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 WorkBench **Fault** screen or read the status of DRV.FAULTS through the controller or HMI for the entire list of faults.

Fault	Message/Warning	Cause	Remedy
0	N/A	Reserved.	N/A
101	Firmware incompatible.	Installed firmware is not compatible with the drive hardware.	Load compatible firmware into the drive.
102	Resident firmware failed.	Software failure detected.	Restart drive. If issue persists, contact technical support.
103	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.
104	Operational FPGA failed.	Software failure detected. Load operational FPGA failure occurred (several cases according to flowchart).	Restart drive. If issue persists, contact technical support.
105	NV memory stamp invalid.	NV memory stamp is corrupted or invalid.	Reset the drive to default memory values using **Parameter Load** in WorkBench.
106	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** in WorkBench.
107	Positive switch imit exceeded. Warning issued prior to fault.	Positive software position limit is exceeded.	Move the load away from the limits.
108	Negative switch limit exceeded. Warning issued prior to fault.	Negative software position limit is exceeded.	Move the load away from the limits.
121	Homing error.	Drive did not finish homing sequence.	Check homing sensor.

Fault	Message/Warning	Cause	Remedy
123	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.
125	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.
126	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.
127	Incomplete emergency stop procedure.	Incomplete emergency stop procedure (problem with the emergency stop motion task).	Disconnect power from drive and check emergency stop procedure.
128	MPOLES/FPOLES not an integer.	Ratio of motor poles to feedback poles must be a whole number.	Change to a compatible feedback device.
129	Heartbeat lost.	Heartbeat lost.	Check CANopen cabling. Reduce bus load or increase the heartbeat update time.
130	Secondary feedback supply over current.	Problem in secondary feedback detected.	Check secondary feedback (X9 connection).
131	Emulated encoder line break.	Problem in secondary feedback detected.	Check secondary feedback (X9 connection).
132	Emulated encoder Z break.	Problem in secondary feedback detected.	Check secondary feedback (X9 connection).
134	Secondary feedback illegal state.	Problem in secondary feedback detected.	Check secondary feedback (X9 connection).
135	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.
136	Instability during autotune.	The FPGA version does not match the firmware FPGA version constants.	Load the FPGA version that is compatible with the firmware.
137	Homing and feedback mismatch	The configured homing mode is not supported by the motor feedback type used.	Change homing mode.

Fault	Message/Warning	Cause	Remedy
138	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.
139	Target Position over short due to invalid motion task activation.	Refer to section 4.2.2.1 of AKD_customer_profile_ application_note.doc	Cleared by activating a valid motion or by the DRV. CLRFAULTS command.
140	VBUS.HALFVOLT has changed.	The user changed the numerical value of VBUS. HALFVOLT. The change only takes effect after a DRV. NVSAVE command and after rebooting the AKD.	Save the parameters in the non-volatile memory with DRV.NVSAVE and turn off/ on the 24[V] power supply in order to reboot the drive or restore the original setting of VBUS.HALFVOLT.
151 to 170	Motion task warning.	Motion task settings and parameters are not set to produce a valid motion task.	DRV.CLRFAULTS will clear the warning. Check motion task settings and parameters to make sure the values will produce a valid motion task.
201	Internal RAM failed.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
202	External RAM failed.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
203	Code integrity failed.	Software failure detected. FPGA register access failure occurred.	Restart drive. If issue persists, contact technical support.
204 to 232	EEPROM failure detected.	EEPROM failure detected.	Restart drive. If issue persists, exchange drive.
234 to 237	Control temperature sensor high. Warning issued prior to fault.	High temperature limit reached.	Check cabinet ventilation system.
240 to 243	Power temperature sensor low. Warning issued prior to fault.	Low temperature limit reached.	Check cabinet ventilation system.
245	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.
247	Bus voltage exceed allowed thresholds.	Hardware problem in bus measurement.	Troubleshoot and repair hardware problem.
301	Motor overheated.	Motor overheated.	Check ambient temperature. Check motor mounting heat sink capability.

Fault	Message/Warning	Cause	Remedy
302	Over speed.	Motor exceeded VL.THRESH value.	Look for overshoot or lower requested speed.
303	Motor foldback.	Maximum motor power has been exceeded; the power has been limited to protect the motor.	Gains are too low; motor is being over driven.
304	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.
305	Brake open circuit.	Motor brake open circuit.	Check cabling and general functionality.
306	Brake short circuit.	Motor brake short circuit.	Check cabling and general functionality.
307	Brake closed during enable state.	Motor brake closed unexpectedly.	Check cabling and general functionality.
308	Voltage exceeds motor rating.	Drive bus voltage exceeds the motor's defined voltage rating.	Make sure that the motor fits the driving rating.
309	Motor I2t load. Reduce load.	Motor I2t load (IL.MI2T) has exceeded the warning threshhold IL.MI2TWTHRESH. This warningcan only be generated in case that the motor protection mode IL.MIMODE has been set to 1.	Reduce the load of the Drive by e.g. adjusting lower acceleration/ deceleration ramps.
401	Failed to set feedback type.	Feedback is not connected or wrong feedback type selected.	Check primary feedback (X10 connection).
402	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.
403	EnDat communication fault.	General communication problem with feedback.	Check primary feedback (X10 connection), EnDat only.
404	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.
405	BiSS watchdog fault.	Bad communication with the feedback device.	Check primary feedback (X10 connection), Biss only.
406	BiSS multicycle fault.	Bad communication with the feedback device.	Check primary feedback (X10 connection), Biss only.
407	BiSS sensor fault.	Bad communication with the feedback device.	Check primary feedback (X10 connection), Biss only.

Fault	Message/Warning	Cause	Remedy
408 to 416	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.
417	Broken wire in primary feedback.	In primary feedback, a broken wire was detected (incremental encoder signal amplitude).	Check feedback cable continuity.
418	Primary feedback power supply.	Power supply fault for primary feedback.	Check primary feedback (X10 connection).
419	Encoder init procedure failed	Phase find procedure did not complete successfully.	Check encoder wiring, reduce/balance motor load prior to phase finding.
420	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).
424	Resolver amplitude low.	Resolver signal amplitude is below minimum level.	Check primary feedback (X10 connection).
425	Resolver amplitude high.	Resolver signal amplitude is above maximum level.	Check primary feedback (X10 connection).
426	Resolver error.	Resolver excitation fault.	Check primary feedback (X10 connection).
427	Analog low.	Analog signal amplitude low.	Check primary feedback (X10 connection).
428	Analog high.	Analog signal amplitude high.	Check primary feedback (X10 connection).
429	Incremental low.	Incremental encoder signal amplitude is below minimum level.	Check primary feedback (X10 connection).
430	Incremental high.	Incremental encoder signal amplitude is above maximum level.	Check primary feedback (X10 connection).
432	Communication fault.	General communication problem with secondary feedback.	Check secondary feedback (X10 connection).
436	EnDat overheated.	Endat Feedback Device is over termperature.	Check ambient temperature. Check motor mounting heat sink capability.
437	Close to limit.	Drive or motor over current or over speed warning.	Check for increased load, jamming or sticking. Is position error set too low?
438	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?

Fault	Message/Warning	Cause	Remedy
439	Following error (user).	Motor did not follow command values. Motor exceeded maximum allowed position following error (user).	Check feedback commutation setup and tuning parameters.
450	Following error (presentation).	Motor did not follow command values. Motor exceeded maximum allowed position following error (presentation).	Check feedback commutation setup and tuning parameters.
473	Wake and Shake. Insufficient movement.	There was less movement than defined by WS.DISTMIN.	Increase WS.IMAX and/or WS.T.
475	Wake and Shake. Excess movement.	WS.DISTMAX has been exceeded.	Increase WS.DISTMAX value or reduce WS.IMAX or WS.T.
476	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.
478	Wake and Shake. Overspeed.	WS.VTHRESH was exceeded.	Increase WS.VTHRESH value or reduce WS.IMAX or WS.T.
479	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.
480	Fieldbus command velocity too high.	Fieldbus command velocity exceeds VL.LIMITP	Lower fieldbus command trajectory or increase the value of VL.LIMITP
481	Fieldbus command velocity too low.	Fieldbus command velocity exceeds VL.LIMITN	Increase fieldbus command trajectory or decrease the value of VL.LIMITN
482	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.
483 to 485	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).
486	Motor velocity exceeds EMU-speed.	Motor velocity exceeds the maximum speed the emulated encoder output can generate.	Reduce value of DRV.EMUEPULSEIDTH.
501	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.

Fault	Message/Warning	Cause	Remedy
502	Bus under voltage. Warning issued prior to fault.	Bus voltage below threshold value.	Check mains voltage.
503	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.
504 to 518	Internal supply voltage fault.	Internal supply voltage fault detected.	Check wiring for electromagnetic compatibility (EMC). If issue persists exchange drive.
519	Regen short circuit.	Regen resistor short circuit.	Regen IGBT short circuit. Contact technical support.
520	Regen overload.	Regen resistor overload.	Motor is being overhauled or motor is being stopped too quickly.
521	Regen over power.	Too much power stored in regen resistor.	Either get larger regen resistor or use DC bus sharing to dissipate power.
523	Bus over voltage FPGA.	Bus over voltage hard fault.	Check mains voltage and check system brake capacity.
524	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.
525	Output over current.	Current exceeds drive peak.	Check for short or feedback faults.
526	Current sensor short circuit.	Current sensor short circuit.	Restart drive. If issue persists, contact technical support.
527	Iu current AD converter stuck.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
528	Iv current AD converter stuck.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
529	Iu current offset limit exceeded.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
530	Iv current offset limit exceeded.	Hardware failure detected.	Restart drive. If issue persists, contact technical support.
531	Power stage fault.	Hardware failure detected.	Restart drive. If issue persists, replace drive.

Fault	Message/Warning	Cause	Remedy
532	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).
534	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.
535	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.
601	Modbus data rate is too high.	Modbus controller data rate is too high.	Reduce data rate.
602	Safe torque off.	Safe torque off function has been triggered.	Reapply supply voltage to STO if safe to do so.
701	Fieldbus runtime.	Runtime communication fault.	Check fieldbus connections (X11), settings, and control unit.
702	Fieldbus communication lost.	All fieldbus communication was lost.	Check fieldbus connections (X11), settings, and control unit.
703	Emergency timeout occurred while axis should disable.	Motor did not stop in the timeout defined.	Change timeout value, change stop parameters, improve tuning.

Specifications are subject to change without notice. It is the responsibility of the product user to determine the suitability of this product for a specific application.