Kollmorgen Automation Suite

Release Notes

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Valid for KAS Software Revision 4.00

Valid for AKD firmware version: 01-22-00-000

Valid for AKD2G firmware version: 02-10-00-000

Part Number: 959720

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

KOLLMORGEN

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- 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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2   Table of Contents

3 Introduction

Welcome to KAS v4.00! This release contains new features and many improvements. This document is intended to help existing users understand the differences between this and KAS v3.07. If you are new to KAS, we recommend you start with other documents, such as the Installation Guide.

This document has these sections:

- "Installation" (➜ p. 5) — This covers system requirements as well as provides firmware, software, and hardware information.
- "What's New in KAS v4.00" (➜ p. 11) — This is an overview of new features.
- "What's Changed in KAS v4.00" (➜ p. 13) — This discusses how this release may affect some older projects.
    - It let's you know what to do when upgrading, especially if there is anything you need to be careful about.
- "What's Fixed in KAS v4.00" (➜ p. 14) — This is a list of issues addressed in this release.
- "Known Issues" (➜ p. 15) — This contains issues we are aware of and may include methods for avoiding or working around them.

➘ TIP

We recommend you visit Kollmorgen Developer Network ("KDN").
KDN is an online resource which includes a knowledge base, provides access to downloads, and has a user community where you can get answers from peers and Kollmorgen employees, and make feature suggestions for KAS.
Beta versions of the help are posted here and are searchable.

NOTE

This PDF contains links to the KAS help system and works best when read from within the KAS IDE installation directory.
The links to content do not work if the PDF is located somewhere other than `(install directory)\Kollmorgen\Kollmorgen Automation Suite 4.00.x.y\Help`.

4 Installation

4.1 System Requirements

These are the minimum system requirements for the KAS IDE:

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

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.

4.2 Firmware & Software Requirements

KAS is comprised of several software components integrated together to provide a complete motion system. We recommend these component software versions for best performance and compatibility.

4.2.1 Computer Software

Software Images	Recommended Version
KAS IDE	4.00.0

4.2.2 Firmware Requirements

4.2.2.1 Controller Firmware

This is the controller firmware to use with KAS v4.00.

Description	Type	Name
PCMM 800MHz	KAS Runtime	KAS Runtime Firmware for AKC-PCMM (KAS-PCMM-M-MCEC)
AKD PDMM 800MHz	KAS Runtime	KAS Runtime Firmware for AKD-PDMM (KAS-PDMM-M-MCEC, KAS-PDMM-M-KCEC)
PCMM 1.2GHz	KAS Runtime	KAS Runtime Firmware for AKC-PCMM (KAS-PCMM-M-M1EC)
PCMM 1.2GHz Dual-Core	KAS Runtime	KAS Runtime Firmware for AKC-PCMM (KAS-PCMM-M-M2EC)
AKD PDMM 1.2GHz	KAS Runtime	KAS Runtime Firmware for AKD-PDMM (KAS-PDMM-M-M1EC, KAS-PDMM-M-K1EC)

- Supported drives include:
  - AKD-M (AKD PDMM Drive)
  - AKD2G, AKD-P (Motion Tasking Drive or Position Indexer)
  - AKD-C/-N
  - MKD-C

- The recommended firmware version is dependent on the drive's model and revision.
- Controller firmware is available on KDN.

4.2.2.2 Drive Firmware

This is the drive firmware to use with KAS v4.00.

> **NOTE**
> AKD and AKD2G firmware is available on KDN.

Description	Type	Name
Firmware for drive built into AKD PDMM	800MHz AKD PDMM	AKD PDMM Servo Drive Firmware • AKD-M-KCEC-01-22-00-000.i00 • AKD-M-MCEC-01-22-00-000.i00
	1.2GHz AKD PDMM	AKD PDMM Servo Drive Firmware • AKD-M-K1EC-01-22-00-000.i00 • AKD-M-M1EC-01-22-00-000.i00
AKD Drive Firmware	AKD-N	AKD-N-xxEC-V01-22-00-000.i00
	AKD-P	AKD-P-NBxC-01-22-00-000.i00
	Resident	R_00-00-68-000.i00
AKD2G Drive Firmware	Non-Safety (FS1)	AKD2G-S-(E)-A-02-10-00-000.i00
	Safety Certified (FS2 & FS3)	AKD2G-S-A-02-05-03-002.i00

4.2.2.3 Firmware Compatibility

Tips

Be aware that you may get an F106 error after upgrading the AKD firmware.

- This indicates that non-volatile parameters are not compatible between the two firmware versions.
- Resetting the drive to the default memory values using Parameter Load will fix this error.

`FBUS.PARAM05` bit 5 should be set to 0 (zero); this is the default value.

- This prevents an error E33 and EtherCAT not starting.
- If it is not set to the default, the rotary switch of the drive is used to set the EtherCAT Station Alias.
  - This can conflict with the address that KAS is writing.

4.2.2.4 Mandatory Resident Firmware for AKD

- The recommended resident firmware for all AKD family drives is R_00-00-68-000.
- To reliably support the EtherCAT firmware download, resident firmware must be at least v35.
  - Contact Kollmorgen for any AKD Drive with resident firmware lower than v35.

4.2.3 Kollmorgen Visualization Builder

Software Images	Recommended Version	Download
Kollmorgen Visualization Builder (KVB)	2.40	e

The new installation package contains both the IDE and runtime for TxC panels.

The KVB ZIP file contains two different installers:

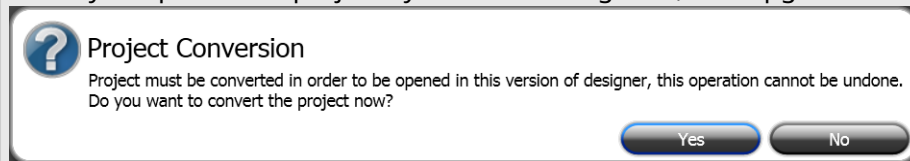| Install Type	File	Notes
New installation	setup.exe	This is the complete package which will install all prerequisite components.
Runtime	RuntimeSetup.exe	This package contains runtime software for TxC panels.

Supported by KVB 2.40

Hardware / Software	Versions
Operating Systems	Windows® 7, Windows 8, Windows 10
Controllers	PCMM, AKD PDMM
HMI	All Kollmorgen AKI panels

NOTE

The KAS IDE creates projects using KVB 2.0.
When you open a v2.0 project by double-clicking on it, KVB upgrades the project to v2.40.

Project Conversion
Project must be converted in order to be opened in this version of designer, this operation cannot be undone.
Do you want to convert the project now?

Yes   No

① IMPORTANT

KVB 1.2 projects are not compatible with KVB 2.x.
An attempt to open a v1.2 project with v2.x results in an alert message.
If accessing v1.2 projects is important, we recommend keeping both versions installed on your system.
New panels automatically use KVB 2.0.

⚲ TIP

Contact Kollmorgen if you have a KVB 1.2 project that needs to be updated in KVB 2.x.

4.2.4 BBH Safety Software

These BBH Safety software and firmware minimum versions are required to operate with the AKD2G, AKT2G-SDO-04-000, AKT2G-SDI-04-000, PCMM, AKD PDMM, and KAS IDE software.

Contact BBH for the latest software and firmware release information and details.

Description	Type	Minimum Version
SCU-1-EC FSoE Master firmware	Firmware	03.00.00.62
SafePLC2 safety programming software	Software	1.7.1.8219

4.3 KAS Controls

KAS Runtime is compatible with, and has been verified with these hardware models:

List of KAS Controllers

Controller	Description	Model Number	Main Characteristics
PCMM	1.2GHz dual core	AKC-PCM-M2-120-00N-00-000	High Performance Multi-Axis Controller
PCMM	1.2GHz single core	AKC-PCM-M1-120-00N-00-000	High Performance Multi-Axis Controller
PCMM	800MHz single core	AKC-PCM-MC-080-00N-00-000	Standard Multi-axis Controller
AKD PDMM	1.2GHz	AKD-M0xxxx-M1EC-0000 AKD-M0xxxx-K1EC-0000	High Performance Drive Resident Controller
AKD PDMM	800MHz	AKD-M0xxxx-MCEC-0000 AKD-M0xxxx-KCEC-0000	Standard Drive Resident Controller

4.4   Allow Simulator to Use HTTP Communication

The Simulator needs to open HTTP ports to allow communication.

The first time Simulator is run, Windows prompts you to block or unblock the KAS application.

Allow access to all of these requests to ensure correct behavior.
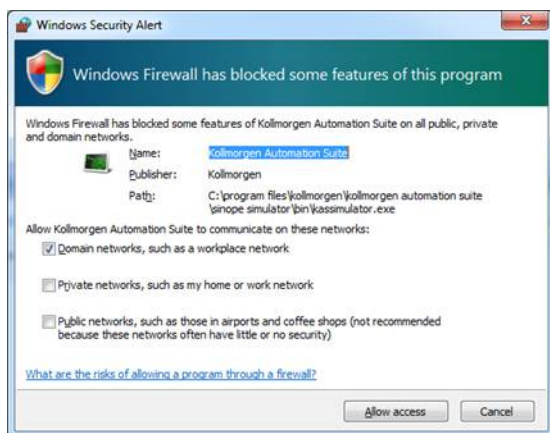
The Simulator uses port 80 for the web server.

Simulator automatically assigns an available free port to the webserver to listen to the incoming HTTP requests if another service is using port 80.

See Start Simulator for more information.

5 What's New in KAS v4.00

These new features have been implemented for this release.

5.1 Next Generation Controller Software

The KAS IDE and Runtimes have been expanded to support both AKD PDMM / PCMM controllers and the future release of next generation PCMM2G controllers.

Application programs written or upgraded to v4.00 (or later) can be compiled for either generation 1 or 2 controllers. The PCMM2G controllers will have multiple-core CPUs. Follow the Programming a Dual Core Controller a guidelines for forwards compatibility to next generation controllers.

- Compatible with AKD PDMM and PCMM (1st Generation Controllers)
- 64-bit Runtime (2nd Generation Controllers)

5.2 AKD2G Modular Device Profile (MDP) I/O

KAS IDE supports AKD2G models with various IO configurations for X22 and X23 using the AKD2GModular Device Profiles (MDP).

- The EtherCAT device I/O view and PDO objects automatically adapt to the AKD2G model specific I/O tables when the device is discovered or when MDP modules are manually added/deleted from the project tree.
    - This feature is available with the AKD2G firmware version 02-09-01-000 (or later).
    - Earlier versions include all possible I/O, requiring a manual configuration based on the AKD2G hardware manuals.

5.3 New Kollmorgen Drive Models

Added support for the -ND, -K, and -ES models of the AKD family drives:

- AKD-M-xxxxx-KCEC, K1EC
    - See AKD-M "Kx" PDMM Controller / Drive Variant for more information.

- AKD-N-xxxxx-ESEC
    - See AKD-N "ES" Drive Variant for more information.

- AKD-P-xxxxx-NDEC
    - See AKD-P "ND" Drive Variant for more information.

- MKD-Cxxxxxx-NDEC
    - See MKD-C "ND" Central Power Supply Variant for more information.

5.4 New Functions

5.4.1 PLC Standard and Advanced Libraries

Added these functions to the PLC Standard and Advanced libraries:

DTCurDateTime - Get the present date and time stamp.

ISINF, ISINFL - Checks if the input value is infinite.

ISNAN, ISNANL - Checks if the input value is not a number.

SWAB - Swap the bytes of an integer.

5.4.2 Real-Time Clock (RTC)

Added these functions to support the Real-Time Clock (RTC) for the PCMM2G and Simulator.

> **NOTE**
>
> AKD PDMM and PCMM do not support RTC because they do not have Real-Time Clock hardware.

DTGetNTPServer - Read the NTP server address.

DTGetNTPSync - Read the NTP synchronization enable state.

DTGetTimeZone - Read the Time Zone.

DTListTimeZones - List the time zones available on the controller.

DTSetDateTime - Sets the local date and time.

DTSetNTPServer - Set the NTP server address.

DTSetNTPSync - Set the NTP synchronization enable state.

DTSetTimeZone - Set the time zone.

6   What's Changed in KAS v4.00

These changes have been implemented for this release.

- Arrays are no longer limited to 64k elements.
- "C" style comments /* ... */ are now supported.
- FFLD editor includes row and column numbers.
- MIN and MAX accept variable number of inputs.
- Bit Field data types support up to 64-bit integers.
- SFC Macro and Macro Body button have been removed from the IDE because the SFC Macro functionality is no longer supported.
  The compiler supports SFC Macro steps from programs created with v3.07, and earlier, for backwards compatibility.
- Earlier versions allowed improper usage of function block return statements in the same way as function return values.
  This could result in undefined behavior.
- In v4.00 and later, the compiler generates an **Unexpected complex data in expression** error for non-compliant syntax.
  - See Compiler Errors for more information.

Examples

IEC 61131-3 Non-Compliant Syntax

```
If inst_functionBlock(myVar1) = True Then
// ...
End_If;
```

IEC 61131-3 Compliant Syntax

```
inst_functionBlock(myVar1);
If inst_functionBlock.q = True Then
// ...
End_If;
```

⚠️ **WARNING**

UDFBs and libraries can have improper syntax.

These Kollmorgen UDFBs have been corrected and can be re-imported into the application code.

See Re-import Kollmorgen UDFBs for more information.

- FB_AKDFltRpt
- FB_AxisPlsPosModulo
- FB_AxisPlsPosNoModulo
- FB_S700FltRpt
- MCFB_AKDFault
- MCFB_DriveFault
- MCFB_Jog
- MCFB_StepAbsSwitchFastInput
- MCFB_StepLimitSwitchFastInput
- MLFB_DriveFault
- MLFB_PlsPosFw
- MLFB_PlsPosFwBw
- MLFB_PlsTimeFw

7 What's Fixed in KAS v4.00

These issues have been fixed for this release.

Defect	Description
BZ-11196	PROFINET IO Device is sending wrong VLAN-ID.
BZ-11186	>64 byte PDOs not supported w/ 3rd party EtherCAT device.
BZ-11185	E21 during EtherCAT communication failure.
BZ-11184	Multiple AKT2G-SDI-004-000 and/or AKT2G-SDO-004-000 may prevent EtherCAT operation.
BZ-11176	3rd Party EtherCAT device PDO outputs not working.
BZ-11172	KAS Simulator crashes randomly when stopping the PLCopen application.
BZ-11170	Reinstate PROFINET drivers in the KAS installer.
BZ-11162	**MC_CamResumePos** returns incorrect position after camming has stopped.
BZ-11161	EtherCAT does not start with CoE Init commands for AKD2G outputs that don't exist.
BZ-11156	WorkBench Setup Wizard always disabled in Online Configuration Mode.
BZ-11153	Multiple **MC_MoveAbsolute** calls with blending buffer mode does not decelerate correctly.
BZ-11084	IDE Crash w/ IDE-WB Scope views during Ethernet connection loss.

8 Known Issues

These are the known issues for this release.

Defect	Description
BZ-11188	Changing rollover parameter, followed by **MC_SetPos** causes incorrect final position for **MC_MoveAbsolute**.
BZ-11169	Multiple **MC_MoveLin/Circ** calls with velocity blending and short path distance may exceed specified deceleration rate.
BZ-11143	IDE has long delay when mapping variables to Safety PDOs.
BZ-11139	IDE PLCopen digitizing axis w/ multi-turn has incorrect user units
BZ-10458	PLC Variable Creation Wizard don't show the mapping.
BZ-10451	Cannot start application with direct Ethernet connection.
BZ-10419	Drag-n-drop variable from UDFB instance to watch window does not display the value.
BZ-10275	PxMM controller bus time not synchronized with DC master time.
BZ-9928	ESI file list not updated when good and bad ESI files added at the same time.
BZ-9835	Non-ASCII characters in projects not handled properly in the IDE.
BZ-9834	Import/export from/to non-ASCII file names does not work correctly.
BZ-9496	AKD-N firmware download fails if 4x drives are selected.
BZ-9359	PDO objects not defined in the object dictionary (or 24-bit size) will not work properly with MLSmpXxxxx(...) functions.
BZ-8659	PLCopen move blending with jerk. If the blending move is commanded with an unreachable velocity, the move may abruptly decelerate to the final position within one sample, exceeding the specified deceleration rate.
BZ-8645	Adding ESI file after scanning results in no selected PDOs.
BZ-8644	PLCopen S-Curve move may not reach target with small jerk.
BZ-8643	EtherCAT scan fails after a AKD drive firmware download failure with a wrong EtherCAT topology.
BZ-8636	Recovered projects don't recover imported libraries (.kal files).
BZ-8608	IDE views do not scale if Windows text scaling is > 100%.
BZ-8605	**MLInitTrig** does not configure the AKD Capture engine correctly for a negative edge trigger.
BZ-8588	EtherCAT network restore fails to recover from drive FW download failure.
BZ-8508	PDOs need padding to meet byte boundary requirement. • The IDE PDO Editor does not automatically pad PDOs on non-byte boundaries. 　• The problem can be avoided by manually adding dummy objects to pad the PDO size to line-up on byte boundaries. • See this article on KDN: How do I Insert PDO Padding in the KAS PDO Editor? for more information.
BZ-8212	Modified cam file is not downloaded when forcing an Online Change.
BZ-8138	WebBrowser component not working for TxB panels.
BZ-7985	IDE disconnects from the controller after several days.
BZ-7759	Breakpoint with For(…) loop, increases VM load significantly.
BZ-7728	IDE animation with non-matching project versions.
BZ-6240	IDE always reports the project has been modified.

9   Known Limitations

- KAS IDE drive status bar cannot detect if AKD2G is active or inactive in pre-op mode.
- RGM is not supported.
- The undo action is not possible for all operations.
- Find/Search/Replace function:
    - Search & Replace function is not supported in Pipe Network.
    - Search & Replace for HMI are supported only with local CTRL+F.

- In SFC programs, breakpoints can only be set on transitions (i.e., in First Level diagram) and not in steps or conditions.
    - With a breakpoint set on transition, you can debug cycle by cycle.

- SFC programs are limited to 64k byte size due to the bytecode engine.
   - If the SFC program exceeds 64k bytes, the compiler generates a warning message: **Warning: limit is 64KB!**.

- Plugging the EtherCAT cable to the OUT port is not detected and is not reported as an error.
- PLC Variable mapping: Each PLC variable can be mapped to an EtherCAT IO and exclusively to either:
    - Modbus for an HMI
    - PDMM Onboard IO
    - External driver

    Example: A PLC variable cannot be mapped to Modbus and Onboard PDMM IO at the same time.

9.1   FFLD Animation Limitation

The animation of FFLDs defined as UDFBs has a limitation where connected rails are not being animated.

This is not the case when FFLDs are defined as programs or subprograms.
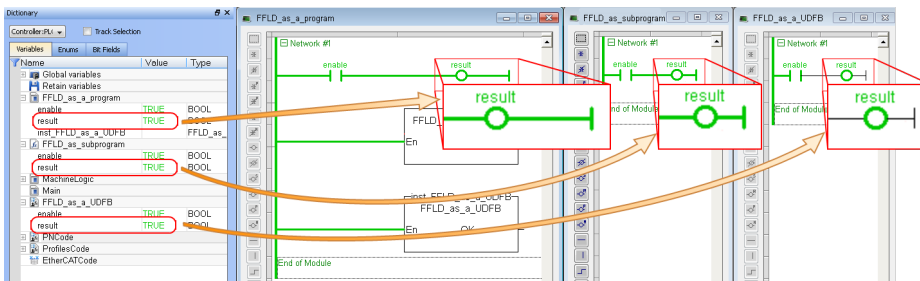
9.2   EtherCAT Limitations

- **Cabling**: Plugging the EtherCAT cable to the OUT port is not detected and is not reported as an error.
- **External EtherCAT Configuration**: If an external EtherCAT XML file needs to be used, the file `AKD-for-KAS.xml` should be used as the ESI file for AKD. This ensures proper operation with KAS.
    - The file is located here: `C:\Users\<user.name>\AppData\Local\Kollmorgen\KAS\Astrolabe\ESI\`.

10   AKD Firmware Notes

- The AKD Firmware v1-16 (and later) supports a new drive parameter, ECAT.LEGACYREV, to enable a backwards compatibility RevisionNo (0x2).
By default, AKD-Series drives ships with the latest production release firmware, with ECAT.LEGACYREV = 1, for backwards compatibility.
- The AKD Firmware v1-16 (and later) supports a 3rd FMMU if the ECAT.LEGACYREV = 0.
The advantage of using a 3rd FMMU is 30% performance improvement with the KAS IDE embedded Workbench communication.
- EtherCAT RevisionNo: EtherCAT provides an optional field to identify a vendor specific RevisionNo for a device and a field to specify the logic to CheckRevisionNo for device compatibility.
  - The KAS IDE and Runtime supports multiple RevisionNos for the same Vendor/ProductID.
  - In previous KAS versions, the EtherCAT initialization would generate a device mismatch error, if the device's RevisionNo and the project's RevisionNo did not match.
  - If the device's ESI file does not specify the CheckRevisionNo logic then, by default, the KAS Runtime allows any RevisionNo at EtherCAT initialization.
  - The IDE allows you to map physical devices to project devices with different RevisionNos and keep the project device configurations.

- Limitation: The CheckRevisionNo options **equal or greater than** (EQ_OR_G, LW_EQ_HW_EQ_OR_G, and HW_EQ_LW_EQ_OR_G) are not supported.
They are evaluated as **equal** (EQ).

11 Third Party EtherCAT Device Support

This section summarizes the known capabilities and limitations with KAS support for third-party EtherCAT devices.

See:

- Add and Configure Third Party Devices in the online help for directions on integration.
- Set Up FSoE Master and an AKD2G with SafeMotion Monitor if integrating a different third-party FSoE master into a KAS system.

11.1 Requirements

- All third-party devices must have an ESI file containing the device information, features, and settings.
- MDP devices must support automatic module discovery at EtherCAT network scan.

11.2 Limitations

- The KAS IDE does not support third-party drives.
    - Contact your local Kollmorgen representative for details.

- MDP fieldbus gateway devices that require MDP gateway profiles, implemented to the ETG 5001.3 specification, may not be discovered.
    - This includes gateway protocols: CAN, CANopen, DeviceNet, Interbus, and IO Link.

- PDO upload is not supported.
- Manual slot configuration is not supported with MDP devices.
- 3rd-party drivers for network gateway devices are not included.

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.

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