

IndraLogic XLC IndraMotion MLC 14VRS

Project Conversion

Application Description
R911341494

Edition 04



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1 About this documentation

Editions of this documentation

Edition	Release Date	Note
01	2014-06	First edition for 14VRS
02	2015-09	Adjust A-0-0035 so that existing velocity limit values A-0-0032/A-0-033 can be active New symbol configuration, array monitoring can be enabled when creating a control
03	2018-06	New: "Steps to upgrade the version to 14 for GAT-based applications" New "Steps to upgrade from version 13 to version 14 for hydraulic applications" Supplemented: L75, VPB40.4 Revision of the chapters "Field buses", "Axes"
04	2019-02	XM4 control supplemented List of MLC/XLC hardware variants revised List of library placeholders revised

Tab. 1-1: Change Record

1.1 Validity of the documentation

This document describes the project conversion of IndraWorks version 07VRS projects with IndraLogic 1.x to IndraWorks version 14VRS 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.

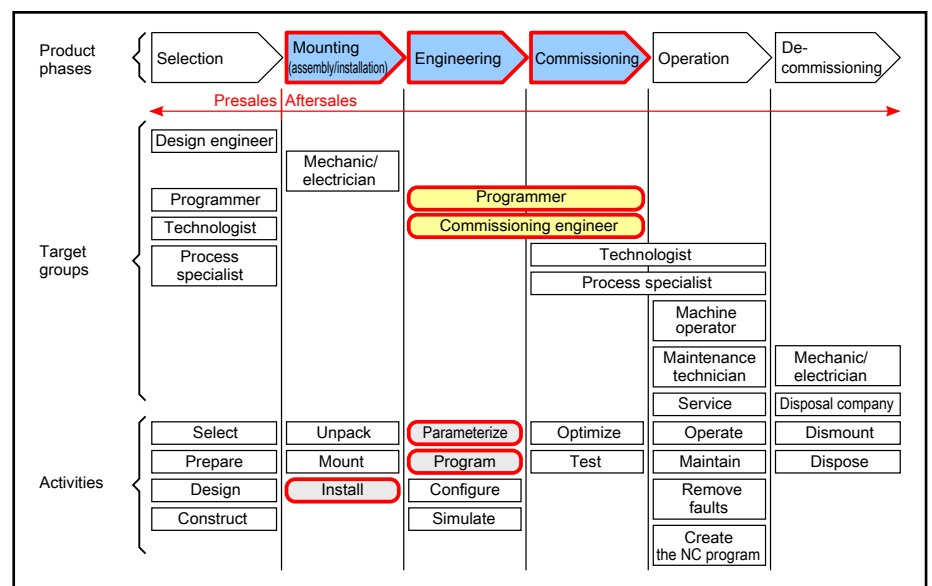


Fig. 1-1: Assigning the present documentation to the target groups, product phases and activities of the target group

About this documentation

1.2 Documentation structure

- [chapter 2 " Introduction" on page 15](#) contains a brief introduction to this documentation.
- [chapter 3 "IndraWorks project conversion with release upgrade within 14VRS" on page 17](#) describes the IndraWorks release upgrade within a version 14VRS.
- [chapter 4 "IndraWorks project conversion with version change to 14VRS" on page 19](#) describes the IndraWorks versions upgrade from 12VRS to 14VRS.
- [chapter 5 "Converting IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS" on page 23](#) describes the conversion of an MLC 04VRS project, created with IndraWorks 07VRS, to IndraWorks 14VRS.
- [chapter 6 "Converting IndraLogic 1.x to IndraWorks 14VRS IndraLogic XLC" on page 37](#) contains information about the conversion of an IndraLogic 1.x project under IndraWorks 07VRS up to IndraWorks 12VRS to IndraLogic 2G under IndraWorks 14VRS.
- [chapter 7 "Step description" on page 45](#) describes the individual steps.
- [chapter 8 "Changes from 12VRS to 13VRS" on page 73](#) contains information about the changes from version 12VRS to 13VRS.
- [chapter 9 "Changes from 12VRS to 14VRS" on page 81](#) contains information about the changes from version 13VRS to 14VRS.
- [chapter 10 "Changes between IndraLogic 1.x and IndraLogic 2G" on page 91](#) describes the differences between IndraLogic 1.x and IndraLogic 2G.
- [chapter 11 "Service and support" on page 99](#) contains information about our customer service help desk.

1.3 Required and supplementing documentation XLC/MLC

Documentation titles with type codes and part numbers

System overview
IndraLogic XLC IndraMotion MLC 14VRS System Overview
DOK-XLCMLC-SYSTEM**V14-PRRS-EN-P, R911341504
This documentation provides an overview on the possible hardware/software components of the automation systems IndraLogic XLC and IndraMotion MLC of the mentioned version. The documentation facilitates assembling a system.

Tab. 1-2: XCL/MLC documentation overview - System overview

About this documentation

First steps
IndraMotion MLC 14VRS First Steps DOK-MLC***-F*STEP**V14-CORS-EN-P, R911341517 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.
IndraLogic XLC 14VRS First Steps DOK-XLC***-F*STEP**V14-CORS-EN-P, R911341489 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.
Rexroth IndraLogic XLC IndraMotion MLC 14VRS Project Conversion DOK-XLCMLC-PROCONV*V14-APRS-EN-P, R911341494 This documentation describes the project conversion of the IndraMotion MLC.

Tab. 1-3: XCL/MLC documentation overview - First steps

Engineering
IndraWorks 14VRS Software Installation DOK-IWORKS-SOFTINS*V14-CORS-EN-P, R911344286 This documentation describes the IndraWorks installation.
IndraWorks 14VRS Engineering DOK-IWORKS-ENGINEE*V14-APRS-EN-P, R911343566 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.
IndraLogic XLC IndraMotion MLC 14VRS Function Description DOK-XLCMLC-FUNC****V14-APRS-EN-P, R911341700 This documentation describes wizards, context menus, dialogs, control commissioning, device configuration and functionalities of the IndraMotion MLC.

Tab. 1-4: XCL/MLC documentation overview - Engineering

Diagnostics and service
IndraLogic XLC IndraMotion MLC 14VRS Diagnostics DOK-XLCMLC-DIAG****V14-RERS-EN-P, R911341481 This documentation includes all control diagnostics implemented in the control systems IndraLogic XLC and IndraMotion MLC.
IndraLogic XLC IndraMotion MLC 14VRS Parameters DOK-XLCMLC-PARAM***V14-RERS-EN-P, R911341479 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.
IndraLogic XLC IndraMotion MLC 14VRS Commissioning DOK-XLCMLC-STARTUP*V14-CORS-EN-P, R911341502 This documentation describes the steps to commission and service the IndraMotion MLC and IndraLogic XLC systems. It includes checklists for frequent tasks and a detailed description of the steps.

About this documentation

Diagnostics and service
WebAssistant DOK-GENERL-WEB*ASSIST*-APRS-EN-P, R911381469 This documentation describes the WebAssistant. The WebAssistant is a webbased diagnostic tool used to access a control system via an Ethernet highspeed connection. The WebAssistant allows OEMs, end users and service engineers to access and to remotely diagnose a system. A PC with Internet Explorer version 11 or higher, Firefox version 45 or above or Google Chrome version 54 or above is required. The following control variants are supported: • IndraMotion MLC L45/L65/L75/XM21/XM22/XM42/VPx • IndraLogic XLC L45/L65/L75/VEP
IndraWorks IndraMotion Service Tool DOK-IWORKS-IMST*****-APRS-EN-P, R911341383 This documentation describes the IndraMotion Service Tool (IMST). IMST is a web-based diagnostic tool used to access a control system via an Ethernet high-speed connection. The IMST allows OEMs, end users and service engineers to access and remotely diagnose a system. The PC has to use at least Internet Explorer 8, Firefox 3.5 or a higher version. The following control variants are supported: • IndraMotion MLC L45/L65/L75/XM21/XM22/XM42/VPx • IndraLogic XLC L45/L65/L75

Tab. 1-5: XLC/MLC documentation overview - Diagnostics and service

Firmware
Rexroth IndraDrive MPx-20, Functions ¹⁾ DOK-INDRV*-MP*-20VRS**-AP01-EN-P, R911345608 This documentation describes all functional properties of the IndraDrive firmware in the variants MPB-20, MPM-20, MPC-20 and MPE-20.
Rexroth IndraDrive MPx-16 to MPx-20 und PSB, Parameters DOK-INDRV*-GEN1-PARA**-RERS-EN-P, R911328651 This documentation contains the descriptions of all parameters implemented in the firmware for drive controllers of the IndraDrive range. It supports the drive controller parameterization.
Rexroth IndraDrive MPx-16 to MPx-20 and PSB, Diagnostic Messages DOK-INDRV*-GEN1-DIAG**-RERS-EN-P, R911326738 This documentation contains the descriptions of all diagnostic messages implemented in the following firmware products: • Drive controller firmware variants MPx-16 to MPx-20 • PSB firmware variants for "HMU05" and "KMV03" type supply units • Firmware variants for "HMOV01" type supply units It assists machine operators and installation programmers with troubleshooting.
Hardware
Rexroth IndraDrive Control Sections CSB02, CSE02, CSH02, CDB02 DOK-INDRV*-Cxx02*****-PRRS-EN-P, R911338962
Rexroth IndraDrive Cs Drive Systems with HCS01 DOK-INDRV*-HCS01*****-PRRS-EN-P, R911322210

About this documentation

Rexroth IndraDrive Mi Drive Systems with KCU02, KSM02, KMS02/03, KMV03 DOK-INDRV*-KCU02+KSM02-PRxx-EN-P, R911335703
Rexroth IndraDrive ML Drive Systems with HMU05 DOK-INDRV*-Hxx05*****-PRxx-EN-P, R911344279

1) In preparation
 Tab. 1-6: Overview of documentations for drive controllers

PLC
IndraWorks 14VRS PLC Programming System IndraLogic 2G DOK-IWORKS-IL2GPRO*V14-APRS-EN-P, R911343571 This documentation describes the PLC programming tool IndraLogic 2G and its usage. It includes the basic use, first steps, visualization, menu items and editors.
IndraWorks 14VRS Basic Libraries IndraLogic 2G DOK-IL*2G*-BASLIB**V14-LIRS-EN-P, R911343920 This documentation describes the system-comprehensive PLC libraries.
IndraLogic XLC IndraMotion MLC 14VRS PLCopen Libraries DOK-XLCMLC-FUNLIB**V14-LIRS-EN-P, R911341491 This documentation describes the function blocks, functions and data types of the RIL_CommonTypes, ML_Base and ML_PLCopen libraries for the IndraLogic XLC/IndraMotion MLC. It also includes the error reactions of function blocks.

Tab. 1-7: XCL/MLC documentation overview - PLC

Field buses
IndraWorks 14VRS Field Buses DOK-IWORKS-FB*****V14-APRS-EN-P, R911341485 This documentation describes the field bus and local periphery connections supported by the IndraLogic XLC, IndraMotion MLC and IndraMotion MTX systems. The focus of this documentation is on the configuration, parameterization, commissioning and the diagnostics of the different periphery connections. This documentation is the basis for the online help.
IndraWorks 14VRS Field Buses Libraries DOK-IWORKS-FB*LIB**V14-LIRS-EN-P, R911343575 This documentation describes the field bus libraries: RIL_ProfibusDP_02, RIL_ProfibusDP Slave, RIL_ProfinetIO, RIL_ProfinetIODevice, RIL_EtherNetIPAdapter, RIL_MappingList, RIL_SERCOSIII, RIL_Inline including their diagnostics and error reactions of the function blocks.
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.
Sercos System Manual for I/O Devices DOK-CONTRL-ILS3*****-APxx-EN-P, R911333512 This documentation describes the configuration, parameterization, commissioning and diagnostics of I/O devices with a Sercos interface.

xx Corresponding edition
 Tab. 1-8: XCL/MLC documentation overview - Field buses

About this documentation

HMI
IndraWorks 14VRS HMI DOK-IWORKS-HMI*****V14-APRS-EN-P, R911343569 This documentation describes the functions, configuration and operation of the user interfaces IndraWorks HMI Engineering and IndraWorks HMI Operation.
IndraWorks 14VRS WinStudio 7.4 DOK-IWORKS-WINSTUD*V14-APRS-EN-P, R911341585 This "User Manual and Technical Reference Book" facilitates working with the "Rexroth WinStudio" software for optimal results. This document provides technical information and step-by-step instructions to create web-enabled HMI/SCADA programs.
Rexroth IndraLogic XLC IndraMotion MLC 14VRS HMI Connection DOK-XLCMLC-HMI*****V14-APRS-EN-P, R911341497 This documentation describes the visualization systems supported by the IndraLogic XLC and IndraMotion MLC and their connection.

Tab. 1-9: XCL/MLC documentation overview - HMI

Technology
IndraLogic XLC IndraMotion MLC 14VRS Generic Application Template DOK-XLCMLC-TF*GAT**V14-APRS-EN-P, R911341487 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.
IndraMotion MLC 14VRS Technology Libraries DOK-MLC***-TF*LIB**V14-LIRS-EN-P, R911341511 This documentation describes the function blocks, functions and data types of the "ML_TechInterface.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.
IndraWorks 14VRS Energy Efficiency Management DOK-IWORKS-4EE*****V14-APRS-EN-P, R911339229 This documentation describes the HMI connection of the energy management system and the function blocks, functions and data types of the "RIL_4EE " library. The documentation also includes the error reactions of the function blocks.
Rexroth IndraMotion MLC 14VRS RegisterControl (Library) DOK-MLC***-REGI*CO*V14-LIRS-EN-P, R911341509 This documentation describes the inputs and outputs of the individual function blocks and provides notes on their use.
IndraMotion MLC 14VRS RegisterControl (Application Description) DOK-MLC***-REGI*CO*V14-APRS-EN-P, R911341507 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.
Rexroth IndraMotion MLC 14VRS Winder Function Application DOK-MLC***-TF*WIND*V14-APRS-EN-P, R911341513 This application-related system documentation describes the application of the winder technology functions.

Technology
Rexroth IndraWorks CamBuilder 13VRS DOK-IWORKS-CAMBUIL*V13-APRS-EN-P, R911336291 This documentation describes the basic principles and operation of the CamBuilder, the cam editing tool.
IndraMotion MLC 14VRS Robot Control V2 DOK-MLC***-ROCO****V14-RERS-EN-P, R911341588 This documentation provides information about the Robot Control V2. The focus is on PLCopen programming. The program structure, variables, functions, motion statements and the required system parameters are described. This documentation also includes the description of the "ML_Robot" library. Robot Control V2 is supported by a kinematic interface. The components of this interface are described in the "ML_KinTech" library.

Tab. 1-10: XCL/MLC documentation overview - Technology

Open Core Engineering - OCE
IndraLogic XLC IndraMotion MLC 14VRS First Steps MLPI (online help) DOK-XLCMLC-MLPI****V14-CORS-EN-E, R911341033 This document describes the installation and the commissioning of the MLPI interface.
IndraLogic XLC IndraMotion MLC 14VRS Automation Interface (online help) DOK-XLCMLC-AUT*INT*V14-APRS-EN-E, R911341499 This documentation describes the script-based access to IndraWorks project data via the interface of the Automation Interface.

Tab. 1-11: XCL/MLC documentation overview - Open Core Engineering - OCE

SafeLogic
IndraWorks SafeLogic 14VRS First Steps DOK-IWORKS-SL*STEP*V14-CORS-EN-P, R911341520 This documentation describes the initial commissioning of the Safety function module and its external Safety periphery. Taking the example of a project, all required steps to commission a simple Safety application are executed.
IndraLogic XLC IndraMotion MLC 14VRS SafeLogic System Overview DOK-XLCMLC-SL**SYS*V14-PRRS-EN-P, R911341696 This documentation describes the project planning, configuration, creation and commissioning of safety-related devices.
IndraWorks 14VRS SafeLogic - Project Configuration, Version 1.2.0.0. DOK-IWORKS-SL**PRJ*V14-APRS-EN-P, R911341694 This documentation describes the configuration of Safety applications.
IndraControl CFL01.1-F1 Safety Function Module DOK-CONTRL-SL**FM*****-ITRS-EN-P, R911336576 This documentation is provided with the hardware and describes the commissioning, the installation, the decommissioning and disposal of the hardware.

Tab. 1-12: XCL/MLC documentation overview - SafeLogic

Hardware
Rexroth IndraControl L45/L65/L85 Control DOK-CONTRL-ICL45L65L85-PRxx-EN-P, R911332116 This documentation describes the IndraControl L45/L65/L85 controls.
Rexroth IndraControl Lxx 14VRS Function Modules DOK-CONTRL-FM*LXX**V14-APRS-EN-P, R911341583 This documentation describes all function modules of the Lxx controls including engineering and diagnostics.

About this documentation

Hardware
IndraControl XM21, XM22 Controls DOK-CONTRL-IC*XM2****-ITRS-EN-P, R911340667 This documentation describes the IndraControl XM21/XM22 controls.
IndraControl XM42 Controls DOK-CONTRL-XM4X*CTRL**-ITRS-EN-P, R911345566 This documentation describes the IndraControl XM42 controls.
IndraControl XFE 01.1 Extension Modules Profibus, RT-Ethernet, Sercos, CAN DOK-CONTRL-XFE**EXTMOD-ITRS-EN-P, R911345570 This documentation describes all extension modules of the XM controls.

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Corresponding edition

Tab. 1-13:

XCL/MLC documentation overview - Hardware

Hydraulics
Rexroth IndraMotion MLC 14VRS Hydraulic Functions DOK-MLC***-TF*HMOT*V14-LIRS-EN-P, R911341907 This documentation describes the function blocks, functions and data types of the MH_TechHydrBase and MH_TechHydrMotion libraries. The documentation also includes the error reactions of the function blocks.
Rexroth IndraLogic XLC IndraMotion MLC 14VRS Sequential Programming DOK-XLCMLC-SEQPROG*V14-LIRS-EN-P, R911341909 This documentation describes the sequential programming options, also when using GAT, and the MH_HydrControlProg library.

Tab. 1-14:

XCL/MLC documentation overview - Hydraulics

1.4Information representation

1.4.1Safety instructions

If there are 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 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 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:



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 controller
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

About this documentation

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. 1-15: Terms and abbreviations

1.4.4 Customer feedback

Customer requests, comments or suggestions for improvement are of great importance to us. Please email your feedback on the documentations to Feedback.Documentation@boschrexroth.de. Directly insert comments in the electronic PDF document and send the PDF file to Bosch Rexroth.

2 Introduction

This document describes the conversion of IndraWorks projects of the versions 07VRS to 13VRS to version 14VRS. 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, IndraWorks 13VRS and IndraWorks 14VRS as well as between IndraLogic 1.x and IndraLogic 2G can be found in a separate chapter.



As part of the continuous development of the products IndraMotion MLC and IndraLogic XLC, extensions and functional changes are introduced. Sporadically, this means that programs also have to be adjusted.

When converting projects, please always refer to the version notes or the first release notes of the versions

- XLC/MLC 12VRS
- XLC/MLC 13VRS
- XLC/MLC 14VRS

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
- IndraMotion MLC 14VRS
- IndraLogic 10VRS
- IndraLogic XLC 11VRS
- IndraLogic XLC 12VRS
- IndraLogic XLC 13VRS
- IndraLogic XLC 14VRS

- **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 14VRS. IndraLogic 1.x contained in IndraMotion MLC 04 is also converted to IndraLogic 2G.

Introduction

This description is valid for the following IndraMotion MLC versions:

- IndraMotion MLC04 (CML L65.1)
- 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

3 IndraWorks project conversion with release upgrade within 14VRS

This section describes the conversion of an IndraWorks project, e.g. created with the IndraWorks version 14V18 should be converted to 14V20.



Create a project copy before starting the conversion.

- Prerequisites**
- IndraWorks project or IndraWorks project archive of an IndraWorks version 14VRS, containing either an IndraMotion MLC or an IndraLogic XLC control

- Installed IndraWorks 14VRS

- Instruction**
1. Starting IndraWorks 14VRS.
 2. Loading the IndraWorks project to be converted
or

Restoring an IndraWorks project archive.

After restoring a project archive, the project is loaded in the compatibility mode. This compatibility mode corresponds to the IndraWorks release originally used to create the project. The project can be edited in this state and loaded again with the original IndraWorks. 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 14VRS Engineering" documentation under chapter "Working with IndraWorks", see [tab. 1-4 "XCL/MLC documentation overview - Engineering" on page 7](#).

While loading can cause warnings, e.g. referenced libraries are missing or there are warning icons at the control node.

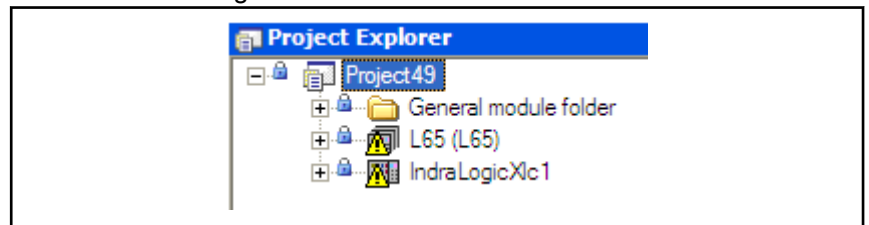


Fig. 3-1: Warning symbol at the control after having loaded the old project state

These warnings or warning icons can be ignored at first.

3. Updating the control version in the project.
[chapter 7.3 "Creating the control version" on page 56](#)
4. Perform firmware update of the control.
If no control is available, this step can be executed at a later point.
Refer to [chapter 7.4 "Exchanging XLC/MLC firmware" on page 58](#).
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 7.6 "Updating PLC libraries" on page 63](#).
6. The menu item **Create ► Clear** can be called to clear old PLC compilation files and to check the library list of the control.

IndraWorks project conversion with release upgrade within 14VRS

7. 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. Also observe the warning notes.

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.

4 IndraWorks project conversion with version change to 14VRS

This section describes the conversion of an IndraWorks version based on the IndraWorks versions 10, 11, 12 or 13 to 14VRS.



Create a project copy before starting the conversion

- Prerequisites**
- IndraWorks project or IndraWorks project archive based on an IndraWorks version 10, 11, 12 or 13 containing either an IndraMotion MLC control or an IndraLogic XLC control
 - Installed IndraWorks 14VRS

- Instruction**
1. Starting IndraWorks 14VRS.
 2. Loading the IndraWorks project to be converted
or

Restoring an IndraWorks project archive.

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

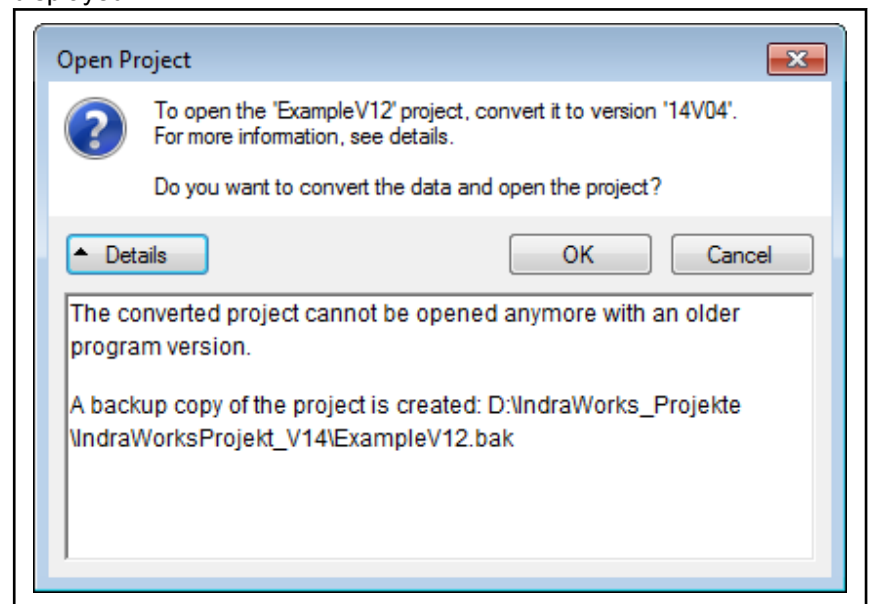


Fig. 4-1: Querying the project conversion to the new IndraWorks format

3. Confirm by clicking on **Yes**.
The project is now converted and loaded. A warning message informing the user on missing libraries or that a task name is too long might be displayed sporadically. This message can be ignored.

IndraWorks project conversion with version change to 14VRS

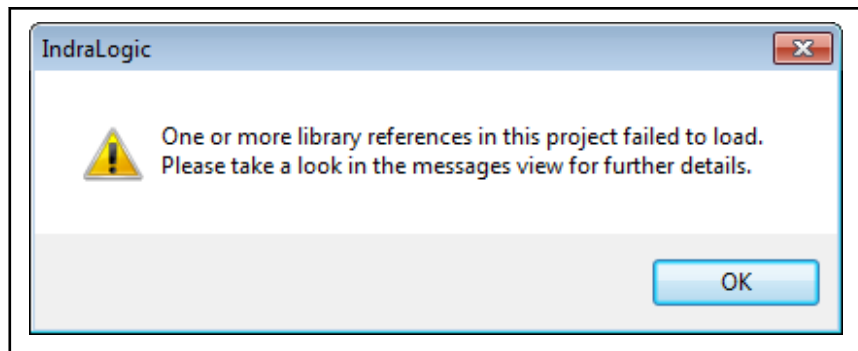


Fig. 4-2: Information regarding modified libraries can be ignored

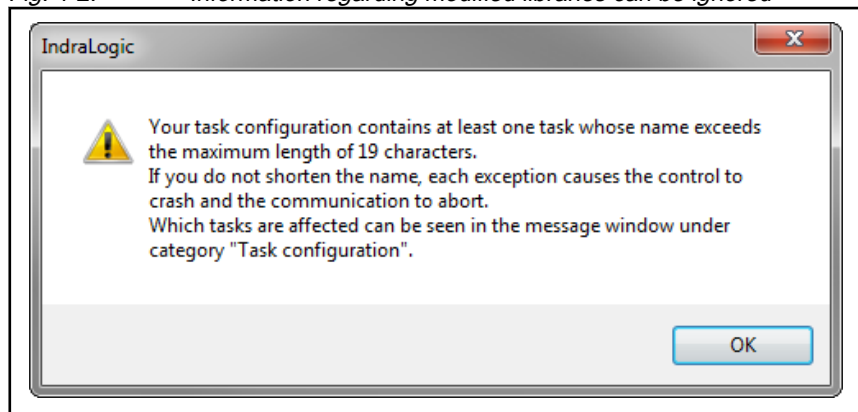


Fig. 4-3: Note on long task names. Irrelevant as of 14V20.

A small yellow warning symbol is sporadically displayed in the Project Explorer.

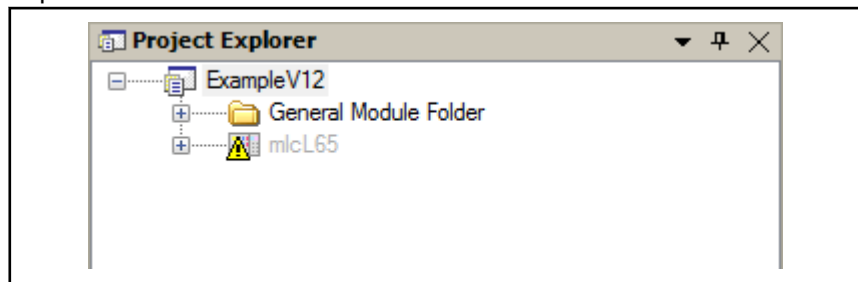


Fig. 4-4: Warning symbol at the control after having loaded the old project status

4. Updating the control version in the project.
Refer to [chapter 7.3 "Creating the control version" on page 56](#).
5. Perform firmware update of the control.
If no control is available, this step can be executed at a later point.
Refer to [chapter 7.4 "Exchanging XLC/MLC firmware" on page 58](#).
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 7.6 "Updating PLC libraries" on page 63](#).
7. The menu item **Create ► Clear** can be called to clear old PLC compilation files and to check the library list of the control.

IndraWorks project conversion with version change to 14VRS

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 parameters A-0-0048 (Velocity polarity) and A-0-0049 (Force polarity) have been introduced in 13VRS. 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.



Additional A-parameters were introduced in 14VRS:

- A-0-0035, Velocity limit value, bipolar
- A-0-0039, Torque/force limit value, positive
- A-0-0040, Torque/force limit value, negative

They have to be initialized respectively in the IndraWorks drive dialogs.

5 Converting IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

5.1 Overview

This section describes the conversion of an MLC 04VRS project in IndraWorks 07VRS to IndraWorks 14VRS. There are two steps:

1. Converting the Motion sections

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

Refer to [chapter 5.2 "Converting the control and axis configuration" on page 23](#)

2. Converting the PLC components

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

Refer to [chapter 6.3 "Converting the PLC and the field buses" on page 38](#)

5.2 Converting 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 14VRS.

There are two options for this:

1. Conversion of the IndraWorks 07VRS project to IndraWorks 14VRS

This option is suitable particularly for large projects with many axes

Refer to ["Converting the project" on page 23](#)

2. Restructuring of the project in IndraWorks 14VRS 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

Refer to ["Restructuring the project" on page 30](#)

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 IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

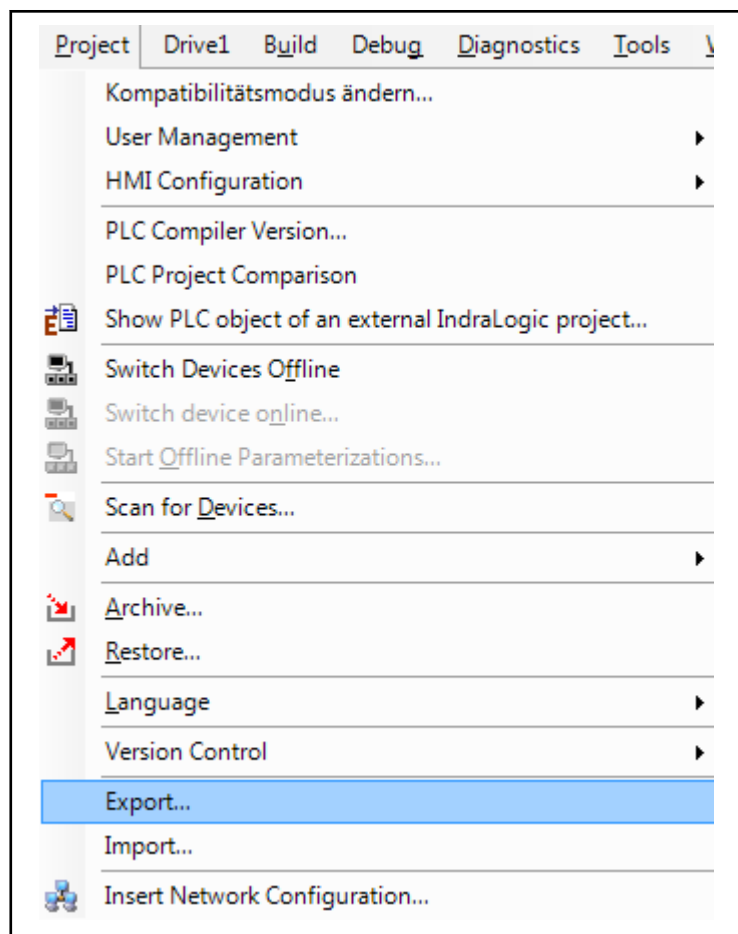


Fig. 5-1: Exporting a project

- 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 IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

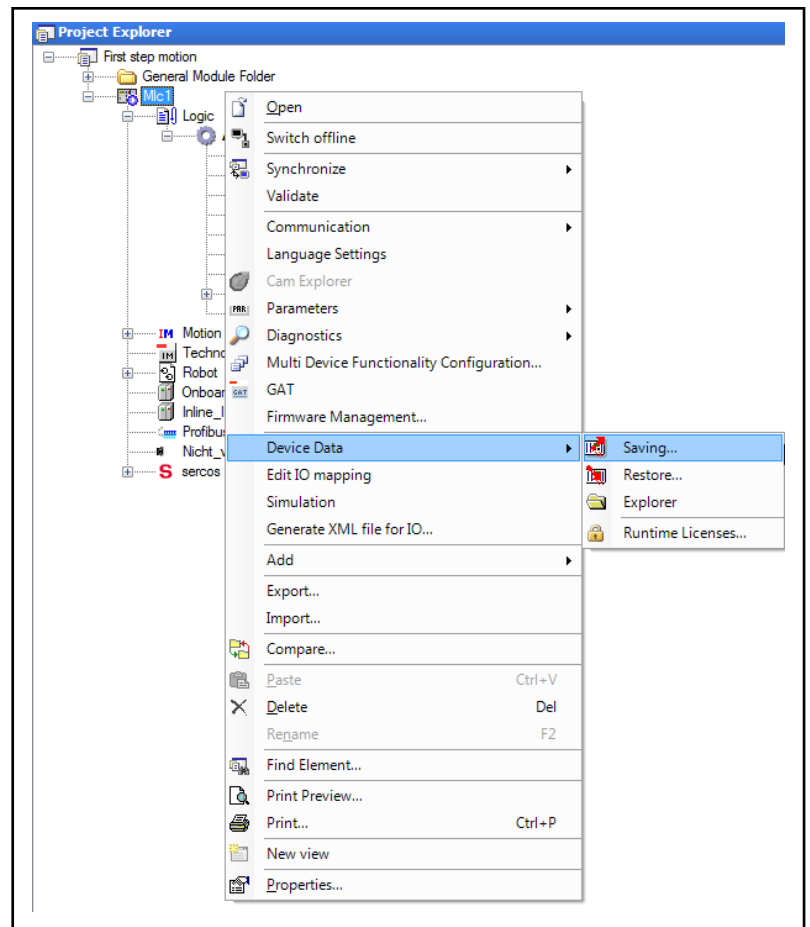


Fig. 5-2: Backing up device data

- Select Parameter and User and OEM partition of the compact flash card and click **OK** to save

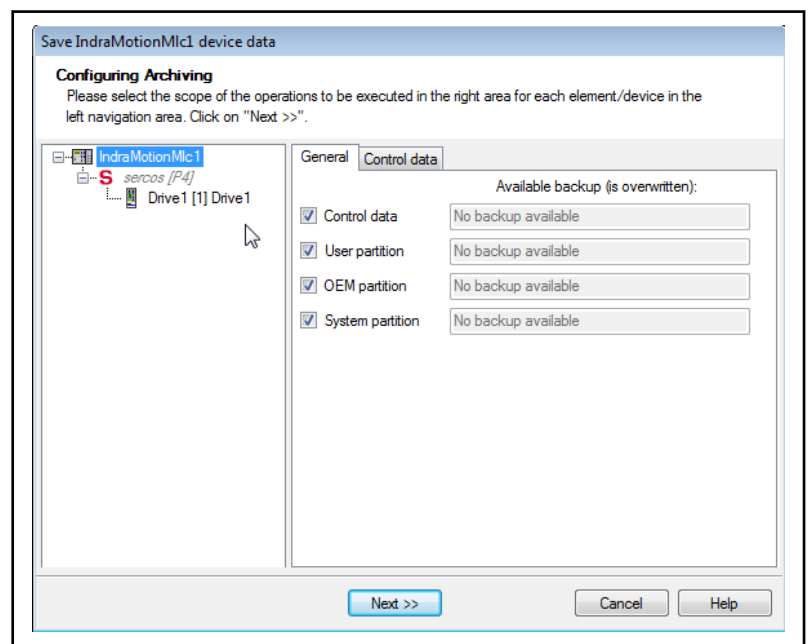


Fig. 5-3: Saving device data

Converting IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

- Select the option "Archive parameters required for restoring" and click on **Export** to start the export

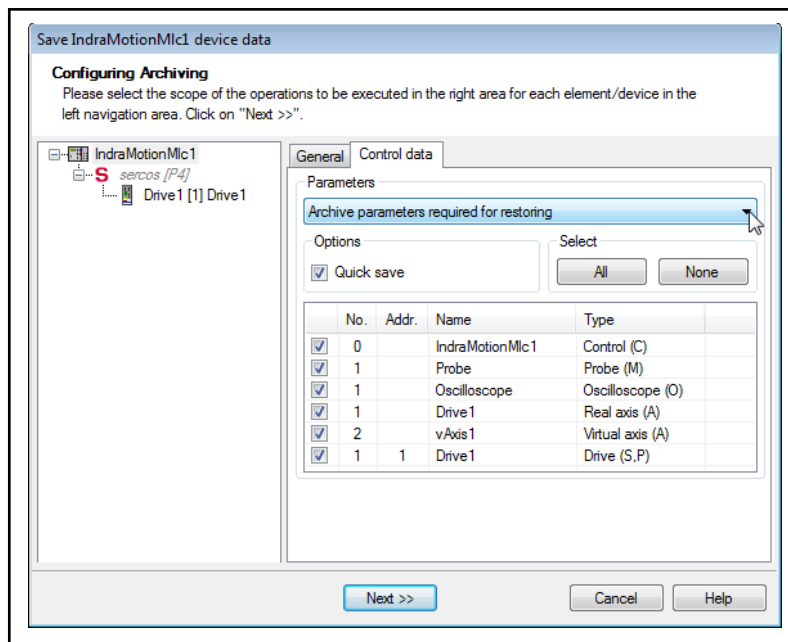


Fig. 5-4: Parameter export

- Renaming and archiving the old project.
 - In the IndraWorks Project Explorer, use the context menu item "Rename" to add the ID "_04VRS" to the project name.
 - Archive the project
- Importing the project using IndraWorks 14VRS

There are different options to import exported data. The IndraWorks Suite 14VRS has to be open.

Variant 1:

- Close the project if required
- Select the menu item **Project ► Import...** from the main menu
- From the dialog "Open export file", select the file type "MLC 04VRS export file (*.xml)" and open the previously exported file
- In the following dialog, select the project name, the storage location and the compatibility mode for the project to be created
- Confirm the following import wizard

Variant 2:

- In the main menu, select menu item **File ► Open ► Export project contents...**
- From the dialog "Open export file", select the file type "MLC 04VRS export file (*.xml)" and open the previously exported file
- If no project is open, drag&drop the first element from the opened export file view to the Project Explorer
- In the following dialog, select the project name, the storage location and the compatibility mode for the project to be created
- Confirm the following import wizard

Converting IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

- If a project is open, drag&drop the control from the opened export file view to the Project Explorer
- Confirm the following import wizard

Variant 3:

- Open an existing project or create a new project
- Select the menu item **Import... ► Import...** from the context menu of the project tree
- From the dialog "Open export file", select the file type "MLC 04VRS export file (*.xml)" and open the previously exported file
- Confirm the following import wizard
- Drag&drop the control from the opened export file view to the Project Explorer
- Confirm the following import wizard

In a summary, the import results are listed.

An MLC L65 is now created in the project. If required, change the hardware type via the "Properties" dialog.

If an MLC L40.2 has been imported and if Sercos II is still to be used as master communication, the Sercos II (CFL01.1-Q2) function module has to be added to the control from the function module folder of the device library.

5. 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 IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

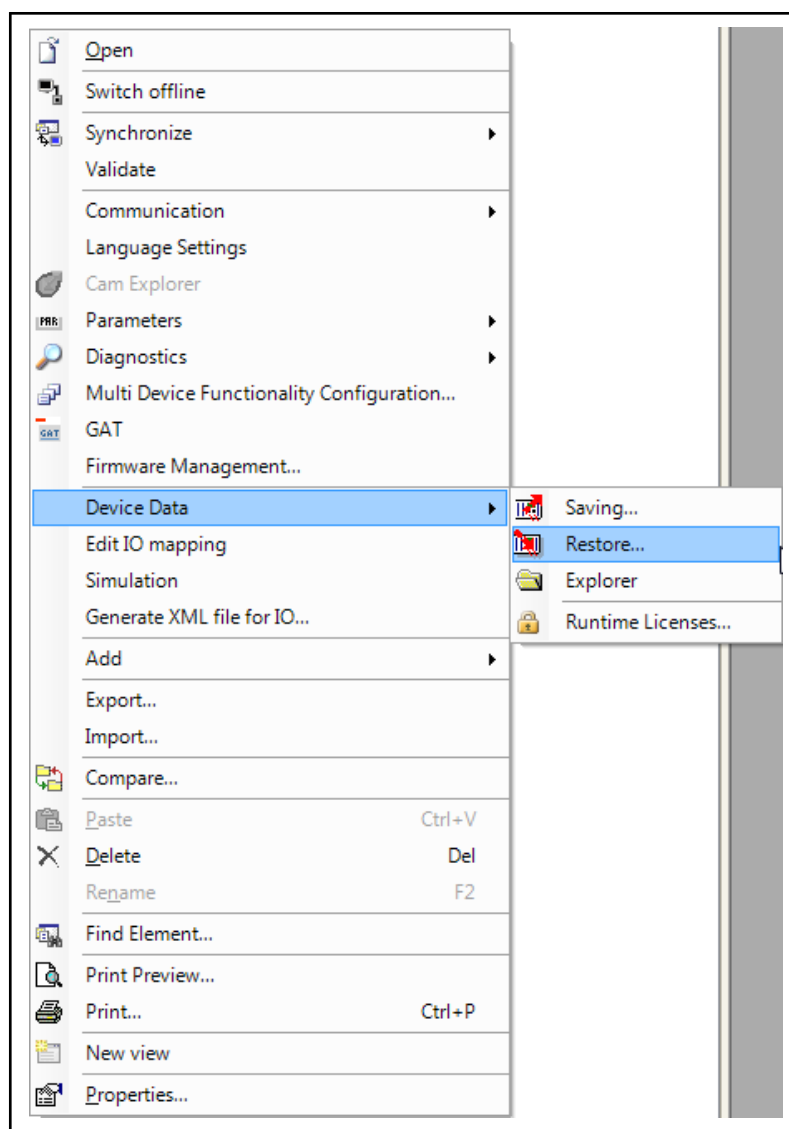


Fig. 5-5: Importing device data

- Select the corresponding options

Converting IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

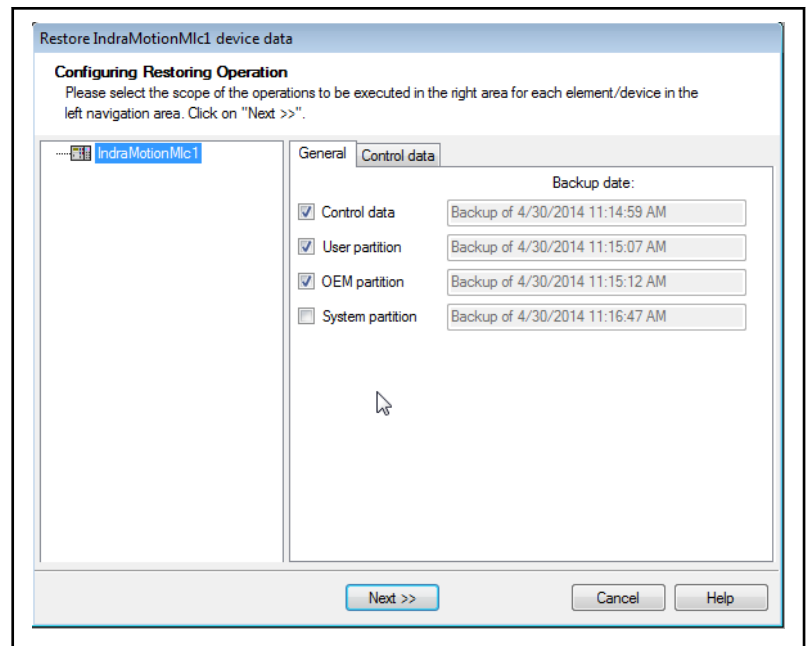


Fig. 5-6: General options in the "Restore device data" dialog

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

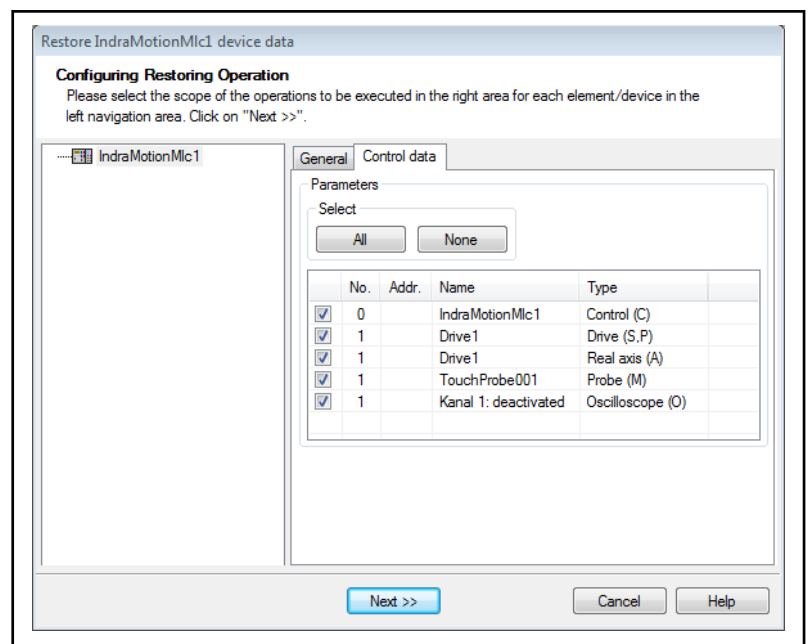


Fig. 5-7: Control data in the "Restore device data" dialog

Converting IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

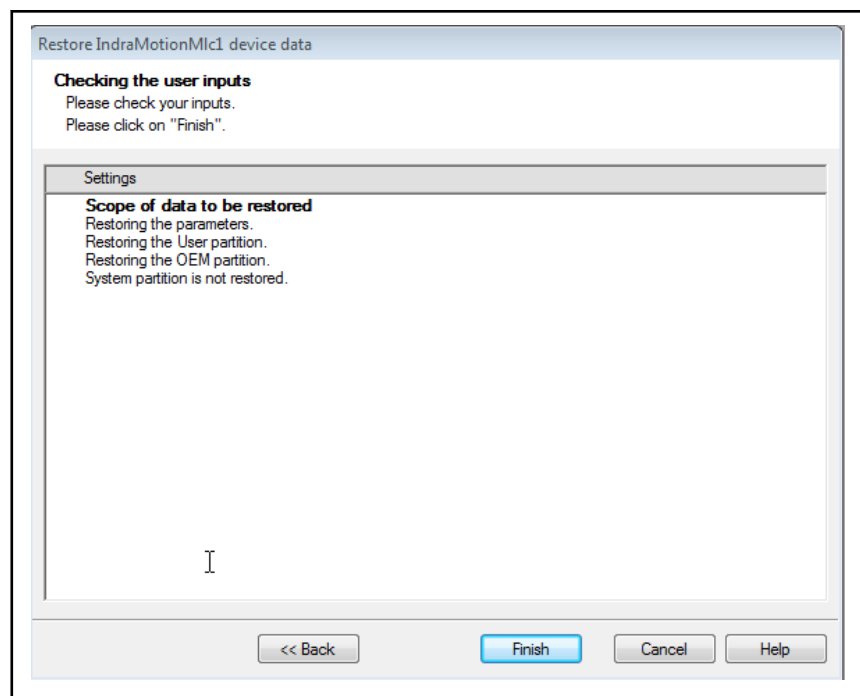


Fig. 5-8: Summary of the results of the import process



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 IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

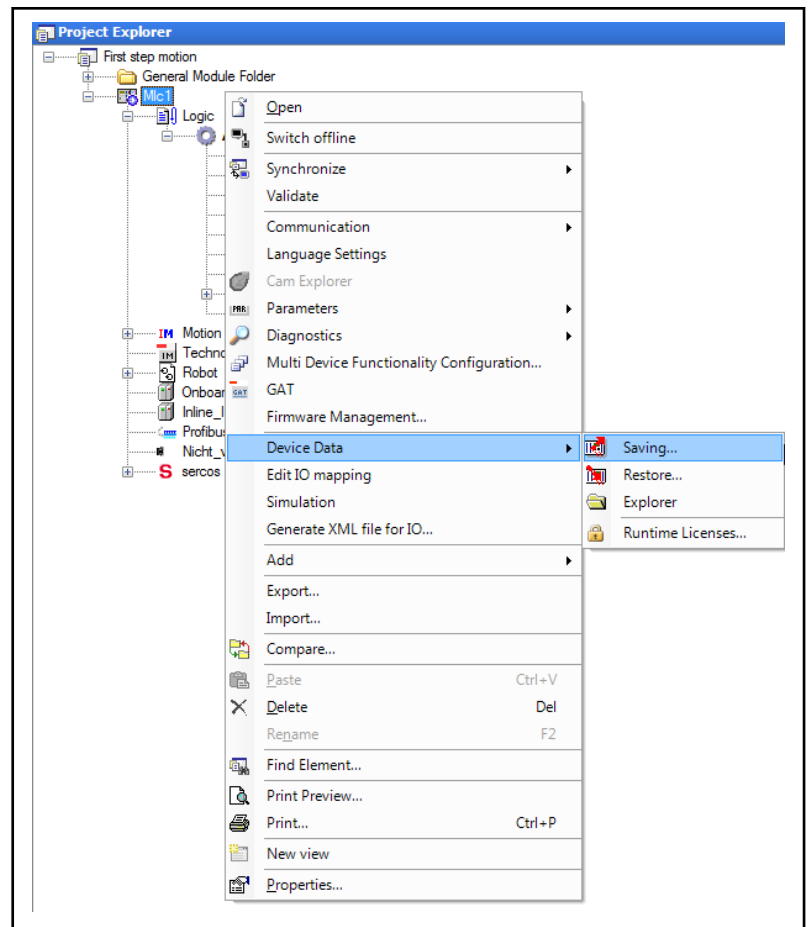


Fig. 5-9: Backing up device data

- Select Parameter and User and OEM partition of the compact flash card and click **OK** to save

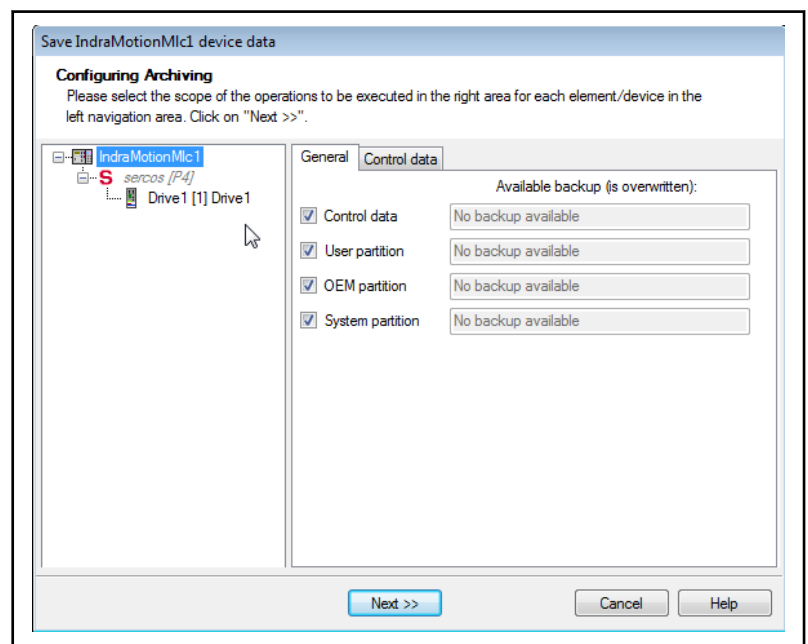


Fig. 5-10: Saving device data

Converting IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

- Select the option "Archive parameters required for restoring" and click on **Export** to start the export

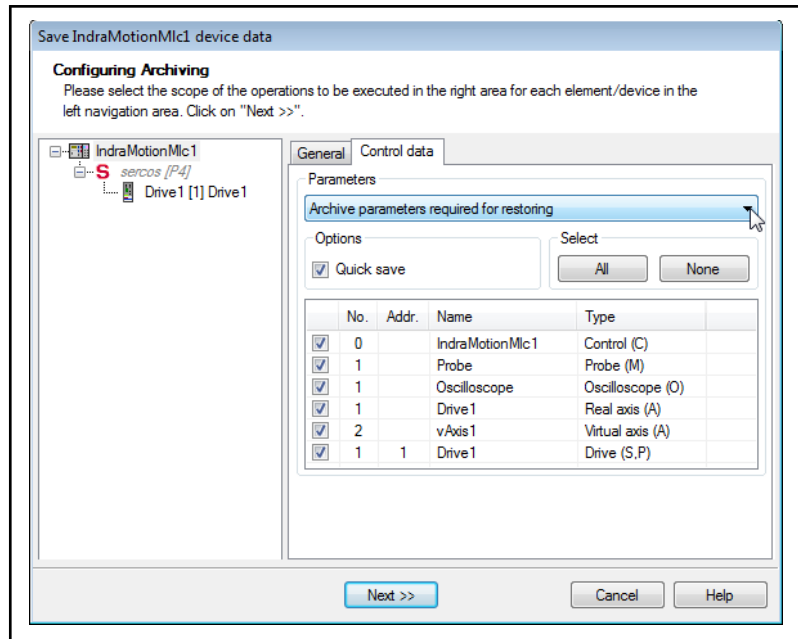


Fig. 5-11: Parameter export

2. Create project.
Start IndraWorks 14VRS and create a new project.
3. Create the control.
Create a new IndraMotion MLC control.
Refer to [chapter 7.1 "Creating a control" on page 45](#).
4. Create the function modules.
Add the function modules to the control, if required.
Refer to [chapter 7.2 "Creating a function module" on page 54](#)
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 have to have the same name as in the old project.
Creating axes is described in detail in the documentation "Rexroth IndraLogic XLC IndraMotion MLC 14VRS Functional Description", see [chapter 1.3 "Required and supplementing documentation XLC/MLC" 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 IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

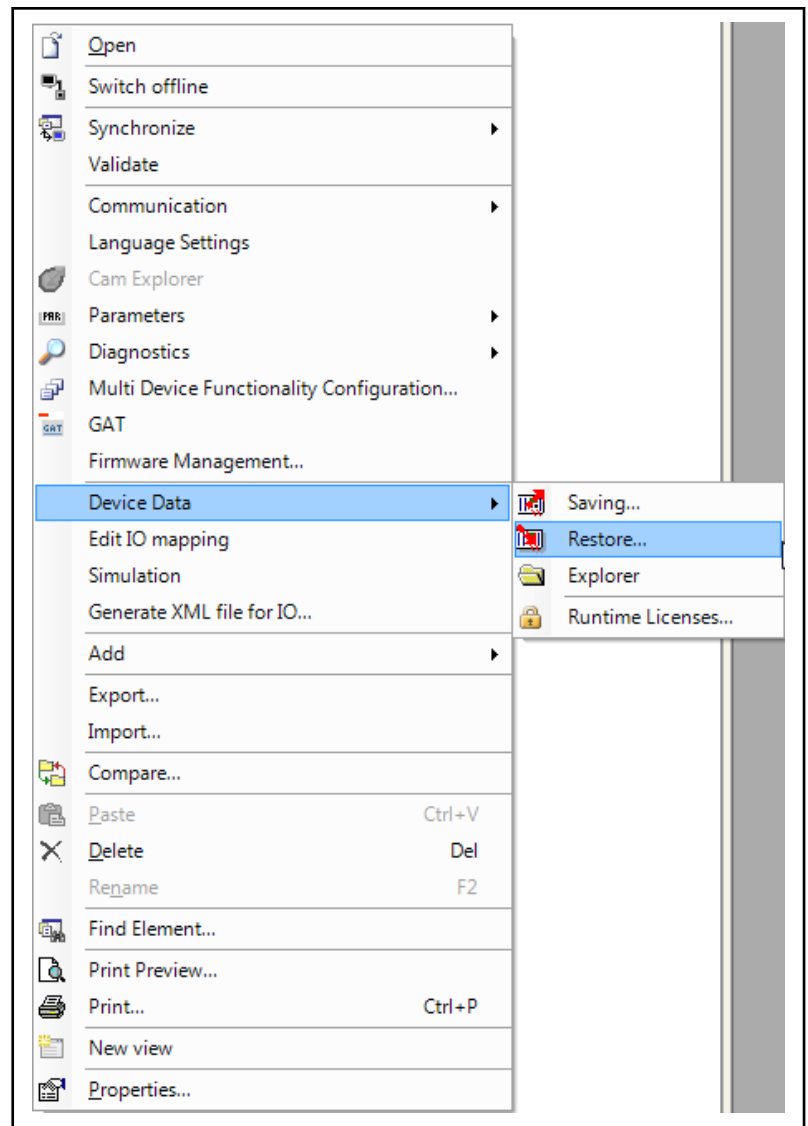


Fig. 5-12: Importing device data

- Select the corresponding options

Converting IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

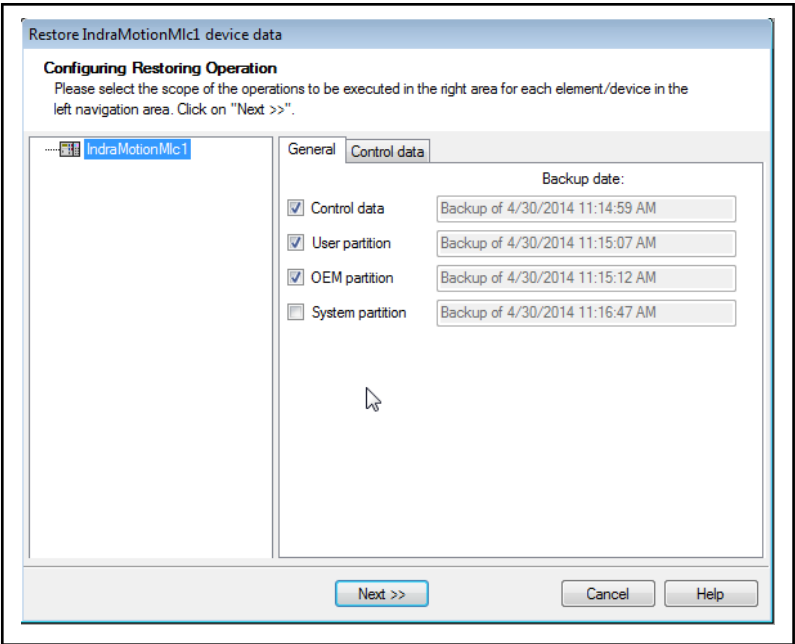


Fig. 5-13: General options in the "Restore device data" dialog

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

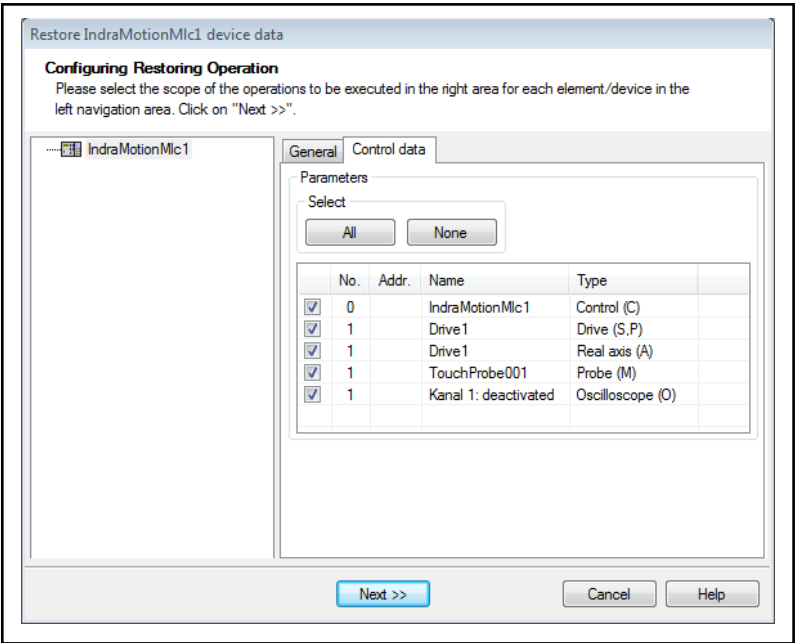


Fig. 5-14: Control data in the "Restore device data" dialog

Converting IndraMotion MLC IndraWorks 07VRS to IndraWorks 14VRS

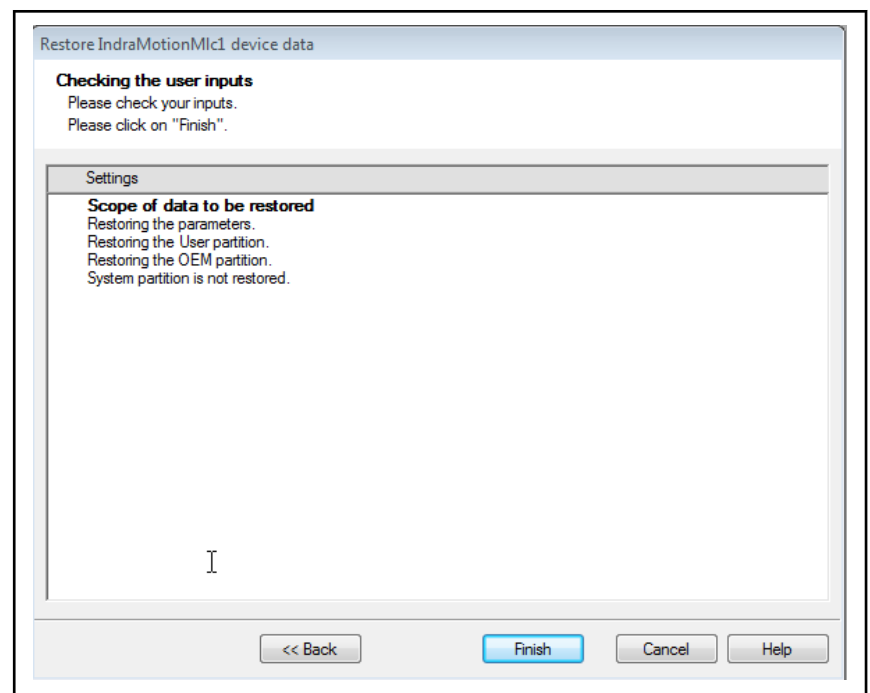


Fig. 5-15: Summary of the results of the import process



IndraDrive/HydraulicDrive with interpolation in the control now use the closed-loop velocity control operation mode in the drive for the function blocks MC_MoveVelocity and MC_GearIn as well as MC_Stop. Up to version 11VRS the function blocks MC_MoveVelocity and MC_GearIn traveled using position control in the drive. This continues to apply for the SercosDrive. If axes with IPO control are used in the projects and if a position-controlled operating mode of the drive is required for the PLCopen commands MC_MoveVelocity and MC_GearIn, the PLCopen commands have to be changed (e.g., instead of MC_MoveVelocity MC_MoveAbsolute, MC_GearInPos or MC_MoveRelative, ...). Adjust the AxisInterface accordingly with regard to the operating mode selection.

6 Converting IndraLogic 1.x to IndraWorks 14VRS IndraLogic XLC

6.1 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 14VRS. There are two steps:

1. **Create a new project under IndraWorks 14VRS**

A new IndraWorks 14VRS project is created and an IndraLogic XLC control is added

Refer to [chapter 6.2 "Creating an IndraLogic XLC project" on page 37](#)

2. **Converting the PLC components**

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

Refer to [chapter 6.3 "Converting the PLC and the field buses" on page 38](#)

3. **Converting the PLC components when using the Profibus.lib**

The provision of the preconditions to convert Profibus devices is described.

Refer to [chapter 6.4 "Profibus device adjustments" on page 43](#)



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.

6.2 Creating an IndraLogic XLC project

This section describes the creation of an IndraLogic XLC project under IndraWorks 14VRS.

1. Create project.

Start IndraWorks 14VRS and create a new project.

2. Create the control.

Create a new IndraLogic XLC control.

Refer to [chapter 7.1 "Creating a control" on page 45](#).

3. Create the function modules.

Add the function modules to the control, if required.

Refer to [chapter 7.2 "Creating a function module" on page 54](#).

Converting IndraLogic 1.x to IndraWorks 14VRS IndraLogic XLC

6.3 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.

1. Open the project.

Load the project converted in [chapter 5.2 "Converting the control and axis configuration" on page 23](#) in IndraWorks 14VRS.

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.

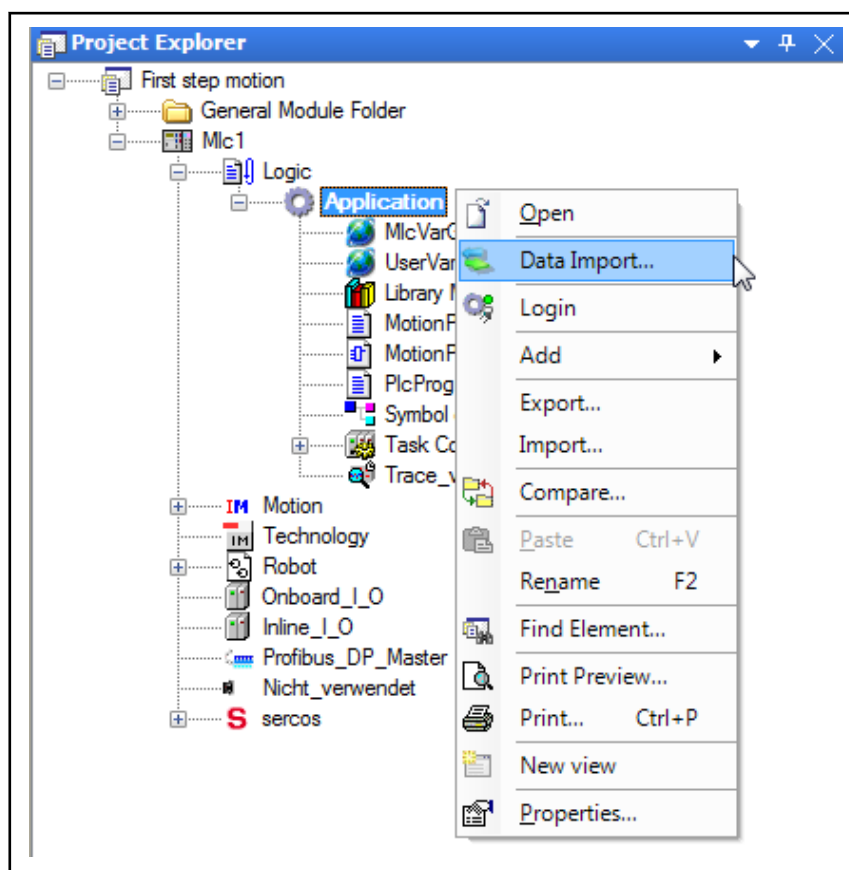


Fig. 6-1: Data import

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 14VRS IndraLogic XLC

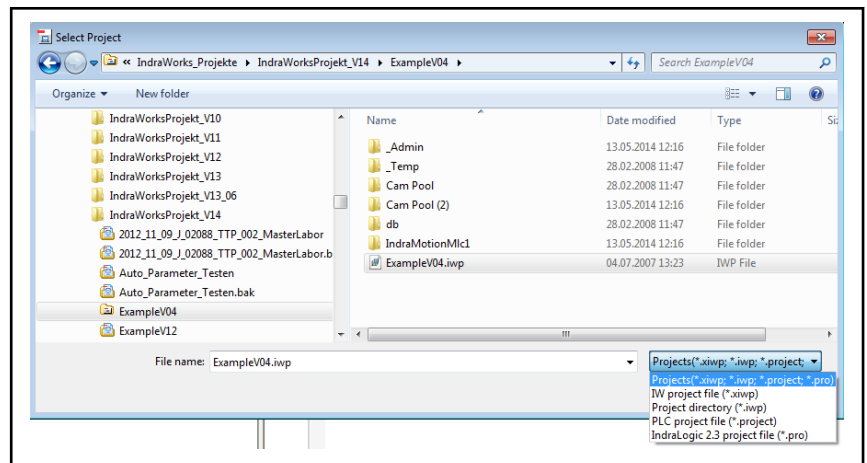


Fig. 6-2: Data import dialog

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

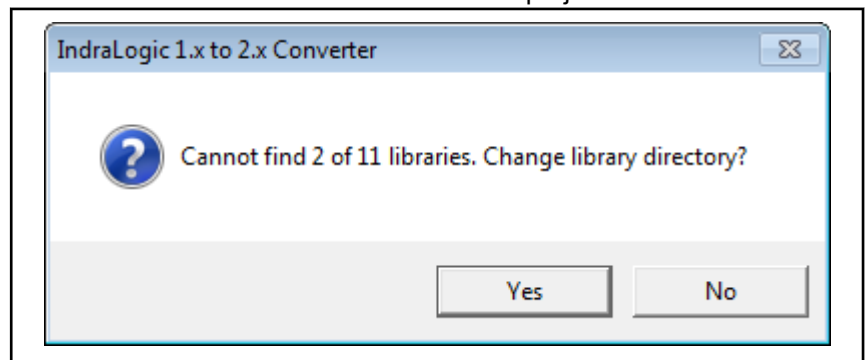


Fig. 6-3: Missing PLC libraries dialog

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 14VRS IndraLogic XLC

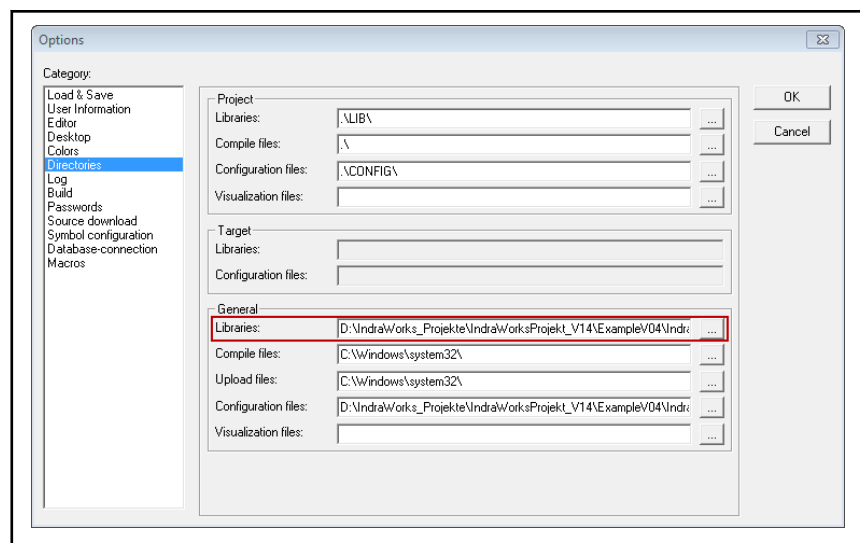


Fig. 6-4: IndraLogic 1.x dialog options

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**.

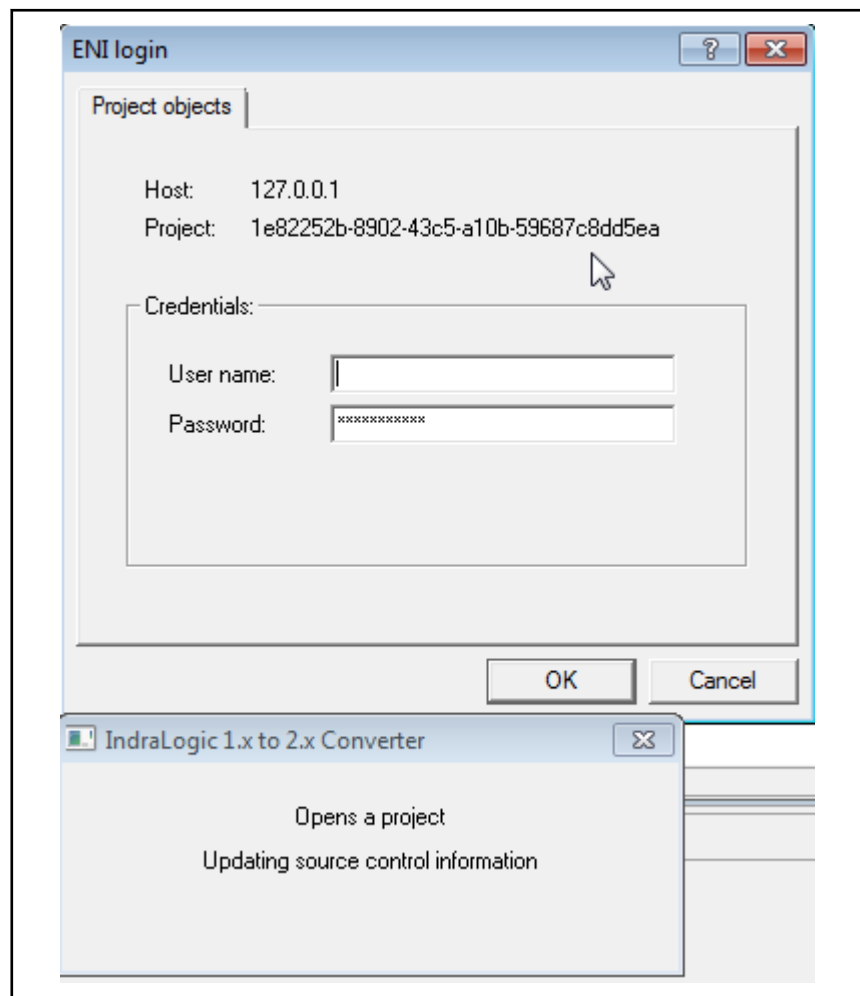


Fig. 6-5: Dialog ENI login

Converting IndraLogic 1.x to IndraWorks 14VRS IndraLogic XLC

6. Compilation

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

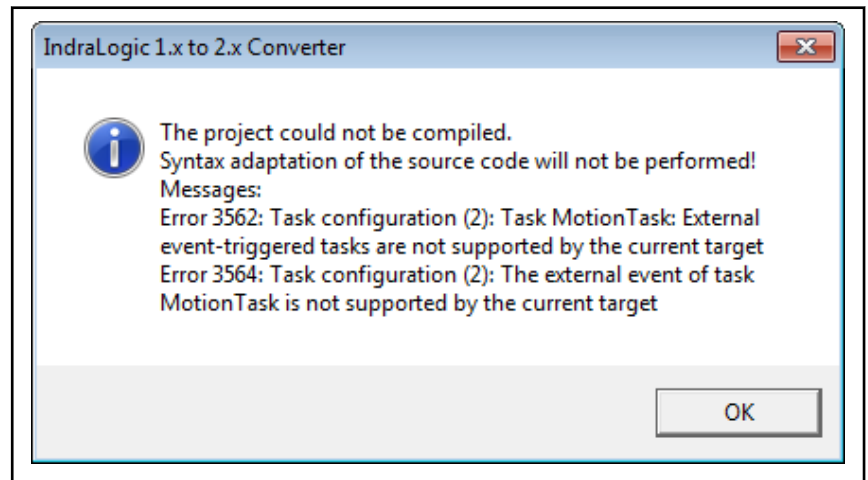


Fig. 6-6: Compilation dialog fails

This can have the following reasons:

- 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 10 "Changes between IndraLogic 1.x and IndraLogic 2G" on page 91](#)).

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:

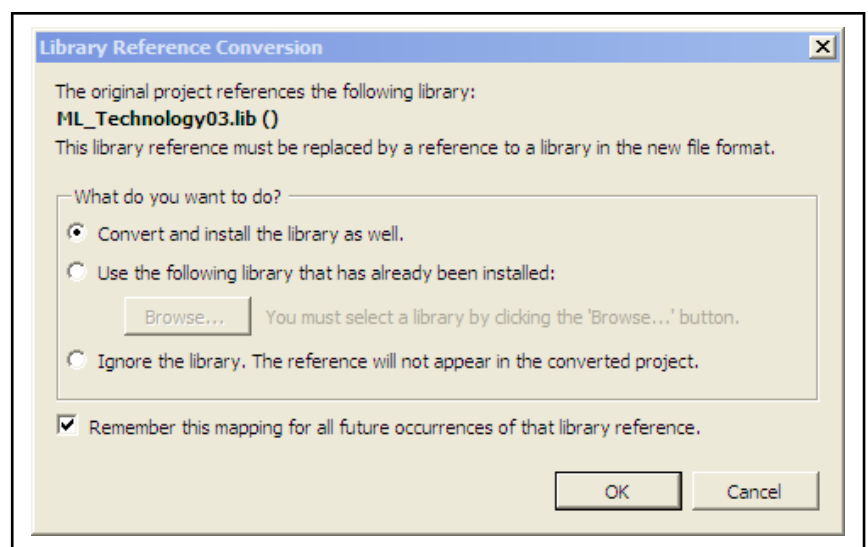


Fig. 6-7: Dialog library conversion

Converting IndraLogic 1.x to IndraWorks 14VRS IndraLogic XLC

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.

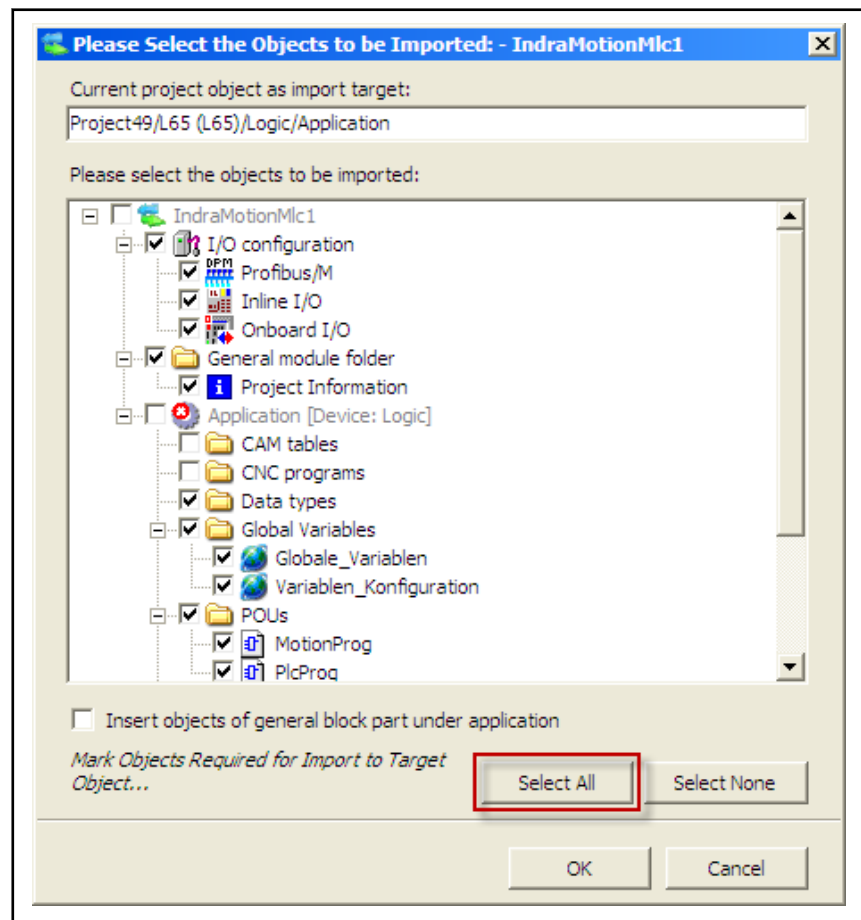


Fig. 6-8: Dialog Selection of objects to be imported

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 corrected by means of [chapter 10 "Changes between IndraLogic 1.x and IndraLogic 2G" on page 91](#).

6.4 Profibus device adjustments

6.4.1 Converting Profibus devices



A .Net version 3.5 is required to convert Profibus devices.
Windows 7 provides this .Net version.
Under Windows 8, install .Net 3.5.
Additionally, register the "IO.Gsd.ocx" file.

Post-installing .Net 3.5

The .Net 3.5 version is contained on the installation DVD of the Windows data carrier and is installed using the following command line command:

Command line command for post-installation

```
Dism /online /enable-feature /featurename:NetFx3 /All /Source:x:\sources\sxs /LimitAccess
```

The x:\sources\sxs path has to be replaced by the path linking to the SXS directory on the Windows 8 data carrier.

Post-registering the "IO.Gsd.ocx" file

Via the following command line, the IO.Gsd.ocx file can be post-registered from the installation path:

Command line command for post-registration

```
regsvr32 ..<Installationspfad>\IO.Gsd.ocx
```

Run this command as administrator!

Subsequently, restart IndraWorks.

6.4.2 Adjustments following a project conversion from IndraLogic 1x to IndraLogic 2G when using the RIL_Profibus.lib library

The equivalent but incompatible 2G library for the RIL_Profibus.lib library is the RIL_Profibus_02.library.

If function blocks or functions of the RIL_Profibus.lib library are used in the PLC program, the RIL_Profibus_02.library has to be integrated via the library manager after the conversion.

Subsequently, the corresponding program part has to be revised on the basis of the RIL_Profibus_02.library.

7 Step description

7.1 Creating a control

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

Creating control via drag&drop

Create a control in a project by dragging the library element from the respective subfolder (IndraLogic XLC, IndraMotion MLC) of the "Drive and Control" library folder to the project folder. The properties of the element are shown in the information window.

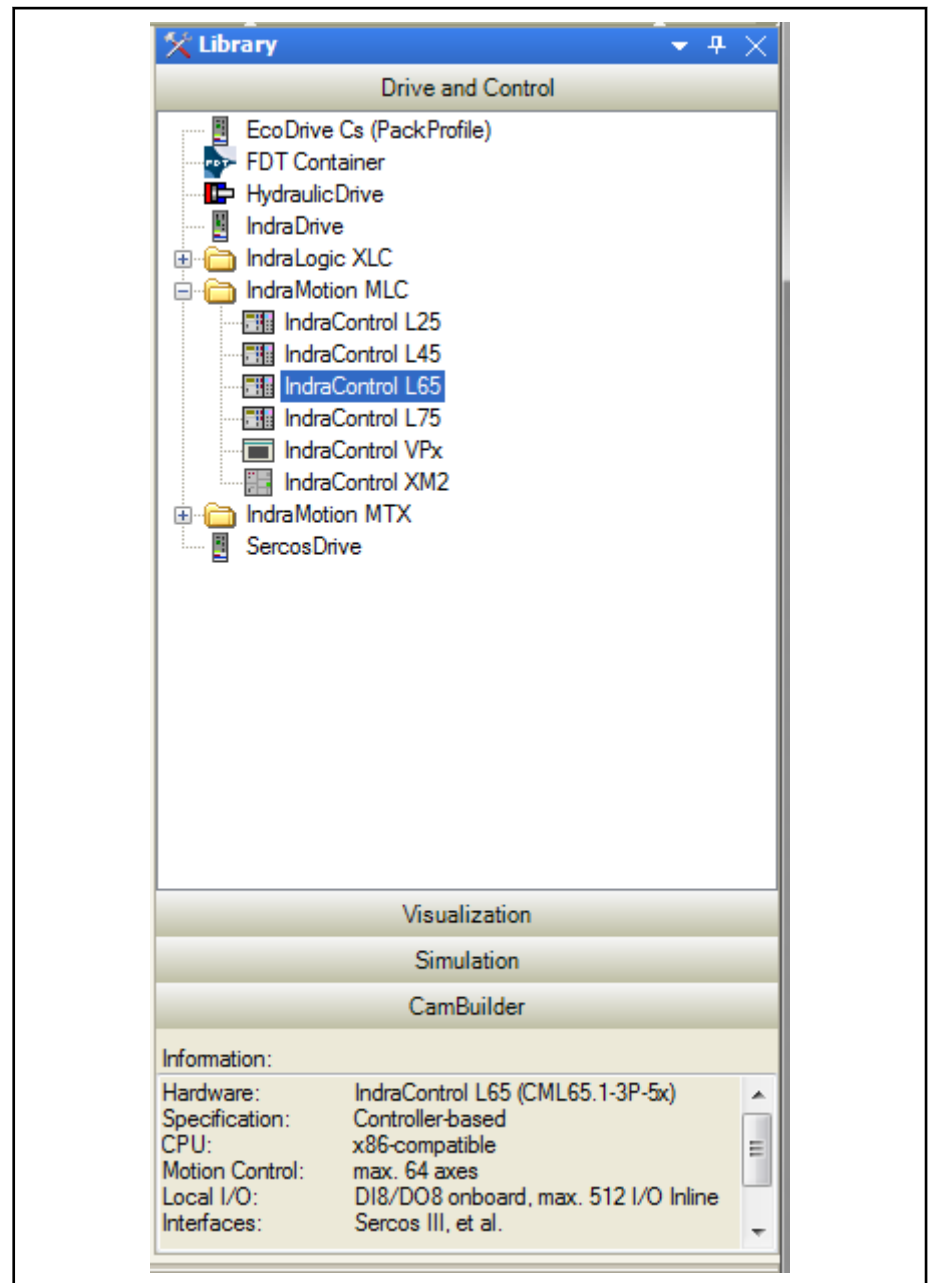


Fig. 7-1: Creating a control (as shown for the IndraMotion MLC L65) - Dragging from the library

Step description

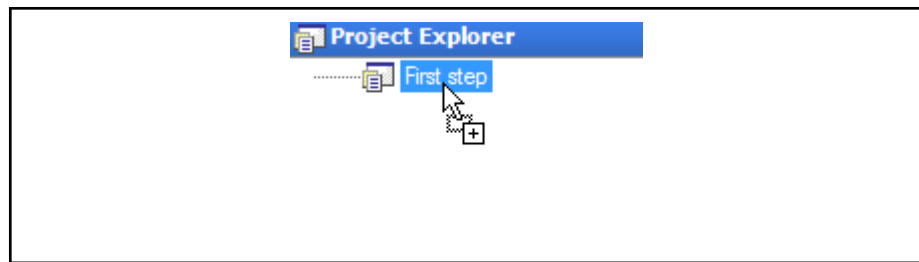


Fig. 7-2: Creating a control - Dropping it to the Project Explorer

Creating a control via the context menu

Right-click on the project node to open the context menu of the project. Select the control via the menu item "Add".

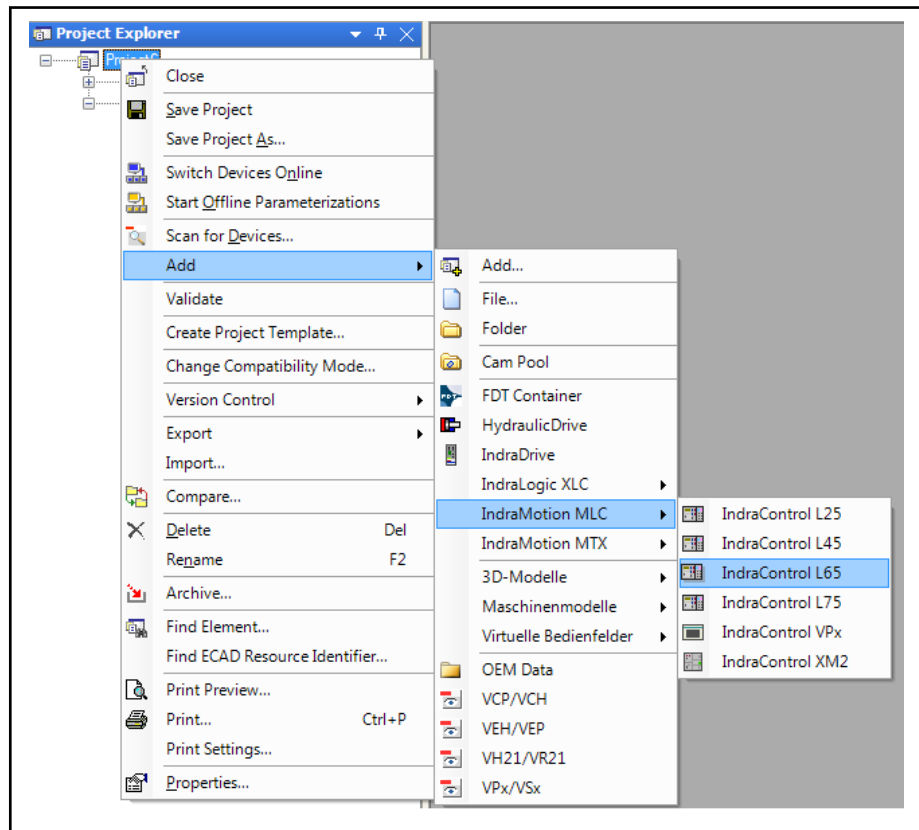


Fig. 7-3: Creating an IndraMotion MLC in the project

Step description

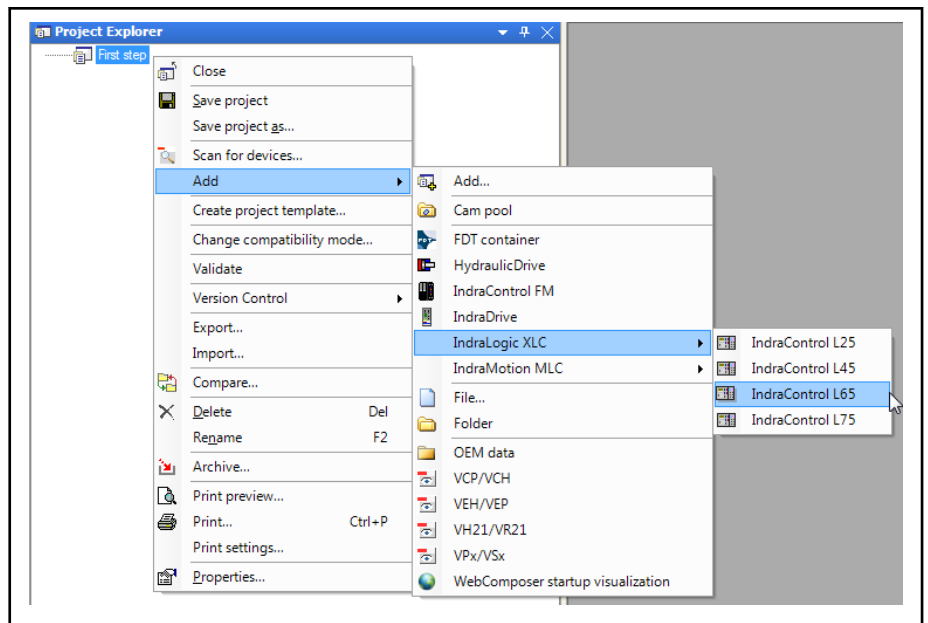


Fig. 7-4: Creating an IndraLogic XLC in the project

Creating a control by copying

A control can also be added via "copy and paste". A control that already exists in the project is copied and pasted at the project node.

Dialogs to create a control

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

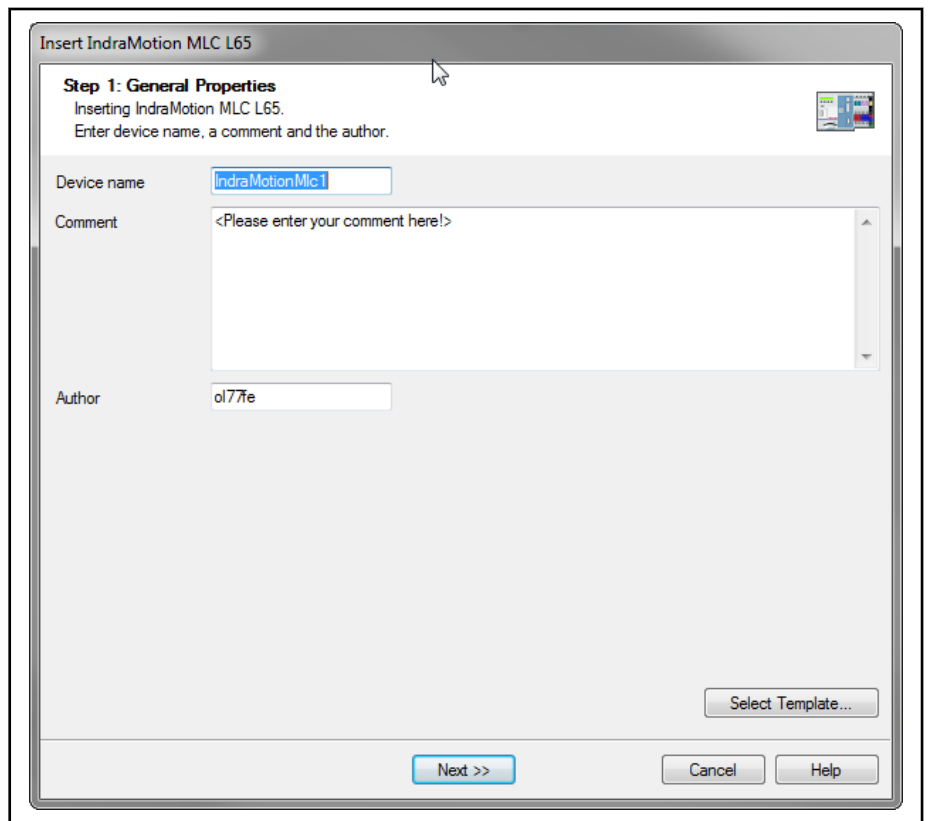


Fig. 7-5: Creating a control - General settings

In the "General settings" step, device name, comment on this device and 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

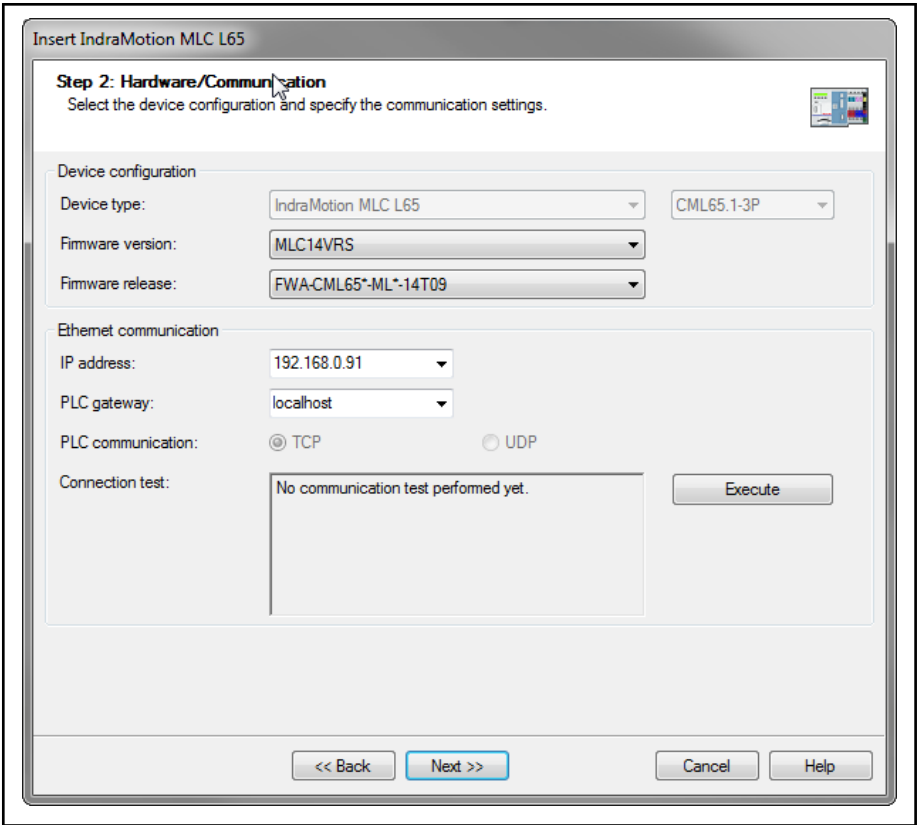


Fig. 7-6: Creating a control (shown for the IndraMotion MLC L65) - Hardware/communication

Device type The system and the control hardware is set in the “Device type” setting. The control hardware is written on the type plate of the control.

The following hardware types are available for the IndraMotion MLC:

Type code	IndraControl	Sercos III	Profibus/Profinet/ Ethernet IP onboard
CML45.1-3P	L45	●	●/●/●
CML65.1-3P	L65	●	●/●/●
CML75.1-3P	L75	●	●/●/●
XM2100.01-.../ XM2200.01-...	XM2	●	-/-/-
XM4203.21-...	XM4	●	-/●/●
MLC VP SET	VPx	●	●/○/○

- Default
- Option
- Not available

Tab. 7-1: IndraMotion MLC hardware variants

The following hardware types are available for the IndraLogic XLC:

Step description

Type code	IndraControl	Sercos III	Profibus/Profinet/ Ethernet IP onboard
CML45.1-3P	L45	•	•/•/•
CML45.1-NP	L45	-	•/•/•
CML65.1-3P	L65	•	•/•/•
CML65.1-NP	L65	-	•/•/•
CML75.1-3P	L75	•	•/•/•
CML75.1-NP	L75	-	•/•/•

- Default
- Not available

Tab. 7-2: IndraLogic XLC hardware variants

The selected hardware platform can be subsequently modified via the "Properties" dialog of the device (open via context menu of the device) at any time.

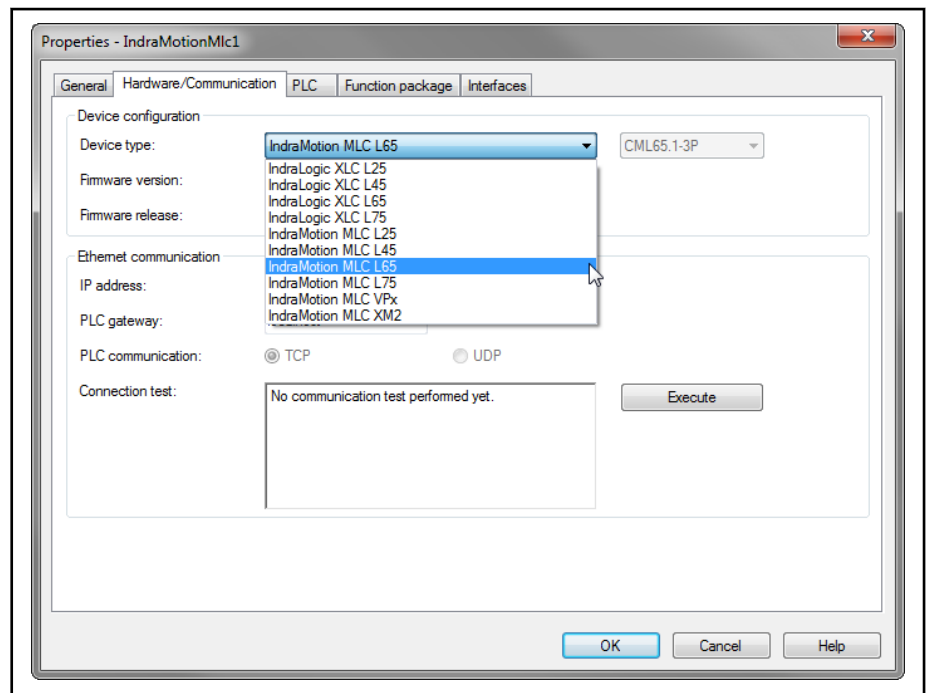


Fig. 7-7: Changing the device type

Step description

	 The device types (product family and hardware) differ in their functional scope. If the newly set device type does not support certain features of the source device type, this special configurations are deleted during conversion (e.g. Sercos III available/not available). Features 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 providing information on the additional or unsupported features of the target device. The device conversion can still be cancelled. The device type is only changed when the change preview is confirmed with OK.
Firmware version	The firmware version generally corresponds to the IndraWorks Suite version.
Firmware release	The "Firmware release" entry references the device description files and libraries belonging to the firmware.
IP address	The IP address of the control "has to" be set in the Configuration step. Otherwise, there is no communication with the control. For the CML25, CML45 and CML75-based controls, the IP address can be shown in the control display.  <i>Fig. 7-8: Display with four operating keys (standard display)</i> Displaying the IP address of the control: 1. Press <Enter> on the display. The ETHERNET display is shown. 2. Press <Enter> again. Now the IP address is displayed (running horizontally across the display).
	 The IP address is set for an XM or VPB40.4 control via the tool IndraControl First Touch. For further information, refer to the device-specific operating instructions.
PLC gateway	The PLC Gateway is generally located on the same computer on 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).

Step description

Insert IndraMotion MLC L65

Step 3: Extended settings
Specify the IndraLogic configuration and select a programming template.
Specify if the offline parameterization for drives is to be supported.

PLC properties

- ☒ Secure online mode
- ☒ Check array accesses
- ☐ Transmit PLC sources together with the boot application

PLC programming templates

☒ Standard Programming language: **ST**

☐ GAT Wizard

☐ Empty

Offline parameterization

☐ Support offline parameterization for drives (S-/P-parameters)

<< Back Next >> Cancel Help

Fig. 7-9: Creating a control - PLC properties

Insert IndraMotion MLC L65

Step 3: Extended settings
Specify the IndraLogic configuration and select a programming template.
Specify if the offline parameterization for drives is to be supported.

PLC properties

- ☒ Secure online mode
- ☒ Check array accesses
- ☐ Transmit PLC sources together with the boot application

PLC programming templates

☒ Standard Programming language: **ST**

☐ GAT Wizard

☐ Empty

Offline parameterization

☐ Support offline parameterization for drives (S-/P-parameters)

<< Back Next >> Cancel Help

Fig. 7-10: Creating a control - Extended settings

Step description

Secure online mode	The "Secure Online Mode" switch enables additional requests to start and stop the PLC and to force values in the PLC monitoring. It is enabled by default for security reasons.
Checking array access	If this switch is enabled, the check function "CheckBounds" from the template database is automatically inserted below the PLC application node. If this switch is disabled again in case of an already existing control, the check function "CheckBounds" is only automatically removed if the following comment block is still present in the implementation section of the check function: <pre>(***** This function was generated by the 'check array access' option of the "Properties" dialog of the controller. If you delete this comment, this function will not be removed by disabling the 'check array access' option. *****)</pre> Customized adaptations in the implementation part of the check function are not deleted when enabling the switch if the comment block is removed.
Transferring PLC sources together with the boot application	 As the automatically inserted check function is not removed anymore when deleting the comment block, the CheckBounds function has to be deleted manually from the application to disable the monitoring of the array limits. A disabled switch does not mean that no CheckBounds functionality is active. If the check function is inserted or deleted, login via online change is not possible. A download is required.
	The checkbox is only selected if the PLC application type "Standard" or "GAT Wizard" is enabled and if there is no user-defined CheckBounds function.
Transferring PLC sources together with the boot application	When transferring the boot application, PLC program sources (POUs, tasks, etc.) are transferred to the control in addition to the compilation. Use this function to additionally display a detailed comparison for the PLC elements during online comparison.
Programming templates	Select between the following variants for the PLC application to be created: • Default: The empty default programs "MotionProg" and "PlcProg" are automatically created in the selected programming language. For other PLC objects, the programming language is selected when creating the object • GAT wizard: Example projects or programming templates can be selected in an additional dialog. GAT is a programming frame ready for operation with predefined locations for the application code. Professional and well-structured application programs with prepared elements using the dialog-based code generation of the GAT Wizard are automatically created • Empty: Creates an empty, non-executable PLC application without programs and tasks
Offline parameterization	The radio button "Support offline parameterization for drives (S-/P-parameters)" enables the offline parameterization for drives. As accessing is very slow, the radio button is disabled by default.
Function packages	Due to the acquired firmware, the function packages are predefined and can thus not be selected for the controls IndraControl L25/L45/L65 and L75. Due to the purchased licenses, the function packages can be selected for the controls IndraControl XM21/22/42 or IndraControl VPx.

Step description

In the fifth 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.

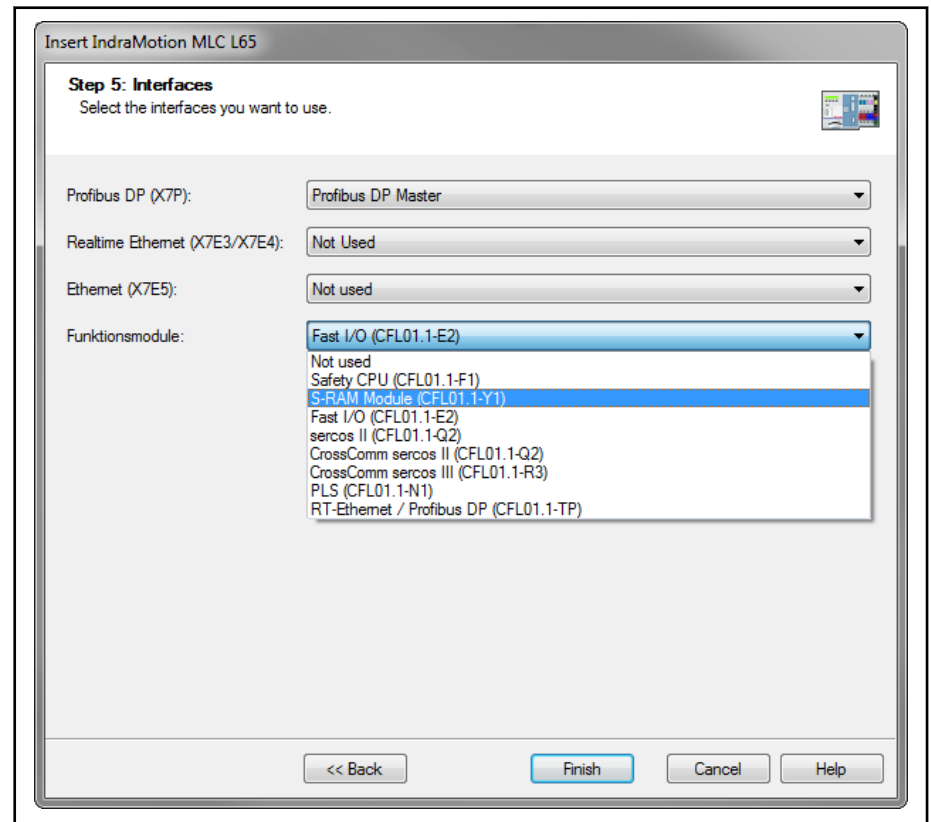


Fig. 7-11: Creating a control (shown for IndraMotion MLC L65) - Specifying the function modules connected, here S-RAM module (CFL01.1-Y1)



Inserting a function module with the IndraLogic XLC / IndraMotion MLC Lxx is also possible if it is not yet connected to the control. While going online, the absence is acknowledged by an error message. A subsequently connected module is detected at next control startup.

Click on **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 IndraLogic XLC IndraMotion MLC14VRS Functional Description", chapter "Structure of a Project", see [\[External link could not be resolved.\]](#).

Context menu

The context menu is described in detail in the documentation "Rexroth IndraLogic XLC IndraMotion MLC14VRS Functional Description", chapter "Control - Context menu", see [\[External link could not be resolved.\]](#).

Step description

7.2 Creating a function module



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

To extend the functionality of the control, up to four (up to two for an IndraMotion MLC L25/IndraLogic XLC L25) function modules can be connected on the left of the control.

Specifying function module when configuring 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 added to the right location in the Project Explorer.

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

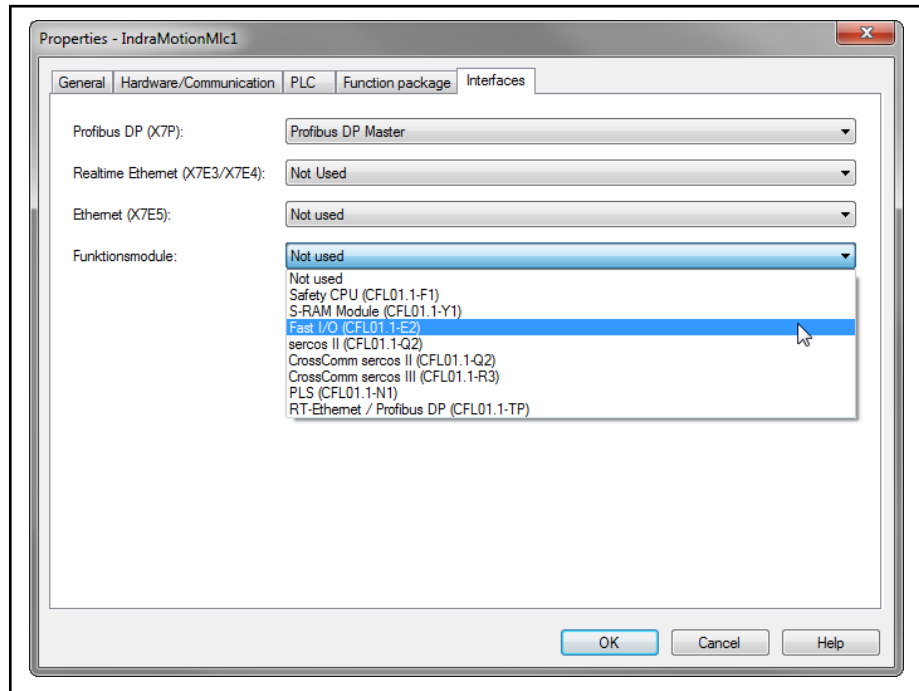


Fig. 7-12: Inserting a Fast I/O function module using a wizard (for an IndraMotion MLC for example)

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

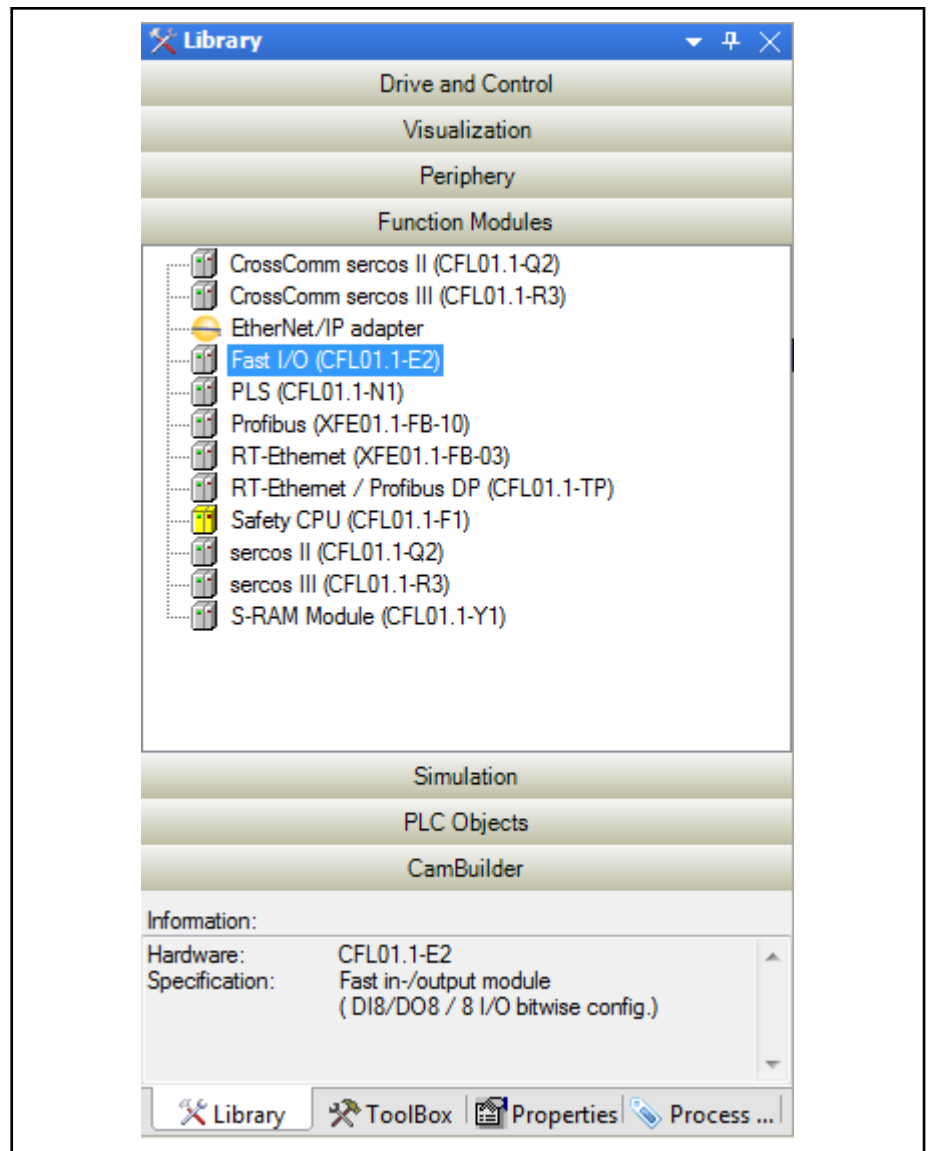


Fig. 7-13: Dragging a module from the library

.... and "drop" it on the control or above the Sercos folder.

Step description

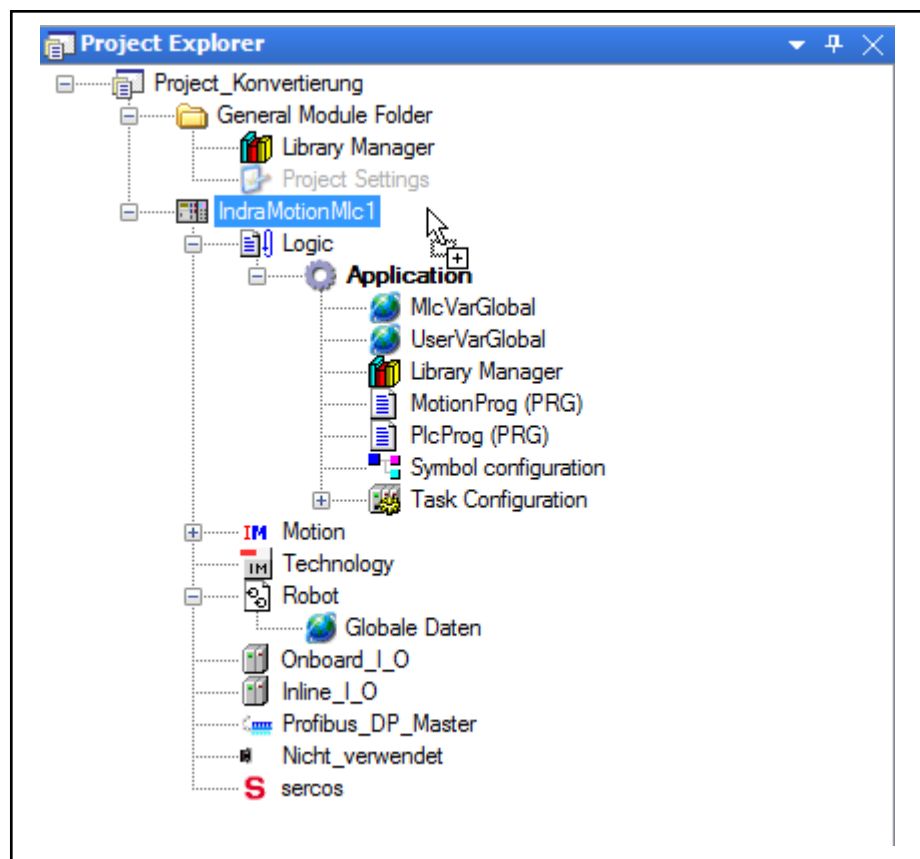


Fig. 7-14: Inserting a module



A subsequently connected module is only detected upon the next control startup.

Configuring the module

Each module, except for the S-RAM module (CFL01.1-Y1), has to be subsequently 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 14VRS Function Modules", see [tab. 1-13 "XCL/MLC documentation overview - Hardware"](#) on page 11.

7.3 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 14VRS.

Execution

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

Step description

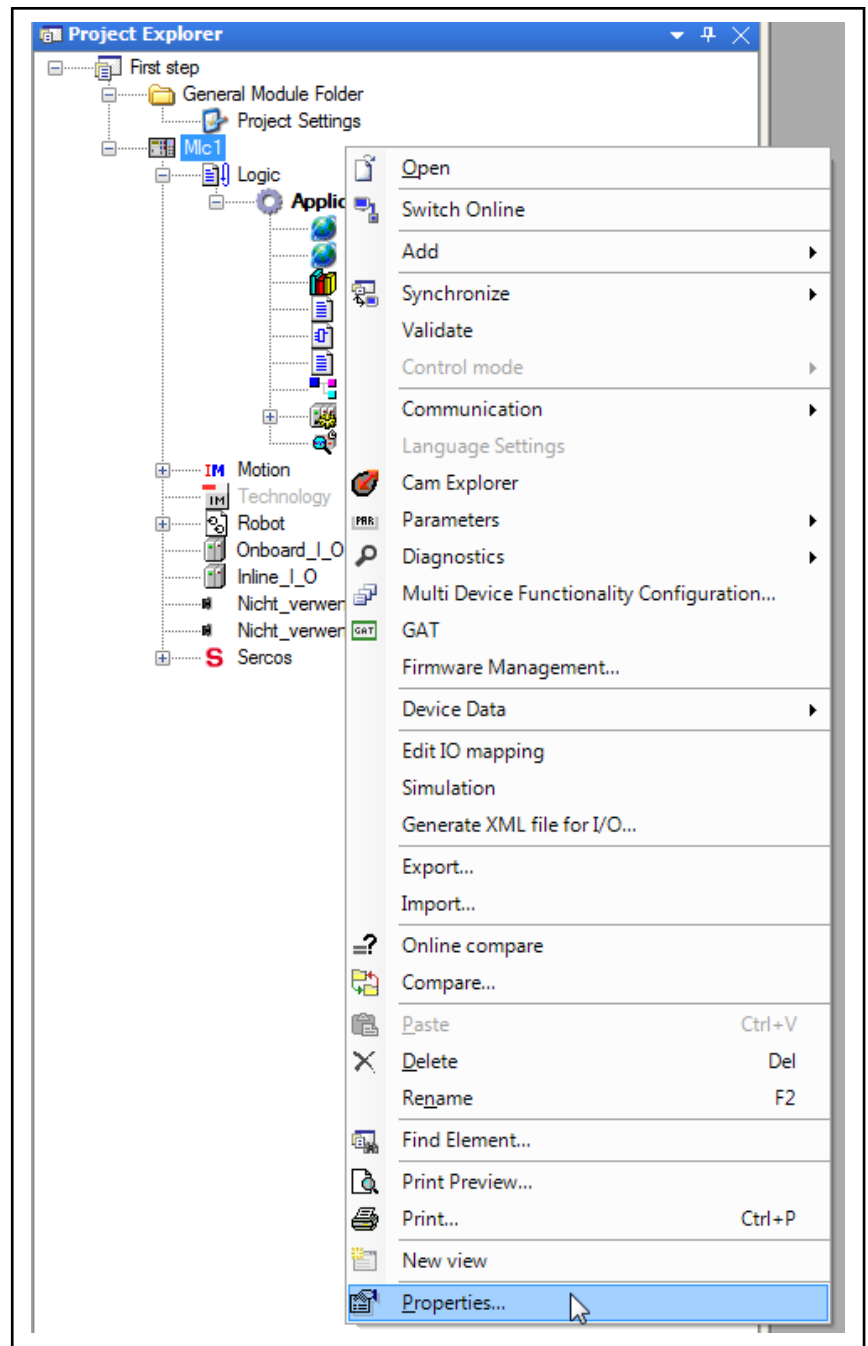


Fig. 7-15: Context menu of the control

The properties dialog of the control is displayed.

2. Version jump:

Under "Firmware version", the version 14VRS has to be selected.

Step description

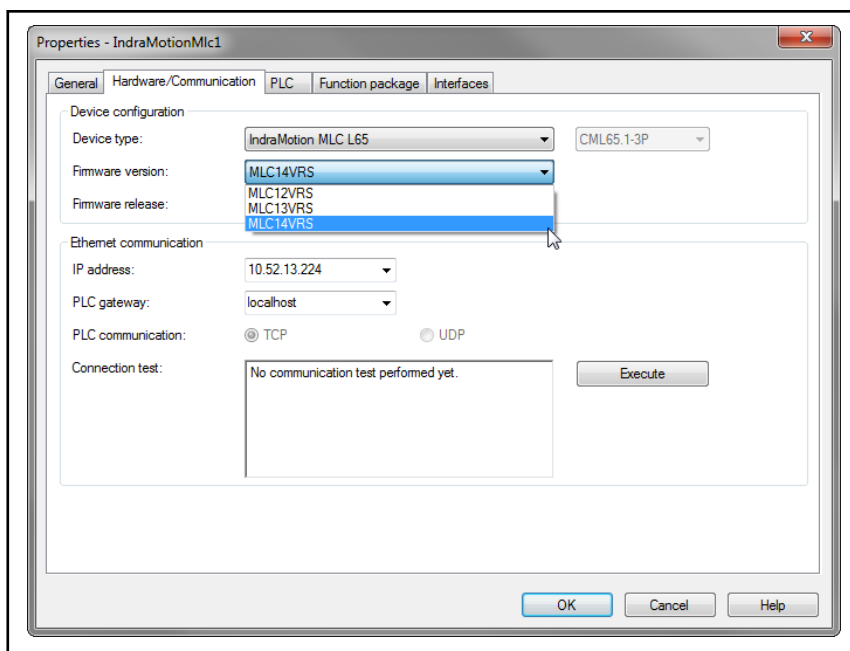


Fig. 7-16: The Properties dialog of the control is used to change the control version.

Release jump:

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

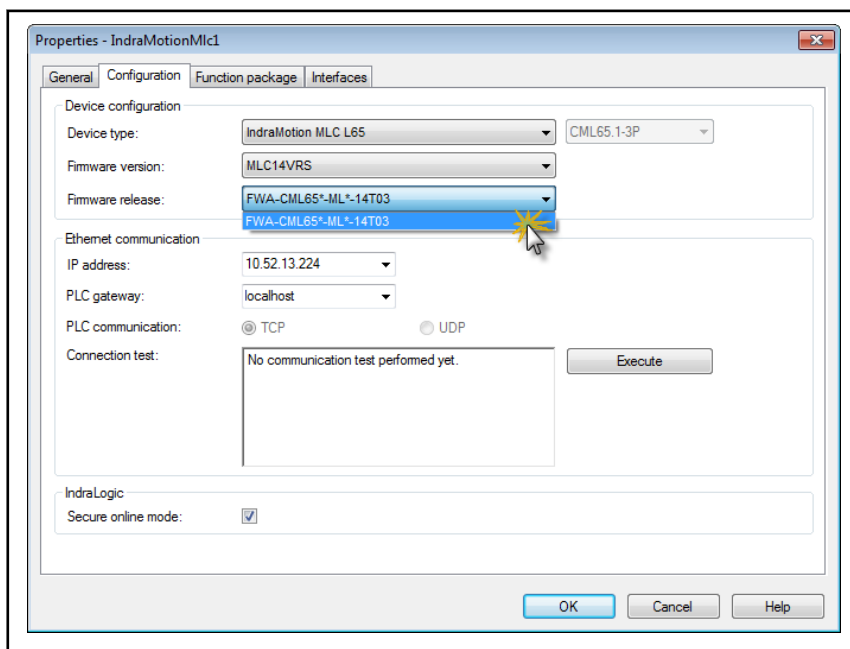


Fig. 7-17: The Properties dialog of the control is used to change the release.

3. Complete by clicking on **OK**.
The control is converted to version 14VRS.

7.4 Exchanging XLC/MLC firmware

Target The control firmware is to be exchanged.

Step description

- Prerequisites**
- 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 containing the control was loaded
 - 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 12VRS, 13VRS or 14VRS is not supported. Note that XLC firmware variants are also provided as update option in addition to the MLC firmware. In this case, an MLC firmware version has to be selected, as the functionality of the control is otherwise limited.



If the intermediate step is to be executed via a firmware 11VRS, consider the current firmware variant XLC or MLC to be used.

Example: If the firmware XLC is to be used in 14VRS, a firmware file of version 11VRS has to be used for the intermediate step in an XLC.



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.

If a version is changed, user data is deleted. If the current control data is required, back up the respective device data before.

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.

Step description

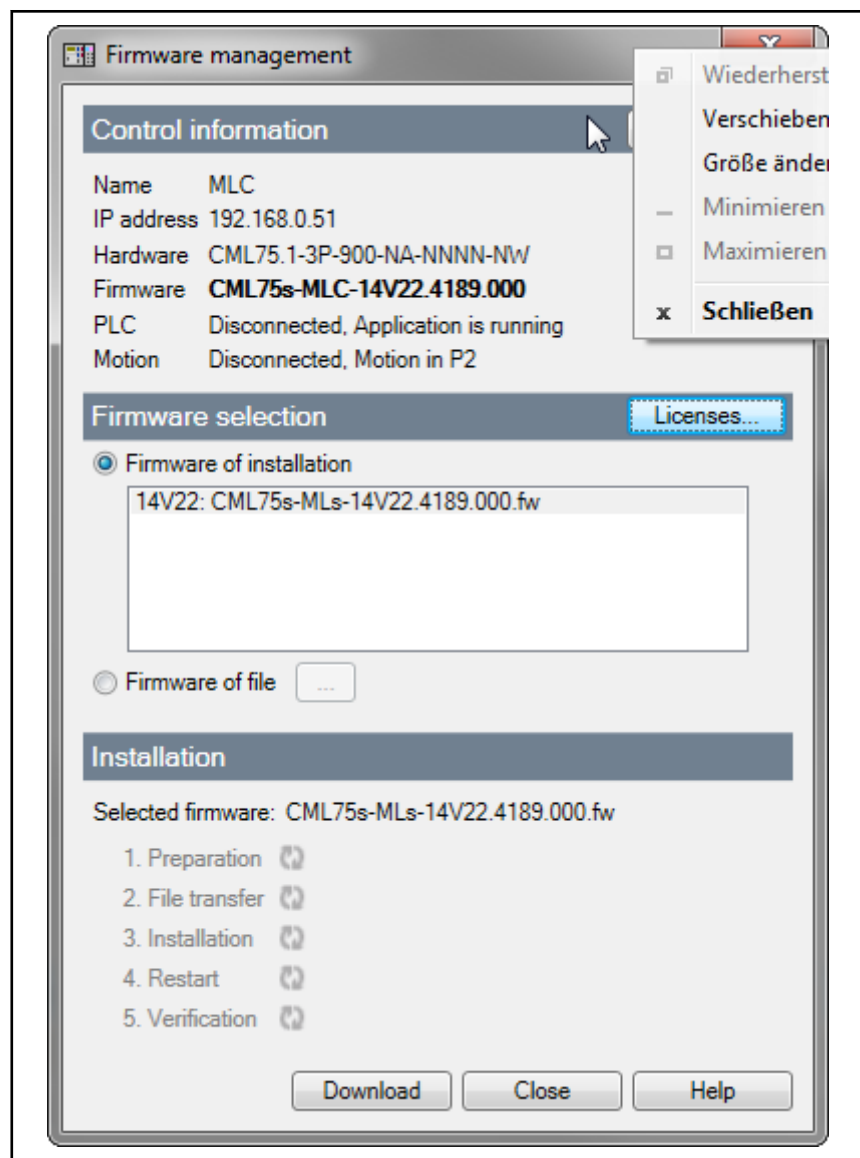


Fig. 7-18: Example: IndraMotion MLC L65 "Firmware Management" dialog

The firmware version available can be selected using the radio button "Firmware of installation" via the IndraWorks installation. Select the desired version. Alternatively, another firmware version can be referenced via the "Firmware of file" radio button.

Then, click on **Download...** to start the download.

The versions available for selection are located under:

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

<Control>: "XLC" or "MLC".



The newly loaded firmware is only applied after the control restart. For the controls L25, L45, L65 and L75, also note the text shown in the control display. If the FPGA of the control has to be updated due to the newly loaded firmware (display HW_INIT), do not switch off the control during programming

3. Confirm the firmware download.

Step description

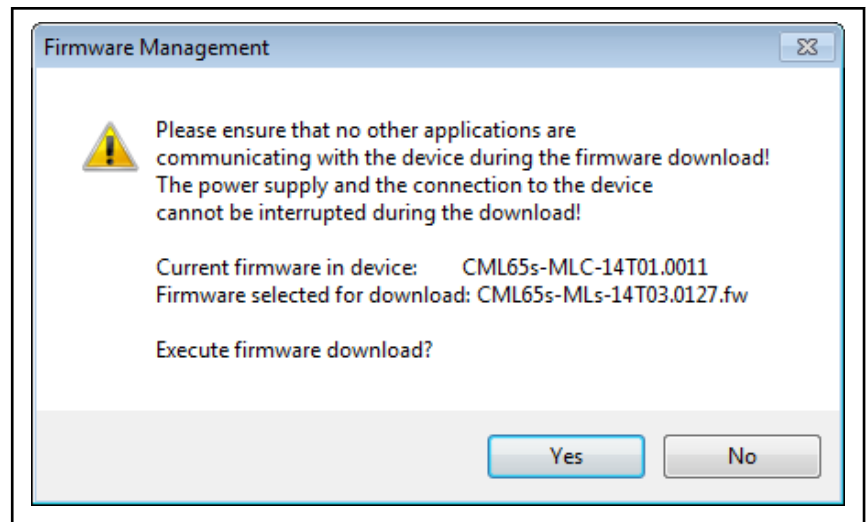


Fig. 7-19: Confirmation of the firmware download

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.

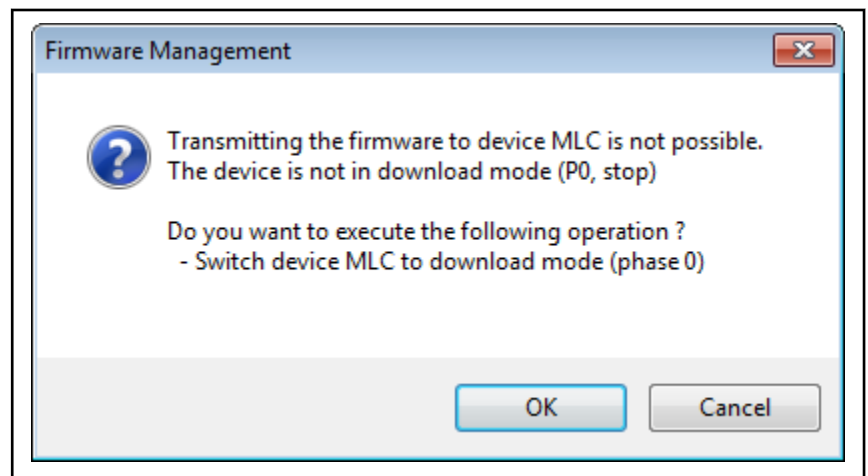


Fig. 7-20: Stopping the PLC

5. Confirm the dialog after establishing the safe state.

Step description

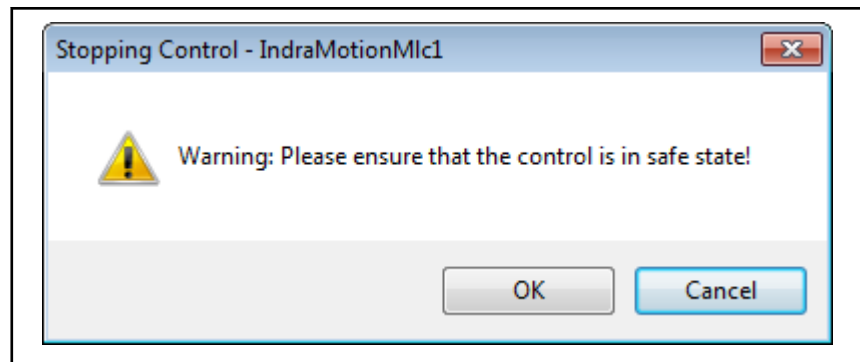


Fig. 7-21: Safe state when stopping the control

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 of the control". Communication continues. A progress bar shows the status.

6. 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 of the control".



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 7.5 "Deleting XLC/MLC memory" on page 62](#)).

7.5 Deleting XLC/MLC memory

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



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.

Step description

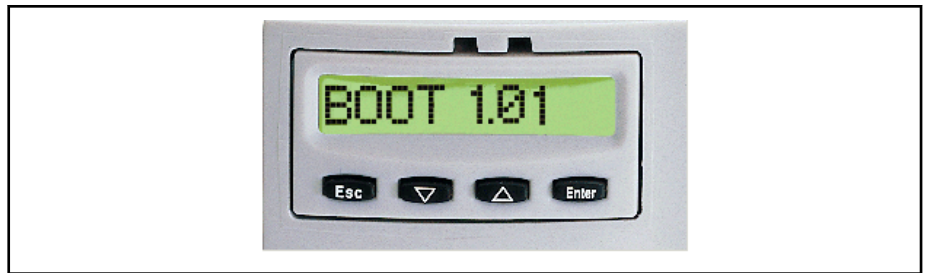


Fig. 7-22: Startup phase of the control (display CML25/45/65/75)

Instruction on how to delete memory - CML controls

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.

Confirm with <Enter>. **CLEANUP** is displayed. If the clean-up was completed successfully, **SUCCESS** and subsequently **REBOOT** are displayed.

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.



For the XM- and VPB40-based control variants, the internal memory can also be deleted via **BOOTSTOP**. Details are described in the MLC function description.

Alternatively, these controls can also be reset to their state upon delivery via the IndraControl First Touch. However, in this case, the IP settings of the control have to be configured and the MLC firmware has to be downloaded additionally.

7.6 Updating PLC libraries

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.

Prerequisites

- IndraWorks project has been loaded
- "Change compatibility mode" to the latest version has been executed
- The control is converted to the current version -> Properties dialog of the control

Execution

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

Step description

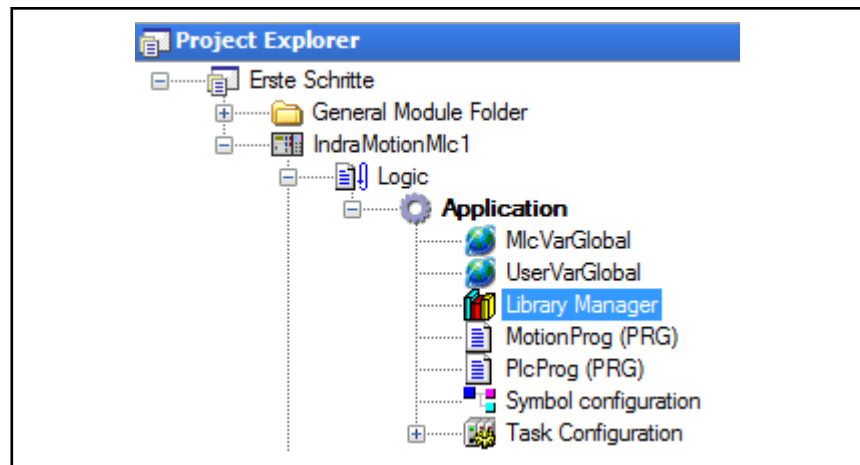


Fig. 7-23: Opening the library manager

The library manager of the control is opened.

2. 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.

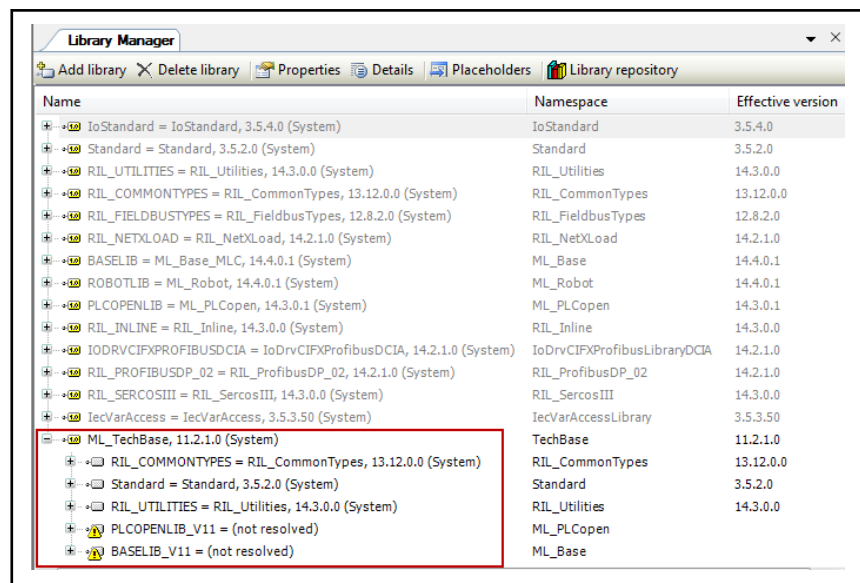


Fig. 7-24: Outdated libraries in the project

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

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

Step description

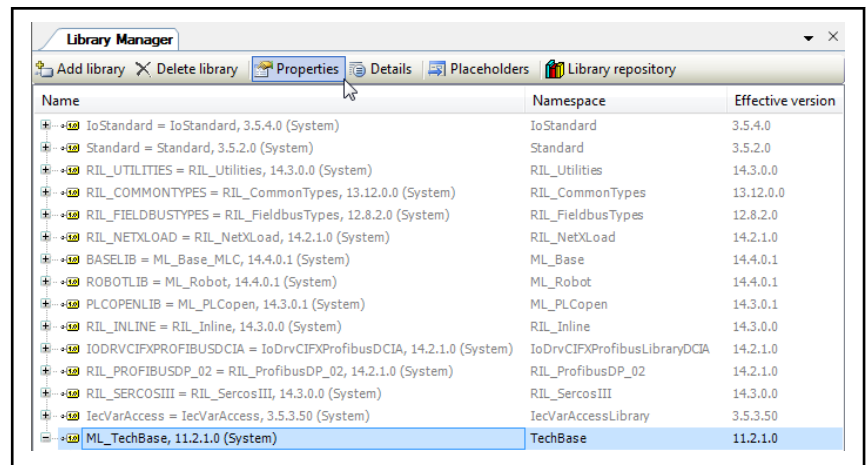


Fig. 7-25: PLC library properties

4.

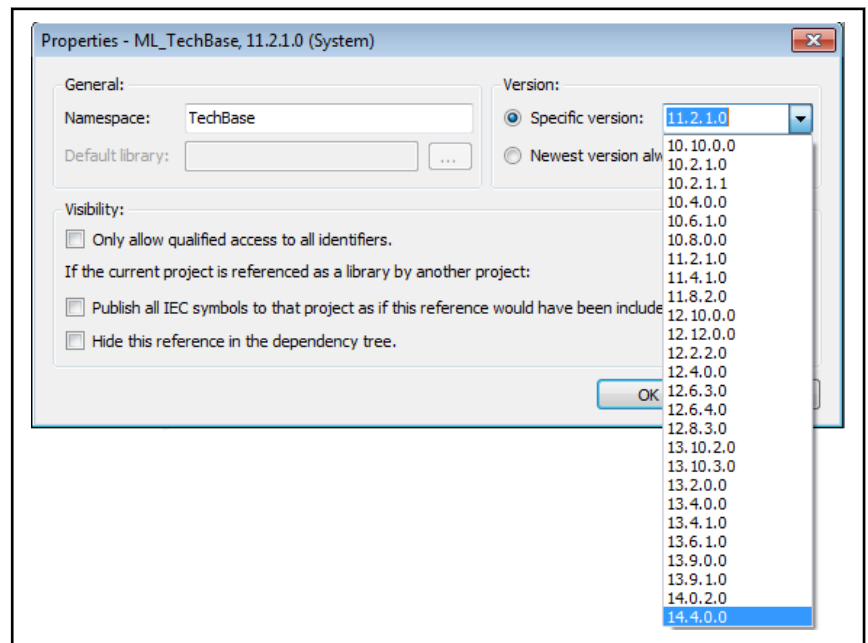


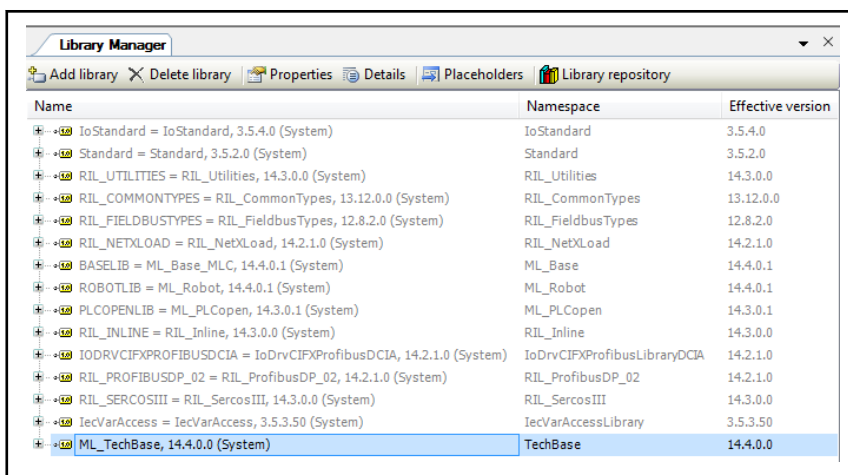
Fig. 7-26: Setting the version

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

Subsequently, the dialog can be closed with OK.

The PLC library has been updated to the latest version.

Step description



Name	Namespace	Effective version
IoStandard = IoStandard, 3.5.4.0 (System)	IoStandard	3.5.4.0
Standard = Standard, 3.5.2.0 (System)	Standard	3.5.2.0
RIL_UTILITIES = RIL_Utilities, 14.3.0.0 (System)	RIL_Utilities	14.3.0.0
RIL_COMMONTYPES = RIL_CommonTypes, 13.12.0.0 (System)	RIL_CommonTypes	13.12.0.0
RIL_FIELDBUSTYPES = RIL_FieldbusTypes, 12.8.2.0 (System)	RIL_FieldbusTypes	12.8.2.0
RIL_NETXLOAD = RIL_NetXLoad, 14.2.1.0 (System)	RIL_NetXLoad	14.2.1.0
BASELIB = ML_Base_MLC, 14.4.0.1 (System)	ML_Base	14.4.0.1
ROBOTLIB = ML_Robot, 14.4.0.1 (System)	ML_Robot	14.4.0.1
PLCOPENLIB = ML_PLCopen, 14.3.0.1 (System)	ML_PLCopen	14.3.0.1
RIL_INLINE = RIL_Inline, 14.3.0.0 (System)	RIL_Inline	14.3.0.0
IODRVCIKXPROFIBUSDCIA = IoDrvCIKXProfibusDCIA, 14.2.1.0 (System)	IoDrvCIKXProfibusLibraryDCIA	14.2.1.0
RIL_PROFIBUSDP_02 = RIL_ProfibusDP_02, 14.2.1.0 (System)	RIL_ProfibusDP_02	14.2.1.0
RIL_SERCOSIII = RIL_SercosIII, 14.3.0.0 (System)	RIL_SercosIII	14.3.0.0
IecVarAccess = IecVarAccess, 3.5.3.50 (System)	IecVarAccessLibrary	3.5.3.50
ML_TechBase, 14.4.0.0 (System)	TechBase	14.4.0.0

Fig. 7-27: Updated PLC library

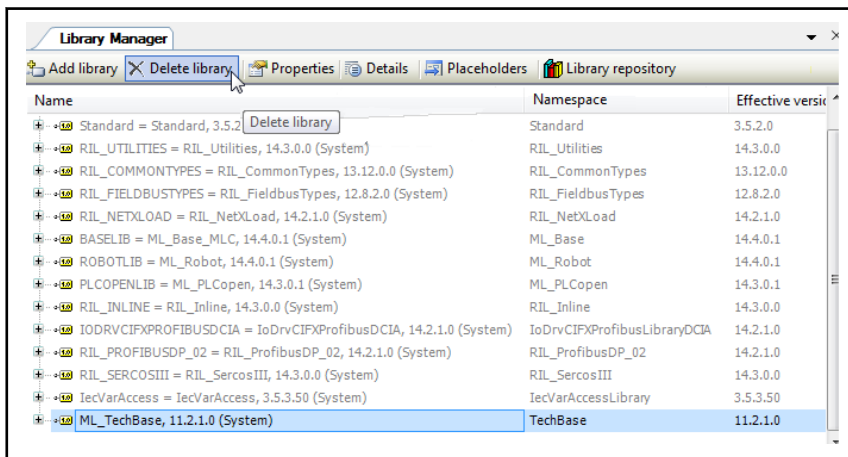
This process is to be repeated for all outdated libraries.

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:

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



Name	Namespace	Effective version
Standard = Standard, 3.5.2	Standard	3.5.2.0
RIL_UTILITIES = RIL_Utilities, 14.3.0.0 (System)	RIL_Utilities	14.3.0.0
RIL_COMMONTYPES = RIL_CommonTypes, 13.12.0.0 (System)	RIL_CommonTypes	13.12.0.0
RIL_FIELDBUSTYPES = RIL_FieldbusTypes, 12.8.2.0 (System)	RIL_FieldbusTypes	12.8.2.0
RIL_NETXLOAD = RIL_NetXLoad, 14.2.1.0 (System)	RIL_NetXLoad	14.2.1.0
BASELIB = ML_Base_MLC, 14.4.0.1 (System)	ML_Base	14.4.0.1
ROBOTLIB = ML_Robot, 14.4.0.1 (System)	ML_Robot	14.4.0.1
PLCOPENLIB = ML_PLCopen, 14.3.0.1 (System)	ML_PLCopen	14.3.0.1
RIL_INLINE = RIL_Inline, 14.3.0.0 (System)	RIL_Inline	14.3.0.0
IODRVCIKXPROFIBUSDCIA = IoDrvCIKXProfibusDCIA, 14.2.1.0 (System)	IoDrvCIKXProfibusLibraryDCIA	14.2.1.0
RIL_PROFIBUSDP_02 = RIL_ProfibusDP_02, 14.2.1.0 (System)	RIL_ProfibusDP_02	14.2.1.0
RIL_SERCOSIII = RIL_SercosIII, 14.3.0.0 (System)	RIL_SercosIII	14.3.0.0
IecVarAccess = IecVarAccess, 3.5.3.50 (System)	IecVarAccessLibrary	3.5.3.50
ML_TechBase, 11.2.1.0 (System)	TechBase	11.2.1.0

Fig. 7-28: Deleting a PLC library

The library has been removed from the library manager.

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

The dialog "Library Added" is displayed. Subsequently, click on "Extended".

Step description

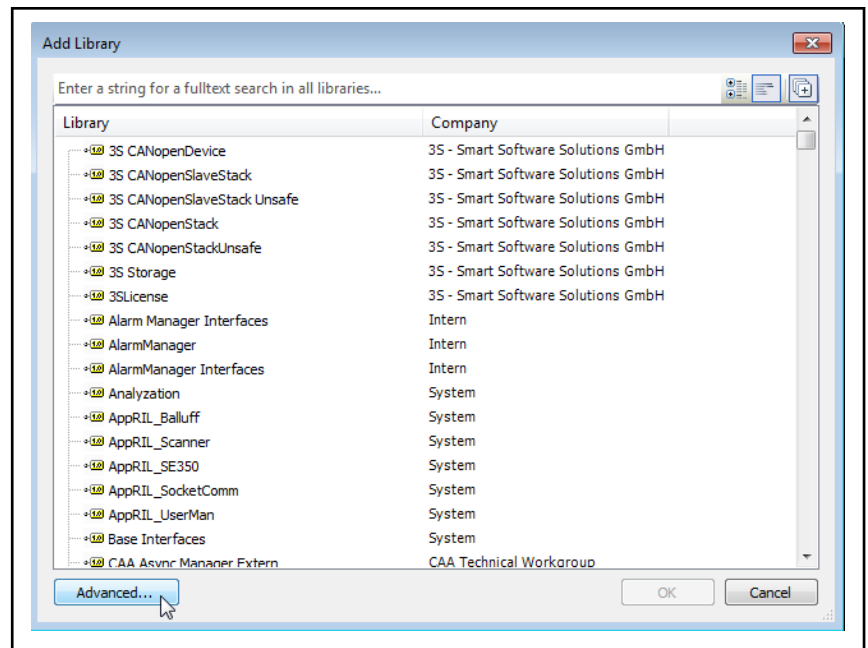


Fig. 7-29: Adding a library

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

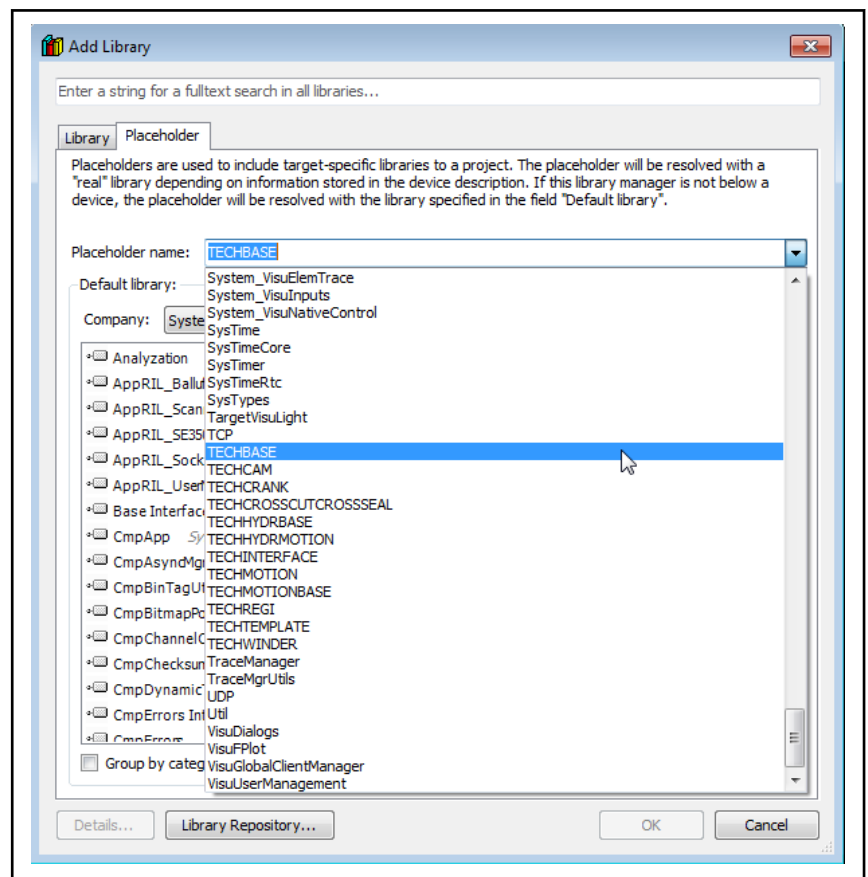


Fig. 7-30: Selecting the placeholder

The placeholder has been entered.

Step description

4. 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.

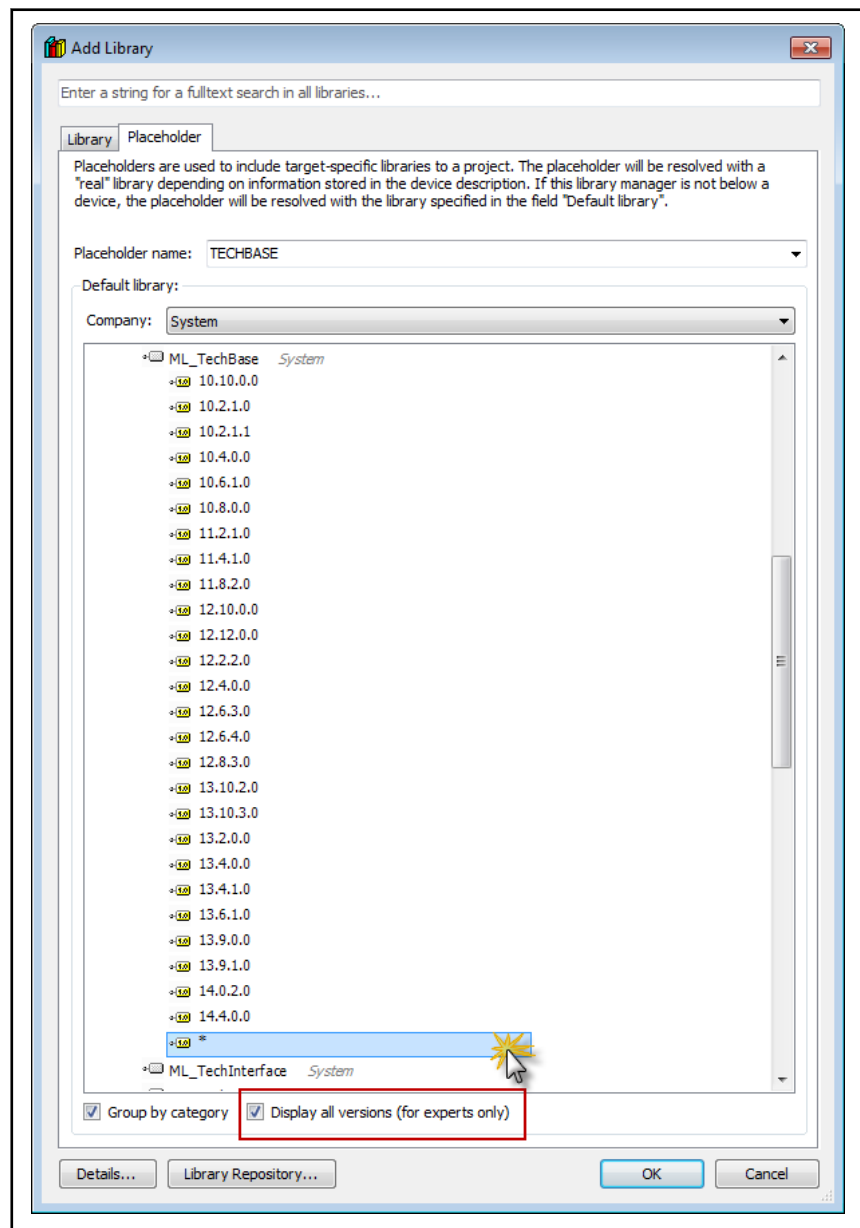


Fig. 7-31: Default library selection

The new library has been added to the library manager.

Step description

Name	Namespace	Effective version
IoStandard = IoStandard, 3.5.4.0 (System)	IoStandard	3.5.4.0
Standard = Standard, 3.5.2.0 (System)	Standard	3.5.2.0
RIL_UTILITIES = RIL_Utilities, 14.3.0.0 (System)	RIL_Utilities	14.3.0.0
RIL_COMMONTYPES = RIL_CommonTypes, 13.12.0.0 (System)	RIL_CommonTypes	13.12.0.0
RIL_FIELDBUSTYPES = RIL_FieldbusTypes, 12.8.2.0 (System)	RIL_FieldbusTypes	12.8.2.0
RIL_NETXLOAD = RIL_NetXLoad, 14.2.1.0 (System)	RIL_NetXLoad	14.2.1.0
BASELIB = ML_Base_MLC, 14.4.0.1 (System)	ML_Base	14.4.0.1
ROBOTLIB = ML_Robot, 14.4.0.1 (System)	ML_Robot	14.4.0.1
PLCOPENLIB = ML_PLCopen, 14.3.0.1 (System)	ML_PLCopen	14.3.0.1
RIL_INLINE = RIL_Inline, 14.3.0.0 (System)	RIL_Inline	14.3.0.0
IODRVCFXPROFIBUSDCIA = IoDrvCfXProfibusLibraryDCIA, 14.2.1.0 (System)	IoDrvCfXProfibusLibraryDCIA	14.2.1.0
RIL_PROFIBUSDP_02 = RIL_ProfibusDP_02, 14.2.1.0 (System)	RIL_ProfibusDP_02	14.2.1.0
RIL_SERCOSIII = RIL_SercosIII, 14.3.0.0 (System)	RIL_SercosIII	14.3.0.0
IecVarAccess = IecVarAccess, 3.5.3.50 (System)	IecVarAccessLibrary	3.5.3.50
TECHBASE = ML_TechBase, 14.4.0.0 (System)	TechBase	14.4.0.0

Fig. 7-32: Newly added library with placeholder

Placeholder List

Placeholder	Default library
BASELIB	ML_Base, *
BASELIBCONST	ML_Base_Constant_MLC_L25,* ML_Base_Constant_MLC_L45,* ML_Base_Constant_MLC_L45,* ML_Base_Constant_MLC_L65,* ML_Base_Constant_MLC_L75,* ML_Base_Constant_XLC_L25,* ML_Base_Constant_XLC_L45,* ML_Base_Constant_XLC_L45,* ML_Base_Constant_XLC_L65,* ML_Base_Constant_XLC_L75,* ML_Base_Constant_MLC_XM2x,* ML_Base_Constant_MLC_XM4x,* ML_Base_Constant_MLC_VPx,*
PLCOPENLIB	ML_PLCopen,*
ROBOTLIB	ML_Robot,*
CONTROLLERBASE	ML_ControllerBase,*
KINTECH	ML_KinTech,*
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,*
TECHMOTIONBASE	ML_TechMotionBase,*
TECHHYDRBASE	MH_TechHydrBase,*
TECHHYDRMOTION	MH_TechHydrMotion,*
SEQPROG	ML_SeqProg,*
JOBComm	ML_JobComm,*
RIH_DALI	RIH_Dali,*
RIH_MODBUS	RIH_MODBUS,*
RIH_INDRACONTROL_S20	RIH_IndraControl_S20,* RIH_IndraControl_S20_XM,*
RIH_SAFETY	RIH_Safety,*
RIH_SAFETY_PROFIBUSDP	RIH_Safety_ProfibusDP,*
RIH_SAFETY_PROFINETIO	RIH_Safety_ProfinetIO,*
RIH_SAFETY_SERCOSIII	RIH_Safety_SercosIII,*
RIL_4EEENERGYMANAGEMENT	RIL_4EEEnergyManagement,*
RIL_COMMONTYPES	RIL_CommonTypes,*
RIL_DIAGNOSIS	RIL_Diagnosis,*
RIL_ETHERCAT	RIL_Ethercat,*
RIL_ETHERNETIP	RIL_EthernetIP,*
RIL_ETHERNETIPADAPTER	RIL_EthernetIPAdapter,*
RIL_FIELDBUSTYPES	RIL_FieldbusTypes,*
RIL_FILESYSTEM	RIL_FileSystem,*
RIL_HMI_UTILITIES	RIL_HMI_Uilities,*
RIL_INLINE	RIL_Inline,*
RIL_INLINEIOMODULES	RIL_InlineIOModules,*
RIL_IOLINK	RIL_IoLink,*
RIL_LOOPCONTROL	RIL_LoopControl,*
RIL_MODBUSTCP	RIL_ModBusTCP,*
RIL_NETXLOAD	RIL_NetXLoad,*
RIL_OPcUACLIENT	RIL_OpcUaClient,*
RIL_OPcUASERVER	RIL_OpcUaServer,*
RIL_PARAMETERCHANNEL	RIL_ParameterChannel,*
RIL_PROFIBUSDP_02	RIL_ProfibusDP_02,*

Step description

Placeholder	Default library
RIL_PROFIBUSDPSLAVE	RIL_ProfibusDP Slave,*
RIL_PROFINETIO	RIL_ProfinetIO,*
RIL_PROFINETIODEVICE	RIL_ProfinetIODevice,*
RIL_SERCOSIII	RIL_SercosIII,*
RIL_SOCKETCOMM	RIL_SocketComm,*
RIL_UTILITIES	RIL_Uilities,*
RIL_PARAMETERCHANNEL	RIL_ParameterChannel,*
RIL_PROFIBUSDP_UTIL	RIL_ProfibusDP_Util,*
RMB_SERCOSIII_UTIL	RMB_SercosIII_Util,*

Tab. 7-3: Selecting the placeholders defined in the device description file

8 Changes from 12VRS to 13VRS

8.1 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 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.

Changes from 12VRS to 13VRS

User management The new user management allows to assign rights for all IndraWorks objects.

8.2 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

8.3 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.

8.4 Operation modes

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

8.5 Robot Control



The Robot Control 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. 1-10 "XCL/MLC documentation overview - Technology" on page 10](#), documentation "Rexroth IndraMotion MLC 13VRS RCL Programming Instruction".

Global variables

Global Variables facilitate the data exchange between several individual RoCo 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. 1-10 "XCL/MLC documentation overview - Technology" on page 10](#), 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. 1-10 "XCL/MLC documentation overview - Technology" on page 10](#), 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 ▶ Login ▶ 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.

8.6 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 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 IndraControl S20 modules can be operated at the bus coupler:

- S20 DI16/4 (digital input module)
- S20 DI32/1 (digital input module)

Changes from 12VRS to 13VRS

	• S20 DO16/3 (digital output module) • S20 DO 32/1 (digital output module) • S20 AI 8 (analog input module) • S20 AO 8 (analog output module) • S20 RTD 8 (temperature module) • S20 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 replacing 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.
Parameter function blocks according to the field bus style guide	The following function blocks and functions have been revised or have been provided again. The function blocks have been created in compliance with the IL2G Programming Style Guide. • Acyclic communication 1. IL_SIIISvcRead 2. IL_SIIISvcWrite 3. IL_SIIICommand • Acyclic communication/parameters 1. IL_SIIIReadRealParameter 2. IL_SIIISetRealParameter 3. IL_SIIIReadParameter 4. IL_SIIISetParameter 5. IL_SIIIReadStringParameter • Utilities 1. IL_SIIIElementsToldn 2. IL_SIIISetToldn 3. IL_SIIIAtribute

8.7 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.

Changes from 12VRS to 13VRS

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".

8.8 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.
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8.9 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.
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_Uilities" 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_PLCOpenFieldbus" 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 "WaitingDistanceBlockedOutfeed". 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).

8.10 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 applications 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.

Changes from 12VRS to 13VRS

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.
GATcompact for IndraLogic XLC without Sercos	GATcompact now also supports controls without Sercos interface.
RoCo in the 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.
Error reaction during initialization	During the initialization, the error reaction can be configured via the new input <code>EnableErrorReactionInit: BOOL := FALSE</code> of the GAT. The error reaction during the initialization is switched off by default.

8.11 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

Changes from 12VRS to 13VRS

- 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 CSMCf_g_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 CSMCf_g_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

8.12 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.

9 Changes from 12VRS to 14VRS

9.1 IndraWorks

Library project without device	The library project without a device contains standard solutions that are applied upon creation of a new project. A template generating a library project with a "General Module Folder" and without a control is also available.
Exporting a versioned element from the version history	An export function is implemented in the "Version History" dialog that can be saved locally in any version of an element. This export can then be used to import the element to the last version.
Offline parameterization	The offline parameterization has been revised: • The individual state "Offline parameterization" does not apply to controls • Parameters can be displayed and changed directly in the parameter editor or when dialogs are offline • Parameters are integrated in a control, axes or kinematics (e.g. when copying) • Drive parameters can also be displayed and changed in the dialogs • Adjusting parameters with the online values parameter selectively in both directions Online <--> Offline
Clear overview and machining option of all axes	A new dialog, listing all available axes and their properties has been provided for a clear overview and machining of all axes. On the following nodes, the dialog can be called via the context menu: • Motion • Real axes • Virtual axes • Encoder axes • Link axes • Controller axes In the dialog, the available axes including their properties are listed line-by-line. The properties can also be edited like the regular property dialog. The following properties can be edited: • Author • Comment • Axis and drive name • Axis number • Firmware (only for real axes and only within the drive family with a consistent number of axes) • Sercos address (only for real axes) • Drive assignment (only for encoder axes) • Interpolation method • Basic package (OpenLoop/ClosedLoop, only for real axes) • Link axis assignment (only for link axes) Extended controller type properties (only for controller axes)

Changes from 12VRS to 14VRS

Creating with templates	Templates for controls, axes and kinematics can be selected using a template wizard. All template properties are applied. Furthermore, devices can be created using a parameter file.
Displaying an activation status of non-real axes in IndraWorks	The animation in the tree and in the context menu of the real axes concerning the activation status are also provided for virtual axes and link axes. Reason: Reduce the computing time in the interpolator of the control.
Parallel drive firmware download when using the Sercos IP channel	A parallel download has been implemented in 14VRS to make the drive firmware download faster.
Support of the standard Windows functionality: Copy & Paste	For all axes and drives below an XLC/MLC, the functions "Cut" and "Copy" can be used. When inserting data, the element properties are not changed. Adjust only the name to be able to differentiate the inserted element from the original element.

9.2 Control

IndraControl XM system support	The S20-based control platform IndraControl XM is introduced in 14VRS. In the first variants, there is a system support XLC/MLC for the target platforms IndraControl XM21 and IndraControl XM22. Both devices in IndraWorks are equally projected using the IndraControl XM2 device. The target platform XM42 is additionally supported from 14V22. It is projected via the IndraControl XM4 device. The devices are only provided as MLC control.
IndraControl L75 system support	As replacement control for the IndraControl L65 hardware, the IndraControl L75 is supported additionally. The control in IndraWorks is projected via the IndraControl L75 device. The devices are provided as XLC and MLC control.
IndraControl VPB40.4 system support	The Bosch Rexroth IPC IndraControl VPB40.4 is supported as high-performance PC-based control variant. The control in IndraWorks is projected via the IndraControl VPx device. The device is only provided as MLC control.

9.3 Axes

Positive and negative torque/force limit value as axis parameter	Up to now, the parameter A-0-0038, " Torque/force limit value, bipolar" is used to enter a torque limit value for the drive, which is sent to the drive parameters S-0-0092, "Torque/force limit value, bipolar", S-0-0082, "Torque/force limit value positive" and S-0-0083, "Torque/force limit value negative". Thus, no unipolar limitation of the torque can be realized via the A-parameter (e.g. in positive direction 400%, in negative direction only 10%). Two new A-parameters (A-0-0039, A-0-0040) have been introduced for the unipolar parameters of the drive (S-0-0082, S-0-0083). In case of several parameters in the same direction, the parameter with the lowest value is always active. Parameter A-0-0038, "Torque limit value, bipolar" only has an effect on parameter S-0-0092, "Torque limit value, bipolar".
Velocity limit value bipolar as axis parameter A-0-0035	Up to now, the parameters A-0-0032, " Velocity limit value, positive" and A-0-0033, " Velocity limit value, negative" are used to send limit values to the drive parameters S-0-0038, "Velocity limit value, positive" and S-0-0039, "Velocity limit value, negative". Additionally, the maximum of these two values is transmitted to the drive parameter S-0-0091, "Velocity limit value, bipolar". A separate axis parameter (A-0-0035) is introduced for drive parameter S-0-0091, "Velocity limit value, bipolar". The axis parameters A-0-0032 and A-0-0033 are only transmitted to the drive parameters S-0-0038 and S-0-0039. The parameter with the lowest value (between unipolar and bipolar parameters) is always active.

Changes from 12VRS to 14VRS

	 Adjust A-0-0035 during the project conversion so that the existing velocity limit values A-0-0032/A-0-0033 can be applied. The bipolar velocity limit value A-0-0035 also has to be changed when increasing the velocity limit values.
Torque/force limit value, positive as axis parameter A-0-0039	The parameter describes the maximum admissible force/torque in positive direction and affects the parameters S-0-0082 (IndraDrive) and S-0-0550 (HydraulicDrive)
Torque/force limit value, negative A-0-0040	The parameter describes the maximum admissible force/torque in negative direction and affects the parameters S-0-0083 (IndraDrive) and S-0-0551 (HydraulicDrive)
MLC-H, controller axis: Detecting parameter changes in the PLC parameter system	For parameters to be backed up of the PLC parameter system, a checksum is generated when reading the new parameter S-0-0531, "Checksum of operating data to be backed up ". This parameter can be used to detect changes of the parameters to be backed up. This checksum can be used if a parameter system has been initialized for the controller axis and the parameters S-0-0192, "IDN list of operating data to be backed up" and S-0-0531, "Checksum of operating data to be backed up" have been registered in the system.
MLC-H, hydraulic central controller axis	There are the following extensions in 14VRS and above • S20 module support in the axis wizard • Incremental encoder support and rotative axis support in the hydraulic controller • Parameterizable error response support for Sercos (check that the I/O modules of the controller axes are active) • New dialog for the hydraulic controller axis, e.g. GearIn, system data, fault inhibition • The parameter range for force (alternating control) is 4 bytes now (previously 2 bytes). Advantage: Higher force values can also be commanded in kN instead of in %
MLC-H, hydraulic synchronous controller axis	There are the following extensions in 14VRS and above: • Incompatible adjustments to support the matching number of slave axes for new controls (e.g. XM21): New constant iMH_SC_MAX_AXIS_NUMBER • Diagnostic parameters adjusted to the central hydraulic controller axis • Alignment function for slave axes available via GAT and hydraulic plug-in • Reference axis (e.g. for master mode) can be set via the axis wizard • Improved online help
Steps to upgrade from version 13 to version 14 for hydraulic applications	Applies to all applications for the central hydraulic controller axis created with the IndraWorks version 13 and ported to version 14. Due to the extensions/changes in 14VRS, the following steps are required: BEFORE VERSION CHANGE: Backing up parameters • Go online with the running machine and log in • Export all parameters or all S-/P-parameters of all controller axes or create a complete (online) archive

Changes from 12VRS to 14VRS

Change project to 14VRS (general)

- Note the information given for the MLC and for the GAT-based application if available



Check in the library manager that all placeholders are provided with their default value.

Upgrade project to 14VRS (specifically for hydraulic controller axes)

- Open the properties of each hydraulic central controller, set the menu item to "with signal assignment" or "without signal assignment" and press OK until all messages are processed
- The plug-in has to be removed and added again for GAT-based applications with hydraulic plug-in. Alternatively (if there are changes in the plug-in code), ambiguous declarations have to be commented in the plug-in (refer to the note text in the diagnostic line)



The declarations for the "OpMode Torque" are integrated into the GAT libraries in 14VRS and above.

- Applications with a synchronous run controller can result in compiler errors due to an incompatible variable type. Then, the constant MB_MAX_AXIS_NUMBER has to be replaced by iMH_SC_MAX_AXIS_NUMBER.
- For applications used in the PLC program "Mass for simulation", the parameter P-0-2917.0.7 has to be replaced by P-0-2832.0.10 or the property HydrControl[...].Data.ActualValue.Weight has to be replaced by HydrControl[...].Data.StateControl.Weight

Loading project to MLC

- Load the project completely to the MLC and start the PLC



Consider the firmware update.

Reload the parameters for the hydraulic controller axis

- Import the parameters for the hydraulic controller axes
- If the required, enter the "moved mass" again either via ParameterEditor or the "System data" dialog.



The mass hardly affects the simulation response in 13VRS.

9.4 Robot Control

Extending the kinematic diagnostics to display all configured coordinate systems

To select the coordinate system, the radio buttons have been replaced by a combo box in which all configured coordinate systems can be selected. Additionally, the coordinate offset and coordinate rotation is represented in a table.

Improving the function of the "ML_KinJog" function block and adjusting the KinInterface

Using the "ML_KinJog" function block, it is possible to jog a Robot Control V2 kinematics. Jogging takes place on the basis of the "MC_MoveLinearRelative" and "MC_MoveDirectRelative" function blocks.

Changes from 12VRS to 14VRS

KinInterface: Teaching with RoCo V2

As the job functionality is now also provided by the firmware and is more easily accessible, the "ML_KinJog" function block now also accesses these functionalities.

The interface of the "ML_KinJog" function block as well as the kinematic interface is adjusted to the firmware function blocks.

Due to the extended firmware functionalities, RoCo V2 can now also be used to teach points. A point can be written, read and deleted. A point file can be saved, loaded and deleted. These functionalities are also available in the KinInterface.

The structure element "Point" can be written on and can be read in the visualization.

Under the "ML_KinematicsInterfaceType01" function block, a second action "actTeachIn" has been added. This action contains the call of all function blocks required for teaching with corresponding configuration by the kinematic interface structures. Relevant function blocks:

- ML_GroupWritePoint
- ML_GroupReadPoint
- ML_GroupReadNextPoint
- ML_GroupDeletePoints
- ML_GroupSavePointFile
- ML_GroupLoadPointFile
- ML_GroupDeletePointFile

To differentiate the selected type, another enumeration has been created (MB_KINEMATICS_TEACH_IN_MODE). This enumeration is used for the Case-Of statement in the action.

The newly created action is called in the "ML_KinematicsInterfaceType01" function block after the "actRCLPoint" action.

9.5 Field buses

Sercos I/O modules	From 14VRS, 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)
IndraControl S20	Bus couplers for IndraControl S20 are now available for Sercos and Profinet. The following IndraControl S20 modules can be operated at the bus coupler: • S20-S3-BK+ (Sercos bus coupler with address selector switch) • S20-AI-8-UTH • S20-AI6-AO2-SSI/IN2 (only in connection with S20-S3-BK+, synchronous operation required)
IndraControl S67	The following IndraControl S67 modules can be operated at the bus coupler: • S67-DI8-M12x8 • S67-DO8-M12x8 • S67-DI8/F-M12 • S67-DO8/F-M12

Changes from 12VRS to 14VRS

I/O list import/export	Via the control node, the I/O list of the configured I/O devices can be exported/imported in PLCopen format.
Supporting Sercos III operation modes/connection types for Sercos I/O devices	The following 3 operation modes can now be used: 1. Cycle-synchronous 2. Non-cyclic type 1 (asynchronous, with watchdog) 3. Non-cyclic type 2 (asynchronous, without watchdog - this is the current default setting) Global watchdog: The global watchdog is identical for all devices and cannot be configured for each device.
Parameter function blocks according to the field bus style guide	The following function blocks and functions have been revised or have been provided again. The function blocks have been created in compliance with the IL2G Programming Style Guide. • Acyclic communication 1. IL_SIIISvcRead 2. IL_SIIISvcWrite 3. IL_SIIICommand • Acyclic communication/parameters 1. IL_SIIReadRealParameter 2. IL_SIIWriteRealParameter 3. IL_SIIReadParameter 4. IL_SIIWriteParameter 5. IL_SIIReadStringParameter • Diagnostics 1. IL_SIIGetConfigSlaveAdrList 2. IL_SIIGetDiagSlaveAdrList 3. IL_SIIGetLiveSlaveAdrList 4. IL_SIIMasterState 5. IL_SIIRemoteSlaveState 6. IL_SIIRemoteSlaveStateDetails • Utilities 1. IL_SIIElementsToldn 2. IL_SIIStringToldn 3. IL_SIIAttribute
Profinet I/O controller and device: Update to the new stack version (netX V3) (as of 14V22)	The Profinet I/O stacks (controller and device) were upgraded to a new netX version (V2 => V3). Profinet I/O controller:

Changes from 12VRS to 14VRS

If a Send Clock = 1 ms is set at one single device, up to 64 devices can be operated as of the compatibility mode 14V22. If a Send Clock > 1 ms is configured at all devices, up to 128 devices are supported. The "Shared Device" configuration is also supported.

Profinet I/O device (control as device):

New features as of the compatibility mode 14V22 are IRT with a minimum cycle time of 250 µs (but no synchronous application), MRP client and "Shared Device". Each configured Profinet I/O device requires 8.6 kB of the persistent retain data of the IEC program.

For further information, refer to the manual "IndraWorks 14VRS Field Buses" (DOK-IWORKS-FB*****V14-APRS-EN-P), chapter "Profinet I/O" and "Ethernet/IP".

Ethernet field buses Profinet I/O and Ethernet/IP: New concept for the IP channel configuration (as of 14V22)

The IP channel for the Ethernet-based netX field buses were completely revised due to the netX upgrade (V2 => V3). As of the compatibility mode 14V22, the IP channel has to be enabled manually using a separate IP address for the Profinet I/O controller and device and EtherNet/IP scanner and adapter. For the first time, the IP channel is supported for the Ethernet/IP scanner.

For further information, refer to the manual "IndraWorks 14VRS Field Buses" (DOK-IWORKS-FB*****V14-APRS-EN-P), chapter "Tab "IP channel settings"".

9.6 Safety technology

SafeLogic The SafeLogic support of PROFIsafe on Profinet in the XLC/MLC system context has been provided.

9.7 PLC libraries

Functions for strings with unlimited length In the RIL_Uutilities.library, string functions for strings with an unlimited length have been implemented.

Function blocks MB_ReadString-ParameterExt/MB_WriteStringParameterExt

In the ML_PLCOpen.library, the function blocks "MB_ReadStringParameterExt" and "MB_WriteStringParameterExt" are implemented to read and write string parameters exceeding 255 bytes. The permitted string length is not limited anymore.

9.8 GAT

Inserting GAT when adding a control

A dialog can be used when inserting a control to select the available GAT variants.

Performance improvement for the AxisInterface

A performance-optimized event-controlled AxisInterface (AxisInterface type11) is available as option.

Updating the GAT HMI style (Win 7 Look & Feel for WinStudio application)

The GAT HMI template for WinStudio has been updated in the style of Windows 7.

Changes from 12VRS to 14VRS

Steps to upgrade the version to 14VRS for GAT-based applications

Applies to all GAT-based applications based on GATcompact, GATcentral and GATdecentral created with the IndraWorks version 13 or below and ported to version 14.

Due to the complete rearrangement of the PLC libraries and additional compiler checks in 14VRS and above, the steps mentioned in the following are required to ensure that the PLC application is compiled without faults.

Perform the following steps to upgrade to 14VRS:

- Change the compatibility mode to V14 (IndraWorks menu: **Project ► Change compatibility mode...**)
- Change the control firmware to V14 (IndraWorks: Context menu "Properties" of the control, tab "Hardware/communication").

If required, IndraWorks adds additional libraries automatically to the library manager and displays them in the message window.

- "Validate" the GAT application with the following steps to update the PLC application:
 - **IndraWorks ► GAT wizard ► Right-click on the node "Machine logic" ► Validate.**
 - If errors are displayed in the IndraWorks message window: Double-click on the error to adjust the PLC application. If IndraWorks does not report any errors, the PLC application has already been updated.
- Compile the PLC application. If warnings can result due to additional compiler checks, they can be disabled by inserting the pragma {warning disable C0354} into the program code before the warning output.
The specified number (e.g. C0354) has to match the number of the warning output.
- If a GAT HMI (WinStudio) is used:
 - **Adjust symbol configuration:**
Therefore, remove the variables "ImcStatus" highlighted in red of the ML_TechInterface library from the symbol configuration.
Subsequently, insert the variable "ImcStatus" from the ML_TechBase library into the symbol configuration.
 - **Adjusting driver sheets of the WinStudio HMI application:**
Therefore, replace
`Application.TechInterface.GLOBAL_IMCINTERFACE...`
with
`Application.TechBase.GLOBAL_IMCINTERFACE...`
in the driver sheets.

9.9 Register controller

Creating a register controller package for narrow web applications

For the register controller, a customized solution has been implemented for narrow web applications. This solution can be ordered as individual product and is intended for narrow web machine requirements. Input options are simplified and non-required functionalities for complex print applications with terminal connections are disabled. The narrow web library is a cost-efficient and reduced variant of the register control with the following restrictions:

- Up to 12 printing units
- No decoupling network

Changes from 12VRS to 14VRS

- No acceleration compensation

Providing a new optics type

For the register control, a new optics "PY-MSS01.3-O1/000,0" is provide for the "PY-MSS01.1-T1" mark stream sensor. The optics has been developed for reflecting backgrounds such as aluminum foil or transparent foil (OPP,BOPP,PE,PET,...). The optics has an angle alignment of 5°/5° and has an increased temperature range. The optics is ATEX certified.

9.10 Technology function bocks

Matlab interface for XLC/MLC via the MLPI interface

An "mlpi4Matlab" interface has been created for the NRT connection of Matlab to the control using the "mlpiCore" interface. A reduced command block of "mlpiCore" is implemented in the NRT variant of the "mlpi4Matlab" interface and can be executed in Matlab (CommandWindow and m-files) after installing the "mlpi4Matlab" tool box.

Porting of 4EE controls

The controls for EnergyMonitoring and EnergyControl and can be used in WinStudio.

Porting the 4EE function blocks and XLC/MLC libraries

The energy management is implemented in the individual function blocks. The function blocks are interconnected via a mechanism of the object orientation. This facilitates an increased flexibility when extending the energy management and ensures an enhanced scalability of the application.

4EE Re-Engineering EnergyMonitoring

The energy monitoring is used to determine the energy consumption of the machine and its individual components. Function blocks are available that are linked as object-oriented. The instances of the device function blocks providing the central function block energy raw data are registered at a central EnergyMonitor function block. Different device function blocks for general loads and for reading out the short time energy counter of IndraDrive drives are available. An HMI collector function block is also registered at the central EnergyMonitor function block which uses the EnergyMonitor function block data for the interface structure to the HMI. This means that the relevant HMI collector function block is always required for HMI controls.

10 Changes between IndraLogic 1.x and IndraLogic 2G

10.1 PLC

10.1.1 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.

10.1.2 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
```

10.1.3 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

```

10.1.4 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

```

10.1.5 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; ();
```

10.1.6 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 (Attribute 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
```

10.1.7 Type 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

10.1.8 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
```

10.1.9 Memory 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
```

10.2 Changes to the task configuration

10.2.1 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

10.2.2 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.

10.3 PLC libraries modifications

10.3.1 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.

10.3.2 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. 10-1: Overview library assignment IndraLogic 1.x to IndraLogic 2G

10.3.3 AxisInterface (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. 10-2: 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.

10.3.4 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. 10-3: Parameter sequence in the MB_WriteCyclicParameter function

10.4 Changes to the visualization

10.4.1 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.

10.5 Symbol file changes

10.5.1 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.

10.5.2 Configuration

The symbol configuration editor in which the symbols of an application can be configured can be opened by double-clicking on the object Symbol configuration in the Project Explorer.

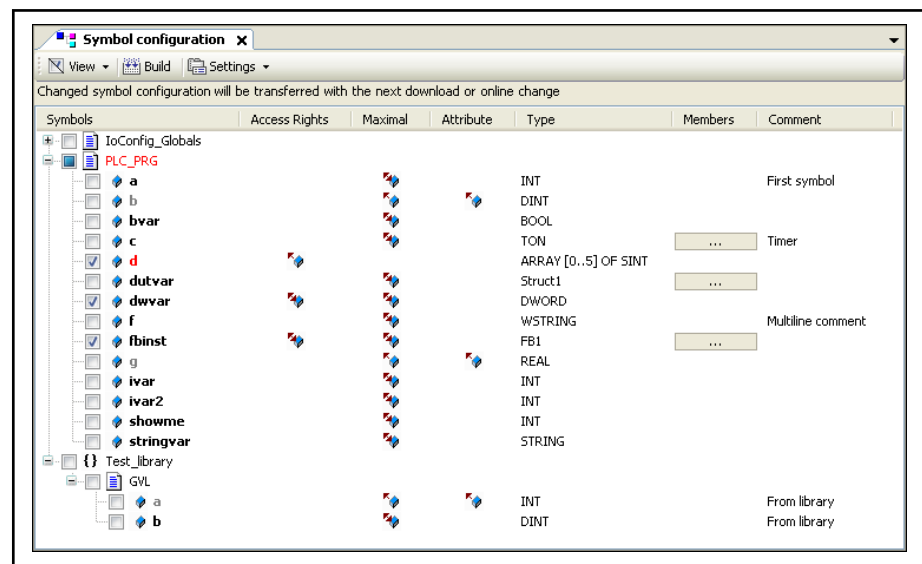


Fig. 10-1: Symbol configuration editor

10.5.3 Storage location

The `IndraLogic.<Devicename>.<Applicationname>.xml` file is saved in the "IndraLogic" folder of the IndraWorks project.

Changes between IndraLogic 1.x and IndraLogic 2G

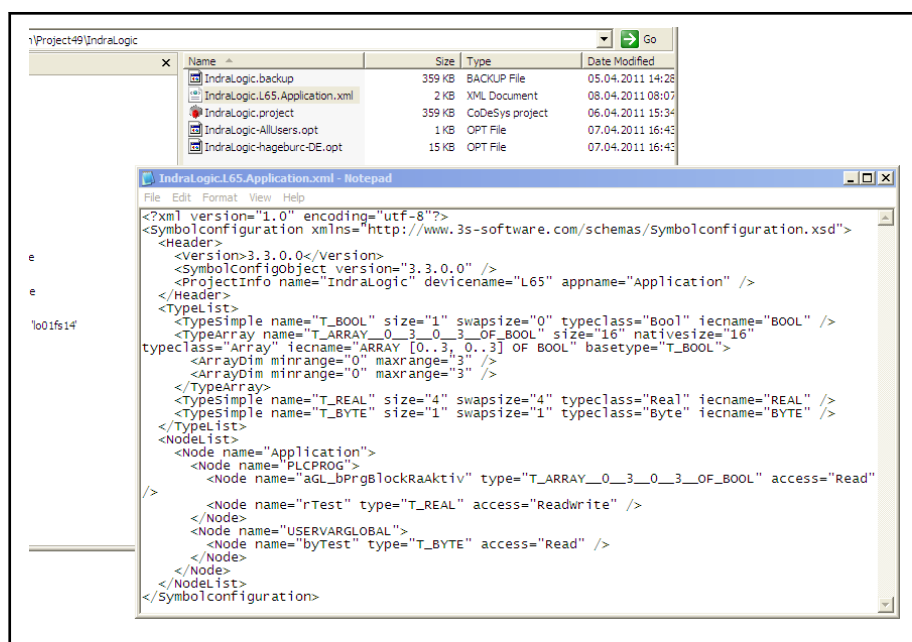


Fig. 10-2: Storage location and symbol configuration structure

10.6 VI-Composer

10.6.1 Importing graphics

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

10.6.2 Changes to the symbol file

From VI-Composer 2.02.00198 SP2 for VCPxx.2 devices, the [symbol file](#) (see page 96) 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.

10.6.3 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.

10.6.4 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 type: IL symbol name
Example	bStart: BOOL: Application.HMI_write.bStart

Tab. 10-4: Mapping table format

Changes between IndraLogic 1.x and IndraLogic 2G

10.6.5 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
```

11 Service and support

Our worldwide service network provides an optimized and efficient support. Our experts offer you advice and assistance should you have any queries. You can contact us **24/7**.

Service Germany Our technology-oriented Competence Center in Lohr, Germany, is responsible for all your service-related queries for electric drive and controls.

Contact the **Service Hotline** and **Service Helpdesk** under:

Phone: **+49 9352 40 5060**
Fax: **+49 9352 18 4941**
E-mail: service.svc@boschrexroth.de
Internet: <http://www.boschrexroth.com>

Additional information on service, repair (e.g. delivery addresses) and training can be found on our internet sites.

Service worldwide Outside Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses on the internet.

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

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

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Notes

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