AKD PDMM™
Fault Card

Edition: May 2014, Revision D
Valid for Hardware Revision DB
Part Number 903-200015-00

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

Record of Document Revisions:

Revision	Remarks
A, 04/2012	Launch version
B, 12/2012	Error E24, E53, and alarm A38 was added. A30 was revised.
C, 09/2013	Added F127, F312, F421, F423, F451 – F469, F493, F560, and F621 – F627.
D, 05/2014	Added F630, E53, and A53.

IMPORTANT NOTICE

Disclaimer

The information in this manual was accurate and reliable at the time of its release. However, Kollmorgen Danaher Motion Servotronix Ltd. reserves the right to change the specifications of the product described in this manual withoutnotice at any time.

This document contains proprietary and confidential information of Kollmorgen Danaher Motion Servotronix Ltd.The contents of the document may not be disclosed to third parties, translated, copied or duplicated in any form, in whole or in part, without the express written permission of Kollmorgen Danaher Motion Servotronix Ltd.

Registered Trademarks

AKD is a registered trademark of Kollmorgen™ Corporation

Technical changes which improve the performance of the device may be made without prior notice.

Printed in the United States of America

May 2014

Table of Contents

1. AKD Fault and Warning Messages

When a fault occurs, the drive fault relay is opened, the output stage is switched off (motor loses all torque), or the load is dynamically braked. The specific drive behavior depends on the type of fault. The LED display on the front panel of the drive shows the number of the fault that occurred. If a warning is issued prior to the fault, the warning is shown on the LED and has the same number as the associated fault. Warnings do not trip the power stage of the drive or fault relay output.

The left side of the LED displays **F** for a fault or **n** for a warning. The right side displays the fault or warning number as follows: 1-0-1-[break]. The highest priority fault is displayed on the LED, but multiple faults may be present when a fault condition is occurring. Check the AKD **Faults** screen or read the status of DRV.FAULTS through the controller or HMI for the entire list of faults.

Fault	Message/Warning	Cause	Remedy
..		1. 24V Control Power input voltage dip. or 2. Auxillary encoder 5V (X9-9) shorted.	1. Insure adequate 24V supply current capacity for the system. or 2. Check and fix X9 wiring.
F0	N/A	Reserved.	N/A
F101	Firmware incompatible.	Installed firmware is not compatible with the drive hardware.	Load compatible firmware into the drive.
F102	Resident firmware failed.	Software failure detected.	Restart drive. If issue persists, contact technical support.
F103	Resident FPGA failed.	Software failure detected. Load resident FPGA failure occurred (several cases according to flowchart, including incompatible image to FPGA type and fieldbus type).	Restart drive. If issue persists, contact technical support.
F104	Operational FPGA failed.	Software failure detected. Load operational FPGA failure occurred (several cases according to flowchart).	Restart drive. If issue persists, contact technical support.
F105	NV memory stamp invalid.	NV memory stamp is corrupted or invalid.	Reset the drive to default memory values using **Parameter Load**.
F106	NV memory data invalid.	NV memory data is corrupted or invalid. This fault often occurs when downloading firmware.	Reset the drive to default memory values using **Parameter Load**.
F121	Homing error.	Drive did not finish homing sequence.	Check homing sensor, homing mode, and homing configuration.
F123	Invalid motion task. Warning issued prior to fault.	Invalid motion task.	Check motion task settings and parameters to make sure that the values entered will produce a valid motion task. Refer to the motion task documentation for additional guidance on specific causes of invalid motion tasks.

Fault	Message/Warning	Cause	Remedy
F125	Synchronization lost. Warning issued prior to fault.	The fieldbus lost synchronization.	Check fieldbus connection (X5 and X6 if you are using EtherCAT; X12 and X13 if you are using CANopen) or the settings of your EtherCAT or CANopen master.
F126	Too much movement. Warning issued prior to fault.	Too much movement was created during a Bode plot. Motor is unstable and is not following drive instructions.	Check that the system is closed loop stable. Refer to the system tuning guide.
F127	Incomplete emergency stop procedure.	Incomplete emergency stop procedure (problem with the emergency stop motion task).	Disconnect power from drive and check emergency stop procedure.
F128	MPOLES/FPOLES not an integer.	Ratio of motor poles to feedback poles must be a whole number.	Change to a compatible feedback device.
F129	Heartbeat lost.	Heartbeat lost.	Check CANopen cabling. Reduce bus load or increase the heartbeat update time.
F130	Secondary feedback supply over current.	5V power supply was shorted out on X9.	Check secondary feedback (X9 connection).
F131	Secondary feedback A/B line break.	Problem in secondary feedback detected.	Check secondary feedback (X9 connection).
F132	Secondary feedback A/B line break.	Problem in secondary feedback detected.	Check secondary feedback (X9 connection).
F134	Secondary feedback illegal state.	Feedback signals were detected in an illegal combination.	Check secondary feedback (X9 connection).
F135	Homing is needed. Warning issued prior to fault.	Attempt to issue motion task before the axis is homed. Axis must be homed before motion task can start.	Change opmode or home axis.
F136	Firmware and FPGA versions are not compatible.	The FPGA version does not match the firmware FPGA version constants.	Load the FPGA version that is compatible with the firmware.
F138	Instability during autotune.	Drive current (IL.CMD) or velocity feedback (VL.FB) exceeds allowable limit. This fault only occurs in BODE.MODE 5.	Change BODE.MODE if appropriate. Otherwise the motor is not stable and may require manual tuning.
F139	Target Position over short due to invalid motion task activation.	The drive cannot decelerate from its current speed to reach the end point of the second motion task without moving past it. Increase the deceleration rate in the move or trigger the move earlier	Change Motion task profile and clear fault with DRV.CLRFAULTS, or change the value of FAULT139.ACTION = 1 to ignore this condition.
F201	Internal RAM failed.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
F202	External RAM failed.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
F203	Code integrity failed.	Software failure detected. FPGA register access failure occurred.	Restart drive. If issue persists, contact technical support.

Fault	Message/Warning	Cause	Remedy
F204 – F232	EEPROM failure detected.	EEPROM failure detected.	Restart drive. If issue persists, exchange drive.
F234 – F237	Control temperature sensor high. Warning issued prior to fault.	High temperature limit reached.	Check cabinet ventilation system.
F240 – F243	Power temperature sensor low. Warning issued prior to fault.	Low temperature limit reached.	Check cabinet ventilation system.
F245	External fault.	This fault is user generated and is caused by user settings.	Users can configure a digital input to trigger this fault (DINx.MODE = 10). the fault occurs according to this input setting. Clear the input to clear the fault.
F247	Bus voltage exceed allowed thresholds.	Hardware problem in bus measurement.	Troubleshoot and repair hardware problem.
F248	Option board EEPROM corrupted.	EEPROM failure detected.	Restart drive. If issue persists, exchange drive.
F249	Option board downstream checksum.	Communications with the I/O on the option board failed.	DRV.CLRFAULTS. If issue persists, contact technical support.
F250	Option board upstream checksum.	Communications with the I/O on the option board failed.	DRV.CLRFAULTS. If issue persists, contact technical support.
F251	Option board watchdog.	Communications with the I/O on the option board failed.	DRV.CLRFAULTS. If issue persists, contact technical support.
F252	Firmware and option board FPGA types are not compatible.	The option board FPGA is not compatible with this hardware.	Download the correct firmware file for this drive.
F253	Firmware and option board FPGA versions are not compatible	The version of the option board FPGA is not compatible with this firmware.	Download the correct firmware file for this drive.
F301	Motor overheated.	Motor overheated.	Check ambient temperature. Check motor mounting heat sink capability.
F302	Over speed.	Motor exceeded VL.THRESH value.	Increase VL.THRESH or lower velocity command.
F303	Motor foldback.	Maximum motor power has been exceeded; the power has been limited to protect the motor.	Current command to the motor is too high for too long. Reduce servo gains, or reduce command trajectory aggressiveness.

Fault	Message/Warning	Cause	Remedy
F304	Motor foldback. Warning issued prior to fault.	Maximum motor power has been exceeded; the power has been limited to protect the motor.	Change move profile to reduce load on motor. Check for load jamming or sticking. Check that current limits are set correctly.
F305	Brake open circuit.	Motor brake open circuit.	Check cabling and general functionality.
F306	Brake short circuit.	Motor brake short circuit.	Check cabling and general functionality.
F307	Brake closed during enable state.	Motor brake closed unexpectedly.	Check cabling and general functionality.
F308	Voltage exceeds motor rating.	Drive bus voltage exceeds the motor's defined voltage rating.	Make sure that the motor fits the driving rating.
F312	Brake released when it should be applied.	Brake disengaged unexpectedly.	Check cabling and general functionality.
F401	Failed to set feedback type.	Feedback is not connected or wrong feedback type selected.	Check primary feedback (X10 connection).
F402	Analog signal amplitude fault.	Analog signal amplitude is too low. Analog fault (resolver signal amplitude or sin/cos amplitude).	Check primary feedback (X10 connection), resolver and sine/cos encoder only.
F403	EnDat communication fault.	General communication problem with feedback.	Check primary feedback (X10 connection), EnDat only.
F404	Hall error.	Hall sensor returns invalid Hall state (111, 000); either all Hall sensors are on or off. Legal Hall states are 001, 011, 010, 110, 100, and 101. This fault can be caused by a broken connection in any one of the Hall signals.	Check the feedback wiring; check all feedback connectors to ensure all pins are positioned correctly.
F405	BiSS watchdog fault.	Bad communication with the feedback device.	Check primary feedback (X10 connection), Biss only.
F406	BiSS multicycle fault.	Bad communication with the feedback device.	Check primary feedback (X10 connection), Biss only.
F407	BiSS sensor fault.	Bad communication with the feedback device.	Check primary feedback (X10 connection), Biss only.
F408 – F416	SFD Feedback Fault	Bad communication with the SFD device.	Check primary feedback (X10 connection). If fault persists, internal feedback failure. Return to manufacturer for repair.
F417	Broken wire in primary feedback.	In primary feedback, a broken wire was detected (incremental encoder signal amplitude).	Check feedback cable continuity.
F418	Primary feedback power supply.	Power supply fault for primary feedback.	Check primary feedback (X10 connection).

Fault	Message/Warning	Cause	Remedy
F419	Encoder init procedure failed	Phase find procedure did not complete successfully.	Check encoder wiring, reduce/ balance motor load prior to phase finding.
F420	FB3 EnDat Communications Fault	A communication error was detected with the EnDat 2.2 device connected to the X9 connector.	Check tertiary feedback (X9 connection).
F421	SFD position sensor fault.	Sensor or sensor wiring failure inside motor.	Try resetting the fault. If it reappears return motor for repair.
F423	NV Failure, Multiturn Overflow.	The position saved in memory is corrupted.	Home axis or disable multiturn overflow. If the fault persists, send the drive for repair.
F438	Following error (numeric) Warning issued prior to fault.	Motor did not follow command values. Motor exceeded maximum allowed position following error (numeric).	Check for increased load, jamming or sticking. Is position error set too low?
F439	Following error (user).	Motor did not follow command values. Motor exceeded maximum allowed position following error (user).	Check feedback commutation setup and tuning parameters.
F450	Following error (presentation).	Motor did not follow command values. Motor exceeded maximum allowed position following error (presentation).	Check feedback commutation setup and tuning parameters.
F451	Feedback battery fault.	The external battery voltage is too low. The F451 fault is generated if the AKD is not powered. The n451 warning is generated if the AKD is powered. This fault can be inhibited with FAULT451. ACTION.	Check or replace the external battery.
F452	Multiturn overflow not supported with this feedback.	Non-multiturn feedback is connected while FB1.PMTSAVEEN is active.	Connect multiturn feedback to the drive or disable multiturn overflow.
F453 to F459	Tamagawa communication fault	Bas communication with the feedback device. Cabling or shielding fault, or internal feedback failure.	Check the cabling to the drive and if the problem persists then return the feedback to the manufacturer for repair.
F460	Tamagawa encoder fault (over speed)	This fault is generated when the shaft is rotated above a maximum speed that can be maintained while the external battery is powered and the drive is powered off.	Reset the fault on the drive with DRV.CLRFAULTS.
F461	Tamagawa encoder fault (counting error)	When the feedback is powered on the position (within one revolution) was incorrect because of a problem with the feedback device.	Reset the fault on the drive with DRV.CLRFAULTS. If the problem persists then clean the feedback code plate.
F462	Tamagawa encoder fault (counting overflow).	Multi-turn counter has overflowed.	Reset the fault on the drive with DRV.CLRFAULTS.
F463	Feedback overheat fault.	The temperatur of the encoder substrate exceeds overheating detection temperature during main power-on.	Reset the fault on the drive with DRV.CLEARFAULTS after temperature of encoder has lowered.

Fault	Message/Warning	Cause	Remedy
F464	Tamagawa encoder fault (multi-turn error).	Any bit-jump occurs in the multi-turn signal during main power-on.	Return to the origin. Reset the fault on the drive with DRV.CLRFAULTS.
F467	Feedback fault (See FB1.FAULTS for details).	The Hiperface DSL device malfunctioned.	Check FB1.FAULTS for detailed fault information.
F468	FB2.SOURCE not set, Remote Commutation not possible.	Feedback Type 44 is being used, which requires FB2 to be setup with a working encoder input. If FB2 is not configured, then Feedback Type 44 cannot complete remote commutation from an external feedback input.	Connect an encoder to FB2 and configure FB2.SOURCE and FB2.ENCRES.
F469	FB1.ENCRES is not power of two, Remote Commutation not possible.	Feedback Type 43 requires that the feedback resolution be a power of two. Feedback Type 43 is not supported for all feedback resolutions.	If the remote feedback device's resolution is a power of two, enter that value in FB1.ENCRES. Otherwise, choose a feedback device with a supported resolution (power of two) and enter that value in FB1.ENCRES.
F473	Wake and Shake. Insufficient movement.	There was less movement than defined by WS.DISTMIN.	Increase WS.IMAX and/or WS.T. Or try using WS.MODE 1 or 2.
F475	Wake and Shake. Excess movement.	WS.DISTMAX has been exceeded in WS.MODE 0 or more than 360 degrees was traveled in WS.MODE 2.	Increase WS.DISTMAX value or reduce WS.IMAX or WS.T. Note that wake and shake is not supported for vertical/ overhung loads.
F476	Wake and Shake. Fine-coarse delta too large.	The angle difference between the coarse and fine calculation was larger than 72 deg.	Modify WS.IMAX or WS.T and try again.
F478	Wake and Shake. Overspeed.	WS.VTHRESH was exceeded.	Increase WS.VTHRESH value or reduce WS.IMAX or WS.T.
F479	Wake and Shake. Loop angle delta too large.	The angle between complete loops was larger than 72 deg.	Modify WS.IMAX or WS.T and try again.
F480	Fieldbus command velocity too high.	Fieldbus command velocity exceeds VL.LIMITP	Lower fieldbus command trajectory or increase the value of VL.LIMITP
F481	Fieldbus command velocity too low.	Fieldbus command velocity exceeds VL.LIMITN	Increase fieldbus command trajectory or decrease the value of VL.LIMITN
F482	Commutation not initialized.	The motor requires the commutation initialization (there are no encoder commutation tracks, Hall sensors, etc.) and no successful Wake and Shake sequence has been performed.	Clear any faults, activate the Wake and Shake procedure (WS.ARM) and enable the drive.
F483 – F485	Wake and Shake error.	Motor U, Motor V, or Motor W phase missing. No current was detected in the phase during initialization (Mode 0 only).	Check the motor connections and WS.IMAX (very low current may produce this error).

Fault	Message/Warning	Cause	Remedy
F486	Motor velocity exceeds EMU-speed.	Motor velocity exceeds the maximum speed the emulated encoder output can generate.	Reduce value of DRV.EMUEPULSEIDTH.
F487	Wake and Shake - Validating positive movement failed	After applying a positive current, motor moved in the wrong direction.	Check motor phase wiring and motor encoder wiring is correct.
F489	Wake and Shake - Validating negative movement failed.	After applying a negative current, motor moved in the wrong direction.	Check motor phase wiring and motor encoder wiring is correct.
F490	Wake and Shake - Validating Comm. angle timed out.	During one of the W&S validation stages the drive stopped responding to commands.	Contact customer support.
F491	Wake and Shake - Validating Comm. angle moved too far - Bad Comm Angle.	After applying a current, the motor moved too far (>15 electrical degrees).	This indicates a poor motor phase angle was found by Wake and Shake. Revise Wake and Shake parameters, and re-run Wake and Shake.
F492	Wake and Shake - Validating Comm. angle required more than MOTOR.ICONT.	A current larger than MOTOR.ICONT was used to excite the motor.	This indicates one of the following: 1. Phase angle is incorrect due to a bad wake and shake. 2. Motor has very high friction, requiring high current to break free. 3. Motor power cable is disconnected or improperly wired.
F493	Invalid commutation detected – motor accelerating in the wrong direction. Motor phase may be incorrect.	The velocity of the motor exceeded WS.CHECKV and the sign of the current was not equal to the sign of motor acceleration or the sign of motor velocity for a period of time larger than WS.CHECKT.	1. Check motor phase wiring 2. Reconfigure wake and shake (if mode 0 or 1 is used). 3. Re-run wake and shake to determine correct communication angle.
F501	Bus over voltage.	Bus voltage too high. Usually, this problem is load related.	Reduce load or change motion profile. Check system regen capacity; add capacity if needed. Check mains voltage.
F502	Bus under voltage. Warning issued prior to fault.	Bus voltage below threshold value.	Check mains voltage.
F503	Bus capacitor overload. Warning issued prior to fault.	Single phase AC input on a drive only rated for three-phase input or excessive single-phase power load.	Check mains voltage.
F504 – F518	Internal supply voltage fault.	Internal supply voltage fault detected.	Check wiring for electromagnetic compatibility (EMC). If issue persists exchange drive.
F519	Regen short circuit.	Regen resistor short circuit.	Regen IGBT short circuit. Contact technical support.

Fault	Message/Warning	Cause	Remedy
F521	Regen over power.	Too much power stored in regen resistor.	Either get larger regen resistor or use DC bus sharing to dissipate power.
F523	Bus over voltage FPGA.	Bus over voltage hard fault.	Check mains voltage and check system brake capacity.
F524	Drive foldback.	Maximum drive power has been exceeded. The power has been limited to protect the drive.	Motion requires too much power. Change profile to reduce load.
F525	Output over current.	Current exceeds drive peak.	Check for short or feedback faults.
F526	Current sensor short circuit.	Current sensor short circuit.	Restart drive. If issue persists, contact technical support.
F527	Iu current AD converter stuck.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
F528	Iv current AD converter stuck.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
F529	Iu current offset limit exceeded.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
F530	Iv current offset limit exceeded.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
F531	Power stage fault.	Hardware failure detected.	Restart drive. If issue persists, replace drive.
F532	Drive motor parameters setup incomplete.	Before a motor can be enabled, you must configure a minimum set of parameters. These parameters have not been configured.	Issue the command DRV.SETUPREQLIST to display the list of the parameters that you must configure. Configure these parameters either manually or automatically. You can manually configure these parameters in three ways: (1) set each parameter individually; (2) use the setup wizard to select the motor; or (3) select the motor type from the motor data base in the Motor window (MOTOR.AUTOSET must be set to 0 (FALSE)). If you use the Motor window, you must first select the feedback type. If the motor has Biss Analog, Endat, or SFD feedback (feedback with memory), then these parameters are set automatically when MOTOR.AUTOSET is set to 1 (TRUE).
F534	Failed to read motor parameters from feedback device.	Motor either does not have motor feedback memory, or the motor feedback memory is not programmed properly so the parameters cannot be read.	Try to read parameters again by clicking the Disable and Clear Faults button, or by issuing the DRV.CLRFAULTS command. If this attempt is not successful, then set MOTOR.AUTOSET to 0 (false) and program the parameters using the setup wizard or manually set up the parameters. If the motor has motor memory (Biss Analog, Endat, and SFD motors have motor memory), return the motor to have the memory programmed.
F630	FPGA cyclic fault.	FPGA-to-firmware data access error.	DRV.CLRFAULTS. If issue persists, contact technical support.

Fault	Message/Warning	Cause	Remedy
F535	Power-board over-temperature fault.	The power-board temperature sensor indicates more than 85 °C.	Reduce the load of the drive or ensure better cooling.
F560	Regen near capacity, could not prevent over voltage.	An F501 Bus Over Voltage has occured while the Regen Resistor was at or above 75% of its dissipation capacity.	Increase the size of regen resistor to be able to dissipate more power.
F601	Modbus data rate is too high.	Modbus controller data rate is too high.	Reduce data rate.
F602	Safe torque off.	Safe torque off function has been triggered.	Reapply supply voltage to STO if safe to do so.
F621	Control Board CRC fault.	Communications with the Power Board Failed	DRV.CLRFAULTS. If issue persists If issue persists, contact technical support.
F623	Power Board CRC fault.	Communications with the Power Board Failed	DRV.CLRFAULTS. If issue persists If issue persists, contact technical support.
F624	Power Board Watchdog fault.	Communications with the Power Board Failed	DRV.CLRFAULTS. If issue persists If issue persists, contact technical support.
F625	Power Board Communication fault.	Communications with the Power Board Failed	DRV.CLRFAULTS. If issue persists If issue persists, contact technical support.
F626	Power Board FPGA not configured.	Communications with the Power Board Failed	DRV.CLRFAULTS. If issue persists If issue persists, contact technical support.
F627	Control Board Watchdog fault.	Communications with the Power Board Failed	DRV.CLRFAULTS. If issue persists If issue persists, contact technical support.
F701	Fieldbus runtime.	Runtime communication fault.	Check fieldbus connections (X11), settings, and control unit.
F702	Fieldbus communication lost.	All fieldbus communication was lost.	Check fieldbus connections (X11), settings, and control unit.
F703	Emergency timeout occurred while axis should disable.	Motor did not stop in the timeout defined.	Change timeout value, change stop parameters, improve tuning.

2. AKD PDMM Errors and Alarms

When an Error(s) occur, the highesty priority error is displayed on the 7-seg LED of the AKD PDMM. Error messages have priority over Alarm messages. When an Error or Alarm occur, always check the controller log messages. The log messages will provide more details about the failure and the history of events leading up to the failure. From the log messages, you can determine the specifics about the cause of the failure to correct the underlying problem.

Errors and alarms are either hardware or software clearable. For instructions on clearing an Error or Alarm locate its number in the table below, and follow the remedy instructions.

Error	Message/Warning	Cause	Remedy
		Errors	
E01	Critical temperature exceeded. PDMM operation is stopped, CPU will be put to sleep.	CPU temperature exceeded safe operating temperature limit.	Power-off. Check airflow and operating environment are within hardware specifications. Allow unit to cool before power-on.
E02	Out of memory. KAS runtime is stopping.	Memory leak, memory corrupted, or hardware memory failure.	Power-off/on. If problem is recurrent, check release notes for firmware updates or return hardware for repair.
E03	Fan failure.	CPU cooling fan was not able to operate properly.	Check temperature and monitor for High temp alarm (see A01). Return hardware for fan replacement.
E10	Firmware is corrupted.	Flash memory corrupted during firmware download or flash hardware failure.	Re-download firmware or boot into recovery mode, download firmware, and power-off/on. If problem persists, return hardware for repair.
E11	Flash is corrupted, no filesystem is available.	At startup the filesystem could not be mounted on the flash.	Reset to factory defaults. If problem persists, return hardware for repair.
E12	Not enough flash memory available.	Flash memory is full, unable to write to flash.	Clean-up the flash memory by removing log files, application programs, recipes, or other data files.
E13	Out of NVRAM space for retained variables.	NVRAM is full.	Change application to reduce the amount of retained variables.
E14	Reset to Factory Defaults failed.	Flash memory could not be formatted during a Reset to Factory Defaults procedure.	Try reset to factory defaults again from power-on. If problem persists, return hardware for repair.
E15	Cannot read/write files from/to a SD card.	SD card is not plugged-in or the filesystem is corrupt and cannot be mounted. PLC function failures will not cause this error.	Insert a valid SD card or re-format the SD card using Settings/SD card/Format button.
E16	Not enough space available on the SD card.	SD card is full, unable to write to the SD card. PLC function failures will not cause this error.	Clean-up SD card space by deleting files or re-format the card using Settings/SD
E20	Runtime plug-in, process, thread or application failed to start.	KAS runtime or application code failed to auto-start at boot.	Power-off/on. Reset to factory defaults. If problem is recurrent, check release notes for firmware updates or download firmware.
E21	Runtime process, thread, or driver failed to respond during operation.	KAS runtime code failed during normal operation.	Power-off/on. If problem is recurrent, check release notes for firmware updates.

Error	Message/Warning	Cause	Remedy
E22	Fatal error in PLC program, application stopped.	Virtual machine failed to execute an instruction.	Re-compile application, download, and re-start. Check the IDE and controller firmware versions are compatible.
E23	CPU is overloaded.	Either the motion engine cycle did not complete or the PLC program did not complete within the timeout period due to excessive CPU loading.	Stop the application or power-off/on. Reduce the sample rate, simplify the application, or reduce the application cycles and re-start the application.
E24	PLC application cannot be started.	PLC application cannot be started, due to an existing condition. Possible reasons: 1. Maintenance operation is in progress. 2. Controller is in online config mode. 3. AKD Restore failed. 4. The IDE version of the compiled PLC code and controller runtime version do not match.	Check the following: 1. Controller web-server home page for any maintenance operation in-progress. Wait for the operation to finish. 2. Connect to the controller with the IDE and disable online config mode. 3. EtherCAT network topology by using the Scan network button in the web-server's Restore tab. Correct the physical topology and re-execute an AKD restore. 4. IDE version (only major.minor. micro) should match with runtime version. To correct, install the correct version of IDE or Runtime.
E30	EtherCAT communication failure during operational mode.	EtherCAT network operation failed due to a network communciation error.	Check the EtherCAT network wiring and devices state. Re-start the application.
E31	EtherCAT communication failure during preop mode.	EtherCAT network operation failed due to a network communciation error.	Check the EtherCAT network wiring and devices state. Re-start the application.
E32	EtherCAT communication failure during bootstrap mode.	EtherCAT network operation failed due to a network communciation error.	Check the EtherCAT network wiring and devices state. Re-start the application.
E33	EtherCAT failed to initialize into operational mode.	EtherCAT network initialization failed due to a network communciation error.	Check the EtherCAT network wiring and devices state. Re-start the application.
E34	EtherCAT failed to initialize into preop mode.	EtherCAT network initialization failed due to a network communciation error.	Check the EtherCAT network wiring and devices state. Re-start the application.
E35	EtherCAT failed to initialize into bootstrap mode.	EtherCAT network initialization failed due to a network communciation error.	Check the EtherCAT network wiring and devices state. Re-start the application.
E36	EtherCAT failed to discover the expected devices.	EtherCAT network discovery failed due to a mismatch between the discovered and expected devices.	Check the EtherCAT devices and wiring order. Correct the device order wiring or re-scan the network, re-compile, and download the updated application. Re-start the application.

Error	Message/Warning	Cause	Remedy
E37	EtherCAT failed to return to init state.	EtherCAT network initialization failed due to a network communciation error.	Check the EtherCAT network wiring and devices state. Re-start the application.
E50	Backup to SD card failed.	An unrecoverable error occurred during the backup operation.	Repeat the backup to SD card operation. If it fails again, replace the SD card.
E51	Restore from SD card failed.	An unrecoverable error occurred during the restore operation.	Do NOT reboot the PDMM! Repeat the restore operation. If it fails again, reset the PDMM to factory defaults. If problem persists, return hardware for repair.
E52	SD Backup files are missing or corrupt.	The restore operation failed due to missing, incomplete, or corrupt files on the SD card.	Perform a backup operation before the restore or use an SD card with valid backup files.
E53	SD Backup files are not compatible.	The restore operation failed. The backup files are not compatible with the PDMM 800MHz model.	Use an SD card with a backup from a PDMM 800MHz model.
Alarm	**Message/Warning**	**Cause**	**Remedy**
		Alarms	
A01	High temperature exceeded.	CPU temperature near the safe operating temperature limit.	Check airflow and operating environment are within hardware specifications.
A02	Low on memory.	Memory leak or corruption.	Power-off/on. If problem is recurrent, check release notes for firmware updates or return hardware for repair.
A04	Low input voltage.	+24 volt input power is +19 volts or less.	Check power supply voltage and connection to the PDMM.
A12	Flash memory is low on free space.	Flash memory is almost full.	Clean-up the flash memory by removing log files, application programs, recipes, or other data files. Reset to factory defaults.
A21	Recoverable process or thread failed to respond during operation.	KAS non-runtime code failed during normal operation and was automatically restarted.	If problem is recurrent, power-off/on. Check release notes for firmware updates.
A23	CPU is overloaded.	CPU usage is too high for 5 (or more) seconds.	Reduce the sample rate, simplify the application, or reduce the application cycles.
A30	EtherCAT missed a send frame during operation mode.	EtherCAT master was unable to send a frame for one or more cycles.	Reduce the controller CPU load, so it has enough Real-Time margin to send EtherCAT frames every cycle.
A38	EtherCAT missed a receive frame during operation mode.	EtherCAT master did not receive a frame for one or more cycles.	Check the EtherCAT network wiring and devices.
A40	Local digital IO missed a cyclic update.	Local digital IO was not updated during a cycle or the updates are no longer synchronous.	Reduce the sample rate, simplify the application, or reduce the application cycles.
A53	PDMM was replaced with a higher performance model.	PDMM 1.2GHz model was restored using backup files from a PDMM 800MHz model.	Either replace the PDMM with an 800MHz model or use the functionally compatible, higher performance 1.2GHz model.

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 integerating standards and custom products, Kollmorgen delivers breakthrough solutions that are unmatched in performace, reliability, and ease-of-use, giving machine builders an irrefutable marketplace advantage.

For assistance with your application needs visit www.kollmorgen.com or contact us at:

North America
Kollmorgen
203A West Rock Road
Radford, VA 24141 USA
Phone: 1-540-633-3545
Fax: 1-540-639-4162
Email: support@kollmorgen.com

Europe
Kollmorgen Europe GmbH
Pempelfurtstraße 1
40880 Ratingen Germany
Phone: +49 (0) 2102 9394 0
Fax: +49 (0) 2102 9394 3155
Email: technik@kollmorgen.com

Asia
Kollmorgen
Rm 2205, Scitech Tower, China
22 Jianguomen Wai Street
Phone: +86 - 400 666 1802
Fax: +86 - 10 6515 0263
Email: technik@kollmorgen.com