AKD®2G

EtherCAT and CANopen Manual

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Valid from firmware version 2.0
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Original Documentation

EtherCAT®

CANopen®

For safe and proper use, follow these instructions.
Keep them for future reference.

1 Revision History

Record of Document Revisions:

Revision	Remarks
A, 12/2018	Launch version

Trademarks

- AKD is a registered trademark of Kollmorgen Corporation
- SynqNet is a registered trademark of Motion Engineering Inc.
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Current patents

- US Patent 8,154,228 (Dynamic Braking For Electric Motors)
- US Patent 8,214,063 (Auto-tune of a Control System Based on Frequency Response)

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

2 Table of Contents

3 EtherCAT and CANopen Overview

3.1 AKD2G vs. AKD: EtherCAT and CANopen

With the introduction of multi-axis operation, AKD2G has substantial changes to EtherCat and CANopen. The entire manufacturer object range (2000h-5FFFh) has been updated to support multi-axis objects and group objects based on their keyword mapping. The device profile objects for Axis 1 are in the same location, while Axis 2 objects are at an 800h offset. For example, Axis 1 control word is 6040h and Axis 2 control word is 6840h.

Several fieldbus related keywords have changed from AKD1. The FBUS.PARAM keywords changed to more specific keywords under ECAT.*, CANBUS.*, AXIS#.CANBUS.*,CANOPEN.*, and AXIS#.CANOPEN.*.

The scaling of acceleration, velocity, and position values now use the CANopen specification as the default scaling behavior (see CANopen Scaling (➜ p. 9)).

EtherCat PDO mappings now support up to 14 objects in both directions, up to 28 objects total, when running 4kHz-1kHz cycle times and 30 objects in both directions, 60 objects total, when running 2kHz and slower.

Fixed PDO maps have been reduced in size to scope them a bit better to specific operation modes. Multiple fixed PDOs can be assigned together now as well as adding the dynamic PDO maps. See Fixed PDO Mappings (➜ p. 16) and Flexible PDO Mappings (➜ p. 17).

The default mode of operation has changed from interpolated mode to cyclic position mode, as recommended by the EtherCat Technology Group.

There are multiple product codes for the EtherCat ESI file to match to devices for single/multi-axis. Currently there are multiple files for each product code. The file name resembles the corresponding drive models that it covers. The revision number within the ESI file now maps to the release number. There will be multiple revision numbers for each product code as new releases come out. ECAT.PRINTESI (➜ p. 124) will print out the corresponding ESI file product/revision code that matches the current drive model/release number.

3.2 CANopen Scaling

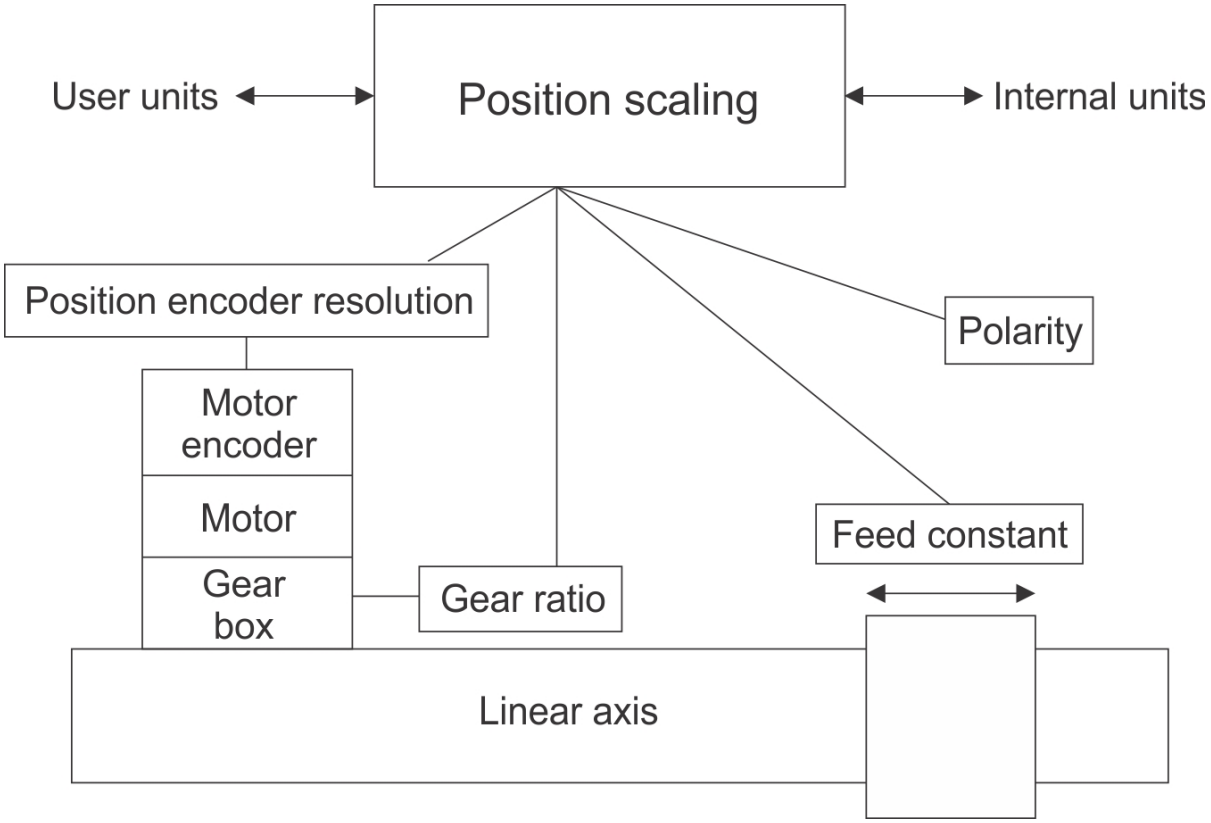
Scaling of position, velocity, and acceleration values are calculated differently depending on the setting of CANOPEN.WORKBENCHUNITS (➜ p. 118). When this is set to 0 (default), the CANopen scaling factors are used described below. When set to 1, the units defined by AXIS#.UNIT.* keywords (AXIS#.UNIT.PROTARY , AXIS#.UNIT.VROTARY , etc) will be used. The scale factors selected will be applied to all CANOpen objects, including manufacturer specific and drive profile objects.

NOTE

For ease of use, it is recommended leaving CANOPEN.WORKBENCHUNITS at 0 to use CANopen scaling. When this is set to 1, the values returned by fieldbus objects may or may not be scaled 1000:1 to improve resolution. See CANopen Object Table (➜ p. 25) for which values are scaled 1:1 vs 1000:1 if WorkBench scaling is used.

3.2.1 CANopen Position Scaling using 0x6091/0x6092

CANopen position scaling concept diagram:



The calculation of the position values is done by the following formula:

```
position value = (position internal value * feed constant) / (position
encoder resolution * gear ratio)
```

The position internal value is given in internal units (encoder increments). For calculation of the position internal values from the target position values the formula is transposed to:

```
position internal value = (position value * position encoder resolution *
gear ratio) / feed constant
```

To simplify the conversion, one can leave gear ratio (0x6091S1 and 0x6091S2) and feed constant revolutions (0x6092S2) set to 1 and only modify the feed (0x6092S1) as number of units per revolution desired: position user value = position internal value * feed / encoder resolution. If units in degrees are desired, set feed (0x6092S1) to 360 units per revolution.

3.2.1.1 0x6091 – Gear Ratio

This object defines the number of motor shaft revolutions per driving shaft revolution. The gear ratio is calculated by the following formula:

```
gear ratio = motor shaft revolutions / driving shaft revolutions
```

Index	Sub-Index	Data Type	Access	PDO Mapping	
0x6091	0x0	USINT	RO	false	Highest sub-index supported (always 3)
	0x1	UDINT	RW	false	Motor revolutions - Axis 1
	0x2	UDINT	RW	false	Shaft revolutions - Axis 1

3.2.1.2 0x6092 – Feed Constant

This object defines the ratio of feed in position units per driving shaft revolutions. The feed constant is calculated by the following formula:

```
feed constant = feed / driving shaft revolutions
```

Index	Sub-Index	Data Type	Access	PDO Mapping	
0x6092	0x0	USINT	RO	false	Highest sub-index supported (always 3)
	0x1	UDINT	RW	false	Feed - Axis 1
	0x2	UDINT	RW	false	Shaft revolutions - Axis 1

3.2.2 Position Counts (actual position internal 0x6063)

Position encoder resolution used in the above calculations is always 2^32 counts/revolution for the internal AKD2G position values regardless of the actual feedback resolution. When reading certain CANopen values that are given in internal units, use AXIS#.CANOPEN.PSCALE (➜ p. 106) to control the resolution of the user value. The value presented via CANopen is shifted by the number of bits specified by the PSCALE parameter.

```
Value = (CANopen value) / 2^(AXIS#.CANOPEN.PSCALE)
```

3.2.3 CANopen Velocity Scaling Using 0x6096

All velocity values over CANopen use the scaling defined by object 0x6096, velocity factor. Velocity values are presented as position units/s, where position units are defined by the objects above (0x6091/0x6092).

```
Velocity factor = Velocity Numerator / Velocity Denominator
```

```
Velocity value = ((velocity internal value * feed constant) / (encoder
resolution * gear ratio)) * velocity factor

or:

Velocity value = (position value / sec) * velocity factor
```

Index	Sub-Index	Data Type	Access	PDO Mapping	
0x6096	0x0	USINT	RO	false	Highest sub-index supported (always 3)
	0x1	UDINT	RW		Velocity Factor Numerator - Axis 1
	0x2	UDINT	RW		Velocity Factor Denominator - Axis 1

NOTE

To get a velocity in revs per second, make the denominator equal counts per rev and to get revs per minute, also set numerator to seconds in a minute (See examples)

3.2.4 Examples

3.2.4.1 CANOPEN.WORKBENCHUNITS = 0 (default, recommended setting)

Position units in default 2^16 counts/rev. Velocity units in default counts/s.

```
0x6091S1 = 1 (motor revs)
0x6091S2 = 1 (shaft revs)
0x6092S1 = 65536 (feed)
0x6092S2 = 1 (shaft revs)
0x6096S1 = 1 (velocity numerator)
0x6096S2 = 1 (velocity denominator)
```

To give a target position of 180 degrees, one would command object 607Ah to 32768 counts:

```
CAN user value = (2^16 counts/rev / 360 deg/rev) * desired position ->
182.0444 counts/deg * 180 deg = 32768 counts
```

To give a target velocity of 100 rpm, one would command object 60FFh to 109227 counts/s. The desired RPM is first converted into RPS to match the per second nature of CANopen velocity units and then multiplied by the number of counts per rev to give us the counts per second value needed.

```
CAN user value = (100 rpm / 60 sec/m) * 65536 counts/rev = 1.6667 rps *
65536 counts/rev = 109266.6667
```

Position units in 1000*deg. Velocity units in rpm.

```
0x6091S1 = 1 (motor revs)
0x6091S2 = 1 (shaft revs)
0x6092S1 = 36000 (feed) - 360 deg * 1000 to get some extra resolution
0x6092S2 = 1 (shaft revs)
0x6096S1 = 60 (velocity numerator) - seconds in a minute to convert
counts per second to counts per minute
0x6096S2 = 36000 (velocity denominator) - counts per rev to convert
counts per second to revs per second
```

To give a target position of 180 degrees, one would command object 607Ah to 18000:

```
CAN user value = (36000 counts/rev / 360 deg/rev) * desired position ->
100 counts/deg * 180 deg = 18000 counts
```

To give a target velocity of 100 rpm, one would command object 60FFh to 100 rpm. The desired RPM is first converted into RPS to match the per second nature of CANopen velocity units and then multiplied by the number of counts per rev to give us the counts per second value needed. Then we apply the velocity factor to the counts per second value, which gives us the RPM.

```
CAN user value = (100 rpm / 60 sec/m) * 36000 counts/rev * velocity
factor =
1.6667 rps * 36000 counts/rev * 60/36000 = 100rpm
```

3.2.4.2 CANOPEN.WORKBENCHUNITS = 1 (legacy, not recommended)

Position in degrees (note the loss in resolution by using this method with only a full degree worth of resolution available). Velocity in rpm.

CANopen scaling objects ignored

UNIT.PROTARY = degrees

UNIT.VROTARY = rpm

To give a target position of 180 degrees, one would command object 607Ah to 180.

To give a target velocity of 100rpm, one would command object 60FFh to 100.

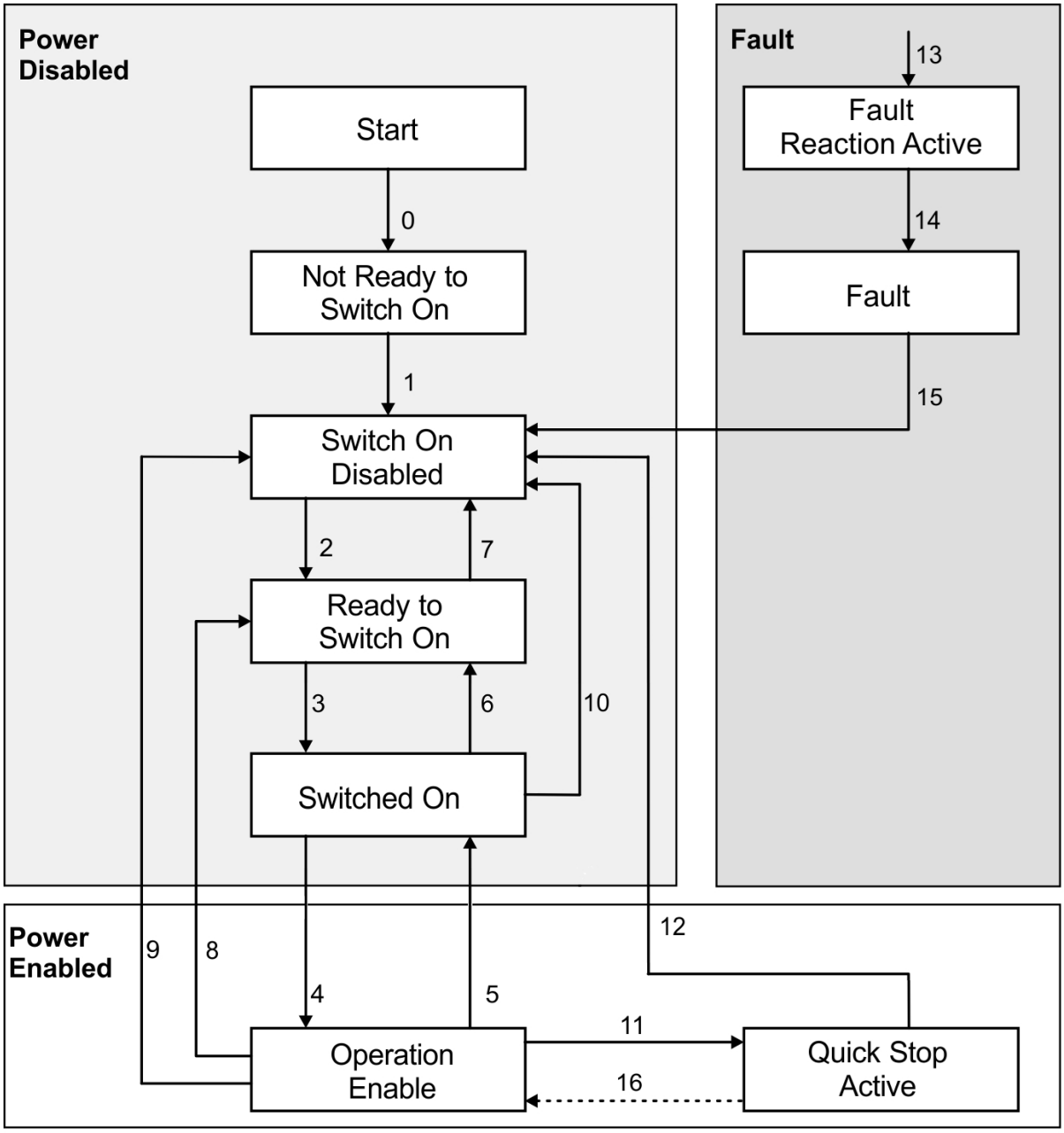
3.3 Device Control (dc)

The device control of the AKD2G can be used to carry out all the motion functions in the corresponding modes. The control of the AKD2G is implemented through a mode-dependent state machine. The state machine is controlled through Object 6040h: Control word (DS402) (➜ p. 85). The mode setting is made through Object 6060h: Modes of Operation (DS402) (➜ p. 88). The states of the state machine are indicated in Object 6041h: Status word (DS402) (➜ p. 86). There are separate state machines for each axis.

NOTE

The fieldbus state machine will control the axis as long as AXIS#.CMDSOURCE is equal to Fieldbus. In order to enable the axis via WorkBench, AXIS#.CMDSOURCE should be changed to Service mode.

3.3.1 State Machine (DS402)



3.3.2 States of the State Machine

State	Description
Not Ready for Switch On	Axis is not ready to switch on, initialization has not completed.
Switch On Disable	Axis is ready to switch on, parameters can be transferred, the bus voltage can be switched on, motion functions cannot be carried out yet.
Ready to Switch On	Bus voltage may be switched on, parameters can be transferred, motion functions cannot be carried out yet.
Switched On	Bus voltage must be switched on, parameters can be transferred, motion functions cannot be carried out yet.

State	Description
Operation Enable	No fault present, output stage and motion functions are enabled.
Quick Stop Active	Drive has been stopped with the emergency ramp, output stage is enabled, motion functions are not enabled.
Fault Reaction Active	A fault has occurred, the drive is in process of stopping with the quickstop ramp.
Fault	A fault is active, the drive has been stopped and disabled.

3.3.3 Transitions of the state machine

The state transitions are affected by internal events (ex: switching off the bus voltage, WorkBench enable/disable) and by the flags in the control word (bits 0,1,2,3,7).

Transition	Event	Action
0	Reset	Initialization
1	Initialization completed successfully. The axis is ready to operate.	None
2	Bit 1 Disable Voltage and Bit 2 Quick Stop are set in the control word (Shutdown command). Bus voltage may be present.	None
3	Bit 0 is also set (Switch On) and bus voltage is present	None
4	Bit 3 is also set (Enable Operation)	Torque is applied to axis and motion function is enabled, depending on the mode that is set.
5	Bit 3 is canceled (Disable Operation)	Output stage is disabled. No torque applied to motor.
6	Bit 0 is canceled (Shutdown)	None
7	Bits 1 and 2 are canceled (Quick Stop/Disable Voltage)	None
8	Bit 0 is canceled (Shutdown)	Output stage is disabled. No torque applied to motor.
9	Bit 1 is canceled (Disable Voltage)	Output stage is disabled. No torque applied to motor.
10	Bits 1 and 2 are canceled (Quick Stop/Disable Voltage)	Output stage is disabled. No torque applied to motor.
11	Bit 2 is canceled (Quick Stop)	Drive is stopped with the emergency braking ramp. The output stage remains enabled. Setpoints are canceled (motion block number, digital setpoint, speed for jogging or homing). Bit 2 must be set again to perform any further motion.
12	Bit 1 is canceled (Disable Voltage)	Output stage is disabled. No torque applied to motor.
13	Fault reaction active	Execute appropriate fault reaction

Transition	Event	Action
14	Fault reaction is completed	Drive function is disabled. The power section may be switched off.
15	"Fault Reset" command received from host	A reset of the fault condition is carried out if no fault exists currently on the drive. After leaving the state Fault the Bit7 'Reset Fault' of the control word must be cleared by the host.

3.4 Fixed PDO Mappings

Various ready-to-use mappings can be selected for cyclic data exchange via SDO's of the object 0x1C12 and 0x1C13. Using object 0x1C12 subindex 1 (Sync Manager 2 assignment), PDO mappings for the cyclic command values can be set with the values 0x1600-0x17FF. Using object 0x1C13 subindex 1 (Sync Manager 3 assignment), a PDO mappings for the cyclic actual values can be set via the data 0x1A00-0x1BFF.

Use the sequence below to select the fixed command value mapping 0x1700 via SDO's:

1. SDO write access to object 0x1C12Sub0 Data:0x00
2. SDO write access to object 0x1C12Sub1 Data:0x1700
3. SDO write access to object 0x1C12Sub0 Data:0x01

NOTE

Axis 1 fixed PDOs use Axis 1's object definitions and Axis 2 fixed PDOs use Axis 2's object definitions (ie: Axis 1 statusword = 0x6041, Axis 2 statusword = 0x6841)

NOTE

Multiple fixed mappings can be selected; however, mappings that duplicate variables are not allowed to be selected at the same time.

3.4.1 Fixed RX PDOs

PDO Mapping	Mode	Entries
0x1620	N/A	Digital Output Control 0x3601Sub1 (4 bytes)
0x1700 (Axis 1) 0x1720 (Axis 2)	Cyclic Position	Control Word 0x6040 (2 bytes), Target Position 0x607A (4 bytes)
0x1701 (Axis 1) 0x1721 (Axis 2)	Profile Velocity	Control Word 0x6040 (2 bytes), Target Velocity 0x60FF (4 bytes)
0x1702 (Axis 1) 0x1722 (Axis 2)	Profile Torque	Control Word 0x6040 (2 bytes), Target Torque 0x6071 (4 bytes)
0x1703 (Axis 1) 0x1723 (Axis 2)	Interpolated Position	Control Word 0x6040 (2 bytes), 1st Position Set-point 0x60C1Sub1(4 bytes)
0x1704 (Axis 1) 0x1724 (Axis 2)	N/A	Touch Probe Function

3.4.2 Fixed TX PDOs

PDO Mapping	Mode	Entries
0x1A20	N/A	Digital Inputs 0x60FD (4 bytes)
0x1B00 (Axis 1) 0x1B20 (Axis 2)	Cyclic Position and Interpolated Position	Status Word 0x6041 (2 bytes), Actual Position 0x6064 (4 bytes), Following Error Actual 0x60F4 (4 bytes)
0x1B01 (Axis 1) 0x1B21 (Axis 2)	Profile Velocity	Status Word 0x6041 (2 bytes), Actual Position 0x6064 (4 bytes), Actual Velocity 0x606C (4 bytes)
0x1B02 (Axis 1) 0x1B22 (Axis 2)	Profile Torque	Status Word 0x6041 (2 bytes), Actual Position 0x6064 (4 bytes), Actual Torque 0x6077 (4 bytes)
0x1B03 (Axis 1) 0x1B23 (Axis 2)	N/A	Touch probe status 0x60B9
0x1B04 (Axis 1) 0x1B24 (Axis 2)	N/A	Touch probe position 1 positive value 0x60BA, Touch probe position 1 negative value 0x60BB
0x1B05 (Axis 1) 0x1B25 (Axis 2)	N/A	Touch probe position 2 positive value 0x60BC, Touch probe position 2 negative value 0x60BD

The objects, which are mapped into the fixed PDOs can be read via the subindices 1 to n of the above indices. The number of mapped entries is available by reading subindex 0 of the above indices.

3.4.2.1 Example

A read access to object 1702 sub 0 gives a value of 2, a read on subindex 1 gives 0x60400010, on subindex 2 0x60710020.

3.5 Flexible PDO Mappings

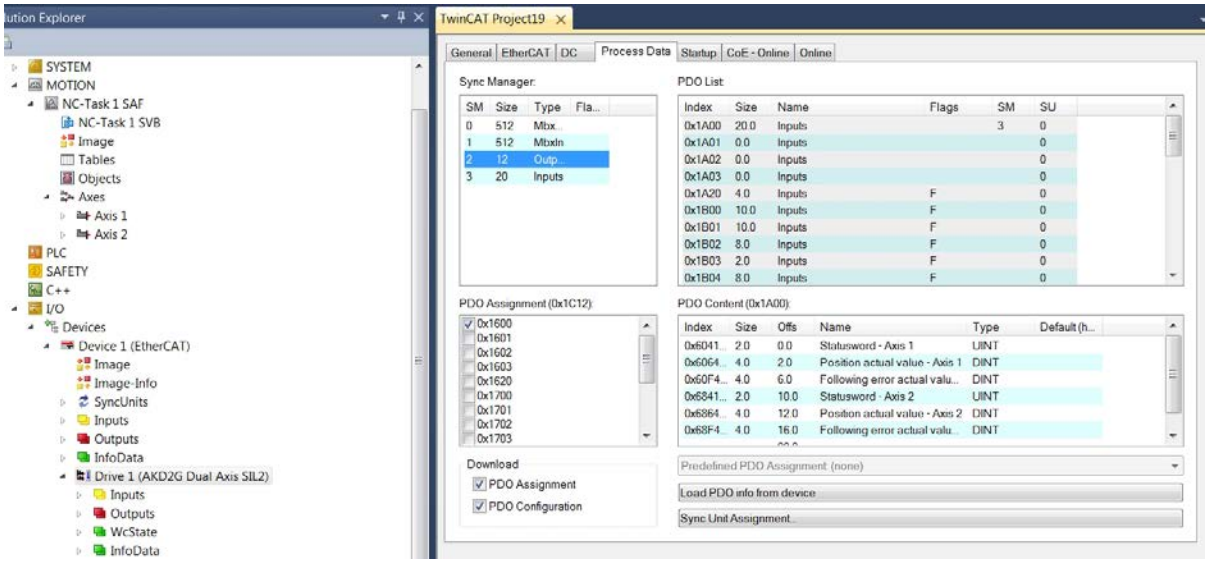
In addition to the fixed PDO mapping the so-called flexible mapping of real-time objects is possible.

NOTE

Available objects for PDO mapping are listed in the object dictionaries (Appendix). All objects with the entry "yes" in column "PDO map." can be used.

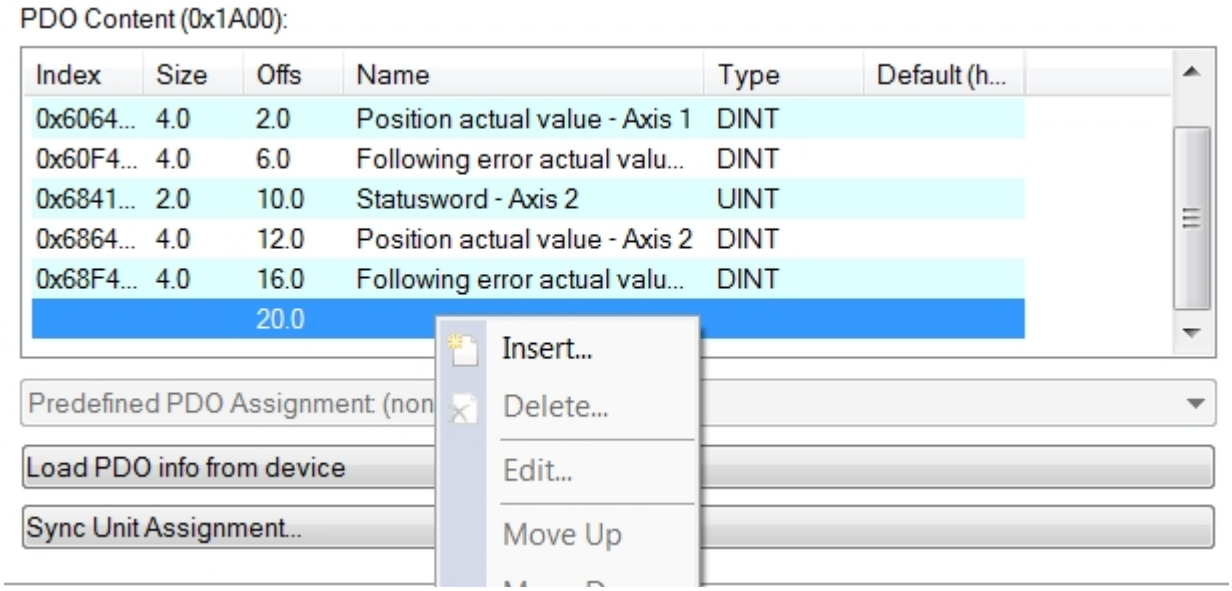
Flexible mapping has restrictions. The allowed PDOs have up to 32 bytes (Tx) or 20 bytes (Rx). They are built from smaller PDO modules with a maximum length of 8 bytes. These are built by using the mapping objects 0x1600 to 0x1603 and 0x1a00 to 0x1a03.

By default, the AKD2G is configured to use the flexible mapping object 0x1600 and 0x1A00 setup for cyclic position mode. These can have objects added and deleted as different applications require. The cyclically used data are visible in the PDO-assignment window for the Inputs and Outputs of the Sync Managers.

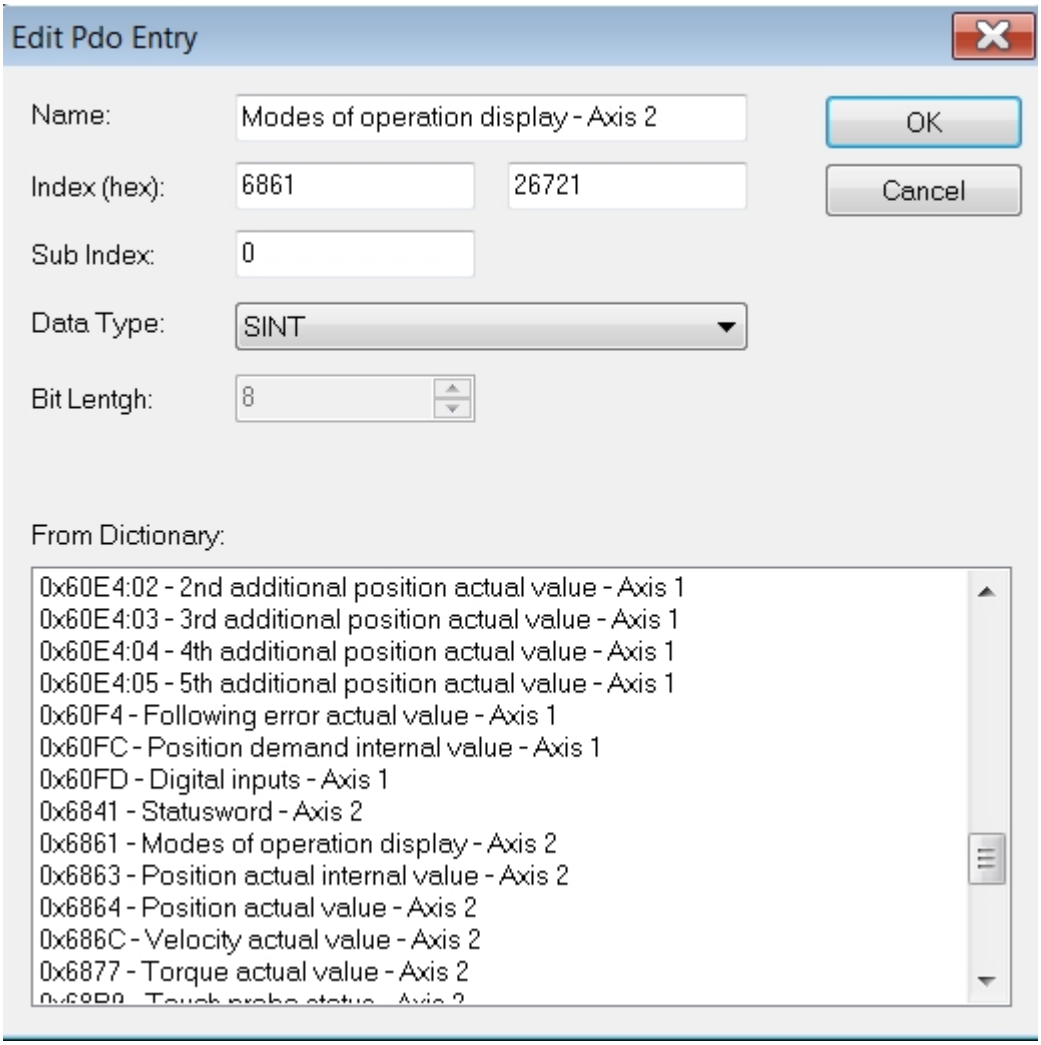


3.5.1 Example: Flexible PDO Mapping in TwinCat

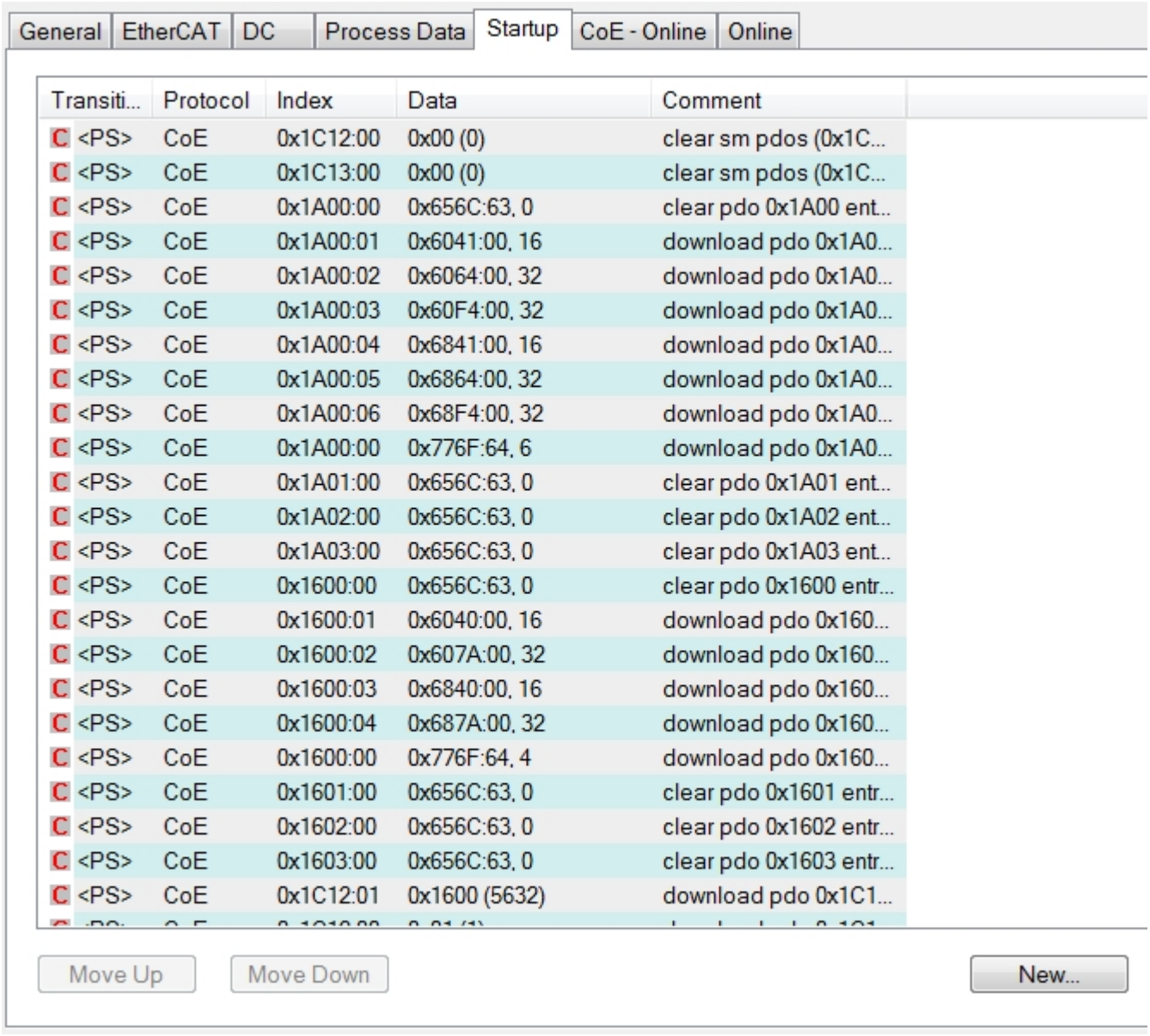
Objects can be added/deleted from the default 0x1600/0x1A00 PDO maps.



A list of possible objects for the mapping will be shown and a new entry can be chosen.

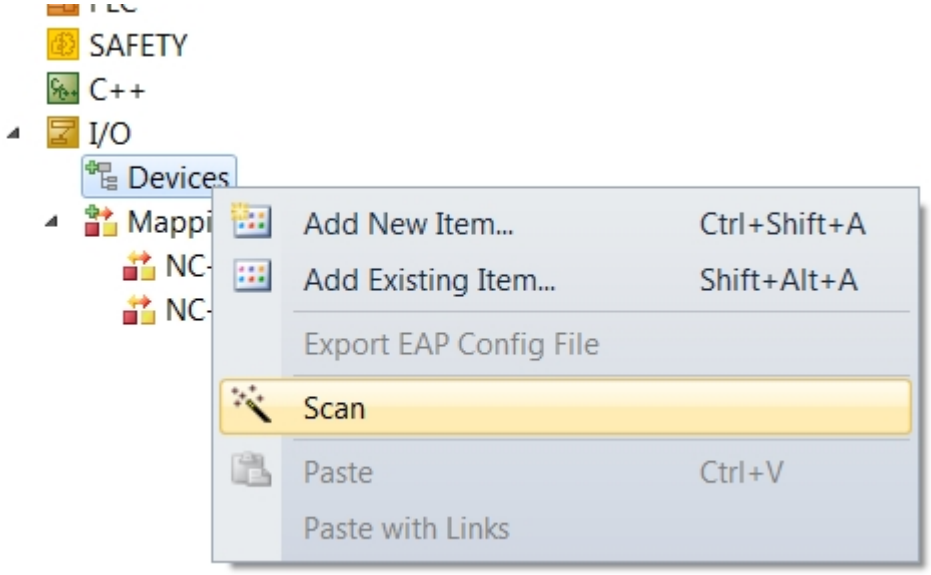


This results in updating the start-up script that TwinCat uses to configure the PDO maps when switching into OP mode:

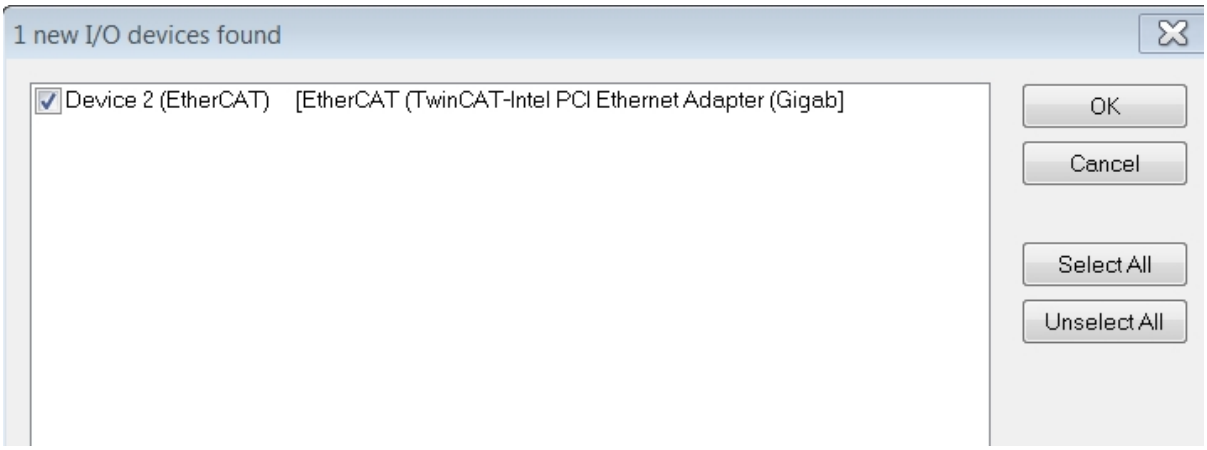


3.6 TwinCAT Setup Example

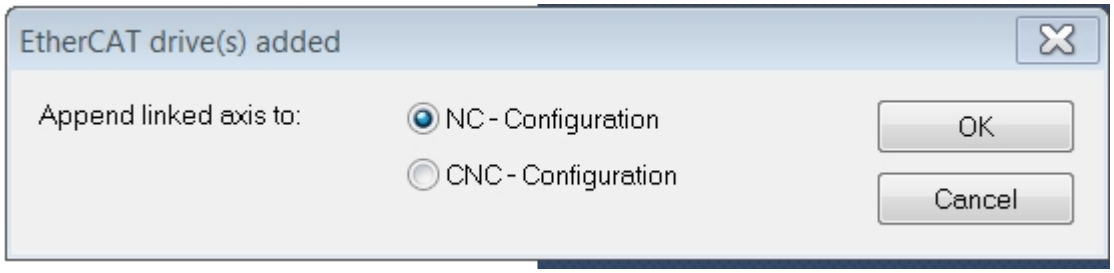
By default, when you add an AKD2G device in TwinCat, it will be linked to an NC-Task allowing manual and primitive control functions to control each axis. This example walks through setting up an AKD2G in TwinCat from scratch. First, we scan for devices and click **OK** on the hint about not being able to find all devices.

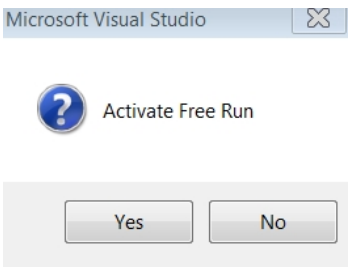


If TwinCat was installed correctly with correct network card, it should find an EtherCat master. Select it and click **OK** and then click **Yes** to scan for boxes.

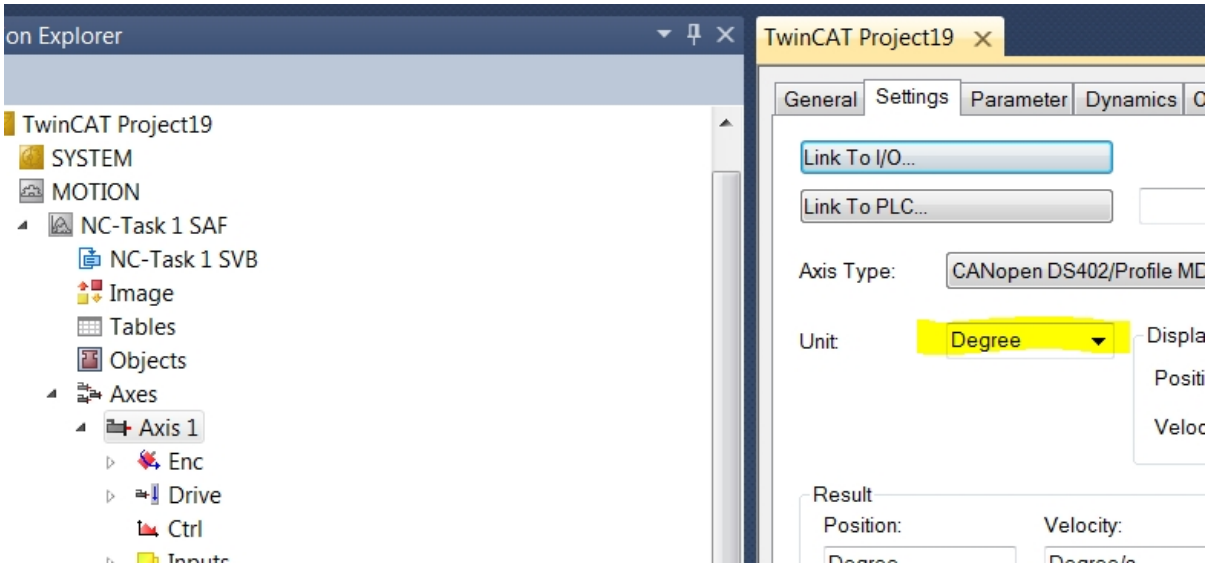


It will ask to link axes to NC, select **OK**, and click **Yes** to activate free run.

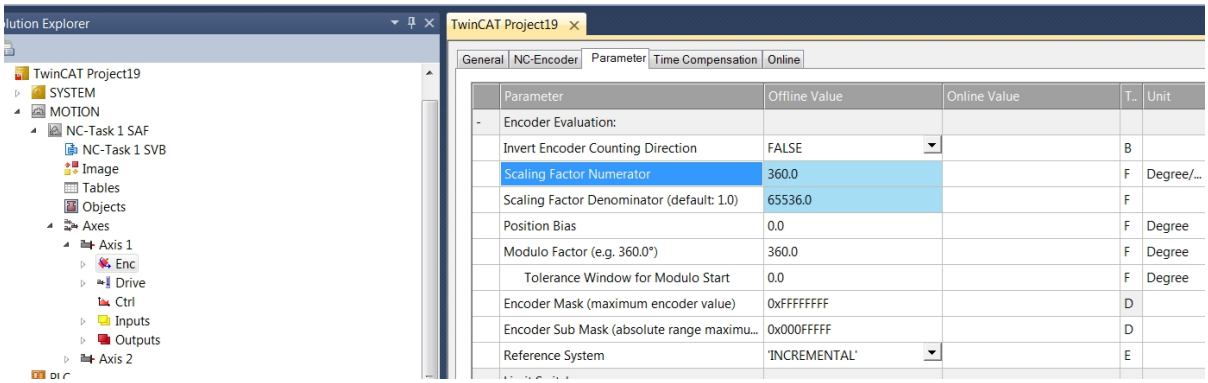




By Default, the AKD2G uses scaling such that there are 65536 counts per revolution. Units can be updated in the NC configuration to convert the displayed actual and target values in degrees. Under MOTION->NC-Task 1 SAF->Axes->Axis 1, click the **Settings** tab and change **Unit** to Degree.

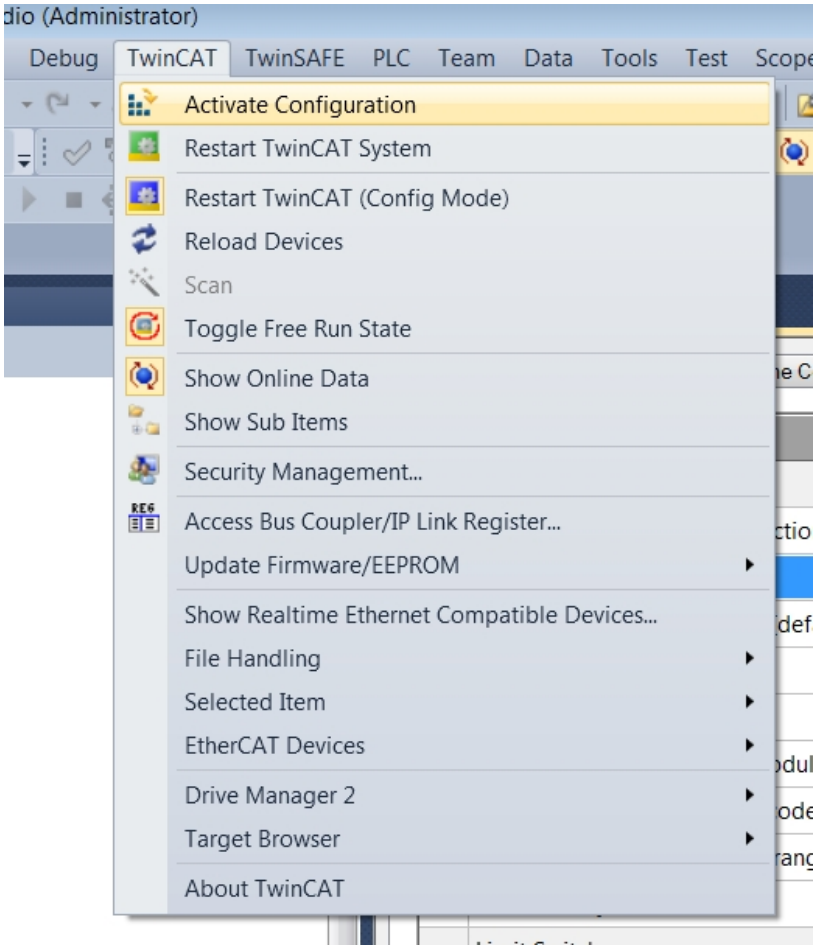


Under MOTION->NC-Task 1 SAF->Axes->Axis 1->Enc, click on the **Parameter** tab and adjust the Numerator/Denominator scaling to be 360 / 65536 to scale the AKD2G 65536 position counts in degrees.

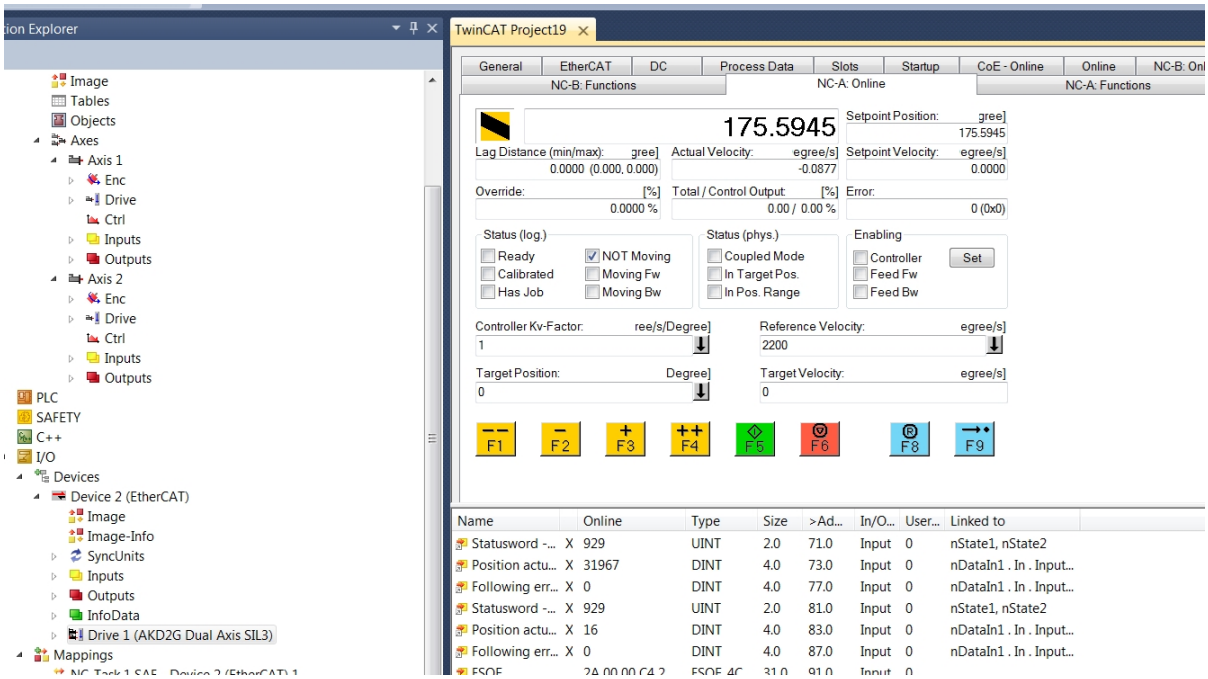


Repeat the process on Axis 2 to setup the units to be the same.

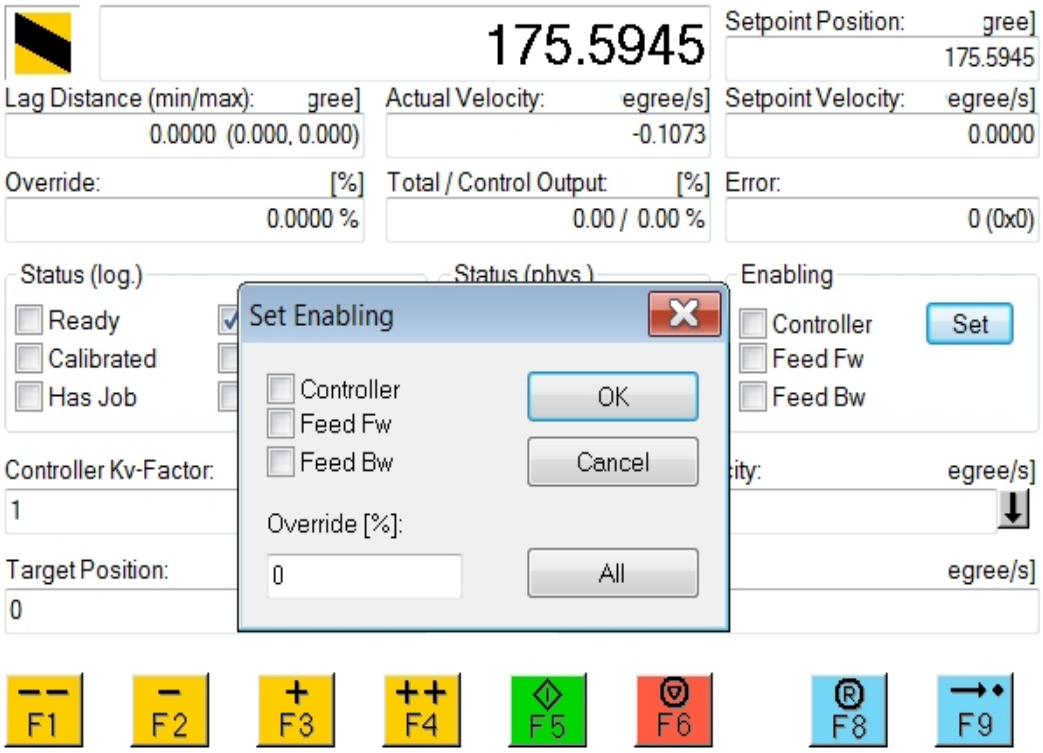
Now click **Activate Configuration**. Click on **OK** to activate the configuration and **OK** to go into Run Mode.



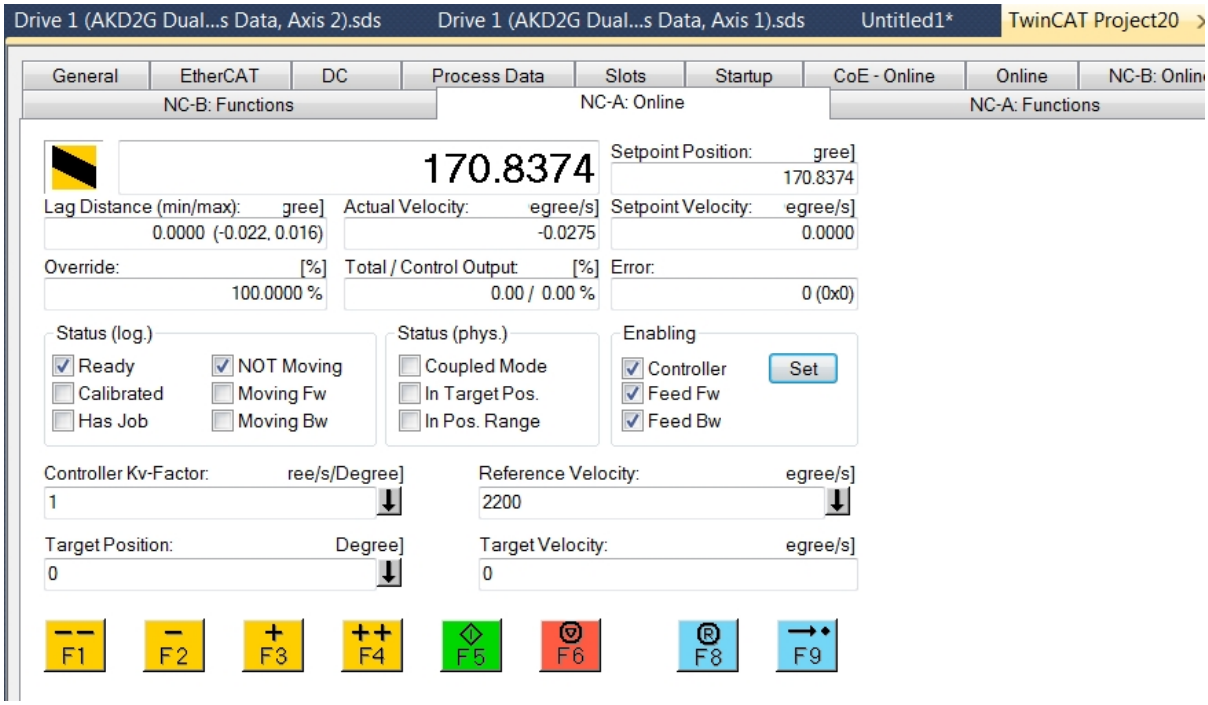
Now on the Drive 1 view under NC-A: Online and NC-B: Online, the position and velocity should be indicated.



To enable the drive, click **Set**, and then **All**.



The axis should now be enabled, indicated by "Ready" and "NOT moving" being checked, as well as the drive display being green:



The **F1-F4** buttons can now be used to jog the axis at varying speeds.

F5 will execute a move if you input a target position with target velocity.

F6 halts the move.

F8 is used to reset the axis in the event of any faults.

F9 is used to perform a calibration routine, but requires mapping touch-probe functions and setting up sensors. This is not covered in this example.

NC-A/B: Functions can also be used to setup primitive logic moves like reversing motion, move to absolute/relative positions, continuous motion, etc.

3.7 CAN Bus Communications

AKD2G drives conform to ISO 11898 (CAN high-speed).

3.7.1 Baud Rate

The CANOpen standard defines a set of Baud rates that can be supported. All the nodes on the CAN network must be operating at the same rate.

The Baud rate of each AKD2G drive is set with CANBUS.BAUD (➜ p. 110).

Due to the electrical characteristics of a CAN network, the maximum length of a CAN network is dependent upon the Baud rate chosen.

CAN Baud Rate (CANBUS.BAUD)	Maximum Bus Length (m)
1000k	25
500k	100
250k	250
125k (default)	500

3.7.2 Node ID

Each CANopen node on a CAN network needs a unique ID. No two nodes can have the same node number. The node number for each AKD2G drive is set with CANBUS.NODEID (➜ p. 112).

3.8 CANopen Object Table

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x1000	0x0	UDINT	-	-	ro	false	Device type
0x1001	0x0	USINT	-	-	ro	false	Error register
0x1003	0x0	USINT	-	-	rw	false	Number of errors
	0x1 to 0xA	UDINT	-	-	ro	false	Standard error field
0x1005	0x0	UDINT	-	-	rw	false	COB-ID SYNC
0x1006	0x0	UDINT	-	-	rw	false	Communication cycle period
0x1009	0x0	STRING(6)	-	-	ro	false	Manufacturer hardware version
0x100A	0x0	STRING(60)	-	-	ro	false	Manufacturer software version
0x100C	0x0	UINT	-	-	rw	false	Guard time

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x100D	0x0	USINT	-	-	rw	false	Life time factor
0x1010	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	Save all parameters
0x1011	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	Restore all default parameters
0x1012	0x0	UDINT	-	-	rw	false	COB-ID Time Stamp
0x1014	0x0	UDINT	-	-	rw	false	COB-ID EMCY
0x1016	0x0	UDINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	Consumer heartbeat time
0x1017	0x0	UINT	-	-	rw	false	Producer heartbeat time
0x1018	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	false	Vendor-ID
	0x2	UDINT	-	-	ro	false	Product code
	0x3	UDINT	-	-	ro	false	Revision number
	0x4	UDINT	-	-	ro	false	Serial number
0x1026	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	wo	true	StdIn
	0x2	USINT	-	-	ro	true	StdOut
0x1200	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	false	COB-ID client to server (rx)
	0x2	UDINT	-	-	ro	false	COB-ID server to client (tx)
0x1400	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	COB-ID used by RPDO1
	0x2	USINT	-	-	rw	false	Transmission type
0x1401	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	COB-ID used by RPDO2
	0x2	USINT	-	-	rw	false	Transmission type
0x1402	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	COB-ID used by RPDO3
	0x2	USINT	-	-	rw	false	Transmission type

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x1403	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	COB-ID used by RPDO4
	0x2	USINT	-	-	rw	false	Transmission type
0x1600	0x0	USINT	-	-	rw	false	Highest sub-index supported
	0x1 to 0x20	UDINT	-	-	rw	false	Mapping entry 1 to Mapping entry 32
0x1601	0x0	USINT	-	-	rw	false	Highest sub-index supported
	0x1 to 0x20	UDINT	-	-	rw	false	Mapping entry 1 to Mapping entry 32
0x1602	0x0	USINT	-	-	rw	false	Highest sub-index supported
	0x1 to 0x20	UDINT	-	-	rw	false	Mapping entry 1 to Mapping entry 32
0x1603	0x0	USINT	-	-	rw	false	Highest sub-index supported
	0x1 to 0x20	UDINT	-	-	rw	false	Mapping entry 1 to Mapping entry 32
0x1620	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	false	Mapping entry 1
0x1700	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x2	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 2
0x1701	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x2	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 2
0x1702	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x2	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 2
0x1703	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x2	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 2
0x1704	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	false	Mapping entry 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x1720	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x2	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 2
0x1721	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x2	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 2
0x1722	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x2	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 2
0x1723	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x2	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 2
0x1724	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	false	Mapping entry 1
0x1800	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	COB-ID for PDO1 TX
	0x2	USINT	-	-	rw	false	Transmission type
	0x3	UINT	-	-	rw	false	Inhibit time
	0x4	USINT	-	-	rw	false	Compatibility entry
	0x5	UINT	-	-	rw	false	Event timer
0x1801	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	COB-ID for PDO2 TX
	0x2	USINT	-	-	rw	false	Transmission type
	0x3	UINT	-	-	rw	false	Inhibit time
	0x4	USINT	-	-	rw	false	Compatibility entry
	0x5	UINT	-	-	rw	false	Event timer
0x1802	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	COB-ID for PDO3 TX
	0x2	USINT	-	-	rw	false	Transmission type
	0x3	UINT	-	-	rw	false	Inhibit time
	0x4	USINT	-	-	rw	false	Compatibility entry
	0x5	UINT	-	-	rw	false	Event timer

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x1803	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	COB-ID for PDO4 TX
	0x2	USINT	-	-	rw	false	Transmission type
	0x3	UINT	-	-	rw	false	Inhibit time
	0x4	USINT	-	-	rw	false	Compatibility entry
	0x5	UINT	-	-	rw	false	Event timer
0x1A0-0	0x0	USINT	-	-	rw	false	Highest sub-index supported
	0x1 to 0x20	UDINT	-	-	rw	false	Mapping entry 1 to Mapping entry 32
0x1A0-1	0x0	USINT	-	-	rw	false	Highest sub-index supported
	0x1 to 0x20	UDINT	-	-	rw	false	Mapping entry 1 to Mapping entry 32
0x1A0-2	0x0	USINT	-	-	rw	false	Highest sub-index supported
	0x1 to 0x20	UDINT	-	-	rw	false	Mapping entry 1 to Mapping entry 32
0x1A0-3	0x0	USINT	-	-	rw	false	Highest sub-index supported
	0x1 to 0x20	UDINT	-	-	rw	false	Mapping entry 1 to Mapping entry 32
0x1A2-0	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	false	Mapping entry 1
0x1B0-0	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x3	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 3
0x1B0-1	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x3	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 3
0x1B0-2	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x3	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 3
0x1B0-3	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	false	Mapping entry 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x1B04	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x2	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 3
0x1B05	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x2	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 3
0x1B06	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	false	Mapping entry 1
0x1B20	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x3	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 3
0x1B21	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x3	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 3
0x1B22	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x3	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 3
0x1B23	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x3	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 3
0x1B24	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x2	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 2
0x1B25	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x3	UDINT	-	-	ro	false	Mapping entry 1 to Mapping entry 3
0x1B26	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	false	Mapping entry 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x1C12	0x0	USINT	-	-	rw	false	Highest sub-index supported
	0x1 to 0xA	UINT	-	-	rw	false	Pdo entry 1 to Pdo entery 10
0x1C13	0x0	USINT	-	-	rw	false	Highest sub-index supported
	0x1 to 0xA	UINT	-	-	rw	false	Pdo entry 1 to Pdo entery 10
0x2F00	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	false	FIRMWARE.MAJOR
	0x2	UDINT	-	-	ro	false	FIRMWARE.MINOR
	0x3	UDINT	-	-	ro	false	FIRMWARE.REVISION
	0x4	UDINT	-	-	ro	false	FIRMWARE.BRANCH
0x3000	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	STRING(10)	-	-	rw	false	DRV.NAME
	0x2	STRING(32)	-	-	rw	false	DRV.CUSTOMIDENTIFIER
	0x3	UDINT	-	-	ro	false	DRV.NVCHECK
	0x4	UDINT	-	-	wo	false	DRV.NVSAVE
	0x5	UDINT	-	-	wo	false	DRV.NVLOAD
	0x6	UDINT	-	-	ro	false	DRV.RUNTIME
	0x7	UDINT	-	-	wo	false	DRV.RSTVAR
0x3007	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	true	REGEN.POWERFILTERED
	0x2	UDINT	-	-	ro	true	REGEN.POWER
	0x3	SINT	-	-	rw	false	REGEN.TYPE
	0x4	UINT	-	-	rw	false	REGEN.WATTEXT
	0x5	UDINT	-	-	rw	false	REGEN.TEXT
	0x6	UINT	-	-	rw	false	REGEN.REXT
0x300A	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	DINT	-	-	ro	false	VBUS.VALUE
	0x2	UINT	-	-	rw	false	VBUS.UVFTHRESH
	0x3	UINT	-	-	rw	false	VBUS.UVWTHRESH
	0x4	USINT	-	-	rw	false	VBUS.UVMODE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x300-B	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	CANOPEN.MONITORSYNC
	0x2	USINT	-	-	rw	false	CANOPEN.WORKBENCHUNITS
0x300-C	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x14	UDINT	-	-	ro	false	Fault history: fault number 1 0 to fault number 1 19
0x300-D	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1 to 0x14	UDINT	-	-	ro	false	Fault history: fault timestamp 1 0 to fault timestamp 1 19
0x3500	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	SINT	-	-	rw	false	FB1.SELECT
	0x2	UDINT	-	-	rw	false	FB1.ENCLINES
	0x3	UINT	-	-	rw	false	FB1.POLES
	0x4	UDINT	-	-	rw	false	FB1.RESKTR
	0x5	UDINT	-	-	rw	false	FB1.RESREFPHASE
0x3501	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	SINT	-	-	rw	false	FB2.SELECT
	0x2	UDINT	-	-	rw	false	FB2.ENCLINES
	0x3	UINT	-	-	rw	false	FB2.POLES
	0x4	UDINT	-	-	rw	false	FB2.RESKTR
	0x5	UDINT	-	-	rw	false	FB2.RESREFPHASE
0x3502	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	SINT	-	-	rw	false	FB3.SELECT
	0x2	UDINT	-	-	rw	false	FB3.ENCLINES
	0x3	UINT	-	-	rw	false	FB3.POLES
	0x4	UDINT	-	-	rw	false	FB3.RESKTR
	0x5	UDINT	-	-	rw	false	FB3.RESREFPHASE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x3503	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	SINT	-	-	rw	false	FB4.SELECT
	0x2	UDINT	-	-	rw	false	FB4.ENCLINES
	0x3	UINT	-	-	rw	false	FB4.POLES
	0x4	UDINT	-	-	rw	false	FB4.RESKTR
	0x5	UDINT	-	-	rw	false	FB4.RESREFPHASE
0x3504	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	SINT	-	-	rw	false	FB5.SELECT
	0x2	UDINT	-	-	rw	false	FB5.ENCLINES
	0x3	UINT	-	-	rw	false	FB5.POLES
	0x4	UDINT	-	-	rw	false	FB5.RESKTR
	0x5	UDINT	-	-	rw	false	FB5.RESREFPHASE
0x3580	0x0	UDINT	-	-	ro	true	Digital input states
0x3590	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN1.INV
	0x2	USINT	-	-	rw	false	DIN1.FILTER
0x3591	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN2.INV
	0x2	USINT	-	-	rw	false	DIN2.FILTER
0x3592	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN3.INV
	0x2	USINT	-	-	rw	false	DIN3.FILTER
0x3593	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN4.INV
	0x2	USINT	-	-	rw	false	DIN4.FILTER
0x3594	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN5.INV
	0x2	USINT	-	-	rw	false	DIN5.FILTER
0x3595	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN6.INV
	0x2	USINT	-	-	rw	false	DIN6.FILTER

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x3596	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN7.INV
	0x2	USINT	-	-	rw	false	DIN7.FILTER
0x3597	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN8.INV
	0x2	USINT	-	-	rw	false	DIN8.FILTER
0x3598	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN9.INV
	0x2	USINT	-	-	rw	false	DIN9.FILTER
0x3599	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN10.INV
	0x2	USINT	-	-	rw	false	DIN10.FILTER
0x359-A	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN11.INV
	0x2	USINT	-	-	rw	false	DIN11.FILTER
0x359-B	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIN12.INV
	0x2	USINT	-	-	rw	false	DIN12.FILTER
0x3600	0x0	UDINT	-	-	ro	true	Digital output states
0x3601	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	true	Physical outputs
	0x2	UDINT	-	-	rw	false	Output mask
0x360-A	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DOUT1.SOURCE
0x360-B	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DOUT2.SOURCE
0x360-C	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DOUT3.SOURCE
0x360-D	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DOUT4.SOURCE
0x360-E	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DOUT5.SOURCE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x360F	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DOUT6.SOURCE
0x3610	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DOUT7.SOURCE
0x3611	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DOUT8.SOURCE
0x3612	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DOUT9.SOURCE
0x3680	0x0	UDINT	-	-	ro	true	Digital IO states
0x368-A	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIO1.DIR
	0x2	USINT	-	-	rw	false	DIO1.INV
	0x3	USINT	-	-	rw	false	DIO1.FILTER
	0x4	USINT	-	-	rw	true	DIO1.STATEU
	0x5	USINT	-	-	rw	false	DIO1.SOURCE
0x368-B	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIO2.DIR
	0x2	USINT	-	-	rw	false	DIO2.INV
	0x3	USINT	-	-	rw	false	DIO2.FILTER
	0x4	USINT	-	-	rw	true	DIO2.STATEU
	0x5	USINT	-	-	rw	false	DIO2.SOURCE
0x368-C	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIO3.DIR
	0x2	USINT	-	-	rw	false	DIO3.INV
	0x3	USINT	-	-	rw	false	DIO3.FILTER
	0x4	USINT	-	-	rw	true	DIO3.STATEU
	0x5	USINT	-	-	rw	false	DIO3.SOURCE
0x368-D	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIO4.DIR
	0x2	USINT	-	-	rw	false	DIO4.INV
	0x3	USINT	-	-	rw	false	DIO4.FILTER
	0x4	USINT	-	-	rw	true	DIO4.STATEU
	0x5	USINT	-	-	rw	false	DIO4.SOURCE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x368E	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIO5.DIR
	0x2	USINT	-	-	rw	false	DIO5.INV
	0x3	USINT	-	-	rw	false	DIO5.FILTER
	0x4	USINT	-	-	rw	true	DIO5.STATEU
	0x5	USINT	-	-	rw	false	DIO5.SOURCE
0x368F	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	DIO6.DIR
	0x2	USINT	-	-	rw	false	DIO6.INV
	0x3	USINT	-	-	rw	false	DIO6.FILTER
	0x4	USINT	-	-	rw	true	DIO6.STATEU
	0x5	USINT	-	-	rw	false	DIO6.SOURCE
0x3780	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	INT	="1000:-1"	-	ro	true	AIN1.VALUE
0x3781	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	INT	="1000:-1"	-	ro	true	AIN2.VALUE
0x3800	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	INT	="1000:-1"	-	ro	true	AOUT1.VALUE
	0x2	INT	="1000:-1"	-	rw	true	AOUT1.VALUEU
0x3801	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	INT	="1000:-1"	-	ro	true	AOUT2.VALUE
	0x2	INT	="1000:-1"	-	rw	true	AOUT2.VALUEU

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x5000	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	STRING(32)	-	-	rw	false	AXIS1.NAME
	0x2	DINT	-	Acceleration	rw	false	AXIS1.ACC
	0x3	DINT	-	Acceleration	rw	false	AXIS1.DEC
	0x4	UDINT	-	-	ro	false	AXIS1.MOTIONSTAT
	0x5	USINT	-	-	rw	false	AXIS1.OPMODE
	0x6	USINT	-	-	rw	false	AXIS1.DISMODE
	0x7	UDINT	="1000:-1"	-	rw	false	AXIS1.DBILIMIT
	0x8	UINT	-	-	ro	false	AXIS1.DISSOURCES
	0x9	UDINT	-	-	rw	false	AXIS1.DISTO
	0xA	USINT	-	-	rw	false	AXIS1.ENDEFAULT
	0xB	DINT	="1000:-1"	-	ro	false	AXIS1.ICONT
	0xC	DINT	="1000:-1"	-	ro	false	AXIS1.IPEAK
	0xD	UDINT	-	-	wo	false	AXIS1.STOP
0x5001	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	AXIS1.BODE.INJECTPOINT
	0x2	USINT	-	-	rw	false	AXIS1.BODE.PRBDEPTH
	0x3	DINT	-	Velocity	rw	false	AXIS1.BODE.VAMP
0x5002	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	ro	false	AXIS1.CS.STATE
	0x2	UDINT	-	Acceleration	rw	false	AXIS1.CS.DEC
	0x3	UDINT	-	-	rw	false	AXIS1.DISTVTHRESH
	0x4	DINT	-	Velocity	rw	false	AXIS1.DISVTHRESH

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x5003	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	AXIS1.CANOPEN.PSCALE
	0x2	DINT	-	-	ro	false	Reserved
	0x3	UINT	-	-	rw	true	Brake control command - Axis 1
	0x4	UINT	-	-	ro	true	Brake status response - Axis 1
	0x5	DINT	-	-	rw	true	Target torque (mA) - Axis 1
	0x6	UDINT	-	-	rw	false	Profile position control - Axis 1
0x5004	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UINT	-	-	ro	false	AXIS1.FAULT1
	0x2	UINT	-	-	ro	false	AXIS1.FAULT2
	0x3	UINT	-	-	ro	false	AXIS1.FAULT3
	0x4	UINT	-	-	ro	false	AXIS1.FAULT4
	0x5	UINT	-	-	ro	false	AXIS1.FAULT5
	0x6	UINT	-	-	ro	false	AXIS1.FAULT6
	0x7	UINT	-	-	ro	false	AXIS1.FAULT7
	0x8	UINT	-	-	ro	false	AXIS1.FAULT8
	0x9	UINT	-	-	ro	false	AXIS1.FAULT9
	0xA	UINT	-	-	ro	false	AXIS1.FAULT10
0x5005	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	AXIS1.FBUS.PROTECTION
0x5006	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	Acceleration	rw	false	AXIS1.GEAR.ACC
	0x2	UDINT	-	Acceleration	rw	false	AXIS1.GEAR.DEC
	0x3	UINT	-	-	rw	false	AXIS1.GEAR.IN
	0x4	INT	-	-	rw	false	AXIS1.GEAR.OUT

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x5008	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	wo	false	AXIS1.HOME.SET
	0x2	UINT	-	-	rw	false	AXIS1.HOME.MODE
	0x3	UINT	-	-	rw	false	AXIS1.HOME.DIR
	0x4	USINT	-	-	rw	false	AXIS1.HOME.AUTOMOVE
	0x5	DINT	="1000:-1"	-	rw	false	AXIS1.HOME.IPEAK
	0x6	DINT	-	Position	rw	false	AXIS1.HOME.PERRTHRESH
	0x7	UDINT	-	Acceleration	rw	false	AXIS1.HOME.DEC
	0x8	UDINT	-	Acceleration	rw	false	AXIS1.HOME.ACC
	0x9	DINT	-	Position	rw	false	AXIS1.HOME.DIST
0x5009	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	AXIS1.HWEN.SOURCE
	0x2	USINT	-	-	rw	false	AXIS1.HWEN.MODE
	0x3	USINT	-	-	ro	false	AXIS1.HWEN.STATE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x500-A	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	DINT	="1000:-1"	-	ro	true	AXIS1.IL.FB
	0x2	UDINT	="1000:-1"	-	ro	false	AXIS1.IL.KP
	0x3	UDINT	="1000:-1"	-	ro	false	AXIS1.IL.KPDRATIO
	0x4	DINT	="1000:-1"	-	rw	false	AXIS1.IL.LIMITP
	0x5	DINT	="1000:-1"	-	rw	false	AXIS1.IL.LIMITN
	0x6	USINT	-	-	rw	false	AXIS1.IL.FBSOURCE
	0x7	DINT	="1000:-1"	-	ro	false	AXIS1.IL.DIFOLD
	0x8	DINT	="1000:-1"	-	ro	false	AXIS1.IL.FOLDFTHRESH
	0x9	DINT	="1000:-1"	-	rw	false	AXIS1.IL.FOLDFTHRESHU
	0xA	DINT	="1000:-1"	-	rw	false	AXIS1.IL.FOLDWTHRESH
	0xB	DINT	="1000:-1"	-	rw	false	AXIS1.IL.FRICTION
	0xC	DINT	="1000:-1"	-	ro	false	AXIS1.IL.IFOLD
	0xD	DINT	="1000:-1"	-	rw	false	AXIS1.IL.KACCFF
	0xE	DINT	="1000:-1"	-	rw	false	AXIS1.IL.KVFF
	0xF	UDINT	="1000:-1"	-	ro	true	AXIS1.IL.MIFOLD
	0x10	USINT	-	-	rw	false	AXIS1.IL.OFFSET

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x500-B	0x0	USINT	-	-	ro	false	Highest sub-index supported

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	0x1	INT	-	-	ro	true	AXIS1.MOTOR.TEMPC

Index	Sub-Inde-x	Data Type	Float Scale	Units	Acces-s	PDO Map-pable	Name
	0x2	UDINT	-	-	ro	true	AXIS1.MOTOR.TEMP

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	0x3	UDINT	="1000:-1"	-	rw	false	AXIS1.MOTOR.KT
	0x4	USINT	-	-	rw	false	AXIS1.MOTOR.TYPE
	0x5	USINT	-	-	rw	false	AXIS1.MOTOR.AUTOSET
	0x6	UINT	-	-	rw	false	AXIS1.MOTOR.VOLTRATED
	0x7	UINT	-	-	rw	false	AXIS1.MOTOR.VOLTMIN
	0x8	USINT	-	-	rw	false	AXIS1.MOTOR.BRAKE
	0x9	UINT	-	-	rw	false	AXIS1.MOTOR.IMTR
	0xA	UINT	="1000:-1"	-	rw	false	AXIS1.MOTOR.IMID
	0xB	DINT	-	Velocity	rw	false	AXIS1.MOTOR.VRATED
	0xC	USINT	-	-	rw	false	AXIS1.MOTOR.BRAKECONTROL
	0xD	USINT	-	-	rw	false	AXIS1.MOTOR.BRAKEIMM
	0xE	UDINT	="1000:-1"	-	rw	false	AXIS1.MOTOR.CTF0
	0xF	USINT	-	-	rw	false	AXIS1.MOTOR.FIELDWEAKENING
	0x10	UDINT	="1000:-1"	-	rw	false	AXIS1.MOTOR.ICONT
	0x11	UDINT	="1000:-1"	-	rw	false	AXIS1.MOTOR.INERTIA
	0x12	UDINT	="1000:-1"	-	rw	false	AXIS1.MOTOR.IPEAK
	0x13	UDINT	="1000:-1"	-	rw	false	AXIS1.MOTOR.KE
	0x14	UDINT	="1000:-1"	-	rw	false	AXIS1.MOTOR.LQLL
	0x15	UINT	-	-	rw	false	AXIS1.MOTOR.PHASE
	0x16	UDINT	="1000:-1"	-	rw	false	AXIS1.MOTOR.PITCH
	0x17	UINT	-	-	rw	false	AXIS1.MOTOR.POLES
	0x18	UDINT	="1000:-1"	-	rw	false	AXIS1.MOTOR.R
	0x19	USINT	-	-	rw	false	AXIS1.MOTOR.RTYPE
	0x1A	UINT	-	-	rw	false	AXIS1.MOTOR.TBRAKEAPP
	0x1B	UINT	-	-	rw	false	AXIS1.MOTOR.TBRAKERLS

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	0x1C	DINT	-	-	rw	false	AXIS1.MOTOR.TBRAKETO
	0x1D	UDINT	-	-	rw	false	AXIS1.MOTOR.TEMPFAULT
	0x1E	UDINT	-	-	rw	false	AXIS1.MOTOR.TEMPWARN
	0x1F	UINT	-	-	rw	false	AXIS1.MOTOR.VMAX
	0x20	UINT	-	-	rw	false	AXIS1.MOTOR.VOLTMAX
0x500-C	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	AXIS1.PL.MODPDIR
	0x2	DINT	-	Position	rw	false	AXIS1.PL.ERRWTHRESH
	0x3	DINT	-	Position	rw	false	AXIS1.PL.ERRFTHRESH
	0x4	UDINT	="1000:-1"	-	rw	false	AXIS1.PL.KP
	0x5	DINT	-	Position	rw	false	AXIS1.PL.MODP1
	0x6	DINT	-	Position	rw	false	AXIS1.PL.MODP2
	0x7	DINT	-	Position	rw	false	AXIS1.PL.AINSCALE
	0x8	USINT	-	-	rw	false	AXIS1.PL.FBSOURCE
	0x9	DINT	-	Position	rw	false	AXIS1.PL.INTOUTMAX
	0xA	UDINT	="1000:-1"	-	rw	false	AXIS1.PL.KI
	0xB	USINT	-	-	rw	false	AXIS1.PL.MODPEN
	0xC	UDINT	="1000:-1"	-	rw	false	AXIS1.PL.PDELAY
0x500-E	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	DINT	="1000:-1"	-	rw	false	AXIS1.SM.I1
	0x2	DINT	="1000:-1"	-	rw	false	AXIS1.SM.I2
	0x3	UINT	-	-	rw	false	AXIS1.SM.MODE
	0x4	UINT	-	-	rw	false	AXIS1.SM.T1
	0x5	UINT	-	-	rw	false	AXIS1.SM.T2
	0x6	DINT	-	Velocity	rw	false	AXIS1.SM.V1
	0x7	DINT	-	Velocity	rw	false	AXIS1.SM.V2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x500F	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	AXIS1.SWLS.EN
	0x2	USINT	-	-	ro	false	AXIS1.SWLS.STATE
	0x3	DINT	-	Position	rw	false	AXIS1.SWLS.LIMIT0
	0x4	DINT	-	Position	rw	false	AXIS1.SWLS.LIMIT1
0x5010	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	AXIS1.UNIT.PIN
	0x2	UDINT	-	-	rw	false	AXIS1.UNIT.POUT
	0x3	USINT	-	-	rw	false	AXIS1.UNIT.ACCROTARY
	0x4	USINT	-	-	rw	false	AXIS1.UNIT.VROTARY
	0x5	USINT	-	-	rw	false	AXIS1.UNIT.PROTARY

Index	Sub-Inde-x	Data Type	Float Scale	Units	Acces-s	PDO Map-pable	Name
0x5011	0x0	USINT	-	-	ro	false	Highest sub-index supported

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	0x1	DINT	="1000:-1"	-	rw	false	AXIS1.VL.KP
	0x2	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.KI
	0x3	DINT	-	Velocity	ro	false	AXIS1.VL.FBFILTER
	0x4	DINT	="1000:-1"	-	rw	false	AXIS1.VL.KVFF
	0x5	DINT	-	Velocity	ro	false	AXIS1.VL.ERR
	0x6	UDINT	-	Velocity	rw	false	AXIS1.VL.LIMITP
	0x7	DINT	-	Velocity	rw	false	AXIS1.VL.LIMITN
	0x8	UDINT	-	Velocity	rw	false	AXIS1.VL.THRESH
	0x9	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.AINSCALE
	0xA	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.FFDELAY
	0xB	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.LMJR
	0xC	SINT	-	-	rw	false	AXIS1.VL.ARTYPE1
	0xD	SINT	-	-	rw	false	AXIS1.VL.ARTYPE2
	0xE	SINT	-	-	rw	false	AXIS1.VL.ARTYPE3
	0xF	SINT	-	-	rw	false	AXIS1.VL.ARTYPE4
	0x10	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARPF1
	0x11	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARPF2
	0x12	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARPF3
	0x13	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARPF4
	0x14	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARPQ1
	0x15	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARPQ2
	0x16	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARPQ3
	0x17	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARPQ4

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	0x18	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARZF1
	0x19	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARZF2
	0x1A	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARZF3
	0x1B	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARZF4
	0x1C	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARZQ1
	0x1D	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARZQ2
	0x1E	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARZQ3
	0x1F	UDINT	="1000:-1"	-	rw	false	AXIS1.VL.ARZQ4
0x5012	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	false	AXIS1.WARNING1
	0x2	UDINT	-	-	ro	false	AXIS1.WARNING2
	0x3	UDINT	-	-	ro	false	AXIS1.WARNING3

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x5013	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	AXIS1.WS.MODE
	0x2	USINT	-	-	rw	false	AXIS1.WS.NUMLOOPS
	0x3	USINT	-	-	ro	false	AXIS1.WS.STATE
	0x4	USINT	-	-	rw	false	AXIS1.WS.T
	0x5	USINT	-	-	rw	false	AXIS1.WS.TDELAY1
	0x6	USINT	-	-	rw	false	AXIS1.WS.TDELAY2
	0x7	UINT	-	-	rw	false	AXIS1.WS.TDELAY3
	0x8	UINT	-	-	rw	false	AXIS1.WS.TDELAY4
	0x9	UDINT	-	-	wo	false	AXIS1.WS.ARM
	0xA	USINT	-	-	rw	false	AXIS1.WS.CHECKMODE
	0xB	DINT	-	Velocity	rw	false	AXIS1.WS.CHECKV
	0xC	DINT	-	Position	rw	false	AXIS1.WS.DISTMAX
	0xD	DINT	="1000:-1"	-	rw	false	AXIS1.WS.IMAX
	0xE	DINT	-	Velocity	rw	false	AXIS1.WS.VTHRESH
	0xF	DINT	-	Position	rw	false	AXIS1.WS.DISTMIN
	0x10	UINT	-	-	rw	false	AXIS1.WS.CHECKT
	0x11	UINT	-	-	rw	false	AXIS1.WS.TIRAMP
	0x12	UINT	-	-	rw	false	AXIS1.WS.TSTANDSTILL
0x5014	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	="1000:-1"	-	rw	false	AXIS1.LOAD.INERTIA
0x5015	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	ro	true	AXIS1.HWLS.NEGSTATE
	0x2	USINT	-	-	ro	true	AXIS1.HWLS.POSSTATE
	0x3	USINT	-	-	rw	false	AXIS1.HWLS.NEGSOURCE
	0x4	USINT	-	-	rw	false	AXIS1.HWLS.POSSOURCE
0x5016	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	Position	rw	false	AXIS1.SETTLE.P
	0x2	UDINT	-	-	rw	false	AXIS1.SETTLE.V

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x50E-F	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	ro	true	Axis1 manufacturer status
	0x2	USINT	-	-	ro	true	Axis1 manufacturer status bytes 1
	0x3	USINT	-	-	ro	true	Axis1 manufacturer status bytes 2
	0x4	USINT	-	-	ro	true	Axis1 manufacturer status bytes 3
	0x5	USINT	-	-	ro	true	Axis1 manufacturer status bytes 4
0x5100	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	STRING(32)	-	-	rw	FALSE	AXIS2.NAME
	0x2	DINT	-	Acceleration	rw	FALSE	AXIS2.ACC
	0x3	DINT	-	Acceleration	rw	FALSE	AXIS2.DEC
	0x4	UDINT	-	-	ro	FALSE	AXIS2.MOTIONSTAT
	0x5	USINT	-	-	rw	FALSE	AXIS2.OPMODE
	0x6	USINT	-	-	rw	FALSE	AXIS2.DISMODE
	0x7	UDINT	1000:1	-	rw	FALSE	AXIS2.DBILIMIT
	0x8	UINT	-	-	ro	FALSE	AXIS2.DISSOURCES
	0x9	UDINT	-	-	rw	FALSE	AXIS2.DISTO
	0xA	USINT	-	-	rw	FALSE	AXIS2.ENDEFAULT
	0xB	DINT	1000:1	-	ro	FALSE	AXIS2.ICONT
	0xC	DINT	1000:1	-	ro	FALSE	AXIS2.IPEAK
	0xD	UDINT	-	-	wo	FALSE	AXIS2.STOP
0x5101	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	USINT	-	-	rw	FALSE	AXIS2.BODE.INJECTPOINT
	0x2	USINT	-	-	rw	FALSE	AXIS2.BODE.PRBDEPTH
	0x3	DINT	-	Velocity	rw	FALSE	AXIS2.BODE.VAMP
0x5102	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	USINT	-	-	ro	FALSE	AXIS2.CS.STATE
	0x2	UDINT	-	Acceleration	rw	FALSE	AXIS2.CS.DEC
	0x3	UDINT	-	-	rw	FALSE	AXIS2.DISTVTHRESH
	0x4	DINT	-	Velocity	rw	FALSE	AXIS2.DISVTHRESH

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x5103	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	USINT	-	-	rw	FALSE	AXIS2.CANOPEN.PSCALE
	0x2	DINT	-	-	ro	FALSE	Reserved
	0x3	UINT	-	-	rw	TRUE	Brake control command - Axis 2
	0x4	UINT	-	-	ro	TRUE	Brake status response - Axis 2
	0x5	DINT	-	-	rw	TRUE	Target torque (mA) - Axis 2
	0x6	UDINT	-	-	rw	FALSE	Profile position control - Axis 2
0x5104	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1 to 0xA	UINT	-	-	ro	FALSE	AXIS2.FAULT1 to AXIS2.FAULT10
0x5105	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	USINT	-	-	rw	FALSE	AXIS2.FBUS.PROTECTION
0x5106	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	UDINT	-	Acceleration	rw	FALSE	AXIS2.GEAR.ACC
	0x2	UDINT	-	Acceleration	rw	FALSE	AXIS2.GEAR.DEC
	0x3	UINT	-	-	rw	FALSE	AXIS2.GEAR.IN
	0x4	INT	-	-	rw	FALSE	AXIS2.GEAR.OUT
0x5108	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	UDINT	-	-	wo	FALSE	AXIS2.HOME.SET
	0x2	UINT	-	-	rw	FALSE	AXIS2.HOME.MODE
	0x3	UINT	-	-	rw	FALSE	AXIS2.HOME.DIR
	0x4	USINT	-	-	rw	FALSE	AXIS2.HOME.AUTOMOVE
	0x5	DINT	1000:1	-	rw	FALSE	AXIS2.HOME.IPEAK
	0x6	DINT	-	Position	rw	FALSE	AXIS2.HOME.PERRTHRESH
	0x7	UDINT	-	Acceleration	rw	FALSE	AXIS2.HOME.DEC
	0x8	UDINT	-	Acceleration	rw	FALSE	AXIS2.HOME.ACC
	0x9	DINT	-	Position	rw	FALSE	AXIS2.HOME.DIST

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x5109	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	USINT	-	-	rw	FALSE	AXIS2.HWEN.SOURCE
	0x2	USINT	-	-	rw	FALSE	AXIS2.HWEN.MODE
	0x3	USINT	-	-	ro	FALSE	AXIS2.HWEN.STATE
0x510-A	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	DINT	1000:1	-	ro	TRUE	AXIS2.IL.FB
	0x2	UDINT	1000:1	-	ro	FALSE	AXIS2.IL.KP
	0x3	UDINT	1000:1	-	ro	FALSE	AXIS2.IL.KPDRATIO
	0x4	DINT	1000:1	-	rw	FALSE	AXIS2.IL.LIMITP
	0x5	DINT	1000:1	-	rw	FALSE	AXIS2.IL.LIMITN
	0x6	USINT	-	-	rw	FALSE	AXIS2.IL.FBSOURCE
	0x7	DINT	1000:1	-	ro	FALSE	AXIS2.IL.DIFOLD
	0x8	DINT	1000:1	-	ro	FALSE	AXIS2.IL.FOLDFTHRESH
	0x9	DINT	1000:1	-	rw	FALSE	AXIS2.IL.FOLDFTHRESHU
	0xA	DINT	1000:1	-	rw	FALSE	AXIS2.IL.FOLDWTHRESH
	0xB	DINT	1000:1	-	rw	FALSE	AXIS2.IL.FRICTION
	0xC	DINT	1000:1	-	ro	FALSE	AXIS2.IL.IFOLD
	0xD	DINT	1000:1	-	rw	FALSE	AXIS2.IL.KACCFF
	0xE	DINT	1000:1	-	rw	FALSE	AXIS2.IL.KVFF
	0xF	UDINT	1000:1	-	ro	TRUE	AXIS2.IL.MIFOLD
	0x10	USINT	-	-	rw	FALSE	AXIS2.IL.OFFSET

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x510-B	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	0x1	INT	-	-	ro	TRUE	AXIS2.MOTOR.TEMPC

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	0x2	UDINT	-	-	ro	TRUE	AXIS2.MOTOR.TEMP
	0x3	UDINT	1000:1	-	rw	FALSE	AXIS2.MOTOR.KT
	0x4	USINT	-	-	rw	FALSE	AXIS2.MOTOR.TYPE
	0x5	USINT	-	-	rw	FALSE	AXIS2.MOTOR.AUTOSET
	0x6	UINT	-	-	rw	FALSE	AXIS2.MOTOR.VOLTRATED
	0x7	UINT	-	-	rw	FALSE	AXIS2.MOTOR.VOLTMIN
	0x8	USINT	-	-	rw	FALSE	AXIS2.MOTOR.BRAKE
	0x9	UINT	-	-	rw	FALSE	AXIS2.MOTOR.IMTR
	0xA	UINT	1000:1	-	rw	FALSE	AXIS2.MOTOR.IMID
	0xB	DINT	-	Velocity	rw	FALSE	AXIS2.MOTOR.VRATED
	0xC	USINT	-	-	rw	FALSE	AXIS2.MOTOR.BRAKECONTROL
	0xD	USINT	-	-	rw	FALSE	AXIS2.MOTOR.BRAKEIMM
	0xE	UDINT	1000:1	-	rw	FALSE	AXIS2.MOTOR.CTF0
	0xF	USINT	-	-	rw	FALSE	AXIS2.MOTOR.FIELDWEAKENING
	0x10	UDINT	1000:1	-	rw	FALSE	AXIS2.MOTOR.ICONT
	0x11	UDINT	1000:1	-	rw	FALSE	AXIS2.MOTOR.INERTIA
	0x12	UDINT	1000:1	-	rw	FALSE	AXIS2.MOTOR.IPEAK
	0x13	UDINT	1000:1	-	rw	FALSE	AXIS2.MOTOR.KE
	0x14	UDINT	1000:1	-	rw	FALSE	AXIS2.MOTOR.LQLL
	0x15	UINT	-	-	rw	FALSE	AXIS2.MOTOR.PHASE
	0x16	UDINT	1000:1	-	rw	FALSE	AXIS2.MOTOR.PITCH
	0x17	UINT	-	-	rw	FALSE	AXIS2.MOTOR.POLES
	0x18	UDINT	1000:1	-	rw	FALSE	AXIS2.MOTOR.R
	0x19	USINT	-	-	rw	FALSE	AXIS2.MOTOR.RTYPE
	0x1A	UINT	-	-	rw	FALSE	AXIS2.MOTOR.TBRAKEAPP
	0x1B	UINT	-	-	rw	FALSE	AXIS2.MOTOR.TBRAKERLS
	0x1C	DINT	-	-	rw	FALSE	AXIS2.MOTOR.TBRAKETO
	0x1D	UDINT	-	-	rw	FALSE	AXIS2.MOTOR.TEMPFAULT
	0x1E	UDINT	-	-	rw	FALSE	AXIS2.MOTOR.TEMPWARN
	0x1F	UINT	-	-	rw	FALSE	AXIS2.MOTOR.VMAX
	0x20	UINT	-	-	rw	FALSE	AXIS2.MOTOR.VOLTMAX

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x510C	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	USINT	-	-	rw	FALSE	AXIS2.PL.MODPDIR
	0x2	DINT	-	Position	rw	FALSE	AXIS2.PL.ERRWTHRESH
	0x3	DINT	-	Position	rw	FALSE	AXIS2.PL.ERRFTHRESH
	0x4	UDINT	1000:1	-	rw	FALSE	AXIS2.PL.KP
	0x5	DINT	-	Position	rw	FALSE	AXIS2.PL.MODP1
	0x6	DINT	-	Position	rw	FALSE	AXIS2.PL.MODP2
	0x7	DINT	-	Position	rw	FALSE	AXIS2.PL.AINSCALE
	0x8	USINT	-	-	rw	FALSE	AXIS2.PL.FBSOURCE
	0x9	DINT	-	Position	rw	FALSE	AXIS2.PL.INTOUTMAX
	0xA	UDINT	1000:1	-	rw	FALSE	AXIS2.PL.KI
	0xB	USINT	-	-	rw	FALSE	AXIS2.PL.MODPEN
	0xC	UDINT	1000:1	-	rw	FALSE	AXIS2.PL.PDELAY
0x510E	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	DINT	1000:1	-	rw	FALSE	AXIS2.SM.I1
	0x2	DINT	1000:1	-	rw	FALSE	AXIS2.SM.I2
	0x3	UINT	-	-	rw	FALSE	AXIS2.SM.MODE
	0x4	UINT	-	-	rw	FALSE	AXIS2.SM.T1
	0x5	UINT	-	-	rw	FALSE	AXIS2.SM.T2
	0x6	DINT	-	Velocity	rw	FALSE	AXIS2.SM.V1
	0x7	DINT	-	Velocity	rw	FALSE	AXIS2.SM.V2
0x510F	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	USINT	-	-	rw	FALSE	AXIS2.SWLS.EN
	0x2	USINT	-	-	ro	FALSE	AXIS2.SWLS.STATE
	0x3	DINT	-	Position	rw	FALSE	AXIS2.SWLS.LIMIT0
	0x4	DINT	-	Position	rw	FALSE	AXIS2.SWLS.LIMIT1
0x5110	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	UDINT	-	-	rw	FALSE	AXIS2.UNIT.PIN
	0x2	UDINT	-	-	rw	FALSE	AXIS2.UNIT.POUT
	0x3	USINT	-	-	rw	FALSE	AXIS2.UNIT.ACCROTARY
	0x4	USINT	-	-	rw	FALSE	AXIS2.UNIT.VROTARY
	0x5	USINT	-	-	rw	FALSE	AXIS2.UNIT.PROTARY

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x5111	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	DINT	1000:1	-	rw	FALSE	AXIS2.VL.KP
	0x2	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.KI
	0x3	DINT	-	Velocity	ro	FALSE	AXIS2.VL.FBFILTER
	0x4	DINT	1000:1	-	rw	FALSE	AXIS2.VL.KVFF
	0x5	DINT	-	Velocity	ro	FALSE	AXIS2.VL.ERR
	0x6	UDINT	-	Velocity	rw	FALSE	AXIS2.VL.LIMITP
	0x7	DINT	-	Velocity	rw	FALSE	AXIS2.VL.LIMITN
	0x8	UDINT	-	Velocity	rw	FALSE	AXIS2.VL.THRESH
	0x9	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.AINSCALE
	0xA	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.FFDELAY
	0xB	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.LMJR
	0xC	SINT	-	-	rw	FALSE	AXIS2.VL.ARTYPE1
	0xD	SINT	-	-	rw	FALSE	AXIS2.VL.ARTYPE2
	0xE	SINT	-	-	rw	FALSE	AXIS2.VL.ARTYPE3
	0xF	SINT	-	-	rw	FALSE	AXIS2.VL.ARTYPE4
	0x10	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARPF1
	0x11	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARPF2
	0x12	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARPF3
	0x13	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARPF4
	0x14	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARPQ1
	0x15	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARPQ2
	0x16	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARPQ3
	0x17	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARPQ4
	0x18	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARZF1
	0x19	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARZF2
	0x1A	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARZF3
	0x1B	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARZF4
	0x1C	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARZQ1
	0x1D	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARZQ2
	0x1E	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARZQ3
	0x1F	UDINT	1000:1	-	rw	FALSE	AXIS2.VL.ARZQ4

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x5112	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1 to 0x3	UDINT	-	-	ro	FALSE	AXIS2.WARNING1 to AXIS2.WARNING3
0x5113	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	USINT	-	-	rw	FALSE	AXIS2.WS.MODE
	0x2	USINT	-	-	rw	FALSE	AXIS2.WS.NUMLOOPS
	0x3	USINT	-	-	ro	FALSE	AXIS2.WS.STATE
	0x4	USINT	-	-	rw	FALSE	AXIS2.WS.T
	0x5	USINT	-	-	rw	FALSE	AXIS2.WS.TDELAY1
	0x6	USINT	-	-	rw	FALSE	AXIS2.WS.TDELAY2
	0x7	UINT	-	-	rw	FALSE	AXIS2.WS.TDELAY3
	0x8	UINT	-	-	rw	FALSE	AXIS2.WS.TDELAY4
	0x9	UDINT	-	-	wo	FALSE	AXIS2.WS.ARM
	0xA	USINT	-	-	rw	FALSE	AXIS2.WS.CHECKMODE
	0xB	DINT	-	Velocity	rw	FALSE	AXIS2.WS.CHECKV
	0xC	DINT	-	Position	rw	FALSE	AXIS2.WS.DISTMAX
	0xD	DINT	1000:1	-	rw	FALSE	AXIS2.WS.IMAX
	0xE	DINT	-	Velocity	rw	FALSE	AXIS2.WS.VTHRESH
	0xF	DINT	-	Position	rw	FALSE	AXIS2.WS.DISTMIN
	0x10	UINT	-	-	rw	FALSE	AXIS2.WS.CHECKT
	0x11	UINT	-	-	rw	FALSE	AXIS2.WS.TIRAMP
	0x12	UINT	-	-	rw	FALSE	AXIS2.WS.TSTANDSTILL
0x5114	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	UDINT	1000:1	-	rw	FALSE	AXIS2.LOAD.INERTIA
0x5115	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	USINT	-	-	ro	TRUE	AXIS2.HWLS.NEGSTATE
	0x2	USINT	-	-	ro	TRUE	AXIS2.HWLS.POSSTATE
	0x3	USINT	-	-	rw	FALSE	AXIS2.HWLS.NEGSOURCE
	0x4	USINT	-	-	rw	FALSE	AXIS2.HWLS.POSSOURCE
0x5116	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	UDINT	-	Position	rw	FALSE	AXIS2.SETTLE.P
	0x2	UDINT	-	-	rw	FALSE	AXIS2.SETTLE.V

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x51E-F	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	UDINT	-	-	ro	TRUE	Axis2 manufacturer status
	0x2 to 0x5	USINT	-	-	ro	TRUE	Axis2 manufacturer status bytes 1 to Axis2 manufacturer status bytes 4
0x6040	0x0	UINT	-	-	rw	true	Controlword - Axis 1
0x6041	0x0	UINT	-	-	ro	true	Statusword - Axis 1
0x6060	0x0	SINT	-	-	rw	true	Modes of operation - Axis 1
0x6061	0x0	SINT	-	-	ro	true	Modes of operation display - Axis 1
0x6063	0x0	DINT	-	-	ro	true	Position actual internal value - Axis 1
0x6064	0x0	DINT	-	Position	ro	true	Position actual value - Axis 1
0x6065	0x0	UDINT	-	Position	rw	false	Following error window - Axis 1
0x606-B	0x0	DINT	-	Velocity	ro	false	Velocity demand value - Axis 1
0x606-C	0x0	DINT	-	Velocity	ro	true	Velocity actual value - Axis 1
0x606-D	0x0	UINT	-	Velocity	rw	true	Velocity window - Axis 1
0x606-E	0x0	UINT	-	-	rw	true	Velocity window time - Axis 1
0x6071	0x0	INT	-	-	rw	true	Target torque - Axis 1
0x6072	0x0	UINT	-	-	rw	true	Max torque - Axis 1
0x6073	0x0	UINT	-	-	rw	false	Max current - Axis 1
0x6077	0x0	INT	-	-	ro	true	Torque actual value - Axis 1
0x607-A	0x0	DINT	-	-	rw	true	Target position - Axis 1
0x607-C	0x0	DINT	-	Position	rw	false	Home offset - Axis 1
0x607-D	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	DINT	-	Position	rw	false	Software position limit 1 - Axis 1
	0x2	DINT	-	Position	rw	false	Software position limit 2 - Axis 1
0x6081	0x0	UDINT	-	-	rw	true	Profile velocity in pp-mode - Axis 1
0x6083	0x0	UDINT	-	-	rw	true	Profile acceleration - Axis 1
0x6084	0x0	UDINT	-	-	rw	true	Profile deceleration - Axis 1
0x6087	0x0	UDINT	-	-	rw	false	Torque slope - Axis 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x6091	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	Motor revolutions - Axis 1
	0x2	UDINT	-	-	rw	false	Shaft revolutions - Axis 1
0x6092	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	Feed - Axis 1
	0x2	UDINT	-	-	rw	false	Shaft revolutions - Axis 1
0x6096	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	UDINT	-	-	rw	FALSE	Numerator - Axis 1
	0x2	UDINT	-	-	rw	FALSE	Divisor - Axis 1
0x6098	0x0	SINT	-	-	rw	false	Homing mode - Axis 1
0x6099	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	Velocity	rw	false	Speed during search for switch - Axis 1
	0x2	UDINT	-	-	rw	false	Speed during search for zero - Axis 1
0x609A	0x0	UDINT	-	-	rw	false	Homing acceleration - Axis 1
0x60B1	0x0	DINT	-	Velocity	rw	true	Velocity offset - Axis 1
0x60B2	0x0	INT	-	-	rw	true	Torque offset - Axis 1
0x60B8	0x0	UINT	-	-	rw	true	Touch probe function - Axis 1
0x60B9	0x0	UINT	-	-	ro	true	Touch probe status - Axis 1
0x60BA	0x0	DINT	-	Position	ro	true	Touch probe position 1 positive value - Axis 1
0x60BB	0x0	DINT	-	Position	ro	true	Touch probe position 1 negative value - Axis 1
0x60BC	0x0	DINT	-	Position	ro	true	Touch probe position 2 positive value - Axis 1
0x60BD	0x0	DINT	-	Position	ro	true	Touch probe position 2 negative value - Axis 1
0x60C0	0x0	INT	-	-	rw	false	Interpolation sub mode select - Axis 1
0x60C1	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	DINT	-	-	rw	true	1st set-point - Axis 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x60C-2	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	USINT	-	-	rw	false	Interpolation time period value - Axis 1
	0x2	SINT	-	-	rw	false	Interpolation time index - Axis 1
0x60D-0	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	INT	-	-	rw	false	Touch probe 1 source - Axis 1
	0x2	INT	-	-	rw	false	Touch probe 2 source - Axis 1
0x60D-5	0x0	UINT	-	-	ro	true	Touch probe 1 positive edge counter - Axis 1
0x60D-6	0x0	UINT	-	-	ro	true	Touch probe 1 negative edge counter - Axis 1
0x60D-7	0x0	UINT	-	-	ro	true	Touch probe 2 positive edge counter - Axis 1
0x60D-8	0x0	UINT	-	-	ro	true	Touch probe 2 negative edge counter - Axis 1
0x60E-0	0x0	UINT	-	-	rw	true	Positive torque limit value - Axis 1
0x60E-1	0x0	UINT	-	-	rw	true	Negative torque limit value - Axis 1
0x60E-4	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	DINT	-	-	ro	true	1st additional position actual value - Axis 1
	0x2	DINT	-	-	ro	true	2nd additional position actual value - Axis 1
	0x3	DINT	-	-	ro	true	3rd additional position actual value - Axis 1
	0x4	DINT	-	-	ro	true	4th additional position actual value - Axis 1
	0x5	DINT	-	-	ro	true	5th additional position actual value - Axis 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x60E-8	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	1st additional gear ratio - motor revolutions - Axis 1
	0x2	UDINT	-	-	rw	false	2nd additional gear ratio - motor revolutions - Axis 1
	0x3	UDINT	-	-	rw	false	3rd additional gear ratio - motor revolutions - Axis 1
	0x4	UDINT	-	-	rw	false	4th additional gear ratio - motor revolutions - Axis 1
	0x5	UDINT	-	-	rw	false	5th additional gear ratio - motor revolutions - Axis 1
0x60E-9	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	1st additional feed constant - feed - Axis 1
	0x2	UDINT	-	-	rw	false	2nd additional feed constant - feed - Axis 1
	0x3	UDINT	-	-	rw	false	3rd additional feed constant - feed - Axis 1
	0x4	UDINT	-	-	rw	false	4th additional feed constant - feed - Axis 1
	0x5	UDINT	-	-	rw	false	5th additional feed constant - feed - Axis 1
0x60E-D	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	1st additional gear ratio - shaft revolutions - Axis 1
	0x2	UDINT	-	-	rw	false	2nd additional gear ratio - shaft revolutions - Axis 1
	0x3	UDINT	-	-	rw	false	3rd additional gear ratio - shaft revolutions - Axis 1
	0x4	UDINT	-	-	rw	false	4th additional gear ratio - shaft revolutions - Axis 1
	0x5	UDINT	-	-	rw	false	5th additional gear ratio - shaft revolutions - Axis 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x60EE	0x0	USINT	-	-	ro	false	Highest sub-index supported
	0x1	UDINT	-	-	rw	false	1st additional feed constant - shaft revolutions - Axis 1
	0x2	UDINT	-	-	rw	false	2nd additional feed constant - shaft revolutions - Axis 1
	0x3	UDINT	-	-	rw	false	3rd additional feed constant - shaft revolutions - Axis 1
	0x4	UDINT	-	-	rw	false	4th additional feed constant - shaft revolutions - Axis 1
	0x5	UDINT	-	-	rw	false	5th additional feed constant - shaft revolutions - Axis 1
0x60F4	0x0	DINT	-	Position	ro	true	Following error actual value - Axis 1
0x60FC	0x0	DINT	-	-	ro	true	Position demand internal value - Axis 1
0x60FD	0x0	UDINT	-	-	ro	true	Digital inputs - Axis 1
0x60FF	0x0	DINT	-	-	rw	true	Target velocity - Axis 1
0x6502	0x0	UDINT	-	-	ro	false	Supported drive modes
0x6840	0x0	UINT	-	-	rw	TRUE	Controlword - Axis 2
0x6841	0x0	UINT	-	-	ro	TRUE	Statusword - Axis 2
0x6860	0x0	SINT	-	-	rw	TRUE	Modes of operation - Axis 2
0x6861	0x0	SINT	-	-	ro	TRUE	Modes of operation display - Axis 2
0x6863	0x0	DINT	-	-	ro	TRUE	Position actual internal value - Axis 2
0x6864	0x0	DINT	-	Position	ro	TRUE	Position actual value - Axis 2
0x6865	0x0	UDINT	-	Position	rw	FALSE	Following error window - Axis 2
0x686B	0x0	DINT	-	Velocity	ro	TRUE	Velocity demand value - Axis 2
0x686C	0x0	DINT	-	Velocity	ro	TRUE	Velocity actual value - Axis 2
0x686D	0x0	UINT	-	Velocity	rw	TRUE	Velocity window - Axis 2
0x686E	0x0	UINT	-	-	rw	TRUE	Velocity window time - Axis 2
0x6871	0x0	INT	-	-	rw	TRUE	Target torque - Axis 2
0x6872	0x0	UINT	-	-	rw	TRUE	Max torque - Axis 2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x6873	0x0	UINT	-	-	rw	FALSE	Max current - Axis 2
0x6877	0x0	INT	-	-	ro	TRUE	Torque actual value - Axis 2
0x687-A	0x0	DINT	-	-	rw	TRUE	Target position - Axis 2
0x687-C	0x0	DINT	-	Position	rw	FALSE	Home offset - Axis 2
0x687-D	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	DINT	-	Position	rw	FALSE	Software position limit 1 - Axis 2
	0x2	DINT	-	Position	rw	FALSE	Software position limit 2 - Axis 2
0x6881	0x0	UDINT	-	-	rw	TRUE	Profile velocity in pp-mode - Axis 2
0x6883	0x0	UDINT	-	-	rw	TRUE	Profile acceleration - Axis 2
0x6884	0x0	UDINT	-	-	rw	TRUE	Profile deceleration - Axis 2
0x6887	0x0	UDINT	-	-	rw	FALSE	Torque slope - Axis 2
0x6891	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	UDINT	-	-	rw	FALSE	Motor revolutions - Axis 2
	0x2	UDINT	-	-	rw	FALSE	Shaft revolutions - Axis 2
0x6892	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	UDINT	-	-	rw	FALSE	Feed - Axis 2
	0x2	UDINT	-	-	rw	FALSE	Shaft revolutions - Axis 2
0x6896	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	UDINT	-	-	rw	FALSE	Numerator - Axis 2
	0x2	UDINT	-	-	rw	FALSE	Divisor - Axis 2
0x6898	0x0	SINT	-	-	rw	FALSE	Homing mode - Axis 2
0x6899	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	UDINT	-	Velocity	rw	FALSE	Speed during search for switch - Axis 2
	0x2	UDINT	-	-	rw	FALSE	Speed during search for zero - Axis 2
0x689-A	0x0	UDINT	-	-	rw	FALSE	Homing acceleration - Axis 2
0x68B-1	0x0	DINT	-	Velocity	rw	TRUE	Velocity offset - Axis 2
0x68B-2	0x0	INT	-	-	rw	TRUE	Torque offset - Axis 2
0x68B-8	0x0	UINT	-	-	rw	TRUE	Touch probe function - Axis 2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x68B9	0x0	UINT	-	-	ro	TRUE	Touch probe status - Axis 2
0x68BA	0x0	DINT	-	Position	ro	TRUE	Touch probe position 1 positive value - Axis 2
0x68BB	0x0	DINT	-	Position	ro	TRUE	Touch probe position 1 negative value - Axis 2
0x68BC	0x0	DINT	-	Position	ro	TRUE	Touch probe position 2 positive value - Axis 2
0x68BD	0x0	DINT	-	Position	ro	TRUE	Touch probe position 2 negative value - Axis 2
0x68C0	0x0	INT	-	-	rw	FALSE	Interpolation sub mode select - Axis 2
0x68C1	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	DINT	-	-	rw	TRUE	1st set-point - Axis 2
0x68C2	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1	USINT	-	-	rw	FALSE	Interpolation time period value - Axis 2
	0x2	SINT	-	-	rw	FALSE	Interpolation time index - Axis 2
0x68D0	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1 to 0x2	INT	-	-	rw	FALSE	Touch probe 1 source - Axis 2 to Touch probe 2 source - Axis 2
0x68D5	0x0	UINT	-	-	ro	TRUE	Touch probe 1 positive edge counter - Axis 2
0x68D6	0x0	UINT	-	-	ro	TRUE	Touch probe 1 negative edge counter - Axis 2
0x68D7	0x0	UINT	-	-	ro	TRUE	Touch probe 2 positive edge counter - Axis 2
0x68D8	0x0	UINT	-	-	ro	TRUE	Touch probe 2 negative edge counter - Axis 2
0x68E0	0x0	UINT	-	-	rw	TRUE	Positive torque limit value - Axis 2
0x68E1	0x0	UINT	-	-	rw	TRUE	Negative torque limit value - Axis 2
0x68E4	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1 to 0x5	DINT	-	-	ro	TRUE	1st additional position actual value - Axis 2 to 5th additional position actual value - Axis 2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
0x68E-8	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1 to 0x5	UDINT	-	-	rw	FALSE	1st additional gear ratio - motor revolutions - Axis 2 to 5th additional gear ratio - motor revolutions - Axis 2
0x68E-9	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1 to 0x5	UDINT	-	-	rw	FALSE	1st additional feed constant - feed - Axis 2 to 5th additional feed constant - feed - Axis 2
0x68E-D	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1 to 0x5	UDINT	-	-	rw	FALSE	1st additional gear ratio - shaft revolutions - Axis 2 to 5th additional gear ratio - shaft revolutions - Axis 2
0x68E-E	0x0	USINT	-	-	ro	FALSE	Highest sub-index supported
	0x1 to 0x5	UDINT	-	-	rw	FALSE	1st additional feed constant - shaft revolutions - Axis 2 to 5th additional feed constant - shaft revolutions - Axis 2
0x68F4	0x0	DINT	-	Position	ro	TRUE	Following error actual value - Axis 2
0x68F-C	0x0	DINT	-	-	ro	TRUE	Position demand internal value - Axis 2
0x68F-D	0x0	UDINT	-	-	ro	TRUE	Digital inputs - Axis 2
0x68F-F	0x0	DINT	-	-	rw	TRUE	Target velocity - Axis 2

3.9 Object 1000h: Device Type

This object describes the device type and device functionality.AKD2G drives are servo drives supporting the DS402 drive profile. Bit 19 indicates when the device compiles with the safety drive profile defined in ETG6100.

Drive Profile Specific Information			Drive Model
Bits 24 to 32	Bits 16 to 23	Bits 0 to 15	
Manufacturer specific Model Bits	Type	Device Profile Number	
00h	02h (servo drive)	0192h (402d)	CANopen over CANbus
00h	02h (servo drive)	0192h (402d)	CANopen over EtherCAT (CoE) without FSoE

Drive Profile Specific Information			Drive Model
00h	0Ah (servo drive with FSoE functional safety)	0192h (402d)	CANopen over EtherCAT (CoE) with FSoE

Index	Sub-Index	Data Type	Access	PDO Mapping
1000h	0	UNSIGNED32	R/O	No

3.10 Object 1001h Error Register

This object is an error register for the device. On CANopen this is a part of an Emergency object.

The reason for the error is signalled if a bit is set to 1.

Bit	Description
0	Generic Error
1 to 7	Not used in AKD2G.

Index	Sub-Index	Data Type	Access	PDO Mapping
1001h	0	UNSIGNED8	R/O	No

3.11 Object 1003h Pre-Defined Error Field

The object 1003h provides an error history with 10 entries. Sub-index 0 contains the number of errors which have occurred since the last time the history was reset. The error history starts empty and can be reset by writing 0 to sub-index 0.

On CANopen each new Emergency message sent is also written into sub-index 1 shifting the old entries one sub-index higher. The old content of sub-index 10 is lost.

The information available from to the sub-indexes is constructed from the following information.

Bit	Description
24 to 31	Axis Number
16 to 23	Status code shown in object 1001h. Always 01h on AKD2G.
0 to 15	Error code from

Index	Sub-Index	Data Type	Access	PDO Mapping	
1003h	0	UNSIGNED8	R/W	No	Number of errors
	1 to 10	UNSIGNED32	R/O	No	Error information

3.12 Object 1005h: COB-ID of the SYNC Message (DS301)

This object defines the COB-Id of the synchronisation object (SYNC).

Only valid for CANopen on CAN bus.

Index	1005h
Name	COB-ID for the SYNC message
Object code	VAR
Data type	UNSIGNED32
Category	conditional
Access	R/W
PDO mapping	not possible
Value range	UNSIGNED32
Default value	0x80

Bit coded information:

Bit	Value	Meaning
31 (MSB)	X	—
30	0	Device not generate SYNC message
	1	Device generates SYNC message
29	0	11 Bit ID (CAN 2.0A)
	1	29 Bit ID (CAN 2.0B)
28 to 11	X	—
	0	if Bit 29=0
10 to 0 (LSB)	X	Bit 0 to 10 of SYNC COB-ID

The device does not support the generation of SYNC-messages and only the 11-bit IDs. So the bits 11 to 30 are always 0.

3.13 Object 1006h: Communication Cycle Period (DS301)

This object can be used to define the period (in µs) for the transmission of the SYNC telegram.

Only valid for CANopen on CAN bus.

Index	1006h
Name	Period of the communication cycle
Object code	VAR
Data type	UNSIGNED32
Category	O
Access	R/W
PDO mapping	not possible

Value range	UNSIGNED32
Default value	00h

3.14 Object 1009h Manufacturer Hardware Revision

This returns the hardware revision of the drive. This hardware revision is on the label on the side of the drive and available using DRV.INFO.

Index	Sub-Index	Data Type	Access	PDO Mapping
1009h	0	VISIBLE_STRING	R/O	No

3.15 Object 100Ah Manufacturer Software Version

This returns the software version of the code running on the drive. This version is also available using DRV.INFO.

Index	Sub-Index	Data Type	Access	PDO Mapping
100Ah	0	VISIBLE_STRING	R/O	No

3.16 Object 100Ch: Guard Time (DS301)Response monitoring

The arithmetical product of the Objects 100Ch Guard Time and 100Dh Lifetime Factor is the response monitoring time. The Guard Time is given in milliseconds. The response monitoring is activated with the first Nodeguard object. If the value of the object Guard Time is set to zero, then the response monitoring is inactive.

Only valid for CANopen on CAN bus.

Index	100Ch
Name	Guard Time
Object code	VAR
Data type	UNSIGNED16
Category	conditional; mandatory, if heartbeat not supported.
Access	R/W
PDO mapping	not possible
Value range	UNSIGNED16
Default value	0

3.17 Object 100Dh: Lifetime Factor (DS301)

The product of Guard Time and Life Time Factor gives the life time for the nodeguarding protocol. If it's 0, the protocol is not used.

Only valid for CANopen on CAN bus.

Index	100Dh
Name	Lifetime Factor
Object code	VAR
Data type	UNSIGNED8
Category	conditional; (mandatory, if heartbeat not supported)
Access	R/W
PDO mapping	not possible
Value range	UNSIGNED8
Default value	0

3.18 Object 1010h Save Parameters

This object allows the saving of parameters to non-volatile memory inside the drive. Next time the drive powers up it will start with the saved parameters.

Reading sub-index 1 the drive provides information about the drives storage capabilities. AKD2G drives always return 1 indicating an AKD2G can save all parameters but does not save parameters autonomously.

To save all parameters the special signature 6576'6173h needs to be written to sub-index 1. Writing any other value to sub-index 1 will not save any parameters. The parameters saved are the same parameters saved with DRV.NVSAVE or the "Save To Device" within WorkBench. The dynamic RxPDO and TxPDO mappings 1600h to 1603h and 1A00h to 1A03h are not saved.

The special signature 65766173h is equivalent to the ASCII for "save".

Index	Sub-Index	Data Type	Access	PDO Mapping	
1010h	0	UNSIGNED8	R/O	No	Highest sub-index supported. Always 1.
	1	UNSIGNED32	R/W	No	Save all parameters.

3.19 Object 1011h Restore Parameters

This object allows the restoring of parameters save to non-volatile memory with object 1010h.

Reading sub-index 1 or 2 the drive provides information about the drives restore capabilities. AKD2G drives always return 1 indicating an AKD2G can restore all parameters.

To restore all parameters the special signature 6461'6F6Ch needs to be written to sub-index 1. Writing any other value to sub-index 1 will not restore any parameters. The parameters restored are the same parameters restored with DRV.NVLOAD. The dynamic RxPDO and TxPDO mappings 1600h to 1603h and 1A00h to 1A03h are not restored.

The special signature 6461'6F6Ch is equivalent to the ASCII for "load".

Index	Sub-Index	Data Type	Access	PDO Mapping	
1011h	0	UNSIGNED8	R/O	No	Highest sub-index supported. Always 1.
	1	UNSIGNED32	R/W	No	Restore all parameters.

3.20 Object 1012h: COB-ID of the Time Stamp (DS301)

This object defines the COB-Id of the time stamp.

Only valid for CANopen on CAN bus.

Index	1012h
Name	COB-ID for thetime stamp
Object code	VAR
Data type	UNSIGNED32
Category	optional
Access	R/W
PDO mapping	not possible
Value range	UNSIGNED32
Default value	100h

Bit coded information:

Bit	Content	Value	Meaning
31 (MSB)	consume	0	Drive does not consume time message
		1	Drive does consume time message
30	produce	0	Drive does not produce time message
		1	Drive does produce time message
29	frame	0	Value fixed to 0
28 to 11	reserved	_	reserved
10 to 0 (LSB)	CAN-ID	0h - 800h	COB-ID of the time stamp

3.21 Object 1017h: Producer Heartbeat Time

The producer heartbeat time defines the cycle time of the heartbeat in ms. If it's 0, it is not used.

Only valid for CANopen on CAN bus.

Index	1017h
Name	Producer heartbeat time
Object code	VAR
Data type	UNSIGNED16
Category	conditional; mandatory, if guarding is not supported
Access	R/W
PDO mapping	not possible
Value range	UNSIGNED16
Default value	0

3.22 Object 1018h Identity Object

This object contains general information about this device.

Sub-index 3 contain two pieces of information. The upper two bytes contain a number that is unique to the CANopen interface to the drive. This number changes each with each revision of the drive firmware which changes the objects in the drives object dictionary. The lower two bytes are always zero.

Sub-index 4 contains a serial number for the drive. This is a globally unique number for each drive so that you can distinguish between identical drives. This 32 bit number is the lower 4 bytes of the drive MAC address which is on the label on the side and can be seen with DRV.INFO.

Index	Sub-Index	Data Type	Access	PDO Mapping	
1011h	0	UNSIGNED8	R/O	No	Highest sub-index supported. Always 1.
	1	UNSIGNED32			Vendor ID. Always 0x6Ah for Kollmorgen.
	2				Product Code. Always 414B'4432h for AKD2G.
	3				Revision Number.
	4				Serial Number.

3.23 Object 1026h OS Prompt

The OS prompt is used for character driven command interface, like the terminal in WorkBench with the drive.

Writing to sub-index 1 is used to send one character to the drive. At the end of each command you need to send a CR(13) LF(10) before the drive will send the response.

Reading from sub-index 2 is used to receive one character from the drive.

Index	Sub-Index	Data Type	Access	PDO Mapping	
1011h	0	UNSIGNED8	R/O	No	Highest sub-index supported. Always 2.
	1		Command	Yes (RxPDO)	Std In
	2		R/O	Yes (TxPDO)	Std Out

3.24 Object 1600 to 1603h RxPDO Mapping Parameters

AKD2G supports 4 receive PDOs that can be dynamically mapped. Dynamic mapping allows the content of the PDO to be changed while the drive is running. The contents of these PDOs are defined by the values written in these objects.

	Index	Sub-Indexes
RxPDO 1	1600h	0 to 32
RxPDO 2	1601h	0 to 32
RxPDO 3	1602h	0 to 32
RxPDO 4	1603h	0 to 32

Sub-index 0 contains the number of objects mapped into a PDO. A value of 0 indicates that this PDO is not active.

Sub-indexes 1 to 32 describe which objects are mapped into each PDO.

31 to 16	15 to 8	7 to 0
Index	Sub-Index	Length (bits)

Index	Sub-Index	Data Type	Access	PDO Mapping	
1600h + RxPDO number	0	UNSIGNED8	R/W	No	Number of mapped application objects in PDO. EtherCAT: Between 0 and 32. CAN bus: Between 0 and 8.
	1 to 32				Mapping

3.25 Object 1A00 to 1A03h TxPDO Mapping Parameters

AKD2G supports 4 transmit PDOs that can be dynamically mapped. Dynamic mapping allows the content of the PDO to be changed while the drive is running. The contents of these PDOs are defined by the values written in these objects.

	Index	Sub-Indexes
TxPDO 1	1A00h	0 to 32
TxPDO 2	1A01h	0 to 32
TxPDO 3	1A02h	0 to 32
TxPDO 4	1A03h	0 to 32

Sub-index 0 contains the number of objects mapped into a PDO. A value of 0 indicates that this PDO is not active.

Sub-indexes 1 to 32 describe which objects are mapped into each PDO.

31 to 16	15 to 8	7 to 0
Index	Sub-Index	Length (bits)

Index	Sub-Index	Data Type	Access	PDO Mapping	
1A00h + TxPDO number	0	UNSIGNED8	R/W	No	Number of mapped application objects in PDO. EtherCAT: Between 0 and 32. CAN bus: Between 0 and 8.
	1 to 32				Mapping

3.26 Object 1C12h Sync Manager 2 RxPDO Assign

NOTE

EtherCAT only

On AKD2G sync manager 2 is always used for the nodes RxPDOs. This object allows you to select which RxPDOs will be in this sync manager.

Sub-index 0 is the number of RxPDOs assigned to this sync manager. On AKD2G a maximum of 4 is allowed.

Sub-indexes 1 to 4 list the RxPDOs that are in this sync manager.

	Index
RxPDO 1	1600h
RxPDO 2	1601h
RxPDO 3	1602h
RxPDO 4	1603h

Index	Sub-Index	Data Type	Access	PDO Mapping	
1C12h	0	UNSIGNED8	R/O	No	Number of assigned RxPDOs
	1	UNSIGNED16	R/W		1st Assigned PDO
	2				2nd Assigned PDO
	3				3rd Assigned PDO
	4				4th Assigned PDO

3.27 Object 1C13h Sync Manager 3 TxPDO Assign

NOTE

EtherCAT only

On AKD2G sync manager 3 is always used for the nodes TxPDOs. This object allows you to select which TxPDOs will be in this sync manager.

Sub-index 0 is the number of TxPDOs assigned to this sync manager. On AKD2G a maximum of 4 is allowed.

Sub-indexes 1 to 4 list the TxPDOs that are in this sync manager.

	Index
TxPDO 1	1A00h
TxPDO 2	1A01h
TxPDO 3	1A02h
TxPDO 4	1A03h

Index	Sub-Index	Data Type	Access	PDO Mapping	
1C13h	0	UNSIGNED8	R/O	No	Number of assigned TxPDOs
	1	UNSIGNED16	R/W		1st Assigned PDO
	2				2nd Assigned PDO
	3				3rd Assigned PDO
	4				4th Assigned PDO

3.28 Object 3600h Digital Output States

This object shall indicate the actual state of the digital outputs. It is a bit-masked value where the bit offset corresponds to the digital output id starting with bit offset 0 = DOUT1

For example, 3600h value of 0x0000108 means DOUT9.STATE and DOUT4.STATE = 1.

Index	Sub-Index	Data Type	Access	PDO Mapping	
3600h	0	UNSIGNED32	R/O	TxPDO	Bit mask of digital output states

3.29 Object 3601h Digital Output Control

This object shall permit controlling of digital output values over fieldbus. Two sub-indexes are bit-masked values where the bit offset corresponds to the digital output id starting with bit offset 0 = DOUT1.

Sub-index 1 sets the desired output states.

Sub-index 2 is a mask that must be set for which DOUTs are to be controlled over fieldbus.

NOTE

When setting the mask, the corresponding DOUT#.SOURCE will change to "Fieldbus." When DOUT#.SOURCE is Fieldbus, the DOUT is not able to be set through action table or DOUT#.STATEU. When clearing the mask, the corresponding DOUT#.SOURCE will change to 'User' and the output state is controlled by DOUT#.STATEU.

Index	Sub-Index	Data Type	Access	PDO Mapping	
3601h	0	UNSIGNED38	R/O	No	Number of entries.
	1	UNSIGNED32	R/W	No	Digital Output Mask
	2	UNSIGNED32	R/W	RxPDO	Digital Output Control

3.29.1 Example

```
3601h sub-index 2 = 0x0000000F
3601h sub-index 1 = 0x00000012
```

In this example, DOUT1-4 sources will be "Fieldbus" and only DOUT2.STATE will be 1. DOUT1, 3, and 4 states will be 0. DOUT5 ignores the fieldbus state since the mask is not set. The value of DOUT5.STATE will be determined by whatever DOUT5.SOURCE is set to.

3.30 Object 6040h: Control word (DS402)

The control commands are built up from the logical combination of the bits in the control word and external signals (ex: enable output stage).

Index	Sub-Index	Data Type	Access	PDO Mappable	Description
0x6040	0	UNSIGNED16	RW	RxPDO	Drive state machine control word

Bit assignment im control word

Bit	Name	Bit	Name
0	Switch on	8	Pause/halt
1	Disable Voltage	9	reserved
2	Quick Stop	10	reserved

Bit	Name	Bit	Name
3	Enable Operation	11	reserved
4	Operation mode specific	12	reserved
5	Operation mode specific	13	reserved
6	Operation mode specific	14	reserved
7	Reset Fault (only effective for faults)	15	reserved

Commands in the control word

Command	Bit 7 Fault Reset	Bit 3 Enable Operation	Bit 2 Quick stop	Bit 1 Disable Voltage	Bit 0 Switch On	Transitions
Shutdown	X	X	1	1	0	2, 6, 8
Switch on	X	X	1	1	1	3
Disable Voltage	X	X	X	0	X	7, 9, 10, 12
Quick Stop	X	X	0	1	X	7, 10, 11
Disable Operation	X	0	1	1	1	5
Enable Operation	X	1	1	1	1	4
Fault Reset	1	X	X	X	X	15

Bits marked by an X are irrelevant.

Mode-dependent bits in the control word

The following table shows the mode-dependent bits in the control word. Only manufacturer-specific modes are supported at present. The individual modes are set by Object 6060h: Modes of Operation (DS402) (➜ p. 88).

Operation mode	No.	Bit 4	Bit 5	Bit 6
Profile Position Mode (pp)	01h	New set-point	Use new set-point immediately	0 = Absolute move 1 = Relative move
Profile Velocity Mode (pv)	03h	reserved	reserved	reserved
Profile Torque Mode (tq)	04h	reserved	reserved	reserved
Homing Mode (hm)	06h	Start homing operation	reserved	reserved
Interpolated Position Mode (ip)	07h	Enable Interpolation	reserved	reserved
Cyclic sync position Mode (csp)	08h	reserved	reserved	reserved

Description of the remaining bits in the control word

The remaining bits in the control word that are not used for drive state machine commands or operation mode specific commands are used for special operations:

Bit 8 – Pause/Halt: If Bit 8 is set, then the drive halts (pauses) in all modes. The set-points (speed for homing or jogging, motion task number, setpoints for digital mode) for the individual modes are retained.

Bits 9-15: Unused/Reserved bits

3.31 Object 6041h: Status word (DS402)

The momentary state of the state machine can be read out with the aid of the status word.

Index	Sub-Index	Data Type	Access	PDO Mappable	Description
0x6041	0	UNSIGNED16	RW	TxPDO	Drive state machine status word

Bit assignment in the status word

Bit	Name	Description
0	Ready to switch on	Controlled by state machine
1	Switched on	Controlled by state machine
2	Operation enabled	Controlled by state machine
3	Fault	Axis fault is active
4	Voltage enabled	Bus voltage is present
5	Quick stop	Controlled by state machine
6	Switch on disabled	Controlled by state machine
7	Warning	Axis warning active
8	STO – Safe Torque Off	STO is preventing drive from enabling (AXIS#.SAFE.STO.ACTIVE)
9	Remote	1 – Fieldbus in control (AXIS#.CMDSOURCE = Fieldbus) 0 – WorkBench in control (AXIS#.CMDSOURCE = Service)
10	Target reached	Axis has reached target position. In profile position mode the position window is set using AXIS#.MT.TPOSWND. In homing mode it is set with AXIS.HOME.TPOSWND.
11	Reserved	
12	Operation mode specific (reserved)	See Mode-dependent bits in the status word (➜ p. 88)
13	Operation mode specific (reserved)	See Mode-dependent bits in the status word (➜ p. 88)
14	Ramp Down Requested	SIL3 drives only. Indicates that a SS1 input was triggered and the master should stop the axis. STO will be triggered in configured SS1_t amount of time for instance of SS1 that was triggered.
15	Manufacturer-specific (reserved)	

States of the state machine

Bits marked by X are irrelevant

State	Bit 6 switch on disabled	Bit 5 quick stop	Bit 3 fault	Bit 2 operation enabled	Bit 1 siwtched on	Bit 0 ready to switch on
Not ready to switch on	0	X	0	0	0	0
Switch on disabled	1	X	0	0	0	0
Ready to switch on	0	1	0	0	0	1
Switched on	0	1	0	0	1	1
Operation enabled	0	1	0	1	1	1
Fault	0	X	1	0	0	0
Fault reaction active	0	X	1	1	1	1
Quick stop active	0	0	0	1	1	1

Mode-dependent bits in the status word

The following table shows the mode-dependent bits in the status word. The individual modes are set by Object 6060h: Modes of Operation (DS402) (➜ p. 88).

Operation mode	No.	Bit 12	Bit 13
Profile Position Mode (pp)	01h	Set-point acknowledge	Following error
Homing Mode (hm)	06h	Homing attained	Homing error
Interpolated Position Mode (ip)	07h	IP mode active	Following error
Cyclic sync position Mode (csp)	08h	This bit stays on 1 as long as the drive is following the position set-points.	Following error

3.32 Object 6060h: Modes of Operation (DS402)

This object is used to set the mode, which can be read out by Object 6061h. Two types of operating mode are used:

- manufacturer-specific operating modes
- operating modes as per CANopen drive profile DS402

These operating modes are defined in the CANopen drive profile DS402. After the mode has been changed, the corresponding setpoint must be set once more (for instance, the homing velocity in the mode homing_setpoint). If the position or jogging mode is stored, then the Homing mode is set after a RESET of the drive.

NOTE

This object only writes the desired operating mode. To verify the actual mode of operation, use Object 6061h: Modes of Operation Display (DS402) (➜ p. 89).

⚠ WARNING

Automatic Start!

Risk of death or serious injury for humans working in the machine. The drive could move unexpectedly. When the drive is enabled, a mode change is only permissible at zero speed.

- Never change the mode while the motor is running!
- Set the speed setpoint to 0 before changing over.

Index	Sub-Index	Data Type	Access	PDO Mappable	Description
0x6060	0	INTEGER8	RW	RxPDO	Desired mode of operation

Supported modes:

Value (hex)	Mode
1	Profile position mode
3	Profile velocity mode
4	Profile torque mode
6	Homing mode
7	Interpolated position mode
8	Cyclic synchronous position mode

3.33 Object 6061h: Modes of Operation Display (DS402)

The current mode of operation.

Index	Sub-Index	Data Type	Access	PDO Mappable	Description
0x6061	0	INTEGER8	RO	TxPDO	Actual mode of operation

3.34 Object 6091 Gear Ratio

This object indicates the configured number of motor shaft revolutions and the number of driving shaft revolutions.

The gear ratio is calculated by the following formula:

```
Gear ratio = motor shaft revolutions / driving shaft revolutions
```

See CANopen Scaling (➜ p. 9).

Index	Sub-Index	Data Type	Access	PDO Mapping	
6091	0	UNSIGNED8	Read Only	No	Number of entries.
	1	UNSIGNED32	Read/Write		Motor shaft revolutions. AXIS#.CANOPEN.GEARPRIMARY.MOTORREV (➜ p. 101)
	2				Driving shaft revolutions AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV (➜ p. 102)

3.35 Object 6092 Feed Constant

This object indicates the configured feed constant, which is the measurement distance per one revolution of the output shaft of the gearbox. The feed constant is calculated by the following formula:

```
Feed constant = feed / driving shaft revolutions
```

See CANopen Scaling (➜ p. 9).

Index	Sub-Index	Data Type	Access	PDO Mapping	
6092	0	UNSIGNED8	Read Only	No	Number of entries.
	1	UNSIGNED32	Read/Write		Feed AXIS#.CANOPEN.FCPRIMARY.FEED (➜ p. 97)
	2				Driving shaft revolutions AXIS#.CANOPEN.FCPRIMARY.SHAFTREV (➜ p. 98)

3.36 Object 60C0h: Interpolation sub mode select

See also AXIS#.CANOPEN.INTERPOLATEMODE (➜ p. 105)

Index	60C0h
Name	Interpolation sub mode select
Object code	VAR
Data type	INTEGER16
Category	optional
Access	R/W
PDO mapping	No
Value range	0
Default value	0
Start Version	02-00-00-000

Value description

Value(decimal)	Description
0	Linear interpolation with a constant time.

3.37 Object 60E4 Additional Position Actual Value

This object shall indicate the actual position in user defined units for additional feedbacks. Each sub-index corresponds to a different feedback device. Objects 60E8h, 60E9h, 60Edh and 60EEh are used to scale this value. See CANopen Scaling (➜ p. 9).

Index	Sub-Index	Data Type	Access	PDO Mapping	
60E4	0	UNSIGNED8	Read Only	No	Number of entries.
	1	INTEGER32		Yes	FB1.P
	2				FB2.P
	3				FB3.P
	4				FB4.P
	5				FB5.P

3.38 Object 60E8 Additional gear ratio – motor shaft revolutions

This object provides the motor shaft revolutions for the additional gear ratio calculation. This object shall be used with the corresponding sub-index of the object 60EDh (driving shaft revolutions for the additional gear ratio calculation). The additional gear ratio value is calculated by the same formula as the primary position gear ratio object 6091h. See CANopen Scaling (➜ p. 9).

Index	Sub-Index	Data Type	Access	PDO Mapping	
60E8	0	UNSIGNED8	Read Only	No	Number of entries.
	1	UNSIGNED32	Read/Write		Gear ratio motor shaft revs for FB1. AXIS#.CANOPEN.GEAR1.MOTORREV
	2				Gear ratio motor shaft revs for FB2. AXIS#.CANOPEN.GEAR2.MOTORREV
	3				Gear ratio motor shaft revs for FB3. AXIS#.CANOPEN.GEAR3.MOTORREV
	4				Gear ratio motor shaft revs for FB4. AXIS#.CANOPEN.GEAR4.MOTORREV
	5				Gear ratio motor shaft revs for FB5. AXIS#.CANOPEN.GEAR5.MOTORREV

3.39 Object 60E9 Additional feed constant – feed

This object provides the feed for the additional feed constant calculation. This object shall be used with the corresponding sub-index of the object 60EEh (driving shaft revolutions for the additional feed constant calculation). The additional feed constant value is calculated by the same formula as given in the object 6092h. See CANopen Scaling (➜ p. 9).

Index	Sub-Index	Data Type	Access	PDO Map-ping	
60E9	0	UNSIGNED8	Read Only	No	Number of entries.
	1	UNSIGNED32	Read/Write		Feed constant feed for FB1. AXIS#.CANOPEN.FC1.FEED
	2				Feed constant feed for FB2. AXIS#.CANOPEN.FC2.FEED
	3				Feed constant feed for FB3. AXIS#.CANOPEN.FC3.FEED
	4				Feed constant feed for FB4. AXIS#.CANOPEN.FC4.FEED
	5				Feed constant feed for FB5. AXIS#.CANOPEN.FC5.FEED

3.40 Object 60ED Additional gear ratio – driving shaft revolutions

This object provides the driving shaft revolutions for the additional gear ratio calculation. This object shall be used with the corresponding sub-index of the object 60E8h (motor shaft revolutions for the additional gear ratio calculation). The additional gear ratio value is calculated by the same formula as given in the object 6091h. See CANopen Scaling (➜ p. 9).

Index	Sub-Index	Data Type	Access	PDO Mapping	
60ED	0	UNSIGNED8	Read Only	No	Number of entries.
	1	UNSIGNED32	Read/Write		Gear ratio driving shaft revs for FB1. AXIS#.CANOPEN.GEAR1.SHAFTREV
	2				Gear ratio driving shaft revs for FB2. AXIS#.CANOPEN.GEAR2.SHAFTREV
	3				Gear ratio driving shaft revs for FB3. AXIS#.CANOPEN.GEAR3.SHAFTREV
	4				Gear ratio driving shaft revs for FB4. AXIS#.CANOPEN.GEAR4.SHAFTREV
	5				Gear ratio driving shaft revs for FB5. AXIS#.CANOPEN.GEAR5.SHAFTREV

3.41 Object 60EE Additional feed constant – driving shaft revolutions

This object provides the driving shaft revolutions for the additional feed constant calculation. This object shall be used with the corresponding sub-index of the object 60E9h (feed for the additional feed constant calculation). The additional feed constant value is calculated by the same formula as given in the object 6092h. See CANopen Scaling (➜ p. 9).

Index	Sub-Index	Data Type	Access	PDO Mapping	
60EE	0	UNSIGNED8	Read Only	No	Number of entries.
	1	UNSIGNED32	Read/Write		Feed constant driving shaft revs for FB1. AXIS#.CANOPEN.FC1.SHAFTREV
	2				Feed constant driving shaft revs for FB2. AXIS#.CANOPEN.FC2.SHAFTREV
	3				Feed constant driving shaft revs for FB3. AXIS#.CANOPEN.FC3.SHAFTREV
	4				Feed constant driving shaft revs for FB4. AXIS#.CANOPEN.FC4.SHAFTREV
	5				Feed constant driving shaft revs for FB5. AXIS#.CANOPEN.FC5.SHAFTREV

3.42 AXIS#.CANBUS Parameters

This section describes the AXIS#.CANBUS parameters.

3.42.1 AXIS#.CANBUS.REPORTWARNINGS

3.42.1.1 Description

Sets whether warnings are reported via EMCY messages on CANBus drives.

3.42.1.1.1 Context

See EtherCAT and CANopen Overview (➜ p. 9).

3.42.1.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.42.1.3 General Information

Type	Read/Write
Units	N/A
Range	0 to 1
Default Value	1
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.42.1.4 Variants Supported

CAN Bus drives: AKD2G-SPC

3.43 AXIS#.CANOPEN Parameters

This section describes the AXIS#.CANOPEN parameters. See

3.43.1 AXIS#.CANOPEN.FCPRIMARY.FEED

3.43.1.1 Description

This keyword provides the feed for the primary position feed constant calculation. It is part of the scaling calculation used for CANOpen objects.

3.43.1.1.1 Context

See CANopen Scaling (➜ p. 9).

3.43.1.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.1.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 4294967295
Default Value	65536 (2^16)
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.43.1.4 Variants Supported

CANBus and EtherCat

3.43.1.5 Fieldbus Information

Fieldbus	CANopen
Index	6092h
Subindex	1
Data Type	U32
Float Scale	1:1
Access	Read/Write
PDO Map	No

3.43.2 AXIS#.CANOPEN.FCPRIMARY.SHAFTREV

3.43.2.1 Description

This keyword provides the driving shaft revolutions for the primary position feed constant calculation. It is part of the scaling calculation used for CANOpen objects.

3.43.2.1.1 Context

See CANopen Scaling (➜ p. 9).

3.43.2.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.2.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 4294967295
Default Value	1
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.43.2.4 Variants Supported

CANBus and EtherCat

3.43.2.5 Fieldbus Information

Fieldbus	CANopen
Index	6092h
Subindex	2
Data Type	U32
Float Scale	1:1
Access	Read/Write
PDO Map	No

3.43.3 AXIS#.CANOPEN.FC#.FEED

3.43.3.1 Description

This keyword provides the feed for the additional feedback feed constant calculation. It is part of the scaling calculation used for CANOpen Object 60E4 Additional Position Actual Value (➜ p. 91).

3.43.3.1.1 Context

See CANopen Scaling (➜ p. 9).

3.43.3.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.3.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 4294967295
Default Value	65536 (2^16)
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.43.3.4 Variants Supported

CANBus and EtherCat

3.43.3.5 Fieldbus Information

Fieldbus	CANopen
Index	60E9h
Subindex	1-5 (sub-index corresponds to # specified after FC)
Data Type	U32
Float Scale	1:1
Access	Read/Write
PDO Map	No

3.43.4 AXIS#.CANOPEN.FC#.SHAFTREV

3.43.4.1 Description

This keyword provides the additional feedback driving shaft revolutions for the additional feedback feed constant calculation. It is part of the scaling calculation used for CANOpen Object 60E4 Additional Position Actual Value (➜ p. 91).

3.43.4.1.1 Context

See CANopen Scaling (➜ p. 9).

3.43.4.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.4.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 4294967295
Default Value	1
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.43.4.4 Variants Supported

CANBus and EtherCat

3.43.4.5 Fieldbus Information

Fieldbus	CANopen
Index	60EEh
Subindex	1-5 (sub-index corresponds to # specified after FC)
Data Type	U32
Float Scale	1:1
Access	Read/Write
PDO Map	No

3.43.5 AXIS#.CANOPEN.GEARPRIMARY.MOTORREV

3.43.5.1 Description

This keyword provides the count of motor shaft revolutions for the primary position gearing ratio calculation. It is part of the scaling calculation used for CANOpen objects.

3.43.5.1.1 Context

See CANopen Scaling (➜ p. 9).

3.43.5.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.5.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 4294967295
Default Value	1
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.43.5.4 Variants Supported

CANBus and EtherCat

3.43.5.5 Fieldbus Information

Fieldbus	CANopen
Index	6091h
Subindex	1
Data Type	U32
Float Scale	1:1
Access	Read/Write
PDO Map	No

3.43.6 AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV

3.43.6.1 Description

This keyword provides the count of driving shaft revolutions for the primary position gear ratio calculation. It is part of the scaling calculation used for CANOpen objects.

3.43.6.1.1 Context

See CANopen Scaling (➜ p. 9).

3.43.6.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.6.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 4294967295
Default Value	1
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.43.6.4 Variants Supported

CANBus and EtherCat

3.43.6.5 Fieldbus Information

Fieldbus	CANopen
Index	6091h
Subindex	2
Data Type	U32
Float Scale	1:1
Access	Read/Write
PDO Map	No

3.43.7 AXIS#.CANOPEN.GEAR#.MOTORREV

3.43.7.1 Description

This keyword provides the additional feedback count of motor shaft revolutions for the additional feedback gearing ratio calculation. It is part of the scaling calculation used for CANOpen Object 60E4 Additional Position Actual Value (➜ p. 91).

3.43.7.1.1 Context

See CANopen Scaling (➜ p. 9).

3.43.7.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.7.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 4294967295
Default Value	1
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.43.7.4 Variants Supported

CANBus and EtherCat

3.43.7.5 Fieldbus Information

Fieldbus	CANopen
Index	60E8h
Subindex	1-5 (sub-index corresponds to # specified after GEAR)
Data Type	U32
Float Scale	1:1
Access	Read/Write
PDO Map	No

3.43.8 AXIS#.CANOPEN.GEAR#.SHAFTREV

3.43.8.1 Description

This keyword provides the additional feedback count of driving shaft revolutions for the additional feedback gearing ratio calculation. It is part of the scaling calculation used for CANOpen Object 60E4 Additional Position Actual Value (➜ p. 91).

3.43.8.1.1 Context

See CANopen Scaling (➜ p. 9).

3.43.8.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.8.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 4294967295
Default Value	1
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.43.8.4 Variants Supported

CANBus and EtherCat

3.43.8.5 Fieldbus Information

Fieldbus	CANopen
Index	60EDh
Subindex	1-5 (sub-index corresponds to # specified after GEAR)
Data Type	U32
Float Scale	1:1
Access	Read/Write
PDO Map	No

3.43.9 AXIS#.CANOPEN.INTERPOLATEMODE

3.43.9.1 Description

AXIS#.CANOPEN.INTERPOLATEMODE configures the method used to interpolate between position set-points. This is only needed if the fieldbus cycle time is slower than 250µs, which is cycle time for the position loop.

During every cycle of the position loop, a new position command value needs to be calculated. For a slower fieldbus cycle time, the position set points sent by the fieldbus master need to be sub-interpolated internally by the drive.

See Object 60C0h: Interpolation sub mode select (➜ p. 90).

Value	Description
0	A linear based function is used for sub-interpolation.
1	A square based function is used for sub-interpolation.
2	Cubic polynomial interpolation, which is also known as position, velocity, and time (PVT) interpolation.

3.43.9.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.9.3 General Information

Type	Read/Write
Units	N/A
Range	0 to 2
Default Value	1
Data Type	Integer
See Also	60C0h
Stored in Non Volatile Memory	Yes

3.43.9.4 Variants Supported

Only available on EtherCAT and CAN drive models.

3.43.10 AXIS#.CANOPEN.PSCALE

3.43.10.1 Description

Internal position values transferred over fieldbus are converted from native 64-bit values to a maximum 32-bit position value. This parameter sets the resolution/revolution of position values back to the controller.

This value determines the counts per revolution of position values delivered by fieldbus. The default value is 20, which yields 2^20 counts/revolution. This scaling is used for CAN PDOs 6063h (Position actual internal value) and 60FCh (Position demand internal value).

3.43.10.1.1 Example

With units = counts 32 bit (ie: 2^32 counts/revolution), the default PSCALE of 20, and AXIS#.PL.FB = 2147483648.000 [Counts], which is half of 2^32, meaning a position of 180 degrees. The position actual internal value (6063h) over the fieldbus would be 2^20 / 2 = 524288 counts.

3.43.10.1.2 Context

See CANopen Scaling (➜ p. 9).

3.43.10.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.10.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 32
Default Value	20
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.43.10.4 Variants Supported

CANBus and EtherCat

3.43.10.5 Fieldbus Information

Fieldbus	Parameter	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
EtherCAT COE and CANopen	AXIS1.CANOPEN.PSCALE	0x5003-h	0x1	U8	1:1	-	Read/Write	False
	AXIS2.CANOPEN.PSCALE	0x5103-h	0x1	U8	1:1	-	Read/Write	False

3.43.11 AXIS#.CANOPEN.VELSCALEDENOM

3.43.11.1 Description

Denominator in CANopen velocity scale factor calculation.

```
Velocity value = ((velocity internal value * feed constant) / (encoder
resolution * gear ratio)) * velocity factor
Or:
Velocity value = (position value / sec) * velocity factor
```

3.43.11.1.1 Example

With default position units at 65536 counts/rev. If one wants velocity scaled in RPM, the velocity factor should be set to 60 s / 65536 counts/rev. 60 seconds in the numerator converts the counts per second into counts per minute and 65536 counts/rev denominator is converts our counts per minute into revolutions per minute.

3.43.11.1.2 Context

See CANopen Scaling (➜ p. 9).

3.43.11.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.11.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 4294967295
Default Value	1
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.43.11.4 Variants Supported

CANBus and EtherCat

3.43.11.5 Fieldbus Information

Field-bus	Parameter	Index	Sub-Inde-x	Dat-a Typ-e	Floa-t Scal-e	Unit-s	Access	PDO Map-pable
Ether-CAT COE and CANope-n	AXIS1.CANOPEN.VELSCALEDE-NOM	0x609-6	0x2	U8	1:1	-	Read/Wri-te	False
	AXIS2.CANOPEN.VELSCALEDE-NOM	0x609-6	0x2	U8	1:1	-	Read/Wri-te	False

3.43.12 AXIS#.CANOPEN.VELSCALENUM

3.43.12.1 Description

Numerator in CANopen velocity scale factor calculation.

```
Velocity value = ((velocity internal value * feed constant) / (encoder
resolution * gear ratio)) * velocity factor
Or:
Velocity value = (position value / sec) * velocity factor
```

3.43.12.1.1 Example

With default position units at 65536 counts/rev. If one wants velocity scaled in RPM, the velocity factor should be set to 60 s / 65536 counts/rev. 60 seconds in the numerator converts the counts per second into counts per minute and 65536 counts/rev denominator is converts our counts per minute into revolutions per minute.

3.43.12.1.2 Context

See CANopen Scaling (➜ p. 9).

3.43.12.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.43.12.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 4294967295
Default Value	1
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.43.12.4 Variants Supported

CANBus and EtherCat

3.43.12.5 Fieldbus Information

Field-bus	Parameter	Index	Sub-Inde-x	Dat-a Typ-e	Float Scal-e	Unit-s	Access	PDO Map-pable
Ether-CAT COE and CANope-n	AXIS1.CANOPEN.VELSCALEN-UM	0x609-6	0x1	U8	1:1	-	Read/Writ-e	False
	AXIS2.CANOPEN.VELSCALEN-UM	0x609-6	0x1	U8	1:1	-	Read/Writ-e	False

3.44 CANBUS Parameters

This section describes the CANBUS parameters.

3.44.1 CANBUS.BAUD

3.44.1.1 Description

CANBUS.BAUD is the CAN bus bit rate.

CANBUS.BAUD	Rate
125	125k Baud
250	250k Baud
500	500k Baud
1000	1000k Baud

3.44.1.1.1 Context

See EtherCAT and CANopen Overview (➜ p. 9).

3.44.1.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.44.1.3 General Information

Type	Read/Write
Units	1k baud
Range	125, 250, 500, 1000
Default Value	125
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.44.1.4 Variants Supported

CAN Bus drives: AKD2G-SPC

3.44.2 CANBUS.BAUDRATE

3.44.2.1 Description

Sets the CAN Bus baud rate. Values are specified in 1k baud. For example, a value of 125 means 125k baud and 1000 is 1M baud.

3.44.2.1.1 Context

See EtherCAT and CANopen Overview (➜ p. 9).

3.44.2.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.44.2.3 General Information

Type	Read/Write
Units	1k baud
Range	125 to 1000
Default Value	125k baud
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.44.2.4 Variants Supported

CAN Bus drives: AKD2G-SPC

3.44.3 CANBUS.NODEID

3.44.3.1 Description

Sets the CAN node id used for communication on the CAN network.

NOTE

This parameter is not affected by DRV.RSTVAR

3.44.3.1.1 Context

See EtherCAT and CANopen Overview (➜ p. 9).

3.44.3.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.44.3.3 General Information

Type	Read/Write
Units	N/A
Range	1 to 255
Default Value	1
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.44.3.4 Variants Supported

CAN Bus drives: AKD2G-SPC

3.45 CANOPEN Parameters

This section describes the CANOPEN parameters.

3.45.1 CANOPEN.MONITORSYNC

3.45.1.1 Description

Configures whether EtherCat/CANBus drives monitor PDO reception. Monitoring begins when this keyword is set and the first SYNC/PDO is received.

- For EtherCat, PDO reception is monitored.
- For CANBus, SYNC messages are monitored.

3.45.1.1.1 Context

See EtherCAT and CANopen Overview (➜ p. 9).

3.45.1.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.45.1.3 General Information

Type	Read/Write
Units	N/A
Range	0 to 1
Default Value	CANBus: 0 (Off) EtherCAT: 1 (On)
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.45.1.4 Variants Supported

CAN Bus and EtherCat drives: AKD2G-SPC and AKD2G-SPE

3.45.1.5 Fieldbus Information

Fieldbus	Parameter	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
EtherCAT COE and CANopen	CANOPEN.MONITORSYNC	0x300B	0x1	U8	-	-	RW	False

3.45.2 CANOPEN.SAMPLEPERIOD

3.45.2.1 Description

This parameter sets the fieldbus sample period (cyclic rate) which is the time between two PDO updates on the fieldbus cyclic channel. Use CANopen objects 60C2 subindex 1 (interpolation time period value) and 2 (interpolation time index) to adjust the CANOPEN.SAMPLEPERIOD over the fieldbus.

Formula:

```
SamplePeriod (seconds) = Interpolation_Time_Period_Value x 10 Inter-
polation_Time_Index
```

For example, SamplePeriod = 1 x 10 -3 seconds, and this will set CANOPEN.SAMPLEPERIOD = 1000 microseconds. Kollmorgen recommends the following standard cycle rates, 250 µs, 500 µs, 1000 µs, 2000 µs, or 4000 µs.

3.45.2.2 Examples

3.45.2.2.1 Usage

For EtherCat:

The sample period must match the SYNC 0 period when using Distributed Clocks. The drive will not transition to OPERATIONAL mode when the SYNC 0 does not match the sample period.

3.45.2.2.2 Code

```
-->CANOPEN.SAMPLEPERIOD 2000
-->CANOPEN.SAMPLEPERIOD
-->2000 microseconds
```

3.45.2.3 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.45.2.4 General Information

Type	Read/Write
Units	Microseconds
Range	250 to 8000 in increments of 250
Default Value	2000
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.45.2.5 Variants Supported

All variants are supported

3.45.2.6 Fieldbus Information

Fieldbus	Parameter	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
EtherCAT COE and CANopen	CANOPEN.SAMPLEPERIOD	0x60C2	0x1	UNSIGNED8	-	-	RW	False
			0x2	SIGNED8	-	-	RW	False

3.45.3 CANOPEN.STATE

3.45.3.1 Description

Indicates the current state of the CANopen state machine.

Value	CANopen over CAN
1	Init
4	Stopped
5	Operational
127	Pre-operational
128	Reset Application
129	Reset Communication

3.45.3.1.1 Context

See EtherCAT and CANopen Overview (➜ p. 9).

3.45.3.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.45.3.3 General Information

Type	Read Only
Units	N/A
Range	1, 4, 5, 127, 128, 129
Default Value	N/A
Data Type	Integer
Stored in Non Volatile Memory	No

3.45.3.4 Variants Supported

CANBus drives: AKD2G-SPC

3.45.4 CANOPEN.WORKBENCHUNITS

3.45.4.1 Description

Configures whether to use WorkBench UNIT keywords (1) or CANopen scaling (0) for CANopen position, velocity, and acceleration fieldbus objects.

When using CANopen scaling, feed constant ratio and motor gear ratio objects are used. See AXIS#.CANOPEN.FCPRIMARY (Object 6092 Feed Constant (➜ p. 90)) and AXIS#.CANOPEN.GEARPRIMARY (Object 6091 Gear Ratio (➜ p. 89)) commands.

NOTE

For ease of use, it is recommended leaving this at 0 to use CANOpen scaling. When this is set to 1, the values returned by fieldbus objects may or may not be scaled 1000:1 to improve resolution. See CAN/EtherCat documentation for object list with which values are scaled 1:1 vs 1000:1.

3.45.4.1.1 Example

```
AXIS1.UNIT.PROTARY 3 //custom
AXIS1.UNIT.PIN 3600
AXIS1.UNIT.POUT 1
AXIS1.PL.FB 1800.000
```

CANOpen object 0x607A Target Position = 1800

3.45.4.1.2 Context

See CANopen Scaling (➜ p. 9)l.

3.45.4.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.45.4.3 General Information

Type	Read/Write
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.45.4.4 Variants Supported

CAN Bus and EtherCAT drives: AKD2G-SPC and AKD2G-SPE

3.45.4.5 Fieldbus Information

Fieldbus	Parameter	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
EtherCAT COE and CANopen	CANOPEN.WORKBENCHUNITS	0x300B	0x2	U8	-	-	RW	False

3.46 ECAT Parameters

This section describes the ECAT parameters.

3.46.1 ECAT.ALIAS

3.46.1.1 Description

Use to read or set the EtherCAT alias address.

3.46.1.1.1 Context

See EtherCAT and CANopen Overview (➜ p. 9).

3.46.1.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.46.1.3 General Information

Type	Read/Write
Units	N/A
Range	0 to 65535
Default Value	0
Data Type	Integer
Stored in Non Volatile Memory	No

3.46.1.4 Variants Supported

EtherCAT drives: AKD2G-SPE

3.46.2 ECAT.PLLMODE

3.46.2.1 Description

This parameter sets the PLL mode.

Value	Description
0	Off - Not Synchronized
1	Synchronize using Distributed Clock
2	Synchronize without using Distributed Clock (synchronizes to the EtherCAT cyclic messages)

3.46.2.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.46.2.3 General Information

Type	Read/Write
Units	N/A
Range	0 to 2
Default Value	1
Data Type	Integer
Stored in Non Volatile Memory	Yes

3.46.2.4 Variants Supported

EtherCAT drives: AKD2G-SPE

3.46.3 ECAT.PLLSTATE

3.46.3.1 Description

This parameter reads the state of the PLL.

Value	Description
0	Idle (not locked)
1	Acquiring lock
2	Searching for reference period
3	Searching for phase lock
4	Searching for frequency lock
5	Fine adjust
6	Locked
7	Fault

3.46.3.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.46.3.3 General Information

Type	Read Only
Units	N/A
Range	0 to 7
Default Value	0
Data Type	Integer
Stored in Non Volatile Memory	No

3.46.3.4 Variants Supported

EtherCAT drives: AKD2G-SPE

3.46.4 ECAT.PRINTESI

3.46.4.1 Description

This keyword outputs a set of text that can be copied into an XML file for use in place of the official released ESI file.

NOTE

This file will not have all prior revisions, and will not support all product codes. It will only support the model and firmware version it was retrieved from. Only the officially released ESI file will support all product codes and revision numbers.

3.46.4.1.1 Example

1. Clear the terminal output
2. Enter the command

```
-->ECAT.PRINTESI
<?xml version ="1.0"?>
...
</EtherCATInfo>
-->
```

3. Select all of the console ouptput and copy into an xml file, such as AKD2G.xml.
4. Delete the terminal command at the beginning and trailing terminal input characters and save the file to have a valid ESI file.
5. Copy the xml file to the ESI file directory of your EtherCat master and it should now be able to import the AKD2G drive.

3.46.4.1.2 Context

See EtherCAT and CANopen Overview (➜ p. 9).

3.46.4.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.46.4.3 General Information

Type	Read Only
Units	N/A
Range	N/A
Default Value	N/A
Data Type	String
Stored in Non Volatile Memory	No

3.46.4.4 Variants Supported

EtherCAT drives: AKD2G-SPE

3.46.5 ECAT.STATE

3.46.5.1 Description

Indicates the current state of the EtherCAT state machine.

Value	CANopen over EtherCAT
1	Init
2	Pre-operational
3	Boot
4	Safe-operational
8	Operational

3.46.5.1.1 Context

See EtherCAT and CANopen Overview (➜ p. 9).

3.46.5.2 Versions

Action	Version	Notes
Implemented	02-00-00-000	

3.46.5.3 General Information

Type	Read Only
Units	N/A
Range	1, 2, 3, 4, 8
Default Value	N/A
Data Type	Integer
Stored in Non Volatile Memory	No

3.46.5.4 Variants Supported

EtherCAT drives: AKD2G-SPE

About KOLLMORGEN

Kollmorgen is a leading provider of motion systems and components for machine builders. Through world-class knowledge in motion, industry-leading quality and deep expertise in linking and integrating standard and custom products, Kollmorgen delivers breakthrough solutions that are unmatched in performance, reliability and ease-of-use, giving machine builders an irrefutable marketplace advantage.

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