Kollmorgen Automation Suite

AKD PDMM Webserver

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Keep all manuals as a product component during the life span of the product.
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1 Using the Web Server

1.1 Using the KAS Web Server

Kollmorgen Automation Suite™ comes with a web server that allows you to perform the following operations:

- Read information about the controller (model, Runtime/firmware version, version of your KAS application)
- Interact with your application (Start and Stop your KAS application)
- View real and simulated axes
- See all the log messages
- Upgrade the controller firmware ‡
- Change the IP address ‡
- View system diagnostics including storage space, memory and CPU temperature ‡
- Reset the controller to factory settings

‡ AKD PDMM only

The web server may be accessed two ways:

1. Open a web browser and enter the controller's IP address.
2. From the Controller node in the Project tree in the KAS IDE.
   - Double-click the Controller node
   - Select "Access Webserver" from the right-mouse menu.

NOTE If you do not know the IP address assigned to the AKD PDMM:

1. Press B3 once. The 7-segment display will flash the letters I and P.
2. Press B2 to select the IP option. The 7-segment display will show the IP address.

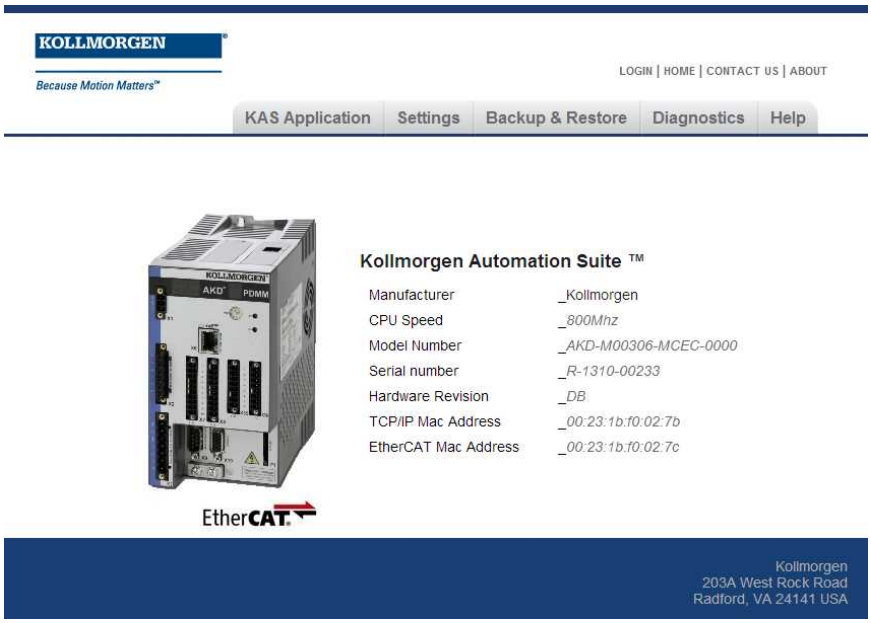
The web server consists of the home page, and the KAS Application, Settings, Backup & Restore, Diagnostics and Help tabs. The Help tab is a link which opens the Web Server manual.

Figure 2-1: The Webserver Tabs as seen on an AKD PDMM webserver.

TIP **Browser Requirements:** We recommend using Firefox 11, Google Chrome, or Internet Explorer 9 or later for accessing the web server.

1.1.1 Web Server Home Page

To access the KAS web server home page, enter the controller's IP address.



This page provides an overview of the device including:

- Manufacturer
- CPU Speed ‡
- Model Number ‡
- Serial Number ‡
- Hardware Revision ‡
- TCP/IP MAC Address ‡ — a unique value associated with the TCP/IP network adapter that uniquely identifies the adapter on a LAN.
- EtherCAT MAC Address ‡ — a unique value associated with the EtherCAT network adapter that uniquely identifies the adapter on an EtherCAT network.

‡ AKD PDMM only

NOTE Please note that any reference to AKD PDMM refers to both the 800MHz and the 1.2GHz variants, unless otherwise noted.

1.1.1.1 Security

Some parts of the web server are locked in order to protect critical operations from unauthorized users. Simply log into the web server to enable access to the locked functions. See "User Authentication" (see page 8) for more information.

NOTE Functions will not be locked if you access the web server through the IDE. Doing so automatically grants administrator access.

The functions which are locked are:

- KAS Application Tab
  - Start/Stop/Cold Start an application
  - "Clear User Data"

- "Clear all Errors"
- Configure 'Auto-start'

- Settings tab
  - Firmware upgrade -->'Choose File' &'upgrade' ‡
  - Reboot ‡
  - "Reset to Factory Settings"
  - SD card Format ‡
  - Change password
  - Change the network settings (IP address) ‡
- Backup & Restore
  - Backup Controller ‡
  - Backup & Restore AKD PDMMs
  - Restore Controller ‡
  - Export Backup
  - Choose File & Replace Backup
- Diagnostics tab ‡
  - Reboot the PDMM controller
  - Clear Errors and alarms
  - Clear Crash dump

‡ AKD PDMM only

1.1.1.2.1 Timeout After Inactivity

To prevent misuse, if the webserver has been idle (no keyboard activity or mouse clicks) for 20 minutes, the user account will be automatically logged out. A dialog box will open to alert you that the session has timed out.

NOTE The idle logout only occurs if you've logged into the webserver with a web browser. Logging in through the KAS IDE will never time out.

1.1.1.3 User Authentication

1.1.1.4.1 Logging In

Logging into the web server is required to prevent unauthorized access or changes. This is accessed from the **LOGIN** link at the top of all web server pages. Clicking the link brings up a form to enter user credentials.

Enter the password to log in. The factory default password is `administrator`. This can be changed after logging in.

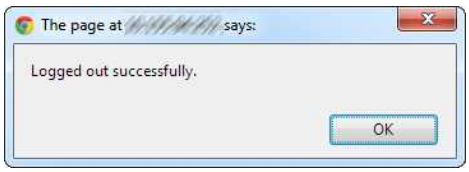
NOTE

- As there is only one user Administrator, "administrator" is the default user name.
- You must re-enter the password each time you log in; the entered password is not stored in the login form.
- Accessing the webserver from the IDE automatically logs you in as *administrator*.

When you are successfully logged in, the user name will appear in the top-right corner of all web server screens.

1.1.1.5.2 Logging Out

After successfully logging in, the menu in the top right corner of the web server contains a link to **LOGOUT**. Clicking this link will immediately log you out of the web server, and informs you of this.



1.1.1.6.3 Changing the Password

The user password is managed from the User Account section of the Settings tab. See "User Account" (see page 19) for more information.

1.1.2 KAS Application

This tab allows you to:

- Display general information about your project that is currently loaded on the controller (PAC or AKD PDMM)
- Start and stop the motion
- Display the Axes run by the controller from the "Axis" (see page 10) tab
- Manage log messages from the "Log Configuration" (see page 11) and "Log Data" (see page 12) tabs
- Display User Data present on the controller from the "User Data" (see page 14) tab

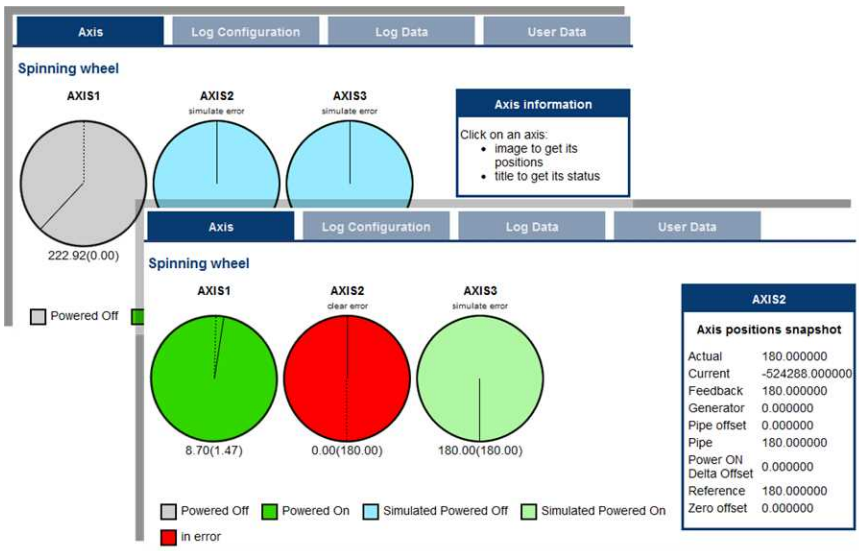
Item	Description
Version of KAS App	This label provides information about the name and version number of the application that is in the controller. The format is `<project_name>:<version>`. The application's source code may be downloaded to the local computer if it is present on the controller. This is accomplished by clicking on the download icon (). This icon is found by the name and version information and is only present when source code is available.
Status of KAS App	The state of the application, *Started* or *Stopped*.

Item	Description
Start	Default mode (warm start) where the Retain Variables are loaded at the application startup. They are **Not** re-initialized; whereas other variables are started with their initial values.
Cold Start	Use retain variables with their default values. Such starts occurs from time to time but are few.
Stop	Stop the application
Auto-start	Select this option to automatically start the KAS application when the controller is powered up. The application will start using retained variables (a "warm start") after the controller has booted up. To change this setting, click the Auto-start checkbox to either activate or deactivate this option and click the Apply button. The control will use the new setting at the next power-up. **NOTE** You can choose to start the application manually when debugging with the Simulator. Whereas the Auto-start mode is recommended when the system is in production, in order to prevent from doing inappropriate actions.
Clear all errors	Clicking this button will clear the error log for all axes.

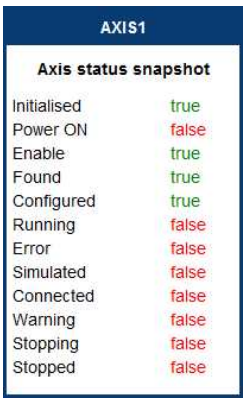
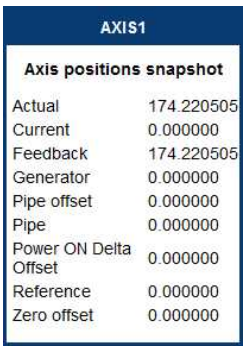
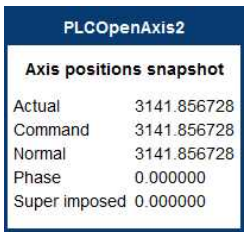
1.1.2.1 Axis

You can view a visual representation of the motors from the Axis tab. The axis wheels are visible after your application is started. The following can be monitored from the display:

- Real and Simulated axes
- Actual position with solid line and actual position value
- Command position with the dotted line and (command position value) in parentheses
- Axis State: Powered-off , Powered-On, or Error as well as Simulated Powered Off and ON
- Identify the axes from the label, as defined by the axis name in your application
- Axis status or positions snapshot



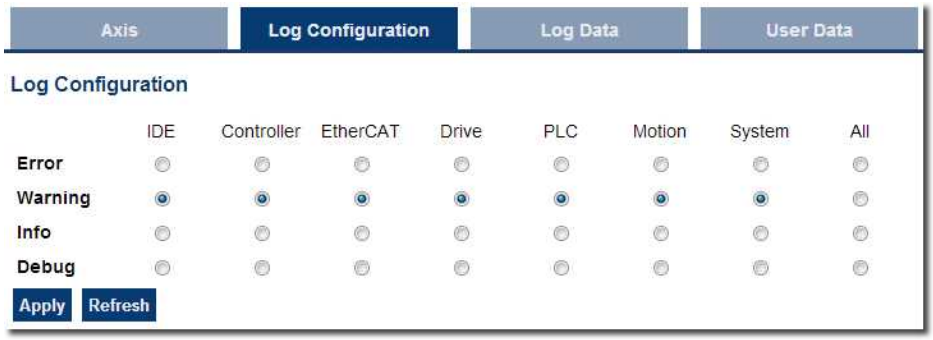
Information that is available by clicking on the axis

Title	Image (PN axis)	Image (PLCopen axis)	Image (digitizing axis)
			
See Axis Pipe Block section of the KAS IDE documentation for information about the axis parameters.		See Axis Parameters in the PLCopen Function Blocks - Overview section of the KAS IDE documentation for information about the axis parameters.	

Additionally, if an axis is in error, the error can be cleared by clicking the text below the axis title.

1.1.2.2 Log Configuration

You can configure the log to filter the messages that are displayed. Each source can be set with its own level.



Each message has one of the following levels, with importance in descending order:
Error > Warning > Info > Debug

TIP **How to Choose the Appropriate Level?**

When a level is set for a source, only messages with the same or higher importance are recorded. For example, if a source is set to WARNING, then all messages with levels WARNING, ERROR and CRITICAL are recorded (DEBUG and INFO messages are discarded).

Therefore, DEBUG is the most verbose and ERROR is the least verbose level. Filtering is quicker with less verbose levels, due to the number of messages.

NOTE Critical messages are always recorded. Therefore, the Critical level is not visible.

Source

Source	Apply to...
IDE	Win32 applications: the KAS IDE and the KAS Runtime Server (also called the KAS Runtime Front-end)
Controller	For the KAS Runtime items: Drivers, IOEngine, SinopEngine...
EtherCAT	For all kinds of EtherCAT items: Motion bus, I/Os
Drive	Messages from the drive (AKD or AKD PDMM)
PLC	For application engineers to create custom log within the PLC programs (similar to printf)
Motion	Messages coming from the Motion engines: PLCopen, Pipe network or VM
System	For common API and libraries. Also includes messages issued from the operating system.

Level

Level	Icon	Description
DEBUG		Any information logged for development purpose. You may safely ignore this log.
INFO		Information status of the current process. You may safely ignore this log.
WARNING		System is stable but the KAS IDE warns that an unexpected event can occur. You can ignore this log.
ERROR		The application does not behave as expected but the processes remain stable.
CRITICAL		Application crashes or becomes unstable. Data is corrupted. At this point the application behavior can be unpredictable.

1.1.2.3 Log Data

KAS log files may be viewed from the Log Data tab. These messages can help describe the current state of the system and to help identify any operation errors encountered when developing your system. An AKD PDMM will display as many as 10 files.

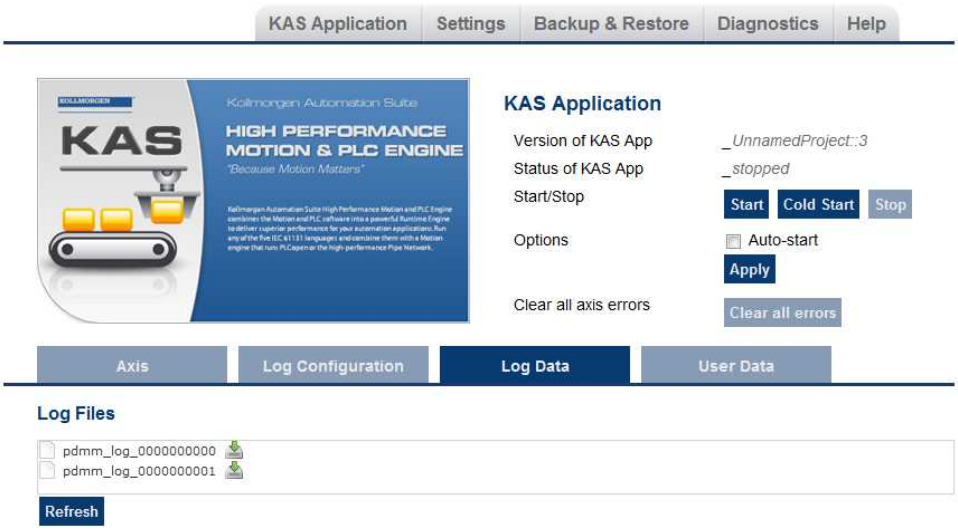


Figure 2-2: Example of log files displayed from an AKD PDMM webserver.

Clicking on a listed log file will open it in your web browser. The log file may be downloaded by clicking on the green download icon next to the log entry. The default name is the same as the file's name. If you try to open a file that no longer exists, the message "*/logfiles/<selected file name> not found.*" Refresh your browser window and try again.

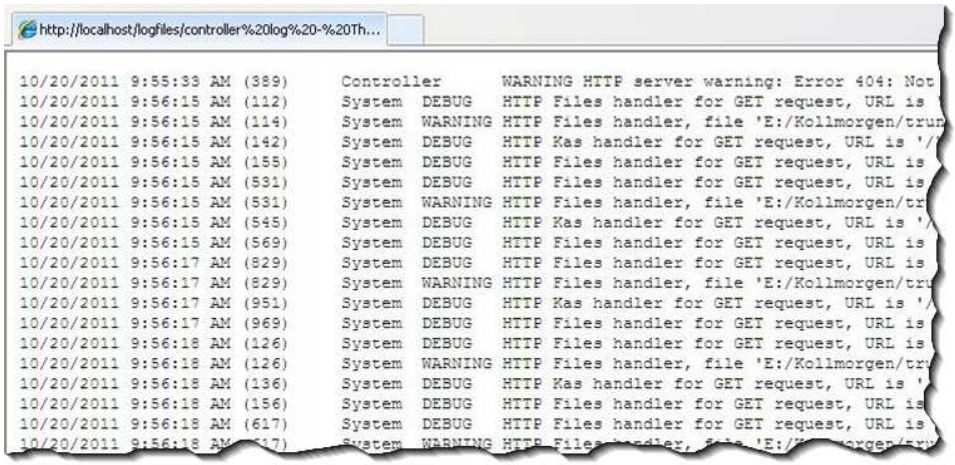


Figure 2-3: Example of a log file's content, displayed in a browser.

> **NOTE** Log data is collected and updated every 15 seconds on a AKD PDMM and a new log file will be created when the current file is full. You may need to wait for up to 15 seconds for a log to show up in the list.

1.1.2.4.1 Log Message Content

Every log message in the table has the following information:

Field	Description
Time	Time when the log was recorded with the format: DD-MMMM-YY hh:mm:ss (millisecond)
Source	Identifies a software or hardware component issuing the messages. Each source is configured with a specific Level.
Level	Each message has one of the following levels with importance in ascending order: DEBUG > INFO > WARNING > ERROR > CRITICAL
Message	Text of the message issued from the source

Table 2-1: Log Messages - List of Field

> **TIP** Log messages is an important source of information when you are troubleshooting your project.
> When reporting an issue to Support, copy/paste the logs in your report.

1.1.2.5.2 AKD PDMM Log Files

Logs generated on a AKD PDMM are stored in flash memory at `/mount/flash/log`. The files are stored in a rotating pool consisting of a maximum of 10 files. The files have a maximum size of 200 kilobytes each; the most amount of space the log files will consume is 2 MB. Once an "eleventh" file is created the earliest file is flushed to make room for the new file.

The AKD PDMM generated log levels can be controlled form the KAS IDE and Web Server. From the IDE, the log levels can be filtered in the configuration window in the *Logs and Information* tab.

1.1.2.6.3.1 Log File Naming Convention

The logs have the naming format `pdmm_logs_n` where *n* is a value ranging from 0000000000 to 4294967295, which is the maximum value a 32-bit location can store.

As an example, when the files are first created they will be named `pdmm_logs_0000000000`, `pdmm_logs_0000000001`, `pdmm_logs_0000000002` and so on. The file that will be created after `pdmm_logs_4294967295` is `pdmm_logs_0000000000`. The naming gets reset and continues.

1.1.2.7 User Data

This tab lists any user-generated files or folders found in the PAC's compact flash drive or the PDMM's flash memory. Clicking a folder will display the folders contents. Clicking on the green download icon will immediately download the file.

The **Clear User Data** button will erase all of the files in the user data folder.

1.1.3 Settings

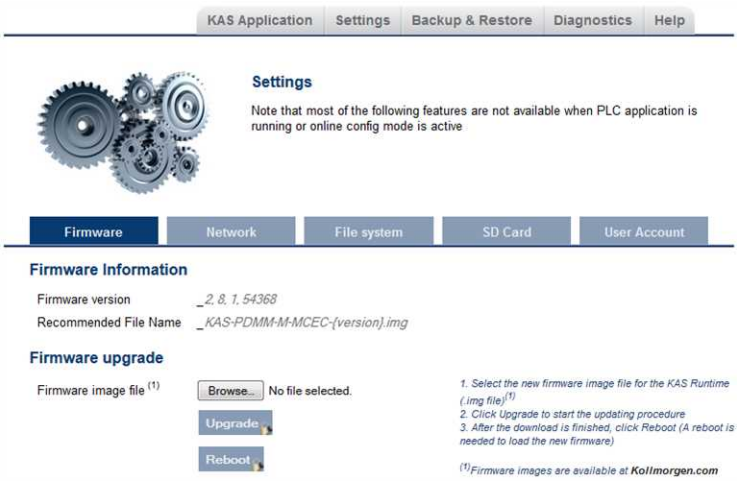
This section allows you to:

- Display and update the firmware for the KAS Runtime‡
- Display the network settings and modify the IP address ‡
- Reset the control to factory settings
- Access the SD Card Actions ‡
- Access the "User Account" (see page 19) to change the password.

‡ AKD PDMM only

1.1.3.1 Firmware Tab (PDMM Only)

This tab displays the firmware version. Additionally, you may upgrade the firmware from this tab.



1.1.3.2.1 Upgrading the Firmware

You can upgrade the AKD PDMM's firmware using the web server by following the instructions below. This operation downloads the KAS Runtime and its version number to the on-board flash memory in the AKD PDMM.

1. Open the AKD PDMM web server in your web browser by entering its IP address.
2. Select the **Settings** tabbed-page.
3. In the **Firmware** pane, click the **Choose File** button to select the new firmware image file for the KAS Runtime.

   The firmware files are IMG files with the following name format:
   `KAS-PDMM-M-{model-code}-{software-revision}.img`

   The *model-code* reflects the CPU speed:

Model	CPU Speed
MCEC	800 MHz AKD PDMM
M1EC	1.2 GHz AKD PDMM

   The recommended file for the PDMM is displayed in the **Current Information** section, as seen below.

4. Click **Upgrade** to start the update procedure.

   TIP If the Upgrade button is disabled, log into the webserver. Click on login at the top of the web page and enter the password. See "User Authentication" (see page 8) for more information about logging in.

   A message and a throbber are shown across the web page, indicating that maintenance is in progress. The AKD PDMM's 7-segment display will animate chasing lights.

Successful upgrade	A message similar to the following is shown upon a successful firmware upgrade: **Upload of firmware KAS-PDMM-M-MCEC-2.8.1.53649.img successful.** **Please reboot the unit in order to boot on the new firmware, and once reboot is performed, press CTRL+F5 in your web browser to force a page refresh.**
Incompatible firmware	An error message similar to the following will be displayed if the wrong firmware file was downloaded: **The file provided is not compatible with this device.** **The file name should be...** **"KAS-PDMM-M-MCEC-{version}.img"**

5. After the download is complete, click **Reboot** (for more details on the boot sequence, refer to Booting the AKD PDMM).

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

6. 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 done.

1.1.3.3.2 Recovery Mode (PDMM Only)

If the AKD PDMM detects a problem in the firmware, it displays an "r" on the 7-segment display and will automatically enter Recovery Mode. Recovery Mode provides the ability to select and upgrade a firmware image file containing the KAS Runtime image on the AKD PDMM. In the rare case when Recovery Mode cannot be automatically accessed, pressing and holding B2 at boot will force the AKD PDMM to boot into Recovery Mode.

IMPORTANT **Warning!** The Recovery Mode allows any firmware image file to be loaded into the AKD PDMM's flash memory. The Recovery Mode does NOT check the selected firmware file to verify it's compatibility with the hardware model. Check that the "Recommended File Name" matches the selected firmware file. If an incompatible firmware file is loaded into the AKD PDMM's flash memory, the AKD PDMM will fail to boot into the Runtime image and will fail to automatically boot into Recovery Mode. To recover from this situation requires manually booting into Recovery Mode. For more details, see Booting from the Recovery Image.

1.1.3.4 Network Tab (PDMM Only)

The contents of this tab display the current rotary switch position of the AKD PDMM and its MAC address. Additionally, you may manually change the AKD PDMM's IP address.

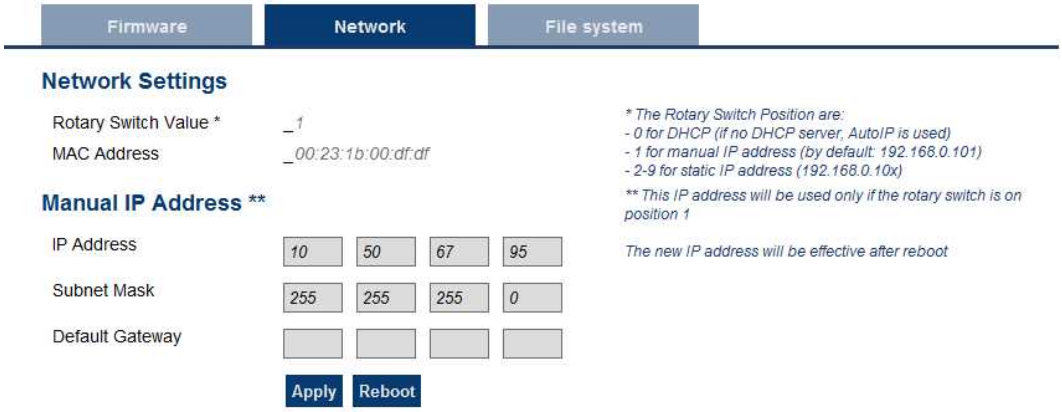


Figure 2-4: Example of an AKD PDMM with a manually defined IP address

1.1.3.5.1 About the Rotary Switch

The rotary switch on the AKD PDMM can be set on a position from 0 to 9.

Switch Position	Description
Position 0	The drive tries to get an IP address from a DHCP server. If the DHCP fails, then the PDMM uses AutoIP to get a usable IP address.
Position 1	The default custom static IP address, 192.168.0.101 or a custom IP address.
Position 2-9	The drive is pre-configured with static IP addresses ranging from 192.168.0.102 (Position 2) to 192.168.0.109 (Position 9).

TIP If a DHCP server is not present, the drive will assume an Automatic Private IP Address of the form 169.254.x.x

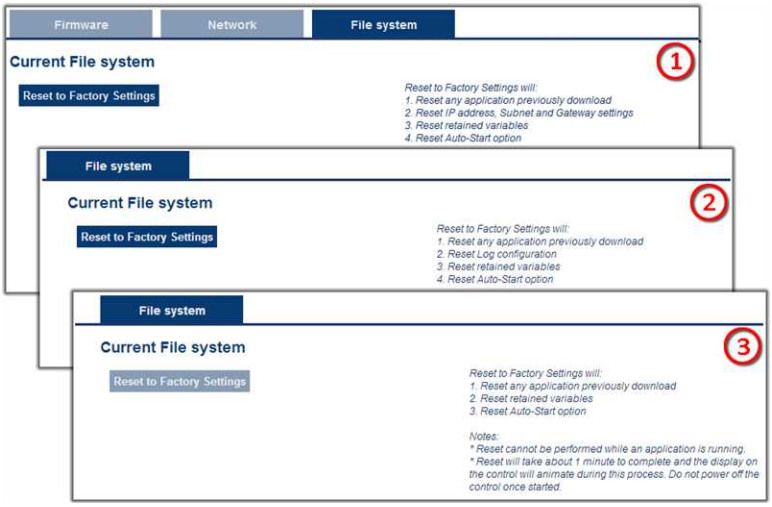
1.1.3.6.2 Change the IP Address

To connect and use your AKD PDMM within your computer network, you may configure its IP address by using the web server as follows:

1. Open AKD PDMM web server in your Internet browser
2. Select the **Settings** tabbed-page
3. In the **Network** pane, set static IP address according to the position defined via the rotary switch
   - If the rotary switch is set to Position 1 you may use the default custom address or set a value in the Manual IP Address fields.
4. Configure the Manual IP Address
5. Configure the subnet mask (default is 255.255.255.0)
6. (Optional) Configure the gateway address if the AKD PDMM is outside your local network
7. Click **Apply**
8. Click **Reboot**

1.1.3.7 File System Tab

This section contains a button which allows you to reset the control to the factory settings. The steps to reset the controller vary slightly based on the platform.



1. AKD PDMM
2. PAC
3. Simulator

Figure 2-5: File System tab on an AKD PDMM web server, PAC web server, and when using Simulator.

1.1.3.8.1 Reset to Factory Settings

When this button is pressed, the control will be reset to factory default settings. The user is prompted to confirm this action before the function is performed.

The following changes occur during factory reset:

- Reset any application previously downloaded
- Reset the IP address, Subnet, and Gateway settings ‡
- Reset any retained variables
- Reset the Auto-Start option
- Reset the password to default

‡ AKD PDMM only

Notes about the reset:

- The factory reset cannot be performed while an application is running. The "Reset to Factory Settings" button is disabled while an application is running.
- The factory reset will take 4-5 minutes to complete and the 7-segment display on the control will animate during this process. The control should not be turned off during this procedure.
- After the factory reset is complete, the controller will be powered down and restarted automatically.
- This webpage will not update during the reset procedure and can be closed.
- PDMM Only: After the controller is restarted, the IP address of the control may change based on the controls rotary switch. If the rotary switch is at position 0, the same IP address as before should be assigned to the control. If the rotary switch is set to 1-9, a pre-configured IP address will be defined and must be taken into account when trying to reconnect to the webpage using a web browser.

1.1.3.9 SD Card Tab (PDMM Only)

1.1.3.10.1 SD Card Actions

The *Format* function formats the SD card as FAT32, erasing all data from the card. This function cannot be performed while an application is running.

1.1.3.11 User Account

To change the password you must enter the current password and the new password twice.

The new password must meet the following conditions:

- It must be 6-20 characters long
- It may not contain semicolons (;), ampersands (&), spaces, quotes (' and "), slashes (/ and \), or the number sign(#).

1.1.3.12.1 I forgot my password

Should this happen, you can set a new password from the IDE.

1. Open the webserver from the IDE.
2. Click on the Settings tab.
3. Click on the User Account tab.
4. Enter and confirm the new password.

This allows you to create a new password without entering the current one.

1.1.4 Backup & Restore

These functions are used to replicate a AKD PDMM (*Backup* and then *Restore*). The elements that are backed up or restored are the firmware, the network configuration, the Retain Variables, and the PLC application.

- These functions cannot be performed while an application is running.
- *Restore* and *Backup* take several minutes to complete. Do not power off the control once started.
- The AKD PDMM is rebooted after a *Restore*.

The PDMM is available with different CPU speed variants (800 MHz and 1.2 GHz). The PDMM models have the same functionality, but due to the CPU speed differences an application designed for the 1.2 GHz model may not execute as expected on the 800 MHz model. The Restore will not allow a higher speed model to be replaced with a lower speed model. The Restore will allow a lower speed model to be replaced with a higher speed model, if the Backup contains the model specific Runtime firmware file.

	800 MHz Restore	1.2 GHz Restore
800 MHz Backup	Yes	Yes - If 1.2 GHz Runtime file is included in the Backup
1.2 GHz Backup	No	Yes

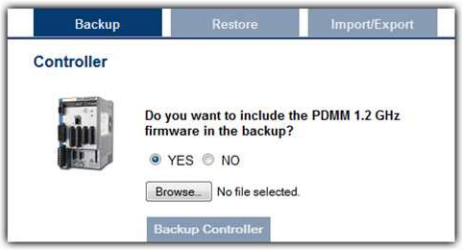
TIP This section provides an overview of the backup and restore processes. For a deeper discussion, see "EtherCAT Devices Backup and Restore" (see page 23).

1.1.4.1 Backup Tab

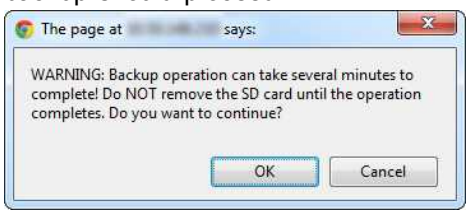
Backup Controller

This function is used to replicate the controller part of the PDMM. Clicking the button will save the data to the SD card.

The 1.2 GHz Runtime firmware file is optional. If provided, an 800 MHz model can be replaced with a 1.2 GHz model. If the 1.2 GHz Runtime firmware file is not included, then an 800 MHz model can only be replaced with another 800 MHz model.



After starting the Backup, an alert will be presented to confirm the backup should proceed.



Backup EtherCAT Devices

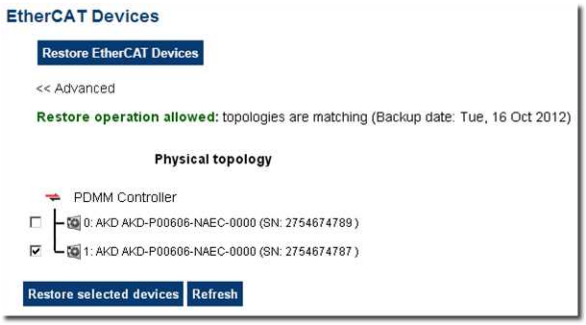
This function replicates the network topology as well as the drives' firmware and data. To accomplish the backup, a copy of the firmware package is required. There are several possible scenarios upon clicking this button.

- If an archived copy of the same firmware package is on the controller as is used on the drives then clicking the button will start the backup.
- If a copy of the firmware package cannot be found, you will be prompted to browser for one. A link to the Kollmorgen website is provided; all firmware packages can be found on the site.

- If an archive is found on the controller but it does not match the network configuration then you will be prompted to browse for one or download one from the website.

TIP Files on the website are saved in ZIP format. You must unzip the download to access the TGZ file.

1.1.4.2 Restore Tab

Restore Controller	This function restores a PDMM's firmware, network configuration, retained variables and PLC application from the SD card.
Restore EtherCAT Devices	This function automatically restores the data and firmware of any replaced drives.
Advanced	Clicking this button creates a map of the network and it's components. If a valid firmware file is found and the current topology matches the backup file you may select the device(s) that need to be restored. Clicking *Restore selected devices* will restore the drive's firmware. 

1.1.4.3 Import/Export

These functions allow you to save a copy of the backup file to a computer and Import the backup file so it may be used for restore functions.

Export Backup	This button allows you to save the backup file to a computer.
Choose File	This button allows you to select a previously exported backup file to be imported.
Replace Backup	This button imports the selected backup file, replacing any existing backup.

1.1.5 Diagnostic (PDMM Only)

This page displays information about the hardware status (storage space, memory and CPU temperature) and errors and alarms.

1.1.5.1 Errors and Alarms

Any controller errors or alarms generated by the system will be shown here and on the 7-segment display. A common error or alarm is due to the flash memory being full. This is often caused by heavy use of the PLC Advanced File function blocks.

The **Refresh** button updates the list. The **Clear** button will remove the contents of this tab. Please note that some errors or alarms are only cleared by powering off and restarting the AKD PDMM.

See Errors and Alarms for a complete list of codes.

TIP Axis errors can be seen in the KAS Application *Axis* tab.

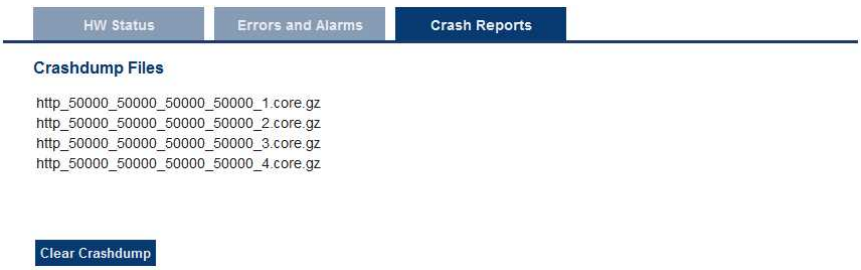
1.1.5.2 Hardware Status

Storage Space	The diagnostic displays both the used and total available amount of storage space in megabytes (MB). **Used** is the amount of file space currently being used by all files in flash memory. **Total** is the total amount of file space available for files in flash memory.
Available Memory	This field displays the amount of RAM memory available on the AKD PDMM.
CPU usage	This field displays the current load on the CPU. If the load goes over 90%, the field turns red.
CPU Temp	This field displays the temperature of the CPU in Celsius. If the CPU temperature is greater then the CPU warning limit, the temperature background color will be changed to yellow. If the CPU temperature is greater than the CPU critical temperature, the temperature background color will be changed to red. The normal operating range is 0-125°C.
CPU Fan Present	This field is either **True** or **False**, depending upon if there is a CPU fan present in the controller.
Refresh	Clicking this button will refresh the Hardware Status information.
Reboot	Clicking this button will reboot the web server.

IMPORTANT Do not try to refresh the web page until the server has rebooted.

1.1.5.3 Crash Reports

The files shown on this tab are reports of the process that failed if there is a crash. These files (GZ archives) may be sent to Kollmorgen for analysis.

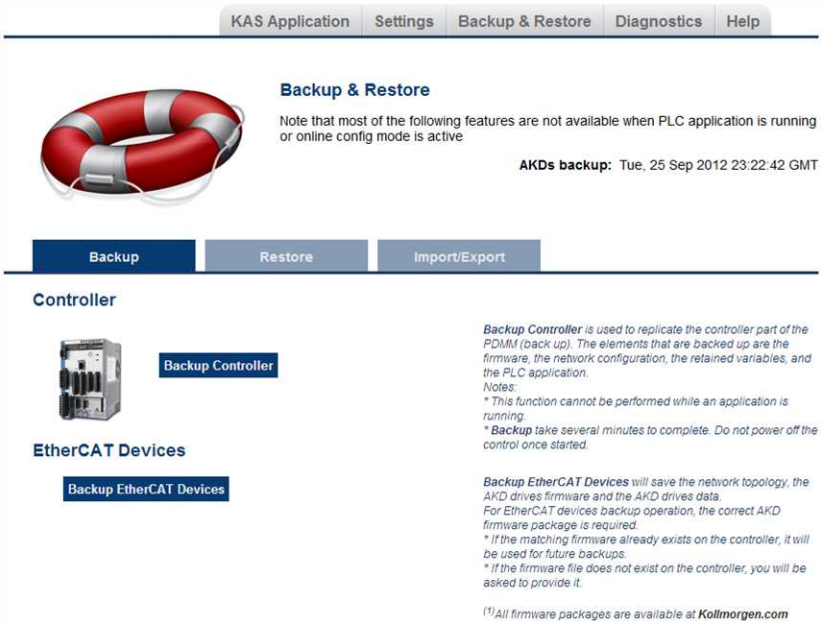


2 EtherCAT Devices Backup & Restore - In Depth

This section discusses device backup and restore in greater depth.

2.1 EtherCAT Devices Backup and Restore

The PAC and AKD PDMM can backup/restore EtherCAT devices (at present, only AKD drives) on an EtherCAT network. This feature is useful as a maintenance operation to replace any AKD drives in an operational machine. This feature reduces the manual steps for saving/loading each AKD drive's firmware and parameters into a few simple automated steps. The Backup/Restore functionality is located in the PAC and AKD PDMM web server and is accessible from a web browser. For details about the web server see "Using the KAS Web Server" (see page 6).



See also Backup and Restore a AKD PDMM.

2.1.1 EtherCAT Devices Backup

The Backup operation discovers all the devices on the EtherCAT network and stores the topology information, AKD firmware files, and AKD parameters to the controller's local storage.

Controller	Local Storage
PAC	Compact Flash Card
AKD PDMM	SD Memory Card (see SD Card Support for more information)

Before starting a backup of the EtherCAT Devices, you will need:

- The AKD firmware files package, `AKD-Firmware-for-KAS-Vxx-xx-xx-xxx.tgz`. This package is included in the KAS software installation directory (`\Program Files (x86)\Kollmorgen\Kollmorgen Automation Suite\Astrolabe\DrivesFW`) or is available for download from the Kollmorgen website (www.kollmorgen.com/en-us/website-resources/other-/akd-software/).
- An SD memory card must be in the SD slot if you are using an AKD PDMM. PACs have a built-in Compact Flash card.
- All the EtherCAT network devices must be connected to the PAC or AKD PDMM, and configured as necessary for machine operation.

> **TIP** Make sure the devices are in the order as expected. The topology information is stored in the backup and is used to check for identical topology during a restore function.

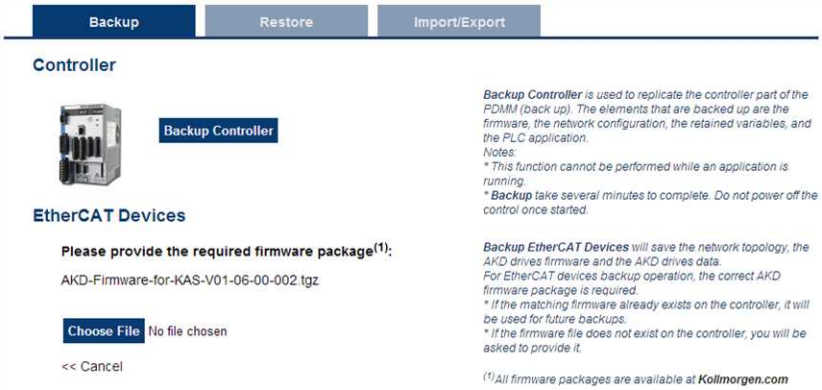
- A PLC application downloaded to the PAC or AKD PDMM, containing the EtherCAT device map.

> **NOTE** The PLC application cannot be running and the IDE must not be in Online Configuration Mode. Please stop your PLC application or disable Online Configuration Mode before a Backup or Restore.

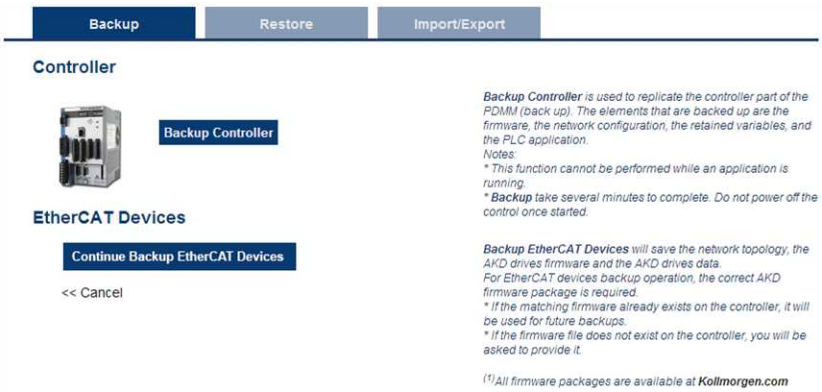
2.1.1.1 Backup Steps

1. From the web server home page, click on the Backup & Restore tab:
2. Under the Backup tab, press the Backup EtherCAT Devices button.

   The web server will ask you to choose a firmware package file and suggest the filename that matches the firmware version on your drives. Selecting the firmware package file is a one-time event. The controller will remember your selection and will not ask you again for future backups.



3. Press the Continue Backup EtherCAT Devices button. It will take a couple of minutes or longer, depending on the number of AKDs in the system.



When the backup is complete, the web server will indicate whether the backup was successful.

> **TIP** After the backup is complete, it is a good idea to export the backup to an off-site location for safe keeping. See "Export/Import EtherCAT Devices Backup" (see page 27).

2.1.2 EtherCAT Devices Restore

The Restore operation discovers the devices on the EtherCAT network and compares the physical topology information to the topology information stored in the backup. A Restore will detect the replaced AKD devices and restore them. Advanced users can manually select the specific AKD devices and restore them. The backup files containing the topology information, AKD firmware file, and AKD parameters are retrieved from the controller's local storage.

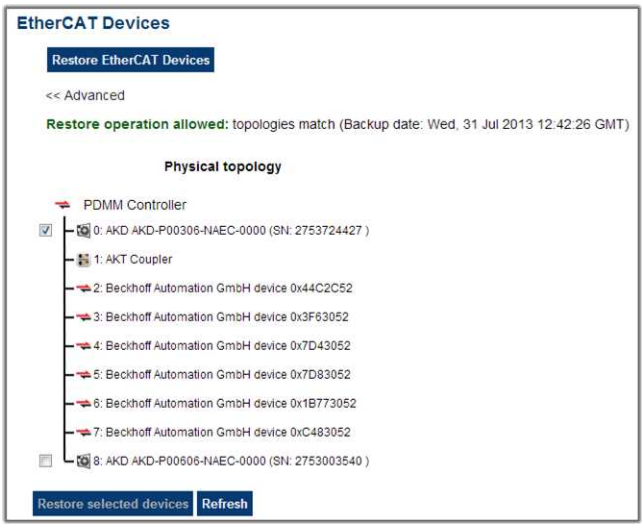
Controller	Local Storage
PAC	Compact Flash Card
AKD PDMM	SD Memory Card (see SD Card Support for more information)

2.1.2.1 Steps

IMPORTANT The application will start immediately after the Restore operation is complete if the Autostart option is enabled on the controller. Be sure to Restore all of the replaced devices and the EtherCAT device order is correct. *Disable the Autostart option before commanding the Restore operation if you want to check the devices before starting the application.*

NOTE The EtherCAT Devices Backup and Restore feature may be used in EtherCAT networks which have third party devices, but only the Kollmorgen AKDs can be backup and restored. Specific configurations applied to third party devices with non-Kollmorgen tools have to be reapplied when the third party device is replaced.

1. From the web server home page, click on the *Backup & Restore* tab:
2. Under the *Restore* tab, you can choose to restore the replaced EtherCAT AKD devices or manually select the AKD devices with the Advanced view.
   - To restore the replaced AKD devices, press the *Restore EtherCAT Devices* button. When the restore is complete, the web server will indicate whether it was successful.
   - To select the AKD devices and manually restore:
     1. Press the *Advanced* link.
     2. Select the AKD devices you want to restore. The controller will identify the replaced AKDs and pre-select them for you.
     3. Press *Restore selected devices*.

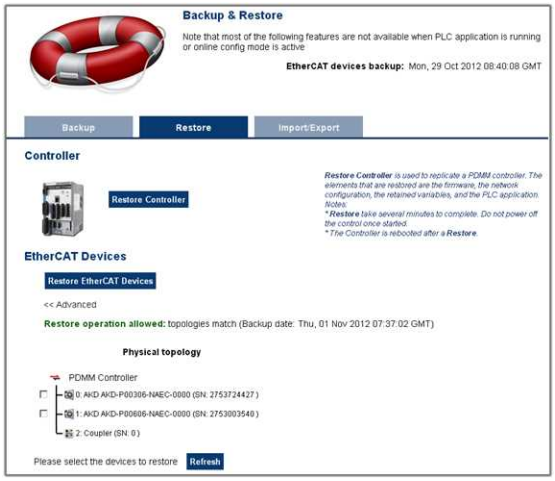


When the restore is complete, the web server will indicate whether it was successful.

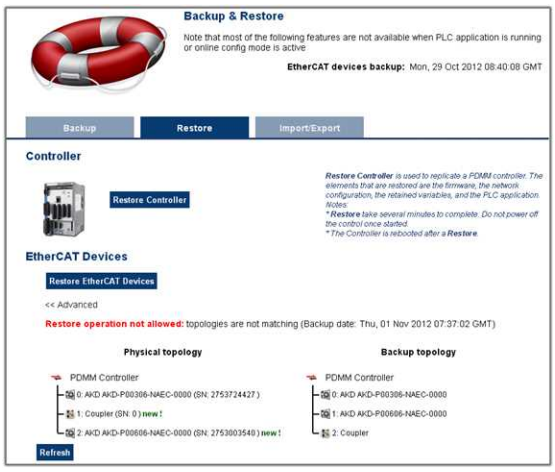
2.1.3 AKD Backup/Restore Compatibility

The replacement AKD must have the same model number as the AKD that was originally stored in the backup. The Restore operation compares the model numbers between the backup and the replacement AKD. The restore will not be allowed if they are not compatible.

- To check the model number on your AKD, see the sticker on the side of the drive.
- To check compatibility between your replacement drive and the backup, replace the AKD on the EtherCAT network, and press the Scan network button.
  - The web server displays the physical topology and allows you to restore the selected drives if the backup and replacement drives are compatible.



  - The web server displays the backup and physical topology and indicates the non-compatible drives if the backup and replacement drive are not compatible, .



TIP The serial number (SN) is displayed in the Physical topology web server view and on the sticker affixed to the AKD. You can use the serial number to match the actual hardware with its representation on the web server.

2.1.4 Autostart with Replacement drives and the unique ID

The EtherCAT unique ID option will write a unique identifier into each EtherCAT device. It can be enabled or disabled in the IDE, from the Project View -> EtherCAT -> XML Configuration File

tab. If the unique ID option is enabled, the unique ID will be stored in the AKD backup. Later, when the drive is replaced and restored, the same unique ID will be restored to the replacement drive.

When the unique ID option is enabled, a replacement drive must be restored before the PLC program can be started. If the option is disabled, then the PLC program can be started without checking that the replaced drive has been restored.

TIP If you enable the Autostart option in the controller and you plan to use the AKD Backup and Restore functions, it is strongly recommended that you enable the unique ID option. This will prevent the controller from automatically starting a PLC application with a replacement AKD, that has *not* been restored.

2.1.5 Export/Import EtherCAT Devices Backup

A network backup may be exported and imported. The export procedure saves a backup file to the computer running the web browser. The import procedure allows you to transfer a backup file onto the controller to be used later for restoring a previous configuration.

2.1.5.1 Export Procedure

NOTE The Export button is only displayed if an AKD backup is available.

1. Click on the "Export Backup" button. The browser starts transferring a backup file. Depending upon the browser being used, this may involve a prompt confirming that you wish to receive the file.
2. You may move the file to a different directory once the file is saved. The file may be renamed to help identify the backup file with the machine.

2.1.5.2 Import Procedure

1. Specify a backup file to import by clicking on the "Browse" button. This backup file will be used to replace the current backup on the controller.
2. After a backup file is specified, click on the "Replace Backup" button. This creates a backup on the controller with the data stored in the specified backup file. Any previously existing backup will be replaced. If the import fails, the previous backup will not be replaced.

NOTE

- The Replace Backup button is disabled until a backup file has been selected.

NOTE

- On some browsers, the "Browse" button may be labeled "Choose File".

2.1.6 EtherCAT Devices Backup/Restore Limitations

- The "EtherCAT Devices Backup" (see page 23) and "EtherCAT Devices Restore" (see page 25) functions are not permitted while a PLC application is running or when the IDE is in Online Configuration Mode. Please stop your PLC application or disable Online Configuration Mode before a Backup or Restore.
- Only a single backup is supported in the controller at one time.

NOTE

If you want to keep multiple backup configurations, you can perform the backup and then export it to a local PC or USB flash memory stick. Later, when you are ready to restore, you can import the specific backup file to the controller, and then perform the restore.

TIP

Beware that an import will overwrite any backup existing in the controller or AKD PDMM SD card. If you are using an AKD PDMM, the alternative method is to use a separate SD card for each backup/restore configuration.

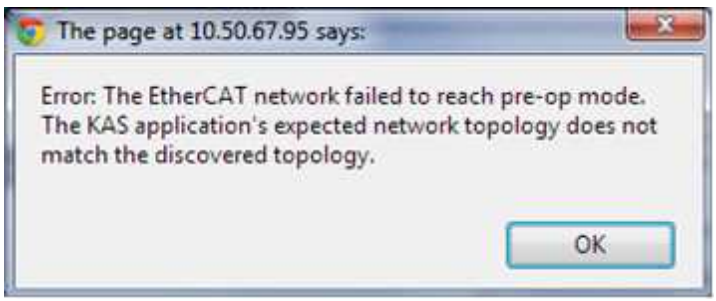
- All AKD drives on the EtherCAT network must have the same AKD firmware version.
- The AKD firmware version must be 01-06-00-003 or higher.
- AKD firmware packages are available for all production releases.
- Only AKD drives are supported for backup/restore. Kollmorgen S300/S700 drives are not supported by backup/restore.
- AKD PDMM system backup or restore is a two-step process:
  1. Backup or Restore the AKD PDMM controller
  2. Backup or Restore the AKDs (including the AKD drive inside the AKD PDMM).

2.1.7 Troubleshooting EtherCAT Devices Backup/Restore

The web server displays an error message if an EtherCAT Device backup or restore fails. The message describes the cause of the failure and a possible remedy. Please be sure to note any error message(s), as they will be helpful with remedying the problem.

Described below are some common error messages and remedies. The message box format may appear differently depending on the web browser, but the message content is the same.

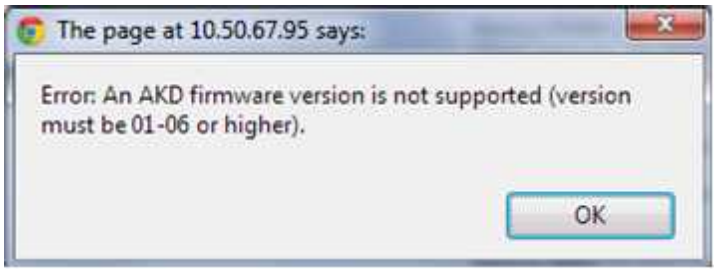
During AKD backup, EtherCAT fails to reach pre-op mode:



1. Using the IDE, open the EtherCAT view and scan the network.
2. Compare the nodes, their order, and types to the topology in your application.

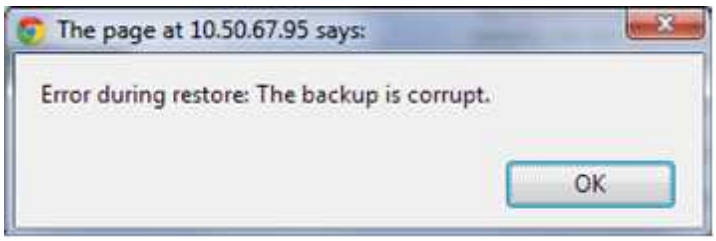
3. After you identify the differences do one of the following:
    - Modify the application's devices to match the physical network.
    - Correct the physical network by adding/moving/removing nodes.

During AKD backup, at least one AKD has an unsupported firmware error for backup:



1. Using the IDE, open the EtherCAT view.
2. Upgrade all of the AKDs drive firmware to at least version 01-06.

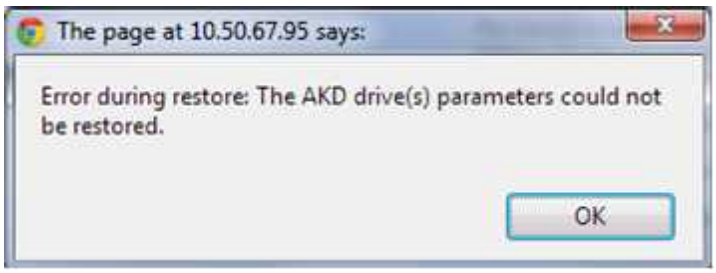
During AKD restore, the backup file is corrupt:



Before restoring AKD(s), the backup file must be valid. To correct a bad backup file on a controller, import a known good backup file from another source (local hard drive, network drive, USB flash stick, etc.). If you do not have a valid backup file, then you will need to manually configure the replacement AKDs by downloading firmware and modifying the drive's parameters using the AKD views in the IDE.

Not able to restore AKDs successfully.

The error message will describe at which step the restore failed. For example, failing to restore parameters:



1. If an AKD restore fails and you have already verified the controller has a valid backup and the network topology is correct, then retry the Restore.
2. If you still cannot restore successfully after two or three attempts, check your network cables and try a different replacement AKD drive(s). This test will isolate the problem to the specific drive(s) or the controller problem.

3. If you still cannot restore a replacement AKD, then you will need to manually configure the replacement AKDs by downloading firmware and modifying the drive's parameters using the AKD views in the IDE.

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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