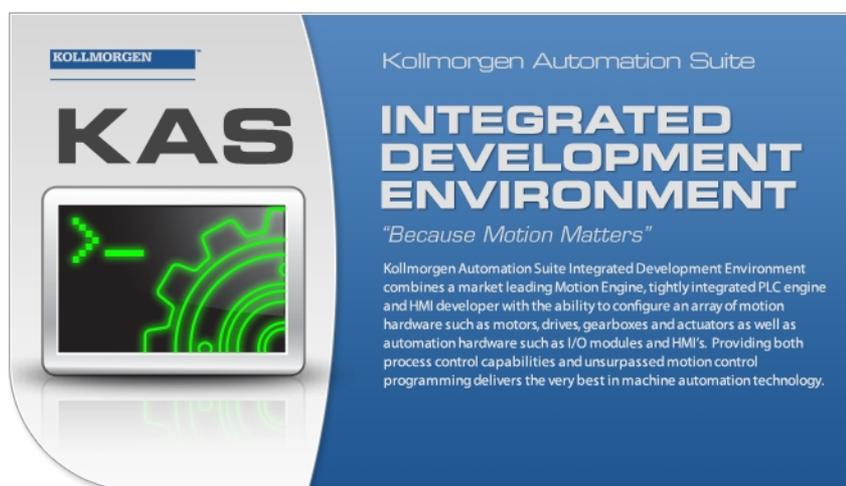


# Kollmorgen Automation Suite

## 30 Minutes to Motion



**Document Edition: E, May 2014**

Valid for KAS Software Revision 2.8

Part Number: 959714

Keep all manuals as a product component during the life span of the product.  
Pass all manuals to future users / owners of the product.

**KOLLMORGEN**

*Because Motion Matters™*

# Trademarks and Copyrights

## Copyrights

Copyright © 2009-14 Kollmorgen™

Information in this document is subject to change without notice. The software package described in this document is furnished under a license agreement or non-disclosure agreement. The software may be used or copied only in accordance with the terms of those agreements.

This document is the intellectual property of Kollmorgen™ and contains proprietary and confidential information. The reproduction, modification, translation or disclosure to third parties of this document (in whole or in part) is strictly prohibited without the prior written permission of Kollmorgen™.

## Trademarks

KAS and AKD are registered trademarks of Kollmorgen™.

SERVOSTAR is a registered trademark of Kollmorgen™.

Kollmorgen™ is part of the Danaher Motion company.

Windows® is a registered trademark of Microsoft Corporation

EnDat is a registered trademark of Dr. Johannes Heidenhain GmbH.

EtherCAT® is registered trademark of Ethercat Technology Group.

PLCopen® is an independent association providing efficiency in industrial automation.

INtime® is a registered trademark of TenAsys® Corporation.

Codemeter is a registered trademark of WIBU-Systems AG.

All product and company names are trademarks™ or registered® trademarks of their respective holders. Use of them does not imply any affiliation with or endorsement by them.

Kollmorgen Automation Suite is based on the work of:

- AjaxFileUpload, software (distributed under the MPL License ).
- Apache log4net library for output logging (distributed under the Apache License).
- bsdtar and libarchive2, a utility and library to create and read several different archive formats (distributed under the terms of the BSD License).
- bzip2.dll, a data compression library (distributed under the terms of the BSD License).
- Curl software library
- DockPanel Suite, a docking library for .Net Windows Forms (distributed under the MIT License).
- FileHelpers library to import/export data from fixed length or delimited files.
- [GNU gzip](http://www.gnu.org)<sup>1</sup> (www.gnu.org) is used by the PDMM (distributed under the terms of the GNU General Public License <http://www.gnu.org/licenses/gpl-2.0.html>).
- [GNU Tar](http://www.gnu.org)<sup>2</sup> (www.gnu.org) is used by the PDMM (distributed under the terms of the GNU General Public License <http://www.gnu.org/licenses/gpl-2.0.html>).

---

<sup>1</sup>Copyright (C) 2007 Free Software Foundation, Inc. Copyright (C) 1993 Jean-loup Gailly. This is free software. You may redistribute copies of it under the terms of the GNU General Public License <<http://www.gnu.org/licenses/gpl.html>>. There is NO WARRANTY, to the extent permitted by law. Written by Jean-loup Gailly.

<sup>2</sup>Copyright (C) 2007 Free Software Foundation, Inc. License GPLv2+: GNU GPL version 2 or later <<http://gnu.org/licenses/gpl.html>> This is free software: you are free to change and redistribute it. There is NO WARRANTY, to the extent permitted by law. Written by John Gilmore and Jay Fenlason.

- jQuery.Cookies, a Javascript library for accessing and manipulating HTTP cookies in the web browser (distributed under the MIT License).
- jquery-csv, a library for parsing CSV files in javascript (distributed under the MIT license <http://www.opensource.org/licenses/mit-license.php>).
- jQuery File Tree, a file browser plugin (distributed under the MIT License).
- jQueryRotate, a plugin which rotates images (img html objects) by a given angle on web pages (distributed under the MIT License, <http://opensource.org/licenses/mit-license.php>).
- JsonCpp software (distributed under the MIT License – see <http://json-cpp.sourceforge.net/LICENSE> for terms).
- LZMA SDK (<http://www.7-zip.org/sdk.html>), used to compress crash dump information (available as public domain).
- Mongoose v3.7, an embedded web server library (distributed under the MIT License).
- MVVM Light Toolkit components for Model – View –ViewModel patterns with Windows Presentation Foundation (distributed under the MIT License).
- pugixml, an XML and XPath parsing library (distributed under the MIT License).
- Qwt project (distributed under the terms of the GNU Lesser General Public License).
- U-Boot, a universal boot loader is used by the AKD-PDMM (distributed under the terms of the GNU General Public License, <http://www.gnu.org/licenses/gpl-2.0.html>). The U-Boot source files, copyright notice, and readme are available on the distribution disk that is included with the AKD-PDMM.
- ZedGraph class library, user control, and web control for .NET (distributed under the LGPL License).
- Zlib software library
- Zlib1.dll, a data compression library (distributed under the terms of the BSD License).

All other product and brand names listed in this document may be trademarks or registered trademarks of their respective owners.

### Disclaimer

The information in this document (Version 2.8 published on 5/16/2014) is believed to be accurate and reliable at the time of its release. Notwithstanding the foregoing, Kollmorgen assumes no responsibility for any damage or loss resulting from the use of this help, and expressly disclaims any liability or damages for loss of data, loss of use, and property damage of any kind, direct, incidental or consequential, in regard to or arising out of the performance or form of the materials presented herein or in any software programs that accompany this document.

All timing diagrams, whether produced by Kollmorgen or included by courtesy of the PLCopen organization, are provided with accuracy on a best-effort basis with no warranty, explicit or implied, by Kollmorgen. The user releases Kollmorgen from any liability arising out of the use of these timing diagrams.

This page intentionally left blank.

# Table of Contents

---

<b>Kollmorgen Automation Suite</b> .....	<b>1</b>
30 Minutes to Motion .....	1
<b>Trademarks and Copyrights</b> .....	<b>2</b>
<b>Table of Contents</b> .....	<b>5</b>
<b>1 Key Features</b> .....	<b>7</b>
1.1 KAS IDE .....	7
1.2 Main Tools .....	7
<b>2 Installing KAS IDE</b> .....	<b>9</b>
2.1 System Requirements .....	9
2.2 Download .....	9
2.3 Installation Procedure .....	9
2.3.1 User Data .....	11
<b>3 Exploring KAS Workspace</b> .....	<b>13</b>
3.1 Windows and Panels Overview .....	13
3.1.0.1 About toolboxes .....	14
3.1.1 Project Explorer .....	14
3.1.2 Libraries .....	14
3.1.2.1 Function Blocks .....	15
3.1.2.2 Controls .....	15
3.1.2.3 Properties .....	15
3.1.3 Variables tab .....	15
3.1.4 Information and Logs .....	17
<b>4 Creating Application</b> .....	<b>19</b>
4.1 Creating a Project .....	19
4.1.1 Add the Controller .....	19
4.1.2 Configure the Controller .....	21
4.2 Compile the Application .....	22
4.3 Launch KAS Simulator .....	24
4.3.1 Connect to the Controller .....	24
4.3.1.1 Actions to Prevent Compatibility Issues .....	24
4.3.2 Download the Application .....	24

---

4.3.3 Device Control .....	25
4.4 Operate the Control Panel .....	25
4.4.1 About KAS Simulator Display .....	26
4.5 Exiting Simulation Mode .....	27

# 1 Key Features

Kollmorgen Automation Suite is Kollmorgen an all-in-one solution for designing, developing and maintaining automation systems. It integrates the three main functionalities of a machine:

- Interface with machine operators (HMI)
- Logic handling of the machine (IEC 61131-3 Soft PLC)
- Precise control of all moving parts (Motion control)

## 1.1 KAS IDE

KAS comes with a powerful Integrated Development Environment (IDE) which allows you to:

- Create new application project using KAS predefined or custom application **templates**
- Define the machine hardware architecture as well as the machine program
- Develop PLC programs using the five **IEC 61131-3** programming languages (ST, IL, FFLD, FBD and SFC) and KAS function block libraries dedicated to motion
- Centrally manage all IEC 61131-3 variables with KAS **variable dictionary** and map logical variables to physical **inputs and outputs**
- Easily set up **HMI panels** and map graphical object to IEC 61131-3 variables

## 1.2 Main Tools

Tool	Description
Pipe Network Editor	Graphical tool describing the mechanical System into the logical world based on an one to one translation
Cam profile Editor	Allows you to create or modify a profile definition that describes the position evolution of the cam in a 2D graphical format
Softscope	Allows to view in a two-dimensional graph one or more variables' evolution (vertical axis) across the time (horizontal axis)
Simulator	Allows you to develop your application without any hardware available

This page intentionally left blank.

## 2 Installing KAS IDE

### 2.1 System Requirements

KAS IDE minimum system requirements:

Element	Description
<b>Operating System</b>	Microsoft® Windows® 7 SP1 (32 or 64-bit). <div style="background-color: #e0ffe0; padding: 5px; margin-top: 5px;"> <b>TIP</b> For optimal performance, please be sure your operating system is fully updated with the latest patches.         </div>
<b>Processor type</b>	Intel® Pentium® M or equivalent processor at 1.5 GHz or greater.
<b>Memory</b>	1 GB RAM or greater (which is recommended for complex applications)
<b>Storage</b>	1 GB hard drive or compact flash space
<b>Display</b>	WXGA+ (1440 x 900) or higher-resolution monitor with 24-bit color <div style="background-color: #e0e0ff; padding: 5px; margin-top: 5px;"> <b>NOTE</b> Better results are achieved with OpenGL and 3D cards         </div>
<b>Connectivity</b>	1 Ethernet port, at either 100Mbps/s or 1Gbits/s. <div style="background-color: #ffe0ff; padding: 5px; margin-top: 5px;"> <b>IMPORTANT</b> A 100Mb network is required in order to allow the IDE to Runtime communication to work in all conditions. The AKD WorkBench AutoTuner and Scope both require 100Mb of bandwidth to function properly.         </div>
<b>WebServer</b>	A modern web browser is required to access the web server. We recommend Internet Explorer 9 (or later)  , Mozilla FireFox  , or Google Chrome  .
<b>IMPORTANT</b> KAS IDE and KAS Simulator should not be installed on a Kollmorgen Industrial PC (PAC). The IDE and Simulator are for use on PCs only.	

### 2.2 Download

The latest version of the Kollmorgen Automation Suite is available at [www.kollmorgen.com](http://www.kollmorgen.com).

### 2.3 Installation Procedure

#### How to proceed if you have a CD?

After inserting the installation CD, a web browser automatically displays the installation start page.

**TIP** If the installation start page does not automatically display, double-click on the file **Index.html** file.

To start the installation of Kollmorgen Automation Suite, click the corresponding link and confirm that you want to execute **KAS-Setup.exe**.

Follow the procedure below to proceed with the KAS IDE software installation.

**IMPORTANT** Installation of the KAS IDE can require you to change your firewall setting. If you do not have sufficient privileges to configure your firewall,

**IMPORTANT** you must stop the relevant Windows Service.

Once KAS has finished downloading, complete the following installation steps:

1. Double-click the **KAS-Setup.exe** file to run the installation Wizard.

**NOTE** A Security Warning dialog displays as a result of security certification. Do not be alarmed.

2. Click **Run** to start the installation Wizard.
3. While the setup is loading, wait for the setup splash screen to vanish after being displayed.



4. If a previous version of the KAS IDE is installed then an uninstall notice is displayed. The previous version must be uninstalled before the installation can continue. All content of the previous repository is deleted during the uninstall.
5. The following Welcome Wizard displays with the version and build number of the KAS IDE. Click **Next** to continue.
6. Review the License Agreement and click "I Agree" to continue the installation.

**NOTE** You must accept the agreement to install Kollmorgen Automation Suite.

7. Select the **Development Environment** installation type from the drop-down menu.

Installation type	Description
<b>Development Environment</b>	This kind of installation is typically used for creating and developing a new application. When you need to install the KAS IDE and the KAS Runtime Simulator, you can select Development Environment as the type of installation.
<b>Run-time Industrial PC</b>	This installation is typically used when you have an industrial PC (IPC). You are able to view and run your application. You need to install Kollmorgen Visualization Builder and the KAS Runtime. Kollmorgen Visualization Builder is specially designed to view and control your application.  The KAS Runtime only executes the application.
<b>Custom</b>	You can manually select the specific KAS components to install.

8. Click **Next** to access the destination folder.
9. Click **Browse** to specify a custom install directory or accept the recommended default location. When finished, click **Install** to continue.

**TIP** Kollmorgen strongly recommends accepting the default destination folder under C:\Program Files\Kollmorgen\Kollmorgen Automation Suite\Kollmorgen Automation Suite.

10. The software installation begins. Wait until the installation process is complete.
11. You are done; click **Finish**.

**TIP** Adding the **KAS IDE** application as an exception in your firewall settings

**TIP** is recommended to avoid security issues

### **2.3.1 User Data**

User-generated data such as log files, project sources, field bus configurations, function blocks, etc. are stored in the Windows User directory and are maintained between installations. This applies to files on PACs, AKD PDMs, as well as Simulator files.

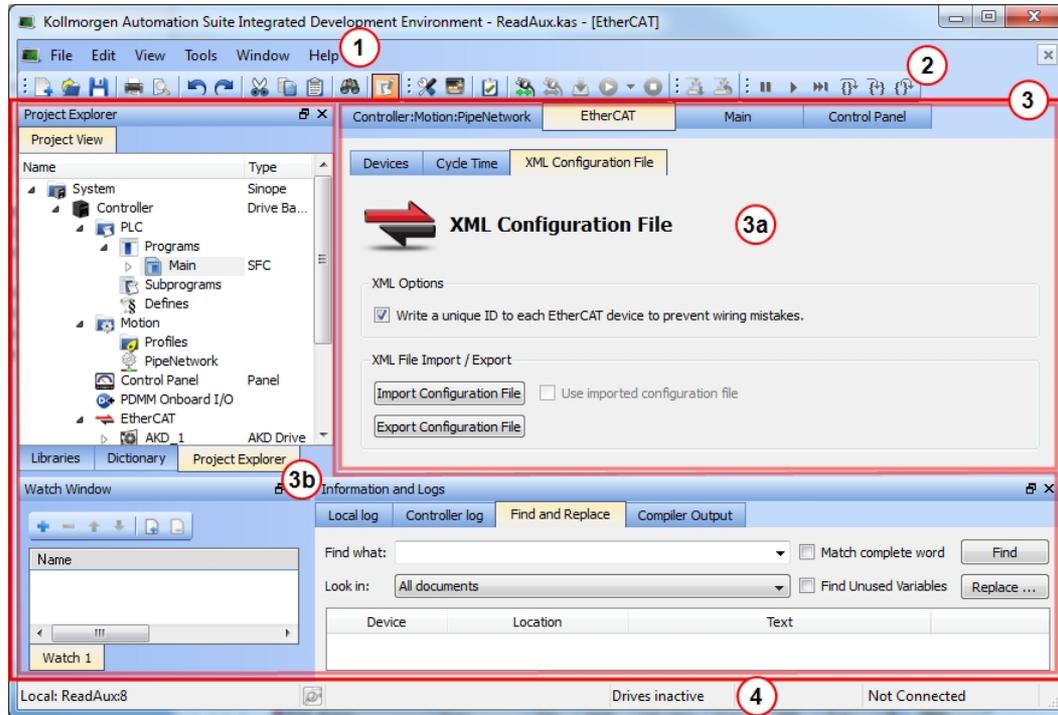
This page intentionally left blank.

## 3 Exploring KAS Workspace

This chapter will help you become familiar with the KAS IDE.

### 3.1 Windows and Panels Overview

The KAS IDE interface provides an all-in-one-window integrated workspace.



**Figure 3-1:** KAS IDE Main Window

The main view in the Integrated Development Environment (IDE) is a Multiple Document Interface (MDI) environment. This provides an easy-to-use and customizable view; including the capability to hide, enlarge or overlap windows in order to optimize visibility.

The main view is saved when you exit the application. This ensures that your workspace remains the same each time you open and use the KAS IDE.

The KAS IDE main window contains the following items:

- Menu bar (see call out 1)
- Toolbar (2) A toolbar is a little bar with icons which is usually located under the menu bar of a window.
- Workspace (3) which contains:
  - A specific area dedicated to displaying the workspace children windows (3a)
  - Several toolboxes (3b) A toolbox is a child window that provides you with some functions to perform specific tasks.
- Status bar at the bottom (4) displaying the current state of the target

### 3.1.0.1 About toolboxes

The available toolboxes include:

- Project Explorer
- "Libraries" (see page 14)
- Dictionary
- "Information and Logs" (see page 17)

### 3.1.1 Project Explorer

The Project Explorer toolbox is a window that displays machine application information in a tree-structure representation. This window contains all the following items used to design, implement, test, and document the application.

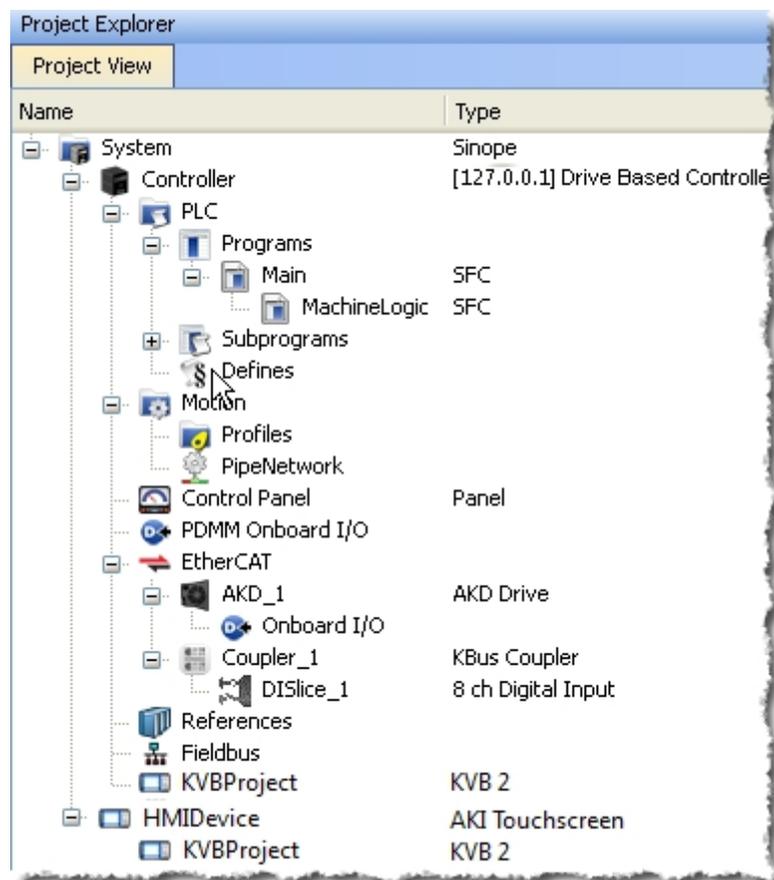
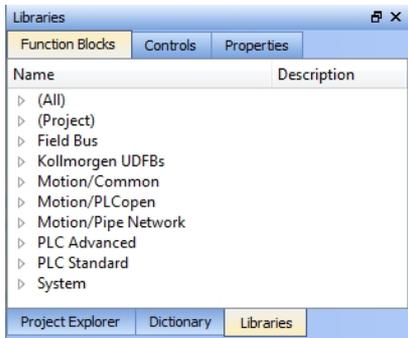


Figure 3-2: Project Explorer

### 3.1.2 Libraries

This toolbox contains several tabs to access all the functions of the available libraries.



**Figure 3-3:** Libraries Toolbox

### 3.1.2.1 Function Blocks

This tab displays all the available libraries shown in a tree-structure representation and gathered by categories. You can expand a library to access all its functions. A short description of each function is also available.

- PLC Standard
- PLC Advanced
- Motion/Pipe Network
- Motion/PLCopen
- Field Bus
- System
- Kollmorgen UDFBs

### 3.1.2.2 Controls

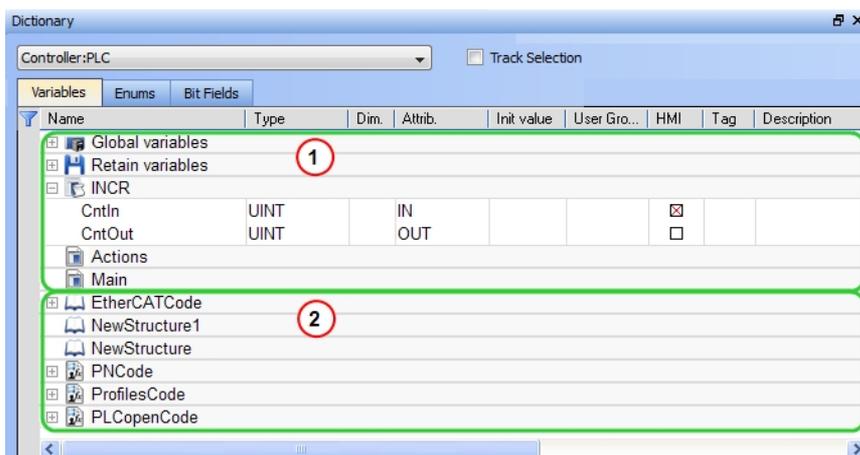
This tab displays all the controls available for the HMI design.

### 3.1.2.3 Properties

This tab displays all the properties of an HMI control.

## 3.1.3 Variables tab

The Variables tab is used to show all the variables defined within the project. All the variable details are displayed in order to show the variable types, dimensions, attributes, etc.



**Figure 3-4:** Dictionary Toolbox

The list of variables is split into two parts:

- All the **Variables** at the top 1
- All the **Structures** at the bottom 2

**About the Dictionary's contextual menu.**

Command	Description
<b>Undo</b>	Undo the last action performed on the Dictionary
<b>Redo</b>	Redo the last undone action
<b>Add Variable</b>	Add a new variable in the selected level (Global, Retain, program). This automatically creates a new variable called NewVar with type BOOL  For a Function or UDFB, you can specify input and output parameters
<b>Rename variables</b>	This function can either replace a section of matching variables or append text to the variables' names. See Rename Variables
<b>Edit variables as text</b>	This function will open a text editing dialog, allowing you to edit the variables found in the group as text using IEC 61131-3 syntax. See Editing Variables as Text for more information.
<b>Browse variable</b>	This function allows you to browse all instances of a variable. See Browse Variable Tab for more information.
<b>Add Structure</b>	Used to have a new complex type. A structure named NewStructure is created and variables can be dragged into it
<b>Rename Structure</b>	Rename the selected structure
<b>Copy</b>	Copy a variable
<b>Paste</b>	Paste the copied variable to the selected level
<b>Delete</b>	Delete the selected variable. A deletion can also be performed by pressing the Delete key on the keyboard
<b>Find all</b>	This function will find all instances of the specified variable and open the results in the Find and Replace tab.
<b>Open UDFB</b>	Open the selected UDFB instance
<b>Plug On Channel ...</b>	Plug the selected variable on a channel. This command opens a dialog used to configure the variable plug operation.  <div style="background-color: #e6f2ff; padding: 5px; border: 1px solid #000080;"> <p> <b>NOTE</b> This command is enable when your application is connected and running, and if the type of variable is eligible for the softscope (i.e. BOOL, INT, SINT, DINT, LINT, UINT, USINT, UDINT, ULINT, BYTE, WORD, DWORD, LWORD, TIME and LREAL, as long as they are not in a UDFB instance)</p> </div>
<b>Unplug All Channels</b>	Unplug all plugged probes from the softscope
<b>Variable I/O mapping</b>	Connect a variable to an I/O.

Command	Description																																																																																																																																																																																																												
<b>Print Dictionary</b> ...	Print all the variables displayed in the Dictionary and sorted by programs. The columns display the Name, Type, Dimension, Initial Value, and Attributes																																																																																																																																																																																																												
	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Dim</th> <th>InitVal</th> <th>R</th> <th>E</th> </tr> </thead> <tbody> <tr> <td colspan="6"><b>(Global)</b></td> </tr> <tr> <td>TravelSpeed</td> <td>LREAL</td> <td>0</td> <td>LREAL#0</td> <td></td> <td></td> </tr> <tr> <td>MasterAbsPos</td> <td>LREAL</td> <td>0</td> <td>LREAL#0</td> <td></td> <td></td> </tr> <tr> <td>MasterDeltaPos</td> <td>LREAL</td> <td>0</td> <td>LREAL#90</td> <td></td> <td></td> </tr> <tr> <td>MachineSpeed</td> <td>LREAL</td> <td>0</td> <td>LREAL#0</td> <td></td> <td></td> </tr> <tr> <td>Axis1Status</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Axis2Status</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>MachineState</td> <td>DINT</td> <td>0</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>bMasterAbs</td> <td>BOOL</td> <td>0</td> <td>FALSE</td> <td></td> <td></td> </tr> <tr> <td>bMasterRel</td> <td>BOOL</td> <td>0</td> <td>FALSE</td> <td></td> <td></td> </tr> <tr> <td>bEStop</td> <td>BOOL</td> <td>0</td> <td>FALSE</td> <td></td> <td></td> </tr> <tr> <td>bLedStatus</td> <td>BOOL</td> <td>4</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Profiles</td> <td>ProfilesCode</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>EtherCAT</td> <td>EtherCATCode</td> <td>0</td> <td></td> <td></td> <td>R</td> </tr> <tr> <td>PipeNetwork</td> <td>PNCCode</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="6"><b>(Retain)</b></td> </tr> <tr> <td>LastAxisPos</td> <td>LREAL</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="6"><b>MachineLogic</b></td> </tr> <tr> <td>lastTravelSpeed</td> <td>LREAL</td> <td>0</td> <td>LREAL#0</td> <td></td> <td></td> </tr> <tr> <td>lastMachineSpeed</td> <td>LREAL</td> <td>0</td> <td>LREAL#0</td> <td></td> <td></td> </tr> <tr> <td colspan="6"><b>ProfilesCode</b></td> </tr> <tr> <td>cmdID</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="6"><b>PNCCode</b></td> </tr> <tr> <td>cmdID</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>MASTER</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>GEAR1</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>CNV1</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>AXIS1</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>GEAR2</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>CNV2</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>AXIS2</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>PipeAXIS1</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>PipeAXIS2</td> <td>DINT</td> <td>0</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Name	Type	Dim	InitVal	R	E	<b>(Global)</b>						TravelSpeed	LREAL	0	LREAL#0			MasterAbsPos	LREAL	0	LREAL#0			MasterDeltaPos	LREAL	0	LREAL#90			MachineSpeed	LREAL	0	LREAL#0			Axis1Status	DINT	0				Axis2Status	DINT	0				MachineState	DINT	0	0			bMasterAbs	BOOL	0	FALSE			bMasterRel	BOOL	0	FALSE			bEStop	BOOL	0	FALSE			bLedStatus	BOOL	4				Profiles	ProfilesCode	0				EtherCAT	EtherCATCode	0			R	PipeNetwork	PNCCode	0				<b>(Retain)</b>						LastAxisPos	LREAL	0				<b>MachineLogic</b>						lastTravelSpeed	LREAL	0	LREAL#0			lastMachineSpeed	LREAL	0	LREAL#0			<b>ProfilesCode</b>						cmdID	DINT	0				<b>PNCCode</b>						cmdID	DINT	0				MASTER	DINT	0				GEAR1	DINT	0				CNV1	DINT	0				AXIS1	DINT	0				GEAR2	DINT	0				CNV2	DINT	0				AXIS2	DINT	0				PipeAXIS1	DINT	0				PipeAXIS2	DINT	0			
Name	Type	Dim	InitVal	R	E																																																																																																																																																																																																								
<b>(Global)</b>																																																																																																																																																																																																													
TravelSpeed	LREAL	0	LREAL#0																																																																																																																																																																																																										
MasterAbsPos	LREAL	0	LREAL#0																																																																																																																																																																																																										
MasterDeltaPos	LREAL	0	LREAL#90																																																																																																																																																																																																										
MachineSpeed	LREAL	0	LREAL#0																																																																																																																																																																																																										
Axis1Status	DINT	0																																																																																																																																																																																																											
Axis2Status	DINT	0																																																																																																																																																																																																											
MachineState	DINT	0	0																																																																																																																																																																																																										
bMasterAbs	BOOL	0	FALSE																																																																																																																																																																																																										
bMasterRel	BOOL	0	FALSE																																																																																																																																																																																																										
bEStop	BOOL	0	FALSE																																																																																																																																																																																																										
bLedStatus	BOOL	4																																																																																																																																																																																																											
Profiles	ProfilesCode	0																																																																																																																																																																																																											
EtherCAT	EtherCATCode	0			R																																																																																																																																																																																																								
PipeNetwork	PNCCode	0																																																																																																																																																																																																											
<b>(Retain)</b>																																																																																																																																																																																																													
LastAxisPos	LREAL	0																																																																																																																																																																																																											
<b>MachineLogic</b>																																																																																																																																																																																																													
lastTravelSpeed	LREAL	0	LREAL#0																																																																																																																																																																																																										
lastMachineSpeed	LREAL	0	LREAL#0																																																																																																																																																																																																										
<b>ProfilesCode</b>																																																																																																																																																																																																													
cmdID	DINT	0																																																																																																																																																																																																											
<b>PNCCode</b>																																																																																																																																																																																																													
cmdID	DINT	0																																																																																																																																																																																																											
MASTER	DINT	0																																																																																																																																																																																																											
GEAR1	DINT	0																																																																																																																																																																																																											
CNV1	DINT	0																																																																																																																																																																																																											
AXIS1	DINT	0																																																																																																																																																																																																											
GEAR2	DINT	0																																																																																																																																																																																																											
CNV2	DINT	0																																																																																																																																																																																																											
AXIS2	DINT	0																																																																																																																																																																																																											
PipeAXIS1	DINT	0																																																																																																																																																																																																											
PipeAXIS2	DINT	0																																																																																																																																																																																																											

**How do I modify parameters of a variable?**

Mode	Description
One Parameter	Assuming you are in the <b>cell</b> edition mode, double-click on the parameter
All the parameters are at the same time	Assuming you are in the <b>row</b> edition mode, double-click in any parameter to open the dialog box for variable configuration as shown below.

**3.1.4 Information and Logs**

The Information and Log window is used to identify current state status and can be used to identify operational errors, compilation errors, and also to quickly assist you in finding areas of the workspace or program variables.

This window contains different tabs that provide:

- Log messages (Local or Controller) including Log Messages Settings
- A system search function
- A list of breakpoints
- A state report on the program compiler

This page intentionally left blank.

## 4 Creating Application

This exercise helps you become familiar with KAS application environment. The Control Panel is used to create a simulated motion on two axes.

In this exercise, you will perform the following steps:

- Create a new KAS project
- Compile the project
- Start the KAS Simulator and download the project to it
- Start the application via the Control Panels and observe the functions in the KAS Simulator

To create the simulated motion, follow this chapter step by step.

### 4.1 Creating a Project

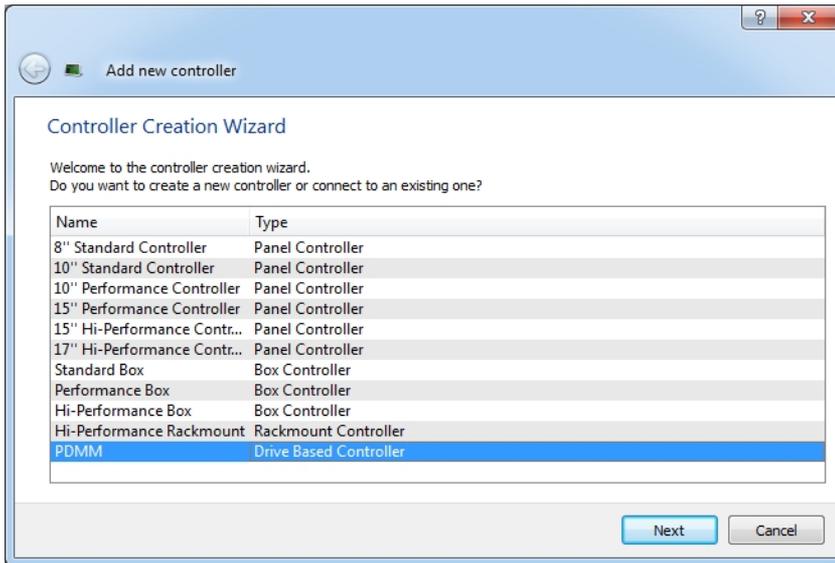
Step	Description
1	To start your project, you have to add a controller, choose which motion engine your application is based on (Pipe Network or PLCopen), and set the properties of the controller
2	Add all AKD drives being part of your EtherCAT network and define all their parameters
3	Add all the IO couplers and slices being part of your EtherCAT network
4	Configure EtherCAT motion bus by mapping all the devices and setting the cycle time
5	Create programs with the five programming languages that comply with the IEC 61131-3 standard
6	Create variables, which can also be arrays or complex structures, and monitor them with the Dictionary, or the variable editor
7	Create functions and function blocks that can be called from your programs
8	Use constant definitions to ease the maintenance of your code
9	Use the functions available in the pre-defined libraries
10	Create your custom libraries containing your PLC code that you can use afterwards in different projects
11	Map digital or analog inputs and outputs, that are on the EtherCAT motion bus, to PLC variables
12	Design motion with pipe blocks in the pipe network or with PLCopen axis
13	Create Cam Profiles that you can associate to a cam pipe block
14	Define the number of cycles between successive executions of the PLC programs, and configure the programs priority
15	Add an HMI Device, design the KVB Panel, and map the variables

**ⓘ IMPORTANT** Each time you modify your project, you have to recompile and download the new version to save your modifications on the target.

#### 4.1.1 Add the Controller

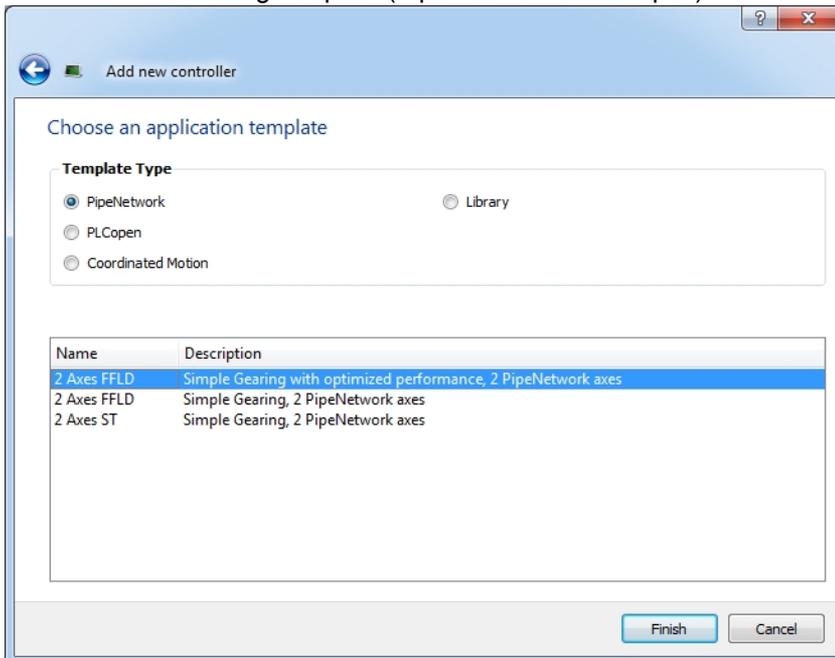
To add a controller to your project:

- Click the **New** command in the **File** menu to start the Controller Creation Wizard
- Select the controller name within the list and click the **Next** button



**Figure 4-1:** Select a Controller

- Choose the motion engine option (Pipe Network or PLCopen) and select the application template

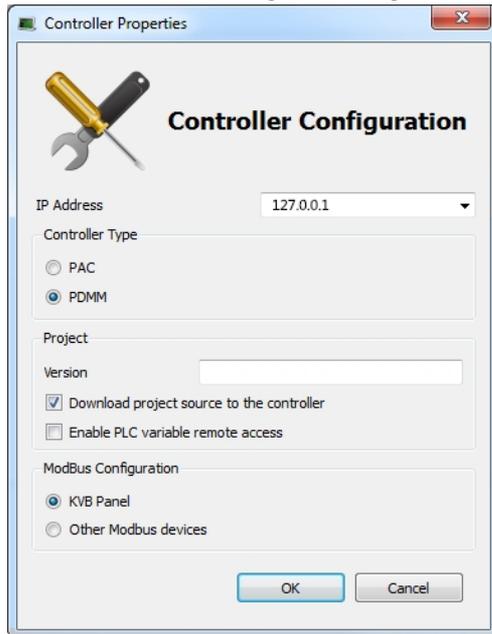


**Figure 4-2:** Select an Application Template

- Click the **Finish** button
- Click the **Save As** command in the **File** menu
- Define the Project Name and its Location
- Click **OK**

## 4.1.2 Configure the Controller

The controller is configured using the Controller Properties dialog box.



To set-up the controller:

1. In the Project Explorer, right-click on the new controller to open the contextual menu
2. Select the **Properties** command
3. Define the IP Address
4. Choose the controller type
5. (Optional) Choose whether the project's source code should be downloaded to the controller. This is enabled by default and your preference is saved with the project. Disabling this option means a comparison of source on the controller and in the IDE will not be available.
6. (Optional) Choose whether PLC variables may be read/written via an HTTP connection. this requires that the source be downloaded to the controller. By default this option is disabled so unauthorized changes may not be made.

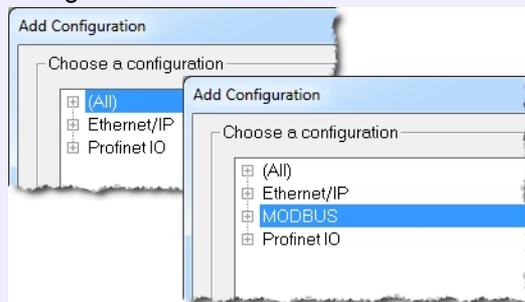
### **TIP**

Be sure to recompile the application before downloading it to the controller.

7. Select whether Modbus will go to a KVB Panel or be handled by another Modbus device.

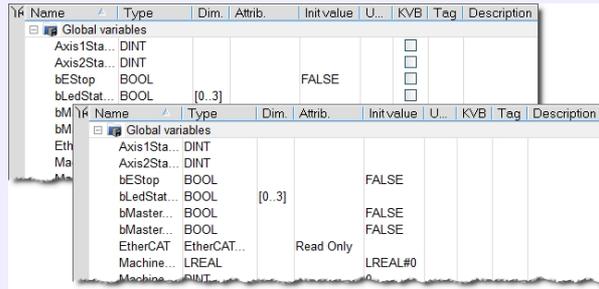
### **NOTE**

- If KVB Panel is selected there will be no node to add a Modbus configuration in the Fieldbus Editor.



**NOTE**

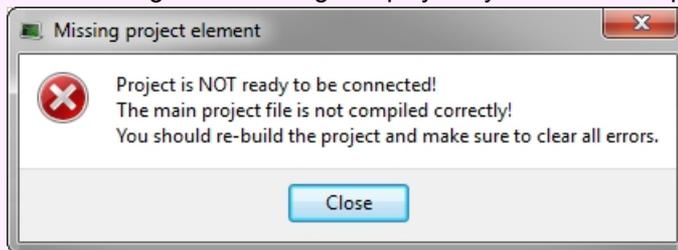
- If Other Modbus devices is selected then the KVB checkbox for Dictionary items will be hidden.. Motion configuration will need to be added from the Fieldbus Editor.



8. Click **OK**

**IMPORTANT**

You must compile your project before trying to connect to a Controller! The following error message displays if you do not compile your project!



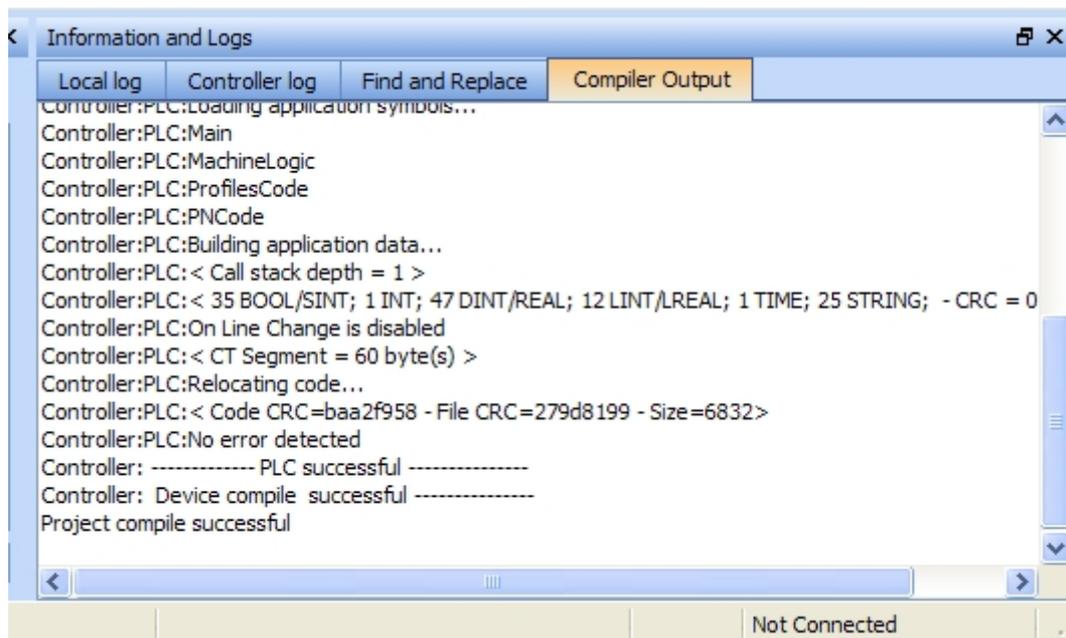
### 4.2 Compile the Application

After creating all the elements of your project, you are ready to compile it. The project must be compiled before it is simulated or downloaded to the target.

You can compile your project with the compile icon  in the toolbar (**Ctrl+B** shortcut).

The compiler reports messages in the Information and Logs toolbox (see **Compiler Output** tab).

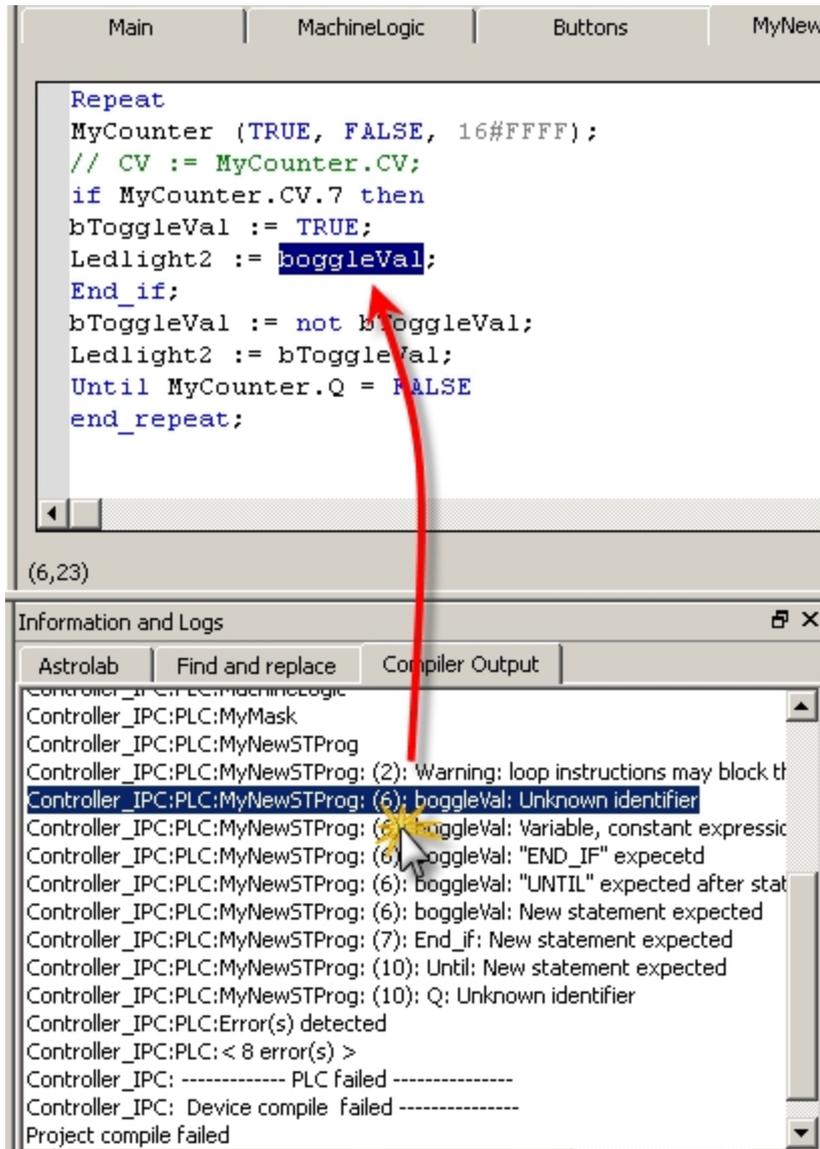
No other actions are possible when the compilation is in progress.



**Figure 4-3:** Compiler Output

**TIP** Errors are easily located using the information and logs window as shown below.

Double-click on an error in the list to open the program and jump directly to the relevant location in the editor.

**Figure 4-4:** Error Location when Compiling

To locate source code, you can also use the **Find and replace** feature (for more information, refer to paragraph "Information and Logs" on page 17)

**NOTE** In FFLD, when a function, function block or UDFB is not connected on the left, then it is ignored (removed at compiling time). This case only applies for functions - **not** for function blocks.

### 4.3 Launch KAS Simulator

If you want to simulate your application, open **All Programs** on your computer and start the KAS Simulator application located under the **Kollmorgen** folder and the **Kollmorgen Automation Suite** subfolder.

Once the program opens, adjust your desktop preferences (position, size, etc.)

If you want to run your project on a physical device, start the KAS Runtime on the target controller.

#### 4.3.1 Connect to the Controller



**Figure 4-5:** The Device Toolbar

Ensure the Simulated device mode is active (the icon  must be selected)

To establish the connection with the target controller, click the Connect Device icon .

##### 4.3.1.1 Actions to Prevent Compatibility Issues

The software versions of the KAS IDE and the KAS Runtime have to match to avoid compatibility problems. The version consists of a series of four numbers (e.g. 2.1.1.87).

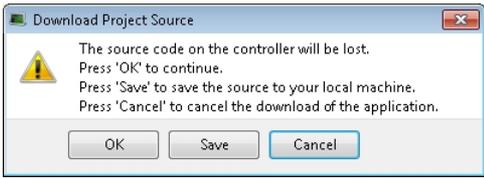
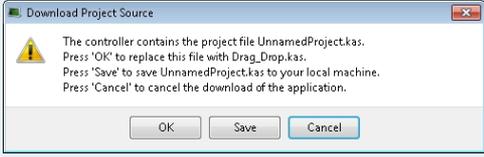
###### TIP

The software versions of the KAS IDE and the KAS Runtime are also available in the local log messages (the level for this message is INFO).

When another KAS IDE is already connected to the controller, a warning is displayed and the connection is discarded to prevent any conflict.

#### 4.3.2 Download the Application

- Click the *Compile and Download*  or the *Download*  button.  
The application is compiled and downloaded or just downloaded to the controller.
  - If you enabled the "Download Project Source in the controller" option in the Controller Properties dialog box (see "Configure the Controller" (see page 21)) then the source code is also copied to the controller.
  - If you disabled the "Download Project Source in the controller" option and the controller has project source loaded you will be prompted with a message. The message presented will vary, based on whether your current project and the project on the controller have the same name or not.

Project Names	Message	Actions
Same name		<p><b>OK:</b> Source on controller is deleted.</p> <p><b>Save:</b> Source on controller is overwritten and is also saved to "My Documents". If that source file already exists in My Documents you will be prompted to rename the source file, overwrite that file or not. If you do not rename or overwrite the file then the download to the controller will be canceled.</p> <p><b>Cancel:</b> Download is stopped.</p>
Different name		<p><b>OK:</b> Source on the controller will be replaced.</p> <p><b>Save:</b> Source on the controller will be saved to "My Documents" as above.</p> <p><b>Cancel:</b> Download is stopped.</p>

- You will be prompted with an alert if there is not sufficient space on the AKD PDMM for the application. Clearing the User Data is one method to create more space on an AKD PDMM.

**TIP**

The versions between the KAS IDE and the KAS Runtime must be the same if you want to be able to debug your application (for example to display the animated values in the editors).

**IMPORTANT**

If the IDE version differs from the runtime after compiling an application, the function blocks defined in the IDE and those implemented in the virtual machine of the runtime can possibly be different. To prevent this potential mismatch, you must compile and download your application again.

**NOTE**

In addition to downloading the application to the controller's flash memory, you can download the project's source code, allowing you to store the project.

### 4.3.3 Device Control

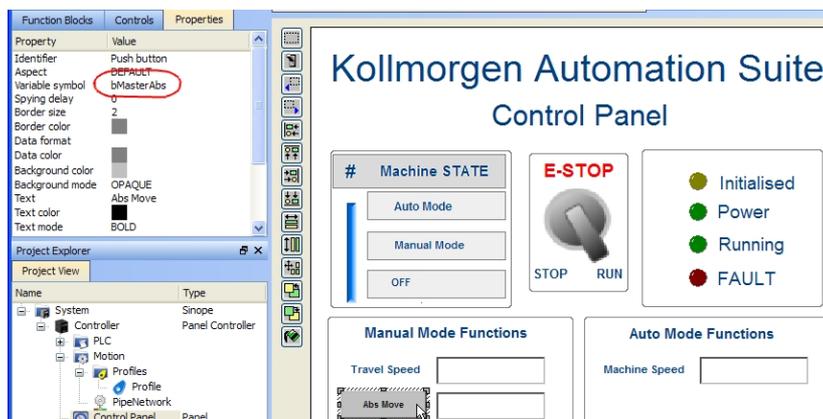
You can start / stop the device with the buttons  and 

### 4.4 Operate the Control Panel

The Example program has a default control panel built-in to make it easy to start an application.

Perform the following steps to operate the control panel:

1. Double-click on **Control Panel** in the Project Explorer to open the form

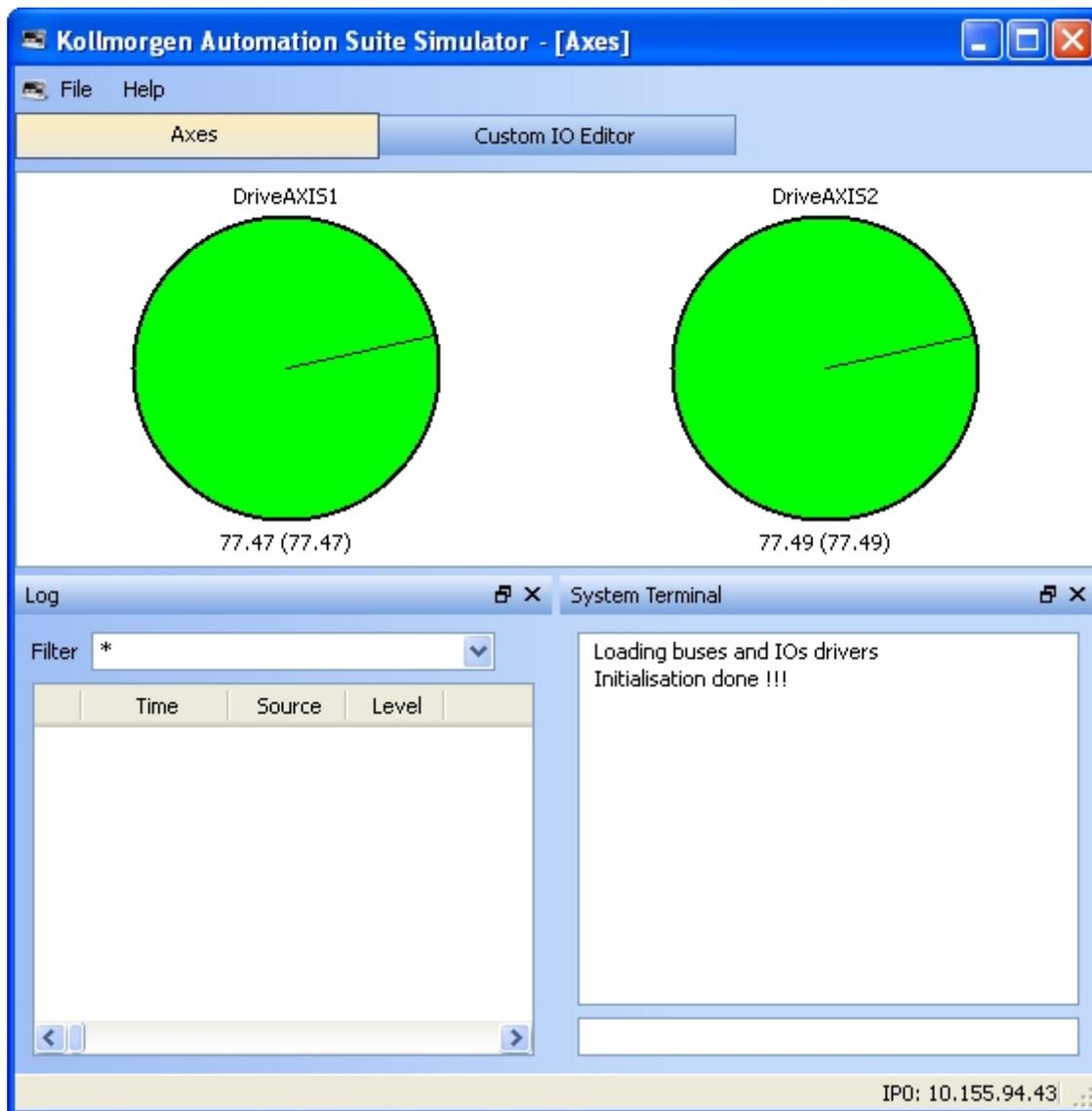


**Figure 4-6:** Control Panel

2. Start by moving the vertical slider bar to select the Machine STATE as **Manual Mode**
3. In the Manual Mode Functions area, double-click the text box for the Travel Speed
4. Enter the numeric value for the Travel Speed and press Enter

#### 4.4.1 About KAS Simulator Display

The KAS Simulator displays the status and position of the axes. It also displays the log messages.



**Figure 4-7:** Display of KAS Simulator

You can continue to use the Control Panel to:

- Experiment with the controls and observe the simulated output
- Perform an absolute move by entering a position in the text box
- Perform a relative move

#### 4.5 Exiting Simulation Mode

To exit Simulation mode, do as follows:

1. Click the Stop Device button
2. Click the Disconnect Device button

This concludes the 30 minutes to motion tutorial.

#### NOTE

For additional information about Kollmorgen Automation Suite, see the

 **NOTE**

following documentation:

- Getting Started
- User Manual
- Technical Reference - PLC Library
- Technical Reference - Motion Library
- Online Help

## About Kollmorgen

Kollmorgen is a leading provider of motion systems and components for machine builders. Through world-class knowledge in motion, industry-leading quality and deep expertise in linking and integrating standard and custom products, Kollmorgen delivers breakthrough solutions that are unmatched in performance, reliability and ease-of-use, giving machine builders an irrefutable marketplace advantage.

For assistance with your application needs, visit [www.kollmorgen.com](http://www.kollmorgen.com) or contact us at:

### North America

#### KOLLMORGEN

203A West Rock Road  
Radford, VA 24141 USA

**Internet** [www.kollmorgen.com](http://www.kollmorgen.com)

**E-Mail** [support@kollmorgen.com](mailto:support@kollmorgen.com)

**Tel.:** +1 - 540 - 633 - 3545

**Fax:** +1 - 540 - 639 - 4162

### Europe

#### KOLLMORGEN Europe GmbH

Pempelfurtstraße 1  
40880 Ratingen, Germany

**Internet** [www.kollmorgen.com](http://www.kollmorgen.com)

**E-Mail** [technik@kollmorgen.com](mailto:technik@kollmorgen.com)

**Tel.:** +49 - 2102 - 9394 - 0

**Fax:** +49 - 2102 - 9394 - 3155

### Asia

#### KOLLMORGEN

Rm 2205, Scitech Tower, China  
22 Jianguomen Wai Street

**Internet** [www.kollmorgen.com](http://www.kollmorgen.com)

**E-Mail** [sales.asia@kollmorgen.com](mailto:sales.asia@kollmorgen.com)

**Tel.:** +86 - 400 666 1802

**Fax:** +86 - 10 6515 0263

**KOLLMORGEN**<sup>®</sup>

*Because Motion Matters™*