at least one of which is movable. Thus, a machine consists of the appropriate machine drive elements, as well as control and power circuits, which have been assembled for a specific application. A machine is, for example, intended for processing, treatment, movement or packaging of a material. The term "machine" also covers a combination of machines which are arranged and controlled in such a way that they function as a unified whole.
Manufacturer	The manufacturer is an individual or legal entity bearing responsibility for the design and manufacture of a product which is placed on the market in the individual's or legal entity's name. The manufacturer can use finished products, finished parts or finished elements, or contract out work to subcontractors. However, the manufacturer must always have overall control and possess the required authority to take responsibility for the product.
Product	Examples of a product: Device, component, part, system, software, firmware, among other things.
Project Planning Manual	A project planning manual is part of the application documentation used to support the sizing and planning of systems, machines or installations.
Qualified Persons	In terms of this application documentation, qualified persons are those persons who are familiar with the installation, mounting, commissioning and operation of the components of the electric drive and control system, as well as with the hazards this implies, and who possess the qualifications their work

Safety Instructions for Electric Drives and Controls

requires. To comply with these qualifications, it is necessary, among other things,

- 1) to be trained, instructed or authorized to switch electric circuits and devices safely on and off, to ground them and to mark them
- 2) to be trained or instructed to maintain and use adequate safety equipment
- 3) to attend a course of instruction in first aid

User A user is a person installing, commissioning or using a product which has been placed on the market.

3.2 General Information

3.2.1 Using the Safety Instructions and Passing Them on to Others

Do not attempt to install and operate the components of the electric drive and control system without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation prior to working with these components. If you do not have the user documentation for the components, contact your responsible Bosch Rexroth sales partner. Ask for these documents to be sent immediately to the person or persons responsible for the safe operation of the components.

If the component is resold, rented and/or passed on to others in any other form, these safety instructions must be delivered with the component in the official language of the user's country.

Improper use of these components, failure to follow the safety instructions in this document or tampering with the product, including disabling of safety devices, could result in property damage, injury, electric shock or even death.

3.2.2 Requirements for Safe Use

Read the following instructions before initial commissioning of the components of the electric drive and control system in order to eliminate the risk of injury and/or property damage. You must follow these safety instructions.

- Bosch Rexroth is not liable for damages resulting from failure to observe the safety instructions.
- Read the operating, maintenance and safety instructions in your language before commissioning. If you find that you cannot completely understand the application documentation in the available language, please ask your supplier to clarify.
- Proper and correct transport, storage, mounting and installation, as well as care in operation and maintenance, are prerequisites for optimal and safe operation of the component.
- Only qualified persons may work with components of the electric drive and control system or within its proximity.
- Only use accessories and spare parts approved by Bosch Rexroth.
- Follow the safety regulations and requirements of the country in which the components of the electric drive and control system are operated.
- Only use the components of the electric drive and control system in the manner that is defined as appropriate. See chapter "Appropriate Use".
- The ambient and operating conditions given in the available application documentation must be observed.
- Applications for functional safety are only allowed if clearly and explicitly specified in the application documentation "Integrated Safety Technolo-

Safety Instructions for Electric Drives and Controls

gy". If this is not the case, they are excluded. Functional safety is a safety concept in which measures of risk reduction for personal safety depend on electrical, electronic or programmable control systems.

- The information given in the application documentation with regard to the use of the delivered components contains only examples of applications and suggestions.

The machine and installation manufacturers must

- make sure that the delivered components are suited for their individual application and check the information given in this application documentation with regard to the use of the components,
- make sure that their individual application complies with the applicable safety regulations and standards and carry out the required measures, modifications and complements.
- Commissioning of the delivered components is only allowed once it is sure that the machine or installation in which the components are installed complies with the national regulations, safety specifications and standards of the application.
- Operation is only allowed if the national EMC regulations for the application are met.
- The instructions for installation in accordance with EMC requirements can be found in the section on EMC in the respective application documentation.

The machine or installation manufacturer is responsible for compliance with the limit values as prescribed in the national regulations.

- The technical data, connection and installation conditions of the components are specified in the respective application documentations and must be followed at all times.

National regulations which the user must take into account

- European countries: In accordance with European EN standards
- United States of America (USA):
 - National Electrical Code (NEC)
 - National Electrical Manufacturers Association (NEMA), as well as local engineering regulations
 - Regulations of the National Fire Protection Association (NFPA)
- Canada: Canadian Standards Association (CSA)
- Other countries:
 - International Organization for Standardization (ISO)
 - International Electrotechnical Commission (IEC)

3.2.3 Hazards by Improper Use

- High electrical voltage and high working current! Danger to life or serious injury by electric shock!
- High electrical voltage by incorrect connection! Danger to life or injury by electric shock!
- Dangerous movements! Danger to life, serious injury or property damage by unintended motor movements!
- Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electric drive systems!

Safety Instructions for Electric Drives and Controls

- Risk of burns by hot housing surfaces!
- Risk of injury by improper handling! Injury by crushing, shearing, cutting, hitting!
- Risk of injury by improper handling of batteries!
- Risk of injury by improper handling of pressurized lines!

3.3 Instructions with Regard to Specific Dangers

3.3.1 Protection Against Contact With Electrical Parts and Housings



This section concerns components of the electric drive and control system with voltages of **more than 50 volts**.

Contact with parts conducting voltages above 50 volts can cause personal danger and electric shock. When operating components of the electric drive and control system, it is unavoidable that some parts of these components conduct dangerous voltage.

High electrical voltage! Danger to life, risk of injury by electric shock or serious injury!

- Only qualified persons are allowed to operate, maintain and/or repair the components of the electric drive and control system.
- Follow the general installation and safety regulations when working on power installations.
- Before switching on, the equipment grounding conductor must have been permanently connected to all electric components in accordance with the connection diagram.
- Even for brief measurements or tests, operation is only allowed if the equipment grounding conductor has been permanently connected to the points of the components provided for this purpose.
- Before accessing electrical parts with voltage potentials higher than 50 V, you must disconnect electric components from the mains or from the power supply unit. Secure the electric component from reconnection.
- With electric components, observe the following aspects:
 - Always wait **30 minutes** after switching off power to allow live capacitors to discharge before accessing an electric component. Measure the electrical voltage of live parts before beginning to work to make sure that the equipment is safe to touch.
- Install the covers and guards provided for this purpose before switching on.
- Never touch electrical connection points of the components while power is turned on.
- Do not remove or plug in connectors when the component has been powered.
- Under specific conditions, electric drive systems can be operated at mains protected by residual-current-operated circuit-breakers sensitive to universal current (RCDs/RCMs).

Safety Instructions for Electric Drives and Controls

- Secure built-in devices from penetrating foreign objects and water, as well as from direct contact, by providing an external housing, for example a control cabinet.

High housing voltage and high leakage current! Danger to life, risk of injury by electric shock!

- Before switching on and before commissioning, ground or connect the components of the electric drive and control system to the equipment grounding conductor at the grounding points.
- Connect the equipment grounding conductor of the components of the electric drive and control system permanently to the main power supply at all times. The leakage current is greater than 3.5 mA.
- Establish an equipment grounding connection with a minimum cross section according to the table below. With an outer conductor cross section smaller than 10 mm² (8 AWG), the alternative connection of two equipment grounding conductors is allowed, each having the same cross section as the outer conductors.

Cross section outer conductor	Minimum cross section equipment grounding conductor	
	Leakage current ≥ 3.5 mA	
	1 equipment grounding conductor	2 equipment grounding conductors
1,5 mm ² (AWG 16)	10 mm ² (AWG 8)	2 × 1,5 mm ² (AWG 16)
2,5 mm ² (AWG 14)		2 × 2,5 mm ² (AWG 14)
4 mm ² (AWG 12)		2 × 4 mm ² (AWG 12)
6 mm ² (AWG 10)		2 × 6 mm ² (AWG 10)
10 mm ² (AWG 8)		-
16 mm ² (AWG 6)	16 mm ² (AWG 6)	-
25 mm ² (AWG 4)		-
35 mm ² (AWG 2)		-
50 mm ² (AWG 1/0)	25 mm ² (AWG 4)	-
70 mm ² (AWG 2/0)	35 mm ² (AWG 2)	-
...	...	...

Tab.3-1: Minimum Cross Section of the Equipment Grounding Connection

3.3.2 Protective Extra-Low Voltage as Protection Against Electric Shock

Protective extra-low voltage is used to allow connecting devices with basic insulation to extra-low voltage circuits.

On components of an electric drive and control system provided by Bosch Rexroth, all connections and terminals with voltages between 5 and 50 volts are PELV ("Protective Extra-Low Voltage") systems. It is allowed to connect devices equipped with basic insulation (such as programming devices, PCs, notebooks, display units) to these connections.

Safety Instructions for Electric Drives and Controls

Danger to life, risk of injury by electric shock! High electrical voltage by incorrect connection!

If extra-low voltage circuits of devices containing voltages and circuits of more than 50 volts (e.g., the mains connection) are connected to Bosch Rexroth products, the connected extra-low voltage circuits must comply with the requirements for PELV ("Protective Extra-Low Voltage").

3.3.3 Protection Against Dangerous Movements

Dangerous movements can be caused by faulty control of connected motors. Some common examples are:

- Improper or wrong wiring or cable connection
- Operator errors
- Wrong input of parameters before commissioning
- Malfunction of sensors and encoders
- Defective components
- Software or firmware errors

These errors can occur immediately after equipment is switched on or even after an unspecified time of trouble-free operation.

The monitoring functions in the components of the electric drive and control system will normally be sufficient to avoid malfunction in the connected drives. Regarding personal safety, especially the danger of injury and/or property damage, this alone cannot be relied upon to ensure complete safety. Until the integrated monitoring functions become effective, it must be assumed in any case that faulty drive movements will occur. The extent of faulty drive movements depends upon the type of control and the state of operation.

Dangerous movements! Danger to life, risk of injury, serious injury or property damage!

A **risk assessment** must be prepared for the installation or machine, with its specific conditions, in which the components of the electric drive and control system are installed.

As a result of the risk assessment, the user must provide for monitoring functions and higher-level measures on the installation side for personal safety. The safety regulations applicable to the installation or machine must be taken into consideration. Unintended machine movements or other malfunctions are possible if safety devices are disabled, bypassed or not activated.

To avoid accidents, injury and/or property damage:

- Keep free and clear of the machine's range of motion and moving machine parts. Prevent personnel from accidentally entering the machine's range of motion by using, for example:
 - Safety fences
 - Safety guards
 - Protective coverings
 - Light barriers
- Make sure the safety fences and protective coverings are strong enough to resist maximum possible kinetic energy.
- Mount emergency stopping switches in the immediate reach of the operator. Before commissioning, verify that the emergency stopping equip-

Safety Instructions for Electric Drives and Controls

ment works. Do not operate the machine if the emergency stopping switch is not working.

- Prevent unintended start-up. Isolate the drive power connection by means of OFF switches/OFF buttons or use a safe starting lockout.
- Make sure that the drives are brought to safe standstill before accessing or entering the danger zone.
- Additionally secure vertical axes against falling or dropping after switching off the motor power by, for example,
 - mechanically securing the vertical axes,
 - adding an external braking/arrester/clamping mechanism or
 - ensuring sufficient counterbalancing of the vertical axes.
- The standard equipment **motor holding brake** or an external holding brake controlled by the drive controller is **not sufficient to guarantee personal safety!**
- Disconnect electrical power to the components of the electric drive and control system using the master switch and secure them from reconnection ("lock out") for:
 - Maintenance and repair work
 - Cleaning of equipment
 - Long periods of discontinued equipment use
- Prevent the operation of high-frequency, remote control and radio equipment near components of the electric drive and control system and their supply leads. If the use of these devices cannot be avoided, check the machine or installation, at initial commissioning of the electric drive and control system, for possible malfunctions when operating such high-frequency, remote control and radio equipment in its possible positions of normal use. It might possibly be necessary to perform a special electromagnetic compatibility (EMC) test.

3.3.4 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting

Magnetic and electromagnetic fields generated by current-carrying conductors or permanent magnets of electric motors represent a serious danger to persons with heart pacemakers, metal implants and hearing aids.

Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electric components!

- Persons with heart pacemakers and metal implants are not allowed to enter the following areas:
 - Areas in which components of the electric drive and control systems are mounted, commissioned and operated.
 - Areas in which parts of motors with permanent magnets are stored, repaired or mounted.
- If it is necessary for somebody with a heart pacemaker to enter such an area, a doctor must be consulted prior to doing so. The noise immunity of implanted heart pacemakers differs so greatly that no general rules can be given.
- Those with metal implants or metal pieces, as well as with hearing aids, must consult a doctor before they enter the areas described above.

Safety Instructions for Electric Drives and Controls

3.3.5 Protection Against Contact With Hot Parts

Hot surfaces of components of the electric drive and control system. Risk of burns!

- Do not touch hot surfaces of, for example, braking resistors, heat sinks, supply units and drive controllers, motors, windings and laminated cores!
- According to the operating conditions, temperatures of the surfaces can be **higher than 60 °C (140 °F)** during or after operation.
- Before touching motors after having switched them off, let them cool down for a sufficient period of time. Cooling down can require **up to 140 minutes!** The time required for cooling down is approximately five times the thermal time constant specified in the technical data.
- After switching chokes, supply units and drive controllers off, wait **15 minutes** to allow them to cool down before touching them.
- Wear safety gloves or do not work at hot surfaces.
- For certain applications, and in accordance with the respective safety regulations, the manufacturer of the machine or installation must take measures to avoid injuries caused by burns in the final application. These measures can be, for example: Warnings at the machine or installation, guards (shieldings or barriers) or safety instructions in the application documentation.

3.3.6 Protection During Handling and Mounting

Risk of injury by improper handling! Injury by crushing, shearing, cutting, hitting!

- Observe the relevant statutory regulations of accident prevention.
- Use suitable equipment for mounting and transport.
- Avoid jamming and crushing by appropriate measures.
- Always use suitable tools. Use special tools if specified.
- Use lifting equipment and tools in the correct manner.
- Use suitable protective equipment (hard hat, safety goggles, safety shoes, safety gloves, for example).
- Do not stand under hanging loads.
- Immediately clean up any spilled liquids from the floor due to the risk of falling!

3.3.7 Battery Safety

Batteries consist of active chemicals in a solid housing. Therefore, improper handling can cause injury or property damage.

Risk of injury by improper handling!

- Do not attempt to reactivate low batteries by heating or other methods (risk of explosion and cauterization).
- Do not attempt to recharge the batteries as this may cause leakage or explosion.
- Do not throw batteries into open flames.
- Do not dismantle batteries.

Safety Instructions for Electric Drives and Controls

- When replacing the battery/batteries, do not damage the electrical parts installed in the devices.
- Only use the battery types specified for the product.



Environmental protection and disposal! The batteries contained in the product are considered dangerous goods during land, air, and sea transport (risk of explosion) in the sense of the legal regulations. Dispose of used batteries separately from other waste. Observe the national regulations of your country.

3.3.8 Protection Against Pressurized Systems

According to the information given in the Project Planning Manuals, motors and components cooled with liquids and compressed air can be partially supplied with externally fed, pressurized media, such as compressed air, hydraulics oil, cooling liquids and cooling lubricants. Improper handling of the connected supply systems, supply lines or connections can cause injuries or property damage.

Risk of injury by improper handling of pressurized lines!

- Do not attempt to disconnect, open or cut pressurized lines (risk of explosion).
- Observe the respective manufacturer's operating instructions.
- Before dismounting lines, relieve pressure and empty medium.
- Use suitable protective equipment (safety goggles, safety shoes, safety gloves, for example).
- Immediately clean up any spilled liquids from the floor due to the risk of falling!



Environmental protection and disposal! The agents (e.g., fluids) used to operate the product might not be environmentally friendly. Dispose of agents harmful to the environment separately from other waste. Observe the national regulations of your country.

3.4 Explanation of Signal Words and the Safety Alert Symbol

The Safety Instructions in the available application documentation contain specific signal words (DANGER, WARNING, CAUTION or NOTICE) and, where required, a safety alert symbol (in accordance with ANSI Z535.6-2011).

The signal word is meant to draw the reader's attention to the safety instruction and identifies the hazard severity.

The safety alert symbol (a triangle with an exclamation point), which precedes the signal words DANGER, WARNING and CAUTION, is used to alert the reader to personal injury hazards.



In case of non-compliance with this safety instruction, death or serious injury will occur.

Safety Instructions for Electric Drives and Controls

** WARNING**

In case of non-compliance with this safety instruction, death or serious injury **could** occur.

** CAUTION**

In case of non-compliance with this safety instruction, minor or moderate injury could occur.

NOTICE

In case of non-compliance with this safety instruction, property damage could occur.

4 Introduction

This document describes the conversion of IndraWorks projects of the versions 07VRS to 12VRS to version 13VRS. Furthermore, upgrading to a new release in an IndraWorks version is explained.

The description of the update are summarized briefly. For some actions, detailed information can be found at the end of the document.

Changes between IndraWorks 12VRS and IndraWorks 13VRS as well as between IndraLogic 1.x and IndraLogic 2G can be found in a separate chapter.

The document describes the following conversions:

- **Release upgrade within an IndraWorks version**

This chapter describes the upgrade to a new IndraWorks release within a version. This is e.g. the case when upgrading from IndraWorks 13V02 to IndraWorks 13V04.

- **Version upgrade to a new IndraWorks version**

This chapter describes the project conversion to a new IndraWorks version. This is e.g. the case when upgrading from IndraWorks 12V04 to IndraWorks 13V02. This description is also valid for older IndraWorks versions if the PLC of the control is compatible with IndraLogic 2G. The following firmware versions contain an IndraLogic 2G:

- IndraMotion MLC 10VRS
- IndraMotion MLC 11VRS
- IndraMotion MLC 12VRS
- IndraMotion MLC 13VRS
- IndraLogic 10VRS
- IndraLogic XLC 11VRS
- IndraLogic XLC 12VRS
- IndraLogic XLC 13VRS

- **Converting an IndraMotion MLC 04 project under IndraWorks 07VRS**

This chapter describes the project conversion of an IndraMotion MLC project under IndraWorks 07VRS to the IndraWorks version 13VRS. IndraLogic 1.x contained in IndraMotion MLC 04 is also converted to IndraLogic 2G.

This description is valid for the following IndraMotion MLC versions:

- IndraMotion MLC04 (CML L40.2)
- IndraMotion MLC04 (CML L65.1)

- **Converting an IndraLogic 1.x to the current IndraWorks version**

This chapter describes a conversion of an IndraLogic 1.x control to the current IndraWorks version. The PLC is converted to IndraLogic 2G. The control is converted from IndraLogic to IndraLogic XLC.

This description is valid for the following firmware versions:

- IndraLogic 03 L10
- IndraLogic 03 L20
- IndraLogic 03 L40
- IndraLogic 04 L10
- IndraLogic 04 L20
- IndraLogic 04 L40

5 IndraWorks Release Upgrade within 13VRS

This chapter describes the project conversion for an IndraWorks release upgrade from e.g. 13VRSV02 to 13VRSV04.



Create a project copy before starting the conversion.

- | | |
|---------------------|--|
| Requirements | <ul style="list-style-type: none"> • IndraWorks project or IndraWorks project archive of an IndraWorks version 13VRS, containing either an IndraMotion MLC or an IndraLogic XLC control • Installed IndraWorks 13VRS |
| Instruction | <ol style="list-style-type: none"> 1. Starting IndraWorks 13VRS. 2. Loading the IndraWorks project to be converted |

or

Restoring an IndraWorks project archive.

The project is loaded in the compatibility mode. To increase the control version in the project, the compatibility mode has to be set to the current IndraWorks version. A description of the compatibility mode can be found in the "Rexroth IndraWorks 13VRS Engineering" documentation under chapter "Working with IndraWorks", see /5/ in [chapter 1.3 "Required and Supplementing Documentations" on page 6](#).

A warning message informing the user that libraries are missing can sporadically be displayed. This message can be ignored. A small yellow warning symbol is sporadically displayed in the Project Explorer.

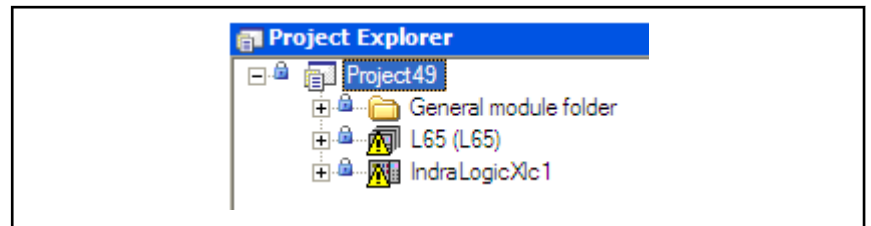


Fig.5-1: Warning symbol at the control after having loaded the old project status

3. Updating the control version in the project.
[chapter 9.3 "Creating the Control Version" on page 61](#)
4. Perform firmware update of the control.
If no control is available, this step can be executed at a later point.
Refer to [chapter 9.4 "Exchanging XLC/MLC Firmware" on page 64](#).
5. Check for old library versions in the library manager of the control (under the application node) and replace the old versions by new versions. Placeholders are now available for most of the libraries.
The procedure is described in [chapter 9.6 "PLC Libraries Update" on page 68](#).
6. The menu item **Create ► Clear All** can be called to clear old PLC compilation files and to check the library list of the control.
7. Start the PLC program compilation using the menu item **Create ► Generate Code**.

IndraWorks Release Upgrade within 13VRS

The PLC program is being compiled. If compilation errors occur, it has to be checked for old library versions in the library manager of the control.

The conversion is completed after the compilation has been completed successfully.

The steps 3 to 7 have to be repeated for all controls in the project.

6 IndraWorks Versions Upgrade from 12VRS to 13VRS

This section describes the project conversion for an IndraWorks version upgrade from 10VRS, 11VRS or 12VRS to 13VRS.



Create a project copy before starting the conversion.

Requirements

- IndraWorks project or IndraWorks project archive of an IndraWorks version 10, 11 or 12, containing either an IndraMotion MLC or an IndraLogic XLC control
- Installed IndraWorks 13VRS

Instruction

1. Starting IndraWorks 13VRS.
2. Loading the IndraWorks project to be converted

or

Restoring an IndraWorks project archive.

The project has to be converted to a new format. A query dialog is displayed:

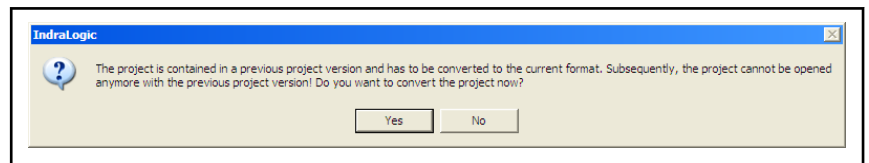


Fig.6-1: Querying the project conversion to the new IndraWorks format

3. Confirm by clicking on **Yes**.

The project is now converted and loaded. A warning message informing the user that libraries are missing can sporadically be displayed. This message can be ignored. A small yellow warning symbol is sporadically displayed in the Project Explorer.

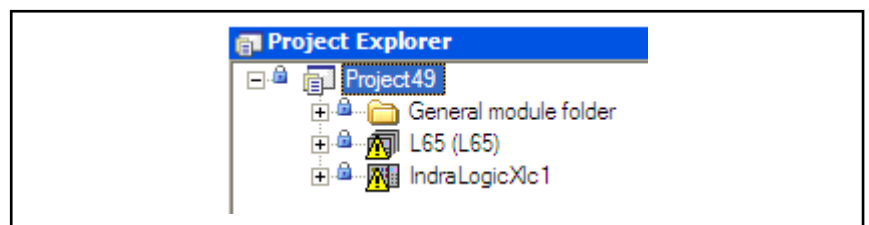


Fig.6-2: Warning symbol at the control after having loaded the old project status

4. Updating the control version in the project.
Refer to [chapter 9.3 "Creating the Control Version" on page 61](#).
5. Perform firmware update of the control.
If no control is available, this step can be executed at a later point.
Refer to [chapter 9.4 "Exchanging XLC/MLC Firmware" on page 64](#).
6. Check for old library versions in the library manager of the control (under the application node) and replace the old versions by new versions. Placeholders are now available for most of the libraries.
The procedure is described in [chapter 9.6 "PLC Libraries Update" on page 68](#).

IndraWorks Versions Upgrade from 12VRS to 13VRS

7. The menu item **Create ► Clear All** can be called to clear old PLC compilation files and to check the library list of the control.
8. Start the PLC program compilation using the menu item **Create ► Generate Code**.

The PLC program is being compiled. If compilation errors occur, it has to be checked for old library versions in the library manager of the control.

The conversion is completed after the compilation has been completed successfully.

The steps 4 to 8 have to be repeated for all controls in the project.

NOTICE

The parameter A-0-0048 (Velocity polarity) and A-0-0049 (Force polarity) have been introduced. The parameters can have incorrect default values. This can result in a change of direction of rotation of axes and thus, in a machine breakdown.

1. Check parameters A-0-0048 and A-0-0049 on all axes.
2. Take reasonable precautions upon the first machine start-up.

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

7 Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

7.1 Overview

This section describes the conversion of an MLC 04VRS project in IndraWorks 07VRS to IndraWorks 13VRS. There are two steps:

1. Conversion of the Motion sections

In this step, the control and all axes are accepted into the new format.

Also refer to [chapter 7.2 "Conversion of the Control and Axis Configuration" on page 31](#).

2. Converting the PLC components

The IndraLogic 1.x PLC program is converted to IndraLogic 2G and integrated in the IndraWorks project

Also refer to [chapter 8.3 "Converting the PLC and the Field Buses" on page 45](#).

7.2 Conversion of the Control and Axis Configuration

This section describes the conversion of the Motion sections, i.e. the control and all of the axes of an MLC 04 project in IndraWorks 07VRS to IndraWorks 13VRS.

There are two options for this:

1. Conversion of the IndraWorks 07VRS project to IndraWorks 13VRS

This option is suitable particularly for large projects with many axes.

Also refer to ["Converting the project" on page 31](#).

2. Restructuring of the project in IndraWorks 13VRS without conversion

This procedure is suitable for small projects in which only a few axes have to be accepted. This is also an alternative in case option 1 fails.

Also refer to ["Restructuring the project" on page 39](#).

Both options are described in the following.

Converting the project

1. Exporting the old project.

- Open the project in IndraWorks 07 (IndraMotion MLC 04)
- The control parameters can be exported in the following ways:
 - If possible, establish a physical connection with the control and go online. Via the menu item **Project ► Export...**, export the project. In this case, the actual settings are saved.
 - If the hardware is not available, the project can also be exported directly using the menu item **Project ► Export...** In this case, the parameters saved in the project are saved.

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

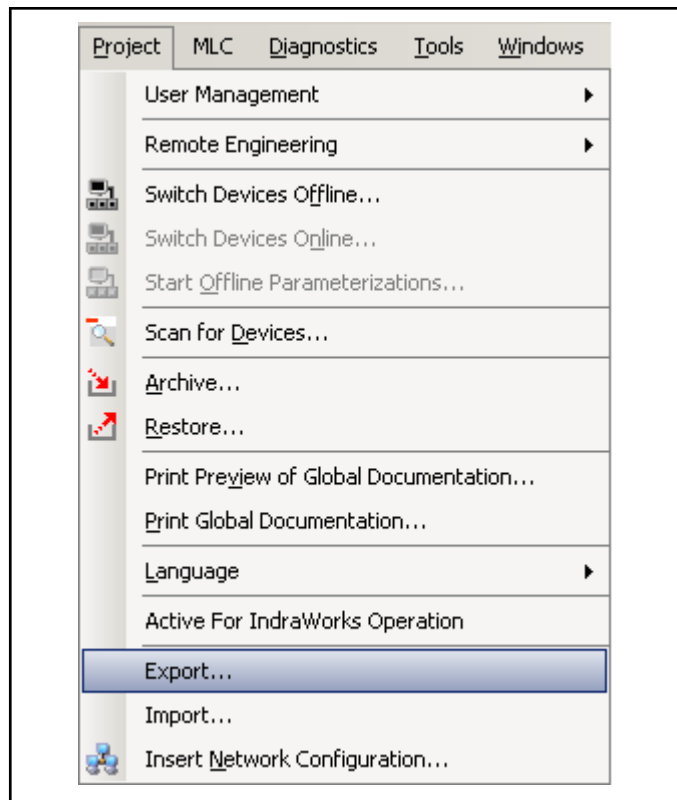


Fig.7-1: Exporting a project

- The directory of the old project is file is always to be selected as the storage location for the export.
2. Save the control parameters and the Compact Flash data.
- Proceed as follows to transfer the control parameters and Compact Flash card data to a new control:
- Establish a physical connection to the control
 - Select **Device Data** ► **Backup...**

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

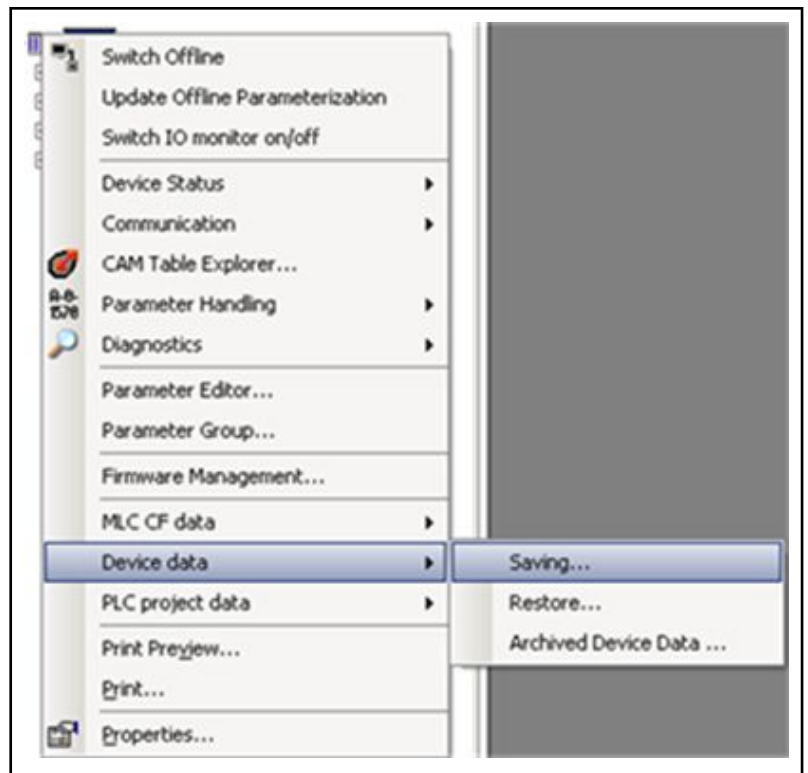


Fig.7-2: Archiving device data

- Select Parameter and User and OEM partition of CompactFlash card and click **OK** to save.

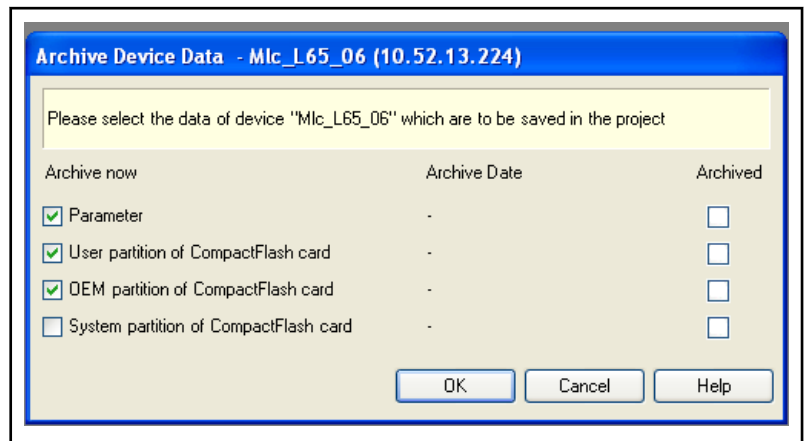


Fig.7-3: Saving device data

- Place a check next to the option "Archive parameters required for restoring" and click **Export** to start the export.

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

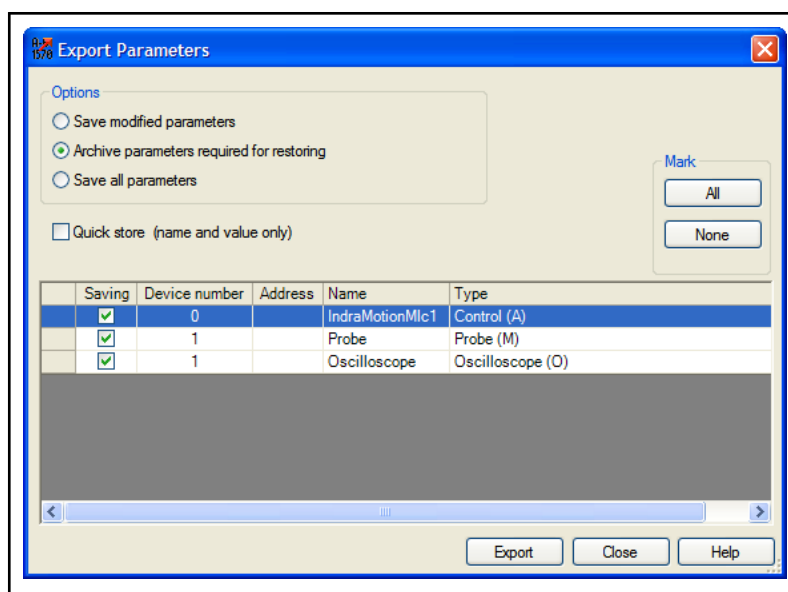


Fig. 7-4: Parameter export

3. Renaming and saving the old project

- In the IndraWorks Project Explorer, use the context menu item "Rename" to add the ID "_04VRS" to the project name.
- To be safe, archive the project.

4. Manipulating the export XML file

In this step, the export file has to be edited manually to upgrade the control to a version supported by IndraWorks 13VRS.

- Open the export file in a text editor, e.g. Windows Notepad++
- Searching the project section. It starts with <Project ...> and ends with </Project>. For each control in the project there is exactly one section:
- Within the project section, the entry directory has to be adjusted to an existing and non read-only directory. The converted project is saved in this directory.
- Search for the control sections. They begin with <MLC ...> and end with </MLC>. For each control in the project there is exactly one section:

```
<MLC name="MyMLC" libraryName="IndraMotion">
</MLC>
```

- Now, the hardware and the firmware version can be changed in the MLC section.

– Changing the hardware:

Search for the entry hardware="..." and change the entry in accordance with the new hardware. The entry libraryName="..." must also be adapted with regard to the hardware.

Example: hardware="IndraMotion MLC L40" ⇒ hardware="IndraMotion MLC L65"

libraryName="IndraMotion MLC L40" ⇒ libraryName="IndraMotion MLC L65"

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

- Changing the firmware:

Search for the entry `firmware="..."` and change the entry in accordance with the new firmware version.

Example: `firmware="FWA-CML40*-ML*-04V06"` ⇒ `firmware="FWA-CML65*-ML*-13V..."`

Program:

```
<ImportFile xmlns:xsd=...>
  <Project name="MLC40_04VRS_to_L65" directory="D:\MLC-Projects\Convert" ...>
    <MLC name="MyMLC" libraryName="IndraMotion MLC L40" ip="10.104.73.202"
      firmware="FWA-CML40*-ML*-04V06" hardware="IndraMotion MLC L40" ...>
```

Program:

```
<ImportFile xmlns:xsd=...>
  <Project name="MLC40_04VRS_to_L65" directory="D:\MLC-Projects\Convert" ...>
    <MLC name="MyMLC" libraryName="IndraMotion MLC L65" ip="10.104.73.202"
      firmware="FWA-CML65*-ML*-13V..." hardware="IndraMotion MLC L65" ...>
```

5. Entering extension modules while keeping sercos II

This step only has to be taken if users are to continue using sercos II for master communication with the drives.

sercos II (fiber optic cable) is installed in IndraControl L40 by default. The IndraControl L45 or IndraControl L65 required for IndraLogic 2G uses sercos III by default (EtherNet). Extension modules are available for sercos II and sercos III for both controls. If the old topology is to be kept in the transition to IndraLogic 2G, these extension modules must be entered. If a switch to sercos III is planned, only the ID has to be changed.

Adding a function module "FM_SERCOS2". This entry must be inserted directly before the ID `</MLC>`:

Program:

```
<MLC ...>
...
<FM_SERCOS2 libraryName="SERCOS-II" fmSlot="1" active="true" />
<MLC ...>
```

6. Changing the master communication to sercos III

This step only has to be taken if the master communication to the drives is to be changed to sercos III.

IndraControl L40 with sercos II master communication to IndraControl L25/L45/65 with sercos III master communication: In each real axis, change the entry `Communication="SERCOS"` to `Communication="SERCOS3"`:

Program:

```
<RealAxis name="Antrieb1" number="1" author="hageburc" comment="" active="true"
driveName="Antrieb1" libraryName="IndraDrive" firmware="FWA-INDRV*-MPH-04VRS-D5-1-SNC-NN"
  communication="SERCOS3" address="49" calculateInDrive="true">
  <ParameterTable />
</RealAxis>
```

7. Changing the cross communication to sercos III

This step only has to be taken if the cross communication is used among several controls.

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

Changing the sercos II cross communication of an IndraControl L40.2 to sercos III cross communication with an IndraControl L45 or IndraControl L65. The entry "FM_C2C" for the function module has to be added. This entry must be inserted directly before the ID <MLC>:

Program:

```
<MLC ...>
...
<FM_C2C libraryName="C2C CrossComm" fmSlot="1" active="true" />
<MLC ...>
```

If a sercos III master communication is used, the drives in the project must have a firmware version > 06VRS. The entries for the drives must be changed accordingly:

Program:

```
<RealAxis name="Axis1" number="2" author="andrlago" comment="" active="true" driveName="Axis1"
libraryName="IndraDrive" firmware="FWA-INDRV*-MPH-07VRS-D5-1-SNC-NN" communication="SERCOS3"
address="1" calculateInDrive="true">
  <ParameterTable />
</RealAxis>
```

8. Saving an export file

After the changes are complete, the file can be saved under a new name, but with the same suffix.

The modified import file is now saved and ready to import into IndraWorks 13VRS.

9. Importing the project with IndraWorks 13VRS

- Open IndraWorks Suite 13VRS.
- Close any open projects
- Select the menu item **Project ► Import**
- Import the XML file adapted in step 4.



Fig. 7-5: Importing the XML file

10. Restoring the saved Compact Flash files

If parameters and data on the Compact Flash card were saved in step 2, they can now be transferred to the control again.

- To do this, copy the folder "...\\Projectname\\Controlname\\ Archived Data" from the old project into the new project at the corresponding position.
- Establish a physical connection to the control.
- Select the menu item **Device Data ► Restore...**

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

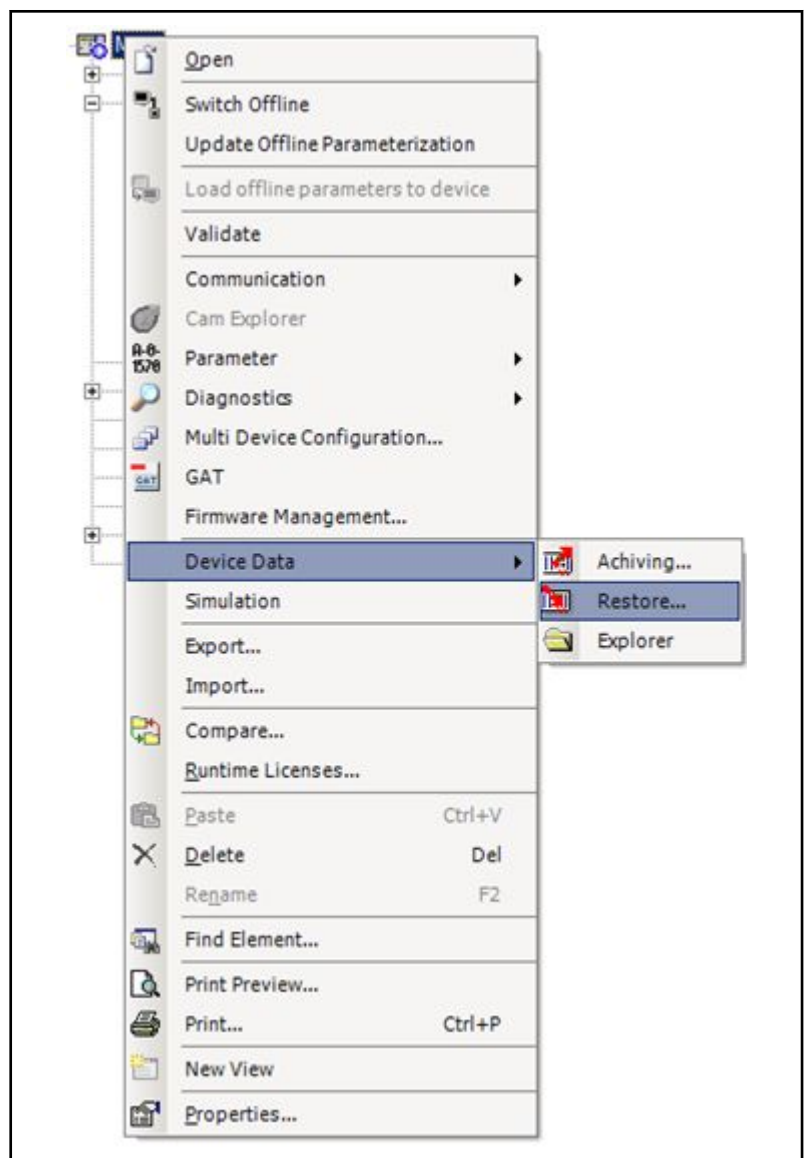


Fig.7-6: Importing device data

- Select the corresponding options.

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

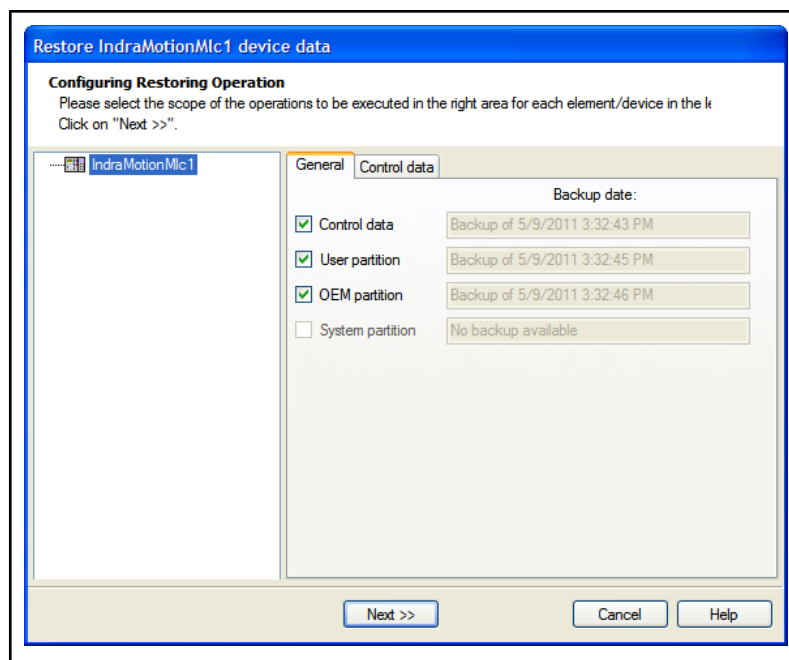


Fig.7-7: General options in the "Restore device data" dialog

- Select the corresponding options and click **Next >>** to start the restoration.

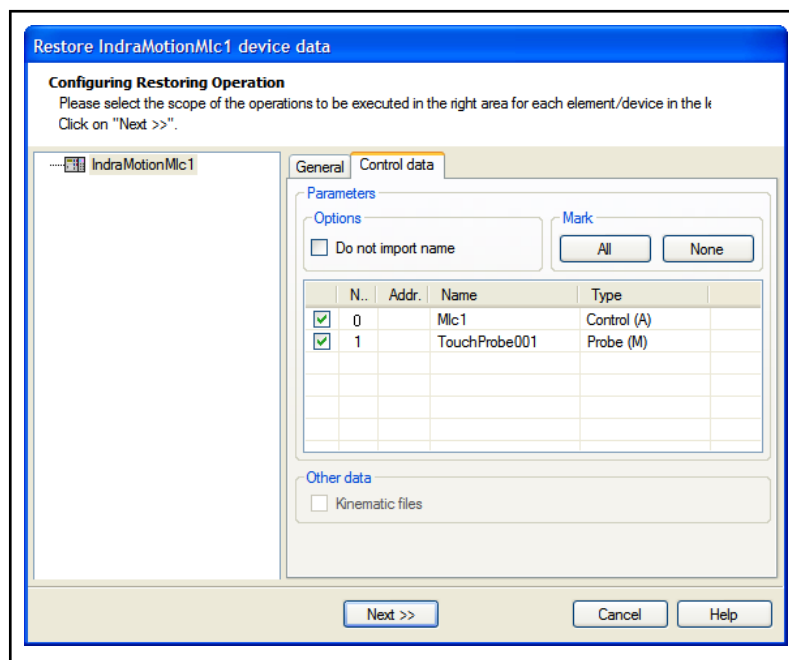


Fig.7-8: Control data in the "Restore device data" dialog

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

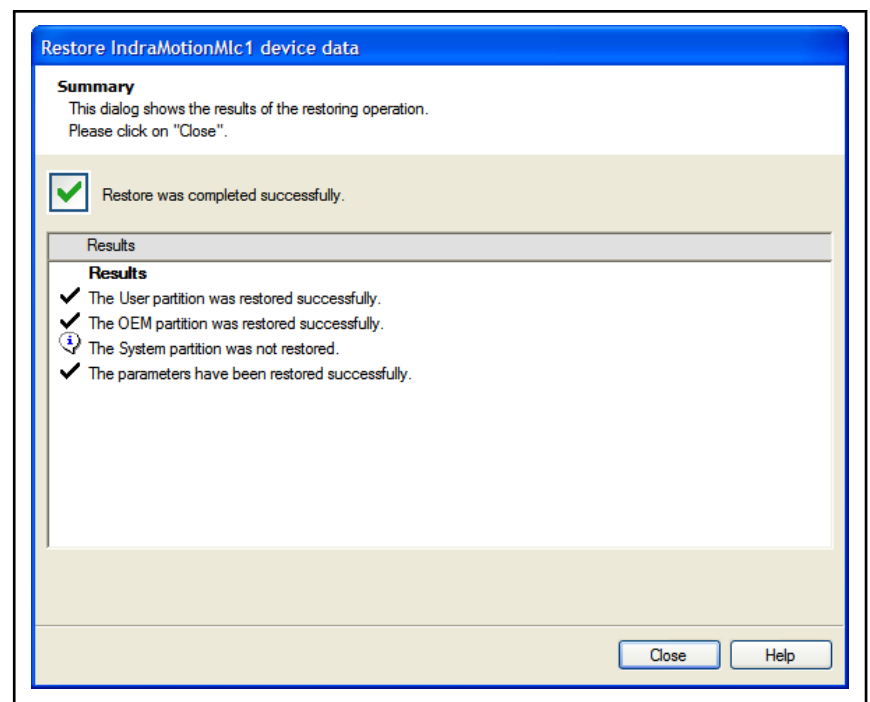


Fig. 7-9: Summary of the results of the import process



Check, if all parameters have been applied correctly.

The following important changes have to be complied with:

- The new axis parameters A-0-0048 (influences S-0-0043) and A-0-0049 (influences S-0-0085) influence the direction of rotation of the axes. For each axis, it has to be checked if the direction of rotation is correct.

Restructuring the project

1. Save the control parameters and the Compact Flash data.

Open the project in IndraWorks 07 (IndraMotion MLC 04).

Proceed as follows to transfer the control parameters and Compact Flash card data to a new control:

- Establish a physical connection to the control.
- Select **Device Data** ► **Backup...**

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

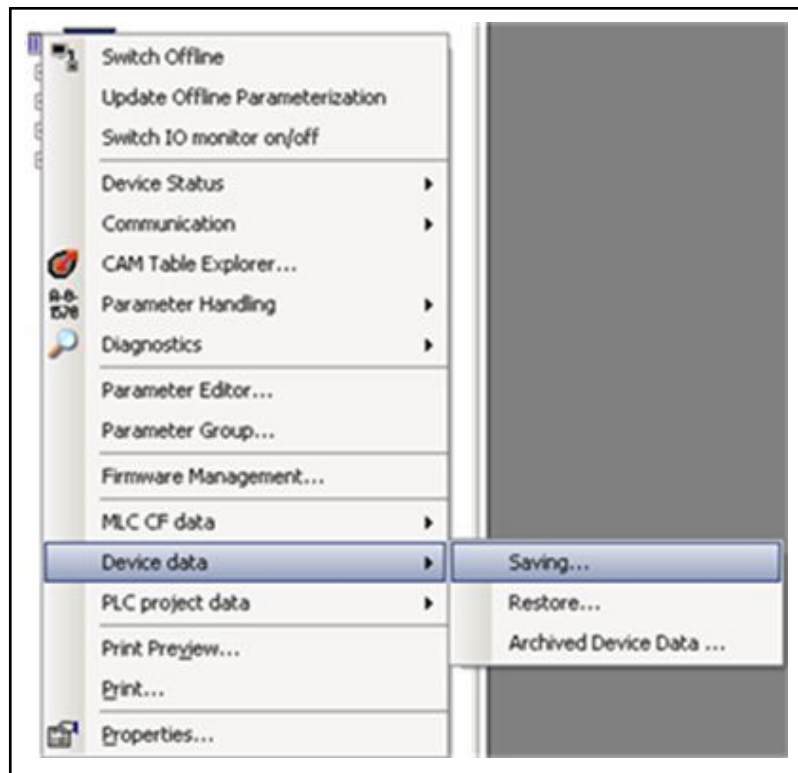


Fig.7-10: Archiving device data

- Select Parameter and User and OEM partition of CompactFlash card and click **OK** to save.

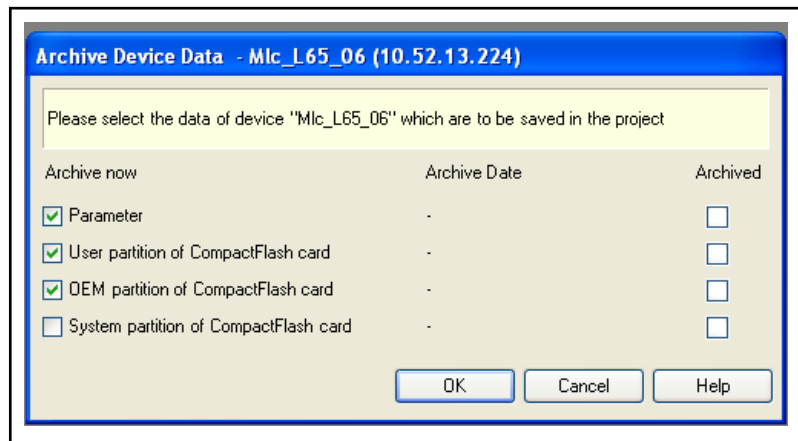


Fig.7-11: Saving device data

- Place a check next to the option "Archive parameters required for restoring" and click **Export** to start the export.

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

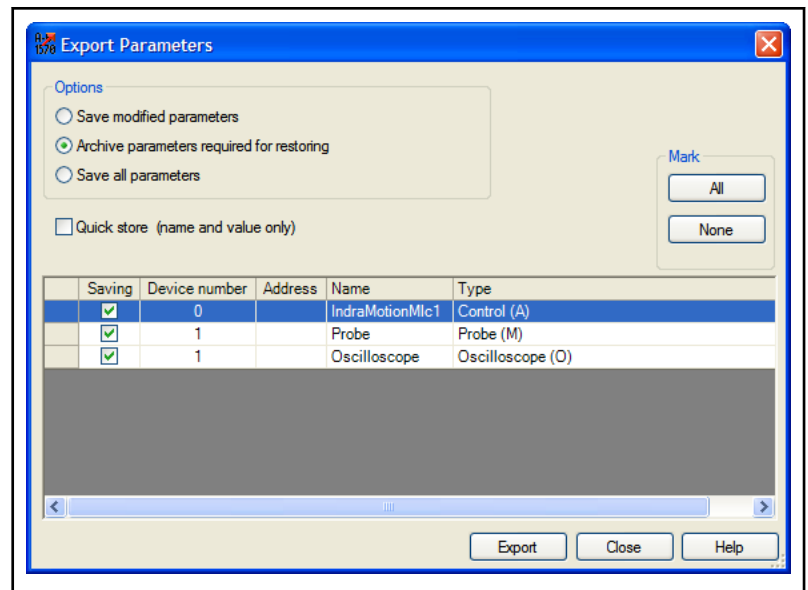


Fig. 7-12: Parameter export

2. Create project.
Start IndraWorks 13VRS and create a new project.
3. Create the control.
Create a new IndraMotion MLC control.
Refer to [chapter 9.1 "Creating a Control" on page 51](#).
4. Create the function modules.
Add the function modules to the control, if required.
Also refer to [chapter 9.2 "Creating a Function Module" on page 58](#).
5. Create the drives.
Now add all necessary drives to the control. Ensure that the axis names, the logical axis number and the sercos address are correct. All axes must have the same designations as in the old project.
Creating axes is described in detail in the documentation "Rexroth IndraMotion MLC 13VRS Functional Description", see [chapter 1.3 "Required and Supplementing Documentations" on page 6](#).
6. Restoring the saved Compact Flash files
If parameters and data on the Compact Flash card were saved in step 1, they can now be transferred to the control again.
 - To do this, copy the folder "Archived Data" from the old project into the new project at the corresponding position.
 - Establish a physical connection to the control.
 - Select the menu item **Device Data ► Restore...**:

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

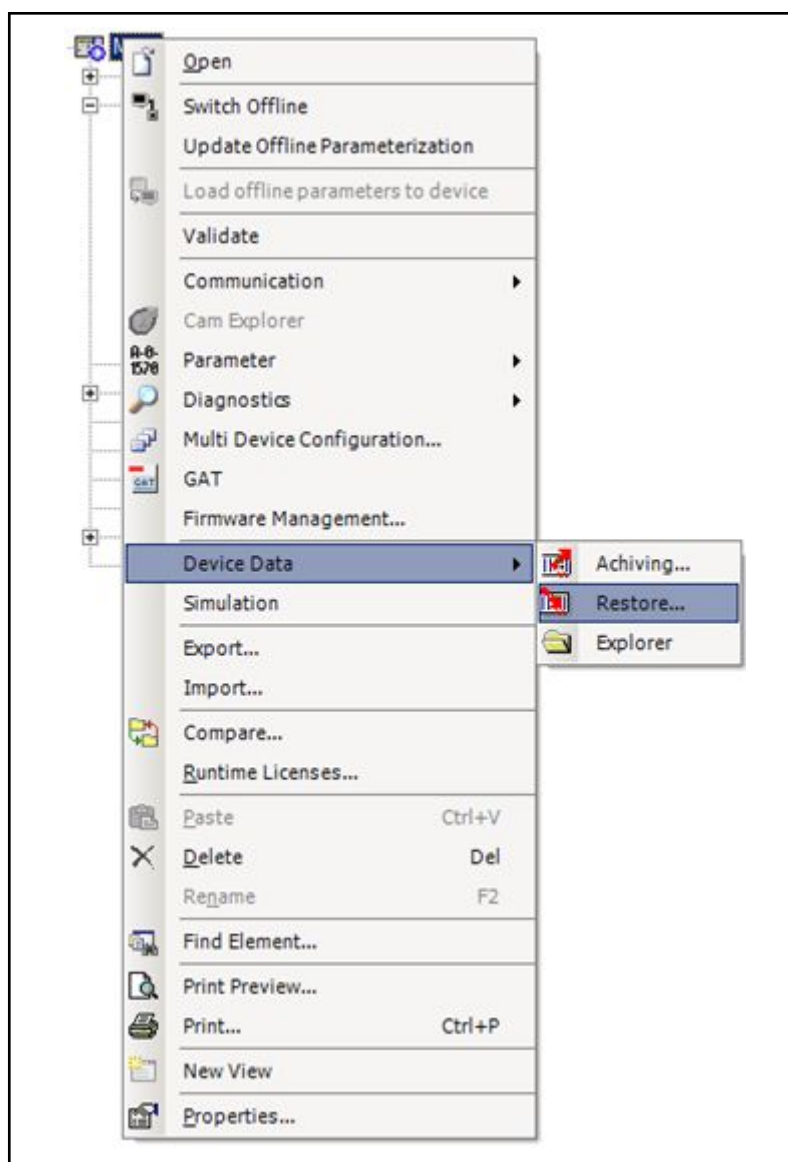


Fig.7-13: Importing device data

- Select the corresponding options.

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

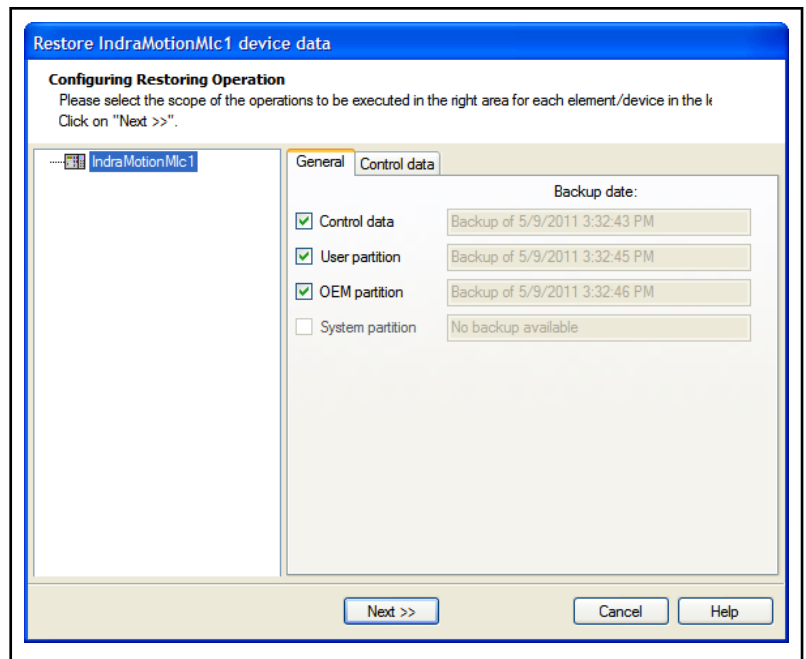


Fig. 7-14: General options in the "Restore device data" dialog

- Select the corresponding options and click **Next >>** to start the restoration.

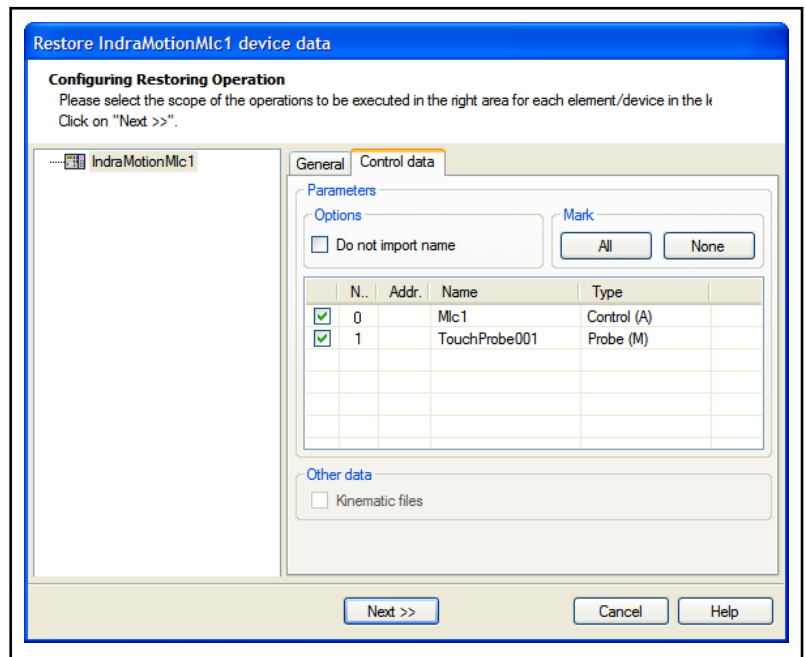


Fig. 7-15: Control data in the "Restore device data" dialog

Converting an IndraMotion MLC IndraWorks 07VRS to IndraWorks 13VRS

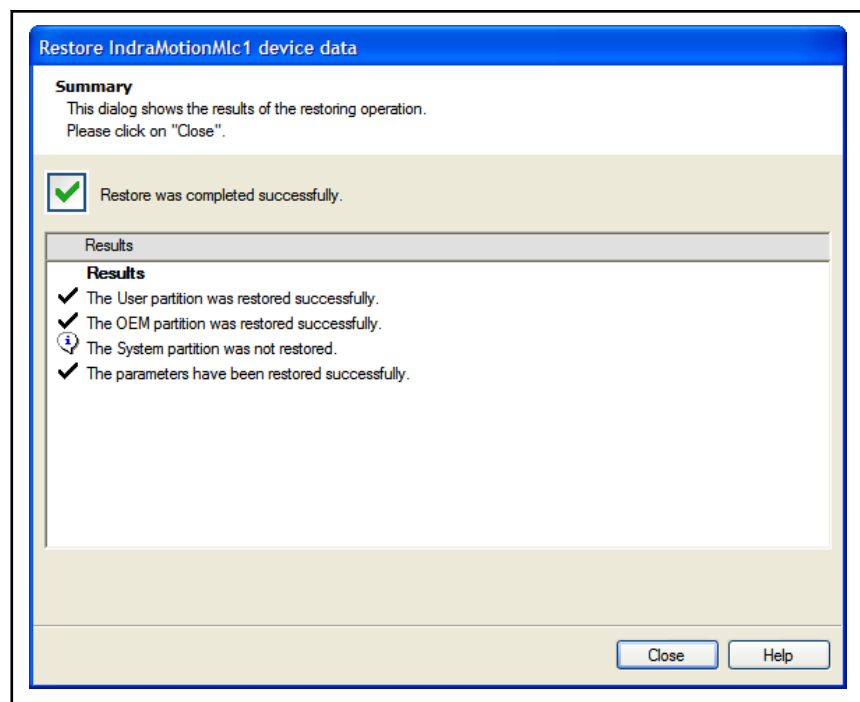


Fig. 7-16: Summary of the results of the import process

8 Converting IndraLogic 1.x to IndraWorks 13VRS IndraLogic XLC

8.1 Overview

This chapter contains information about the conversion of an IndraLogic 1.x project under IndraWorks 07VRS up to IndraWorks 12VRS to IndraLogic 2G under IndraWorks 13VRS. There are two steps:

1. **Create a new project under IndraWorks 13VRS**

A new IndraWorks 13VRS project is created and an IndraLogic XLC control is added

Also refer to [chapter 8.2 "Creating an IndraLogic XLC Project" on page 45](#).

2. **Converting the PLC components**

The IndraLogic 1.x PLC program is converted to IndraLogic 2G and integrated in the IndraWorks project

Also refer to [chapter 8.3 "Converting the PLC and the Field Buses" on page 45](#).



Check the project for conversion errors after the conversion. The system has to be commissioned again after a successful conversion.

Known Problems

CFC logic is changed during the project conversion from IndraLogic 1.x to IndraLogic 2G

Negated inputs as well as AND functions are changed during the conversion of IndraLogic 1.x projects to IndraLogic 2G projects in the PLC code. The error only occurs in the CFC (Continuous Function Chart).

For IndraLogic program parts in which the CFC logic is used, the "Converter for IndraLogic 1.x projects" cannot be used.

8.2 Creating an IndraLogic XLC Project

This section describes the creation of an IndraLogic XLC project under IndraWorks 13VRS.

1. Create project.

Start IndraWorks 13VRS and create a new project.

2. Create the control.

Create a new IndraLogic XLC control.

Refer to [chapter 9.1 "Creating a Control" on page 51](#).

3. Create the function modules.

Add the function modules to the control, if required.

Refer to [chapter 9.2 "Creating a Function Module" on page 58](#).

8.3 Converting the PLC and the Field Buses

After the devices as well as the required libraries have been converted, the IEC can be converted next. The entire IEC code, the visualization as well as the I/Os are converted.

Converting IndraLogic 1.x to IndraWorks 13VRS IndraLogic XLC

1. Open the project.

Load the project converted in [chapter 7.2 "Conversion of the Control and Axis Configuration"](#) on page 31 in IndraWorks 13VRS.

2. Import the PLC project.

To import an IndraLogic 1.x project, highlight the "application" node in the Project Explorer and select "Data Import..." from the context menu.

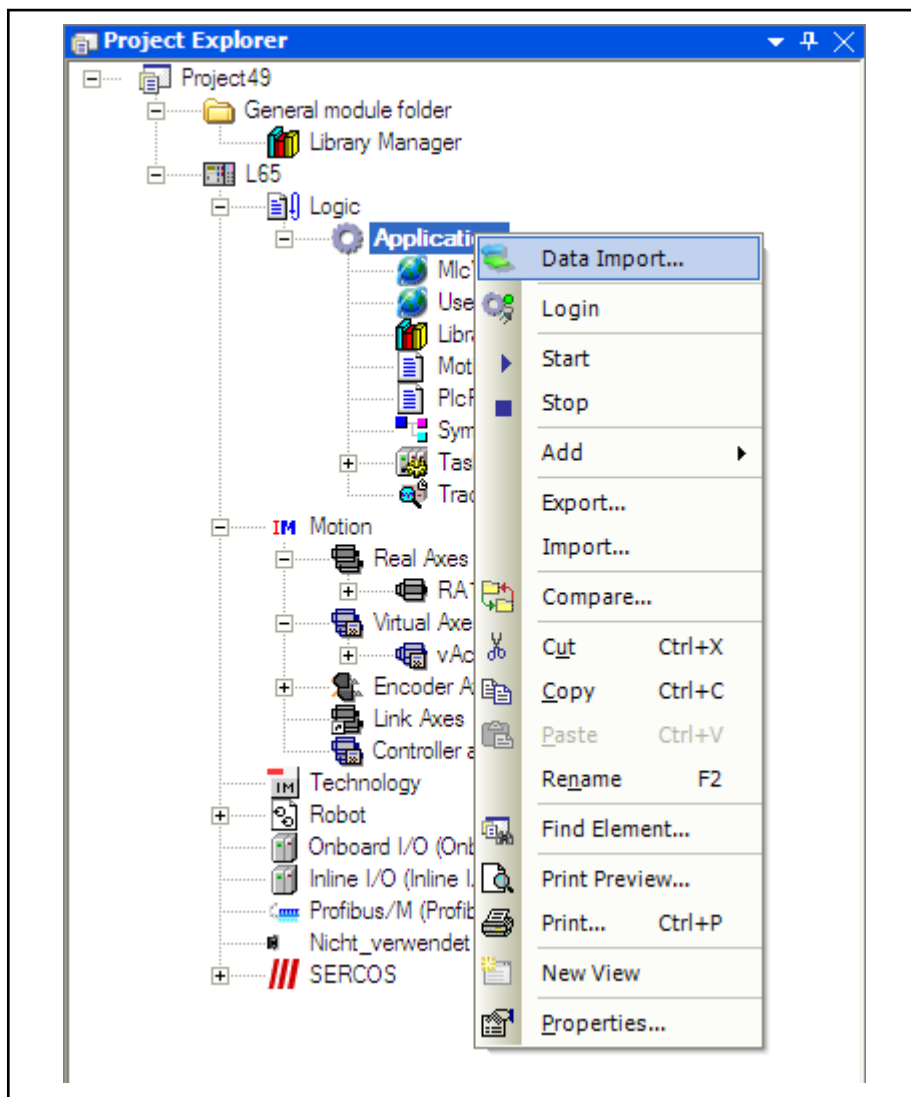


Fig.8-1: Data import

The "Data Import..." dialog is displayed.

3. Selecting the project file.

The project type has to be set to IndraWorks. Subsequently, the old IndraWorks project can be selected via the ... button. Confirm by clicking on **OK**.

Converting IndraLogic 1.x to IndraWorks 13VRS IndraLogic XLC

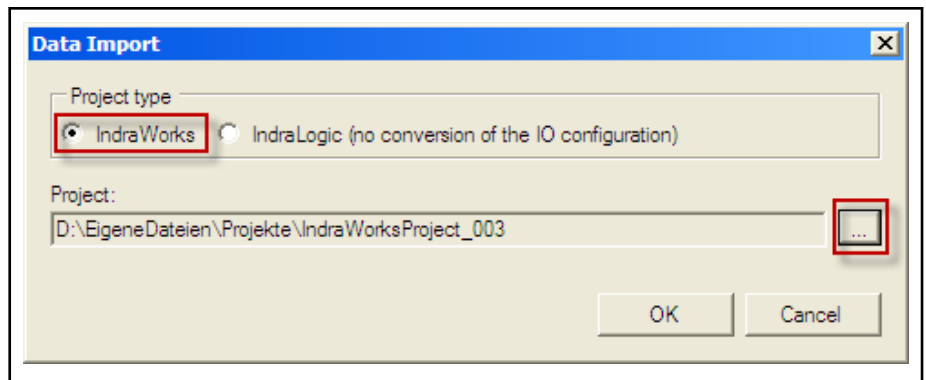


Fig.8-2: Data import dialog

The project is loaded and checked. The following dialog is displayed if not all PLC libraries can be found in the old project:

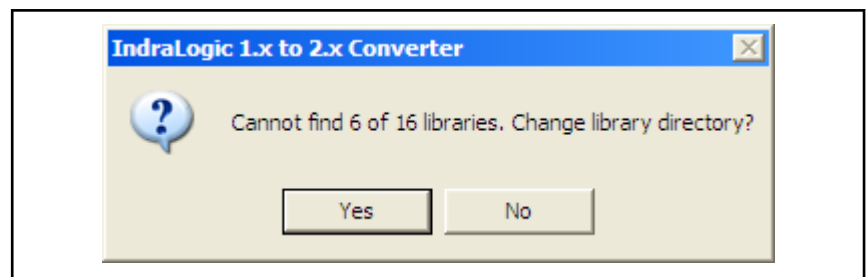


Fig.8-3: Missing PLC libraries dialog

In this case, please proceed with step 4, otherwise proceed with step 5.

4. Setting the directories.



It is important that the old PLC project can find all required libraries. Only then, the project can be compiled. The PLC source code is also only automatically adjusted by the converter if all required libraries can be found.

The dialog displayed after step 3 has been executed has to be confirmed by clicking on **Yes**. The settings dialog for IndraLogic 1.x projects is displayed. The paths for PLC libraries can be set in this dialog.

Converting IndraLogic 1.x to IndraWorks 13VRS IndraLogic XLC

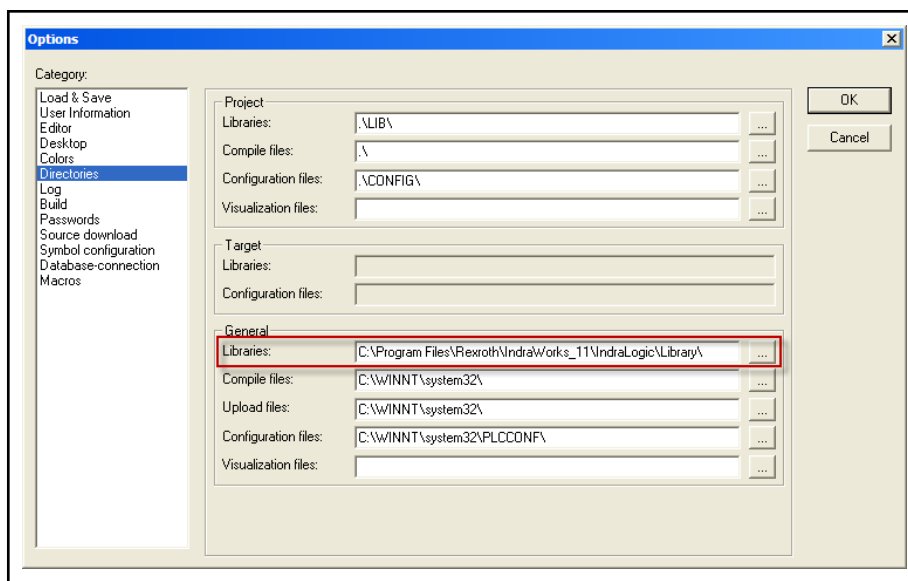


Fig.8-4: IndraLogic 1.x dialog Options

Step 5 has to be executed after confirming with **OK**.

5. ENI Login.

The "ENI login" dialog is displayed after the conversion dialog. This dialog has to be canceled by clicking on **Cancel**.

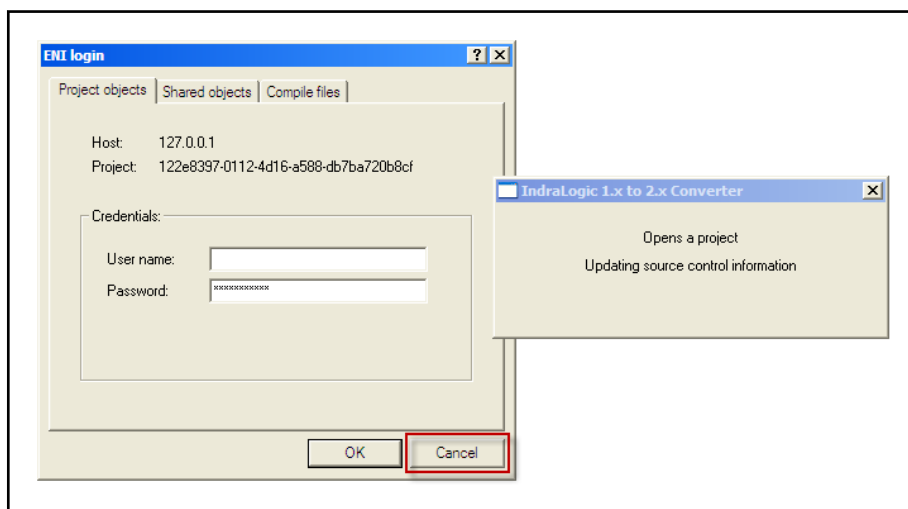


Fig.8-5: Dialog ENI login

6. Compilation

After the project has been analyzed by the converter, compilation is started. If the compilation fails, the following dialog is displayed:

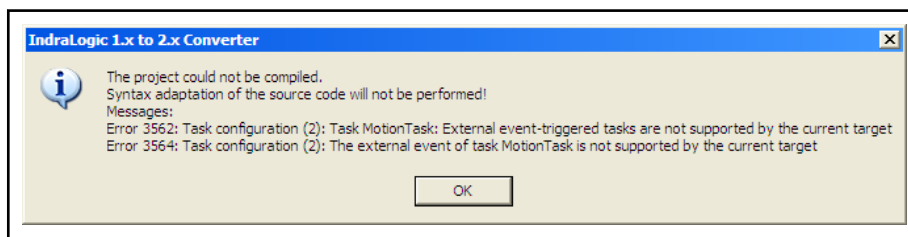


Fig.8-6: Compilation dialog fails

This can have the following reasons:

Converting IndraLogic 1.x to IndraWorks 13VRS IndraLogic XLC

- One or several PLC libraries have not been found
- Information about the control cannot be found
- Externally integrated configuration files could not be found

In general, the project can also be applied without a successfully completed compilation. However, the PLC source text is not automatically adjusted. The text can be adjusted manually (see [chapter 11 "Changes between IndraLogic 1.x and IndraLogic 2G" on page 83](#)).

7. Converting the PLC libraries.

It is checked if a PLC library is contained under IndraLogic 2G for each IndraLogic 1.x PLC library. The standard libraries are automatically converted by means of a list. The following dialog is displayed if the project contains unknown libraries:

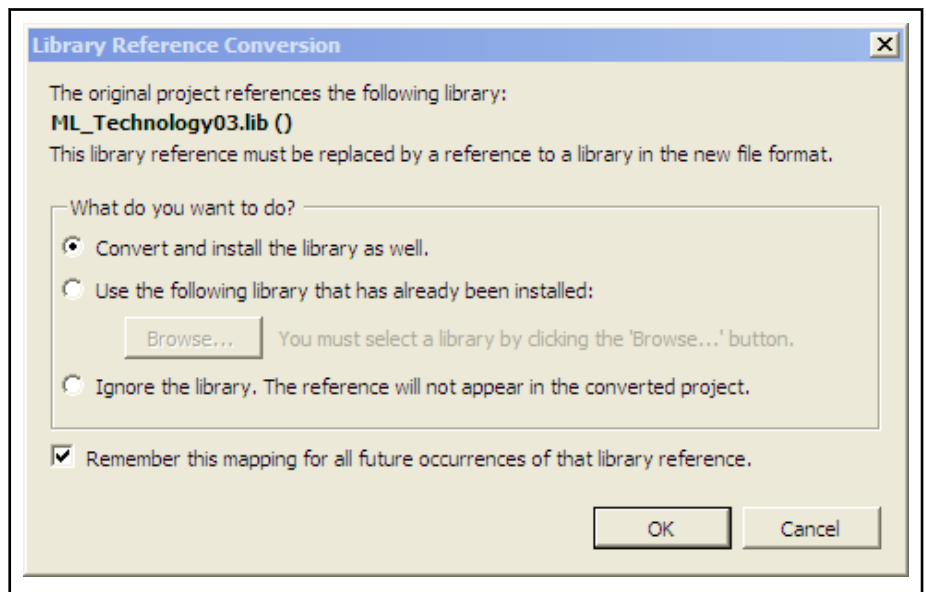


Fig.8-7: Dialog library conversion

The option "Convert and Install this Library as well" can be selected. Usually, the libraries have to be edited.

8. Selection of the objects to be applied.

A selection dialog is displayed, asking for objects to be imported. **Select All** has to be selected.

Converting IndraLogic 1.x to IndraWorks 13VRS IndraLogic XLC

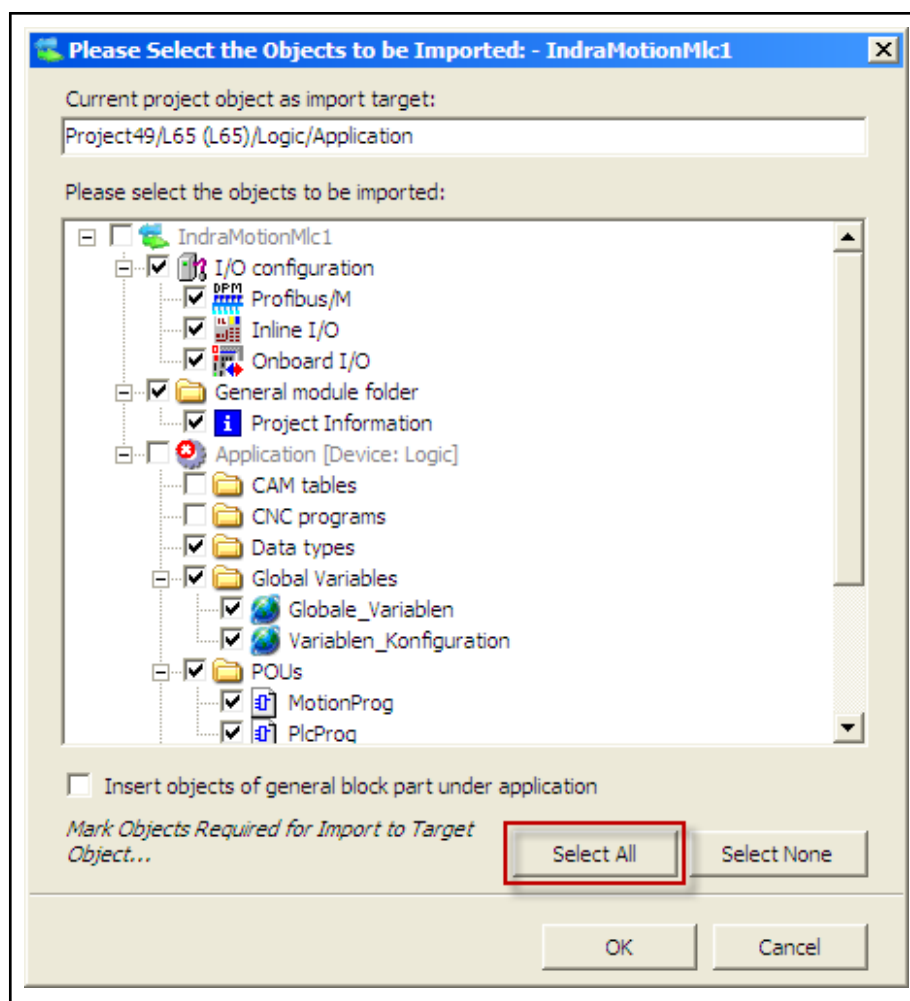


Fig.8-8: Dialog Selection of objects to be imported

The project import is started and completed. Acknowledge possible warning messages.

9. Correcting task priorities.

To avoid collisions with the Motion task, all PLC tasks should have a task priority greater than 3. The task priority can be set below the logic node under "Task configuration".

10. Compilation

The converted project is being compiled. The compilation is started via the menu item **Create ► Compile**. Warnings and errors can be correctly by means of [chapter 11 "Changes between IndraLogic 1.x and IndraLogic 2G"](#) on page 83.

9 Step Description

9.1 Creating a Control

There are two ways to create a control in the project:

Creating control via Drag & Drop

A control within a project is created by dragging the library element from the respective subfolder (IndraLogic XLC, IndraMotion MLC) of the "Drive and Control" library folder into the project folder. The properties of this element are given in the information window.

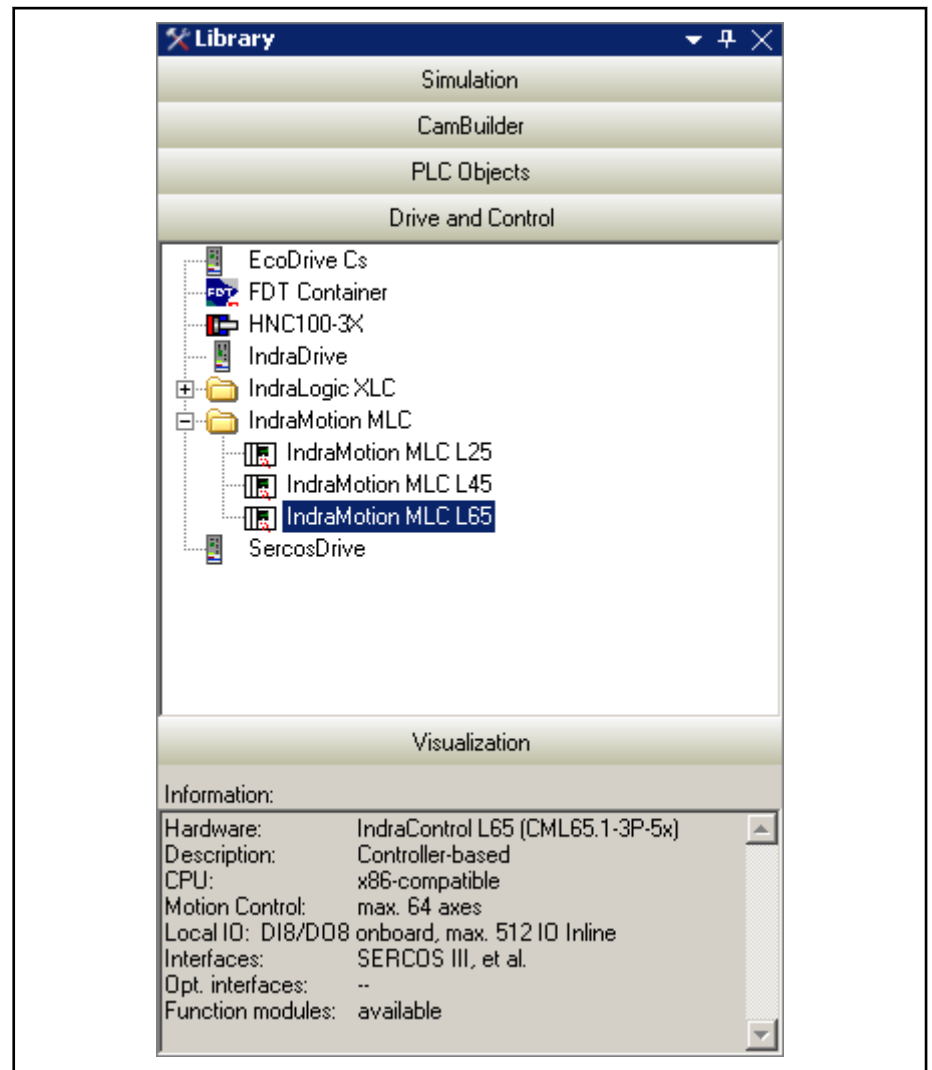


Fig.9-1: Creating a control (as shown for the IndraMotion MLC L65) - dragging from the library

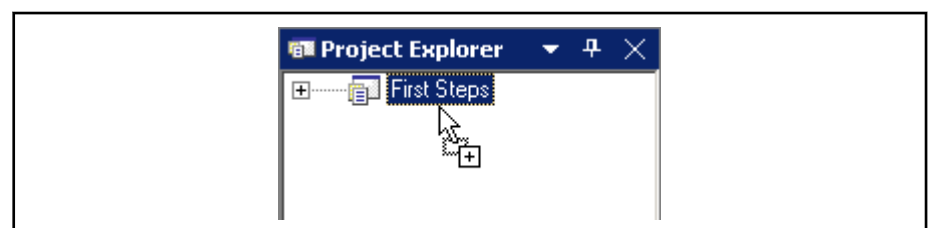


Fig.9-2: Creating a control - dropping it to the Project Explorer

Step Description

Creating a control using the context menu

Right-click on the project node to open the context menu for the project. Then select the desired control under the menu item "Add".

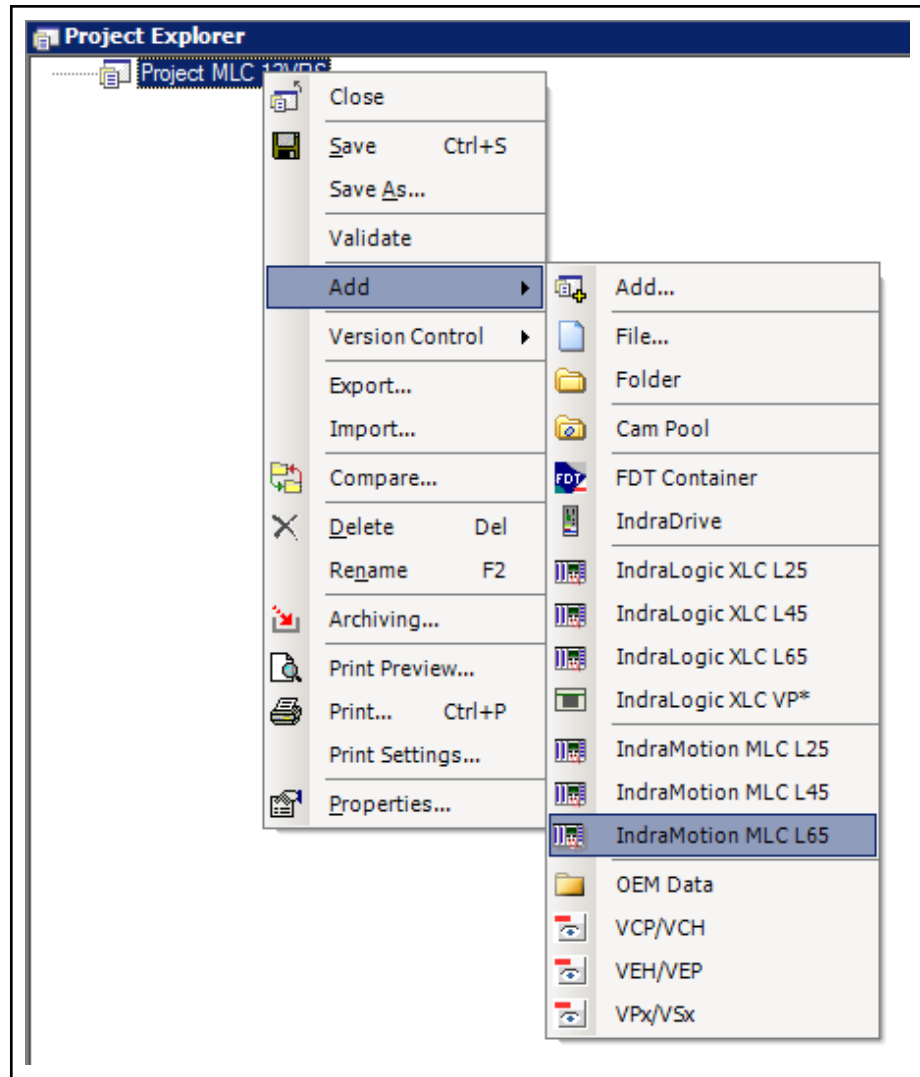


Fig. 9-3: Creating an IndraMotion MLC in the project

Step Description

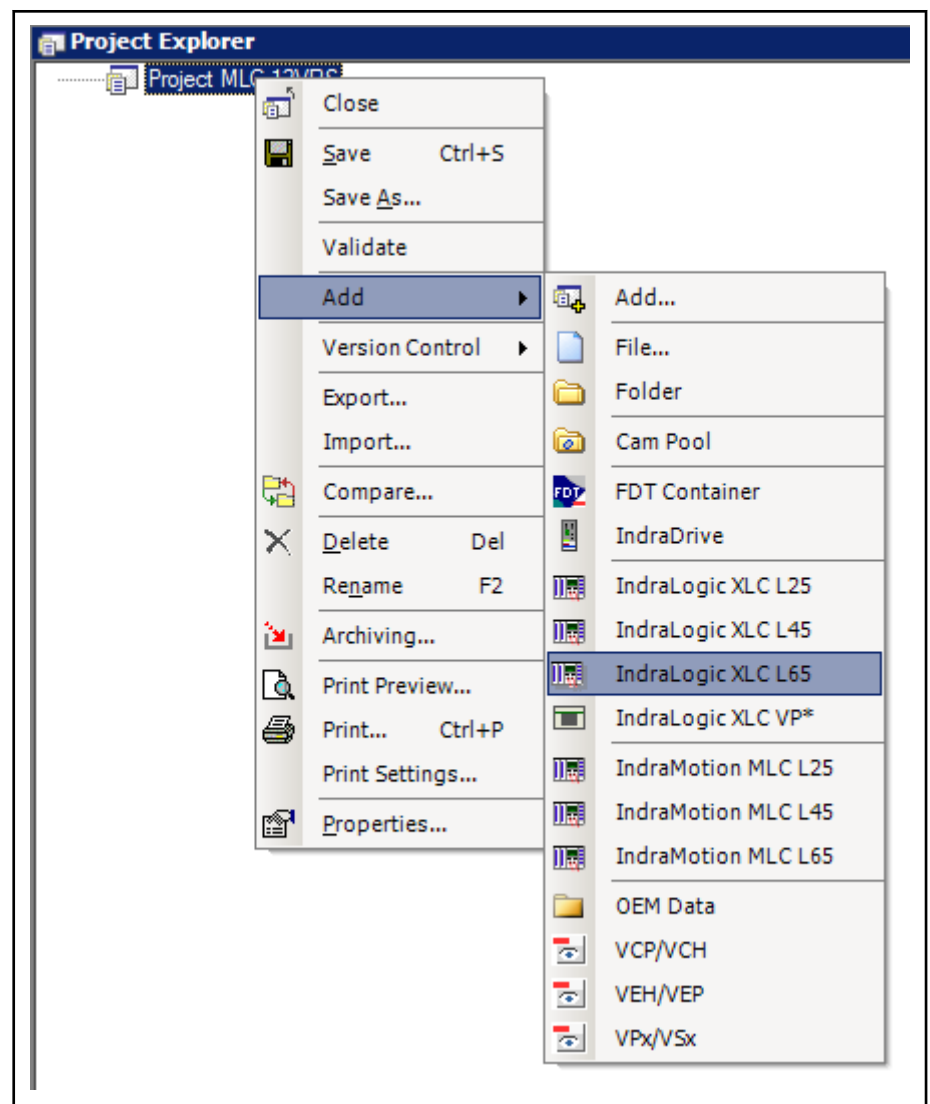


Fig.9-4: Creating an IndraLogic XLC in the project

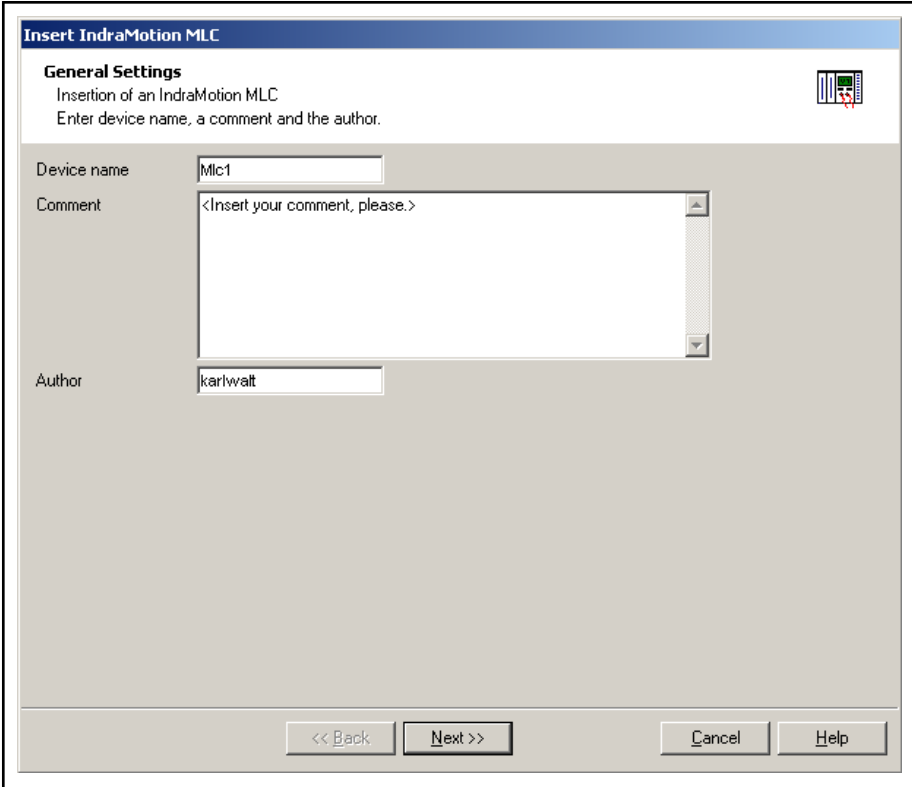
Creating a control by copying

A control can also be added by "copying and pasting". A control that already exists in the project is copied and inserted at the project node.

Dialogs for creating a control

Creating a control is supported by a wizard with three dialog windows.

Step Description



The screenshot shows a Windows-style dialog box titled "Insert IndraMotion MLC". It has a "General Settings" tab selected. Below the title bar, there is a sub-header "General Settings" followed by the text "Insertion of an IndraMotion MLC" and "Enter device name, a comment and the author." in a smaller font. To the right of this text is a small icon of a control panel. The main area of the dialog contains three input fields: "Device name" with the text "Mlc1", "Comment" with the placeholder text "<Insert your comment, please.>", and "Author" with the text "karlwallt". At the bottom of the dialog, there are four buttons: "<< Back", "Next >>", "Cancel", and "Help".

Fig.9-5: Creating a control - General Settings

In the "General Settings" step, the device name, a comment on this device and the author are entered.

Accept the preset values (comment is optional) or change them.

The name of the author is derived from the user's Windows login.

Step Description

Fig.9-6: Creating a control (shown for the IndraMotion MLC L65) - Configuration

Device type The system and the control hardware is set in the "Device type" setting. The control hardware can be read on the type plate of the control.

The following types of hardware are available for the IndraMotion MLC:

Type designation code	IndraControl	sercos III	Profibus/Profinet
CML25.1-3N	L25	x	-
CML45.1-3P	L45	x	x
CML65.1-3P	L65	x	x

Tab.9-7: IndraMotion MLC hardware variants

The following types of hardware are available for the IndraLogic XLC:

Type designation code	IndraControl	sercos III	Profibus/Profinet
CML25.1-3N	L25	x	-
CML25.1-PN	L25	-	x
CML45.1-3P	L45	x	x
CML45.1-NP	L45	-	x
CML65.1-3P	L65	x	x
CML65.1-NP	L65	-	x

Tab.9-8: IndraLogic XLC hardware variants

Step Description

The selected hardware platform can be modified later via the Properties dialog of the device (calling via the context menu of the device).

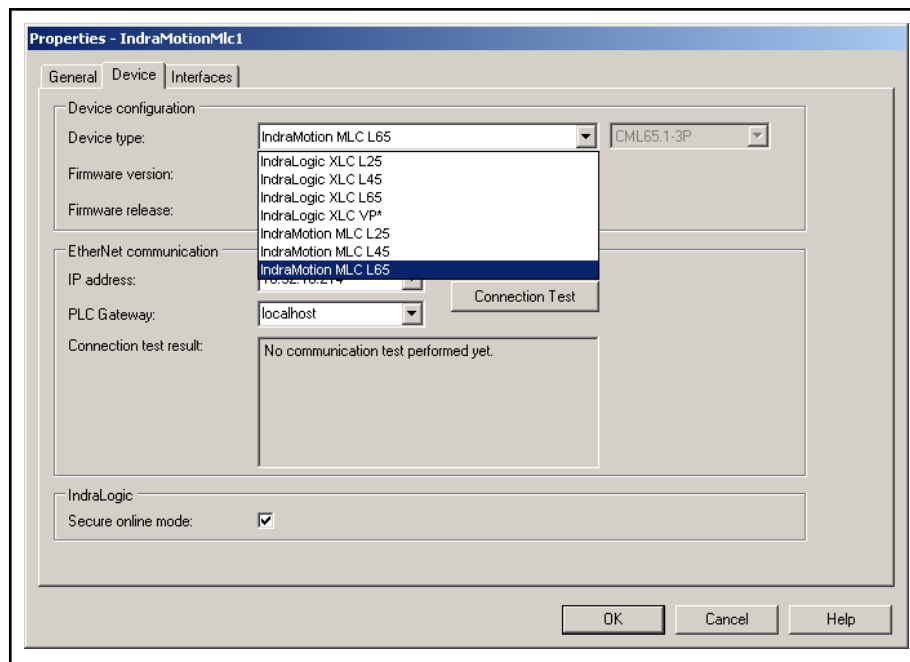


Fig.9-9: Changing the device type



The device types (product family and hardware) differ in their functional scope.

If the new device type set does not support certain features of the source device type, then these special configurations are deleted during the conversion process (e.g. sercos III available/not available). Features that are only supported in low numbers are maintained but generate a warning before switching online (e.g. various axis numbers).

Before the configuration of the "Properties" dialog is applied with **OK**, it is checked whether the device type has changed. If there was a change, an information dialog with a change preview is displayed, which provides information about the additional or unsupported features of the target device. The process of device conversion can still be cancelled at this point. The device type is only changed when the change preview is confirmed by clicking **OK**.

Firmware version	The firmware version generally corresponds to the IndraWorks Suite version.
Firmware release	The firmware release indicates the firmware state in the version.
IP address	The IP address of the control "must" be set in the Configuration step. Otherwise, communication with the control is not possible. The IP address can be shown in the control display.

Step Description



Fig. 9-10: Display with four operating keys (standard display)

Displaying the IP address of the control:

1. Press the <Enter> key. The **ETHERNET** display is shown.
2. Press the <Enter> key again. Now the **IP address** is displayed (running horizontally across the display).

PLC Gateway The PLC Gateway is generally located on the same computer in which IndraWorks is running. Generally, this setting can thus left unchanged.

Connection test The connection test checks whether a control with this IP address exists (ping) and responds with the device name of the control and the name of the current user (author).

Secure online mode The "Secure Online Mode" switch enables additional requests for starting and stopping the PLC and forcing values in PLC monitoring. It is enabled by default for security reasons.

PLC programming language The PLC programming language only specifies the language for the automatically created standard programs "MotionProg" and "PlcProg". For new programs (PRG) the programming language can be selected when the program is created.

In the third dialog of the wizard, the desired function modules (only for the IndraControl Lxx) have to be preset in their actual order and the use of the onboard interfaces Profibus DP, Profinet I/O-Controller and EtherNet/IP slave have to be defined.

Step Description

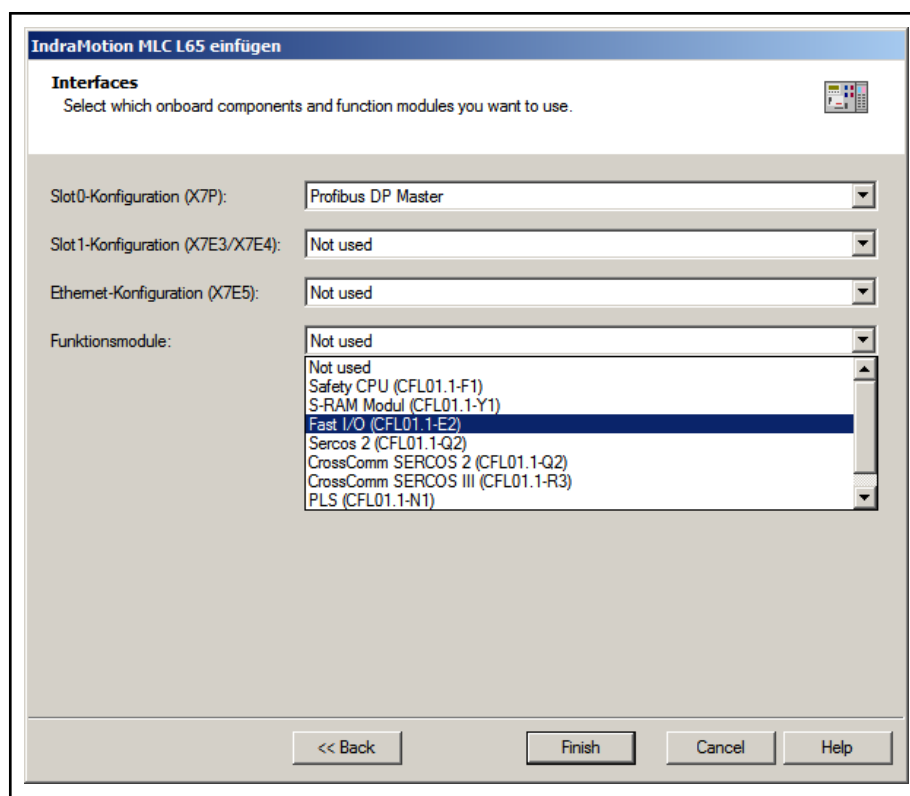


Fig.9-11: *Creating a control (illustrated by the example of the IndraMotion MLC L65) - specification of the function modules connected, in this case "Fast I/O (CFL01.1-E2)"*



The insertion of a function module with the IndraLogic XLC / IndraMotion MLC Lxx is possible if it is not yet connected to the control.

While going online, the absence is acknowledged by an error message.

A module that is connected later on is detected at next control startup.

Then click **Finish**.

In the following waiting time, the PLC program belonging to the project is automatically created in the background.

The device (in the example "Mlc1") is thus added to the current project.

Overview in the Project Explorer

The project structure is described in detail in the documentation "Rexroth IndraMotion MLC 13VRS Functional Description" and "Rexroth IndraLogic XLC 13VRS Functional Description", in the chapter "Structure of a Project" (see [chapter 1.3 "Required and Supplementing Documentations" on page 6](#)).

Context menu

The context menu is described in detail in the documentation "Rexroth IndraMotion MLC 13VRS Functional Description" and "Rexroth IndraLogic XLC 13VRS Functional Description", in the chapter "Control - Context Menu" (see [chapter 1.3 "Required and Supplementing Documentations" on page 6](#)).

9.2 Creating a Function Module



Function modules are only available for Lxx variants for IndraLogic XLC controls.

Step Description

**Specification of function module
when configuring the control**

To extend the functionality of the control, up to four (a maximum of two with IndraMotion MLC L25 / IndraLogic XLC L25) function modules can be connected to the left side of the control.

It is possible to specify a function module when configuring the control (see following figure), even if it is not yet connected to the control.

The module is already integrated into the right location in the Project Explorer.

While going online, the absence is acknowledged by an error message.

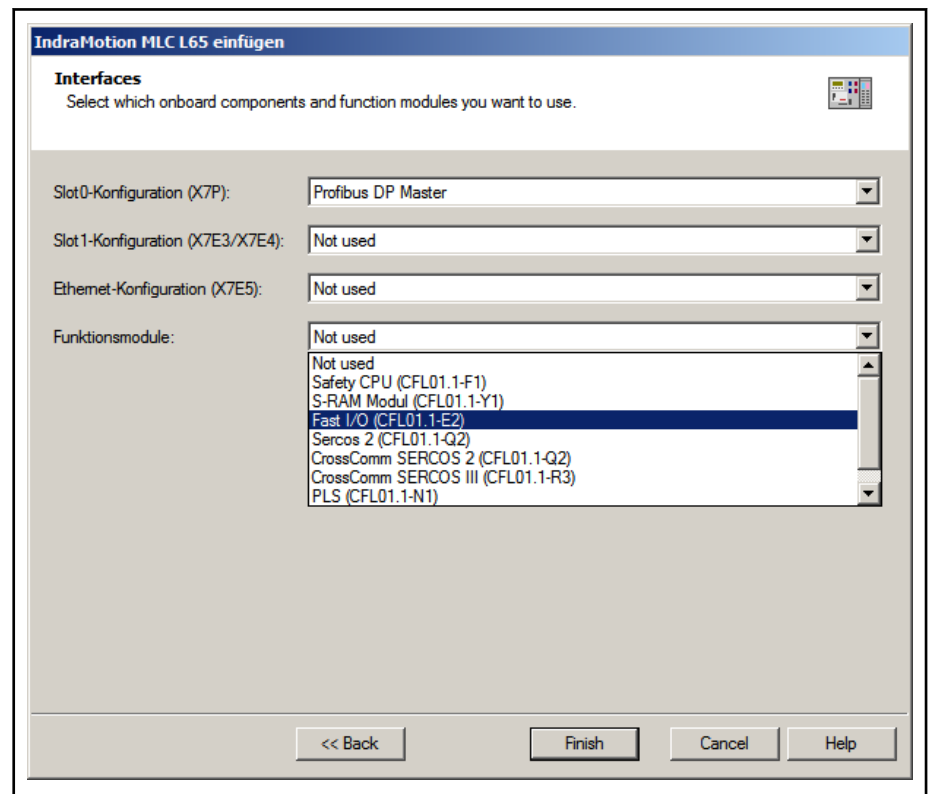


Fig.9-12: Adding a Fast I/O function module via a wizard (for an IndraMotion MLC for example)

**Inserting a module from the device
library via drag&drop**

Function modules to be subsequently connected have to be selected from the library via drag&drop and stored on the control in the Project Explorer.

Procedure:

Drag the function module from the "Function modules" group of the library to the control

Step Description

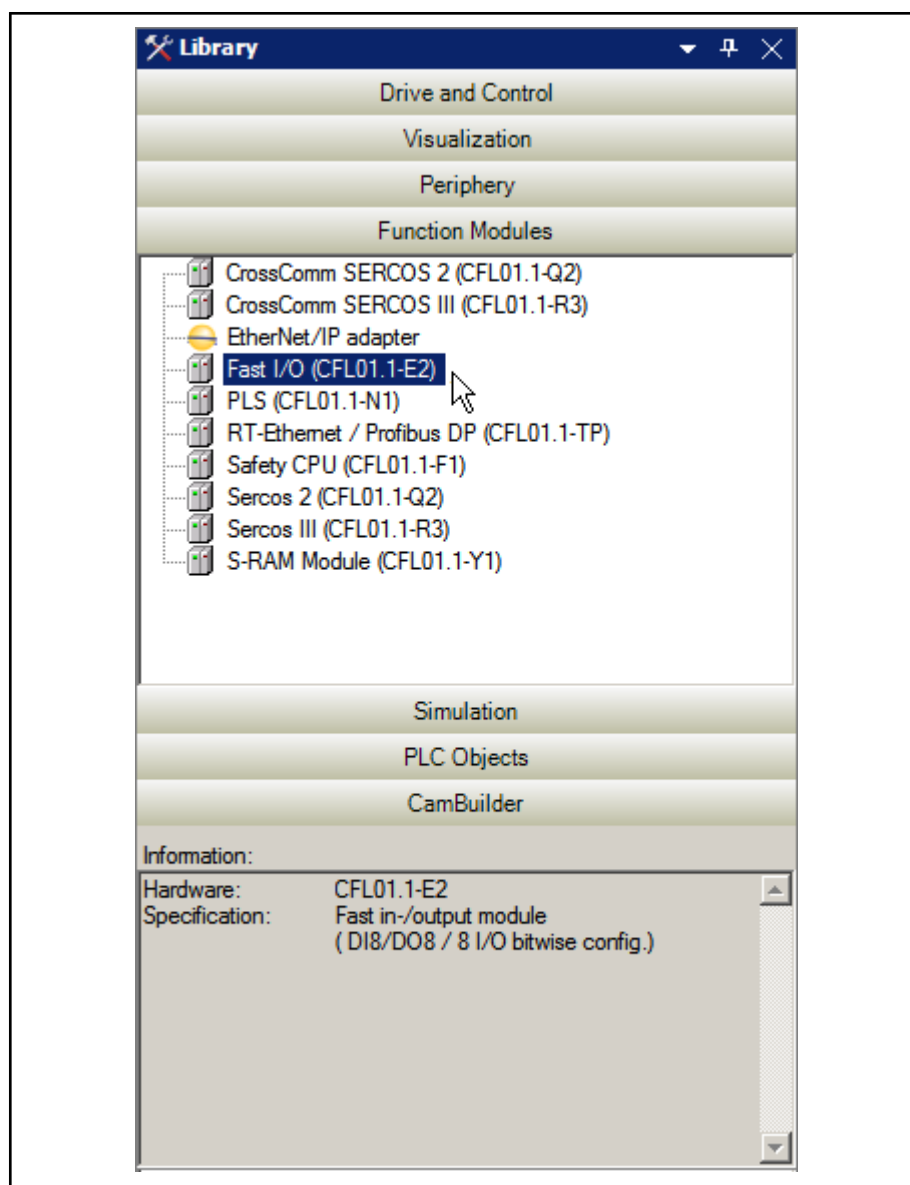


*Fig.9-13: Dragging a module from the library
.... and "drop" it on the control or above the sercos folder.*

Step Description

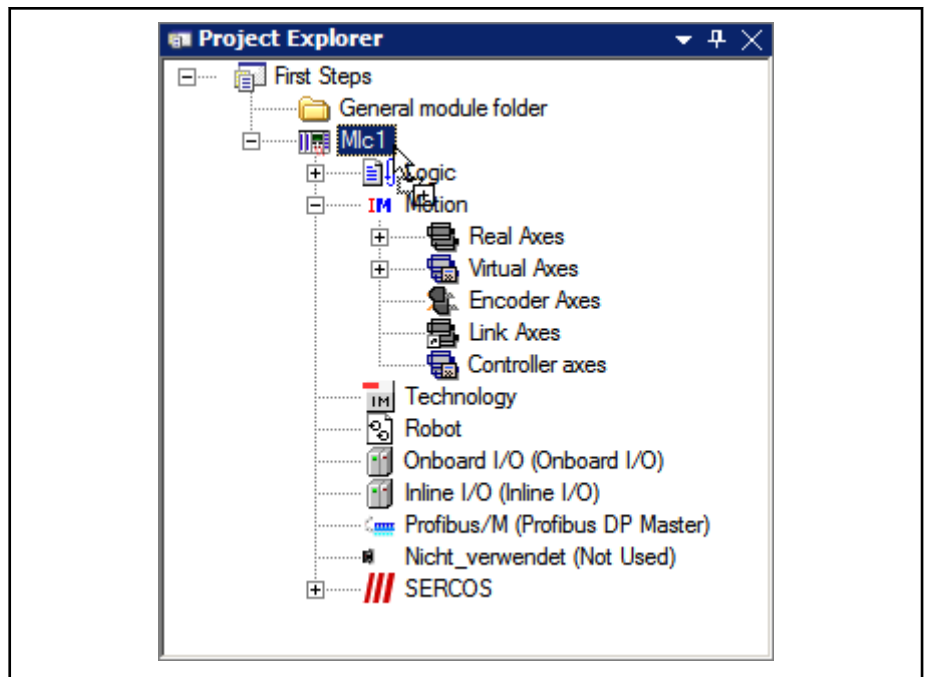


Fig. 9-14: Inserting a module



A module that is connected later is not detected before the next startup of the control.

Configuration of the module

Each module, with the exception of the S-RAM module (CFL01.1-Y1), must subsequently be configured via corresponding dialogs with an IndraMotion MLC.

The function modules currently available for the IndraLogic XLC/IndraMotion MLC, as well as their functionality and configuration, are described in "Rexroth IndraControl Lxx 13VRS Function Modules", see [Required and Supplementing Documentations, page 6](#).

9.3 Creating the Control Version

When converting projects, the new version or the release have to be set via the property dialog of the control.

Requirements

The project has been loaded in IndraWorks 13VRS.

Execution

1. The property dialog can be opened via the context menu of the control.

Step Description

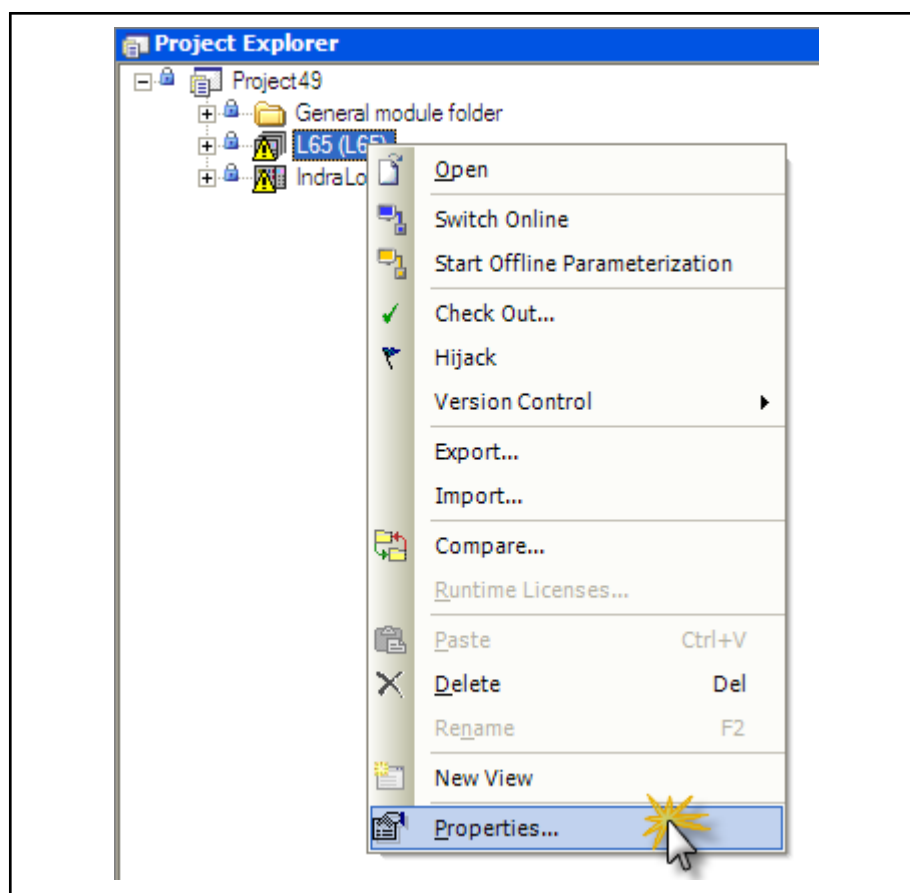


Fig.9-15: Context menu of the control

The properties dialog of the control is displayed.

2. Version jump:
Under "Firmware version", the version 13VRS has to be selected.

Step Description

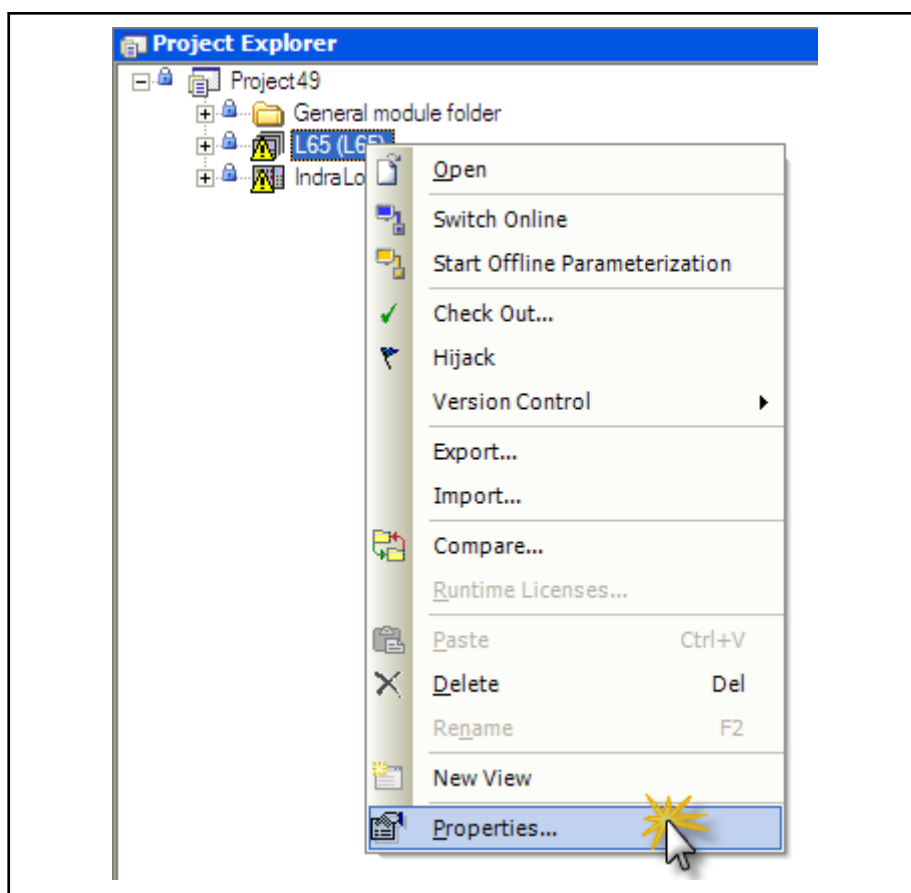


Fig.9-16: The Properties dialog of the control is used to change the control version.

Release jump:

Under "Firmware release ", the latest release has to be selected.

Step Description

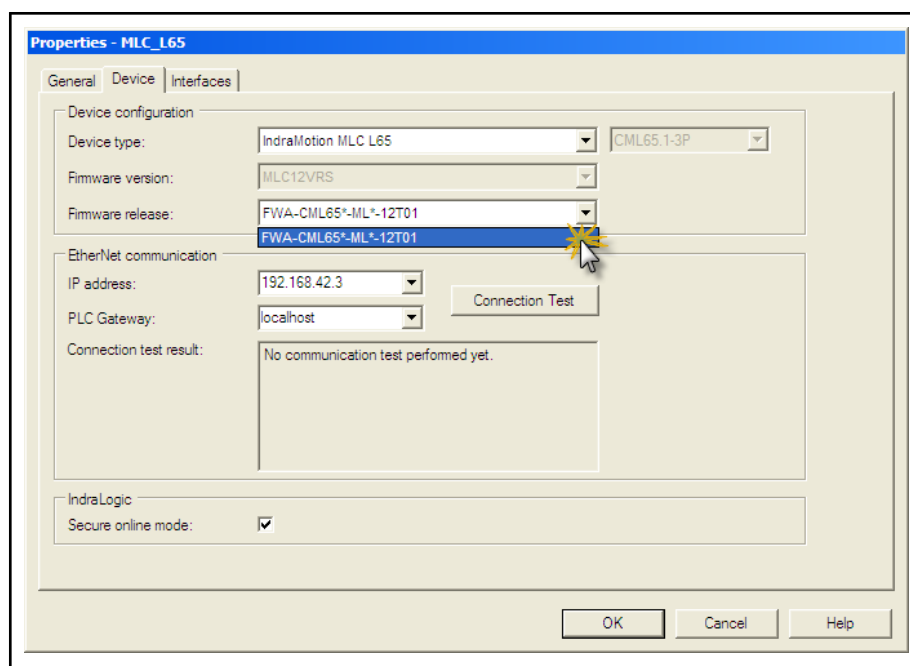


Fig.9-17: The Properties dialog of the control is used to change the release.

3. Complete by clicking on **OK**.

The control is converted to version 13VRS.

9.4 Exchanging XLC/MLC Firmware

Goal The firmware in the control should be exchanged without loss of data.

- Requirements**
- The control is switched on
 - The network settings on the control are correct.
 - The IndraWorks versions 04 VRS (required for an update from MLC 04VRS to MLC 13VRS) and 13VRS (higher than 13V02) are installed
 - IndraWorks has started and a project was loaded containing the control
 - The IP address of the control in the project has to match the IP address of the connected control.

Procedure An intermediate step via firmware MLC 11VRS is required for the update of the MLC 04VRS firmware as a direct firmware update to MLC 13VRS is not supported. Please note that XLC firmware variants are also offered as an update option in addition to the MLC firmware. In this case, an MLC firmware version has to be selected as otherwise the functionality of the control is limited.



If the intermediate step is to be executed via a firmware 11VRS, the firmware variants XLC or MLC of 13VRS have to be taken into consideration.

Example: If the firmware XLC is to be used for 13VRS, a firmware file of version 11VRS has to be used for the intermediate step in an XLC.

Step Description



Read the release notes for the new firmware first.

In general, the parameter scope within a version remains stable so that the NVRAM does not have to be deleted.

It is assumed that the control runs in **BB RUN** with active axes.

It is recommended to follow this sequence:

1. Switch IndraMotion MLC/IndraLogic XLC to "Offline".



If the control is not switched offline, a message is displayed to switch the control offline.

Confirm this dialog.

2. Download the firmware via the context menu item "Firmware management" of the control.

The dialog can be opened in the context menu of the respective control.

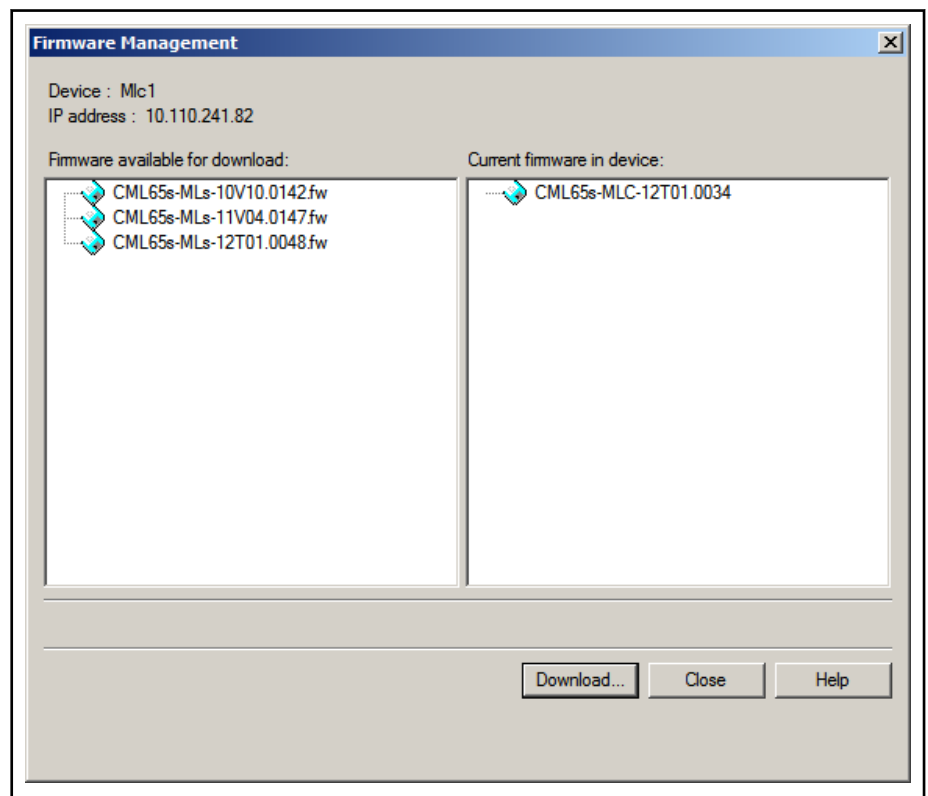


Fig.9-18: Example: IndraMotion MLC L65 "Firmware Management" dialog

The available firmware versions are located in the left section. Select the desired version and start the download using the **Download...** button.

The versions available for selection are located under:

<Drive>:\Programs\Rexroth\IndraWorks\<Control>\Firmware.

<Control>: "XLC" or "MLC"



The new firmware becomes only effective after the control restart.

3. Confirm the firmware download.

Step Description

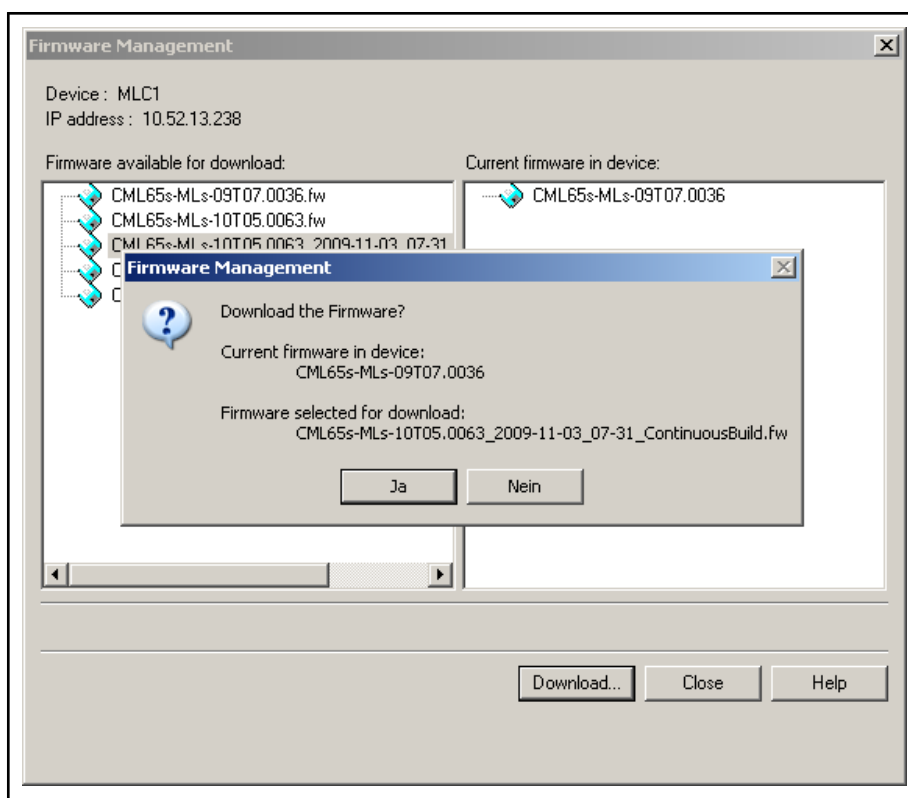


Fig.9-19: Confirmation of the firmware download

4. The PLC is running.

Confirm that the PLC should be stopped so that the firmware can be downloaded.

NOTICE

Stopping the PLC triggers an emergency stop of all moving axes.

Ensure that the control is in a secure state.

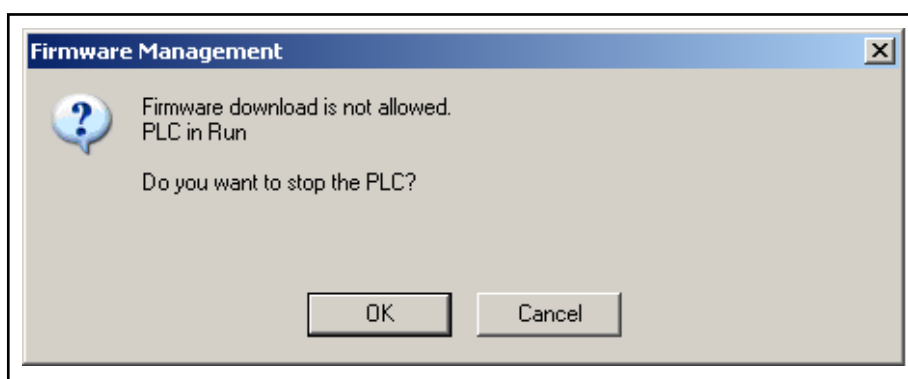


Fig.9-20: Stopping the PLC

5. Confirm the dialog after establishing the safe state.

Step Description

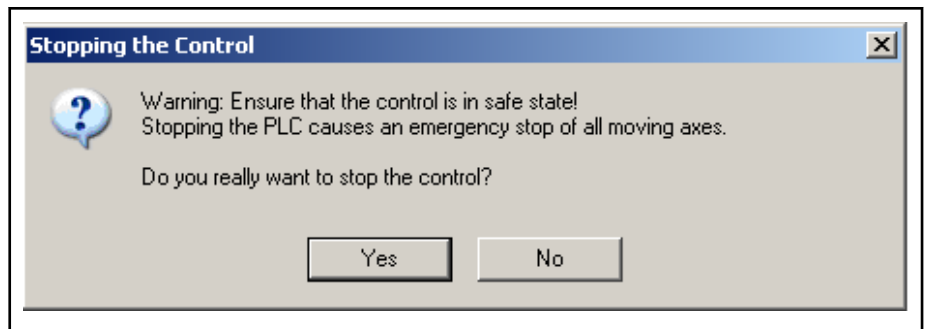


Fig.9-21: Safe state when stopping the control

6. Confirm the dialog for switching the control to download mode (phase 0).

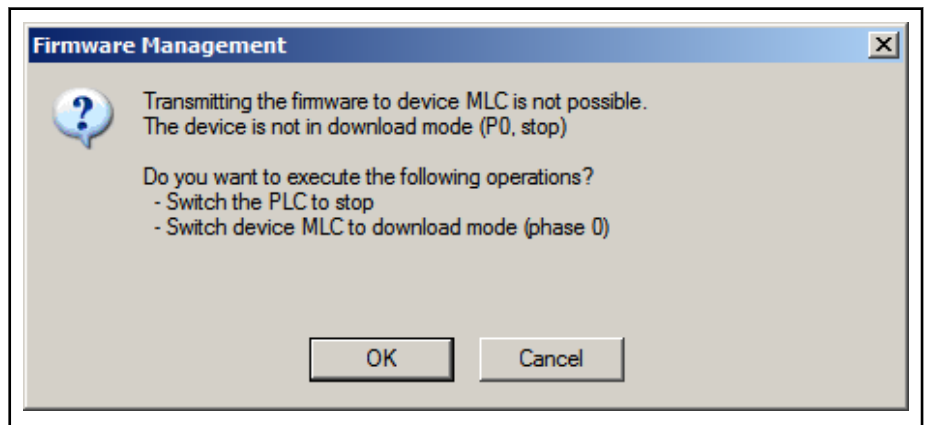


Fig.9-22: Switching to phase 0

The firmware is downloaded and the control is rebooted automatically. After the restart, the control runs up to **P2 Stop** or **BB Stop** depending on the setting of "C-0-0450, Startup target mode Motion". Communication continues. A progress bar shows the status.

7. The control is generally rebooted automatically. However, in some cases the control has to be restarted manually. In this case, "PWRCYCLE" is displayed on the control display. Disconnect the supply voltage for a short period and then restart the control.

After the restart, the control runs up to **P2 Stop** or **BB Stop** depending on the setting of "C-0-0450, Startup target mode Motion".



At a firmware version upgrade, the control memory is deleted automatically.

At a firmware release update, the memory might be deleted manually in the prototype phase (see [chapter 9.5 "XLC/MLC Deleting Memory" on page 67](#)).

9.5 XLC/MLC Deleting Memory

From previous usage, the control can contain old program components, parameterizations and PLC data that are removed in this step by clearing the memory.

Step Description



Starting with IndraWorks version 10V06, memory deletion takes place automatically during a firmware upgrade.

In the prototype phase, manual memory deletion may be necessary for a release update.

When using the function module as C2C interface (control link) for IndraMotion MLC, consider the notes on parameter C-0-0040.

With brand-new controls, this step can be omitted.

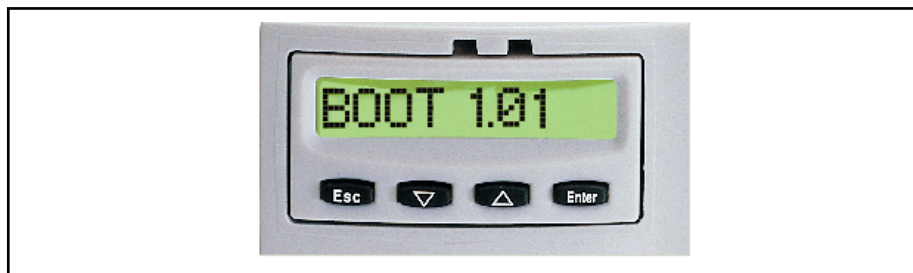


Fig.9-23: Startup phase of the control

1. After switching on the control, if <BOOT 1.01> is displayed, press both the keys at the outside edges below the display: <Esc> and **Enter**.

BOOTSTOP is displayed.

2. Now press both center key simultaneously.

CLEANUP is displayed and in case of an error-free run, **REBOOT** is displayed. The keys can now be released.

If an error occurs, **CLEANERR** is displayed.



If the memory deletion has failed several times, inform customer support, since no information on the cause is displayed.

3. Now, the control runs up to **BB STOP**, the memory is cleared, the Motion components are ready for operation and the PLC components in process are stopped

9.6 PLC Libraries Update

When upgrading to a new IndraWorks version or a new release, not all libraries are adjusted automatically. Thus, some settings have to be selected manually.

This section describes the library/library version adjustment to the current version.

Requirements

- IndraWorks project has been loaded
- The control is converted to the current version

Execution

1. Open the library manager by double-clicking on the symbol of the library manager in the Project Explorer.

Step Description

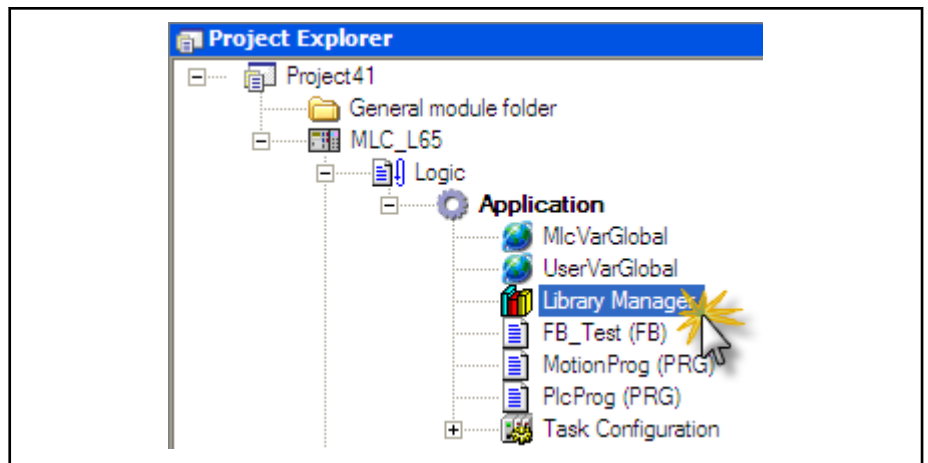


Fig.9-24: Opening the library manager

The library manager of the control is opened.

- All libraries highlighted in gray are automatically managed by the system and can be ignored. These libraries have already been exchanged during the control update. The libraries displayed in black have been inserted manually and have to be checked.

To find outdated library versions or missing libraries, expand the first level of all libraries. If yellow warning symbols are displayed, the version is outdated.

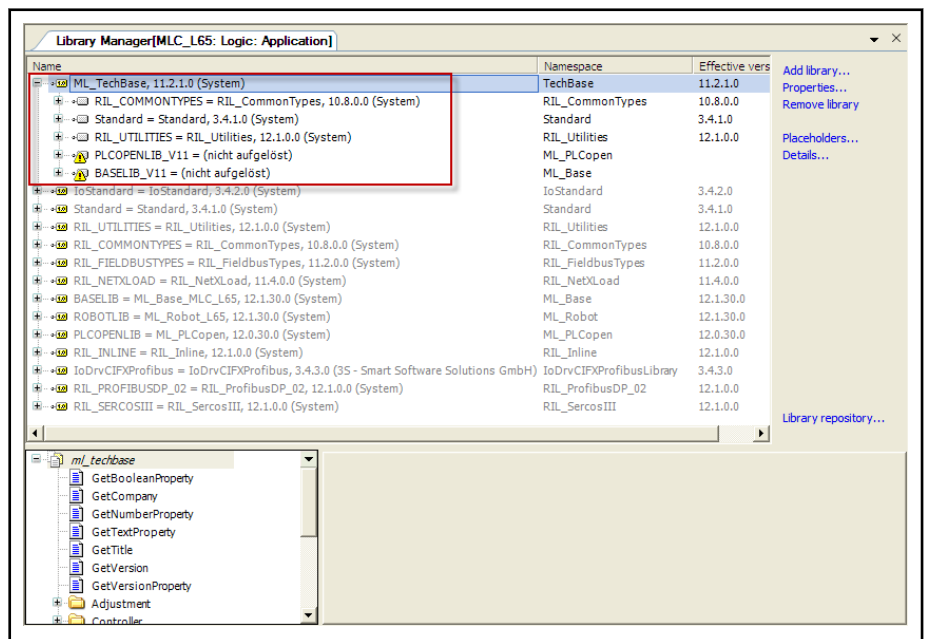


Fig.9-25: Outdated libraries in the project

If no warning symbols are displayed, the project can be compiled. However, it is still possible that outdated library versions are contained in the project.

- To change the version of a PLC library, the properties dialog of the library has to be opened.

Step Description

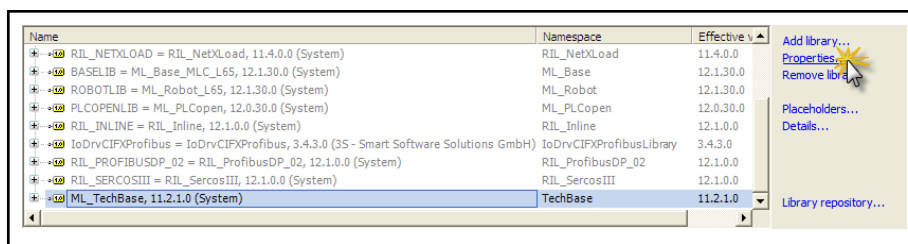


Fig.9-26: PLC library properties

- The latest available library version can now be selected in the properties editor of the PLC library.

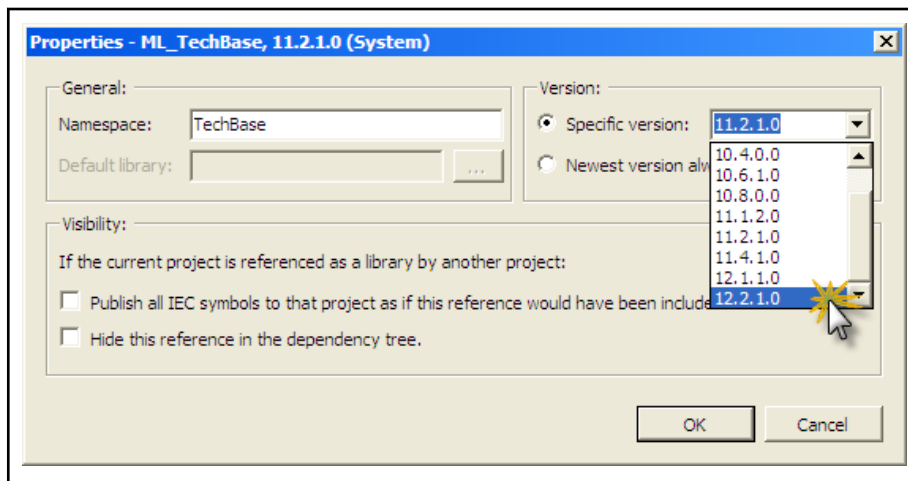


Fig.9-27: Setting the version

Subsequently, the dialog can be closed with **OK**.

The PLC library has been updated to the latest version.

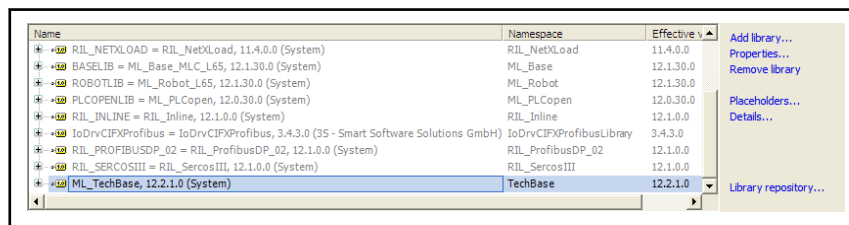


Fig.9-28: Updated PLC library

This process is to be repeated for all outdated libraries.

Introducing placeholders

From version 12VRS, placeholders have been introduced for almost all libraries. Advantage of placeholders: The library versions are updated with the control version. Thus, the libraries integrated via placeholders are updated with the version of the control.

To replace a library with a placeholder, execute the following steps:

- The old library has to be deleted from the library manager.

Step Description

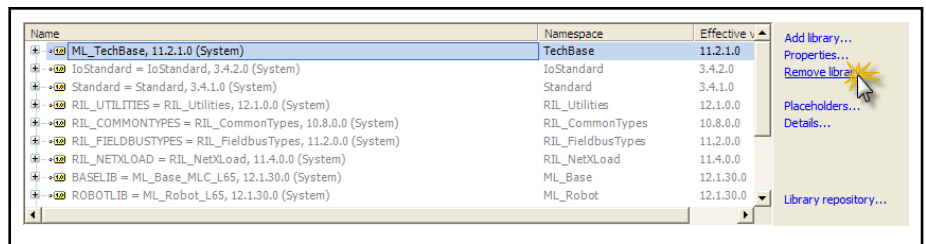


Fig. 9-29: Deleting a PLC library

The library has been removed from the library manager.

- Now, the library can be added with placeholders. Adding is started via **Add Library....**

The "Add Library" dialog is displayed.

- Select the placeholder for the library in this dialog. A selection of available placeholders is listed at the end of this section.

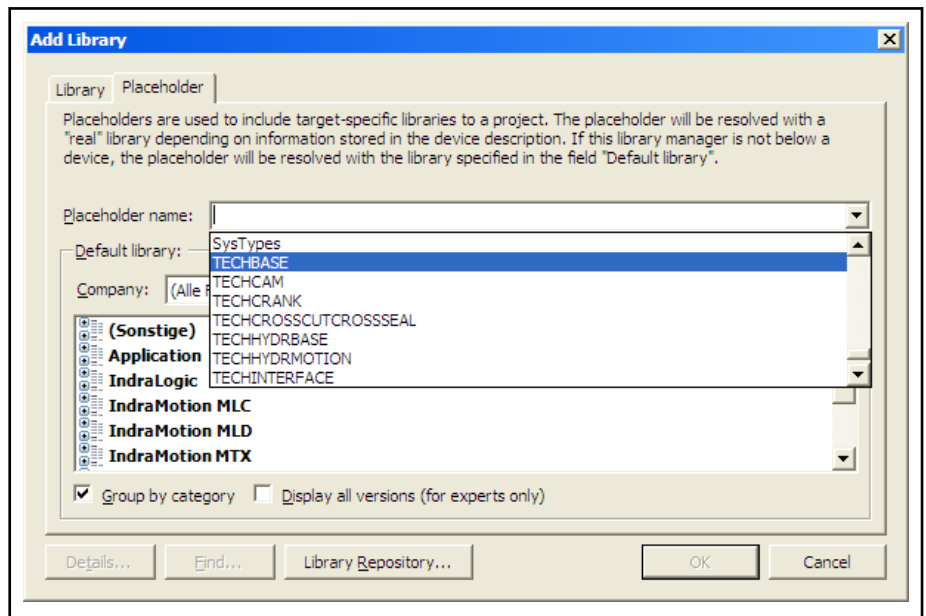


Fig. 9-30: Selecting the placeholder

The placeholder has been entered.

- A default library has to be specified for each placeholder. The default library is used if the placeholder is not defined. The default library selection is identical to the selection of a regularly integrated library. However, "*" should always be selected as version.

Step Description

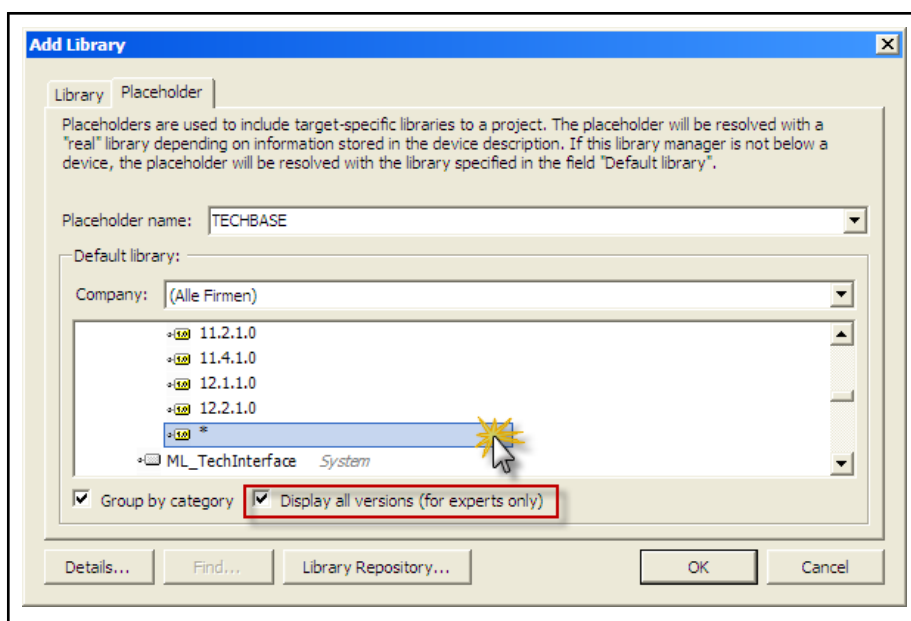


Fig.9-31: Default library selection

The new library has been added to the library manager.

Name	Namespace	Effective v
RIL_NETLOAD = RIL_NetLoad, 11.4.0.0 (System)	RIL_NetLoad	11.4.0.0
BASELIB = ML_Base_MLC_L65, 12.1.30.0 (System)	ML_Base	12.1.30.0
ROBOTLIB = ML_Robot_L65, 12.1.30.0 (System)	ML_Robot	12.1.30.0
PLCOPENLIB = ML_PLCopen, 12.0.30.0 (System)	ML_PLCopen	12.0.30.0
RIL_INLINE = RIL_InLine, 12.1.0.0 (System)	RIL_InLine	12.1.0.0
IoDrvCIFXProfibus = IoDrvCIFXProfibus, 3.4.3.0 (3S - Smart Software Solutions GmbH)	IoDrvCIFXProfibusLibrary	3.4.3.0
RIL_PROFIBUSDP_02 = RIL_ProfibusDP_02, 12.1.0.0 (System)	RIL_ProfibusDP_02	12.1.0.0
RIL_SERCOSIII = RIL_SercosIII, 12.1.0.0 (System)	RIL_SercosIII	12.1.0.0
TECHBASE = ML_TechBase, 12.2.1.0 (System)	TechBase	12.2.1.0

Fig.9-32: Newly added library with placeholder

Placeholder List

Placeholder	Default library
BASELIB	ML_Base, *
PLCOPENLIB	ML_PLCopen, *
ROBOTLIB	ML_Robot, *
CONTROLLERBASE	ML_ControllerBase, *
PARAMBASE	ML_ParamBase, *
IPOIMPACTCONTROL	ML_IPOImpactControl, *
HYDRCONTROL	MH_HydrControl, *
SYNCHCONTROL	MH_SynchControl, *
TECHBASE	ML_TechBase, *
TECHCRANK	ML_TechCrank, *
TECHWINDER	RMB_TechWinder, *
TECHREGI	ML_TechRegi, *
TECHINTERFACE	ML_TechInterface, *

Step Description

Placeholder	Default library
TECHTEMPLATE	ML_TechTemplate, *
TECHCAM	RMB_TechCam, *
TECHCROSSCUTCROSSSEAL	RMB_TechCrosscutCrossseal, *
TECHMOTION	ML_TechMotion, *
TECHHYDRBASE	MH_TechHydrBase, *
TECHHYDRMOTION	MH_TechHydrMotion, *
SEQPROG	ML_SeqProg, *
RIL_COMMONTYPES	RIL_CommonTypes, *
RIL_UTILITIES	RIL_Uilities, *
RIL_SOCKETCOMM	RIL_SocketComm, *
RIL_LOOPCONTROL	RIL_LoopControl, *
RIL_PARAMETERCHANNEL	RIL_ParameterChannel, *
RIL_PROFIBUSDP_UTIL	RIL_ProfibusDP_Util, *
RIL_MODBUSTCP	RIL_ModBusTCP, *
RIL_DIAGNOSIS	RIL_Diagnosis, *
RIL_INLINE	RIL_Inline, *
RIL_PROFIBUSDP_02	RIL_ProfibusDP_02, *
RIL_PROFIBUSDPSLAVE	RIL_ProfibusDPSlave, *
RIL_PROFINETIO	RIL_ProfinetIO, *
RIL_PROFINETIODEVICE	RIL_ProfinetIODevice, *
RIL_SERCOSIII	RIL_SercosIII, *

Tab.9-33: Selecting the placeholders defined in the device description file

10 Changes from Version 12VRS to 13VRS

10.1 IndraWorks

Going online without adjustment	In IndraWorks 13V06 and higher, going online is possible without adjusting the Motion configuration. Thus, parameters and diagnostics can be accessed without a project. Press a button to transfer the Motion command configuration of the project to the control. It is also possible to apply the Motion configuration of the control to the project.
Improving the MLC toolbar	The MLC toolbar has been changed as follows: • The buttons "Warning is pending" and "Error is pending" continue to show the MLC state. If one of the buttons is pressed, the MLC diagnostic dialog is displayed. This behavior does not depend on whether an error or a warning is currently reported • The button "Axis is active" continues to display the axis state. If this button is pressed, the device status dialog is displayed. This behavior does not depend on whether an axis is moving or not • The button text "Clear Error" is replaced by a symbol. This symbol is the same as in the MLC context menu
CamBuilder XY-plot	An XY plot function has been added to CamBuilder. The position, the velocity and acceleration as well as the jerk can be displayed in a 2D coordinate system by means of this function.
Multiple device measurement in the oscilloscope	The oscilloscope can simultaneously record data of multiple devices.
Set data status of invalid sercos parameters	If invalid parameters are found when switching drives to P4, they are displayed in the list of invalid operating data. The invalid parameters can now be set to a valid state by pressing a key.
Error status of control	The error status of the control is now displayed as tooltip on the control node after online switching. If no error is reported, the tooltip is displayed as, e.g. "P2 RDY, Motion phase 2 reached, PLC in Ready".
MLC diagnostic dialog	The MLC diagnostic dialog has been improved. By default, all errors are displayed in the logbook of the control. Loading of the error list was accelerated.
Compatibility across releases	The project formats of all IndraWorks releases from 13V02 are downward-compatible. This means that the project formats of older releases can be read in, edited or saved. The saved project can subsequently be opened and edited with an older IndraWorks release of the same version.
Alterable axis properties	The following axis properties can now be altered: • Logic axis number • sercos address (for the real axis) • Drive firmware (for IndraDrive) • Interpolation type (for IndraDrive) • Real axis assignment (for encoder axis) Changes to these axis properties are transmitted to the control during online switching. The respective axes are deleted or created again on the control during the automatic adjustment upon online switching. The corresponding A-parameters are transmitted from the deleted to the newly created axes. Thus, the "drive exchange" function is not needed anymore.
Axis dialogs	The edited drive can be changed via a check box in the axis dialogs. Only drives that support the displayed dialog are supported by check box.
User management	The new user management allows to assign rights for all IndraWorks objects.

Changes from Version 12VRS to 13VRS

10.2 Control

Applying the IP address	The network settings of the control such as IP address, subnet mask and gateway can be changed via the display. These changes are now immediately applied without rebooting the control.
MLPI	The "Motion Logic Programming Interface" (MLPI) is an API for high-level language programming (C/C++/C#/VBA/Java/LabVIEW). By means of the MLPI, a user-defined application can be created to interact with the Bosch Rexroth controls IndraMotion MLC and IndraLogic XLC as well as their peripheral systems. By means of MLPI, control properties, parameters, the PLC application, I/Os and variables as well as axis functionality can be accessed. The accesses are structured in libraries. MLPI is available as a customizable SDK as additional installation, contained on the IndraWorks installation DVD as well as via the MLPI portal.
IMST	The dialog for the sercos address assignment has been added to the "IndraMotion Service Tool" websites. The sercos address of sercos I/Os can be changed using this dialog.
Cycle times	The preset cycle times for the Motion or the sercos cycle have been adjusted as follows: • L65: 2 ms • L45: 4 ms • L25: 8 ms

10.3 Drives

Parameterization level	If the sercos bus is in P4, individual drives can be switched to P2. All other bus devices can continue to exchange cyclic data. The drives can return to cyclic mode after a completed parameterization.
Axis commissioning	Axes without PLC support can be traversed using the axis commissioning dialog of the Motion node.
Command Value Decoupling	The command value coupling is now also possible in case of an existing power enable command. The drive switches to AH. When exiting the command value coupling, it is returned to the original operating mode.
Axis dialogs	In an axis dialog (e.g. scaling/measuring units), toggling between the axes is possible via the combo box of the axis selection. However, the axis selection is limited to the same axis type. I.e., if the dialog for a virtual axis is opened, it can only be changed to another virtual axis.
Drive firmware	The drive firmware MPx03, MPx04 and MPx05 is not supported anymore.
Cyclic data channels	The number of cyclic data channels has been reduced from 6 to 5 due to drive control adjustments via sercos during write access.
Supporting drives without encoders	Drives without encoders are now supported as "Open Loop". These drives can only be velocity- or force-controlled. Positioning as well as phase-synchronous operation modes are not valid for these drives. From XLC/MLC 12V06 Patch 4, drives without position feedback (Open Loop) are supported by the control. The open loop operation (motors without encoders) has to be enabled when creating the axis in IndraWorks. The "Closed Loop" box has to be deselected in the "Insert Axis" dialog.

10.4 Operation Modes

FlexProfile The number of maximum possible FlexProfile steps per FlexProfile has been increased from 16 to 64.

10.5 RobotControl



The RobotControl functionality is only provided the IndraMotion MLC.

Supporting tool coordinate systems

By supporting tool coordinate systems, it is possible to use several tools (e.g. grippers) in the same world coordinate system. See [tab. 1-2 "XCL/MLC documentation overview" on page 7](#), documentation "Rexroth IndraMotion MLC 13VRS RCL Programming Instruction".

Global Variables

Global Variables facilitate the data exchange between several individual Ro-Co user programs. The basic concept is to summarize programs using identical global variables in one program group. A program can export data in this group (=produce; keyword "PUBLIC"), while the other programs of this group can only import this data (=consume; keyword "EXTERNAL"). A user-defined number of program groups can be created on the control (only limited by the available memory space). This function provides the option to exchange data across kinematics. See [tab. 1-2 "XCL/MLC documentation overview" on page 7](#), documentation "Rexroth IndraMotion MLC 13VRS RCL Programming Instruction".

Include instruction (INCLUDE)

The new RCL keyword "INCLUDE" is available. The basic concept is the common use of source code. I.e., there are prepared code fragments that provide a certain functionality or variables. They can be integrated in an RCL program by using the RCL command "INCLUDE". See [tab. 1-2 "XCL/MLC documentation overview" on page 7](#), documentation "Rexroth IndraMotion MLC 13VRS RCL Programming Instruction".

Program flow tracking

The program flow tracking is a diagnostic auxiliary for RobotControl users. By activating the program flow tracking (IndraWorks main menu **Debug** ► **Log-in** ► **Connect to program flow tracking**), the RCL programming system is connected to a running RCL program. The graphic display of the active block in the RCL editor is activated by connecting to the running RCL program. The execution in the control must not be changed by this mode.

10.6 Field Buses

sercos devices

Now, up to 99 I/O devices are supported at the sercos bus.

Scan sercos bus

Scanning of the sercos bus now also works if there sercos devices are already contained in the project. The configured and the real configuration is adjusted. Additionally, sercos I/O modules are found and applied.

sercos I/O modules

From 13VRS, the following sercos I/O modules are additionally supported:

- R-ILB S3 AI6 AO4/F (6 analog inputs, 4 analog outputs)
- R-ILB S3 24 DI16 DO16/F (16 digital inputs, 16 digital outputs)
- R-S67 S3 BK DI8 M8 (sercos S67 bus coupler, 8 digital inputs)

IndraControl S20

Bus couplers for the axioline bus S20 are now available for sercos and Profinet. The following S20 axioline modules can be operated at the bus coupler:

- AXL DI16/4 (digital input module)
- AXL DI32/1 (digital input module)

Changes from Version 12VRS to 13VRS

- AXL DO16/3 (digital output module)
- AXL DO 32/1 (digital output module)
- AXL AI 8 (analog input module)
- AXL AO 8 (analog output module)
- AXL RTD 8 (temperature module)
- AXL CNT/INC 2/2 (counter/INC-IN module)

Disabling inline bus devices Analog to Profibus, configured devices at the inline bus can be disabled via UserDef.cfg. This functionality can be configured via the download in IndraWorks.

Replacing I/O components Assuming an error-free operation of the Profinet system, ProfiNet devices can be replaced by new, identical devices. The new devices are automatically detected by the Profinet controller. The control automatically detects the new devices with any support by the interface.

10.7 HMI

Profinet VAM 10/11/40/41 The machine control panels VAM10.3-ET-NF-TA-TA-VD-1608-NN and VAM40.3-ET-NF-TA-TA-VD-MA-1608- NN can be connected to the control via Profinet.

(In preparation)

WinStudio with VEH30.2 VEH30.2 now also supports WinStudio applications.

ProVi diagnostics ProVi is a diagnostic framework that displays messages on the HMI generated by a PLC program. Additionally, the messages are protocolled in a log.

Scaling WinStudio HMI dialogs The size of dialogs integrated in WinStudio can be changed. Thus, they can be adjusted to the actual display size.

M-Key and F-Key M- and F-Keys can now also write to BYTE, WORD, or DWORD variables.

WinStudio help The help in WinStudio can now be opened by pressing <F1>.

Set absolute dimension via IMST The absolute dimension can now be set on all drive operating modes via the IMST website.

WinStudio via OPC UA WinStudio applications can now also access PLC data via the OPC UA server of the control.

WinStudio driver sheet check WinStudio variables can be connected to control variables using the WinStudio driver sheets. The variable links can now also be checked using the function "Validating the HMI node".

10.8 Safety Technology

SafeLogic The safety technology solution "SafeLogic" consists of a safety control (function module) that can be connected to the control. Secure I/O data can be exchanged between the safety control and the standard control. ProfiSafe via Profibus and CSOs via sercos are available as safe bus systems.

10.9 PLC Libraries

Set control time The "IL_SetDateTime" function block of the "ML_Base" library facilitates setting of the control time and of all connected drives.

Temperature control The self-adjusting temperature controller "IL_TempControlType02" has been implemented in the "ML_TechBase" library.

TCP/IP communication The new function blocks "IL_TCPCyclic" and "IL_UDPCyclic" facilitate a simple, cyclic data exchange between two controls. The IP protocols TCP and UDP are supported.

Changes from Version 12VRS to 13VRS

ModbusTCP client	For IndraWorks 13V06, the function blocks are available for the Modbus TCP client in the RIL_ModbusTCP library.
Winders	The function blocks of the PLC library "RMB_TechWinder" can now also be used with interpolation in the control.
Read local time	The "IL_GetLocalTime" function block of the "RIL_Utility" PLC library converts the UTC time of the control to local time using a time zone description. Summer and winter time are taken into consideration.
Field bus drives	The function blocks for field bus drives of the PLC library "RMB_PLCOpen-Fieldbus" now also take the IndraDrive double-axis drives into consideration.
MagicBelt	The "MB_MagicBeltType01" function block has been extended and is compatible with the function: A train moving towards an assigned outfeed position is stopped at a stand-by position. The stand-by position is specified by a new input "WaitingDistance-BlockedOutfeed". This input specifies the distance to the assigned outfeed position. The default setting "WaitingDistanceBlockedOutfeed = 0" does not change the function block behavior (error output in case of blocked outfeed).

10.10 GAT

Improved logging function	GAT central/decentral is extended by a functionality in order to enter errors occurring in the GAT in the control log.
Plug-ins	The GAT central and decentral application can be extended by other plug-ins. The plug-ins for the GAT application can be added or deleted via the GAT wizard after a GAT initial import.
Data container ConsumedAxis	In addition to the "Axes" data container of a GAT module or a unit, another data container "ConsumedAxes" is introduced. All axes that cannot be commanded in the module (e.g. master axes, encoder, link and C2C consumed axes) are contained in this data container.
GAT compact for IndraLogic XLC without sercos	GATcompact now also supports controls without sercos interface.
RoCo in AxisInterface	The AxisInterface supports RoCo axes. The new operating mode "MODE_RO_CO" has been implemented. When adding the new operating mode, the AxisInterface behavior is identical to the already available operating mode "MODE_EXTERNAL_FB". However, the "MC_AddAxisToGroup" function block is additionally called to assign the axis to a RoCo group. If the "MODE_RO_CO" operating mode is exited by selecting another operating mode, the MC_RemAxisFromGroup function block is internally called.
Parameterization level in the AxisInterface	Individual drives can be switched to the parameterization level via the "arAxisCtrl_gb[].Admin.ParamLevel" control structure and the AxisInterface. An active parameterization level is displayed at the "arAxisStatus_gb[].Admin.ParamLevelAck" status output.
RoCo	GAT decentral now also supports sequential kinematic functions. The function can be enabled via the GAT wizard.
GAT wizard	The GAT wizard layout can be toggled between vertical and horizontal layout. Additionally, the GAT wizard function can now also be called via the context menu of the respective node. The operating panel can still be hidden.
Dialog-based axis commanding	In the ST editor, the "Axis Commanding" context menu item is provided for GAT applications. This function starts an input dialog. The axis commands and corresponding data can be entered in this dialog. Based on this information, the function generates the corresponding PLC code and inserts this code at the cursor position.

Changes from Version 12VRS to 13VRS

Error reaction during initialization During the initialization, the error reaction can be configured via the new input `EnableErrorReactionInit: BOOL := FALSE` of the GAT. The error reaction during the initialization is switched off by default.

10.11 Parameters

The following parameters have been added or modified:

A-0-0004	Axis type	
	Bit 15	Parameterization level support 0: Parameterization level is not supported 1: Parameterization level is supported
A-0-0007	Axis configuration	
	Bit 3	Extending the position command value interface (only IndraDrive and HydraulicDrive) 0: Disabled (transmitting S-0-0047 to MDT) 1: Enabled (transmitting S-0-0047 and P-0-0100 to MDT)
A-0-0024	Axis condition	
	Bit 0:	Park axis
	Bit 1	Axis disabled
	Bit 2	Command value processing in the drive is disabled
	Bit 3	Retain axis in parameterization mode
C-0-0015, C-0-0016		The parameters have been removed.
C-0-0440	Configuring PM OM switching	
		This parameter configures changing between parameterization and operation mode. Switching of operating modes is triggered via the C-0-1070, command: Switching PM/OM.
	Bit 1	Execute switching for all axes
	Bit 31	Preselecting the PM/OM switching If bit 1 is set in C-0-0440 and bit 31 is not set, the command C-0-1070 deletes the PM bit in all A-0-0024 firmware-internally.
C-0-0520	sercos master, sercos III, connection configuration	
		The parameter contains the configuration of sercos III connections among sercos III slaves. The configuration is stored in CSMCfg_bin format.
C-0-0521	sercos master, sercos III, connection configuration active	
		The parameter contains the complete configuration of sercos III connections. The configuration is stored in CSMCfg_bin format.
C-0-1070	Command: Switch PM OM	
		New parameter. This command starts or ends the parameterization mode depending on parameter C-0-0440, configuring PM/OM switching.
C-0-2484	Kinematic configuration list	
		This parameter defines the kinematics system.
	0	No kinematic mechanism configured
	1	Kinematics configured (previous code basis)
	2	Kinematics configured (RCF) - currently in preparation

Changes from Version 12VRS to 13VRS

10.12 Documentation

SafeLogic system overview The new documentation "Rexroth IndraLogic XLC IndraMotion MLC SafeLogic System Overview" has been created. An overview of the system solutions "SafeLogic" and "SafeLogic compact" is given. Systems according to the safety engineering standards IEC 61508 / IEC 62061 and EN ISO 13849-1 can be created using these system solutions.

11 Changes between IndraLogic 1.x and IndraLogic 2G

11.1 PLC

11.1.1 General Information

Converting IndraLogic 1.x to IndraLogic 2G is equivalent to a generation jump in the PLC. The entire PLC syntax now corresponds to the standard IEC-61131-3. Additionally, object-oriented extensions have been introduced. Necessary adjustments to the PLC program resulted from these changes.

11.1.2 Enums

Enum definitions cannot be defined inline anymore. An individual data type has to be created for each enum.

Example

IndraLogic 1.x

Program:

```
VAR
  enState: (STATE_IDLE, STATE_INIT, STATE_INOP) := STATE_IDLE;
END_VAR
```

IndraLogic 2G

Program:

```
TYPE FBNAME_STATES:
  (STATE_IDLE, STATE_INIT, STATE_INOP)
END_TYPE

VAR
  enState: FBNAME_STATES := STATE_IDLE;
END_VAR
```

11.1.3 Array Initializations

Initial values of arrays have to be in brackets.

Example for a 1-dimensional array

IndraLogic 1.x

Program:

```
VAR CONSTANT
  ubMaxNum: BYTE := 8;
  arubList: ARRAY [0..GL_ubMaxNum] OF BYTE := 1, 1, 1, 1, 2, 2, 2, 0;
END_VAR
```

IndraLogic 2G

Program:

```
VAR CONSTANT
  ubMaxNum: BYTE := 8;
  arubList: ARRAY [0..GL_ubMaxNum] OF BYTE := [1, 1, 1, 1, 2, 2, 2, 0];
END_VAR
```

Example for a 2-dimensional array

IndraLogic 1.x

Program:

```
VAR
  arList : ARRAY[0..3, 0..3] OF BOOL
  := TRUE, TRUE, TRUE, FALSE,
  TRUE, FALSE, TRUE, FALSE,
  FALSE, FALSE, FALSE, FALSE,
  FALSE, FALSE, FALSE, FALSE;
END_VAR
```

IndraLogic 2G

Changes between IndraLogic 1.x and IndraLogic 2G

Program:

```

VAR
  arList : ARRAY[0..3, 0..3] OF BOOL
  := [TRUE, TRUE, TRUE, FALSE,
      TRUE, FALSE, TRUE, FALSE,
      FALSE, FALSE, FALSE, FALSE,
      FALSE, FALSE, FALSE, FALSE ];
END_VAR

```

11.1.4 Bit Access

The new data type BIT replaces the pragma `bitaccess`. To emulate old access mechanisms via `bitaccess`, the pragma "attribute `relative_offset`" is additionally required. This attribute sets the structure-internal pointer to a certain position within the structure. The BIT definitions in the example thus superimpose the WORD definition.



The use of pragmas "attribute `relative_offset`" can sporadically influence the calculated data structure size. The `SIZEOF()` operator always returns an incorrect value.

Example IndraLogic 1.x*Program:*

```

TYPE STRUCT_BitAcc_ErrorNumber :
STRUCT
  wValid : WORD;
  {bitaccess bCome      00 'Event came'}
  {bitaccess bGone      01 'Event gone'}
  {bitaccess bAck       02 'Event ack'}
  {bitaccess bEventInProd 08 'Event in prod'}
END_STRUCT
END_TYPE

```

IndraLogic 2G

Program:

```

TYPE STRUCT_BitAcc_ErrorNumber :
STRUCT
  wValid : WORD;
  {attribute 'relative_offset':='0'}
  bCome      : BIT; // Event came
  bGone      : BIT; // Event came
  bAck       : BIT; // Event ack
  {attribute 'hide'}
  bDummy3    : BIT;
  {attribute 'hide'}
  bDummy4    : BIT;
  {attribute 'hide'}
  bDummy5    : BIT;
  {attribute 'hide'}
  bDummy6    : BIT;
  {attribute 'hide'}
  bDummy7    : BIT;
  bEventInProd : BIT; // Event in prod
END_STRUCT
END_TYPE

```

11.1.5 Action Calls

If actions or programs are called in ST, parentheses have to be added.

Example IndraLogic 1.x*Program:*

```
actInit;
```

IndraLogic 2G

Changes between IndraLogic 1.x and IndraLogic 2G

Program:

`actInit;();`

11.1.6 Variable Initialization with Constants

If variables are initialized with defined constants, these constants have to be created as VAR CONSTANT as they are assigned the value "0" otherwise. Another option is to specify the initialization sequence using the attribute 'global_init_slot'. An error message is displayed by the compiler in case of an incorrect initialization sequence.

Example IndraLogic 1.x*Program:*

```
VAR GLOBAL
  TIMEOUT: INT := 10;
END_VAR

FUNCTION BLOCK Test
  VAR INPUT
    iTimeOut: INT := TIMEOUT;
  END_VAR
```

IndraLogic 2G (VAR CONSTANT)*Program:*

```
VAR GLOBAL CONSTANT
  TIMEOUT: INT := 10;
END_VAR

FUNCTION BLOCK Test
  VAR INPUT
    iTimeOut: INT := TIMEOUT;
  END_VAR
```

IndraLogic 2G (Attribut global_init_slot)*Program:*

```
{attribute 'global_init_slot':='5000'}
VAR GLOBAL
  TIMEOUT: INT := 10;
END_VAR

FUNCTION BLOCK Test
  VAR INPUT
    iTimeOut: INT := TIMEOUT;
  END_VAR
```

11.1.7 Typ Definitions

A colon has to be added after TYPE and the type name. The colon, however, can also be added after IndraLogic 1.x.

Example IndraLogic 1.x*Program:*

```
TYPE STRUCT_TEST
  iTest: INT;
END_TYPE
```

IndraLogic 2G*Program:*

```
TYPE STRUCT_TEST :
  iTest: INT;
END_TYPE
```

Changes between IndraLogic 1.x and IndraLogic 2G

11.1.8 Processing Status in SFCs

To be able to access the processing status of actions within AS function blocks, an underscore has to be added before the name of the action.

Example IndraLogic 1.x

Program:

```
IF NOT actInSync.x THEN
...
END_IF
```

IndraLogic 2G

Program:

```
IF NOT _actInSync.x THEN
...
END_IF
```

11.1.9 Storage System Layout of Structures

From IndraLogic 2G, structure entries are assigned to addresses divisible by the type width by default. Thus, pad bytes are inserted.

The following applies:

- INT, UINT, WORD: 2 divisible addresses
- DINT, UDINT, DWORD, REAL: 4 divisible addresses
- LINT, ULINT, LWORD, LREAL: 8 divisible addresses

The structure element layout can be prevented by the compiler attribute {attribute 'pack_mode' := '1'}. This is especially recommended for data structures that are exchanged between controls and other devices.

Example IndraLogic 1.x

Program:

```
TYPE Structure001 :
STRUCT
  Element_01 : USINT;
  Element_02 : DWORD;
  Element_03 : BYTE;
  Element_04 : INT;
END_STRUCT
END_TYPE
```

IndraLogic 2G

Program:

```
{attribute 'pack_mode' := '1'}
TYPE Structure001 :
STRUCT
  Element_01 : USINT;
  Element_02 : DWORD;
  Element_03 : BYTE;
  Element_04 : INT;
END_STRUCT
END_TYPE
```

11.2 Changes to the Task Configuration

11.2.1 Task Priorities

The Motion kernel priority has been changed to 3. Thus, all tasks that should not interrupt the Motion should be increased to a priority greater than 3.

Changes between IndraLogic 1.x and IndraLogic 2G

11.2.2 MotionTask

In some cases, error messages occurred when compiling a converted MotionTask. In this case, the MotionTask has to be deleted and recreated. All settings have to be applied.

11.3 Changes to PLC Libraries

11.3.1 Library Dependencies

In contrast to IndraLogic 1.x, PLC libraries are not exclusively linked on project level anymore. If components of other libraries are used within a library, the corresponding libraries have to be available.

11.3.2 Library Assignment

Under IndraLogic 2G, a changed distribution of the function blocks has been introduced. New library names have been assigned:

IndraLogic 1.x	IndraLogic 2G
ML_AxisInterface.lib + ML_ImcInterface.lib	ML_TechInterface.library
ML_Technology04.lib	ML_TechBase.library + ML_TechMotion.library
ML_Packaging.lib	ML_TechCrank.library + ML_TechMotion.library
ML_TechCam + ML_TechCamIEC	RMB_TechCam
ML_TechCommon	ML_TechBase

Tab. 11-1: Overview library assignment IndraLogic 1.x to IndraLogic 2G

11.3.3 Axis Interface (ML_TechInterface)

Due to the new BIT data type, access to "_OpMode" changes within the AxisCtrl structure:

Use of enum	arAxisCtrl[MyRealAxis1.Axisno].Admin._OpMode.en := ModeAH
Use of BIT	arAxisCtrl[MyRealAxis1.Axisno].Admin._OpMode.b.MODE_SYNC_PHASE := TRUE;

Tab. 11-2: Changes in the access to the AxisCtrl structure _OpMode

SyncMode.Profile.SyncVelocity and SyncMode.Profile.SyncAcceleration have been moved to SyncMode.SyncVelocity or SyncMode.SyncAcceleration. Both entries are only contained in the TE_AxisInterface function block that is part of the AxisInterface sample project or the GAT.

11.3.4 Cyclic Data Channels (ML_TechBase)

Due to the new PLC compiler, the handle is the first parameter in the WriteCyclicParameter as well as the WriteCyclicRealParameter function.

Changes between IndraLogic 1.x and IndraLogic 2G

IndraLogic 1.x	MB_WriteCyclicParameter(value, FP_P_0_0690);
IndraLogic 2G	MB_WriteCyclicParameter(FP_P_0_0690, value);
IndraLogic 1.x and 2G	MB_WriteCyclicParameter(Value:=value, Handle := FP_P_0_0690);

Tab. 11-3: Parameter sequence in the MB_WriteCyclicParameter function

11.4 Changes to the Visualization

11.4.1 Placeholder

Placeholder are used under IndraLogic 1.x for parameter transfer to the individual visualization component. This concept are canceled in each visualization in favor of the declaration part. Placeholders have to be integrated in the declaration part of the visualization as input variable during the conversion. Accesses to placeholders in a visualization have to be adjusted accordingly.

11.5 Symbol File Changes

11.5.1 Creating the Symbol Configuration

To create the symbol configuration, the PLC object "Symbol configuration" has to be moved to the "Application" node. When creating a new control in the project, the symbol configuration is already created and is available as element in the project tree.

11.5.2 configuration

Open the configuration editor by double-clicking on the "Symbol configuration" node. After the application has been compiled, variables can be selected and added to the symbol file.

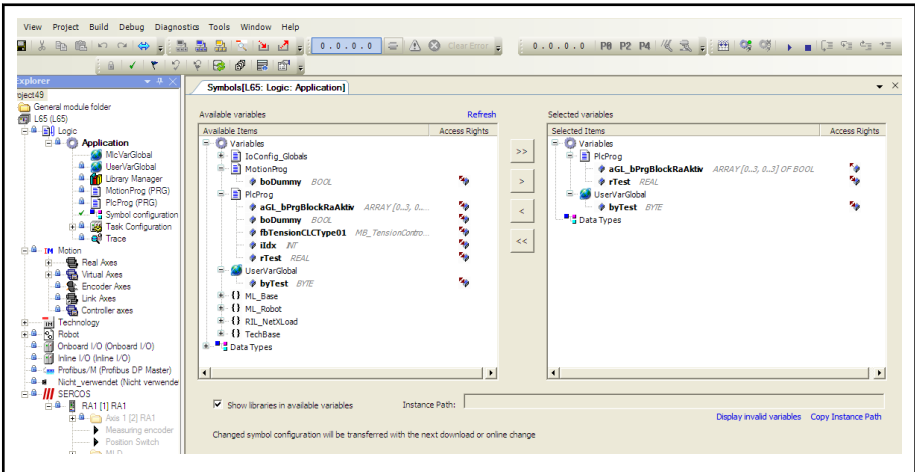


Fig. 11-4: Symbol Configuration

11.5.3 Storage location

The IndraLogic.<Devicename>.<Applicationsname>.xml File is saved in the "IndraLogic" folder of the IndraWorks project.

Changes between IndraLogic 1.x and IndraLogic 2G

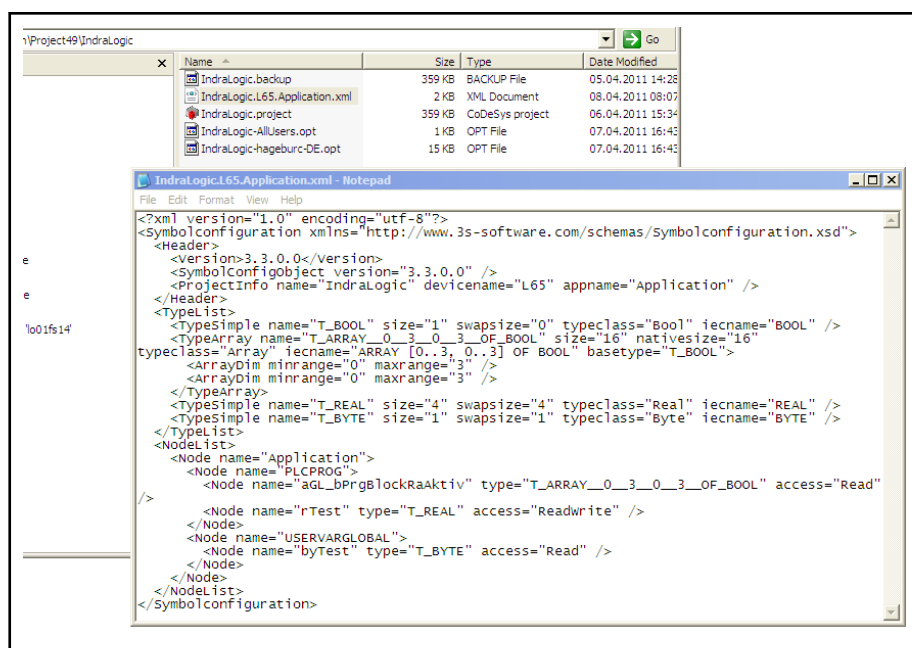


Fig. 11-5: Storage location and symbol configuration structure

11.6 VI-Composer

11.6.1 Importing Graphics

As a general rule, the resources have to be imported before the graphics.

11.6.2 Changes to the Symbol File

From VI-Composer 2.02.00198 SP2, the [symbol file](#) (see page 88) in ".xml" format, as generated under IndraLogic 2G, can be imported. Select file type ".xml" when importing the symbol configuration. If the symbol file is loaded to the variable list of an existing VI-Composer project, the variable assignment has to be restored in each graphics.

11.6.3 VCPxx.1 Devices with IndraLogic 2G Projects

Workaround for VI-Composer 1 and VCPxx.1 devices in which the ".xml" file cannot be imported: Manual editing of the ".sym" file. As it can be assumed that the variables for the VCP device did not change, the ".sym" file can be edited using the text editor and in front of each <Application-name><. variable or in case of global variables, the <Application-name><. <GVL-name><. has to be inserted. Subsequently, the ".sym" has to be read in the VI-Composer 1 Project again. The variable link has to be restored for each graphics.

11.6.4 Retaining the Variable Assignment (Converting *.xml Symbol File to Extended *.sym)

To retain the variable assignments in the VI-Composer, the "extended symbol file" can be used. The symbol file contains a mapping table (known from WinStudio driver sheets).

Format	VCP symbol name: IL data typ: IL symbol name
Example	bStart: BOOL: Application.HMI_write.bStart

Tab. 11-6: Mapping table format

Changes between IndraLogic 1.x and IndraLogic 2G

11.6.5 Retaining the Variable Assignment (Pragma "attribute namespace")

From MLC 11VRS, the "attribute namespace" pragma is available. By using the pragma, an alias instead of the complete variable name can be used. If an empty string is used as namespace alias, the symbol file variables are assigned the same name as in IndraLogic 1.x; i.e., the symbol file generated by IndraLogic 2G can be directly applied to the VI-Composer project created in IndraLogic 1.x.

Example:

Program:

```
{attribute 'namespace' := ''}  
VAR_GLOBAL  
    iTest: ARRAY[1..5] OF INT;  
END_VAR
```

12 Service and Support

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Internet:	http://www.boschrexroth.com

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Preparing information

To be able to help you more quickly and efficiently, please have the following information ready:

- Detailed description of malfunction and circumstances resulting in the malfunction
- Type plate name of the affected products, in particular type codes and serial numbers
- Your contact data (phone and fax number as well as your email address)

Index

A

Abbreviations.....	12
About this documentation.....	5
Information representation.....	11
Validity of the documentation.....	5
Action calls.....	84
Axis interface.....	87
Array initializations.....	83

B

Bit access.....	84
-----------------	----

C

Changes between IndraLogic 1.x and IndraLogic 2G.....	83
Changes from version 12VRS to 13VRS.....	75
Changes to PLC libraries.....	87
Changes to the symbol file.....	89
Changes to the task configuration.....	86
Changes to the visualization.....	88
Conversion of the control and axis configuration	31
Converting an IndraMotion MLC.....	31
Converting IndraLogic 1.x.....	45
Converting the PLC and the field buses.....	45
Create control.....	51
Create function module.....	58
Creating a control	51
Creating an IndraLogic XLC project.....	45
Creating the control version.....	61
Cyclic data channels	87

D

Documentation.....	81
Documentation structure.....	5
Drive system.....	15
Drives.....	76

E

Electric drive system.....	15
Enum.....	83
Exchanging firmware.....	64

F

Field Buses.....	77
Firmware update.....	64

G

GAT.....	79
----------	----

H

HMI.....	78
----------	----

I

Important instructions on use.....	13
------------------------------------	----

Importing graphics.....	89
IndraWorks.....	75
IndraWorks release upgrade.....	27
IndraWorks version upgrade.....	29
Intended	
state-of-the-art.....	13
Intended use.....	13
Areas of use and application.....	13

L

Library assignment.....	87
Library dependencies.....	87

M

MotionTask.....	87
-----------------	----

O

Operation modes.....	77
----------------------	----

P

Parameters.....	80
PELV.....	19
PLC.....	83
PLC libraries.....	78
PLC libraries update.....	68
Processing status in SFCs.....	86
Product phases.....	5
Protective extra-low voltage.....	19

R

Reboot control.....	67
Retaining the variable assignment.....	89, 90
RobotControl.....	77

S

Safety instructions.....	11
Safety instructions for electric drives and controls.....	15
Safety technology.....	78
Steps.....	51
Storage location.....	88
Storage system layout of structures.....	86
Support	
See service hotline.....	91
Symbol configuration.....	88
Symbol file.....	88
Symbols used.....	11

T

Target groups.....	5
Task priorities.....	86
Terms and abbreviations.....	12
Typ definitions.....	85

Index

U

Unintended use.....	14
Consequences, Exclusion of Liability.....	13

V

Variable initialization with constants.....	85
VCPxx.1 devices with IndraLogic 2G projects....	89
VI-Composer.....	89

X

XLC/MLC Deleting memory.....	67
------------------------------	----

Notes

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