

## AKD™ Firmware Release Notes

**Firmware Version: M\_01-02-00-000**

**FPGA version: 0002\_00\_02 (updated automatically during firmware download procedure)**

**Compatible with WorkBench Version: 1.2.0.12841**

**Compatible with Hardware Version: A (see drive label for hardware version)**

This document describes the changes between the previous firmware release (M\_01-01-00-001) and the current release (M\_01-02-00-000). The firmware files in the current release are described in the table below and are available on the Kollmorgen web site:

[http://www.kollmorgen.com/website/com/eng/products/drives/ac\\_servo\\_drives/akd\\_drives\\_akd\\_softw\\_are\\_tab.php](http://www.kollmorgen.com/website/com/eng/products/drives/ac_servo_drives/akd_drives_akd_softw_are_tab.php)

Downloading these firmware files to an AKD drive will update the operational firmware and the FPGA version of the drive.

Drive Type	Customer Firmware File
AKD Base Analog	AKD-B-NAAN-V01-02-00-000.i00
AKD Position Indexer Analog	AKD-P-NAAN-V01-02-00-000.i00
AKD Position Indexer CANopen	AKD-P-NACN-V01-02-00-000.i00
AKD Position Indexer EtherCAT	AKD-P-NAEC-V01-02-00-000.i00

These release notes include the following information:

- [AKD WorkBench Compatibility](#)
- [Backwards Compatibility Issues](#)
- [New Features](#)
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### AKD WorkBench Compatibility

Please update to WorkBench version 1.2.0.12841 when using this firmware. WorkBench is available on the Kollmorgen web site:

[http://www.kollmorgen.com/website/com/eng/products/drives/ac\\_servo\\_drives/akd\\_drives\\_akd\\_softw\\_are\\_tab.php](http://www.kollmorgen.com/website/com/eng/products/drives/ac_servo_drives/akd_drives_akd_softw_are_tab.php)

WorkBench is compatible with all previous AKD firmware versions. WorkBench forward compatibility, however, cannot be ensured. When a behavior in the firmware changes, an older WorkBench version may not function correctly with the new firmware. Kollmorgen recommends that you update WorkBench when you install new firmware.

The table below describes compatibility between WorkBench versions and firmware versions. Any new firmware not listed here may have compatibility issues with WorkBench.

	Firmware Version	
	M_01-01-00-zzz	M_01-02-00-zzz
WorkBench Version 1.1.z.z	√	<b>x</b>
WorkBench Version 1.2.z.z	√	√

### Backwards Compatibility Issues

The Velocity Actual Value PDO reported over EtherCAT and CANopen using object 0x606C was incorrect. It is now correct and reported in Velocity Units\*1000. (1291)

The Target Velocity SDO and PDO reported over EtherCAT and CANopen using object 0x60FF is now scaled in Velocity Units\*1000. (1986)

#### Critical Notes for Bugs 1291 and 1986

Firmware versions M\_01-01-00-zzz for CANopen and EtherCAT drives used an incorrect scaling factor for CAN or COE PDO access to objects 606C (Velocity Actual Value) and 60FF (Target Velocity). This incorrect scaling factor did not match other SDO velocity variable scaling and was not an acceptable unit. Firmware version M\_01-02-00-000 corrects this scaling error so that PDO access to these objects is now in units of 1000 rpm.



**WARNING** As a result of the scaling change, commanded motor motion using PDO access to Objects 606C and 60FF in the new firmware is now approximately 4.5 times faster than in the previous firmware for the same integer number command. **You must reduce the existing values for these objects before upgrading to the new software.** If you do not reduce these values, any existing working applications using firmware version M\_01-01-00-zzz versions and using PDO access to CAN objects 606C and 60FF will function differently after you upgrade to firmware version M\_01-02-00-000.

To transition working applications using firmware version M\_01-01-00-zzz to firmware version M\_01-02-00-000, you must multiply any existing PDO writes to CAN objects 606C and 60FF by the following factor,  $f$ , and obtain the corrected, lower value for the new firmware:

$$f = \frac{16000 * 60 * 1000}{2^{32}} = 0.2235174$$

#### Example

In the previous firmware, a PDO write of 447392 to Object 60FF set the target velocity to 100 rpm. In the new firmware, this same PDO write of 447392 now sets the target velocity to 400 rpm.

In order to command a desired target velocity of 100 rpm, you must multiply your previous value for the PDO write to Object 60FF by 0.2235174 to get a corrected, lower value for the PDO write to Object 60FF:

$$\text{Previous value} * f = \text{corrected value}$$

447392 \* 0.2235174 = 100000

The new PDO write of 100000 to Object 60FF now sets the target velocity to 100 rpm.

## New Features

Support for the Wake and Shake feature has been added. Wake and Shake allows the drive to establish commutation when using feedbacks that do not provide initial commutation information (for example, incremental and sine encoders without Hall tracks, or BiSS type C encoders that are not mechanically aligned with motor back EMF). The following new parameters have been added: WS.ARM, WS.DISTMAX, WS.DISTMIN, WS.IMAX, WS.MODE, WS.NUMLOOPS, WS.STATE, WS.T, WS.TDELAY1, WS.TDELAY2, WS.TDELAY3, and WS.VTHRESH. You can access these parameters in the **Terminal** view in WorkBench. (1372, 1434, 1435)

The new parameter FBUS.PLLSTATE has been added to the firmware. This parameter reports the current state of the PLL (phase locked loop) used when synchronizing the drive to a network master.

Support has been added for Sin-Cos Feedback without Halls. A new FB1.SELECT has been added (FB1.SELECT 21). (1373)

Digital input mode 21 has been added to reduce the peak current (DINx.MODE 21). (1440)

Auto-enable is now allowed on any drive configured as an analog drive, except for NACN versions. (1328)

Digital output mode 14 has been added to report home complete. (1360)

A new “Homing is Needed (135)” warning has been added. This warning is generated when the drive tries to issue a motion task movement before homing has been commanded. The warning is cleared when homing is completed successfully or the opmode is changed. (1228)

Support for analog output mode 9 (debug mode) has been added. The following new parameters have been added to the firmware: AOUT.DEBUGADDR, AOUT.DEBUGDATATYPE, and AOUT.DEBUGSCALE. (1391 and 1268)

The new object 0x6072 – Max Torque has been added and is accessible using EtherCAT and CANopen. (1403, 1375)

## Changes to Existing Features

The scaling for the analog input and outputs has changed. In the previous release, the analog input and output shared the same scaling. The new firmware provides independent parameters for the input and the output. Parameters AIO.ISCALE, AIO.VSCALE, and AIO.PSCALE have been removed from the firmware and the following new parameters have been added to the firmware: AIN.ISCALE, AIN.VSCALE, AIN.PSCALE, AOUT.ISCALE, AOUT.VSCALE, and AOUT.PSCALE. (1397)

Digital input mode 6 (DINx.MODE 6, Start Jog) has been extended to work in position mode. (1151)

Digital output mode 0 now uses a new parameter for the user to control the output. The new DOUT1.STATEU and DOUT2.STATEU parameters have been added to the firmware. (1477)

Digital output mode 1-Mains Ready has been added to the firmware. (1121)

The service motion interface (SM.MODE) has been clarified. (367, 1462, 627)

- Service motion can now change parameters on the fly in the reversing section only.

- SM.ACCTYPE, SM.VPM1 and SM.VPM2 have been removed.
- The values used by SM.MODE have different definitions.
- DRV.MOTIONSTAT now reports state correctly with service motion.

The range of DRV.ACC and DRV.DEC has been increased. In earlier versions of firmware, the acceleration and deceleration was limited to  $2.1\text{m/s}^2$  for a linear motor. (1129)

The default values for VL.ARPQ3 and VL.ARZQ3 have been changed to 0.5 to match the default filter type. (1286)

When DRV.EMUEMODE is set to 4 or 5, the units of DRV.EMUERES has changed from lines/rev to counts/rev. (1359)

The upper limit for PL.KI and VL.KI was higher than needed; this limit has been lowered. (1378)

The default value for UNIT.PROTARY has been set to "4 - Counts 16 bit". (1443)

The defaults accelerations for DRV.ACC, DRV.DEC, MT.ACC, MT.DEC, HOME.ACC, HOME.DEC, GEAR.ACCMAX, and GEAR.DECMAX have been increased to 10,000 rpm/s. (1344)

The STO will not generate a fault when the HW and SW enables are on. (1384)

"CW" and "CCW" have been changed to "positive" and "negative" in Fault and Warning Messages related to limit switch trigger. (1370)

A spelling mistake in Warning 301 is fixed. (1395)

The ASCII channel via EtherCAT has many fixes and speed improvements.

Errors in the EtherCAT XML file have been fixed. (1387)

In the previous release, EtherCAT drives would generate a PLL unlocked warning even if EtherCAT was not connected. The drive now only generates the warning if EtherCAT is in the operational state. (1405)

BODE.MODE is no longer an NV parameter. (1393)

## Bug Fixes

Current loop instability AND changing IL.KP was not saved correctly on drive power up (cold start). (1379)

Hardware limits were ignored during homing. (1406)

EnDat intermittently failed to identify the feedback device. (1385)

Broken wire detection for feedback devices was not handled correctly. (1425, 1278, 1192, 1288)

Incorrect homing behavior occurred when HOME.DIST  $\neq$  0. (1402)

VBUS.UVWTHRESH was not stored in NV memory. (1102)

Digital output mode 4 "In Position" was not cleared when drive was disabled. (1346)

DRV.HELPALL crashed the drive if motion tasks had been saved to NV memory. (1295)

DRV.INFO showed the incorrect power and control board serial numbers. The product serial number was displayed correctly. (1461)

Executing DRV.RSTVAR did not clear the motion task parameters. (1193)

The recorder trigger could miss a trigger condition if REC.GAP is greater than 1. (1417)

The range of DOUT1.PARAM and DOUT2.PARAM was different from DRV.HELP and reference. (321)

The upper limit for MOTOR.INERTIA has been increased. (1230)

The accuracy of the position capture was found to be poor. (1243)

The sense of the precondition digital inputs when configuring the capture engine was inverted. (1284)

When reading the CAP0.PREEDGE and CAP1.PREEDGE, the value was returned incorrectly. (1398)

If you tried to enable the drive too quickly after it powered up, the drive faulted with an Iu/Iv calculation fault and had to be power cycled to allow it to enable correctly. (1326)

EtherCAT synchronization has been fixed. (1343)

The EtherCAT status word did not report the current fault status correctly. (1399)

Over EtherCAT the latch position status bit was not being set correctly. (1311)

When triggering motion via CANopen the motion sometimes did not start. (1416)

If you tried to use a fixed mapping that does not exist you did not get an error. (1436)

## Known Problems

### WARNING

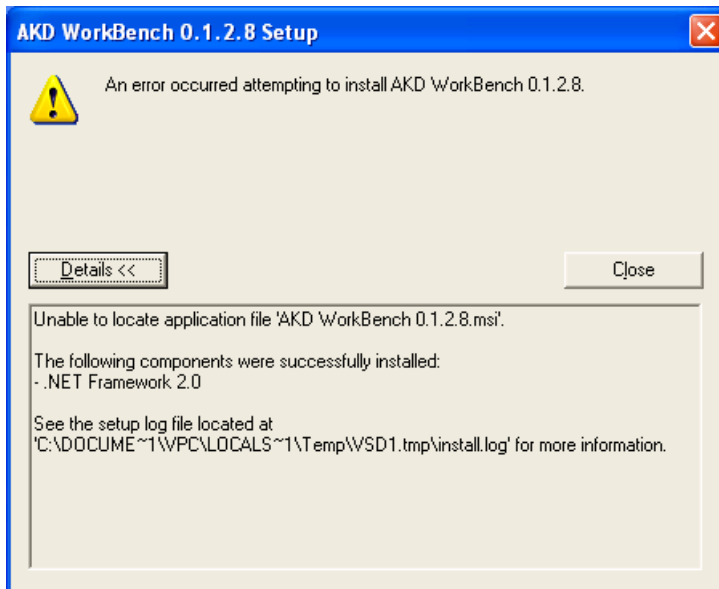
Even if the drive is configured in DRV.DISMODE 2 (Controlled Stop), the system will not follow a controlled stop when the EtherCAT link is removed. A pre-release version of the firmware will be available to correct this issue until the firmware version 1.3 is released. Contact Kollmorgen customer support for additional details. (2007)

### WARNING

A potential "race" condition may occur when running the EtherCAT network at 4 KHz. This condition may appear as inconsistent responses to limit switches due to the race condition. This condition occurs less often at lower frequencies. A pre-release version of the firmware will be available to correct this issue until firmware version 1.3 is released. Contact Kollmorgen customer support for additional details. (2082)

- Issues exist when reading large positions from the drive using some unit conversions. The raw counts and 16-bit counts do not have any problems.
- Current software for AKD does not have appropriations to set up and run linear motors.
- Installing WorkBench for the first time may produce a setup error if you run versions of Windows XP older than SP2 and do not have .NET 2.0 installed. The WorkBench installer downloads and

installs .NET 2.0, which requires Windows Installer 3.0 or later. If your computer does not have Windows Installer 3.0 or later installed, then .NET 2.0 is downloaded and installed during the installation process, but you must then reboot in order to install WorkBench. After rebooting, you may see the following popup message:



This error occurs because the temporary installation files were removed after rebooting. You must rerun the AKD WorkBench setup utility to complete the installation.

Also, if you do not have .NET 2.0 installed (on any installation), the computer must be connected to the internet so that the installer can download .NET 2.0.

- CAP1 is currently not functional. The values that CAP1 appears to be capturing are not accurate for the intended use. This issue will be corrected in version 1.3.0.
- DRV.DIS and Controlled Stop have timer issues. The timer which is used when the DRV.DIS command is issued is DRV.DSTO, instead of CS.TMAX when DIS.MODE is set to 2 as it should be. This issue will be corrected in version 1.3.0.
- Digital input mode 7 (operation mode change on fly) has been temporarily removed. If you are currently using this function, you must reload firmware version M\_01-01-00-001 at this time.

## Kollmorgen Customer Support Contact Information

### North America

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