# 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 limit 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. |
| 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. |
| 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 exceeds allowed thresholds. | Hardware problem in bus measurement. | Troubleshoot and repair hardware problem. |
| 301 | Motor overheated. Warning issued prior to fault. | Motor overheated. | Check ambient temperature. Check motor mounting heat sink capability. |
| 302 | Over speed. | Motor exceeded VL. THRESH value. | Look for overshoot or lower requested speed. |
| 303 | Runaway. | Motor did not follow command values. | 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. | Motion is requiring too much power. 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. |
| 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. |
| 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). |

| Fault | Message/ Warning | Cause | Remedy |
|---|---|---|---|
| 419 | Encoder init procedure failed | Phase find procedure did not complete successfully. | Check encoder wiring, reduce/balance motor load prior to phase finding. |
| 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). |
| 431 | Secondary feedback Hall error. | Secondary feedback illegal Hall state (000,111). | Check X9 connection. |
| 432 | Communication fault. | General communication problem with secondary feedback. | Check secondary feedback (X10 connection). |
| 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? |
| 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. |
| 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. |
| 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. Warning issued prior to fault. | Too much power stored in regen resistor. | Increase regen resistor capacity.Either get larger regen resistr or use DC bus sharing to dissipate power. |
| 523 | Bus over voltage FPGA. | Bus over voltage hard fault. | Check mains voltage and check system regen capacity. |
| 524 | Drive foldback. Warning issued prior to fault. | Maximum drive power has been exceeded. The power has been limited to protect the drive. | Motion requires too much power. Change move to reduce load on drive profile. |
| 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. |
| 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. |
| 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. |

KOLLMORGEN®

*Because Motion Matters™*


**Kollmorgen Customer Support:**

**North America**
E-mail: support@kollmorgen.com
Internet: www.kollmorgen.com
Phone: 1-540-633-3545
Fax: 1-540-639-4162

**Europe**
E-mail: technik@kollmorgen.com
Internet: www.kollmorgen.com
Phone: +49 (0) 203 99 79 0
Fax: +49 (0) 203 99 79 155





Part Number 903-200002-00