

## AKD Firmware Release Notes



These release notes for the AKD drive firmware (the software that executes inside the AKD drive) describe the changes between the previous firmware releases and this release.

Kollmorgen provides different firmware files for each model type. Use the file that matches the model number of your drive. For example, with a Base Analog drive with a model number like AKD-Bxxxx-NAAN-0000, use the firmware file AKD-B-NAAN-V01-05-00-000.i00.

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.

Please update to WorkBench version 1.8.0.00000 or later when using this firmware.

## Release Summaries

Version: 01-08-00-005, January 23, 2013

- + General Issues
- + BASIC Issues

Version: 01-08-00-004, December 15, 2012

- + Field Bus Specific Issues
- + BASIC Issues

Version: 01-08-00-003, November 30, 2012

- + Field Bus Specific Issues
- + General Issues
- + BASIC Issues

Version: 01-07-00-003, October 05, 2012

- + General Issues
- + Field Bus Specific Issues

Version: 01-07-00-002, August 31, 2012

- + General Issues
- + Field Bus Specific Issues

Version: 01-07-00-001, August 17, 2012

- + General Issues
- + BASIC Issues

Version: 01-07-00-000, July 27, 2012

- + General Issues
- + BASIC Issues

Version: 01-06-07-000, June 22, 2012

- + Feedback Issues
- + General Issues
- + Field Bus Specific Issues
- + BASIC Issues

Version: 01-06-06-000, June 08, 2012

- + BASIC Issues
- + Feedback Issues
- + General Issues

Version: 01-06-05-000, May 25, 2012

- + General Issues
- + BASIC Issues
- + Feedback Issues

Version: 01-06-04-000, May 11, 2012

Version: 01-08-00-005 Release Date: January 23, 2013

## General Issues

## Fixed Bugs

- **T-ICAN (BASIC drive with option board) will not boot if there is a failure communicating with the option board. (S-10308)**

## Issue:

This drive will fail to power up successfully if there is a problem communicating with the option card.

## Solution:

AKD will now boot up and show a drive fault if the option card is not responding.

## BASIC Issues

## Fixed Bugs

- **F251 Randomly Reported On BASIC with IO option Card (4233)**

## Issue:

Some BASIC drives with an IO option card would generate a F251 fault randomly.

## Solution:

F521 Faults are no longer randomly generated.

Version: 01-08-00-004 Release Date: December 15, 2012

## Field Bus Specific Issues

## Fixed Bugs

- **EtherNet/IP - Connection timeouts can lead to a drive crash (4193)**

## Issue:

Connection time outs (due to cabling issues, or expected packet rate too high) result in a drive crash rather than a simple fault.

## Solution:

This issue has been resolved. The drive will now fault with a network timeout F702 and will not crash.

- **EtherNet/IP - Connection timeout faults cannot be cleared with Logix controllers (4193)**

## Issue:

With a Logix controller, F702 Fieldbus Communication Lost cannot be cleared after it occurs without a reboot.

## Solution:

The system has been modified so that these controllers are able to reconnect after a network timeout.

## BASIC Issues

## Fixed Bugs

- **Drive crash when a BASIC program with I/O Option Board parameters were executed on a BASIC drive without an I/O Option Board. (4274)**

## Issue:

Loading a BASIC program written for a drive with the I/O Option Board onto a drive without the option board could result in a drive crash.

## Solution:

Accessing I/O Option Board parameters from a BASIC program will no longer cause a crash when executed on a drive without an I/O Option Board.

Version: 01-08-00-003 Release Date: November 30, 2012

+ IO Issues

+ General Issues

+ Feedback Issues

Version: 01-06-03-000, April 27, 2012

+ Field Bus Specific Issues

+ General Issues

Version: 01-06-02-000, April 13, 2012

+ Field Bus Specific Issues

+ IO Issues

+ General Issues

Version: 01-06-01-000, March 30, 2012

+ Field Bus Specific Issues

+ General Issues

Version: 01-06-00-002, March 29, 2012

+ General Issues

Version: 01-06-00-001, March 26, 2012

+ General Issues

+ Field Bus Specific Issues

Version: 01-05-13-000, March 20, 2012

+ General Issues

+ Field Bus Specific Issues

Version: 01-05-12-000, February 17, 2012

+ Field Bus Specific Issues

+ Motion Tasking Issues

+ General Issues

+ IO Issues

+ Feedback Issues

Version: 01-05-10-000, January 27, 2012

+ Feedback Issues

+ General Issues

+ Field Bus Specific Issues

Version: 01-05-08-000, January 20, 2012

+ General Issues

Version: 01-05-07-000, January 06, 2012

+ General Issues

+ IO Issues

Version: 01-05-06-000, December 23, 2011

+ Field Bus Specific Issues

+ General Issues

Version: 01-05-05-000, December 09, 2011

+ General Issues

+ Field Bus Specific Issues

Version: 01-05-04-000, November 25, 2011

+ General Issues

+ Feedback Issues

## Field Bus Specific Issues

### New Features

- **Fieldbus Command Arbitration: Block Telnet Access to Parameters (S-10131)**

**New Feature Details:**

It is sometimes desirable to block specific service channel commands (normally available in Workbench) when using a fieldbus to ensure motion commands from the fieldbus are not interrupted.

**Solution:**

New parameters FBUS.PROTECTION and FBUS.BLOCKING added.

FBUS.PROTECTION sets the protection level from 0 to 2. A level of 0 disables the parameter protection, a level of 1 and higher enables the protection of parameters with an equal or lower protection value.

Currently, to all protected parameters a level of 1 is assigned. A fieldbus (CANOpen and EtherCAT) must be operational to activate the protection. The protection is enabled when FBUS.PROTECTION is greater than 0 and CANOpen or EtherCAT are operational.

FBUS.BLOCKING is a read-only parameter and returns 1 if the protection is active, 0 otherwise.

- **Read firmware version during EtherCAT scan (S-10060)**

**Solution:**

The firmware version is now part of the EEPROM - emulation in EtherCAT. It is located in the address 0x0801 and has 12 characters in the form 0x-xx-xx-xxx.

- **Keyword FBUS.state returns the current state of the fieldbus. ()**

**New Feature Details:**

User needs to be able to retrieve the current state of the fieldbus.

**Solution:**

FBUS.STATE returns the current state of the fieldbus. This keyword is currently implemented only for CANOpen and EtherCAT.

### Fixed Bugs

- **AKD doesn't reach BOOTSTRAP mode after PREOP->INIT transition (4117)**

**Issue:**

When downloading a firmware file over EtherCAT the drive was sometimes unable to switch to BOOTSTRAP mode.

**Solution:**

The drive will no longer be stuck in the INIT transition, but will transition to BOOTSTRAP mode successfully.

- **Dynamic mapping table of Modbus did not get restored after DRV.NVSAVE. (4156)**

**Issue:**

After configuring the dynamic mapping table and executing DRV.NVSAVE the mapping table does not get restored after a power-up or DRV.NVLOAD.

**Solution:**

Fix a problem in drive initialization which prevented restoration of the mapping table.

- **The index number of the objects DRV.HANDWHEELSRC, IL.KPLOOKUPINDEX, IL.KPLOOKUPINDEX, IL.KPLOOKUPVALUE, FAULT451.ACTION has changed, these object were no longer accessible by it previous index number. (4154)**

**Issue:**

Customer wants to write and read IL.KPLOOKUPINDEX, Object 5265h and IL.KPLOOKUPVALUE, Object 5266h during Start up but it is not possible, because the object numbers has changed.

**Solution:**

Corrected the index numbers to the previous values.

## General Issues

### Feature Changes

- **Voltage thresholds modified for 5V Logic line faults (4145)**

**Issue:**

Intermittent faults F510 "5V over voltage", and F512 "5V under voltage" are sometimes seen.

**Solution:**

The fault threshold values have been expanded. The allowed range is now 4.70-5.35 V.

### Fixed Bugs

- **SFD Checksum Fault F534 seen intermittently (4063)**

**Issue:**

With certain drive types (except EtherCAT), spurious F534 faults are sometimes seen with SFD feedback devices.

**Solution:**

These faults should now only occur when there is a real problem communicating with the feedback device.

- **Broken Wire Detected fault F417 reported incorrectly on certain incremental encoders (4111)**

**Issue:**

False broken wire faults could be reported by the drive when incremental encoders anomalously jitter up/down at a very high rate for extended periods of time. Renishaw incremental encoders have this non-ideal characteristic even at position hold.

**Solution:**

## Feedback Issues

### + Field Bus Specific Issues

### + IO Issues

Version: 01-05-03-003, November 07, 2011

### + General Issues

### + Field Bus Specific Issues

Version: 01-05-02-000, October 28, 2011

### + General Issues

Version: 01-05-01-000, October 14, 2011

### + General Issues

### + Feedback Issues

### + Field Bus Specific Issues

Version: 01-04-19-000, September 30, 2011

### + General Issues

### + Field Bus Specific Issues

### + Homing Issues

Version: 01-04-18-000, September 16, 2011

### + General Issues

Version: 01-04-17-000, September 12, 2011

### + General Issues

### + IO Issues

### + Field Bus Specific Issues

Version: 01-04-15-002, August 29, 2011

### + Feedback Issues

### + General Issues

### + Field Bus Specific Issues

Version: 01-04-14-000, August 23, 2011

### + Field Bus Specific Issues

### + General Issues

Version: 01-04-13-000, August 15, 2011

### + General Issues

### + Field Bus Specific Issues

Version: 01-04-12-000, August 01, 2011

### + Field Bus Specific Issues

### + General Issues

Version: 01-04-11-000, July 18, 2011

### + Field Bus Specific Issues

### + General Issues

Version: 01-04-10-000, July 01, 2011

### + General Issues

Version: 01-04-09-000, June 21, 2011

### + General Issues

### + Service Motion Issues

Version: 01-04-08-000, June 08, 2011

### + General Issues

## Notes

Incorrect faults should no longer be reported on these devices.

### • Power Stage Fault F531 is sometimes reported when STO power is first applied. (4100)

#### Issue:

False faults can be reported by the drive when power is first applied to the STO input. This issue exists only on the following part numbers:

AKD->X00xx7->xxxx

AKD->X00246->xxxx

#### Solution:

Incorrect faults should no longer be reported on these drives.

## BASIC Issues

### Fixed Bugs

### • MOVE.GOREL on top of camming in the negative direction would result in motion in positive direction. (4122,S-10192)

#### Issue:

Commanding a relative move (i.e. MOVE.GOREL) in the negative direction on top of camming would result in motion in the positive direction.

#### Solution:

Now MOVE.GOREL in the negative direction on top of camming works correctly.

Version: 01-07-00-003 Release Date: October 05, 2012

Version: 01-07-00-002 Release Date: August 31, 2012

## General Issues

### New Features

### • New keyword WS.CHECKMODE (S-09884)

#### New Feature Details:

As a user, I want to select between active, passive, or no commutation check, as my application may not work with one of the modes.

#### Solution:

The addition of WS.CHECKMODE allows the user to specify which method the drive will confirm a valid commutation after Wake and Shake. When WS.CHECKMODE is set to 0(No commutation check), neither passive nor active commutations checks will be executed. When WS.CHECKMODE is set to default value 1(Active commutation check), AKD will make a short torque move after an angle has been selected. If the motor fails to move in the expected direction, a fault will be generated. When WS.CHECKMODE is set to 2(Passive commutation check), AKD will monitor torque commands and acceleration values for 10 revolutions after Wake and Shake has completed. During this time, a fault will be generated if unexpected motion is detected.

### Fixed Bugs

### • Drive crashes on EtherNet/IP drive when disconnect/reconnect network cable (3762)

#### Issue:

Occasionally, the drive crashes after replugging the network cable and when an EtherNet/IP TCP connection is running.

#### Solution:

Non thread-safe function call generated this problem. The problem is fixed.

### • Can't reset IP Address while drive is in a dynamic brake state (DRV.STATUS=3) (4018)

#### Issue:

When the drive is disabled, it should be possible to reset the IP address. But if the drive is disabled with dynamic brake engaged (due to DRV.DISMODE setting or certain faults) it is not possible to reset the IP address.

#### Solution:

A bug was identified and fixed where the IP Address could not be reset when the drive was in a dynamic braking state.

### • Wake and Shake remains active after a fault (4030)

#### Issue:

A problem in the Wake and Shake state machine can allow Wake and Shake to remain active after a fault occurs.

#### Solution:

The state machine has been re-worked to prevent conflicting commands.

### • WS.TSTANDSTILL can set values out of the range (4043)

#### Issue:

WS.TSTANDSTILL returns successfully when set values bigger than the maximum value, and smaller than the minimum value.

#### Solution:

Add range check for WS.TSTANDSTILL.

### • The measured time to ramp the current up to WS.IMAX takes longer than the setting value (4046)

#### Issue:

In wake and shake mode 1, set WS.TIRAMP = 256 ms, WS.IMAX = 1, the measured time to ramp the current up to WS.IMAX could be more than 100 ms longer than the setting value.

#### Solution:

## + Field Bus Specific Issues

Version: 01-04-07-000, May 23, 2011

## + General Issues

Version: 01-04-05-000, May 11, 2011

## + General Issues

## + Field Bus Specific Issues

Version: 01-04-03-000, May 09, 2011

## + General Issues

## + IO Issues

## + Motion Tasking Issues

## + Field Bus Specific Issues

Version: 01-04-02-000, April 21, 2011

## + General Issues

## + Homing Issues

## + Field Bus Specific Issues

Version: 01-04-01-000, April 11, 2011

## + IO Issues

## + General Issues

Version: 01-03-20-001, April 04, 2011

## + General Issues

## + Field Bus Specific Issues

Version: 01-03-19-000, March 28, 2011

## + Field Bus Specific Issues

## + Motion Tasking Issues

## + General Issues

Version: 01-04-00-000, March 18, 2011

## + General Issues

## + Field Bus Specific Issues

Version: 01-03-18-000, March 16, 2011

## + General Issues

Version: 01-03-16-000, February 16, 2011

## + General Issues

## + Motion Tasking Issues

Version: 01-03-14-000, February 01, 2011

## + General Issues

## + Field Bus Specific Issues

Version: 01-03-13-000, January 26, 2011

## + General Issues

## + Capture Issues

Version: 01-03-12-000, January 18, 2011

## + General Issues

## + Field Bus Specific Issues

Version: 01-03-10-000, January 04, 2011

## + General Issues

Version: 01-03-09-000, December 28, 2010

Modify WS.TIRAMP minimum value to 512ms, the measured time to ramp the current up to WS.IMAX also could be a little bigger than the setting time, but won't drift too far.

### • F493 will not be generated in some opmode/commandd source combinations (4088)

#### Issue:

An error caused commutation validation to not run in Fieldbus/Velocity, Analog/Torque, and Analog/Velocit modes.

#### Solution:

The state machine has been updated to run commutation checking in all opmode/command source combinations.

### • DRV.DIS is ignored if performing a Controlled Stop (S-10049)

#### Issue:

If DRV.DISMODE is 0 or 1 (disable immediately or dynamic brake immediately) and the drive is performing a controlled stop issuing a DRV.DIS or removing the fieldbus enable would be ignored and the drive would continue to complete the controlled stop.

#### Solution:

The drive now terminates the controlled stop and will immediately disable or dynamic brake.

### • The reaction to an overspeed fault should have been to dynamic brake. (4059)

#### Issue:

The reaction to a overspeed fault was to initiate a controlled stop. If the overspeed is due to a loss of commutation or an unstable servo tuning the controlled stop will not be able to slow the axis down. If the DRV.DISTO is set to a long time the axis will not stop until this timeout has been reached.

#### Solution:

The firmware has been changed to perform a dynamic brake in response to an overspeed fault.

### • F106 fault and parameters lost when upgrading from earlier firmware versions (4041)

#### Issue:

When upgrading from certain earlier versions, changes in parameter types can result in an F106 Nonvolatile Memory data error, and parameter settings stored in the drive are lost.

#### Solution:

Parameter type changes are now handled, such that upgrading from older versions will result in proper parameter values, and no fault will be reported.

## Known Issues

### • Position Loop not executing when inside a software limit switch (3773)

#### Issue: (Identified in Version 01-06-01-000)

This bug was fixed in version 01-06-01-000 but caused a larger bug: 4092. This bug has been intentionally re-introduced until a full fix for both 3773 and 4092 can be implemented. Behavior is unchanged from previous AKD production releases (same behavior as 1.6, 1.5, etc).

## Field Bus Specific Issues

### Fixed Bugs

### • DS402: Object 3470h sub 3 (AOUT.VALUEU) doesn't work as PDO, but as an SDO (3939)

#### Issue:

The object mapping works, but the value written to the PDO doesn't get into effect. The SDO-access works as expected.

#### Solution:

Object 3470 sub 3 works as expected by SDO or PDO access.

### • EtherCAT fieldbus disable causes glitch before controlled stop (4060)

#### Issue:

Disabling the drive via control word when running interpolated or cyclic position mode, can introduce a short velocity jump till a control stop is executed. This occurs when the master freezes the position set point value and in the same moment disables the drive.

#### Solution:

The drive now maintains the last valid velocity command from the master until the controlled stop has started.

Version: 01-07-00-001 Release Date: August 17, 2012

## General Issues

### Fixed Bugs

### • F301 "Motor overheated" appears after power cycle (3966)

#### Issue:

After a power cycle, there is a chance that Fault 301 - Motor Overheated is generated erroneously

#### Solution:

The fault is now inhibited until the sensors are fully initialized.

### • Restore DRV.OPMODE and DRV.CMDSOURCE to initial condition when W&S fails because of a disable of the power stage (S-09829)

#### Issue:

User disabled accidentally the Wake & Shake process by disabling the power stage. Afterwards the DRV.OPMODE and DRV.CMDSOURCE stayed in the mode used in the Wake & Shake process.

+ General Issues

+ Field Bus Specific Issues

Version: 01-03-08-000, December 07, 2010

+ General Issues

+ Field Bus Specific Issues

Version: 01-03-07-000, November 23, 2010

+ IO Issues

+ General Issues

Version: 01-03-06-000, November 09, 2010

+ General Issues

+ Field Bus Specific Issues

Version: 01-03-05-000, October 26, 2010

+ General Issues

Version: 01-03-04-000, October 19, 2010

+ General Issues

+ Field Bus Specific Issues

Version: 01-03-02-000, October 11, 2010

+ General Issues

+ Field Bus Specific Issues

Version: 01-03-01-000, September 17, 2010

+ General Issues

+ Field Bus Specific Issues

Version: 01-03-00-004, August 02, 2010

+ General Issues

Solution:

The previous values are restored now. Additionally the Wake & Shake is re-armed.

- **Wake and Shake changes opmode and command source if arm, then disarm is issued before the drive is enabled. (4031)**

Issue:

If Wake and Shake is armed, then disarmed without running Wake and Shake, the opmode/command source values are restored to uninitialized states. This results in setting the drive to Torque Mode and Service Mode.

Solution:

Issuing a Wake and Shake disarm command no longer restores previous opmode and command source.

- **AOUT.PSCALE has wrong minimum value reported by DRV.HELP (4009)**

Issue:

The minimum value setting for AOUT.PSCALE is larger than the maximum value

Solution:

A signed issue caused the minus sign to be misinterpreted. This has been fixed.

- **Glitch in enable when dynamic brake signal changes (4014)**

Issue:

A very infrequent "glitch" was found where the drive will apply the dynamic brake and then briefly re-enable for several milliseconds before again applying the dynamic brake and disabling successfully. This condition can only be seen when the drive is disabling and it is configured to use the dynamic brake (DRV.DISMODE=1 or 3).

Solution:

A bug has been identified and fixed so this re-enabling glitch cannot occur.

- **Reading FB1.USERBYTE, USERWORD, or USERDWORD may cause a drive crash (3969)**

Issue:

Using FB1.USERBYTEx commands with no feedback with memory leads to a drive crash.

Solution:

The behaviour is now fixed.

- **WS.MODE 1 results in incorrect motor phase when DRV.DIR = 1 (4003)**

Issue:

Wake and Shake Mode 1 does not work properly when the drive direction (DRV.DIR) is set to 1. The value of the commutation angle is wrong (MOTOR.PHASE) after commutation alignment was successful terminated.

Solution:

Eliminated a sign problem that caused the the wrong motor phase.

## BASIC Issues

### Fixed Bugs

- **Drive crash when using a camming program. (4027,S-09935)**

Issue:

When the compiler generates an odd number of data bytes, it could be placed on an odd boundary that would cause a misaligned access exception.

Solution:

The firmware was modified to avoid the misaligned access exception.

Version: 01-07-00-000 Release Date: July 27, 2012

## General Issues

### Fixed Bugs

- **DRV.FAULTHIST reports incorrect time stamps due to bad runtime values. (3619,S-09413)**

Issue:

The runtime value got stuck at 48days, which led to incorrect fault history values once the runtime hit this limit.

Solution:

Removed the limiting bug in the code.

## BASIC Issues

### Fixed Bugs

- **After MOVE.ABORT the decel rate used is CS.DEC instead of MOVE.DEC. (3958)**

Issue:

After MOVE.ABORT the decel rate used is CS.DEC instead of MOVE.DEC.

Solution:

Now MOVE.DEC is restored as the decel rate after a MOVE.ABORT.

- **Drive crash with BASIC telnet console output (3940,S-09703)**

Issue:

A drive crash can occur when a BASIC program is printing and receiving messages simultaneously.

Solution:

The BASIC program can now send and receive messages from Workbench or another client simultaneously. Receiving strings from the BASIC program still occurs on port 54321. Now when sending string to the BASIC program the Telnet client must use port 54322.

- **Virtual Encoder/Master moving flag (CAMVM.MOVING) not working correctly. (3974,S-09770)**

**Issue:**

Starting a move like CAMVM.GOREL and checking the CAMVM.MOVING flag immediately afterwards could result in incorrect value.

**Solution:**

CAMVM.MOVING is now reporting the correct value.

- **EXTENCODER.FREQ, CAMVM.FREQ did not report correct values for large internal values (> 2<sup>32</sup>) of these parameters. (3972)**

**Issue:**

ExtEncoder Frequency/Velocity conversion routine does not work correctly for large values.

**Solution:**

EXTENCODER.FREQ and CAMVM.FREQ is now reporting the correct values.

- **Analog Position Mode does not work. (3918,S-09667)**

**Issue:**

In Analog Position mode the drive does not respond to analog commands.

**Solution:**

Analog position mode is now working correctly.

- **Incorrect unit conversions for FB1.P, FB2.P, and FB3.P. (3937,S-09657)**

**Issue:**

Reading the values of FB1.P, FB2.P, and FB3.P returns incorrect values.

**Solution:**

Reading FB1.P, FB2.P, and FB3.P now returns correct values.

- **SD.SAVE saves active parameters instead of NV parameters. (3976,S-09800)**

**Issue:**

SD.SAVE saves active parameters instead of NV parameters which may result in incorrect drive state saved in the SD card.

**Solution:**

Now SD.SAVE performs a DRV.NVLOAD prior to saving away the parameters. Users should be aware that current changes to their parameters will be overwritten when performing SD.SAVE.

## New Features

- **The parameters EXTENCODER.POSITION, EXTENCODER.FREQ, CAM.MASTERPOS, CAMVM.POSITION, CAMVM.FREQ are now recordable and triggerable. (S-09724)**

**New Feature Details:**

When debugging camming applications it is useful to see plots of these parameters on the scope.

**Solution:**

User can view plots of above parameters as part of developing, testing, and debugging camming programs.

**Version: 01-06-07-000 Release Date: June 22, 2012**

## Feedback Issues

### Fixed Bugs

- **FB1.ENCREC Changed to be Read-Only When Using Tamagawa Abs Feedbacks (S-09616)**

**Issue:**

If you upload a parameter file from a drive using a Tamagawa feedback and download it back to the same drive you get the following error message "Error: [0054] Unknown Encoder Type."

**Solution:**

FB1.ENCREC has been changed to be read-only when the Tamagawa feedback is selected. With this parameter read-only it will not be included in an uploaded parameter file or output by DRV.NVLIST. With this parameter not in the parameter file downloading it back to a drive will not generate any error messages.

## General Issues

### Fixed Bugs

- **Scope traces for IL.VCMD were inverted (S-09650)**

**Issue:**

If you scoped plotted IL.VCMD and IL.CMD then you would see the IL.VCMD is not the correct sign.

**Solution:**

IL.VCMD now reports the voltage with the correct sign.

- **W&S was sometimes automatically disarmed after drive enable. (3932)**

**Issue:**

When W&S is armed and the drives gets enabled to start the WSS procedure the drive has self disarmed W&S. In this case it was also possible that even disarmed the motor moves, when the motor phase has been altered to angle that would lead to a commutation fault.



**Solution:**  
Drive will no longer self disable W&S.

- **VL.FBFILTER overflows in some situations (3954)**

**Issue:**  
When VL.FB reaches a speed of > 3500 RPM or the acceleration is very high, an overflow can occur in the calculation of VL.FBFILTER.

**Solution:**  
Calculation has been modified so that an overflow cannot occur.

- **Unexpected velocity command seen when controlled stop initiates (3981)**

**Issue:** (Identified in Version 01-06-00-001)  
When a controlled stop is commanded, it is expected that the velocity command will immediately be set to actual velocity, and then decelerate at the rate of CS.DEC. But if the actual velocity is above 3500 rpm, the velocity command at controlled stop initiation will be set to a wrong value (possibly lower than expected or in the wrong direction). The velocity command then decelerates from this wrong initial command value, resulting in unexpected deceleration rates or acceleration in the wrong direction.

**Solution:**  
A bug has been fixed in VL.FBFILTERED (the 10Hz filtered actual velocity value) which is used to set the initial velocity command for a controlled stop. The behavior is now that a controlled stop from above 3400 rpm will decelerate properly at CS.DEC from the starting actual velocity to a stop.

- **W&S mode 0: Occasional "Fault 475 Excessive movement" failures (3956)**

**Issue:**  
During W&S mode 0, sometimes a fault 475 was triggered although the axis moved in the allowed position range.

**Solution:**  
The start position for the W&S monitoring was not always properly initialized.

## Field Bus Specific Issues

### Fixed Bugs

---

- **Profinet: Signal ITIST\_GLATT (torque value) not updated (3955)**

**Issue:**  
The torque value in telegram 350 was not updated.

**Solution:**  
Torque value is now available as "actual value" in telegram 350.

### New Features

---

- **Profinet: New manufacture specific telegram 351 created. (3957)**

**New Feature Details:**  
Telegram 350 has for velocity mode only the actual current and actual velocity. In some application there is also need for the actual position.

**Solution:**  
For the velocity mode, a new manufacture specific telegram 351 is created, which returns the actual current, velocity and position.

## BASIC Issues

### Fixed Bugs

---

- **MOVE.ABORT not clearing out the position error. (3882,S-09714)**

**Issue:**  
When executing a MOVE.ABORT, the motor would not stopped the expected position.

**Solution:**  
Now a MOVE.ABORT will decelerate and the CS.DEC rate and the position error will be cleared.

- **CAMVM.POSITION reported incorrect position values. (3914,S-09639)**

**Issue:**  
When reading CAMVM.POSITION, the values reported would be in internal units.

**Solution:**  
Now CAMVM.POSITION reports the value in user units.

- **EXTENCODER.POSMODULO cannot be written while drive is enabled. (3911)**

**Issue:**  
EXTENCODER.POSMODULO cannot be written while drive is enabled.

**Solution:**  
Now EXTENCODER.POSMODULO can be written when drive is enabled..

- **CAMVM.GOREL did not work. (3912,S-09596)**

**Issue:**  
CAMVM.GOREL did not work.

**Solution:**  
Now CAMVM.GOREL works properly.

- **CAMVM.GOVEL did not execute when the drive was disabled. (3913,S-09597)**

**Issue:**

CAMMM.GOVEL would stop or not start if the drive is disabled.

**Solution:**

Now CAMVM.GOVEL starts and continues when the drive is disabled.

- **Program running upon start up (i.e. VM.AUTOSTART = 1) may not start a move or enable drive. (3909,S-09593)**

**Issue:**

Program running upon start up (i.e. VM.AUTOSTART = 1) may not start a move or enable drive.

**Solution:**

Now the program starts running after the drive has been completely initialized.

**Version: 01-06-06-000 Release Date: June 08, 2012**

## BASIC Issues

### Fixed Bugs

- **Incorrect default value for EGEAR.RATIO. (3902,S-09509)**

**Issue:**

EGEAR.RATIO had incorrect default value of 0.

**Solution:**

EGEAR.RATIO default value changed to 1.

- **Incorrect handling of Over-Travel, MOVE.ABORT, and drive disable in the Trajectory Generator (including Electronic Gearing and Camming). (3891,S-09437)**

**Issue:**

Trajectory Generator did not operate properly when OT switch, MOVE.ABORT, or drive disabled occurred.

**Solution:**

Trajectory Generator now behaves per specification when the drive is disabled, OT switch or MOVE.ABORT occurs.

- **MOVE.ABORT would cause MOVE.DEC to be over-written by the value of CS.DEC. (3904,S-09541)**

**Issue:**

MOVE.ABORT would cause MOVE.DEC to be over-written by the value of CS.DEC.

**Solution:**

MOVE.ABORT now uses the CS.DEC value without modifying MOVE.DEC.

### New Features

- **Stop and restart a BASIC program with the rotary switches and B1. (S-09553)**

**New Feature Details:**

Need to be able to stop and restart a program without a PC connected.

**Solution:**

Set the rotary switch to 0x12 to stop or 0x13 to restart and long press B1 to stop/restart the BASIC program.

## Feedback Issues

### Fixed Bugs

- **Battery Fault was generated for Tamagawa feedback devices if the Battery Power was lost when AKD is still powered (S-09322)**

**Issue:**

When using a Tamagawa feedback and the battery was disconnected while the drive was powered on, a F465 fault was generated. As long as the AKD drive is still powered a fault should not be generated because the drive can still operate normally.

**Solution:**

Fault F465 "Tamagawa encoder fault (battery error)" has been deleted. Fault F451 "Feedback battery fault." has been maintained and is generated if the feedback loses the battery power while the drive is powered off. A new warning n451 "Feedback battery" has been added to indicate that the Tamagawa feedback does not currently have any battery power. The n451 warning is not shown if FAULT451.ACTION is 1.

- **MOTOR.PHASE with Tamagawa feedbacks was being set incorrectly (S-09322)**

**Issue:**

When using a Tamagawa feedback, wake and shake would fail because MOTOR.PHASE was used incorrectly. MOTOR.PHASE is correct for all other feedbacks.

**Solution:**

Reading and writing MOTOR.PHASE is now correctly used for Tamagawa feedbacks.

## General Issues

### Fixed Bugs

- **Wake and Shake fails often with Fault 492 (3899)**

**Issue:** (Identified in Version 01-05-08-000)

When Wake and Shake completes, a short validation routine runs to ensure the commutation angle is correct. User may observe that high friction / high inertia systems Fault 492 occurs often.



**Solution:**

It was discovered that WS.IMAX was overriding the current peak limits for the entirety of Wake and Shake, including the validation. This was found to be incorrect, and should only affect the execution portion of Wake and Shake, not the validation. This prevented the validation check from using the full current motor continuous rating.

**Version: 01-06-05-000 Release Date: May 25, 2012**

## General Issues

### Feature Changes

---

- **DIN[X].PARAM and DOUT[X].PARAM ranges are now enforced (S-08920)**

**Issue:**

Digital Input/Output parameter keywords allowed any numerical value. This could lead to internal overflows for certain cases.

**Solution:**

Now the appropriate ranges are implemented for each digital input/output mode. Now each time the digital input or output mode is changed, the associated parameter is set to zero to avoid conflicts. This also means that the IO Mode must be set **before** the parameter is set.

### Fixed Bugs

---

- **Motion Task Table disappeared after reboot of AKD in Beta 01-06-03-000 (3865,S-09353)**

**Issue:** (Identified in Version 01-06-03-000)

Motion Tasks are not restored after a power cycle or the execution of DRV.NVLOAD.

**Solution:**

Motion task tables are now properly restored from non-volatile memory.

- **Acceleration rates not restored after a drive reboot in Beta 01-06-03-000 (3894)**

**Issue:** (Identified in Version 01-06-03-000)

Acceleration parameters were not saved properly to non-volatile memory. This bug was introduced in 01-06-03-000.

**Solution:**

Acceleration parameters such as DRV.ACC are now restored after a power cycle or load from non-volatile memory.

### New Features

---

- **Timeout duration included in DRV.HELP response (S-09310)**

**New Feature Details:**

Some drive keywords take a long time to complete execution.

**Solution:**

The specific max timeout values are now included in the DRV.HELP string.

## BASIC Issues

### Feature Changes

---

- **BASIC Compiler and VM now support MOTOR.TBRAKETO. (3873,S-09348)**

**Issue:**

Compiler error when MOTOR.TBRAKETO is in the params section.

**Solution:**

MOTOR.TBRAKETO is now available to BASIC programs.

### Fixed Bugs

---

- **Occasionally drive crashes when connecting/disconnecting from Workbench Console. (3808,S-09315)**

**Issue:**

Drive can crash when connecting or disconnecting from the Workbench Console.

**Solution:**

This issue has been resolved.

- **MOVE.MOVING = 1 when disabled and move command is issued. (3877,S-09355)**

**Issue:**

MOVE.MOVING = 1 when disabled and move command is issued.

**Solution:**

MOVE.MOVING will now be 0 when disabled. It will only be 1 when both enabled and moving.

- **107: "Warning: Positive Limit Switch Triggered", when software limit switches weren't configured. (3860,S-09349)**

**Issue:**

107: "Warning: Positive Limit Switch Triggered", when software limit switches weren't configured.

**Solution:**

This problem has been resolved.

The problem has been resolved.

- **A negative value of PL.Mod2 should not be allowed (3821,S-09316)**

**Issue:**

A negative value of PL.MODP2 in the BASIC firmware causes the Modulo positioning to malfunction.

**Solution:**

The minimum value of PL.MODP2 in the BASIC firmware is now 0 (zero).

- **Do not allow BASIC motion (including EGearing, Camming, and CamVM) in non-BASIC mode. (3841,S-09364)**

**Issue:**

Can initiate BASIC Trajectory Generator, EGearing, Camming, and CamVM motion in non-BASIC mode.

**Solution:**

Set DRV.CMDSOURCE to Program (5) to use BASIC Trajectory Generator (including EGearing, Camming, and CamVM).

## Feedback Issues

### Fixed Bugs

---

- **Tamagawa Feedback: Battery fault Issues (S-09272)**

**Issue:**

If you disconnect the battery to the Tamagawa feedback device you correctly get a feedback battery fault. If you then clear the battery fault without connecting the battery the battery fault is cleared, it should continue to be reported.

**Solution:**

The clear faults will now not clear the feedback battery fault if the battery is not connected. The fault number for the Feedback battery fault has change to 451 to be consistent with the FAULT451.ACTION that you use to ignore this fault. Changing the FAULT451.ACTION would not immediately ignore or enable the feedback battery fault, now the firmware immediately applies the setting change.

**Version: 01-06-04-000 Release Date: May 11, 2012**

## IO Issues

### Fixed Bugs

---

- **AIN2.VALUE not returning correct values when recorded (3836)**

**Issue:**

AIN2.VALUE shows up correctly on the Analog Input screen, and when accessed by AIN2.VALUE, but when recorded, AIN2.VALUE returns wrong value

**Solution:**

AIN2.VALUE was pointing at the value of AIN.VALUE, it has been corrected

- **DIN21-32, DOUT21-30 when recorded always return 0 (3823)**

**Issue:**

When recording DIN21-32.VALUE or DOUT20-30.VALUE the recorder always returns 0, even though the values can be accessed via the terminal, or the Digital IO screen.

**Solution:**

An interface bug was found causing these values not to record correctly, it has been corrected. DIN21-32.VALUE and DOUT21-30.VALUE can now be recorded.

## General Issues

### New Features

---

- **IL.VCMD, IL.VUFB, IL.VVFB are now recordable in the Scope (S-09072)**

**New Feature Details:**

It is difficult to diagnose all problems. To aid in difficult problems three voltages have been added to the available traces for the Scope.

**Solution:**

IL.VCMD is the torque producing voltage output by the current loop.

IL.VUFB is the voltage on the U winding of the motor

IL.VVFB is the voltage on the V winding of the motor

- **Support for reading and writing parameter data and BASIC programs to an SD card. (S-09107)**

**New Feature Details:**

The new drive variant with an I/O Option Card supports an SD Card for storing parameter data and BASIC project files.

**Solution:**

New commands SD.SAVE and SD.LOAD have been added to AKD. On drives equipped with an option card, these commands will copy parameter and project data to and from an SD Card.

## Feedback Issues

### Fixed Bugs

---

- **Motor parameters are not properly stored with FB1.MOTIDSAVE and Hiperface feedback (S-09236)**

**Issue:**

The parameters MOTOR.CTFO, MOTOR.PHASE, MOTOR.TBRAKERLS, MOTOR.BRAKE, MOTOR.TBRAKEAPP, MOTOR.VOL.TMAX, MOTOR.VMAX are always set to zero for an Hiperface encoder when executing FB1.MOTIDSAVE

**Solution:**

These set of parameters can now be stored properly in the feedback memory.

**Version: 01-06-03-000 Release Date: April 27, 2012**

## Field Bus Specific Issues

### New Features

- **Profinet: More manufacture specific PNUs are now supported. (3816)**

**New Feature Details:** (Identified in Version 01-06-02-000)

DRV.DIR and FB1.OFFSET were not accessible through pure PROFINET/PROFIdrive interface.

**Solution:**

DRV.DIR is accessible via PNU 2117, FB1.OFFSET is accessible via PNU 2145. Further PNUs are now supported (see PROFINET manual).

### Feature Changes

- **Additional parameters are now available through the fieldbus service channel (PROFINET, SyqnNET, Modbus, EtherNet/IP) ()**

**Issue:**

Some drive parameters were not available through the fieldbus service channel.

**Solution:**

Many additional parameters are now available through the fieldbus service channels.

### Fixed Bugs

- **Unwanted movement in motor, when switching the AKD off via control word in CAN-application in interpolated position mode (3843)**

**Issue:** (Identified in Version 01-06-02-000)

Customer used interpolated position mode in CAN (same in EtherCAT). A jump occurred, when switching off the drive and again when switching to enable.

**Solution:**

The bug had been, that position values were taken in other states than Operation Enable + setpoint enable bit of interpolated position mode. This is solved.

- **Scaling of DS402-object 60F4 sub 0 wrong (3815)**

**Issue:** (Identified in Version 01-06-00-002)

The value of the PDO-content of object 60F4 sub 0 was 4096 times too high. Only with FBUS.PARAM05 bit 4 = 0 (telnet scaling, OK with DS402-scaling).

**Solution:**

The content is now consistent.

## General Issues

### Feature Changes

- **Improved timing and bugfixes for W&S mode 0 (S-09018)**

**Issue:**

Faster and more reliable wake and shake mode 0.

**Solution:**

Improved mode 0 timing. Calculated more accurate angles from W&S. Detected and fixed a coding error that caused the last coarse angle to be used instead of the calculated average. Added new command WS.DELAY4 to set the time between the initial shake, which should move the rotor from the cogging point, and the start of actual W&S. When WS.DELAY is 0, there is no delay.

### Fixed Bugs

- **AIN.PSCALE has invalid Range (3742)**

**Issue:**

The range of AIN.PSCALE was incorrect. A second bug prevented the user from setting AIN.PSCALE to a negative value

**Solution:**

Range has been updated to only allow valid values, and range checking has been fixed. Note: this bug only applied to Analog Position Mode.

- **Fault history log cannot recover if it is corrupted. (3819)**

**Issue:**

The drive saves a fault log to non-volatile memory. If an entry is corrupted (such as power loss during the write of a log entry) the system could fail to provide correct log data until DRV.CLRFAULTHIST is executed.

**Solution:**

The code for reading and writing fault history entries is now robust, so that the system can gracefully recover from corrupted entries. The particular bad entry will simply be reported in the fault log as a bad log entry.

- **Digital Input Mode 23 broken when input is high on boot (3751)**

**Issue:**

If a digital input is configured to be mode 23, and the digital input is high on boot, the digital input will not be configured correctly.

**Solution:**

The mode is configured on a state change, because the digital input started high (no state change) the input was not being configured. This bug has been solved, so that the input is correctly configured on boot.

**Version: 01-06-02-000 Release Date: April 13, 2012**

## Field Bus Specific Issues

### New Features

---

- **Wake and Shake support via SynqNet Autonomous Action (S-09111)**

**New Feature Details:**

This issues only affected firmware release 01-06-01-000, earlier versions worked as expected.

**Solution:**

SynqNet now supports the Autonomous Drive Action mode, as well as the parameter command WS.ARM. The MPI software will now work as follows: 1. ensure drive is disabled 2. set WS.ARM (warning will be triggered) 3. set mode to Autonomous Action 4. enable drive to start WS. When WS is completed, the drive will set autonomous action complete bit to 1. The MPI software then disables the drive, which responds by clearing the autonomous action complete bit. The MPI software then changes the operating mode back to torque.

## IO Issues

### Fixed Bugs

---

- **In 01-06-01-000 DOUT9.STATEU, DOUT10.STATEU and DOUT11.STATEU Would Not Drive Any Outputs (S-03221)**

**Issue:**

This issues only affected firmware release 01-06-01-000, earlier versions worked as expected.

**Solution:**

The firmware has been changed to fix this issue so that

## General Issues

### New Features

---

- **Added command grouping telnet (E-01446)**

**New Feature Details:**

The telnet protocol was inefficient because the client could only send one command to the drive at a time and would have to wait for the response before sending the next command.

**Solution:**

The client can now send multiple commands separated by CR LF in one message. The drive will respond with the responses grouped into one message with each response terminated with the cursor "-->". A drive that supports this new protocol will respond to a read of DRV.FEATURES with a line "003: Message grouping".

### Fixed Bugs

---

- **Analog Velocity Mode cannot operate when UNIT.VSCALE = 0 (3766)**

**Issue:**

When an AKD is configured as a Linear Motor in Velocity Mode, and the units have been set to Counts (UNIT.VSCALE = 0), the range of UNIT.VSCALE was being calculated improperly.

**Solution:**

Calculation has been fixed in this mode.

### Feature Changes

---

- **FPGA Updated to version 0301 (3813)**

**Issue:**

The FPGA has been updated to version 0301

**Solution:**

Additionally, a new 15.5kHz filter has been added to the internal feedforward term of the FPGA interpolator to smooth out noise. This will improve low resolution feedback device performance.

**Version: 01-06-01-000 Release Date: March 30, 2012**

## Field Bus Specific Issues

### Fixed Bugs

---

- **STO sometimes triggers warning not error - 1.06 and trunk (S-08781)**

**Issue:**

A software disable was executed, when the STO was seen by the DS402 state machine. This was faster detected then the STO-fault.

**Solution:**

STO-fault will come in every case.

## General Issues

### Fixed Bugs

---

- **Position Loop not executing when inside a software limit switch (3773)**

**Issue:**

If the motor is driven into a software limit switch, a controlled stop is executed and held until motion is commanded away from the limit switch. A bug was found that caused the position loop to stop executing, which allowed the position error to slowly grow over time.

**Solution:**

The bug has been fixed, and the drive will correctly hold the axis at the command position the controlled stop ended at.

### New Features

---

- **Added support for the I/O option Board (S-08903)**

**Solution:**

The firmware will now support the new I/O option board.

**Version: 01-06-00-002 Release Date: March 29, 2012**

## General Issues

### Fixed Bugs

---

- **Poor system performance when connected via EtherCAT ()**

**Issue:** (Identified in Version 01-05-01-000)

Under certain circumstances, recent beta versions (1.5.1+) can suffer poor performance when under a heavy load and connected to an EtherCAT master.

**Solution:**

System performance has been dramatically improved with an EtherCAT connection.

**Version: 01-06-00-001 Release Date: March 26, 2012**

## General Issues

### Feature Changes

---

- **Controlled Stop starts from VL.CMD instead of VL.FB (3721)**

**Issue:**

When a Controlled Stop was issued, the trajectory towards zero velocity would originate from the current velocity command. This can cause problems when the trajectory is at a much higher speed than the current actual motor speed.

**Solution:**

Controlled Stop now begins trajectory calculation based on current velocity feedback, not velocity command to ensure a safe trajectory to zero velocity.

- **Change name of FBx.P related parameter commands. (S-88220)**

**Issue:**

Some of the Fbx.P related parameter might cause confusion to the user, so they have to be changed to make them more clear.

**Solution:**

Commands FBx.OFFSET, FBx.UNIT, FBx.DIR are renamed FBx.POFFSET, FBx.PUNIT, FBx.PDIR

### Fixed Bugs

---

- **Controlled stop overflow bug (3711)**

**Issue:**

After running against a mechanical limit and a disabled following error detection, the commanded setpoint velocity will increase inside the drive over a numerical limit. If this happens and a control stop is executed (e.g. through a fault situation), the drive could execute a control stop from a very high velocity in the opposite direction and then try to slow down.

**Solution:**

The numerical overflow is fixed.

- **Unexpected following error fault when in a limit switch (3709)**

**Issue:**

When the drive enters a limit switch, it will execute a controlled stop (deceleration to zero velocity) then come under command of the current operation mode. When the controlled stop completes, a following error may occur.

**Solution:**

Properly calculate position error during the controlled stop (previously it was not being updated during a controlled stop).

- **dynamic brake flickers off and on when enabling in DISMODE 1 or 3 (3727)**

**Issue:**

If the drive is configured to use the dynamic brake when disabled, the dynamic brake might go and off when enabling the drive, so that DRV.ACTIVE changes between 1 and 3 repeatedly.

**Solution:**

The source of the problem has been identified and fixed.

- **Biss Mode C allows feedback to be set when faults exist (3658)**

**Issue:**

In certain intermittent instances, it is possible to set FB1.SELECT = 34, and the feedback will be identified even when there is nothing connected to the X10 connector.

**Solution:**

The initialization process was happening quicker than the faults could be detected, allowing the feedback to pass initialization. A short delay was added to the initialization of Biss Mode C devices to detect faults and fail the init process reliably.

- **When downloading firmware the seven segment display did not show the correct characters. (D-03107)**

**Issue:**

If you download firmware from WorkBench the seven segment display would show Fr during whole of the download process. The seven segment display should be showing a the sequence dd, d5, d7.

**Solution:**

The firmware will now show the correct sequence of characters.

## Field Bus Specific Issues

### Fixed Bugs

---

- **SDO value read or written with object 6081 are wrong by factor 4 (3790)**

**Issue:** (Identified in Version 01-05-13-000)

The SDO value of object 0x6081 sub 0 is wrong, when DS402 - scaling is used (FBUS.PARAM05 bit 4 = 1)

**Solution:**

Now PDO and SDO deliver the same correct value for object 0x6081 sub 0

- **AKD DRIVE STATUS - through SDO (3737)**

**Issue:**

The drive is enabled via Telnet. The DS402-statusword does not show the transition as it in earlier KAS-versions.

**Solution:**

The DS402-statusword goes again to the state SWITCHED ON (0x33), when the drive is enabled via Workbench (if FBUS.PARAM05 bit 2 set to 0).

**Version: 01-05-13-000 Release Date: March 02, 2012**

## General Issues

### Fixed Bugs

---

- **MT.CONTINUE only continues the current task, and not following tasks (3616)**

**Issue:**

When a series of sequential motion tasks is configured, and during one of the motion tasks a DRV.STOP commands is issued, motion stops as expected. If motion is resumed using MT.CONTINUE only the motion task that was interrupted finishes, and not any following motion tasks.

**Solution:**

The logic bug has been identified which caused following tasks to not occur.

- **DOUT1.MODE/DOUT2.MODE 13 range does not allow user to set values (3656)**

**Issue:**

The range for DOUT1.PARAM and DOUT2.PARAM when DOUT1/2.MODE is set to 13 has a range of Minimum 0 to Maximum 0. This range does not allow the user to enter a valid value for the digital output parameter.

**Solution:**

The range was not being correctly set for Digital Output mode 12 or 13, the range is now set appropriately based on the user units for velocity the user has selected.

- **F439 unexpected FollowingError (3707)**

**Issue:**

Under certain circumstances an unexpected following error can occur (fault F439).

**Solution:**

The issue is fixed.

## New Features

---

- **Added new homing mode for rotary motors and new homing command. (S-08737)**

**New Feature Details:**

A homing mode is needed which will turn the motor into one direction until the reference switch is found. When the reference switch is active when the drive starts homing it is not allowed to move the motor into the opposite direction to deactivate the switch, like it is for homing mode 4. Also distance the motor is allowed to turn should be restritable, so that the motor won't spin endless into one direction and reaching the maximum distance should lead to an error.

**Solution:**

Homing mode 14 has been added. This homing mode will always let the motor spin into the direction set with HOME.DIR. Even when the reference switch is active while starting the homing procedure. To restrict the maximum distance a new command has been added HOME.MAXDIST with this command the user can set the distance relative to the starting position the motor is allowed to move until an the drive will have an error.

## Field Bus Specific Issues

### Fixed Bugs

---

- **Clear the fieldbus torque command when switching operational mode (S-08717)**

**Issue:**

When operating EtherNet/IP in torque mode, switching to velocity mode, then back to torque mode, the motor will immediately move according to the previous torque command.

**Solution:**

When entering torque mode, the fieldbus torque command is cleared. The master must send a new torque command after switching the operational mode to initiate motion.

**Version: 01-05-12-000 Release Date: February 17, 2012**

## Field Bus Specific Issues

### Fixed Bugs

---

- **ZSW1 bits shall be set before drive is enabled (S-08607)**

**Issue:**

The ZSW1 bits were set only if the drive was enabled (ProfiDrive state S4).

**Solution:**

The ZSW1 bits are now directly set depending on the opmode.

- **ZSW1 traversing task ACK bit (S-08606)**

**Issue:**

If a motion task was triggered without a homed axis (position mode), the ZSW1 ack bit was set in any case.

**Solution:**

The traversing task acknowledge bit in ZSW1 is not set in case of an error like homing was not done.

- **Cannot Disable/Enable with WB after Ethercat was running (3660)**

**Issue:**

After disconnecting a running ethercat communication, it was not possible to reenable the drive via Workbench.

**Solution:**

If the ethercat cyclic communication (writing the control word) is done, the drive will again accept commands over the service channel (WB).

- **Disable over DS402 allows uncontrolled velocity until controlled stop takes effect. (D-03004)**

**Issue:**

A disable over fieldbus will allow a vertical load to drop quickly until the controlled stop eventually starts.

**Solution:**

The code resolves this problem in 2 ways: First, after a disable DS402 will provide interpolated velocity or position requesting 0; Second, AKD now triggers a controlled stop much more quickly after receiving the disable command.

- **PDO transmission stops after some NodeGuard requests (3616)**

**Issue:**

Remote frames like node guarding frames could lead to undefined behaviour in the CANopen communication.

**Solution:**

Remote frames are now properly handled by the AKD with CANopen interface.

### New Features

---

- **Analog Output 0 can be written via Synqnet. (S-08479)**

**New Feature Details:**

The user can now write the value for Analog Output 0. This value will be written cyclic in to register of Analog Input 0.

**Solution:**

Analog Input 0 will now cyclic be set with the value from Analog Output 0 via Synqnet.

## Motion Tasking Issues

### New Features

---

- **Fault 139 Action command implemented (S-08637)**

**New Feature Details:**

If a motion task was unable to successfully complete without the trajectory overshooting due to a command change on-the-fly,

Fault 139 would be generated, even if this was acceptable behavior.

**Solution:**

FAULT139.ACTION has been implemented to allow the user to ignore this fault. When the fault is ignored, Motion tasking will not throw a fault even in cases where on-the-fly moves cause trajectory overshoots.

Note: The target position will be correct even in the case of an overshoot when Fault 139 is ignored.

## General Issues

### Fixed Bugs



---

- **MOTOR.TBRAKETO=0 should cause the brake to apply immediately (S-08628)**

**Issue:**

The drive was ignoring the timer when TBRAKETO=0, so would not apply brake in until velocity fell below CS.VTHRESH

**Solution:**

The brake will now apply immediately in the case of a disable when MOTOR.TBRAKETO=0

- **Gearing slave moves during time that brake is releasing (no motion is expected during this time) (3649)**

**Issue:**

When a gearing slave is disabled through the Hardware Enable input, and then re-enabled, the motor may move at a constant velocity during the time the brake is releasing.

**Solution:**

When the drive is disabled, gearing motion is now aborted and the velocity feedforward is zeroed.

---

## New Features

- **With a vertical axis (and certain other situations), it should be possible to immediately apply the brake in the event of the drive disabling for any reason. (S-08628)**

**New Feature Details:**

With a vertical axis, the brake must be applied immediately in the event of a fault which causes the power stage to disable. Any other disabling event should also ensure that the brake is applied immediately.

**Solution:**

With the new keyword MOTOR.BRAKEIMM (Brake Immediately) set to 1, the brake will be applied immediately in the event of the drive disabling for any reason.

- **Drive discovery protocol extended to return extra data (S-08585)**

**New Feature Details:**

Currently the Ethernet protocol WorkBench uses to discover drives in the Ethernet network only provides drive name, a free/busy status, the MAC address and IP address of the drive.

**Solution:**

The discory protocol now includes extra information including the model number, serial number and hardware revision of the drive in addition to the executing firmware and FPGA version numbers. Older versions of WorkBench will still work with new firmware, WorkBench will just not show the extra information. Newer versions of WorkBench will work with any version of firmware, if the drive supports this extended protocol the extra information is available.

---

## Feature Changes

- **MOTOR.TBRAKETO should apply the brake if controlled stop is unable to stop motion (S-08628)**

**Issue:**

When a controlled stop was in progress, the brake timer MOTOR.TBRAKETO was previously not started until motion had stopped.

**Solution:**

The brake timer MOTOR.TBRAKETO will now be started at the beginning of a controlled stop, rather than waiting until motion has stopped. If this timer expires before the controlled stop has completed, the brake will apply and then the drive will be disabled.

## IO Issues

### Fixed Bugs

- **Range on AIN.PSCALE is invalid (3653)**

**Issue:** (Identified in Version 01-05-07-000)

AIN.PSCALE had its range increased in firmware version 01-05-07-000, however it was not marked as a signed value which caused an overflow.

**Solution:**

The paramter has been marked as a signed value and now works as expected

## Feedback Issues

### New Features

- **New commands for FB2 and FB3! (S-08672)**

**New Feature Details:**

The user wants to read the value of the feedback seprately and set the unit of the value. Also the diretion and the offset of feedback 3 should be changeable.

**Solution:**

Feedback 1 - 3 should be readable seprately and independend, addition keywords are needed FB1.P, FB2.P, FB3.P in 64Bit count (32Bit Multiturn, 32Bit Singleturn) or user specific. To set the unit for each feedback use the new commands FB1.UNIT, FB2.UNIT, FB3.UNIT. Following unit are available 0 for 64Bit counts and 3 for user specific. The User specific unit can be set with FBx.PIN and FBx.POUT. Additional new command are FB3.DIR which will change the counting direction of feedback 3 and FB3.OFFSET which wil set set the offset of feedback 3 (does not affect the position loop offset when feedback 3 used as position feedback)

Version: 01-05-10-000 Release Date: January 27, 2012

## Feedback Issues

### New Features

## new features

---

- **Added new commands FB1.P, DRV.HANDWHEELSRC and a new warning n604: EMUEMODE incompatible with HANDWHEELSRC. (S-08499)**

**New Feature Details:**

The customer wants use the feedback 3 as handwheel and will compare the value of feedback 1 with feedback 3 for safety applications.

**Solution:**

Add command to read raw value of feedback 1 and allow the user to select the handwheel source.

- **Added new parameter to configure sine/cosine auto calibration. (S-08572)**

**New Feature Details:**

Customers cannot configure auto calibration for sine/cosine encoders

**Solution:**

FB1.CALTHRESH is used to set the velocity threshold for auto calibration. The unit depends on the UNIT.\* settings. The auto calibration is activated by setting FB1.TRACKINGCAL to 1.

## General Issues

### Fixed Bugs

---

- **HOME.AUTOMOVE conditional modifications (3572,S-08545)**

**Issue:**

If automatic homing procedure is activated it should work until the drive is homed successfully.

**Solution:**

Following modification incorporated: 1. If an auto-home failed due to STO or Fault or HW disable, it is possible to re-start auto-home after clearing. 2. If an auto-home done, then another auto-home will not be allowed until a power cycle.

- **Electronic Gearing Accel/Decel defaults are too low (3635)**

**Issue:** (Identified in Version 01-05-01-000)

Electronic Gearing Accel/Decel clamping was fixed in 01-05-01-000. Afterwards it was found that the default values for GEAR.ACCMAX and GEAR.DECMAX often caused oscillations in the movement profile.

**Solution:**

These limits were meant to be safety limits, and not trajectory shaping parameters such as DRV.ACC and DRV.DEC. The solution to this was to raise GEAR.ACCMAX and GEAR.DECMAX to their maximum values, and users can attenuate these values based on machine/application requirements.

## Field Bus Specific Issues

### Feature Changes

---

- **Improvements to EtherNet/IP messages ()**

**Issue:**

Several issues were identified with IO command and response messages that could be improved.

**Solution:**

1. It is now possible to send 0 values for acceleration and deceleration in Jog and Move commands. In this case the existing values will be used.
2. The direction bit now reports the command direction of motion, not the actual velocity direction. The bit is now stable when moving in one direction at low speed.

**Version: 01-05-08-000 Release Date: January 20, 2012**

## General Issues

### Fixed Bugs

---

- **Bug in Wake and Shake Validation Routine (S-08531)**

**Issue:**

A bug was found in the Wake and Shake validation routine when DRV.DIR was set to 1.

**Solution:**

Wake and Shake now takes into account the DRV.DIR setting.

- **BiSS Mode C Failed to initialise feedback device (S-08520)**

**Issue:**

Since firmware version 01-05-05-000 selecting BiSS mode C (FB1.SELECT = 34) would fail to identify the feedback device.

**Solution:**

The firmware has been corrected so that selecting BiSS mode C (FB1.SELECT = 34) will now correctly identify and initialise BiSS mode C feedbacks.

## New Features

---

- **Ascii parameter from type integer can be written in hexadecimal format. (S-08531)**

**New Feature Details:**

The user might want to write ascii parameters from type integer directly in hexadecimal format (comparable to the user manual) instead of the convert it to decimal (Bitcombination are easier to modify).

**Solution:**

Hexadecimal format is supported e.g. MT.CNTL 0x2003.

- **Added Support for Tamagawa feedbacks (S-08482)**

**New Feature Details:**

Tamagawa feedback devices are now supported as a primary feedback device. Tamagawa feedback is not supported on all drive models.

**Solution:**

Setting FB1.SELECT to 42 manually selects Tamagawa feedback as the primary feedback.

A new NV parameter F451.ACTION has been added to to select if the feedback battery fault (F451) should be ignored.

0 = Disable amplifier.

1 = Ignores the fault.

The following new faults can be reported when using Tamagawa feedback devices.

F453 Tamagawa communication fault (timeout)  
F454 Tamagawa communication fault (transfer incomplete)  
F456 Tamagawa communication fault (CRC)  
F457 Tamagawa communication fault (start timeout)  
F458 Tamagawa communication fault (UART Overrun)  
F459 Tamagawa communication fault (UART Framing)  
F460 Tamagawa encoder fault (over speed)  
F461 Tamagawa encoder fault (counting Error)  
F462 Tamagawa encoder fault (counting overflow)  
F463 Feedback overheat fault  
F464 Tamagawa encoder fault (multi-turn error)  
F465 Tamagawa encoder fault (battery error)  
F467 Feedback Battery Fault

- **Add a programmable delay on the HW Enable input so the drive can apply the brake before the disable. (R-01936)**

**New Feature Details:**

With a vertical load (bias in one direction), some movement could occur when the drive was disabled with a hardware input because the power stage was disabled immediately, before the brake could apply.

**Solution:**

A user parameter DRV.HWENDELAY has been added which will delay the disabling of the power stage. During this delay time, the drive will apply the brake immediately and simultaneously attempt to follow normal disable procedures (according to DRV.DISMODE and CS.\* settings).

**Version: 01-05-07-000 Release Date: January 06, 2012**

## General Issues

### Fixed Bugs

- **Brake may not be applied under certain fault conditions ()**

**Issue:**

With a fault disable, the brake logic previously would never apply the brake until velocity fell below CS.VTHRESH. However, on a vertical axis, it is not guaranteed that motor velocity will fall below CS.VTHRESH when an axis disables, since it may accelerate downward. This may result in the axis falling to the floor in the case of a fault.

**Solution:**

MOTOR.TBRAKETO was previously added to solve a similar problem for a hardware disable - the brake will apply after TBRAKETO milliseconds, regardless of velocity. This logic has been extended to ALL disable conditions. In all cases, the brake will now apply no more than TBRAKETO milliseconds after the disable. On a vertical axis, this parameter should be set to a small value according to system mechanics.

- **Motion task relative to previous target position does not work properly after homing (3563,S-08418)**

**Issue:**

Motion task relative to previous target position does not work properly after homing only for the first activation. The final position will not be as expected when HOME.DIST is used.

**Solution:**

Position scale will be refreshed when HOME.P hold any value. The motion task after homing in this situation will now end at the desired position.

- **IL.KP Gain Scheduling rounding down when not necessary (S-08496)**

**Issue:**

An integer math error was uncovered, in some instances when a value was entered for the gain scheduling term, it would be rounded down further than necessary.

**Solution:**

Integer math rounding fixed.

## IO Issues

### Fixed Bugs

- **Analog Output scaling units are incorrect (3513)**

**Issue:** (Identified in Version 01-05-00-000)

The units for analog output scaling were inadvertently inverted.

**Solution:**

The unit label has been corrected.

## Field Bus Specific Issues

### Fixed Bugs

---

- **Acceleration Feedforward causes audible noise when used over Fieldbus (2485)**

**Issue:** (Identified in Version 01-00-00-000)

When using acceleration feed forward (IL.KACCFF) and a field bus where the sample rate is less than 4khz, audible noise is heard during acceleration and deceleration.

**Solution:**

The algorithm which derives the acceleration has been modified to take into account the field bus sample rate. This ensures the correct acceleration is calculated regardless of sample rate and that the acceleration feedforward is applied for the correct duration.

## General Issues

### Fixed Bugs

---

- **When a fault occurs, the drive should continue servoing until the brake has been engaged ()**

**Issue:** (Identified in Version 01-03-04-000)

For overhanging loads, it is very important for the drive to continue servoing until the brake has fully engaged, for any disable situation. Since version 01-03-04-000, some fault conditions would cause the drive to disable at the same time that the brake begins engaging. This created a short period of time during which the load would not be under control.

**Solution:**

The problem has been identified and fixed. The drive will now wait for the brake to fully engage before disabling.

- **Motion task and DIN.MODE 14 do not work properly after homing starts but fails (3563,S-08418)**

**Issue:**

Motion task and DIN.MODE 14 do not work properly after homing starts but fails.

**Solution:**

DOUT monitor based on DRV.MOTIONSTAT is modified. The four bits of DRV.MOTIONSTAT to be checked, before enabling DOUT. > BIT 1 - Home position found /reference point set - High > BIT2 - Home routine finished - High > BIT3 - Homing active - low > BIT4 - Homing error condition has occurred - low

- **Error loading parameter file - FB1.ENCREC ()**

**Issue:**

If the drive is currently set to a feedback type which does not allow setting of FB1.ENCREC, and a parameter file is loaded which contains FB1.ENCREC, an error will be reported.

**Solution:**

FB1.SELECT is now listed in the parameter file before FB1.ENCREC. This ensures that the value will always be accepted properly.

### New Features

---

- **Report Motor autosec parameters in drive parameter files (3433)**

**New Feature Details:**

For diagnosing system problems, it would be very helpful for motor auto-set parameters (which are read-only for certain motor types) to be reported in parameter files.

**Solution:**

A new section has been added to the bottom of the parameter file, which is created by the Workbench Save Parameters to File button. This section is for information purposes only, and will not be loaded into the drive when the parameter file is loaded.

## General Issues

### New Features

---

- **SM.MODE 2 constant torque/velocity with SM.I2/SM.V2. (S-08247)**

**New Feature Details:**

**Solution:**

With SM.MODE 2, the SM.I2/SM.V2 and SM.T2 parameters are used for the service motion. This is the only difference to SM.MODE 0.

- **Allow ignoring of Fault 702 Bus Communication Lost (S-08276)**

**New Feature Details:**

In some situations, it may be desirable to ignore certain faults.

**Solution:**

A new keyword FAULT702.ACTION has been added. With the default value of 0, normal fault handling occurs. Set the value to 1 (Ignore) to ignore this fault. The fault will not be reported and drive will remain enabled.

### Fixed Bugs

---

- **FB1 faults can be cleared without initialized feedback (3550)**

**Issue:** (Identified in Version 01-05-03-002)

A bug since 01-05-03-002 could allow a user to clear faults without correctly configuring feedback, and subsequently allowing the amplifier to enable.

**Solution:**

The fault mechanism has been repaired and functions as expected.

## Field Bus Specific Issues

### New Features

---

- **Jog 1 and Jog 2 for PROFINET added. (S-08247)**

**New Feature Details:**

**Solution:**

The user can now configure the jog velocity 1 with PNU 1004, jog velocity 2 with PNU 1005 and the acceleration and deceleration for the jog move with PNU 1006 and PNU 1007. The jog move is started with Bit 8 and 9 in STW1.

### Fixed Bugs

---

- **DS402: Drive enabled after stopping application (3254)**

**Issue:**

When a specific KAS application stopped running, the drive enabled after a short time and stayed enable afterwards.

**Solution:**

The application didn't look for the DS402 status word before switching states. There should be looked always after feedback from the status word, when the control word changes states! Firmware behaviour changed because of safety relevance.

**Version: 01-05-04-000 Release Date: November 25, 2011**

## General Issues

### Fixed Bugs

---

- **Failure to Read Motor Parameters from Hiperface Feedback Memory (3229)**

**Issue:**

When the drive is power cycled sometimes the motor parameters were not read from the feedback device. This would result in a 534 Fault "Failed to Read Motor Parameters From Feedback Device"

**Solution:**

Firmware modifications have made the reading of motor parameters from Hiperface Feedback more reliable.

- **Analog Position Mode creates limit cycles (3455)**

**Issue:**

Under certain circumstances where DRV.ACC was set to a low value (1000 RPM/s or less), the motor would overshoot the target position, then undershoot the target position in a sinusoidal manner.

**Solution:**

A bug was identified in the acceleration clamping mechanism. Correct clamping of acceleration and not deceleration has been fixed.

- **FAN Bit is overwritten earlier set through FPGA (3415)**

**Issue:**

The fan speed control bit in the FPGA does not always get set or cleared when using the test mode.

**Solution:**

The firmware has been modified to consistently write to the fan control bit in the FPGA.

- **Secondary Feedback faults occur on boot (3419)**

**Issue:**

A condition was identified where the FPGA would latch faults before setting up the secondary feedback and was using the wrong fault mask, so it would allow faults when they should not be allowed.

**Solution:**

The logic has been corrected and FB2 faults are only returned when they should be.

## Feedback Issues

### Fixed Bugs

---

- **SFD Fault (402/421) occurs on DRV.RSTVAR command (S-08093)**

**Issue:**

A condition was identified where the FPGA would latch a fault before configuring feedback devices. This led to false faults being returned for correctly identified smart feedback devices.

**Solution:**

Start up logic has been modified to clear feedback faults before feedbacks have been configured.

## Field Bus Specific Issues

### New Features

---

- **Fault 702: Fieldbus communication lost added. (S-08032)**

**New Feature Details:**

If the PROFINET connection times out, the drive generates no fault.

**Solution:**

Fault 702: Fieldbus communication lost added.

## IO Issues

### Feature Changes

---

- **DIOx.INV range limited to 0 only. (S-08253)**

**Solution:**

DIOx.INV range is limited to 0 until mode one and two are implemented. The actual mode one will be mode two as it behaves different from the inverting function from the other in/outputs as it is a hardware implementation in the fpga. The new mode one will behave the same way the other inverting functions do.

**Version: 01-05-03-003 Release Date: November 07, 2011**

## General Issues

### New Features

---

- **W&S validation step added to Wake and Shake algorithm (3412)**

**New Feature Details:**

There are known failure modes for the current implementations of Wake and Shake. These failure modes can allow Wake and Shake to finish with an incorrect motor phase angle. Enabling a motor with an invalid motor phase can result in a runaway.

**Solution:**

An extra step has been added to both Wake and Shake mode 0 and 1 which validates that Wake and Shake returned a valid motor phase.

### Feature Changes

---

- **SFD Resolver signal level faults changed from generic "402 Analog signal fault" to "421 SFD resolver signal fault" (S-08041)**

**Issue:**

Generic signal level faults with sin/cos and quadrature encoders could generate a 402 Analog signal fault. SFD feedback devices could also trigger this fault, however internally this means something different. This can lead to difficult debugging.

**Solution:**

When a SFD feedback device has a resolver signal fault, a new fault 421 SFD resolver signal fault is thrown instead of the old 402 Analog signal fault.

## Field Bus Specific Issues

### Fixed Bugs

---

- **Using PROFINET in position mode, the traversing task acknowledge bit in the status word (ZSW1) was not cleared properly. (S-08012)**

**Issue:**

If the user implements a handshake algorithm and loads a new motion task AFTER the current motion task has finished, the traversing task acknowledge bit is not cleared after the activate traversing task bit in the control word (STW1) is cleared.

**Solution:**

The acknowledge bit is cleared also when the motion task has finished.

- **Using PROFINET and run homing, the homing was not aborted properly. (S-08080)**

**Issue:**

When a homing is started and the "Do Not Reject Traversing Task" bit in control word (bit 4 in STW1) is cleared, the home procedure cannot be aborted by clearing the homing bit (STW1).

**Solution:**

The homing bit 11 can be used for stopping the home procedure although the "Do Not Reject Traversing Task" is cleared.

**Version: 01-05-02-000 Release Date: October 28, 2011**

## General Issues

### Fixed Bugs

---

- **PL.ERRMODE 1 is broken (3383)**

**Issue:**

When PL.ERRMODE is set to 1, unless the Position Error Tolerance (PL.ERRFTHRESH) is extremely low, a position following error fault cannot be generated.

**Solution:**

When PL.ERRMODE is 0 and 1, the displayed Error is always the same (PL.ERR). When PL.ERRMODE is 1, the value that triggers a position following error fault is not PL.ERR but an internal calculation of position error based on the trajectory. PL.ERRMODE 1 also requires that the calculated error must be greater than the fault threshold for 100ms.

**Error Calculation with PL.ERRMODE = 1**

[ERROR] = | PL.ERR - velocityDelta \* (1 - VL.KVFF) / PL.KP |  
where velocityDelta = standard control loop trajectory - velocity feed forward output.

Note: When PL.ERRMODE = 1, and VL.KVFF = 1, the error is calculated the same as PL.ERRMODE 0. However, the 100ms requirement is still true.

- **When the drive is first configured for IP.MODE=1 (Static IP setting), a DHCP server can subsequently reset the address. (3411)**

**Issue:**

When the drive is configured for static IP addressing, a DHCP server can change the address.

**Solution:**

IP addressing now shuts down the DHCP client when configured for Static IP mode

**Version: 01-05-01-000 Release Date: October 14, 2011**

## General Issues

### Feature Changes

- **FB1.ENCREs may be set with an uninitialized feedback device ()**

**Issue:**

FB1.ENCREs is dependent on the feedback type, as it is not used for some types. Sometimes it may be desirable to set ENCREs before selecting the feedback type.

**Solution:**

FB1.ENCREs may now be set if no feedback type has been identified (FB1.IDENTIFIED = 0). In addition, DRV.HELP will report properly whether FB1.ENCREs is read-only or read/write.

### New Features

- **Added Warning for OPMODE incompatible with CMDSOURCE (S-07857)**

**New Feature Details:**

It is possible to configure the drive with DRV.CMDSOURCE set to electronic gearing and DRV.OPMODE set to torque or velocity modes. In this state the drive will not perform any motion, a zero command is passed to control loops, because gearing will only work in position mode. This may be confusing if your drive was in this state by mistake.

**Solution:**

A new warning, 603: OPMODE incompatible with CMDSOURCE, has been added and is generated when the drive is enabled and the gearing command source is selected at the same time as torque or velocity op-mode.

### Known Issues

- **Current Loop Gain Scheduling modified -- tables stored in older versions of FW will be lost when upgrading. (1)**

**Issue:**

The tables for storing current gain scheduling have been modified, and are not compatible with older versions of firmware. If you use this feature, save parameters to a file and then restore them to the drive after upgrading to this version.

## Feedback Issues

### New Features

- **New Keyword: FB2.DIR allows user to change direction of secondary feedback input. (S-07794)**

**New Feature Details:**

FB2 has always always incremented positive for positive inputs on either X9 or X7

**Solution:**

The user can now configure FB2 to move positive by leaving FB2.DIR = 0 (default), and configure FB2 to count negative by setting FB2.DIR = 1.

### Fixed Bugs

- **Re-arm the commutation phase-find procedure in case that the previous procedure failed. (S-07486)**

**Issue:**

The user connects a motor + feedback combination to the AKD, which required a commutation phase-find procedure after the software enable (such as Wake & Shake). This phase-find procedure was not re-armed automatically in case that the previous process failed. The user expects that the W&S function will be re-started after the next software enable in case that the previous W&S function failed.

**Solution:**

The DRV.CLRFAULTS command identifies a pending W&S error and re-arms the phase-find process again.

## Field Bus Specific Issues

### New Features

- **Add a Torque attribute to the EtherNet/IP Position Controller Object (attribute 0x19) (R-01589)**

**New Feature Details:**

It is desirable to access actual torque through Polled I/O by using the Get Attribute field. But Torque is not a supported attribute.

**Solution:**

Torque is now supported with attribute 0x19 of the Position Controller Object.



Torque may now be read with attribute UXTY of the Position Controller Object.

- **DS402: Standard objects for touch probe functionality (60b8 etc.) shall be implemented (1676,S-07661)**

**New Feature Details:**

Besides the latch implementation (nearly compatibel with Servostar) the DS402 touch probe functionality is needed.

**Solution:**

The DS402 standard objects are implemented

## Fixed Bugs

- **DS402: Creation of a SFD fault creates besides the correct fault emergency codes a generic warning emergency code (3417)**

**Issue:**

The Emergency Error Code for F438 was built wrongly, the warning n414 lead to the generic warning.

**Solution:**

F438 leads now to the error code 0x86B0, n414 to the error code 0x7390.

**Version: 01-04-19-000 Release Date: September 30, 2011**

## General Issues

### Fixed Bugs

- **Electronic Gearing States not cleared after Command Source change. (3185)**

**Issue:** (Identified in Version 01-04-00-000)

When Electronic Gearing was enabled, and the Command Source was subsequently changed out of Electronic Gearing mode, the Electronic Gearing Active state and Electronic Gearing Slave Synchronized state were not cleared. This prevented other types of motion in other command source modes.

**Solution:**

The Electronic Gearing states are now cleared when changing out of electronic gearing mode

- **Endat Feedback Does Not Read Sine/Cosine Information During Initialization (2994)**

**Issue:**

Endat Feedback devices were not reading the sine/cosine information during initialization, so the initialization accuracy was on the order of arc minutes, not arc seconds.

**Solution:**

A new FPGA has been implemented, and firmware has been modified so that the sine/cosine information is now read during Endat feedback device initialization. So now initialization accuracy is on the order of arc seconds.

- **Homing direction has the wrong default value. (2872)**

**Issue:**

HOME.DIR should default to the positive direction (1)

**Solution:**

The default value of HOME.DIR is now positive.

- **DRV.ACC and DRV.DEC does not update trajectory with large numbers (3349)**

**Issue:**

A bug was found in the trajectory generator where large values of DRV.ACC and DRV.DEC would be rejected from the trajectory generator without alerting the user.

**Solution:**

The trajectory generator now will return an error to the user, and accepts a larger range of values

- **With Digital Input mode 22, cannot set DINx.PARAM to command source Gearing or Analog (3356)**

**Issue:**

Since 01-04-16-000, Digital Input mode 22 has a bug, where you cannot set the command-source portion of DINx.PARAM to 2 or 3.

**Solution:**

All valid values of DINx.PARAM are now accepted when the input mode is 22.

- **Recorder trigger does not work when capturing on CAP0.PLFB and CAP1.PLFB (3353)**

**Issue:**

When the recorder was set to CAP0.PLFB or CAP1.PLFB the capture will work and capture new positions, but will not trigger the recorder.

**Solution:**

A bug was found in the triggering code that was preventing this from working reliably.

- **Downloading Parameter Files To Configure a Drive For Electronic Gearing Generates An Error Message (3350)**

**Issue:**

If you have a parameter file which sets up the drive for electronic gearing you can not download it without generating an error setting DRV.CMDSOURCE. This is because setting DRV.CMDSOURCE to gearing when DRV.OPMODE is in its default torque mode generated an error message.

**Solution:**

The firmware has been modified to remove the error generated when setting DRV.CMDSOURCE before DRV.OPMODE.

- **F307 Brake Applied During Enable-State (3047)**

**Issue:**

When using a motor with brake, you may sometimes see F307 if you command a drive enable while the drive is in the process of braking, or command a disable while the drive is enabling.

**Solution:**  
This condition should no longer cause a fault.

- **Recorder does not trigger on DRV.ACTIVE rising edge (0 to 1) (3358)**

**Issue:**  
Trying to trigger the Recorder by setting the trigger parameter to DRV.ACTIVE never triggers the scope

**Solution:**  
The internal scaling of the trigger parameter was incorrect, this created a condition that could never be true. The internal scaling has been corrected, and triggering on DRV.ACTIVE works as expected.

- **FB2 Faults not always occurring (S-07804)**

**Issue:**  
When FB2 faults were added to work when FB2.MODE was configured, FB2 faults were inadvertently broken for DRV.EMUEMODE configurations

**Solution:**  
This has been fixed so either keywords DRV.EMUEMODE and FB2.MODE can generate FB2 faults when they are configured as inputs on X9. An additional bug was fixed for FB2.MODE configurations that prevented a 5V overcurrent fault.

- **Incorrect Motor.Ke unit label (3338)**

**Issue:**  
When a Rotary motor is configured, the units for MOTOR.KE are Vpeak / k-rpm. The correct units for rotary motors is Vrms / k-rpm

**Solution:**  
This has been fixed. Note: for Linear Motors, the units are still Vpeak / m/s.

- **It takes more than 50msec for the drive to begin deceleration after a quickstop trigger. (3015,S-07819)**

**Issue:**  
The DualMoveTest\_Type10\_QuickStop\_... tests check for the time it takes from when the DIN configured for QuickStop is triggered and when the deceleration begins. Its observed to take as long as 67.5msec in some instances. This is seen on both the Release candidate(M\_01-04-00-002) and the trunk(M\_01-03-20-000)

**Solution:**  
Quickstop inputs were sampled in a background task. As a fix, inputs in quick stop mode are now sampled in the 1kHz task.

- **Velocity blend move with same velocity donot work (3360,S-07798)**

**Issue:**  
Identical or very close velocities cause problem when configured as blend in to velocity. Next motion task donot take over.

**Solution:**  
The condition for triggering next motion task is modified, which now can handle both positive and negative velocity conditions.

## New Features

---

- **Adding new command DRV.DIFVAR to see parameters changed (S-07569)**

**New Feature Details:**  
Add DRV.DIFVAR (servostar name) to see parameters changed

**Solution:**  
DRV.DIFVAR command is added.

- **Clear multiplier when DINx.MODE changes from mode 23 to another mode (3296)**

**New Feature Details:**  
If you change the DINx.MODE from mode 23 to another mode the analogue input will remain inverted or zeroed.

**Solution:**  
The firmware has been changed to restore the analogue input to the state without inversion or zero when changing away from DINx.MODE 23.

## Field Bus Specific Issues

### Fixed Bugs

---

- **Correction of the latch-functionality via DS402-objects 20a4/20a5 (S-07661)**

**Issue:**  
The use of capture engine 1 via the DS402-objects 20a4/20a5 + 20a2/20a3 was depending on the parameter CAP0.MODE.

**Solution:**  
The capture engine 1 functionality is now dependant on CAP1.MODE.

## New Features

---

- **The DS402-objects allow only a torque resolution of 0.1% of the rated torque. (R-01785)**

**New Feature Details:**  
The DS402-objects 6071/6077 allow only a torque resolution of 0.1% of the rated torque.

**Solution:**  
The new objects 2071 / 2077 are 32-bit values and are given in mAmps.

## Feature Changes

---

- **CANOpen: DRV.NVCHECK re-assigned to SDO3895 ()**

**Issue:**

DRV.NVCHECK was assigned to SDO2019. This was inconsistent with the general SDO groups.

**Solution:**

DRV.NVCHECK is now assigned to SDO3895. SDO2019 got deleted!

## Homing Issues

### Fixed Bugs

---

- **HOME.MODE=4 did not work in case that homing velocity is very low. (2872,S-07604)**

**Issue:**

The user selects a small homing velocity  $\leq 2$ [rpm]. In HOME.MODE=4 when hitting the reference switch the motor turns the direction instead of stopping the motion and indicating that the home position has been found.

**Solution:**

A wrong program sequence has been corrected. The homing mode 4 works from now on also with a very small homing speed.

**Version: 01-04-18-000 Release Date: September 16, 2011**

## General Issues

### Fixed Bugs

---

- **A fault should be issued if the emergency timer times out while executing a controlled stop (3169)**

**Issue:**

DRV.DISTO (emergency timeout) should be applied to controlled stop. The drive will disable after the timer expires, but does not reliably issue F703.

**Solution:**

F703 is now issued if the disable time expires while executing a controlled stop.

- **Drive should enable when Controlled Stop input is set. (3048)**

**Issue:**

If controlled stop input is cleared (to active a stop) and then set (to enable), the drive does not enable but a software enable command must be sent to enable.

**Solution:**

Setting the controlled stop input will now enable the drive, as long as all other disable inputs are cleared.

- **Can't change digital input mode 13 when controlled stop input is cleared (3170)**

**Issue:**

If controlled stop input is cleared (to active a stop), the digital input mode cannot be changed. This is to ensure that changing the input mode does not cause the drive to unexpectedly enable.

**Solution:**

When leaving digital input mode 13 (controlled stop), if the input is cleared, the mode will be changed as requested, and the software enable will be cleared to keep the drive disabled.

- **Fault not issues for undervoltage when enabled (S-07691)**

**Issue:**

When VBUS.UVMODE=1 and bus power is below the threshold, the drive should fault when it is enabled. A bug was introduced in 01-04-10-000 which prevents the drive from faulting in this condition.

**Solution:**

The drive now faults in this condition.

- **Motor Overtemperature fault not seen when sensor was disconnected. (S-07690)**

**Issue:**

A bug was introduced in 01-04-10-000 that rejected certain raw values (including the value for a disconnected sensor) returned by the sensor ADC.

**Solution:**

The drive now faults in this condition.

## Feature Changes

---

- **Changing REC.TRIGPARAM Sometimes generates an "Error: Argument bigger than maximum." (3320)**

**Issue:**

Some time if you change the trigger parameter using REC.TRIGPARAM it will generate an error.

**Solution:**

The firmware has changed to not generate this error.

## New Features

---

- **New Emulated Encoder modes for Step/Direction and CW/CCW, pulse width of emulated encoder signals is**

**configurable, fault 486 is raised, if the drives velocity exceeds the emulators capability. ()**

**New Feature Details:**

Step/Direction and CW/CCW modes, adjustable pulse width of emulated output, raise fault, if the velocity exceeds the pulse width. This fault is disabled (masked) by default.

**Solution:**

Added DRV.EMUJEPULSEWIDTH to configure the pulse width. Added DRV.EMUJECHECKSPEED to enable / disable fault 486 (velocity exceeds emulator's capability (pulse width too high)). Added new modes to DRV.EMUJEMODE: - 6 Step/Direction, Z-pulse / rev. - 7 Step/Direction, Z-pulse absolute - 8 CW/CCW, Z-pulse / rev. - 9 CW/CCW, Z-pulse absolute Added new fault 486 - Velocity exceeds maximum speed of emulated encoder.

**Version: 01-04-17-000 Release Date: September 12, 2011**

## General Issues

### New Features

- **Tertiary feedback (FB3) support has been added for Endat 2.2 (S-07498)**

**New Feature Details:**

Users need to connect a digital feedback device to the X9 connector for use as a dual feedback device. Currently this connector only supports A Quad B encoder signals, or step and direction, or step up/step-down signals

**Solution:**

Tertiary feedback (FB3) support has been added for Endat 2.2 feedback devices. Two new keywords have been created, FB3.P and FB3.MODE. A new fault, Fault 420 – "FB3Endat communication fault" has been added. In addition keywords DRV.EMUJEMODE, and PL.FBSOURCE have been modified.

The FB3 Endat 2.2 Feedback device is connected to the X9 connector on the drive. To configure X9 for FB3 input, the X9 mode is set to 11 (DRV.EMUJEMODE = 11). The FB3 feedback type (currently Endat 2.2 only) is selected with FB3.MODE (0 = Endat 2.2). The position value is reported by FB3.P as raw encoder counts.

FB3 can be selected as the position loop feedback by setting PL.FBSOURCE to 2. Then the keyword PL.FB reports the FB3 position. With this configuration the FB3 position can be used to provide dual loop control via the drive. Or the FB3 value can be retrieved via the PL.CMD position by a control computer connected by a fieldbus to the drive. This position can be used by the control computer for diagnostic purposes, or it can be used to control the axis's position loop with the control computer. .

When FB3 feedback has been selected (DRV.EMUJEMODE = 11), if the feedback device is not connected, or is not operating properly, fault 420 (FB3 Endat communication fault) will be generated. A clear fault command can clear this fault once the device is connected and operating properly.

### Fixed Bugs

- **Electronic Gearing Deceleration clamp not working (S-07518)**

**Issue:**

Acceleration is properly clamped, however when the command position reaches the gearing master, rather than overshoot and slowly decelerate, the trajectory decelerates uncontrolled to ensure no overshoot. This causes discontinuities in the velocity command, and therefore audible noise and erratic motion.

**Solution:**

The Deceleration clamp has been fixed.

- **Secondary Feedback Faults un-clearable (S-07610)**

**Issue:**

In FW 01-04-15-000, FB2 faults were fixed so that they would alert users to wiring issues on FB2 connectors X7 and X9. A bug was discovered where when FB2 was being used on X9 where all possible faults were enabled. Making the X9 unusable for most secondary feedback applications, like Step & Direction, or Up/Down.

**Solution:**

FB2 faults have been modified so only faults relevant to the secondary feedback mode selected are active.

Further, new keywords: FAULT130.ACTION, FAULT131.ACTION, FAULT132.ACTION and FAULT134.ACTION have been added which allow the user to further allow/ignore FB2 faults. See documentation for keyword usage.

- **Drive Sometimes Was Not Listed in the WorkBench Connect Window (3286)**

**Issue:**

Sometimes after a power cycle or a firmware download the drive would not appear at all or appear as "unknown" in the list of drives in the WorkBench connect dialoge.

**Solution:**

The firmware of the drive has been fixed to correct an intermittent problem with responding to the drive discovery protocol.

## IO Issues

### New Features

- **Use signals of the X9 connector as general purpose IOs. (S-07416)**

**New Feature Details:**

Fieldbus masters need to be able to use the signals of the X9 connector as general purpose IOs.

**Solution:**

New keywords have been added in order to allow adjusting the signals of the X9 connector as general purpose IOs in case that DRV.EMUJEMODE has been set to 10. The keywords are called: DIOx.DIR, DIOx.INV, DOUTx.STATE, DOUTx.STATEU and DINx.STATE with x=9, 10 & 11)

- **New DRV.EMUJEMODE 10 allows X9 connector to be used as General Purpose IO or SynqNet fieldbus controlled IO (2003)**

...

#### **New Feature Details:**

Some customers would like to use the bidirectional IOs of X9 for their own use. SynqNet applications expect these IOs to be directly under the control of the SynqNet master via the SynqNet FPGA.

#### **Solution:**

DRV.EMUEMODE 10 allows the 3 bidirectional IOs on the X9 connector to be controlled as general purpose digital IO. The new commands DIN9.DIR, DIN10.DIR and DIN11.DIR can be used to set the direction of these pins individually, where DINx.DIR 0 indicates input (and is the default) and DINx.DIR 1 indicates and output. When one of these pins is an input, the value can be read at DINx.STATE. When it is configured as an output, it can be set at DOUTx.STATEU. In the special case of the SynqNet fieldbus, when the fieldbus is in cyclic mode and is set to an output, the output value will be set directly from the SynqNet master with no user involved.

## **Field Bus Specific Issues**

### **New Features**

---

- **AKD now supports SynqNet Fieldbus (in torque mode only) (1795)**

#### **New Feature Details:**

SynqNet fieldbus users want to use AKD drives

#### **Solution:**

The SynqNet fieldbus is implemented on AKD in torque mode only. Note that once a drive is under the full control of the SynqNet master, that is in cyclic mode, some Workbench and Telnet commands have restricted parameter lists or are read-only to avoid interference with the master. For details, please see the AKD SynqNet Manual.

### **Fixed Bugs**

---

- **PDO with torque actual value report wrong data on MV3 (3212)**

#### **Issue:**

The DS402 object 6077 showed a wrong value when negative values should be shown. Object 6072 via SDO was scaled wrong according to DS402.

#### **Solution:**

The object 6077 and 6072 show now correct scaled values in 1/1000 of rated torque.

- **Cannot save or clearfaults on Ethernet/IP using Explicit Messages (S-07616)**

#### **Issue:**

When sending a DRV.CLRFAULTS or DRV.NVSAVE command with an explicit message to the Parameter Object, the connection times out.

#### **Solution:**

These commands now work properly. The response will be given right away and the commands will execute in the background. Note that no error checking is possible, so the response will show a success whether or not the command succeeds.

**Version: 01-04-15-002 Release Date: August 29, 2011**

## **Feedback Issues**

### **Feature Changes**

---

- **Feedback 5V Supply is active even on feedback errors (3153)**

#### **Issue:**

When a feedback device was incorrectly configured or any feedback fault was detected, the 5V power was disconnected. This made diagnosing feedback problems difficult, and aligning Sin/Cos feedback devices required an external power supply.

#### **Solution:**

Feedback connectors have been configured to always output 5V when the feedback type is selected.

Note: 5V will NOT be active if a feedback fault occurs while "Auto Identify", a feedback type MUST be selected for 5V to be active.

- **Faults not returned for FB2 (3101,S-07392)**

#### **Issue:**

Feedback faults for FB2 were not always returned when FB2 is configured using FB2.SOURCE.

#### **Solution:**

This problem has been fixed, and now FB2 faults are returned when configured on connectors X9 and X7.

## **General Issues**

### **Feature Changes**

---

- **Access parameters in Modbus with Workbench scaling units (S-07422)**

#### **Issue:**

Modbus has its own scaling algorithms. For some simple HMI's, it is desirable to use Workbench units instead of these Modbus-specific units.

#### **Solution:**

The parameter MODBUS.SCALING allows users to disable Modbus scaling and enable WB (Telnet) scaling.

## **Field Bus Specific Issues**

### **Feature Changes**

---

- **Add a fieldbus disable flag, separate from the user software disable flag (S-07388)**

Issue:

**Issue:**

It is desirable to have separate disable bits in DRV.DISSOURCES for disabling/enabling the drive from Workbench and from Ethernet/IP

**Solution:**

Bit 0x40 of DISSOURCES is now a Fieldbus Disable bit. When Ethernet/IP enters cyclic communication, the Software Disable (bit 0x01 of DISSOURCES) will be cleared and Fieldbus Disable will follow the fieldbus command. When exiting cyclic communication, the Software Disable will be set if the Fieldbus Disable was set, and then the Fieldbus Disable will be cleared. This allows for user control of enable/disable when the fieldbus is disconnected. This also allows the user to disable the drive from Workbench while in cyclic communication.

**Version: 01-04-14-000 Release Date: August 23, 2011**

## Field Bus Specific Issues

### New Features

- **New CANopen/Ethercat object 0x3544 IL.KVFF added (S-07373)**

**New Feature Details:**

IL.KVFF no accessible over CANopen.

**Solution:**

Feedforward gain for torque mode now also accessible via CANopen access.

- **Ethernet/IP Cyclic Message Enhancements (S-07283)**

**New Feature Details:**

User programs often need to monitor actual position and velocity in each cycle

**Solution:**

The cyclic message now returns actual position and velocity in each response.

- **Ethernet/IP Motion task control (S-07283)**

**New Feature Details:**

User programs may wish to setup and control motion task sequences through Ethernet/IP

**Solution:**

The cyclic message now provide the ability to trigger motion task sequences and report the active motion task.

## General Issues

### Feature Changes

- **Add Modbus Dynamic Mapping to DRV.NVLIST, so that the mapping is stored in the parameter file. (S-07193)**

**Issue:** (Identified in Version 01-04-05-000)

Modbus Dynamic Mapping could only be configured through Modbus itself. Workbench was not able to store the mapping in the parameter file.

**Solution:**

DRV.NVLIST (used by Workbench to save the configuration) includes the Modbus mapping. The following new commands were added: - MODBUS.DYNMAP to enable (0) or disable (1) - MODBUS.CLRDYNMAP to reset (default) the dynamic mapping table. - MODBUS.ADDR# indexed parameter to read / write dynamic mapping entries. First index (register address) is 8192.

**Version: 01-04-13-000 Release Date: August 15, 2011**

## General Issues

### New Features

- **New Keyword IP.MODE (R-07325)**

**New Feature Details:**

Understanding what mode the drive would use to select an IP address was complicated.

**Solution:**

The addition of IP.MODE allows the user to specify which method the drive will acquire an IP Address. IP.MODE 0 is the default and current operation, where the Rotary Switches are tried first, then DHCP and lastly AutoIP. When IP.MODE is set to 1, the IP.ADDRESS, IP.SUBNET and IP.GATEWAY settings are used. When IP.Mode is set to 2, the operation is the same as Mode 0, except the Rotary switches are bypassed and the akd immediately goes to DHCP, followed by AutoIP.

### Feature Changes

- **IP.RESET is inhibited when drive is enabled (S-07326)**

**Issue:**

A safety concern has been identified, if the drive is in operation and the user accidentally initiates a IP.RESET and loses communication.

**Solution:**

IP.RESET is now inhibited when the drive is enabled, and will return an error message.

- **IP.ADDRESS, IP.SUBNET, and IP.GATEWAY now displayed in IPv4 format (S-07385)**

**Issue:** (Identified in Version 01-04-05-000)

When the IP Keywords were implemented in 01-04-05-000, when NVRam was saved to a parameter file, IP Addresses would be listed as a single 32-bit unsigned integer. This is hard to read and hard for a user to edit.

**Solution:**

IP.ADDRESS, IP.SUBNET, and IP.GATEWAY are now listed in parameter files as a standard IPv4 address (ie. 192.168.0.1).  
**Note:** Any parameter file saved between betas 01-04-05-000 and 01-04-13-000 will not restore IP.ADDRESS, IP.SUBNET or IP.GATEWAY correctly due to this change.

## Field Bus Specific Issues

### Feature Changes

---

- **Minimum value for PLL offset variable changed from 10[ns] to 2[ns] (S-07370)**

**Issue:**

TG Drives requests that the minimum value for the CAN object 0x3496 subindex 4 is lowered to 2.

**Solution:**

The minimum value for the CAN object 0x3496 subindex 4 has been changed according to the customer request.

- **Send motion commands over Ethernet/IP in a single communication cycle (S-05942)**

**Issue:**

Motion commands take too long to execute, because position, velocity and acceleration values are sent to the drive in successive packets.

**Solution:**

Motion commands are now sent in a single message.

**Version: 01-04-12-000 Release Date: August 01, 2011**

## Field Bus Specific Issues

### New Features

---

- **EIP.CONNECTED parameter added (S-07016)**

**New Feature Details:**

It is desirable to detect whether the EthernetIP connection is active from Workbench.

**Solution:**

The parameter EIP.CONNECTED returns a 1 if connected to an EthernetIP master, and a 0 if disconnected.

- **Parameter AOUT.CUTOFF needs DS402-support (2977,S-06468)**

**New Feature Details:**

DS402-support for LPF of analogue output is needed

**Solution:**

The new object is 3470 sub 6 (UNSIGNED32)

## General Issues

### New Features

---

- **New general indexed parameter USER.INT1 to USER.INT24. (S-07288)**

**New Feature Details:**

A customer (user) needs a set of parameters to store application specific values in the AKD drive

**Solution:**

Parameter USER.INT1 to USER.INT24 were added.

- **New parameter value checksum needs to be visible on EtherCAT. (S-07267)**

**New Feature Details:**

Customers must be able to read the parameter checksum via EtherCAT / CANOpen

**Solution:**

SDO2019 Subindex 0 was added and is linked to DRV.NVCHECK.

- **Trigger scope on exact values and on bitmasks (R-01729)**

**New Feature Details:**

The scope is triggered on the slope of a parameter passing a value. It would be helpful at times to trigger on an exact value, or when a value matches a bitmask.

**Solution:**

Two new trigger types have been added.

1) Parameter Exact Value – this is like normal triggering off a parameter, but instead of setting a slope to positive or negative and waiting for the value to be greater or less, this triggers if and only if the value exactly matches the trigger value.

2) Parameter Bitmask – this adds a mask parameter, and does a bitwise AND with the data before comparing to the trigger value.

IF (trigger\_data & mask) == trigger\_value) THEN trigger()

REC.TRIGTYPE

4 = Parameter Exact

5 = Parameter Bitmask

REC.TRIGMASK - mask value to use with TRIGTYPE=5

REC.TRIGVALUE - this existing parameter is used for both new trigger types.

- **New parameter, DRV.NVCHECK, added to check if NV parameters have changed. (R-01705)**

**New Feature Details:**

In some applications it is desired that a master in the systems wishes to confirm the AKD drive contains an expected set of drive



parameters. You could read the drive parameters individually from the drive but this could be a long process. DRV.NVCHECK is a checksum on all the NV parameters that can be read in a single transaction to confirm that the drive parameters match the expected.

**Solution:**

DRV.NVCHECK will return the same number if all the drive parameters match, if any of the drive parameters are changed or are different then DRV.NVCHECK will return a different value. This parameter is accessible via EtherCAT / CANOpen using SDO2019 Subindex0. This parameter is accessible via Modbus using address .

## Fixed Bugs

---

- **VBUS.VALUE reported as high number when actual voltage is negative (3132)**

**Issue:**

When the VBUS goes negative due to voltage, or improper calibration settings, the VBUS.VALUE reported may report a negative number resulting in multiple faults: Fault 501 Bus Over Voltage Fault 503 Bus Capacitor Over Load Fault 308 Voltage Exceeds Motor Rating

**Solution:**

This has been fixed to display the correct negative number.

## Feature Changes

---

- **Initialize absolute linear position properly for Endat Feedback (1776,S-07189)**

**Issue:**

When using Linear Endat Feedback devices, the initialization is not correct. The encoder resolution parameter FB1.ENCRESP is not set properly. In addition the absolute linear position is not set properly.

**Solution:**

The firmware has been changed so that the parameter FB1.ENCRESP is set properly, and the linear absolute position is initialized properly for all endat feedback devices

**Version: 01-04-11-000 Release Date: July 18, 2011**

## Field Bus Specific Issues

### Fixed Bugs

---

- **Fieldbus synchronization improvement/correction (3125,S-07180)**

**Issue:**

The synchronization of the Slave when work with an Eckelmann CAN master did not work properly for certain FBUS.SYNCDIST settings.

**Solution:**

The fieldbus synchronization routine has been improved and simplified so that the AKD works properly with the Eckelmann CAN controller. New CANopen-objects 3496 sub 1 to 4 for FBUS.SYNCDIST, FBUS.SYNCACT, FBUS.SYNCWIND and FBUS.COMPTIME (last not available via Telnet). Default FBUS.COMPTIME changed to 150 ns and FBUS.SYNCDIST-default changed from 100000 to 320000 for CAN.

- **First PDO value of DS402 object 60FF gives a wrong velocity setpoint (3167,S-07233)**

**Issue:**

The resulting setpoint value in the profile velocity mode is 4.4 times higher than the demanded value.

**Solution:**

PDO and SDO setpoint values are synchronized now

## New Features

---

- **Switch fieldbus type (DRV.TYPE) without a Workbench connection (S-07092)**

**New Feature Details:**

For CC drive models the user wants to be able to switch from fieldbus type EtherCAT to CAN and vice versa without connecting with Workbench to the Drive. The DRV.TYPE parameter need to be accessed in a second way.

**Solution:**

For AKD CC drive models the user can set the rotary switches to the value of 89 and press the B1 button for about 3 seconds. The Drive will indicate the DRV.TYPE switch on the 7 segment display. The AKD needs to power cycled after the procedure (see documentation).

## General Issues

### New Features

---

- **New user specific ASCII commands (USER.VAR1...USER.VAR24) added. (3118,S-07113)**

**New Feature Details:**

The user wants to have 24 general purpose keywords which are stored in the NV-memory for own purposes.

**Solution:**

24 new ASCII commands USER1...USER24 have been implemented. These commands will be stored in the NV-memory. The object numbers for SDO-/Mailbox-access are 2030 sub 1 to 0xc for USER.VAR1-12 and 2090 sub 1 to 0xc for USER.VAR13-24.

## Feature Changes

---

- **The Units for DRV.EMUENTURN have been corrected to be revolutions (3135,S-07137)**

**Issue:**

When using emulated encode output (EEO) mode 2 the Z pulse is located at an absolute position. DRV.EMUENTURN specifies in which turn the Z pulse will be but the units are reported incorrectly as counts when they should be revolutions.

**Solution:**

The drive firmware has been changed to now report the units as [rev].

**Version: 01-04-10-000 Release Date: July 01, 2011**

## General Issues

### Fixed Bugs

- **MOTOR.VMAX minimum lowered to 1RPM / 1mm/s (3039)**

**Issue:**

The minimum for MOTOR.VMAX was 100RPM. Some Motors have a VMAX lower than 100RPM.

**Solution:**

The range of MOTOR.VMAX has been increased so the minimum value is now 1 RPM, or 1mm/s for Linear Motors

- **Biss Analog Feedback Will F3Bar After a Power Cycle (3055)**

**Issue:**

When Biss Analog Feedback is selected (FB1.SELECT = 32) and the drive is power cycled with no feedback device connected, when the clear faults command is issued, the drive will generate an F3Bar fault.

**Solution:**

The firmware has been modified so that the conditions described above do not generate an F3Bar fault.

### New Features

- **Report the hardware revision number in DRV.INFO and via fieldbus (3118)**

**New Feature Details:**

It is desirable to read the hardware revision number.

**Solution:**

The hardware revision number is now accessible in Workbench with the DRV.INFO command, or in EtherCat/CANopen in SDO 1009.

**Version: 01-04-09-000 Release Date: June 21, 2011**

## General Issues

### Fixed Bugs

- **Autoset Value of VL.THRESH (2660,S-06606)**

**Issue:**

When a feedback device with motor feedback memory (SFD, ENDAT, BISS or HIPERFACE) is connected and autosetting is TRUE (MOTOR.AUTOSET = 1) the value of VL.THRESH is automatically set to the value read from the feedback (MOTOR.VMAX). Three changes were needed to improve this feature 1). VL.THRESH should be set to 120% of MOTOR.VMAX (it was getting set to 100%) 2). When units other than RPM are used, the value is not set properly 3). The value for VL.THRESH should only be set to 120% of MOTOR.VMAX when the current value (at initialization time) is set to the default value.

**Solution:**

These three issues have been corrected 1). VL.THRESH will be set to 120% of MOTOR.VMAX (it was getting set to 100%) 2). When units other than RPM are used, the value of VL.THRESH is set properly 3). The value for VL.THRESH will only be set to 120% of MOTOR.VMAX when the current value of VL.THRESH (at initialization time) is set to the default value. This will allow the user to set a value for VL.THRESH that is different than the value saved in motor memory, and the drive will preserve this value. To recover the value saved in motor memory, the user can issue a DRV.RSTVAR, or set the value of VL.THRESH back to the default value, and toggle MOTOR.AUTOSET from 1 to 0 and back to 1.

### New Features

- **Get Motion task Target Velocity value from Analog Input or User parameter (S-07070)**

**New Feature Details:**

The user wants to determine the target velocity of a motion task via the voltage measured on an analog input signal.

**Solution:**

The motion task control word has a bit (bit 16) that determines if the Motion task Target Velocity is set by the MT.V parameter (Stored in motion task table) from the user (bit value 0), or if it is scaled by the analog input (bit value 1).

### Feature Changes

- **Add velocity acc and dec limits in analogue position mode. (S-07044)**

**Issue:**

In analogue position mode a sudden change will accelerate the motor with maximum torque to the highest possible speed.

**Solution:**

Acceleration is limited to DRV.ACC and the velocity of VL.LIMITP AND VL.LIMITN.

## Service Motion Issues

## Service Motion Issues

### Fixed Bugs

- **Changing service motion parameter on the fly did not work properly. (3138,S-00000)**

**Issue:**

The user starts a reversing service motion in DRV.OPMODE = 1 or 2. The motor continuous moving with 1/4 times the expected service motion speed when changing a service motion parameter (e.g. SM.T1/2 or SM.V1/2) on the fly.

**Solution:**

The code has been fixed and the motor moves with the expected speed when changing service motion parameters on the fly for reversing mode.

**Version: 01-04-08-000 Release Date: June 08, 2011**

## General Issues

### Fixed Bugs

- **Rev 8 and 9 Control boards occasionally get 2V5 undervoltage errors. (3103)**

**Issue:**

After power up some boards have fault 507: 2V5 under voltage. The Rev 8 and 9 control boards have no 2.5 v supply. There should never be a fault for this voltage on these boards.

**Solution:**

This fault was triggered erroneously when the condition was tested prior to complete system initialization. The test is now done at the proper time.

- **External Regen Resistor needs to be read/write not read only (3076)**

**Issue:**

External Regen resistor value to be made Read/Write

**Solution:**

REGEN.REXT is changed as Read/Write parameter with 330 ohm as default value. Min value is 0 and Max value is 330 Ohm

- **Modbus writes of large values to MT.ACC\_32 and MT.DEC\_32 is not correct (3111)**

**Issue:**

When writing large values ( $\geq 0x80000000$ ,  $\geq 2147483648$ ) to MT.ACC\_32 (2056) or MT.DEC\_32 (2058) via Modbus, the write fails and when reading the value back the returned value reading is negative.

**Solution:**

Fixed the sign extension handling for 64bit parameters mapped to 32bit.

## Field Bus Specific Issues

### New Features

- **AKD-Test with interpolated-position mode via CAN (3077)**

**New Feature Details:**

The information about the state of the hardware limit switches and home switch were not inside of the object 60FD. This CNC needs this information in this object.

**Solution:**

Now the state of the negative HWLS is in bit 0, of the positive HWLS is in bit 1 and the state of the home switch is in bit 2.

- **Problems with state switch from SWITCHED ON to OPERATION ENABLE (3084)**

**New Feature Details:**

User needed the state SWITCHED ON with free rotating motor shaft, as it is demanded in the DS402 - spec of the ETG.

**Solution:**

This behaviour can now be forced by setting bit 8 of FBUS.PARAM05 to 1.

**Version: 01-04-07-000 Release Date: May 23, 2011**

## General Issues

### Fixed Bugs

- **Switch from velocity to position mode with limited torque (3030)**

**Issue:**

Some Applications needs to limit the current (torque) in velocity mode and then switch to position loop to hold the position. This can result in instable velocity loop, which sets a higher set point for the current loop than allowed (due to the limited current (torque)). This affects only applications, which use the KI in the velocity loop and the limitation of the current (torque).

**Solution:**

If the users limit the current (torque) with IL.LIMITN and IL.LIMITP, also the upper limit for integral error in the velocity loop is affected. The set point for the current loop from the velocity will now be given in this limited range and a faster response of the velocity loop is given.

- **Switch from velocity to position mode with limited torque (3038)**

**Issue:**

The AKD executes a Motion Task or Service Motion and enters the fault state or warning state. Executing the Controlled Stop (CS) caused a Watchdog F3bar. Tests showed that high Modbus traffic plus performing motion caused the Watchdog F3bar.

**Solution:**

#### Solution:

A high data rate (request rate) of Modbus plus executing a motion led to a watchdog timeout, because other background tasks did not get enough CPU time. A data rate monitor was added to Modbus. If the delay between the last response message and a new request is too small for 10 consecutive messages the Modbus thread is suspended for 5ms to free CPU time for other background tasks. The new warning 601 is raised to inform the user that the data rate is too high and that the response time has increased.

- **Jump in the position command value during command source switch fixed (3077)**

**Issue:**

The can master triggered the following sequence in DRV.OPMODE=2 (Position): 1) Start a homing in mode 5 and stop the process after a while. 2) Switch command source to fieldbus and move the motor a bit. 3) Switch back to command source Service. After these three steps a jump in PL.CMD has been observed.

**Solution:**

The actual position need to be forwarded to the motion classes when switching the command source from one value to another in order to avoid the jump in PL.CMD.

- **F125 fault doesn't open fault relay (3095)**

**Issue:**

Behavior was changed prior to version 01-04-00-000 so that an F125 fault no longer opened the fault relay. The relay should be opened.

**Solution:**

The relay will now open if an F125 fault occurs.

- **FW setting of DRV.DISMODE should not be tied to DINx.mode 13 (2887)**

**Issue:**

When a user sets a digital input for a controlled stop (dinx.mode - 13) they expect a controlled stop where the drive ramps down the velocity to zero using the power of the drive. DRV.DISMODE actually controls the desired behavior the controlled stop. The default value is 0. This value corresponds to an immediate power stage disable, NOT A CONTROLLED STOP. If a user sets a digital input to mode 13, and they are not aware of the DRV.DISMODE setting, they will not get the behavior that they want. dinx.mode-13 should behave like DRV.DISMODE 3, but not be dependant on that setting.

**Solution:**

The controlled stop input (DINx.MODE = 13) behaves the same way for all DRV.DISMODE values.

**Version: 01-04-05-000 Release Date: May 11, 2011**

## General Issues

### Fixed Bugs

- **Information of External Regen Resistor (3076,S-06788)**

**Issue:**

Two parameter values for regen resistor (external) is wrong. (help sends back wrong values) 1. REGEN.REXT  
2.REGEN.WATTEXT

**Solution:**

1. REGEN.REXT is changed as read-only parameter with 330 ohm as default value. This Resistance value is fixed. 2. REGEN.WATTEXT data is corrected as MAX value to 6000 Watt.

- **CAPx.MODE is not saved to NV memory (3021,S-06805)**

**Issue:**

The capture parameter are not stored to non volatile memory. If the user needs a special capture setting, e.g. for homing, the setting will be lost after power cycle.

**Solution:**

CAPx.MODE, CAPx.EDGE, CAPx.EN, CAPx.EVENT, CAPx.FILTER, CAPx.PREFILTER, CAPx.PRESELECT, CAPx.PREEDGE are now stored to non volatile memory. Furthermore, HOME.AUTOMOVE is working with homing mode 3, 6, 10, 11. The home modes are dependent on one capture engine.

## Field Bus Specific Issues

### New Features

- **Allow Rotary Switch to Set EtherCAT Station Alias (2414,S-06598)**

**New Feature Details:**

The address set by the rotary switches should be usable for the EtherCAT configured station alias - usage.

**Solution:**

When there is built a Hot-Connect-Group in TwinCAT or other EtherCAT-masters the address of the drive can be either fixed by the parameter FBUS.PARAM03, if the rotary switches are on 0 or via the rotary switches, if they are not on 0. FBUS.PARAM03 can be used independently of the rotary switches, when FBUS.PARAM05- bit 5 (0x20) is set.

**Version: 01-04-03-000 Release Date: May 09, 2011**

## General Issues

### Fixed Bugs

- **Motor Phase Needs to be Set to 0 with Memory Version 0.01 (2985,S-06488)**

**Issue:**

Motor phase is not defined for feedback device memory version 0.01. As a result if motor phase (MOTOR.PHASE) has been previously set for a different motor, the non-zero value will remain for memory version 0.01 feedback devices.

**Solution:**

#### **Solution:**

Motor phase will be set to 0 if the feedback memory is version 0.01.

- **Reconnection of LAN cable results in IP address 1 (DHCP) (3051,S-06615)**

#### **Issue:**

If the IP address is assigned through DHCP, after a reconnection of the cable, the IP address will be set to 0.0.0.1 instead assigned IP address by DHCP server.

#### **Solution:**

The assigned DHCP server address also after reconnection used.

- **Modbus: Reception of fragmented request messages or multiple request messages. (S-06401)**

#### **Issue:**

The former handling expected a complete Modbus request in the TCP/IP reception queue. The Modbus via TCP/IP specification permits multiple requests. Depending on the delay between requests, it is possible that more than one request is in the TCP/IP reception queue. If so, only the first request was processed!

#### **Solution:**

Added a preprocessor to handle all request stored in the reception queue, including fragmented messages.

- **Drive does not re-enable after clearing CS input if DRV.DISMODE = 2 or 3 (3048)**

#### **Issue:**

When the CS input was activated (DIN mode 13) a controlled stop would set the software disable if DRV.DISMODE is 2 or 3. This would require DRV.EN to re-enable the drive when the CS input was no longer active.

#### **Solution:**

A check was made for controlled stop input being active in DISMODE 2 and 3 and the SW disable was not set in this case.

## New Features

---

- **Add Support for Hiperface SEK90 Feedback Device (R-01616)**

#### **New Feature Details:**

Support is required for SEK 90 Hiperface Feedback Device. This is a Single Turn Hollow Rotary Feedback Device

#### **Solution:**

Support for the SEK 90 Hiperface Feedback device has been added. The firmware has also been modified so that any future Hiperface feedback device with the label type 0xFF can be automatically configured. Feedback Devices SEK90 and SEK160 have this label type, and all new Hiperface encoders should also have this label type so that the firmware does not have to be modified in order to support these new devices.

- **New warning n140 added when changing VBUS.HALFVOLT (1096,S-06599)**

#### **New Feature Details:**

Changing VBUS.HALFVOLT takes only affect in case that the parameters are stored on the NV memory and the Drive is power-cycled. This needs to be indicated to the user.

#### **Solution:**

A new arming (n140) indicates that a DRV.NVSAVE and a power-cycle of the Drive needs to be triggered in case that the user changes the numerical value of VBUS.HALFVOLT.

- **New Homing Mode 13 - "Use current feedback position" (S-06623)**

#### **New Feature Details:**

With homing mode 0 the current position of the feedback is set to HOME.P. But some application needs the possibility to set the current feedback position directly to home position without explicit configuring HOME.P or FB1.OFFSET.

#### **Solution:**

Homing mode 13 sets the current feedback position as home position without starting a movement.

- **Modbus.Mt commands are positive edge triggered ()**

#### **New Feature Details:**

Modbus.Mt executes several commands, like MT.SET or MT.MOVE. If a master writes to Modbus.Mt repeatedly commands might be executed with each write request leading to an undesired behavior.

#### **Solution:**

To avoid multiple executions when a Modbus master is writing to Modbus.Mt repeatedly, the commands are only executed when the corresponding bit changes from 0 to 1 (positive edge triggered).

- **Modbus.Mt commands are positive edge triggered ()**

#### **New Feature Details:**

Modbus.Mt executes several commands, like MT.SET or MT.MOVE. If a master writes to Modbus.Mt repeatedly commands might be executed with each write request leading to an undesired behavior.

#### **Solution:**

To avoid multiple executions when a Modbus master is writing to Modbus.Mt repeatedly, the commands are only executed when the corresponding bit changes from 0 to 1 (positive edge triggered).

## IO Issues

### Fixed Bugs

---

- **Digital Output mode 4-In Position does not function properly (2921,S-06557)**

#### **Issue:**

Output mode 4- "In Position" does not change state based on a window around a target position, as it should. Rather it functions as "Position Error > x".

#### **Solution:**

Output mode 4- "In Position" will now only change state when the position error is greater than the target position.

DOUT Mode-17 is added as "MINPOSITION", and will enable the DOUT1 using a window around target position of the MOTION task which donot have any further following Motion tasks. DOUT Mode-4 is renamed as "PositionErrorMonitor".

## Motion Tasking Issues

### New Features

- **New DRV.MOTIONSTAT bit 15 added (2921,S-06557)**

**New Feature Details:**

A new output mode needs to be created in order to set the digital output to high as soon as the actual position PL.FB is within a certain area around the target position of a motion task.

**Solution:**

A new DRV.MOTIONSTAT bit has been implemented in order to allow creating the new digital output mode.

## Field Bus Specific Issues

### New Features

- **Support for some AKD-parameters is needed (3052,S-06622)**

**New Feature Details:**

Support needed for the following parameters: VBUS.UVMODE, VBUS.UVFTHRESH, VBUS.UVWTHRESH, DOUT1.PARAM, DOUT2.PARAM, DIN1.PARAM-DIN7.PARAM, HOME.AUTOMOVE, HOME.DIST

**Solution:**

- New SDOs (EDS-file revision 24):

parameter	object (index/subindex)
DIN1.PARAM	SDO 3474 sub 1/8 (low/high)
...	...
DIN7.PARAM	SDO 3474 sub 7/0xE (low/high)
DOUT1.PARAM	SDO 3475 sub 1/3 (low/high)
DOUT2.PARAM	SDO 3475 sub 2/4 (low/high)
HOME.DIST	SDO 3484 sub 0
VBUS.UVWTHRESH	SDO 3495 sub 0
VBUS.UVMODE	SDO 3617 sub 0
VBUS.UVFTHRESH	SDO 361D sub 0
HOME.AUTOMOVE	SDO 36D7 sub 0

Version: 01-04-02-000 Release Date: April 21, 2011

## General Issues

### Feature Changes

- **Modbus: MODBUS.HOME AND MODBUS.DRV commands are edge triggered. ()**

**Issue:**

A level triggered command executes the command with each write request. This is inefficient and may lead to error responses.

**Solution:**

Added edge detection and to avoid repeated execution of commands.

- **Unit strings retruned by a TelNet command need to be modified. (S-06482)**

**Issue:**

For some parameters the TelNet command response of the units were not coherent in terms of using brackets and spaces.

Example: A velocity parameter could be displayed with the unit [PIN/POUT/s] although the related acceleration parameter is using brackets as follows: [(PIN/POUT)/s^2].

**Solution:**

The unit strings of the TelNet commands have been modified in order to be coherent.

- **Crash dump diagnostic information can now be cleared by the user. ()**

**Issue:**

When diagnosing drive problems, it is sometimes helpful to clear out old diagnostic information.

**Solution:**

The command DRV.CLRCRASHDUMP may now be entered in the terminal window in Workbench to clear old diagnostic information.

### New Features

- **DRV.DISSOURCES should be recordable in the Workbench scope ()**

**New Feature Details:**

It would be helpful to record DRV.DISSOURCES

**Solution:**

This value can now be recorded.

### Fixed Bugs

- **Strange behaviour of axis, when motion task movement is blocked (3020)**

**Issue:**

The current command would reverse several times if a motion was commanded (position mode) and the axis was blocked

**Solution:**

The acceleration limiting method was rolling over. The calculation causing the rollover was revised to correct the problem

- **Unit strings for analog output scaling parameters corrected. (3046)**

**Issue:**

The unit strings for the commands AOUT.ISCALE, AOUT.VSCALE and AOUT.PSCALE have been wrong.

**Solution:**

The unit strings for the commands AOUT.ISCALE, AOUT.VSCALE and AOUT.PSCALE have been corrected.

## Homing Issues

### Fixed Bugs

- **Jerk during homing in HOME.MODE 0 (2992,S-06473)**

**Issue:**

A jerk in the motor-shaft could happen when triggering a homing via HOME.MOVE in HOME.MODE=0 while the Drive is enabled. The jerk appeared since the parameter DRV.MOTIONSTAT was accessed from different priority levels.

**Solution:**

The modification of DRV.MOTIONSTAT from different priority levels is now protected.

- **IL.OFFSET does not work in Torque Mode (2996)**

**Issue:**

A bug was identified that prevented IL.OFFSET from applying a torque command while the drive was in Torque Mode (IL.OFFSET worked fine in Velocity and Position mode)

**Solution:**

Bug has been removed, and now IL.OFFSET works in Torque Mode

## Field Bus Specific Issues

### Fixed Bugs

- **DS402 (Cyclic synchronous position mode): Motor jumped back to old position, when switching on (2970)**

**Issue:**

The motor jumped to its old set point position, when drive was disabled, moved in the disabled state and afterwards got to the DS402-state "Switched on" again.

**Solution:**

Behaviour corrected. Set points are only taken, when DS402-state "Operation enabled" is reached.

- **NMT reset communication command (2670)**

**Issue:**

After the AKD node receives a NMT reset communication command, the SDO transmission stops.

**Solution:**

The SDO communication is now working after NMT reset command.

**Version: 01-04-01-000 Release Date: April 11, 2011**

## IO Issues

### Fixed Bugs

- **Jog move out of the software or hardware limits and triggered via digital input mode 6 has been corrected. (3010)**

**Issue:**

A user moves into a positive/negative software/hardware limit switch in DRV.OPMODE velocity or position. The attempt moving out of this limit switch by triggering a jog move via digital input mode 6 did not work reliable. Sometimes a user has to trigger the jog move for several times before the motor moves.

**Solution:**

The code has been corrected in a way that only one trigger event is needed for moving out of the limit switches.

## General Issues

### Fixed Bugs

- **Brake delay for apply and release does not seem to work? (1241)**

**Issue:**

Brake handling in earlier versions of the drive firmware had several problems involving the apply or release sequence. The release delay should prevent motion until after the mechanical delay in releasing the brake that is normally seen when power is applied to the brake. Similarly, disabling the power stage may also be delayed until the motor has stopped and the brake has been applied.

**Solution:**

This sequencing has been corrected in this version of the firmware to match the behavior described in the AKD documentation (MOTOR.TBRAKEAPP, MOTOR.TBRAKERLS, DRV.DISMODE).

- **Need ability to disarm wake and shake after arming (2237)**

**Issue:**



-----

There were various problems with Wake and Shake for both mode 0 and mode 1. Faults could not be cleared (2336, 2488), time scale was incorrect, disarming was not an option (2237).

**Solution:**

These problems were corrected in this release.

- **Cannot generate fault 138: Instability during autotune - on the trunk firmware. (2999)**

**Issue:**

N/A

**Solution:**

The Fault mask is properly configured and the GetBodeFaults procedure is modified.

- **Strange behavior of axis occurs when motion task movement is blocked. (3020)**

**Issue:**

This problem was caused by a rollover in CControl::ExecuteAccDecLimit() in position mode. The Position PI output is limited to 32 bits while CControl::ExecuteAccDecLimit() is limited to 28 bits. This problem was introduced when the acceleration resolution was increased (between 1.3.2 and 1.3.3) and is not seen in 1.3.0.012.

**Solution:**

The correction is to allow CControl::ExecuteAccDecLimit() to handle 32 bits when in position mode (i. e. not limiting).

- **Modbus.Home was not readable. ()**

**Issue:**

Modbus.Home is a command and did not return a zero when read.

**Solution:**

Add ArgGetVal and ArgGetValIntern to the command handler function of Modbus.Home

- **Modbus: Reading velocity parameters returned an invalid value, most of the time a -1. (2995)**

**Issue:**

Reading velocity values, like VL.FBFILTER or VL.CMD, returned a -1.

**Solution:**

Velocity parameters are 64bit values mapped to 32bit values in Modbus. The mapping uses flags, which were not reset correctly. Those flags caused the return of the wrong value.

## New Features

---

- **Adding Low-Pass filter on Analog Output. (2977)**

**New Feature Details:**

Noise signals at analog output to be filtered.

**Solution:**

A user configurable Low-pass filter is added in the firmware. Default filter will be off. New user command AOUT.CUTOFF is introduced for user configuration of filter frequency. The range is 0 - 100000 Hz, and 0 will disable the filter.

**Version: 01-03-20-001 Release Date: April 04, 2011**

## General Issues

### New Features

---

- **Auto Homing for Multi-turn Feedback (2439)**

**New Feature Details:**

When a multi-turn feedback device is initialized it should be automatically homed with no motion, and with the multi-turn absolute position preserved.

**Solution:**

The firmware has been modified so that Multi-turn feedback devices will be automatically homed with no motion. The multi-turn position is preserved and the home done flag is set to true. This will allow software limits to also be active. The keyword MT.HOMEREQUIRE has also been removed as part of this change, since it is no longer required since multi-turn feedback devices will automatically be homed.

- **Voltage thresholds for HV and MV Drives needs to be lowered on demand. (1096)**

**New Feature Details:**

voltage thresholds for an MV or HV Drive needs to be lowered on demand in case that the Drive will be supplied with a lower DC-bus voltage.

**Solution:**

A new command called VBUS.HALFVOLT has been implemented in order to lower voltage thresholds for the overvoltage fault generation and for the inrush-relay and regen-resistor activation thresholds.

## Fixed Bugs

---

- **Overspeed takes too long to detect (3005)**

**Issue:**

A velocity over speed takes too long to detect (problem introduced in the 01-03-19-000.

**Solution:**

The drive will now respond to a velocity overspeed in 13ms or less.

## Feature Changes

## Feature Changes

---

- **On CC drives the default was Has been changed to 2 (3007)**

**Issue:**

On CC drives DRV.TYPE should default to EtherCAT not Analog.

**Solution:**

The default for DRV.TYPE has been changed.

## Field Bus Specific Issues

### Fixed Bugs

---

- **DS402: Profile velocity (object 6081) gives a four times too high velocity set point. (2993)**

**Issue:**

The target speed for the profile position mode didn't work as in former firmwares (< 1.3.17.0).

**Solution:**

A new conversion had been introduced. The PDO-function and SDO-function for the object 6081 fits now to the new scheme.

**Version: 01-03-19-000 Release Date: March 28, 2011**

## Field Bus Specific Issues

### Fixed Bugs

---

- **Multiple Ethercat errors (2905)**

**Issue:**

- Halt bit in profile position mode only works one time - Writing 0 to object 6098 sub 0 (Home mode) doesn't work correctly, gives a timeout

**Solution:**

- Halt bit (bit 8 control word) works now correctly- Value 0 for object 6098 generates now an abort message as well as the other not supported values

- **Object 6072 sub 0 influenced only the positive torque limit (2969)**

**Issue:**

Object 6072 sub 0 (max torque) should set both current limits, but the negative isn't changed.

**Solution:**

Bug fixed. Now also IL.LIMITN is changed.

## Motion Tasking Issues

### New Features

---

- **Parameter PL.MODPDIR extended (2957)**

**New Feature Details:**

A user enables modulo-axis and starts an absolute motion task within the modulo range. The user requests that the motor moved the shortest distance to the expected target position.

**Solution:**

The parameter PL.MODPDIR has been extended. PL.MODPDIR=3 let the motor move to the expected target position via using the shortest distance.

## General Issues

### Fixed Bugs

---

- **Motor brake behaviour corrected (2958)**

**Issue:**

The MOTOR.BRAKE parameter was not correctly initialized in case that a feedback device with motor-id memory version 0.2 has been connected to the AKD and in case that MOTOR.AUTOSSET has been set to 1.

**Solution:**

The initialization process of the MOTOR.BRAKE parameter for MOTOR.AUTOSSET=1 has been corrected.

- **Motion task deceleration rate otherthan expected (2918)**

**Issue:**

This is a condition of change-on-fly exception, when new MT is activated, and creeping to target position with adjusted deceleration ramp.

**Solution:**

1. When the motion task encounter exception during activation process, and another Motion task is already active (On fly) a new behaviour is implemented, that the currently active Motion task will decelerate to zero velocity, and during the process, if it exceeds next motion task target position, fault (F139) will be raised, otherwise the balance distance will be covered with the activation of new motion task. 2. Bit 13 of DRV.MOTIONSTAT is configured to indicate motion task exception during activation (static or dynamic activation). The bit will get reset up on successful activation of another motion, or by using DRV.CLRFAULTS command.

## New Features

---

- **New motor protection (I2t) added (2900)**

**New Feature Details:**

The actual motor load should be calculated and displayed in %.

**Solution:**

A new I2t motor load algorithm has been implemented in order to show the motor load in %. Furthermore the applied current will be limited according to the load of the motor. The new mode can be activated via a new parameter called IL.MIMODE. The commands IL.MIMODE, IL.MI2TRESH and IL.MI2T are supported by CAN/EtherCAT via the objects 3427 sub 1, 2 and 3.

- **Support for Hiperface SEK 160 Feedback Device (2915)**

**New Feature Details:**

Support is required for the Hiperface SEK 160 (type 255) Feedback device.

**Solution:**

Firmware has been modified to include support for the Hiperface SEK 160 Feedback device.

**Version: 01-04-00-000 Release Date: March 18, 2011**

## General Issues

### New Features

- **Support for SFD sensor fault added. (1921)**

**New Feature Details:**

When the SFD Feedback Sensor (Resolver) does not provide the correct signal to the SFD feedback board, the AKD firmware should generate a signal amplitude fault (Fault 402).

**Solution:**

The firmware has been modified so it will generate a signal amplitude fault (Fault 402) when the SFD Feedback Sensor (resolver) does not provide the correct signal to the SFD Sensor board.

- **Allow writing of motor parameters to encoder memory. (2606)**

**New Feature Details:**

When using Endat and Hiperface encoders, the ability to write the motor parameters to the motor is required.

**Solution:**

The firmware has been modified to allow writing the motor parameters (motor ID) to the Endat and Hiperface encoder memory. The command to write to the memory is password protected. Note that for Hiperface feedback devices, the ability to read motor parameters from the memory has also been implemented. Endat Feedback devices already have the ability to read the motor parameters from the memory. To read the memory contents, the autoset parameter (MOTOR.AUTOSSET) must be set to True.

- **Read the availability of a motor-brake from the feedback NV memory. (575)**

**New Feature Details:**

The availability of a motor brake was not read from a feedback device with memory, even if the information was available.

**Solution:**

For feedback devices with factory programmed memory (SFD, EnDat, and Biss) the firmware will read the availability of the motor brake from the feedback NV memory and initialize the corresponding MOTOR.BRAKE parameter.

- **Current loop gain scheduling feature added. (2776)**

**New Feature Details:**

When motors saturate, their effective inductance decreases, which can cause instabilities in the current loop since the current loop gain is dependent on motor inductance.

**Solution:**

Current loop gain scheduling has been implemented under the Current Loop view so that a user can specify a current loop lookup table to change the current loop gain based on a current command level.

### Fixed Bugs

- **Hiperface encoder locks up sometimes with clear faults. (2890)**

**Issue:**

Sometimes Hiperface encoders would not be able to clear the "Failed to Set Feedback Fault" (Fault 401) with the clear faults command. The drive had to be power cycled in order to clear this fault.

**Solution:**

The firmware has been modified so that Hiperface feedback devices can clear the "Failed to Set Feedback Fault" (Fault 401) with the clear faults command (assuming that the feedback device is functioning properly). Power cycling is not required to clear this fault.

- **Read the availability of a motor-brake from the feedback NV memory. ()**

**Issue:**

A setting of MODBUS.PSCALE = 20 did not work as expected.

**Solution:**

The shift factor is now calculated correctly.

## Field Bus Specific Issues

### New Features

- **CANopen autobaud detection added. (2818)**

**New Feature Details:**

If the two CANopen nodes have a fix, but not the same baudrate, the communication will not work. Autobaud creates a flexible and easy to install CANopen-Bus configuration.

**Solution:**

Instead of using a fix baudrate, the autobaud detection can be configured. A master node can send an initial CANopen-Frame on the CANopen-Bus and the drive measures the bit-rate and initializes the baudrate of the CAN-Controller with the measured baudrate (125, 250, 500 or 1000 kBit/s).

- **New parameters supported via CANopen. (2901)**

**New Feature Details:**

Customer requested support for parameters MOTOR.VRATED, MOTOR.VOLTRATED, MOTOR.VOLTRATED, PLL.SYNCDIST and PLL.SYNCWIND.

**Solution:**

The parameters MOTOR.VRATED, MOTOR.VOLTRATED and MOTOR.VOLTRATED are implemented as SDO 3457 sub 1, 2 and 3. The support for the PLL commands is not provided.

## Fixed Bugs

---

- **CANopen SDO request answered before Bbootup message has been sent. (2907)**

**Issue:**

After power on, a CANopen master polls a CANopen object via SDO request before the bootup message of the drive has been sent. The drive does not answer this request until it is fully initialized. This initialization is done when the boot up message has been sent.

**Solution:**

A SDO request is not answered until the bootup message has been sent.

- **Bit 10 of the DS402 status word did not work in profile velocity mode. (2805)**

**Issue:**

Bit 10 (target reached) of the DS402 status word did not work in profile velocity mode.

**Solution:**

The objects 606D sub 0 (Velocity Window) and 606E sub 0 (Velocity window time) determine the setting for the surveillance of the velocity demand value. If the velocity reached the window and is in for the defined time, bit 10 will be set.

- **Sometimes the commanded torque value is not taken by the drive. (2830)**

**Issue:**

The object 6071 sub 0 is sent periodically. From time to time, the old value is kept and the new not taken.

**Solution:**

The takeover of the command value via SDO 6071 always works now. The PDO access was not affected.

**Version: 01-03-18-000 Release Date: March 16, 2011**

## General Issues

### Fixed Bugs

---

- **Range specified for MOTOR.KE is too small (0.000 - 1000.000). (2952)**

**Issue:**

The range for the motor back emf constant (MOTOR.KE) is too small. The maximum value that can be set is 1000 Volts/Krpm. This range should be increased to 100,000 Volts/Krpm to cover DDR Motors.

**Solution:**

The range has been increased to 100,000 Volts/Krpm.

- **Blink Drive causes fault F532 (2971)**

**Issue:**

Using the "blink drive" button in Workbench can cause an F532 fault due to changing the value of DRV.SETUPREQBITS.

**Solution:**

DRV.SETUPREQBITS is no longer modified when the drive display blinks.

**Version: 01-03-16-000 Release Date: February 16, 2011**

## General Issues

### New Features

---

- **Modulo extension added. (1672)**

**New Feature Details:**

The modulo-axis feature should be completed.

**Solution:**

The following scopable variables are converted into modulo-format (if selected) upon a recorder retrieve command: CAP0.PLFB, CAP1.PLFB, PL.FB, PL.CMD

- **Read motor phase from Hiperface feedback memory added. (2814)**

**New Feature Details:**

Hiperface feedback devices are not aligned to the motor's windings. As a result the commutation offset angle must be read from the Hiperface feedback memory, and set on the drive using the MOTOR.PHASE parameter.

**Solution:**

The commutation offset angle will be read from the Hiperface feedback memory. The angle is read from the S-300 drive memory location which is Datafield 0, bytes 2 and 3. When autoset is true (MOTOR.AUTOSSET = 1) this read value is automatically stored in the drive in the parameter MOTOR.PHASE. Note that ALL motors will have this value programmed into their memory.

in the drive, in the parameter MOTOR.PHASE. Note that AKM motors will have this value programmed into their memory when shipped from the factory. For non-AKM motors, an S-300 drive must be used to program this value in the Hiperface memory. When full motor ID is implemented for Hiperface in the future, the drive will be able to store this angle in the Hiperface memory.

## Fixed Bugs

---

- **Inputs "switch bounce" changes the motion task profile. (2065)**

**Issue:**

More DIN modes were created to enable interruptible and uninterruptible motion task features.

**Solution:**

Bit No 13 and 14 in control word (MT.CNTL) are used to identify the authentication of activation of new motion task externally. If control word bits 13 and 14 are not set, then normal operation occurs. Any motion task is allowed for Activation. If control word bit 13 is set and any motion task is active, then Deny Activate, Otherwise Allow Activation occurs. If control word bit 14 is set and no motion task is active, then Deny Activate, Otherwise Allow Activation occurs.

- **Motor.KT Limit too low for linear motors (2833)**

**Issue:**

The drive firmware limits the value of to 65 Nm/A for rotary motors, and 65 N/A for linear motors. This value is too low, as it is easy to exceed this limit on a linear motor.

**Solution:**

The firmware limit has been changed to 1,000,000 Nm/A for rotary motors, and 1,000,000 N/A for linear motors.

## Motion Tasking Issues

### New Features

---

- **Additional options for the registration move added. (2666)**

**New Feature Details:**

Two additional bits were added to the motion task control-word, which both have an impact on the motion-task trigger.

**Solution:**

A motion task can not be interrupted if bit 13 of the MT.CNTL parameter of a running motion task has been set to true. A motion task can not be started from velocity 0 if bit 14 of the MT.CNTL parameter of that motion-task, which is supposed to be started, has been set to true.

**Version: 01-03-14-000 Release Date: February 01, 2011**

## General Issues

### New Features

---

- **Modbus: Mapping of 64-bit parameters to 32-bit added. ()**

**New Feature Details:**

HMI devices or PLCs using Modbus do not always support 64bit variables / parameters.

**Solution:**

An interim solution is provided: Starting at register address 2000, the low 32-bit word of 64-bit parameters are mirrored. The mapping of these registers is described in Modbus documentation.

- **Digital output modes 5 & 6 should function with PL.FB in linear or in modulo scaling, depending on the PL.MODPEN setting. (1672)**

**New Feature Details:**

Certain functionalities of the drive should work with modulo-scaled position variables when a modulo axis is selected.

**Solution:**

The digital output modes 5 & 6 now work with modulo-scaled position variables when a modulo-axis is selected.

- **Software limit switches should function with PL.FB in linear or in modulo scaling, depending on the PL.MODPEN setting. (1672)**

**New Feature Details:**

Some certain functionalities of the drive should work with modulo-scaled position variables when a modulo axis has been selected.

**Solution:**

The software limit-switch functionality now works with modulo-scaled position variables when a modulo-axis has been selected.

## Fixed Bugs

---

- **PLS also should follow modulo scaling if enabled. (2797)**

**Issue:**

Programable Limit Switches also need to be follow modulo scaling.

**Solution:**

The Programable Limit Switch functionality now works with modulo-scaled position variables when a modulo axis has been enabled.

## Field Bus Specific Issues

### New Features

---

- **MODBUS.FAULT1 - MODBUS.FAULT10 now return the fault numbers of the active faults. ()**

**New Feature Details:**

It was not possible to determine the fault status of the drive via Modbus.

**Solution:**

Up to 10 active faults are now stored in registers MODBUS.FAULT1 to MODBUS.FAULT10. - If MODBUS.FAULT1 is zero, then no fault is active. - If MODBUS.FAULT1 is non-zero, then the following register may contain further fault numbers. - A fault register with a value of zero marks the end of the fault list.

- **CANopen baud rate can be configured via the rotary switches and button B1. (2583)**

**New Feature Details:**

The user wants to configure the CANopen baud rate without using a PC.

**Solution:**

The new feature supports CANopen baud rate configuration through the rotary switches and button B1. The following sequence will configure a new baud rate and store the setting in non-volatile memory. 1.) Drive must be disabled. 2.) Set the rotary switches to: 91 - 125K bit 92 - 250K bit 93 - 500K bit 94 - 1000K bit (1M) 3.) Push the button B1 and hold it for at least 3 seconds. 4.) To confirm the new setting, the setting of the rotary switches will flash 5 times on the 7seg LEDs 5.) Reset the rotary switches to the original setting. If an error occurred, the following error messages will flash 5 times: E1 - Drive is enabled. E2 - Non-volatile storage of the new setting failed. E3 - Invalid rotary switch selection.

**Version: 01-03-13-000 Release Date: January 26, 2011**

**General Issues****New Features**

- **Improved motion task blending ("registration move") added. (2666)**

**New Feature Details:**

Users want to interrupt a currently active motion task and start a new motion task via a digital input. When the input is triggered, the actual position value is latched and the second motion task is started, depending on the latched position.

**Solution:**

Users can use CAPx.MODE 4 to continuously capture the actual feedback position, depending on a digital input (configurable via CAPx.TRIGGER). With DINx.MODE 2 or 4, a motion task can be started via a digital input. With MT.CNTL 5 (relative to external start position), the specific motion task uses the captured position as start position of the triggered motion task.

**Fixed Bugs**

- **Biss Mode C Encoder initializes with incorrect position. (2849)**

**Issue:**

Biss Mode C Resolute Single Turn encoders with 32 bits of precision do not initialize the position correctly. If the starting position is greater than 180 degrees, the position was being initialized to a value of 180 degrees minus the start position.

**Solution:**

Now when the start position is greater than 180 degrees, the position is initialized properly

**Capture Issues****New Features**

- **CAP0.PLFB and CAP1.PLFB should be converted in modulo format when a modulo axis is selected. (1672)**

**New Feature Details:**

Certain functionalities of the drive should work with modulo scaled position variables when a modulo axis has been selected.

**Solution:**

CAP0.PLFB and CAP1.PLFB are converted in modulo format when the modulo axis is selected.

**Version: 01-03-12-000 Release Date: January 18, 2011**

**General Issues****Fixed Bugs**

- **Motion task complete does not work with S-curve enabled. (2645)**

**Issue:**

S-Curve Motion task do not set Motion Task complete status bit after reaching target position.

**Solution:**

Motion task complete now works with S-curve enabled.

- **S-curve profiles moving to wrong position. (2732)**

**Issue:**

1:1 S-curve Motion task always reach the specified target position by 360 degrees.

**Solution:**

S-curve profiles move to correct position now.

- **Problems occur when recording using an immediate trigger at a rate other than 16 kHz (2837)**

**Issue:**

When recording data using immediate trigger, the first data point would sometimes be duplicated. Also, REC.RETRIEVE would return data starting at an incorrect index.

**Solution:**

This problem has been identified and fixed.

- **Inputs "switch bounce" changes the motion task profile. (2065)**

**Issue:**

Customers using an earlier version of DIN.MODE-2 requested the interruptible Motion Task feature.

**Solution:**

Digital Input Mode 2 - "Start Motion task" was reverted as interruptible Motion Task and new DIN mode was added (Digital Input Mode 24 - "Start uninterrupted Motion task").

## Feature Changes

---

- **Fault 133 "Instability during autotune" number changed to 138. Fault is now also shown in the display. (2731)**

**Issue:**

Fault was not shown on display.

**Solution:**

Fault number was changed and enabled to show on display.

## New Features

---

- **FB1.MECHPOS should be recordable by the WorkBench scope. (1125)**

**New Feature Details:**

When setting up motor commutation, it is helpful to be able to plot the mechanical position of the motor (FB1.MECHPOS) in conjunction with the Hall switch states. The parameter FB1.MECHPOS should be made "recordable" in order to achieve this.

**Solution:**

The firmware has been modified so that FB1.MECHPOS is recordable.

## Field Bus Specific Issues

### Fixed Bugs

---

- **FBUS.PARAM01 was reset to its default value by DRV.RSTVAR and object 1011 sub 1. (2550)**

**Issue:**

With the object or the command DRV.RSTVAR, the CANopen-baudrate was reset to its default value. This leads to problems in working machines.

**Solution:**

FBUS.PARAM01 is no longer reset to default by DRV.RSTVAR and object 1011 sub 1.

### New Features

---

- **Emergency 0x8AF0 added for unreasonable parameter combinations of homing mode and feedback type. (2792)**

**New Feature Details:**

Some combinations of motor feedback types with the selected homing mode are unreasonable. For example, a SFD feedback is used together with homing mode "Find index". In this case a emergency message 0x8AF0 "Homing and Feedback mismatch!" is generated because no index signal is generated by the SFD feedback.

**Solution:**

An emergency is issued when the selected homing mode cannot be used with the feedback device. Use another homing mode.

**Version: 01-03-10-000 Release Date: January 04, 2011**

## General Issues

### Fixed Bugs

---

- **Opmode switching over SDO causes runaway. (2567)**

**Issue:**

When switching opmode via command word in CANOpen, unexpected motion occurs about 10% of the time.

**Solution:**

Code has been corrected so that opmode and command source are cleanly handled from all change sources.

- **Fault reaction time is too slow. (2767)**

**Issue:**

Fault response time is not deterministic and can take over 50 ms in a worst case scenario.

**Solution:**

Response time is now deterministic and under 5 ms.

## Feature Changes

---

- **DIN mode 22 - opmode switching with multiple digital inputs added. (2573)**

**Issue:**

DIN mode 22 was initially implemented with only one input changing. The case of multiple inputs changing was not defined. This implementation extends the original design with the following rule: if more than one input is active at a time, the lowest numbered input will determine the desired opmode.

**Solution:**  
Mode 22 works as described above for multiple inputs.

**Version: 01-03-09-000 Release Date: December 28, 2010**

## General Issues

### Fixed Bugs

- **Hiperface Type SEL37 does not initialize. (2775)**

**Issue:**  
The multi-turn Hiperface feedback device SEL37 does not initialize properly.

**Solution:**  
Firmware has been modified so that the SEL37 multi-turn Hiperface feedback will initialize. A delay was added to the firmware to accommodate the longer than typical time to power up the encoder. According to the SEL37 data sheet, it takes 1200 ms for this encoder to power up and initialize. Note that the hiperface specification says that this time is no longer than 900 ms for a typical Hiperface encoder.

- **Hiperface feedback selection initializes properly. (1664)**

**Issue:**  
If the user selects Hiperface explicitly (FB1.SELECT = 33), then the absolute position will not be initialized properly for both single turn and multi-turn hiperface encoders.

**Solution:**  
Firmware has been modified so that the user can select either auto identify (FB1.SELECT = -1) or explicitly select Hiperface (FB1.SELECT = 33) and the absolute position information will be correct.

### New Features

- **Warnings added for unreasonable parameter combinations of homing mode and feedback type. (2792)**

**New Feature Details:**  
Some combinations of motor feedback types with the selected homing mode are unreasonable. For example, a SFD feedback is used together with homing mode "Find index". In this case a warning 137 "Homing and Feedback mismatch" is generated because no index signal is generated by the SFD feedback.

**Solution:**  
A warning is issued when the selected homing mode cannot be used with the feedback device. Use another homing mode.

## Field Bus Specific Issues

### Fixed Bugs

- **Velocity set point via SDO 60FF was sometimes not taken. (2793)**

**Issue:**  
Sometimes the velocity set point coming via SDO 60FF is not taken into account correctly. The last sent value was often taken again.

**Solution:**  
This set point is now handled properly.

### Feature Changes

- **Brake delay times were not observed in DS402-state-machine. (2411)**

**Issue:**  
The state "Operation Enabled" was signaled too early with motors with brakes. This might have confused controls, when the set points were taken later than intended.

**Solution:**  
The times connected to brake now influence the DS402 state machine. The state switches will take longer with brake motors.

- **In DS402 profile velocity mode, scaling objects 604B and 604C have been replaced with 204C. ()**

**Issue:**  
Objects 604B and 604C, as implemented, are not appropriate for profile velocity mode.

**Solution:**  
Manufacturer specific object 204C has been added to implement unit scaling for this mode.

**Version: 01-03-08-000 Release Date: December 07, 2010**

## General Issues

### Fixed Bugs

- **Controlled Stop function (logic state) illegal on startup. (2689)**

**Issue:**  
After a power cycle the drive is not in the controlled stop state, and the drive can be enabled even though Digital input 1 is configured to generate a controlled stop (DIN1.MODE =13), and the input is in the state that should generate the controlled stop. Note the drive off time during the power cycle must be approximately 90 seconds in order to see this issue.

**Solution:**  
Firmware was modified so that now the drive will be in the controlled stop state (and it cannot be activated when the controlled



stop is configured), and the input bit is in the state that will generate a controlled stop.

- **Linear motor acceleration limits are too low. (1777)**

**Issue:**

When linear motors are selected, the limits for allowable command accelerations are too low. When the linear motor type is selected, the maximum allowable acceleration is 833 encoder counts/second<sup>2</sup>. For linear motors there are 4294967296 encoder counts per electrical cycle, where one electrical cycle is typically on the order of 32 to 36 millimeters in length, which translates to a maximum acceleration of 6 e-6 mm/sec<sup>2</sup>.

**Solution:**

Problem with units conversion for linear motors was corrected. The old conversion was actually poles/sec/sec instead of counts/sec/sec.

- **Hall Switch U, V and W State parameters must be recordable in the WorkBench scope. (1125)**

**Issue:**

The new U, V and W Hall Switch State parameters cannot be recorded and displayed by the WorkBench scope. These parameters are FB1.HALLSTATEU, FB1.HALLSTATEV, and FB1.HALLSTATEW.

**Solution:**

Firmware has been modified so that these parameters can now be recorded by the WorkBench scope.

- **Implementation of DRV.ENDEFAULT corrected. (2695)**

**Issue:**

The user selects DRV.ENDEFAULT=1, HOME.AUTOMOVE=1, HOME.MODE=4. With this combination of parameters the drive should enable automatically after power-up and start immediately afterwards a homing procedure. But instead, the drive immediately creates an undervoltage fault after the boot sequence when trying to start the homing procedure. The root cause was the attempt to move the motor before the inrush relay was closed.

**Solution:**

The DRV.ENDEFAULT feature pays attention to the status of the inrush relay and the drive will only be enabled when the inrush-relay is closed.

- **Inputs "switch bounce" changes the motion task profile. (2065)**

**Issue:**

The multiple raising edges on digital input were triggering the same motion task again and again, which is unexpected.

**Solution:**

Digital Input Mode 2 - "Start Motion task" was modified as an un-interrupted profile, and ignores any sub-sequent activate signals of the same motion task from same digital input. These input signals could be occurring because of bouncing switches.

- **Need to issue two DRV.CLRFAULTS commands in order to clear a safe torque off (STO) fault. (1844)**

**Issue:**

Need to issue two DRV.CLRFAULTS commands in order to clear a safe torque off (STO) fault.

**Solution:**

It is now possible to clear the STO fault after one DRV.CLRFAULTS command.

- **Modbus speed improvements added. (2624)**

**Issue:**

The response time was too slow (sometimes as high as 200ms).

**Solution:**

Response time has been dramatically improved (10ms response typical).

- **Help string not covering Min, Max and Default values for DINx.FILTER parameters. (2766)**

**Issue:**

Min, Max and Default values for DINx.FILTER help are missing.

**Solution:**

Support for Min, Max and Default values for DINx.FILTER added.

- **Restoring parameters for a linear motors may not work correctly. ()**

**Issue:**

If you used DRV.NVLIST to save parameters for a system with a linear motor and you tried to restore these parameters to a new drive some of the position, velocity and acceleration parameters were not restored correctly.

**Solution:**

DRV.NVLIST has been changed to output the MOTOR.TYPE parameter at the top of the list of parameters output by DRV.NVLIST.

- **New digital input mode 23 added. (2676)**

**Issue:**

The user wants to change the algebraic sign of the measured analog voltage upon a rising edge on the digital input in order to change the direction of motion. The user wants to zero the measured voltage upon a falling edge on the digital input.

**Solution:**

A new digital input mode (mode 23) has been added.

- **DRV.DISMODE should not be writable when the drive is enabled. (2779)**

**Issue:**

Kollmorgen recommends that you do not change the disable mode when the drive is enabled due to complex interactions.

**Solution:**

The drive must now be disabled before changing DRV.DISMODE.

- **Multi-turn Hiperface support added. (1664)**

**New Feature Details:**

Current AKD firmware treats multi-turn Hiperface encoders as single turn Hiperface encoders. The multi-turn information is ignored.

**Solution:**

Firmware has been modified so that the multi-turn information is used.

## Field Bus Specific Issues

### Fixed Bugs

---

- **The first event Tx-PDO or event Rx-PDO will not get processed. Starting with the second event PDO, the processing is executed. (2674)**

**Issue:**

The first event Tx-PDO or event Rx-PDO will not get processed. Starting with the second event PDO, the processing is executed.

**Solution:**

A minor bug in event RxPDO processing prevented the first RxPDO from being executed.

### Feature Changes

---

- **DS402 status work now displays the status of the Safe Torque Off input.**

(0)

**Issue:**

The STO status should be displayed in the status word.

**Solution:**

Bit 8 of the DS402 status word now reflects the STO state.

- **HOME.IPEAK SDO35E2s0 should be scaled in mA not in Amps. (2345)**

**Issue:**

Amps is not a useful scaling for HOME.IPEAK.

**Solution:**

The value is now in mA.

**Version: 01-03-07-000 Release Date: November 23, 2010**

## IO Issues

### New Features

---

- **Added "switch bounce" conditioning to the digital inputs. (2065)**

**New Feature Details:**

Digital Input debounce switches create problems such as multiple activations, multiple triggers, etc. based on the mode of the Digital Input assigned.

**Solution:**

FPGA is built with configurable filters for Digital I/O channels. New user command "DINX.FILTER" is added as user command which can alter the configuration of DIN filter. DINX.FILTER simply returns the present value of the filter of channel X. DINX.FILTER followed with data will alter the value of the filter. The data allowed is 0 to 3. 0 - No filter setting (40ns) 1 - Fast filter setting (10.24µs +/- 0.64µs) 2 - Standard filter setting (163µs +/- 10.24µs) 3 - Slow filter setting (2.62ms +/- 0.16384ms)

### Fixed Bugs

---

- **When the value of AIN.DEADBAND is non-zero, the value of AIN.VALUE is affected. (2741)**

**Issue:**

If the AIN.DEADBAND value was set to a value, then the value of AIN.VALUE would reflect AIN.DEADBAND applied to the actual value of the analog input. This is incorrect; AIN.VALUE should always return the actual value on the Analog Input.

**Solution:**

Firmware was modified so that AIN.DEADBAND does not affect the value of AIN.VALUE

## General Issues

### Fixed Bugs

---

- **Provide specific warning messages for various types of motion task errors. (2466)**

**Issue:**

Clearing of motion task warnings to be done on successful activation of motion.

**Solution:**

Clearing of motion task warnings implemented on successful activation of motion. Also, users can clear these warnings by DRV.CLRFAULTS command.

- **Controlled stop should ramp down from present actual velocity to zero, not from present velocity command. (2717)**

**Issue:**

Controlled stop would ramp down from present commanded velocity to zero. If the commanded velocity was very high, the ramp would cause the motor to accelerate rather than decelerating when in controlled stop!

**Solution:**

The present actual velocity is now used for the start of the controlled stop ramp.

• **Add parameter for states of the individual Hall switches U, V and W (1125)**

**Issue:**

During setup of non-catalog motors with Hall switches, the user needs to be able to see the states of the individual Hall switches using the WorkBench scope.

**Solution:**

Parameters were added to report the states of the three Hall switches U, V and W. These parameters are FB1.HALLSTATEU, FB1.HALLSTATEV and FB1.HALLSTATEW.

• **Differentiate the warnings for motion tasks, add new emergency error codes for CANopen and EtherCAT. (2466)**

**Issue:**

A general motion warning was shown to the customer. This warning was not informative enough.

**Solution:**

New emergency error codes corresponding to the new warnings:

Warning number	emergency error code	warning
n151	0x8686	Not enough distance to move; Motion Exception
n152	0x8687	Not enough distance to move; Following Motion Exception
n153	0x8688	Velocity Limit Violation, Exceeding Max Limit
n154	0x8689	Following Motion Failed; Check Motion Parameters
n156	0x868a	Target Position crossed due to Stop command
n157	0x86a0	Homing Index pulse not found
n158	0x86a1	Homing Reference Switch not found
n159	0x86a2	Failed to set motion task parameters
n160	0x86a3	Motion Task Activation Failed
n161	0x86a4	Homing Procedure Failed

• **Wrong behavior in DS402-quickstop-state, when new set point was given. (2716)**

**Issue:**

When the state machine of DS402 was in the state of quick stop, the drive moved, when getting a new set point in profile velocity and profile torque mode.

**Solution:**

The drive does not take set points now in states other than Operation Enable.

**Feature Changes**

• **No full access to MT.CNTL via SDO. ()**

**Issue:**

Bit 0 of MT.CNTL is reserved for the use via the DS402-control word.

**Solution:**

Now, if the full access is needed, bit 6 of FBUS.PARAM05 can be set to 1 to get it.

**Version: 01-03-06-000 Release Date: November 09, 2010**

**General Issues**

**Fixed Bugs**

• **Homing Mode 10 does not work. (1635)**

**Issue:**

The user starts a homing mode 10 in any direction and hits a mechanical stop. Instead of changing the direction and searching for the index signal, the drive states that a "homing procedure error" occurred.

**Solution:**

The homing mode 10 now works properly.

• **Wrong exception handling for 1:1 profile handling. (2677)**

**Issue:**

The total time calculation is using maximum velocity instead of target velocity.

**Solution:**

The calculation has been corrected.

• **Provide specific warning messages for various types of motion task errors. (2466)**

**Issue:**

The warning numbers assigned are clashing with some Error numbers.

**Solution:**

Warning numbers are changed to 150 series. The updated list can be found in log for release version "01-03-05-000".

- **Drive unexpectedly enables when clearing a fault while in dynamic braking and DISMODE=2. (2673)**

**Issue:**

Certain faults cause the drive to enter dynamic brake mode regardless of the value of DRV.DISMODE. This is expected, but when clearing these faults, it was possible for the drive to unexpectedly enable.

**Solution:**

The drive no longer enables in this situation when faults are cleared, but instead enters the software disabled state as expected.

## Feature Changes

---

- **DRV.EMUERES EEO output resolution too low. (2600)**

**Issue:**

The existing resolution of 65535 lines/revolution for the emulated encoder output (DRV.EMEURES) is too low for some customer applications.

**Solution:**

The FPGA and firmware have been modified to increase the resolution from 65535 (16 bits) to 16777215 (24 bits).

- **VL.FB now includes AR Filter 3 and 4, added VL.FBUNFILTERED to return raw velocity signal. (2678)**

**Issue:**

Previously, a user was unable to filter the velocity feedback; this was counterintuitive since two filters are listed as feedback filters.

**Solution:**

The value of VL.FB has been updated to return the actual velocity, after it has passed through Feedback Filters 3 and 4. An additional drive parameter, VL.FBUNFILTERED, has been added which returns the raw feedback value.

## New Features

---

- **New homing mode required. (2607)**

**New Feature Details:**

A new homing mode was requested (homing to mechanical stop + motion to a home switch).

**Solution:**

A new homing mode 12 has been implemented.

- **Require new parameters for linear motor support. (2697)**

**New Feature Details:**

Drive parameters LOAD.INERTIA and MOTOR.KE have been added. LOAD.INERTIA is in units  $\text{kg}\cdot\text{cm}^2$  for rotary motors and kg for linear motors. MOTOR.KE (Back EMF Constant) is in units of  $\text{Vpeak}/\text{k-rpm}$  for rotary motors and  $\text{Vpeak} / \text{m/s}$  for linear motors.

**Solution:**

Added LOAD.INERTIA and MOTOR.KE as drive parameters

- **Added VL.FBUNFILTERED and VL.FBFILTER to available Analog Output options. (2556)**

**New Feature Details:**

VL.FBUNFILTERED (raw velocity feedback), and VL.FBFILTER (10Hz filter applied to raw velocity feedback) have been added as AOUT.MODE 10 and 11 (respectively).

- **Analog Input Deadzone feature added. (2469)**

**New Feature Details:**

The existing operation of the AIN.DEADBAND value holds the output at zero when the input is less than the deadband; once the value has exceeded the deadband, the full input is used to calculate the output. This new AIN.DEADBANDMODE = 1 changes this operation

When AIN.DEADBANDMODE = 1, while the input is less than the deadband the output will be held at zero, once the input exceeds the deadband, the output will be calculated:  $\text{Output} = (\text{Input} - \text{Deadband}) * \text{Scaling}$ .

## Field Bus Specific Issues

### Fixed Bugs

---

- **Add several available CANopen objects to EtherCAT xml file. (2682)**

**Issue:**

Objects 0x3440sub1 (CS.DEC), 0x3440sub2 (CS.VTHRESH), 0x3440sub3 (CS.TO) and 0x3440sub4 (CS.STATE) should be in the EtherCAT xml file.

**Solution:**

The xml file has been updated.

**Version: 01-03-05-000 Release Date: October 26, 2010**

## General Issues

### Fixed Bugs

---

- **Units need to be correct for Linear Motor mode. (2652)**

**Issue:**

When putting the AKD into Linear motor mode, Motor units are returned in rotary units.

**Solution:**

MOTOR.KT set to [N/Arms] and MOTOR.INERTIA set to [kg], MOTOR.PITCH default value changed to 32mm. MOTOR.VMAX units set to [mm/s].

- **Provide specific warning messages for various types of motion task errors. (2466)**

**Issue:**

There is only a single warning type for motion task problems. It can be difficult to debug the source of the problem.

**Solution:**

Several warnings were added for motion tasking. Note that the way to reset these warnings is by using DRV.CLRFAULTS command. Emergency Stop Fail 150 MT exception 151 Following MT exception 152 Target Velocity Limit 153 MT Next Fail 154 Target Position Overstep 156 Home Index Fail 157 Home Ref Switch Fail 158 MT Set Fail 159 MT Activation Fail 160 Home Procedure Fail 161

**Version: 01-03-04-000 Release Date: October 19, 2010**

## General Issues

### Feature Changes

- **The resolution of acceleration parameters is too coarse. (1271)**

**Issue:**

The resolution of acceleration parameters is 1.86 rpm/sec. This resolution is too coarse.

**Solution:**

Resolution has been increased to 0.224 rpm/sec for all acceleration parameters.

## Field Bus Specific Issues

### Feature Changes

- **CANopen SDO object 606C (position feedback) scaling is reverted to maintain backward compatibility. (2427)**

**Issue:**

The scaling of this object was changed in the previous beta release, breaking backward compatibility.

**Solution:**

The change is reverted to maintain backward compatibility.

### Fixed Bugs

- **SDO 1010 sub 1 stores parameters on read access. (2549)**

**Issue:**

The object 1010 has one subindex, which gives the right response on read access (line 11 of trace), but it takes one second to respond. Investigation showed that the parameters are stored, when reading subindex 1. This should only happen for write access with the special value 0x65766173 (meaning "save"), which works also.

**Solution:**

SDO1010 sub 1 triggered an NVSAVE on a read request, because the code did not check for a read access. The code always assumed a write access. Separate read-write access was implemented and tested and resolved this issue.

- **SDO 1011 sub 1 does not work. (2550)**

**Issue:**

Writing of this SDO should reset all parameters. The drive returns an abort code of 0606 0000, which means SDO hardware fault.

**Solution:**

Only the infrastructure of SDO1011 was implemented. The actual functionality was missing. This functionality was added and tested to reset parameters to default values.

- **CanOpen DS301 nodeguard is not responding. (2113)**

**Issue:**

The drive did not process node guarding messages (Index: 701, RTR, zero length). The incoming message was ignored.

**Solution:**

Processing of RTR messages was not built into the CANopen controller interface. To resolve this issue, the following were implemented: - Configuration of CANopen controller to accept incoming RTR messages (node guarding only). - Include RTR flag in message data, so that the port code recognizes the node guarding message.

- **CANopen Interface: NMT reset creates no bootup message. (2113)**

**Issue:**

CANopen specification requires a message after nmt reset (DS301). This message is currently not provided.

**Solution:**

Port code triggered bootup message transmission, but the request was not forwarded to the application code (CCanOpen). A new flag was added to forward the request.

**Version: 01-03-02-000 Release Date: October 11, 2010**

## General Issues

### Fixed Bugs

- **The maximum value in DRV.HELP for IL.KP is not correct. (2110)**  
**Issue:**  
The maximum value from DRV.HELP IL.KP should be 2,000 but it was reported incorrectly.  
**Solution:**  
The firmware has been modified to report the maximum value correctly.
- **On a 24A drive DRV.HELP WS.IMAX reports an incorrect maximum value. (2598)**  
**Issue:**  
When using a 24A drive and setting the MOTOR.IPEAK to a large value (greater than about 30A), you can not set WS.IMAX to a value larger than 6A.  
**Solution:**  
The firmware has been changed to report and use the correct maximum value.
- **DRV.DBLIMIT can not be set to ICONT of drive. (2595)**  
**Issue:**  
Using a 24A drive and with the MOTOR.IPEAK set to a value larger than 65.535A will give a incorrect maximum value for DRV.DBLIMIT. This will prevent you from entering a large value for DRV.DBLIMIT.  
**Solution:**  
The firmware has changed to report and use the correct maximum value.
- **Motor jumps when transitioning from analog velocity to digital position mode. (2477)**  
**Issue:**  
When using a digital input to change opmode and cmdsource, the motor will sometimes jump when transitioning from analog velocity to digital position mode.  
**Solution:**  
The motor no longer jumps when transitioning modes.
- **Fix the unexpected "Global Motion Task Warning" for motion tasks in negative direction. (2448)**  
**Issue:**  
A motion task in negative direction was triggered and the motion task was stopped in the middle via a DRV.STOP command. The n123 warning (Global Motion Warning) was accidentally shown.  
**Solution:**  
A bug was present in the source code responsible for creating the n123 warning when crossing the target position of a motion task upon a DRV.STOP command. This bug is fixed.
- **Modify CS.VTHRESH min and default value, and use filtered velocity for controlled stop. (2371)**  
**Issue:**  
Velocity threshold and default value for controlled stop are too high, and the velocity is too noisy.  
**Solution:**  
CS.VTHRESH min value was changed to 0, and default value was changed to 5 rpm. Velocity filtered by 10 Hz LPF (like VL.FBFILTER) is used for controlled stop.
- **Bode would sometimes fail due to negative limits. ()**  
**Issue:**  
Bode would sometimes fail.  
**Solution:**  
Negative limits are now written correctly on power up, removing the issue.

## Feature Changes

---

- **Reduce minimum value for DRV.DISTO so that the disable timeout can be disabled. (1819)**  
**Issue:**  
There is no way to disable the disable timeout.  
**Solution:**  
The range of DRV.DISTO minimum value is modified to allow setting it to 0, which disables the disable timeout.
- **VBUS.VALUE will be changed to float type, and recording it will show the value calculated based on the last 2 samples done at 16Khz. (1853)**  
**Issue:**  
User read only parameter VBUS.VALUE is an integer data type and this means the reportable value is quantized to 1 Volt, which is not enough. Second VBUS.VAULE variable is so filtered it is too sluggish to accurately catch rapidly rising bus voltages.  
**Solution:**  
VBUS.VALUE has been changed to float, and the deep moving average changed to averaging last 2 values sampled in 16Khz.

## Field Bus Specific Issues

### Fixed Bugs

---

- **Small changes were made to CANopen code to pass conformance tests. ()**  
**Issue:**  
The drive would fail the conformance test due to small configuration issues.  
**Solution:**  
Configuration issues fixed in EDS file and in firmware.

## Feature Changes

---

- **SDO object 606C is now scaled in units of 0.001 rpm. (2427)**

**Issue:**

The PDO and SDO of object 606C are scaled differently.

**Solution:**

Both the PDO and SDO of object 606C are now scaled in units of 0.001 rpm

- **Changed operation of the EtherCAT master mailbox counter to allow communication with master devices which are not standard conformant. ()**

**Issue:**

Some EtherCAT masters, which are not fully conformant to the specification, cannot communicate with the drive.

**Solution:**

Non-conformant drives can now communicate with the drive.

## New Features

---

- **Added object 0x3473 for CANopen access to the rotary switch. ()**

**New Feature Details:**

The rotary switch cannot be read via CANopen.

**Solution:**

Subindex 1 provides access to DIN.ROTARY, and subindex 2 gives access to DIN1.INV-DIN7.INV via bits 0 to 6.

- **Added object 0x35D2 for access to FB1.MECHPOS. ()**

**New Feature Details:**

An object is not provided for accessing mechanical position of feedback 1.

**Solution:**

This value is now available via object 0x35D2.

**Version: 01-03-01-000 Release Date: September 17, 2010**

## General Issues

### Fixed Bugs

---

- **Change the syntax for fault F106. (1540)**

**Issue:**

Users should be made aware that Fault 106 might happen after a firmware download.

**Solution:**

The phrase "(might occur when downloading firmware)" is added to the fault message.

- **Fix FB1.MEMDUMP Command for Biss feedback. (2578)**

**Issue:**

parameter FB1.MEMDUMP does not work properly for Biss analog feedback devices.

**Solution:**

parameter FB1.MEMDUMP for Biss Analog Feedback devices is now functioning properly.

- **The drive will intermittently not setup properly when using EnDat feedbacks. (2451)**

**Issue:**

When the drive powers on and you are using EnDAT feedback and MOTOR.AUTOSSET is 1 the drive intermittently does not get the motor identification data from the feedback device and will not setup the drive correctly. The drive will report a 534 "Failed to read motor parameters from feedback device" fault. This fault can be cleared and the drive will continue to operate correctly.

**Solution:**

The firmware is fixed so that data read from the EnDAT device is now consistently read correctly.

- **Drive will intermittently not setup up encoder resolution (FB1.ENCRES) properly when using EnDat 2.1 (2453)**

**Issue:**

When the drive powers on and you are using EnDAT 2.1 feedback, the drive intermittently does not get the correct value for the encoder resolution (FB1.ENCRES). The drive will not report any faults, but the motor commutation will not work properly. As a result when motion is commanded, the motor will not move, and the drive may generate a 503 fault - Bus Capacitor Overload. This problem can be cleared by toggling the feedback selection between 30 (Endat 2.1) and -1 (auto identify), or by power cycling the drive.

**Solution:**

The firmware has been fixed so that data read from the EnDAT device is now consistently read correctly.

- **Drive will intermittently issue a signal amplitude fault with Endat 2.1 or Biss analog feedbacks. (2426)**

**Issue:**

When the drive powers on or you switch feedback types using FB1.SELECT when using an EnDAT 2.1 or Biss Analog feedback device the drive intermittently will get a signal amplitude fault (fault 402). The fault cannot be cleared with a clear faults command in WorkBench. It can only be cleared by power cycling the drive.

**Solution:**

A new FPGA was created that will prevent this from occurring. The new FPGA that corrects this issue is version FP0004\_0100\_00\_02

- **The Homing complete output is "on" when the drive is first powered up. (2546)**

**Issue:**  
When the drive powers on when an absolute feedback device is connected (SFD, Endat, Biss, Hiperface or Resolver) the home "found" bit is true. As a result, the homing complete output is on as well. The intent of this was so that absolute feedback devices could execute a motion task without having to first be homed.

**Solution:**  
The firmware has been modified so that absolute feedback devices are not considered "homed" when they first power up (reference bug 2439). The ability to execute a motion task without first homing is now handled by the new parameter MT.HOMEREQUIRE (reference bug 2038).
- **Infrequent watchdog error upon receipt of drive discovery message from WorkBench. (2130)**

**Issue:**  
The drive would occasionally experience watchdog errors upon receipt of a drive discovery message when WorkBench was opened on a connected computer.

**Solution:**  
This issue has been corrected.
- **Running multiple instances of WorkBench can cause some drives not to appear in the Connect screen. ()**

**Issue:**  
If using multiple copies of WorkBench on a network, drives sometimes disappear from the Connect screen.

**Solution:**  
Drives now respond properly to discovery messages when multiple instances of WorkBench are on the network.
- **F703 occurs after disabling the drive for the first time. (2435)**

**Issue:**  
The drive issues an F703 fault (emergency timeout) when it receives a disable command for the first time after the boot process.

**Solution:**  
A variable was not initialized and therefore the disable function did not work properly. This issue has been resolved and the fault does not occur.
- **All homing modes should move to home position + home distance. (2191)**

**Issue:**  
When home distance is set to zero, motion should stop at the home position. Instead, the motion stops at a different position due to deceleration distance.

**Solution:**  
The target position is now set to home position + home distance, even when the home distance is set to zero.
- **Default value for VL.OBSBW is incorrect. (2205)**

**Issue:**  
The default value for VL.OBSBW is below the stated minimum value.

**Solution:**  
The default value has been updated from 0.3 Hz to the correct value of 30 Hz.
- **Units for IL.FF and IL.BUSFF are incorrect. (1539)**

**Issue:**  
IL.BUSFF and IL.FF units should be Arms.

**Solution:**  
IL.BUSFF and IL.FF units are now shown as Arms.
- **Drive issues wrong error message for IL.DLIMITP minimum value. (1593)**

**Issue:**  
When IL.DLIMITP is set to -1, the user gets a message stating "Argument bigger than maximum".

**Solution:**  
A signed integer compared to an unsigned integer caused this bug. This issue has been resolved.
- **Analog command does not work properly in position mode. (1600)**

**Issue:**  
When setting AIN.PSCALE to a value equals or greater than  $2^{32}$ , the actual scale is wrong. The scale resembles a numerical overflow or truncation. -->DRV.EN -->AIN.PSCALE 4294967296 -->AIN.PSCALE 4294967296.000 [Counts/M] -->AIN.OFFSET 1.000 [M] -->AIN.VALUE 1.016 [M] -->PL.CMD 4362692968.000 [Counts] -->AIN.OFFSET 2 -->AIN.VALUE 2.016 [M] -->PL.CMD 4362158398.000 [Counts]

**Solution:**  
The position command variable was 64 bits long and casting of this variable to 32 bits lost all data of the higher 32 bits. The casting was removed and now the command works properly.
- **Current sensor short cannot be reset. (1803)**

**Issue:**  
When the drive issues Fault 526: "Current sensor short", the WorkBench Disable and Clear Faults buttons do not clear this fault.

**Solution:**  
When the drive was in dynamic brake mode, the clearing of the relevant fault bit in the FPGA did not occur, because the drive was considered enabled. This issue has been fixed.
- **Record reports the value of MT.VCMD incorrectly. (2117)**

**Issue:**  
When using WorkBench to record MT.VCMD, the value is off by a factor of 4.

**Solution:**



Recording is now correct for MT.VCMD.

- **DCT capture result is incorrect when near zero. (2491)**

**Issue:**

Capture of the EtherCAT Distributed Clock (DCT) was not correct when the result was near zero.

**Solution:**

DCT is now accurate near zero.

- **Drive failure occurred when running feedback auto-identify on devices that do not support auto-ID. (2511)**

**Issue:**

The drive could intermittently fail during the auto-ID process.

**Solution:**

The issue has been resolved.

- **Wrong minimum and maximum values for BODE.IAMP. (2202)**

**Issue:**

The drive reported incorrect minimum and maximum values for BODE.IAMP, which could cause problems in WorkBench.

**Solution:**

These values are now reported correctly.

## New Features

---

- **Customer Profile Tables (1689)**

**New Feature Details:**

Users would like to download various S-Curve profiles and other customer defined profiles to be executed as motion tasks by the drive.

**Solution:**

Customer profile tables can now be loaded and executed by the drive.

## Field Bus Specific Issues

### Fixed Bugs

---

- **EtherCAT Stability Improvements (2435)**

**Issue:**

When using EtherCAT communications the drive would perform erratically and the ASCII SDO would take a long time to respond to the master.

**Solution:**

Several performance improvements and stability changes were made to the firmware allowing the drive to operate reliably.

- **The drive allows an EtherCAT mailbox size of only 512 bytes. (2449)**

**Issue:**

Users should be able to configure a mailbox size of 40 to 512 bytes. The drive, however, allows a mailbox size of only 512 bytes for the SyncManagers 0 and 1 mailbox. The drive should allow a mailbox size of 40 to 512 bytes for these state transitions.

**Solution:**

The drive now accepts even-numbered mailbox sizes between 40 and 512 bytes for the SyncManagers 0 and 1.

- **Scaling of PDO20A6 is not the same as PDO6063. (2344)**

**Issue:**

The fixed mapping for TxPDOS 0x1B23 contains the actual internal position feedback and the captured position (CAP0.PLFB, AKD.xml name: Latch 1 pn). The scaling is different, but should be the same.

**Solution:**

PDO20A6 now has the same scaling as PDO6063.

- **Small changes were made to EtherCAT communication to pass the conformance test. (1335)**

**Issue:**

EtherCAT communications were not fully conformant.

**Solution:**

Changes were made to fix the non-conformant issues.

## New Features

---

- **Support Modbus block read/write and single register access. (2464)**

**New Feature Details:**

Many Modbus HMIs require block read/write access.

**Solution:**

Block read/write is now supported, as well as reading individual registers (16 bits) out of 32 or 64 bit parameters.

- **Support PDO Free-Mapping for EtherCAT. (1677)**

**New Feature Details:**

Users would like to create dynamic PDO maps rather than relying on fixed mappings.

**Solution:**

Free mapping is now supported.

## General Issues

### Feature Changes

---

- **Add drive support for the Modbus TCP protocol. (1669)**

**Issue:**

Modbus TCP is a common communication protocol used primarily for HMI interfaces and low-priority communication.

**Solution:**

The drive now fully supports access to drive parameters over Modbus TCP, in addition to the existing Telnet interface and WorkBench software. See the User Guide and parameter reference for usage instructions. This feature does not currently support block read/write. A future update will include block read/write access. This feature also does not currently support partial reads of 64-bit parameters. A future update will include the ability to read 64-bit variables as 32-bit variables to help support more devices and programs.

- **Add support for single-ended pulse command inputs on X7 high-speed opto inputs. (2135)**

**Issue:**

Support for single-ended pulse command inputs was needed for the X7 high-speed opto inputs (pins 9 and 10).

**Solution:**

Support for single-ended pulse command inputs for the X7 high speed opto inputs has been added. This support was added to the firmware using the parameters FB2.XX. The new parameters are the source (FB2.SOURCE), the mode (FB2.MODE) and the resolution (FB2.ENCRESES). The emulated encoder input (X9 connector) modes can be defined using these keywords also, or with the previous keywords (DRV.EMUEMODE, DRV.EMUJERES).

- **Add support for Endat 2.2 feedback. (1776)**

**Issue:**

Support for Endat 2.2 encoders is required. Support is required for rotary single turn and multi-turn encoders and linear encoders.

**Solution:**

Support for Endat 2.2 encoders has been added to the firmware. Rotary single turn and multi-turn encoders are currently supported. The drive does not support linear Endat 2.2 encoders yet.

- **Add Mode 22-Command source/opmode change. (1603)**

**Issue:**

Applications require command source and opmode changes during operation via digital inputs.

**Solution:**

DINx.MODE 22 (command source/opmode change) was added.

- **Add support for Programmable Limit Switches for turning on outputs at programmed positions. (1673)**

**Issue:**

Additional support needed for Programmable Limit Switches.

**Solution:**

Added support for Programmable Limit Switches for turning on outputs at programmed positions.

- **Add DRV.HWENMODE. (1744)**

**Issue:**

A rising edge on the hardware enable input would always clear any faults on the drive. If you are using the drive with an EtherCAT or CANopen master, you may want to control the clearing of faults independently using the network.

**Solution:**

A new parameter DRV.HWENMODE has been added. This parameter controls whether or not the rising edge of the hardware enable clears any drive faults.

- 0 (default) = The rising edge of the hardware enable clears the drive faults.
- 1 = The rising edge of the hardware enable does not clear the drive faults.

The high/low state of the hardware enable is always used to control the active enable state of the drive.

- **Increase the maximum allowed position delta between two fieldbus position command values. (2136)**

**Issue:**

The motor moves in the wrong direction when the position delta between two fieldbus position command values is larger than 0.5 motor rev, which corresponds to  $2^{(FB1.PSCALE)} \text{Fieldbus-Counts}$ .

**Solution:**

Instead of only considering the position delta within one revolution (the lower FB1.PSCALE bits in the fieldbus position command value), the whole 32-bit position delta is now used for calculating a position delta within the drive. Thus the maximum position delta for the fieldbus command values is  $0.5 * 2^{(32-FB1.PSCALE)} \text{motor rev}$ , which corresponds to  $2^{*31} \text{Fieldbus-Counts}$ .

- **Added DRV.CMDDELAY to add delays in the command buffer for commands which take time to execute (such as DRV.EN). (2177)**

**Issue:**

Some command actions do not occur immediately (such as DRV.EN). When using the command buffer, this delay causes the en->move command sequence to fail.

**Solution:**

By adding DRV.CMDDELAY, you can insert a delay command into the command buffer. For DRV.EN, this delay allows the drive to enable before the motion command is given.

- **Update of the AKD XML File to version 1.09. (1335)**

**Issue:**

TwinCAT did not behave according to the EtherCAT conformance test tool during a Mailbox access (SDO exchange). The mailbox counter was not incremented by TwinCAT.

**Solution:**

The AKD XML file has been updated in order to activate the missing feature in TwinCAT (incrementing the mailbox counter for each mailbox access).

• **Add DS402-mode 8 - cyclic synchronous position mode. (1432)**

**Issue:**

The EtherCAT-conformance tool demands one of the cyclic set point modes (position, velocity, or torque). This mode works in user-scaled positions, whereas the interpolated position mode works in motor incremental units.

**Solution:**

This new mode is now implemented. Two new fixed PDO-mappings have been created for this mode: In the receive direction the mapping (0x1724) includes the object 0x607A sub 0 as target position. In the transmit direction (0x1B24), the mapping includes the object 0x6064 sub 0 as position actual value. This mode is supported starting with version 1.08 of the AKD.xml-file.

• **STO fault behavior change. (1384)**

**Issue:**

The STO fault appears upon power up, which causes a safety-chain deadlock.

**Solution:**

The STO fault will not occur unless software and hardware enable are on.

• **DS402-state machine should be influenced by the hardware-enable input. (1743)**

**Issue:**

No change of the state machine occurred if the hardware-enable signal was taken away and the drive was disabled.

**Solution:**

The default behavior is changed. If the hardware enable goes to 0, then the state of the state machine goes to "Switch On Disabled". This behavior can be switched off by setting bit 0 of FBUS.PARAM05 to 1.

• **Add DS402-support for parameters DOUTx.MODE, PL.ERRWTHRESH, IL.IFOLD, MOTOR.PHASE, REGEN.POWER, DRV.DISMODE, and MT.SET. (1796)**

**Issue:**

This feature addresses a customer request for SDO access to parameters.

**Solution:**

New objects:

<b>parameter</b>	<b>object (index/subindex)</b>
DOUT1.MODE	0x35AF sub 0
DOUT2.MODE	0x35B2 sub 0
PL.ERRWTHRESH	0x3483 sub 0
IL.IFOLD	0x3425 sub 0
MOTOR.PHASE	0x359C sub 0
REGEN.POWER	0x3416 sub 0
DRV.DISMODE	0x35FF sub 0
MT.SET	0x3431 sub 0

• **Add DS402-support for parameters VL.KVFF, MOTOR.INERTIA, MOTOR.KT, VL.ERR, WS.MODE, WS.IMAX, WS.DISTMIN, WS.DISTMAX, WS.T, WS.TDELAY1, WS.TDELAY2, WS.TDELAY3, WS.VTHRESH, WS.STATE, and IL.KACCCF. (1719)**

**Issue:**

This feature addresses a customer request for SDO access to parameters.

**Solution:**

New objects:

<b>parameter</b>	<b>object (index/subindex)</b>
VL.KVFF	0x354B sub 0
MOTOR.INERTIA	0x35AB sub 0
MOTOR.KT	0x3493 sub 0
VL.ERR	0x3407 sub 4
WS.MODE	0x3864 sub 0
WS.IMAX	0x3494 sub 1
WS.DISTMIN	0x36D1 sub 0
WS.DISTMAX	0x3494 sub 2
WS.T	0x36D0 sub 0
WS.TDELAY1	0x3863 sub 0
WS.TDELAY2	0x3865 sub 0
WS.TDELAY3	0x3494 sub 3
WS.VTHRESH	0x3494 sub 4
WS.STATE	0x3494 sub 5
WS.NUMLOOPS	0x36E2 sub 0
IL.KACCCF	0x3426 sub 0

• **Add DS402-support for parameters AIN.PSCALE, AOUT.PSCALE, MOTOR.CTF0, MOTOR.LQLL, MOTOR.POLES, MOTOR.R and WS commands. (2168)**

**Issue:**

This feature addresses a customer request for SDO access to parameters.

**Solution:**

New objects:

parameter object (index/subindex)

parameter	object (index/subindex)
AIN.PSCALE	0x3472 sub 0
AOUT.PSCALE	0x3471 sub 5
MOTOR.CTF0	0x3454 sub 0
MOTOR.LQLL	0x3455 sub 0
MOTOR.POLES	0x359D sub 0
MOTOR.R	0x3456 sub 0
PLS.P1 .. PLS.P16	0x34A0 sub 1..8
PLS.WIDTH1 .. PLS.WIDTH8	0x34A1 sub 1..8
PLS.T1 .. PLS.T8	0x34A2 sub 1..8
PLS.EN	0x34a3 sub 1
PLS.RESET	0x34a3 sub 2
PLS.MODE	0x34a3 sub 3
PLS.STATE	0x34a3 sub 4
PLS.UNITS	0x34a4 sub 0

- **Allow EtherCAT firmware download with 512 byte and 1024 byte mailbox size. (2243)**

**Issue:**

The software download via KAS was not possible because the EtherCAT state transition from Init -> Bootstrap was denied by the drive. This state was denied because, originally, a reconfigured mailbox size of 1024 bytes was required.

**Solution:**

The drive now allows a mailbox size of 512 bytes and 1024 bytes when switching from Init to Bootstrap state.

- **Correction of the electronic gearing behavior when hitting a hardware limit switch. (2362)**

**Issue:**

The electronic gearing class continued counting master pulses when hitting a hardware limit switch in a certain direction. This behavior let the following error grow. While this situation was pending, it would be problematic to release the hardware limit switch, since the position loop tries immediately to move the motor to PL.CMD. It appears as a runaway problem in the drive.

**Solution:**

The electronic gearing class no longer considers master signals, which try to move the motor in direction of an active hardware limit switch.

- **SDO access needed for WS.ARM. (2412)**

**Issue:**

SDO-Access needed for WS.ARM.

**Solution:**

SDO 0x3494 sub 6 implemented for WS.ARM.

- **Added new homing mode. (1709)**

**Issue:**

This feature was added to address customer requests that a new homing mode (Homing Mode 11) be added to the already existing homing modes. This new mode searches for the index signal without the need to identify a hardware limit switch, a home switch, or a mechanical stop prior to the index-signal detection.

**Solution:**

The new homing mode searches for the index. The motor starts rotating in the homing direction as soon as the homing is triggered. If the limit switch is active before the index, the motor turns its direction of rotation and searches for the index. As soon it finds the index, home position found status should be set. The actual position and command position is set to the home position.

- **VBUS.OVWTHRESH was changed to R/W. (1251)**

**Issue:**

The over voltage warning was not operative.

**Solution:**

VBUS.OVWTHRESH changed to be R/W with default 0 (which inhibits the warning). The user can define this parameter to allow the warning to appear.

- **Increase the fault log size. (1594)**

**Issue:**

The fault log size is too small.

**Solution:**

Fault log size was increased to 50 entries.

- **VBUS.UVFTHRESH was changed to R/W. (1790)**

**Issue:**

A customer requested an option to execute a controlled stop when main loss is discovered.

**Solution:**

VBUS.UVFTHRESH was changed to be read/write type and can now be stored on the NV. VBUS.UVFTHRESH default value is the value set on the EE (which is also the parameter minimum value) and its maximum value is VBUS.OVFTHRESH.

- **Changed active disable behavior on INMODE 13 and on DRV.DIS. (1874)**

**Issue:**

Confusion around the behavior of INMODE 13 and DRV.DIS resulted in a request to unite CS.TMAX and DRV.DISTO.

**Solution:**

CS.TMAX was removed and DRV.DISTO is activated whenever active disable is requested.

## Fixed Bugs

---

- **Digital input mode 1 (fault reset) would clear the software enable. (1744)**

**Issue:**

When you used only the digital inputs to control the drive, if you cleared a fault with a digital input configured as mode 1, the software enable would also be cleared and you could not enable the drive without sending a command using Telnet.

**Solution:**

DIN.MODE 1 (fault reset) was changed so that it does not clear the software enable.

- **DRV.HELP returned an inconsistent response. (1871)**

**Issue:** (Identified in Version 01-02-00-000)

DRV.HELP for FB1.HALLSTATE, DRV.SETUPREQLIST, and DRV.ONTIME returned a response that did not match the original command.

```
-->DRV.HELP FB1.HALLSTATE
Help for: FB1.HALLSTATE [Info] [Recordable]
-->
```

**Solution:**

DRV.HELP for FB1.HALLSTATE, DRV.SETUPREQLIST, and DRV.ONTIME now returns a consistent response.

- **Long strings would crash the drive. (1308)**

**Issue:** (Identified in Version 01-01-00-000)

If you send a long string to the drive using Telnet the drive crashed, either immediately or the next time you try to connect to the drive.

**Solution:**

The firmware now detects long strings (greater than 256 characters) and returns "Error: Command was not found."

- **RxPDOs were not configured as event-triggered by default. (1881)**

**Issue:**

All RxPDOs should be event-triggered by default.

**Solution:**

The default configuration of the transmission type has been set to event-triggered. Additionally, a bug in the event detection algorithm was fixed.

- **Electronic gearing was aborted when a HW or SW limit switch is triggered. (1974)**

**Issue:**

The drive moves a motor in "Electronic Gearing" mode and triggers a limit switch while the motor is in motion. The electronic gearing was aborted and therefore it was not possible for the drive to move the motor out of the limit switch.

**Solution:**

The electronic gearing function now remains active even if a limit switch has been triggered. This active state allows the drive to leave the limit switch in the opposite direction.

- **False brake fault conditions reported during brake enable/disable. (1857)**

**Issue:**

When enabling or disabling a motor brake, a 306: Brake Short Circuit Fault condition occurred intermittently on a working brake.

**Solution:**

The false brake faults no longer occur.

- **DRV.ENDEFAULT was not working on CANopen drives. (1328)**

**Issue:**

DRV.ENDEFAULT was ignored on CANopen drives regardless of CMDSOURCE value.

**Solution:**

The drive now prevents CANopen from disabling the drive upon power up. DRV.ENDEFAULT is now considered even if DRV.CMDSOURCE=1.

- **User could not enter maximum value of acceleration/deceleration parameters. (2098)**

**Issue:**

The user was not able to enter the maximum value of acceleration parameters in UNIT.ACCROTARY=3.

**Solution:**

The CUnitsConversion class has been corrected in order to allow setting the maximum allowed acceleration value, which is displayed in the DRV.HELP information.

- **Delay occurred when starting a Motion Task from the digital inputs. (2211)**

**Issue:**

The user has a 2 to 12 ms delay in starting a motion task from the digital inputs. This delay occurs in digital inputs modes 2 and 4.

**Solution:**

Digital input mode 2 and mode 4 were corrected to have a maximum delay of 1 ms.

- **Analog position mode correction. (2224)**

**Issue:**

A problem existed with the interpolation mechanism of the analog position mode.

**Solution:**

A bug existed in the interpolation mechanism of the analog position mode. The flag for new position command was missing, causing the interpolation to repeat on the same command.

- **DRV.STOP behavior corrected for motion in modes 2 (1987)**

• **DRV.STOP behavior corrected for motion in opmode 2. (1907)**

**Issue:**

A problem occurred when a motion task was running with a very low PL.KP gain and a DRV.STOP command was triggered while the motion task was in the deceleration phase. The software scope exposed that the motion task was triggered again, although a stop-procedure had been triggered.

**Solution:**

A race-condition was the root cause of this bug. The motion task class displayed that the stop-procedure is finished although the underlying trajectory generator was still active. Consequently, the motion task was triggered again when PL.CMD was set to PL.FB at the end of the stop procedure even though the motion task was not completed by the trajectory generator. This condition has been fixed.

• **Corrected the "target position reached" bit in DRV.MOTIONSTAT. (2239)**

**Issue:**

The user adjusts a sequence of motion tasks that are consecutively called (one motion task calls the next one). The error was that the "target position reached" flag in DRV.MOTIONSTAT was high after finishing the first motion task, although further motion tasks follow. This behavior also adversely affected digital output mode 3, which considers this particular bit in DRV.MOTIONSTAT.

**Solution:**

The line in the motion task class source code, which sets the target position reached flag too early, has been identified and has been removed.

• **Analog input low-pass filter blocked input. (1730)**

**Issue:**

If the low pass filter is set to any value below 4, then the input signal is blocked and no response occurred to a changing input signal.

**Solution:**

The minimal value allowed to be written to low-pass filter is now 1.

• **PDO scaling of DS402-object 0x606C sub 0 was wrong. (1681)**

**Issue:**

A still motor returned large values for the actual speed in PDO.

**Solution:**

The scaling was not correct for negative values. The value is now scaled in rpm/1000.

• **DRV.DISMODE=2 enables the drive automatically when HW-enable is set to 1. (2037)**

**Issue:**

The drive was creating motion when the hardware enable was set to 0. After stopping motion and setting the hardware enable to 1 again, the axis was enabled automatically. This happened only with DRV.DISMODE=2.

**Solution:**

The definition of DRV.DISMODE=2 is "Use a controlled stop to ramp down and then disable the drive". This setting is now fixed.

• **When the TwinCAT-EtherCAT-master is re-started, the axis does not move (when set to operation enabled in profile velocity mode). (2170)**

**Issue:**

When the TwinCAT-EtherCAT-master is re-started, the axis does not move (when set to operation enabled in profile velocity mode). The drive gets a communication fault and cannot be re-started.

**Solution:**

The fault situation was not handled correctly. This problem is fixed and the axis moves.

• **Correction of the motion abort when moving out of the limit switches. (2246)**

**Issue:**

You create a motion in DRV.OPMODE 2 (service motion) into a hardware limit switch and afterwards the motion stops. When you try to move out of the hardware limit switch via a service motion in the opposite direction, the motion is immediately aborted after starting that motion due to the behavior of the hardware limit switch code.

**Solution:**

The hardware limit handler now aborts only motion in direction of the limit switch and does not abort the motion when the motor leaves the limit switch.

• **The DS402-state machine does not change its state when software enable is removed via Telnet. (2102)**

**Issue:**

The external software disable does not change the state of the DS402-state machine from operation enable.

**Solution:**

The state of the DS402-state machine is now changed by an external software disable. This behavior can be switched off by setting bit 3 of FBUS.PARAM05 to 1.

• **Some objects in the fixed EtherCAT-PDOs are not scaled. (1915)**

**Issue:**

The actual position given by object 6063 and object 60C1 sub 1 and the latched values 20A0 to 20A3 are not scaled by FB1.PSCALE. Also, the object 60F4 (following error) is not scaled correctly.

**Solution:**

The objects 6063, 60C1 and 20A0 to 20A3 are now scaled via object 608F sub 1, which is connected to the parameter FB1.PSCALE, and gives the increments per motor revolution (power of 2).

• **Bit 5 of the DS402-control word does not work correctly in profile position mode. (2223)**

**Issue:**

If you try to start more than one motion task, the first works correctly, but the next ones are not stored to motion task 0.

**Solution:**

The bit 5 set to 0 works now correctly. When a first motion task is running and a second one is started with bit 5 = 0, the execution

of it is delayed until the first reaches its target position.

- **Bit 13 of the DS402-status word was not supported. (1720)**

**Issue:**

Bit 13 in the DS402-status word was not supported.

**Solution:**

Bit 13 is set when the following fault (F439) occurs. This condition can happen in all positioning modes (profile position, homing, interpolated position mode, cyclic synchronous position mode)

- **Position mode capture returns raw data results instead of position values that are adjusted for scaling and homing. (2262)**

**Issue:**

CAPx.PLFB returns raw data values that are not scaled or adjusted for homing as PL.FB is.

**Solution:**

The value returned by CAPx.PLFB is now scaled and homed. It will match what the user expects from PL.FB.

- **Wrong maximum value check returned for the MT.TNUM parameter. (2347)**

**Issue:**

A maximum value of 8 for the MT.TNUM parameter was allowed, but the AKD returns an error when sending the motion task with MT.TNUM=8 to the drive via the MT.SET command.

**Solution:**

The maximum value check has been changed from 8 to 7 for the MT.TNUM parameter.

- **CANopen SDO objects for the velocity channel biquad filters were not responding. (1929)**

**Issue:**

CANopen SDO objects for the velocity channel biquad filters were not responding to read or write requests.

**Solution:**

The SDO objects have been fixed and now function properly.

- **HOME.SET prevents motion in electronic gearing mode. (2269)**

**Issue:**

HOME.SET should not prevent any subsequent motion if the drive is enabled.

**Solution:**

Issuing HOME.SET no longer suppresses motion in electronic gearing mode.

- **DCT capture feature was incomplete. (2133)**

**Issue:**

Capture of the EtherCAT Distributed Clock (DCT) was not implemented.

**Solution:**

Capture of the EtherCAT Distributed Clock is now supported.

- **SDO-access to object 60FD sub 0 does not work. (2327)**

**Issue:**

The read access to 60FD sub 0 delivers 0 instead of the read value of the PDO.

**Solution:**

The read access to 60FD sub 0 now delivers the correct value.

- **Safe torque off warning is missing. (1384)**

**Issue:**

Safe torque off does not issue a fault until the user tries to make the drive active. As soon as the user tries to make the drive active, the drive faults. The drive should issue a warning when the drive is inactive and the safe torque is off.

**Solution:**

Added a warning to the state in which the drive is inactive and safe torque is off.