Kollmorgen Automation Suite

Getting Started

INTEGRATED DEVELOPMENT ENVIRONMENT

“Because Motion Matters”

Kollmorgen Automation Suite Integrated Development Environment combines a market leading Motion Engine, tightly integrated PLC engine and full development tools to configure any motion hardware such as motors, drives, gearboxes and actuators as well as automation hardware such as I/O modules and HMIs. Providing both process control capabilities and unsurpassed motion control programming delivers the very best in machine automation technology.

Valid for KAS Software Revision 4.00
Part Number: 959713

For safe and proper use, follow these instructions. Keep for future use.
1 Trademarks and Copyrights

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Kollmorgen Automation Suite is based on the work of:

- 7-zip (distributed under the terms of the LGPL and the BSD 3-clause licenses - see terms)
- The C++ Mathematical Expression Library (distributed under the MIT License)
- curl software library
- JsonCpp software (distributed under the MIT License – see terms)
- Mongoose software (distributed under the MIT License - see terms)
- Qt cross-platform SDK (distributed under the terms of the LGPL3; Qt source is available on KDN)
- Qwt project (distributed under the terms of the Qwt License)
- U-Boot, a universal boot loader is used by the AKD PDMM and PCMM (distributed under the terms of the GNU General Public License). The U-Boot source files, copyright notice, and readme are available on the distribution disk that is included with the AKD PDMM and PCMM.
- Zlib software library

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3 Introduction
This guide covers these main procedures to have your KAS system up and running:

- **Hardware (HW) Installation** (Connection and Wiring): Wiring and hardware details, connectors, system diagrams.
- **HW Configuration**: Basic configuration and settings needed to start the HW components (e.g., HMI, Industrial PC, Fieldbus, I/O).
- **Software (SW) Installation**: KAS software setup.

3.1 Related Documents
See the Kollmorgen Downloads page for documentation about controllers, drives, motors, and other components.

3.2 Alerts and Warnings
When alert symbols are seen in a manual, be aware of the potential for personal injury.
Follow the recommended precautions and safe operating practices included with the alert symbols.

- Safety notices in the manuals provide important information.
- Read and be familiar with these instructions before attempting to install, operate, or perform maintenance.
- The purpose of this section is to alert users to possible safety hazards associated with equipments and the precautions that need to be taken to reduce the risk of personal injury and damage to the equipment.
- Failure to observe these precautions could result in serious bodily injury, damage to the equipment, or operational difficulty.
4 System Overview

Kollmorgen Automation Suite (KAS) is a complete system solution. This includes a variety of powerful software packages designed for complete control over your hardware.

4.1 Software Packages

<table>
<thead>
<tr>
<th>Software</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KAS IDE</td>
<td>The KAS Integrated Development Environment (KAS IDE) provides all the necessary tools for designing, programming, configuring, debugging and maintaining machine applications.</td>
</tr>
<tr>
<td>KAS Runtime</td>
<td>The KAS Runtime engine includes a soft PLC and a motion controller.</td>
</tr>
<tr>
<td>KVB (optional)</td>
<td>The Kollmorgen Visualization Builder (KVB) assists in designing an HMI panel.</td>
</tr>
</tbody>
</table>
### 4.2 Hardware Components

The KAS system is comprised of these hardware components.

<table>
<thead>
<tr>
<th>Component</th>
<th>Models</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td>PCMM</td>
<td>Standalone programmable controller. Provides a real-time platform with a PLC engine and motion engine to execute your application program and communicate with all network devices (e.g., remote I/O, drives, HMI, other PLCs, etc.)</td>
</tr>
<tr>
<td>Controller + Drive</td>
<td>AKD PDMM</td>
<td>Integrated programmable controller and servo drive. Provides a real-time platform with a PLC engine and motion engine to execute your application program and communicate with all network devices (e.g., remote I/O, drives, HMI, other PLCs, etc.)</td>
</tr>
<tr>
<td>Remote I/O</td>
<td>AKT, AKT2G</td>
<td>Digital and analog input and output signals that provide sensor feedback and actuation between your automation system and the physical world.</td>
</tr>
<tr>
<td>HMI</td>
<td>AKI, AKI2G</td>
<td>Provides a graphical interface for the operator to manage the machine's operations.</td>
</tr>
<tr>
<td>Drive</td>
<td>AKD, AKD2G, AKD-C/N</td>
<td>Servo drives specifically designed with versatility, communications, and the power to expand machine performance.</td>
</tr>
<tr>
<td>Motor</td>
<td>AKM, AKM2G</td>
<td>Servo motor is an actuator that allows for precise control of position, velocity, and acceleration by closing the control loop with a feedback device.</td>
</tr>
</tbody>
</table>
5 Install KAS IDE

5.1 System Requirements

These are the minimum system requirements for the KAS IDE:

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Microsoft® Windows® 10 (32- or 64-bit). For optimal performance, verify the operating system is fully updated with the latest patches.</td>
</tr>
<tr>
<td>Processor Type</td>
<td>Intel® Pentium® M or equivalent processor at 1.5GHz or greater.</td>
</tr>
<tr>
<td>Memory</td>
<td>1GB RAM (for 32-bit) or 2GB RAM (for 64-bit) or greater (which is recommended for complex applications).</td>
</tr>
<tr>
<td>Storage</td>
<td>16GB (for 32-bit) or 20GB (for 64-bit) of free space on hard disk.</td>
</tr>
<tr>
<td>Display</td>
<td>WXGA+ (1440 x 900) or higher-resolution monitor with 24-bit color. See Note #1.</td>
</tr>
<tr>
<td>Connectivity</td>
<td>1 Ethernet port, at either 100MB or 1GB. See Note #2.</td>
</tr>
<tr>
<td>Web Browser</td>
<td>A modern web browser is required to access the web server and online help. We recommend Microsoft Edge, Google Chrome, Mozilla Firefox.</td>
</tr>
</tbody>
</table>

**NOTE**

1. Better results are achieved with OpenGL and 3D cards.
2. 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.

**TIP**

See Connect Remotely for information about the ports used by the KAS IDE.
The ports may need to be opened to support connecting from an external network.

5.2 Download

The latest version of the Kollmorgen Automation Suite is available from KDN.

See www.kollmorgen.com/en-us/developer-network/ to download the latest or older versions.

**NOTE**

This is a restricted community to which you must be given access based on having purchased KAS. If you do not have access, contact support.
5.3 Installation Procedure

**CD/ DVD Information**

After inserting the installation CD or DVD, a web browser automatically opens the installation start page.

**TIP**

If the installation start page does not automatically display, double-click the `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 this procedure to continue 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, you must stop the relevant Windows Service.

Once KAS has finished downloading, complete these 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. The Welcome Wizard displays with the version and build number of the KAS IDE.
4. Click **Next** to continue.
5. Review the License Agreement and click **I Agree** to continue the installation.
   
   **NOTE**
   
   You must accept the agreement to install KAS.

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

<table>
<thead>
<tr>
<th>Installation Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development Environment</td>
<td>This 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.</td>
</tr>
<tr>
<td>Custom</td>
<td>You can manually select the specific KAS components to install.</td>
</tr>
</tbody>
</table>

7. Click **Next** to access the destination folder.
8. Accept the recommended default location or Click **Browse** to specify a custom install directory.
9. 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 4.00.X.X`.

10. The software installation begins. Wait until the installation process is complete.
11. Click **Finish**.
5.4 Additional Literature

**List of PDF KAS Guides**

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Description</th>
<th>Download</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release Notes</td>
<td>The KAS Release Notes contain a summary of new features, fixed and known limitations, workarounds, and information on all hardware and software components that have been updated, changed, or added in this release.</td>
<td>📋</td>
</tr>
<tr>
<td>Getting Started</td>
<td>Contains these main steps to get your KAS system up and running.</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>- <strong>Hardware (HW) Installation</strong> (Connection and Wiring): Wiring and hardware details, connectors, system diagrams.</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>- <strong>HW Configuration</strong>: Basic configuration and settings needed to start the HW components (e.g., HMI, Industrial PC, Fieldbus, I/O).</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>- <strong>Software (SW) Installation</strong>: KAS software setup.</td>
<td>📋</td>
</tr>
<tr>
<td>30 Minutes to Motion</td>
<td>Contains the main topics to help you quickly start with KAS IDE.</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>The objective is to familiarize you with the basic principles and the way the program works by creating a simple motion application project.</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td><strong>What does it contain?</strong></td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>- Key Features</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>- Explore the Workspace</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>- Build a Motion Project</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>Almost every task performed in KAS falls under one of these basic steps (which may not always be completed in this order):</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>1. <strong>Start Projects</strong> - Create a project from scratch or modify an existing project.</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>2. <strong>Add Components</strong> - Add necessary elements to build the project and control the motion part of the system.</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>3. <strong>Build Output</strong> - Select a device and generate the application to deliver to users.</td>
<td>📋</td>
</tr>
<tr>
<td></td>
<td>4. <strong>Run Output</strong> - Make the output accessible to end-users.</td>
<td>📋</td>
</tr>
<tr>
<td>Document Title</td>
<td>Description</td>
<td>Download</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>IDE User Manual</td>
<td>Contains content to help with KAS IDE except the topics included in the Reference Manuals.</td>
<td><img src="e" alt="Download" /></td>
</tr>
<tr>
<td>Reference Manual - PLC Library</td>
<td>Contains Technical References on PLC Programming Languages and Library.</td>
<td><img src="e" alt="Download" /></td>
</tr>
<tr>
<td>Reference Manual - Motion Library</td>
<td>Contains Technical References on Motion Library for PipeNetwork and PLCopen.</td>
<td><img src="e" alt="Download" /></td>
</tr>
</tbody>
</table>
6 Installing KAS Runtime

The controller has all the necessary software installed (including KAS Runtime).

**NOTE**

KAS Runtime is only supported with Kollmorgen controllers.

6.1 Updating the Runtime on AKD PDMM and PCMM

The KAS Runtime is contained in the AKD PDMM and PCMM firmware and comes pre-installed. This procedure is for updating the firmware and runtime using the KAS web server.

The firmware files for AKD PDMM and PCMM are different than those for PCMM2G.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>AKD PDMM &amp; PCMM</th>
<th>PCMM2G</th>
</tr>
</thead>
<tbody>
<tr>
<td>File Type</td>
<td>.IMG files</td>
<td>.ZIP files</td>
</tr>
<tr>
<td>Format</td>
<td>KAS-PCMM-M-&lt;model-code&gt;-&lt;software-revision&gt;.img</td>
<td>KAS-PCMM2G-M-&lt;model-code&gt;-&lt;software-revision&gt;.zip</td>
</tr>
</tbody>
</table>

**NOTE**

The downloaded ZIP file may contain .SWU (an operating system update) and/or .TGZ (a KAS Runtime update) files.

<table>
<thead>
<tr>
<th>Model Code</th>
<th>CPU Speed</th>
<th>Cores</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCEC</td>
<td>800 MHz</td>
<td>single</td>
</tr>
<tr>
<td>M1EC</td>
<td>1.2 GHz</td>
<td>single</td>
</tr>
<tr>
<td>M2EC</td>
<td>1.2 GHz</td>
<td>dual</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model Code</th>
<th>CPU Speed</th>
<th>Cores</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCEC</td>
<td>1.5 GHz</td>
<td>quad</td>
</tr>
</tbody>
</table>

1. Download the latest drive firmware and/or runtime firmware from Kollmorgen.com.
2. Open the controller’s web server in your web browser by entering its IP address.
3. Select the Settings tabbed-page.
4. In the Firmware pane, click the Choose File button to select the new firmware image file for the KAS Runtime.

The recommended file is displayed in the Firmware Information section, shown here:

**AKD PDMM and PCMM**

- **Runtime version**: 2.10.0.86788
- **Recommended File Name**: KAS-PDMM-M-MCEC-{version}.img

**PCMM2G**

- **Runtime version**: 4.00.0.87649
- **Recommended File Name**: KAS-PCMM2G-M-MCEC-{version}.zip
5. Click **Upgrade** to start the update procedure.

   **TIP**
   If the **Upgrade** button is disabled, log into the webserver.
   Click **Login** at the top of the web page and enter the password.
   A message and a throbber are shown across the web page, indicating that maintenance is in progress.
   The AKD PDMM or PCMM's 7-segment display animates with chasing lights.

<table>
<thead>
<tr>
<th><strong>Successful upgrade</strong></th>
<th>The controller automatically reboots with new firmware.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Press CTRL+F5 in your web browser to force a page refresh so the &quot;Firmware Version&quot; displays the new version number.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Incompatible firmware</strong></th>
<th>An error message similar to this is displayed if the wrong firmware file was downloaded:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The file provided is not compatible with this device.</td>
</tr>
<tr>
<td></td>
<td>The file name should be...</td>
</tr>
<tr>
<td></td>
<td>&quot;KAS-PDMM-M-MCEC-{version}.img&quot;</td>
</tr>
</tbody>
</table>

6. After the download is complete, click **Reboot**

   A message and a throbber are shown over the web server while the reboot is in progress.
   The login session is no longer valid when the reboot is complete.
   The webserver displays a message to indicate the user has been logged out.

   **NOTE**
   This step is not necessary if the controller automatically reboots during the upgrade (previous step).

7. Press **CTRL+F5** to force the web browser to refresh the page.

   **IMPORTANT**
   Do not try to refresh the web page until firmware upgrade is completed.
7 Installing Hardware (HW)

Before your motion application can be up and running, all hardware components need to be connected, wired, and configured.

The **Getting Started** guide contains procedures for installing and configuring hardware components (e.g., HMI, controllers, I/O Terminals, EtherCAT Motion Bus, AKD2G Drive, and AKM2G Motor).

**NOTE**

For extensive information about installing the different hardware components, see this documentation:

- KAS.Kollmorgen.com
- KAS IDE online help (after KAS has been installed)

This table has links to installation instructions for hardware components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMI (Human-Machine Interface)</td>
<td>Install the graphic operator interface. See &quot;HMI - Graphic Operator Interface&quot; (→ p. 15).</td>
</tr>
<tr>
<td>Controller</td>
<td>Install the PCMM or AKD PDMM controller. See &quot;Install Controller - AKD PDMM and PCMM&quot; (→ p. 15).</td>
</tr>
<tr>
<td>EtherCAT Motion Bus</td>
<td>Set up EtherCAT Motion Bus Communication. See AkD™ EtherCAT Communication</td>
</tr>
<tr>
<td>Component</td>
<td>Installation</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>I/O Terminal</td>
<td>Install the remote Input/Output Terminal. See &quot;Remote Input/Output - I/O Terminal&quot; (p. 16).</td>
</tr>
<tr>
<td>Safety</td>
<td>&quot;Working with SafePLC2 Projects&quot; (p. 18)</td>
</tr>
<tr>
<td>AKD Drive</td>
<td>Install a AKD or AKD2G Drive. See AKD Installation Manual and also AKD Quick Start. Available from KDN: AKD Downloads.</td>
</tr>
<tr>
<td>AKM and AKM2G Motor</td>
<td>Install the AKM or AKM2G Motor. Mechanical and Electrical installation. Available from KDN: AKM Downloads or AKM2G Downloads.</td>
</tr>
</tbody>
</table>
7.1 HMI - Graphic Operator Interface

This is a list of each HMI available component:

<table>
<thead>
<tr>
<th>HMI Part Number</th>
<th>Description</th>
<th>KVB</th>
<th>Manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKI2G-CDA-MOD-05T-000</td>
<td>Graphical Display 7” TFT LCD, Touchscreen</td>
<td>v2.20</td>
<td></td>
</tr>
<tr>
<td>AKI2G-CDA-MOD-07T-000</td>
<td>Graphical Display 5” TFT LCD, Touchscreen</td>
<td>v2.20</td>
<td></td>
</tr>
<tr>
<td>AKI2G-CDB-MOD-07T-000</td>
<td>Graphical Display 7” TFT LCD, Touchscreen</td>
<td>v2.20</td>
<td></td>
</tr>
<tr>
<td>AKI2G-CDB-MOD-12T-000</td>
<td>Graphical Display 12” TFT LCD, Touchscreen</td>
<td>v2.20</td>
<td></td>
</tr>
<tr>
<td>AKI-CDC-MOD-12T-000</td>
<td>Graphical Display 12.1” TFT LCD, Touchscreen</td>
<td>v2.0</td>
<td></td>
</tr>
<tr>
<td>AKI-CDC-MOD-15T-000</td>
<td>Graphical Display 15.4” TFT LCD, Touchscreen</td>
<td>v2.0</td>
<td></td>
</tr>
<tr>
<td>AKI-CDC-MOD-21T-000</td>
<td>Graphical Display 21.5” TFT LCD, Touchscreen</td>
<td>v2.0</td>
<td></td>
</tr>
</tbody>
</table>

See www.kollmorgen.com for specifications and Technical Manuals for more information.

7.2 Install Controller - AKD PDMM and PCMM

The AKD PDMM and PCMM installation information is found here:

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Description</th>
<th>Manual</th>
</tr>
</thead>
</table>
| AKD PDMM Install Guide | • Covers the most important points to install the drive hardware and software.  
|                   | • Provides instructions for basic drive setup and connection to a network. |        |
| PCMM Install Guide | Covers the most important points of the installation and setup of the controller. |        |

7.3 EtherCAT Motion Bus

One EtherCAT master has to be connected with all the slaves (drives and I/O terminals) of your system. Details about the installation procedure for the EtherCAT Motion Bus are here:

- AKD2G: Installation and Setup
  - Click Apply to set the Fieldbus filters on the website.

- AKD: Download - AKD EtherCAT Communications Manual
  - Select the PDF from the list.
7.4 Remote Input/Output - I/O Terminal

This is a list of available I/O components.

See the AKT2G I/O Manual or the online help for detailed information on setting up I/O.

AKT2G (EtherCAT) Terminals

<table>
<thead>
<tr>
<th>I/O Terminal Part Number</th>
<th>I/O Terminal Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKT2G-AC-FAN-001</td>
<td>Fan cartridge for EtherCAT and Bus Terminals</td>
</tr>
<tr>
<td>AKT2G-AN-240-000</td>
<td>2-channel input terminal PT100 (RTD) for resistance sensors, 16-bit, 2-, 3-wire system</td>
</tr>
<tr>
<td>AKT2G-AN-400-000</td>
<td>4-channel thermocouple input terminal, preset to type K, with wire breakage detection, 16-bit</td>
</tr>
<tr>
<td>AKT2G-AN-430-000</td>
<td>4-channel analog input, parameter capable, -10/0...+10 V, -20/0/+4...+20mA, 16-bit</td>
</tr>
<tr>
<td>AKT2G-AT-410-000</td>
<td>4-channel analog output terminal 0...10V, 12-bit, 1-wire system</td>
</tr>
<tr>
<td>AKT2G-AT-425-000</td>
<td>4-channel analog output terminal -10V...+10V, 12-bit, 4 x 2-wire system</td>
</tr>
<tr>
<td>AKT2G-BRC-000-000</td>
<td>Brake Chopper Terminal</td>
</tr>
<tr>
<td>AKT2G-DN-002-000</td>
<td>Up/down counter 24VDC, 100 kHz, 32-bit counter depth</td>
</tr>
<tr>
<td>AKT2G-DN-008-000</td>
<td>8-channel digital input terminal 24VDC, filter 3.0 ms, 1-wire system</td>
</tr>
<tr>
<td>AKT2G-DNH-008-000</td>
<td>8-channel digital input terminal 24VDC, filter 10 µs, 1-wire system</td>
</tr>
<tr>
<td>AKT2G-]DT-008-000</td>
<td>8-channel digital output terminal 24VDC, 0.5A, 1-wire system</td>
</tr>
<tr>
<td>AKT2G-ECT-000-000</td>
<td>EtherCAT Coupler for E-bus terminals</td>
</tr>
<tr>
<td>AKT2G-EM-000-000</td>
<td>Bus end cover for E-bus terminals, cover for power and E-bus contacts, gray</td>
</tr>
<tr>
<td>AKT2G-ENC-180-000</td>
<td>1-channel incremental encoder interface, 32-bit</td>
</tr>
<tr>
<td>AKT2G-ENC-190-000</td>
<td>Incremental encoder interface with differential input, 16- / 32-bit</td>
</tr>
<tr>
<td>AKT2G-PSF-024-000</td>
<td>Power supply terminal with fuse, 24VDC</td>
</tr>
<tr>
<td>AKT2G-SDI-004-000</td>
<td>4-channel digital input terminal, Safety, 24VDC</td>
</tr>
<tr>
<td>AKT2G-SDO-004-000</td>
<td>4-channel digital output terminal, Safety, 24VDC, 0.5 A</td>
</tr>
<tr>
<td>AKT2G-SM-L15-000</td>
<td>Stepper motor terminal, 24VDC, 1.5A, vector control</td>
</tr>
<tr>
<td>AKT2G-SM-L50-000</td>
<td>Stepper motor terminal, 50VDC, 5A, vector control</td>
</tr>
</tbody>
</table>
7.5 Installing Drives

<table>
<thead>
<tr>
<th>Drive Manuals</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKD EtherCAT Manual</td>
<td>Describes the installation, setup, range of functions, and software protocol for the EtherCAT AKD product series.</td>
</tr>
<tr>
<td>AKD Installation Manual</td>
<td>• Installation manual for AKD and AKD PDMM drives.</td>
</tr>
<tr>
<td></td>
<td>• Describes the AKD series of digital drives and includes mechanical, electrical, and software installation information needed to safely install AKD.</td>
</tr>
<tr>
<td>AKD PDMM Fault Card</td>
<td>• Describes the AKD PDMM (including AKD) faults, warnings, error messages, and alarms.</td>
</tr>
<tr>
<td></td>
<td>• Provides cause and remedy instructions to determine the specifics of the failure and to correct the underlying problem.</td>
</tr>
<tr>
<td>AKD PDMM User Manual</td>
<td>• Describes the software installation, setup, and operation for the AKD PDMM drive.</td>
</tr>
<tr>
<td></td>
<td>• Includes basic topics and examples to help set up and use the various features in the drive.</td>
</tr>
<tr>
<td>AKD2G EtherCAT Manual</td>
<td>Describes the installation, setup, range of functions, and software protocol for the AKD2G product series.</td>
</tr>
<tr>
<td>AKD2G Installation Manual</td>
<td>• Describes the AKD2G series of digital drives.</td>
</tr>
<tr>
<td></td>
<td>• Includes mechanical, electrical, software, and functional safety options.</td>
</tr>
<tr>
<td>MKD Installation Manual</td>
<td>• Installation manual for MKD-N power supply and MKD-C drives.</td>
</tr>
<tr>
<td></td>
<td>• Describes the MKD devices and includes mechanical, electrical, and software installation information needed to safely install the devices.</td>
</tr>
<tr>
<td>S300 Reference Documentation</td>
<td>Kollmorgen website with access to all S300 manuals.</td>
</tr>
<tr>
<td>S700 Reference Documentation</td>
<td>Kollmorgen website with access to all S700 manuals.</td>
</tr>
</tbody>
</table>

7.6 Installing the AKM Motors

To install AKM or AKM2G Servomotors, see either the AKM Instructions Manual or the AKM2G Installation Manual.
7.7 Working with SafePLC2 Projects
A node can be added to the Project tree connected to a SafePLC2 project.

- This is used to synchronize a SafePLC2 project with a KAS project.
- The KAS IDE automatically generates the PDOs for the connected devices and establishes the Black Channel with the EtherCAT Safety network.

These are the methods for creating the synchronization between KAS Runtime and SafePLC2:

- "Working with SafePLC2 Projects" (p. 18) - This is used when both the KAS IDE and SafePLC2 are installed on the same computer.
- "Working with SafePLC2 Projects" (p. 18) - This is used when KAS IDE and SafePLC2 are installed on different computers.

See the online help or the AKT2G I/O Manual for detailed directions.
8 Updating Firmware

Check the KAS software Release Notes to find the AKD PDMM firmware version that matches your KAS software version. The latest version of the firmware can be downloaded from the Kollmorgen website.

To ensure your installation is correct, you have to:

1. Check the current AKD or AKD2G drive firmware.
2. Download the official version, if necessary.
3. Update the firmware.

8.1 Check AKD / AKD2G Drive Firmware

To check the device firmware with KAS IDE:

1. Create a new project.
2. Set the controller type and IP address.
3. In the Project Explorer, double-click the EtherCAT node to open the EtherCAT Devices summary window.
4. In the Devices tab, click the Scan Devices button.
5. Choose the Create... option to map the physical device to a new device.

**NOTE**

If a Kollmorgen drive is showing the firmware version as "Unknown", the drive has valid resident firmware (from which to boot), but does not have valid operational firmware. Download and install the latest operational firmware and reboot the AKD / AKD2G.

6. If the version is not correct, continue with this procedure:
7. Compile the project.
8. Connect to the controller.
9. Download the project to the controller.
10. If the version is not correct, download the new firmware (click here) and follow the next procedure.

8.2 Download AKD PDMM Drive Firmware

<table>
<thead>
<tr>
<th>Component</th>
<th>Title</th>
<th>Download</th>
</tr>
</thead>
<tbody>
<tr>
<td>800MHz AKD PDMM Drive FW</td>
<td>AKD PDMM Servo Drive Firmware (AKD-M-MCEC-[firmware version])</td>
<td><img src="download.png" alt="Download" /></td>
</tr>
<tr>
<td>1.2GHz AKD PDMM Drive FW</td>
<td>AKD PDMM Servo Drive Firmware (AKD-M-M1EC-[firmware version])</td>
<td><img src="download.png" alt="Download" /></td>
</tr>
</tbody>
</table>
To upgrade the AKD PDMM drive Firmware with KAS IDE:

1. In the toolbar, deactivate the Online Configuration Mode.
2. Select the drives requiring the same firmware version to be updated.

   The firmware download is limited to 16 drives at a time.

3. Click Upgrade Firmware button.

   Give careful attention to any warning dialog that appears at this point. These warnings usually include important information about preventing damage to the drives.

4. Browse to select the new AKD/AKD2G firmware file.
5. Click Open to start the updating procedure.

### 8.3 AKD/AKD2G Firmware Update

Based on the File Access over EtherCAT (FoE) protocol, the AKD/AKD2G drive Firmware can be downloaded:

1. Scan the devices and make sure all devices are created.
2. Compile the project.
3. Connect to the controller.
4. Download the project to the controller.
5. Open the EtherCAT Devices summary form.
6. Select the drives requiring the same firmware version to be updated.
   - Multiple drives of the same type can be selected.
     - This allows the same firmware file to be downloaded to the selected drives simultaneously.
   - **AKD-P**: The last four letters of the model number must be the same for simultaneous firmware download.
   - **AKD-N**: The last four characters can be different. However, the firmware file selected to download must support all the selected models. The file `AKD-N-xxEC-********.i00` supports multiple AKD-N models.
   - **AKD-C**: Devices with the product description "AKD String 2" do not support firmware download.
7. Click the **Upgrade Firmware** button.

![Upgrade Firmware button]

**IMPORTANT**
Give careful attention to any warning dialog that appears at this point. These warnings usually include important information about preventing damage to the drives.

8. Browse to select the new AKD firmware file matching the AKD revision. Refer to the Release Notes for the latest supported firmware.

9. Click **Open** to start the updating procedure.

**NOTE**
This procedure is not possible when applications are running and when the drive is in Online Configuration Mode.

During the firmware download, the AKD/AKD2G Firmware Update window displays a progress bar and these messages are displayed:

- Uploading firmware to the drive.
  - During the download process, the drive LED displays [dL].
  - Additional codes may appear during the download.
    - See either AKD or AKD2G Display Codes for a description of codes related to the firmware download.

- Resetting the drive.
- Firmware update is complete.

**CAUTION**
While the firmware is downloading to your drive, **do not** remove the 24V logic power. If you remove the 24V logic power during a firmware download, a severe drive crash can occur. If a crash occurs, the drive will restart in a special mode and prompt you to reload the firmware.

**IMPORTANT**
An AKD drive executing the resident firmware is detected as a different device than an AKD or AKD2G drive executing the operational firmware. Be sure to re-scan the network and compile it if a drive's executed firmware has changed since the last scan.

**TIP**
Power cycling is recommended after completing the update for all drives.
9 Installing Kollmorgen Visualization Builder

Kollmorgen Visualization Builder (KVB) is used to design HMI running on AKI panels. KVB is an optional feature that is only included in some licenses.

**NOTE**

Kollmorgen Visualization Builder contains these two installation packages:

- Kollmorgen Visualization Builder(KVB IDE) for development PC
- Visualizer RT (KVB RT) for AKI panel runtime

### 9.1 Download

<table>
<thead>
<tr>
<th>Component</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latest Version of Kollmorgen Visual Builder</td>
<td>v.2.40</td>
</tr>
<tr>
<td>Visualizer RT (KVB RT)</td>
<td>v.2.40</td>
</tr>
</tbody>
</table>

### 9.2 Installation Procedure

These programs automatically install during the KVB installation.

- Microsoft .NET Compact Framework 3.5
- Microsoft SQL Server Compact 3.5
- Microsoft Visual C++ 2013 - Redistributable Setup

Once Kollmorgen Visualization Builder has finished downloading, complete these installation steps:

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

   **NOTE**

   If KVB was already installed and you want to update to a new version, then running **NeoSetup.msi** is enough.

2. Select the check box to accept the License agreement and click **Next** to start installing **Kollmorgen Visualization Builder**.

3. Select where you want to install **Kollmorgen Visualization Builder** and the application language, then click **Next**.
Kollmorgen strongly recommends accepting the default destination folder under C:\Program Files (x86)\Kollmorgen\Kollmorgen Visualization Builder.

4. Click **Install** to start **Kollmorgen Visualization Builder** installation.

5. Click **Close** or to start using KVB right away, click **Launch**.
### KVB Guides

<table>
<thead>
<tr>
<th>KVB Guides</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kollmorgen Visualization Builder™ Quick Start Guide</td>
<td>The Quick Start covers these important points to:</td>
</tr>
<tr>
<td></td>
<td>• Install and use Kollmorgen Visualization Builder.</td>
</tr>
<tr>
<td></td>
<td>• Configure HMI Panels and PC operated control applications.</td>
</tr>
<tr>
<td>Kollmorgen Visualization Builder™ User Manual</td>
<td>Contains all the content to help with Kollmorgen Visualization Builder.</td>
</tr>
</tbody>
</table>
10 Finalizing Installation

To complete the KAS installation, you can optionally:

- Test the system.
- Create a backup image.

10.1 Testing Installation

To conclude your installation, the whole system has to be tested.

A test could be done with the standard Two-Axis Template that corresponds to a simple application (refer to KAS 30 Minutes to Motion).
### 11 Troubleshooting

Faults occur for a variety of reasons, depending on the conditions in your installation. The causes of faults in multi-axis systems can be especially complex.

**TIP**

You can find more details here:

- The Troubleshooting section in the online help.
- The Faults and Warnings section of the online help.
- Search the Kollmorgen Developer Network (KDN) at [www.kollmorgen.com/developer-network](http://www.kollmorgen.com/developer-network) for answers or submit a question.
12  Support and Services

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.

Join the Kollmorgen Developer Network for product support. Ask the community questions, search the knowledge base for answers, get downloads, and suggest improvements.

North America
KOLLMORGEN
201 West Rock Road
Radford, VA 24141, USA
Web: www.kollmorgen.com
Mail: support@kollmorgen.com
Tel.: +1 - 540 - 633 - 3545
Fax: +1 - 540 - 639 - 4162

Europe
KOLLMORGEN Europe GmbH
Pempelfurtstr. 1
40880 Ratingen, Germany
Web: www.kollmorgen.com
Mail: technik@kollmorgen.com
Tel.: +49 - 2102 - 9394 - 0
Fax: +49 - 2102 - 9394 - 3155

South America
KOLLMORGEN
Avenida João Paulo Ablas, 2970
Jardim da Glória, Cotia - SP
CEP 06711-250, Brazil
Web: www.kollmorgen.com
Mail: contato@kollmorgen.com
Tel.: +55 11 4615-6300

China and SEA
KOLLMORGEN
Room 302, Building 5, Lihpao Plaza,
88 Shenbin Road, Minhang District,
Shanghai, China.
Web: www.kollmorgen.cn
Mail: sales.china@kollmorgen.com
Tel.: +86 - 400 668 2802
Fax: +86 - 21 6248 5367