AKD®2G

EtherCAT and CANopen Communications Manual

Edition: A, August 2021

Valid from firmware version 2.0

Part Number 907-200004-00

Original Documentation

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

KOLLMORGEN

Revision History

Record of Document Revisions:

Revision	Remarks
A, 07/2021	Launch version

Trademarks

- AKD is a registered trademark of Kollmorgen Corporation
- CANopen is a registered trademark of CAN in Automation (CiA)
- EtherCAT is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH
- Ethernet/IP is a registered trademark of ODVA, Inc.
- PROFINET is a registered trademark of PROFIBUS and PROFINET International (PI)
- Windows is a registered trademark of Microsoft Corporation

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)
- US Patent 8.566.415 (Safe Torque Off over network wiring)
- US Patent 10.374.468 (System and method for improved DC power line communication)

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

Table of Contents

1 Preface

1.1 About this Manual

The *AKD2G EtherCAT and CANopen Communications Manual* describes the installation, setup, range of functions, and software protocol for the EtherCAT AKD2G product series. All AKD2G EtherCAT drives have built-in EtherCAT functionality; therefore, an additional option card is not required.

A digital version of this manual (pdf format) is available on the DVD included with your drive. Manual updates can be downloaded from the Kollmorgen website.

Related documents for the AKD2G series include:

- *AKD2G Installation* . This manual provides instructions for installation and drive setup.
- *AKD2G WorkBench Online Help*. The help system describes how to use your drive in common applications. It also provides tips for maximizing your system performance with the AKD2G. The Online Help includes the parameter and command reference information, which provides documentation for the parameters and commands used to program the AKD2G.
- *Accessories Manual*. This manual provides documentation for accessories like cables and regen resistors used with AKD2G. Regional versions of this manual exist.

Additionally, an EtherCAT XML file, entitled *AKD2G EtherCAT Device Description*, describes the drive SDO and PDO. This file is available on the Kollmorgen website (part of the firmware zip archive).

1.2 Target Group

This manual addresses personnel with the following qualifications:

- Installation: only by electrically qualified personnel.
- Setup: only by qualified personnel with extensive knowledge of electrical engineering and drive technology.
- Programming: software developers, project-planners

Qualified personnel must know and observe the following standards:

- ISO 12100, IEC 60364 and IEC 60664
- National accident prevention regulations

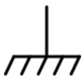
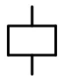
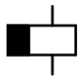
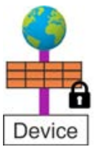
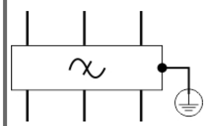
1.3 Symbols Used

Warning Symbols

Symbol	Indication
⚠ DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates situations which, if not avoided, could result in property damage.
NOTE	This symbol indicates important notes.

Symbol	Indication
	Warning of a danger (general). The type of danger is specified by the text next to the symbol.
	Warning of danger from electricity and its effects.
	Warning of danger from hot surface.
	Warning of danger from suspended loads.
	Warning of danger from automatic start.

Drawing symbols

Symbol	Description	Symbol	Description
	Signal ground		Diode
	Chassis ground		Relay
	Protective earth		Relay switch off delayed
	Resistor		Normally open contact
	Fuse		Normally closed contact
	State-of-the-art firewall		EMC filter

1.4 Abbreviations

Abbreviation	Meaning
AL	Application Layer: the protocol that directly used by the process entities.
DC	Distributed Clocks Mechanism to synchronize EtherCAT slaves and master
ENCP	Kollmorgen European Network of Collaborative Practice cables
ESC	EtherCAT Slave Controller
FPGA	Field Programmable Gate Array

Abbreviation	Meaning
FTP	File Transfer Protocol
HW	Hardware
IEC	International Electrotechnical Commission: The international standards
IEEE	Institute of Electrical and Electronics Engineers, Inc.
LLDP	Link Layer Discovery Protocol
MAC	Media Access Control
PDO	Process Data Object
PLL	Phase Locked Loop
PTP	Precision Time Protocol in accordance with IEEE 1588
Rx	Receive
RxPDO	Drive receive PDO, controller ouput
TCP	Transmission Control Protocol
Tx	Transmit
TxPDO	Drive transmit PDO, controller ouput
ZA ECAT	Access mode EtherCAT
ZA Drive	Access mode drive

2 Installation and Setup

2.1 Setup Instructions

NOTICE

Only professional personnel with extensive knowledge of control and drive technology are allowed to setup the drive.

WARNING **Automatic Restart!**

Risk of death or serious injury for humans working in the machine. Drives with EtherCAT are remote-controlled machines. They can start to move at any time without previous warning. The drive might restart automatically after power on, voltage dip or interruption of the supply voltage, depending on the parameter setting.

- **Place a warning sign ("WARNING: Possible Automatic Start" or similar) to the machine.**
- **Ensure, that power on is not possible, while humans are in a dangerous zone of the machine.**

1. Check assembly/installation. Check that all the safety instructions in the product manual for the drive and this manual have been observed and implemented. Check the setting for the station address and baud rate.
2. Connect PC, start WorkBench. Use the setup software WorkBench to set the parameters for the drive.
3. Setup basic functions. Start up the basic functions of the drive and optimize the current, speed and position controllers. This section of the setup is described in the in the online help.
4. Save parameters. When the parameters have been optimized, save them in the drive.

NOTE

See EtherCAT Configuration Parameters and for more information.

2.1.1 You should pay attention to this

This section helps to recognize risks and avoid dangers to people and objects.

Specialist staff required!

The devices are intended for industrial applications. Machine builders must employ qualified personnel. Qualified personnel are people who have been trained to transport, install, commission and operate electrical drives.

- Transport, storage, unpacking: only by personnel with knowledge of handling electrostatically sensitive components.
- Mechanical installation: only by personnel with mechanical expertise.
- Electrical installation: only by personnel with expertise in electrical engineering.
- Basic tests / setup: only by personnel with expertise in electrical engineering and drive technology.

The qualified personnel must know and observe ISO 12100 / IEC 60364 / IEC 60664 and national accident prevention regulations.

Read the documentation!

Read the available documentation before installation and commissioning. Improper handling of the devices can cause harm to people or damage to property. The operator of systems using the drive system must ensure that all personnel who work with the drive read and understand the manual before using the drive.

Check Hardware Revision!

Check the Hardware Revision Number of the product (see product label). This number is the link between your product and the manual. The product Hardware Revision Number must match the Hardware Revision Number on the cover page of the manual.

Pay attention to the technical data!

Adhere to the technical data and the specifications on connection conditions. If permissible voltage values or current values are exceeded, the devices can be damaged. Unsuitable motor or wrong wiring will damage the system components. Check the combination of drive and motor. Compare the rated voltage and current of the units.

Perform a risk assessment!

The manufacturer of the machine must generate a risk assessment for the machine, and take appropriate measures to ensure that unforeseen movements cannot cause injury or damage to any person or property. Additional requirements on specialist staff may also result from the risk assessment.

Automatic restart

The drive might restart automatically after power on, voltage dip or interruption of the supply voltage, depending on the command setting. Risk of death or serious injury for humans working in the machine.

If the command AXIS#.ENDEFAULT is set to 1, then place a warning sign to the machine (Warning: Automatic Restart at Power On) and ensure, that power on is not possible, while humans are in a dangerous zone of the machine. In case of using an undervoltage protection device, you must observe EN 60204-1:2006 chapter 7.5 .

ATTENTION: The drive is ready to operate with pre-configured STO function.

Observe electrostatically sensitive components!

The devices contain electrostatically sensitive components which may be damaged by incorrect handling. Electrostatically discharge your body before touching the device. Avoid contact with highly insulating materials (artificial fabrics, plastic film etc.). Place the device on a conductive surface.

Hot surface!

Drives may have hot surfaces during operation. The housing can reach temperatures above 80°C. Risk of minor burns! Measure the temperature, and wait until the housing has cooled down below 40 °C before touching it.

Earthing!

It is vital that you ensure that the drive is safely earthed to the PE (protective earth) busbar in the switch cabinet. Risk of electric shock. Without low-resistance earthing no personal protection can be guaranteed.

Leakage Current!

Since the leakage current to PE is more than 3.5 mA, in compliance with IEC61800-5-1 the PE connection must either be doubled or a connecting cable with a cross-section >10 mm² must be used. Deviating measures according to regional standards might be possible.

High voltages!

The equipment produces high electric voltages up to 900 V. Lethal danger exists at live parts of the device. Do not open or touch the equipment during operation. Keep all covers and cabinet doors closed. Built-in protection measures such as insulation or shielding may not be removed. Work on the electrical installation may only be performed by trained and qualified personnel, in compliance with the regulations for safety at work, and only with switched off mains supply, and secured against restart.

Never undo any electrical connections to the drive while it is live. There is a danger of electrical arcing with damage to contacts and personal injury. Wait at least adjust in target minutes after disconnecting the drive from the main supply power before touching potentially live sections of the equipment (such as contacts) or removing any connections.

Always measure the voltage in the DC bus link and wait until the voltage is below 50 V before handling components.

Functional Safety!

The assessment of the safety functions according to EN13849 or EN 62061 must finally be done by the user.

Reinforced Insulation

Thermal sensors, motor holding brakes and feedback systems built into the connected motor must have reinforced insulation (according to IEC61800-5-1) against system components with power voltage, according to the required application test voltage. All Kollmorgen components meet these requirements.

Never modify the drive!

It is not allowed to modify the drive hardware without permission by the manufacturer. Opening the housing causes loss of warranty.

2.1.2 Important Instructions

DANGER **High Voltage up to 900 V!**

There is a danger of serious personal injury or death by electrical shock or electrical arcing. Capacitors can still have dangerous voltages present up to 7 minutes after switching off the supply power. Control and power connections can still be live, even if the motor is not rotating.

- Never remove electrical connections to the drive while it is live.
- Wait at least seven minutes after disconnecting the drive from the main supply power before touching potentially live sections of the equipment (e.g. contacts) or undoing any connections.
- To be sure, measure the voltage in the DC bus link and wait until it has fallen below 50 V.

WARNING **Automatic Restart!**

Risk of death or serious injury for humans working in the machine. Drives with EtherCAT are remote-controlled machines. They can start to move at any time without previous warning. The drive might restart automatically after power on, voltage dip or interruption of the supply voltage, depending on the command setting.

- Place a warning sign (for example": "WARNING: Possible Automatic Start" or similar) to the machine.
- Ensure that power on is not possible while humans are in a dangerous zone of the machine.

NOTICE

Install the drive as described in the *Installation Manual*. The wiring for the analog setpoint input and the positioning interface, as shown in the wiring diagram in the *Installation Manual*, is not required. Never break any of the electrical connections to the drive while it is live. This action can result in destruction of the electronics.

NOTICE

The drive's status must be monitored by the Programmable Logic Controller (PLC) to acknowledge critical situations. Wire the FAULT contact in series into the emergency stop circuit of the installation. The emergency stop circuit must operate the supply contactor.

NOTE

It is permissible to use the setup software to alter the settings of the drive. Any other alterations invalidate the warranty. Because of the internal representation of the position-control parameters, the position controller can only be operated if the final limit speed of the drive does not exceed:

Rotary	Linear
at sinusoidal² commutation: 7500 rpm	at sinusoidal² commutation: 4 m/s
at trapezoidal commutation: 12000 rpm.	at trapezoidal commutation: 6.25 m/s

NOTE

All the data on resolution, step size, positioning accuracy etc. refer to calculatory values. Non-linearities in the mechanism (backlash, flexing, etc.) are not taken into account. If the final limit speed of the motor must be altered then all the parameters that were previously entered for position control and motion blocks must be adapted.

2.1.3 Important Notes

NOTICE

Only professional staff who are qualified in electrical engineering are allowed to install the drive. Wires with color green with one or more yellow stripes must not be used other than for protective earth (PE) wiring.

DANGER **High Voltage up to 900 V!**

There is a danger of serious personal injury or death by electrical shock or electrical arcing. Capacitors can still have dangerous voltages present up to adjust in target minutes after switching off the supply power. Control and power connections can still be live, even if the motor is not rotating.

- Only install and wire the equipment when it is not live.
- Make sure that the cabinet is safely disconnected (for instance, with a lock-out and warning signs).
- Never remove electrical connections to the drive while it is live.
- Wait at least adjust in target minutes after disconnecting the drive from the main supply power before touching potentially live sections of the equipment (e.g. contacts) or undoing any connections.
- To be sure, measure the voltage in the DC bus link and wait until it has fallen below 50 V.

NOTICE

Wrong mains voltage, unsuitable motor or wrong wiring will damage the drive. Check the combination of drive and motor. Compare the rated voltage and current of the units. Implement the wiring according to the matching connection diagram, Wiring overview, single axis drive.
Make sure that the maximum permissible rated voltage at the terminals L1, L2, L3 or +DC, –DC is not exceeded by more than 10% even in the most unfavorable circumstances (see IEC 60204-1).

NOTICE

Excessively high external fusing will endanger cables and devices. The fusing of the mains power and logic power must be installed by the user. Hints for use: Residual current protective device (RCD).

NOTICE

Since the leakage current to PE is more than 3.5 mA, in compliance with IEC61800-5-1 the PE connection must either be doubled or a connecting cable with a cross-section >10 mm² must be used. Deviating measures according to regional standards might be possible.

NOTICE

The drive status shall be monitored by the Programmable Logic Controller (PLC) to acknowledge critical situations. We recommend wiring the ready to operate relay contact in series into the emergency off circuit of the installation. The emergency off circuit must operate the supply contactor.

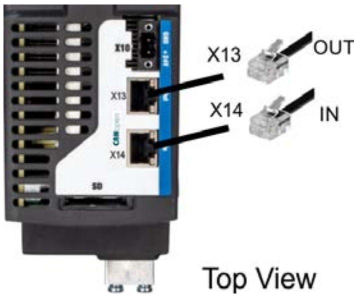
NOTE

It is permissible to use the setup software to alter the settings of the drive. Any other alterations invalidate the warranty.

2.2 Hardware Interface

2.2.1 CAN-Bus Interface connector X13/X14

AKD2G drives with connectivity option **C** can be connected to a CAN-Bus by using two 6-pin RJ25 connectors X13/X14.

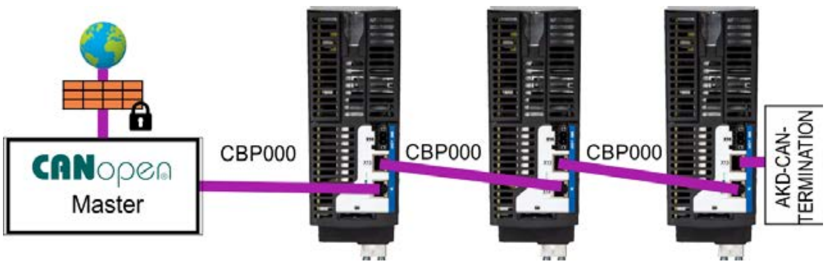


- RJ25
- Up to 1000 kbit/s operation
- Node ID to be set by WorkBench
- Baudrate to be set by WorkBench

Pin	Signal	Description
1	Termination	Internal Termination Resistor
2	Shield	Chassis
3	CAN_high	CAN bus high signal
4	CAN_low	CAN bus low signal
5	CAN_GND	CAN bus ground
6	Termination	Internal Termination Resistor

2.2.1.1 CAN-Bus Topology

We recommend the use of Kollmorgen CBP000 cables.



Cable requirements

To meet ISO 11898, a bus cable with a characteristic impedance of 120 Ω should be used. The maximum usable cable length for reliable communication decreases with increasing transmission speed.

As a guide, you can use the following values measured by Kollmorgen; however, these values are not assured limits:

- Characteristic impedance: 100–120 Ω
- Cable capacitance max.: 60 nF / 1000 m
- Lead loop resistance: 159.8 Ω / 1000 m

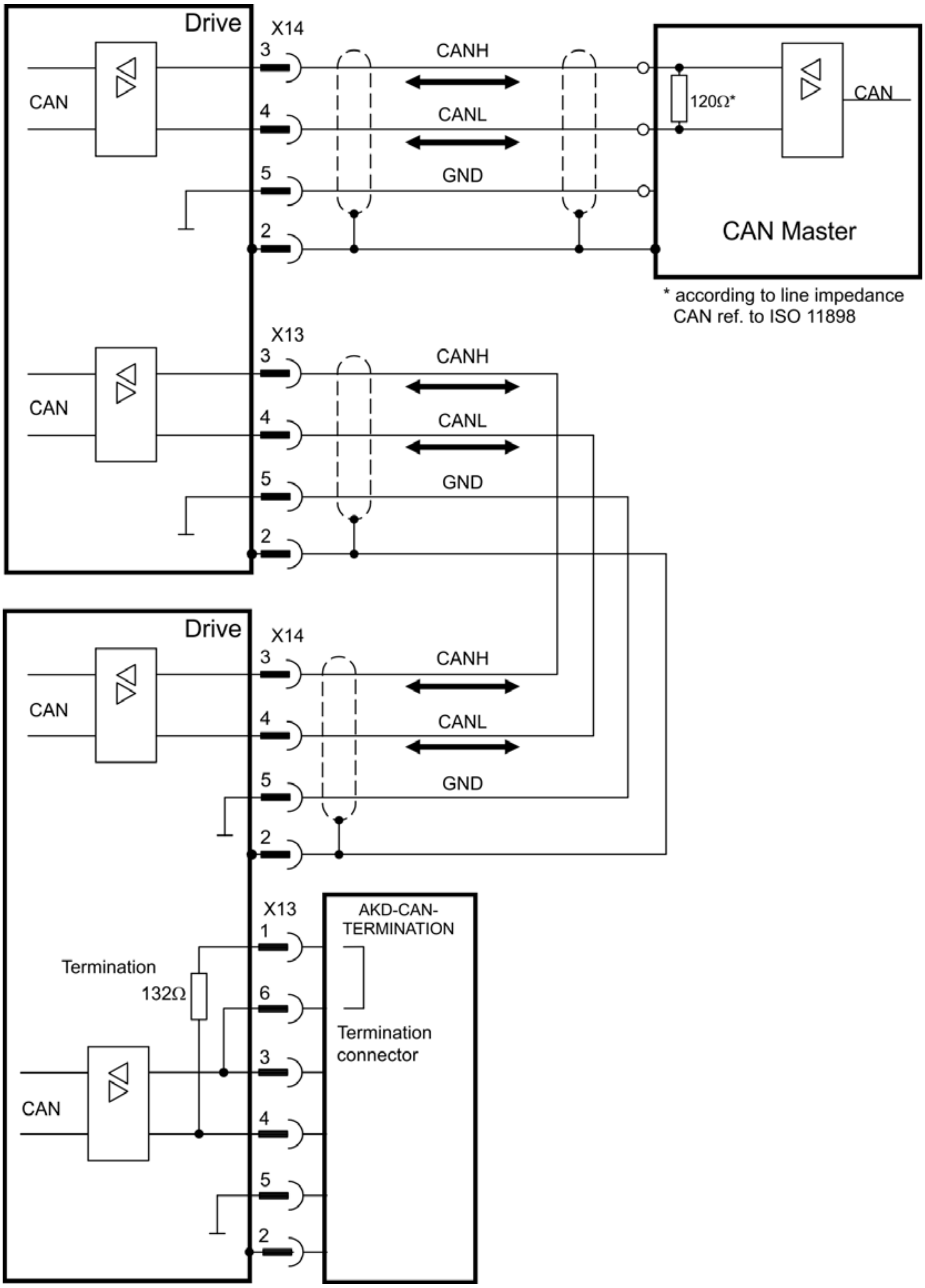
Transmission Rate (kBaud)	1000	500	250	125
Maximum Cable Length (m)	25	100	250	500

Lower cable capacitance (max. 30 nF / 1000 m) and lower lead resistance (loop resistance, 115 Ω / 1000 m) allow larger distances. The characteristic impedance 150 ± 5 Ω requires terminating resistor 150 ± 5 Ω.

Communication profile

For CANopen communication profile description refer to the manual "*AKD2G CAN-Bus Communication*".

2.2.1.2 CAN-Bus Wiring



2.2.1.3 Baud rate for CAN-Bus

The transmission rate can be set by using the parameter **CANBUS.BAUD** in WorkBench.

Baud rate [kBit/s]	CANBUS.BAUD
125	125 (default)
250	250
500	500
1000	1000

With a fix baud rate, the drive sends the boot up message with the baud rate saved in the drive's non volatile memory after a power cycle.

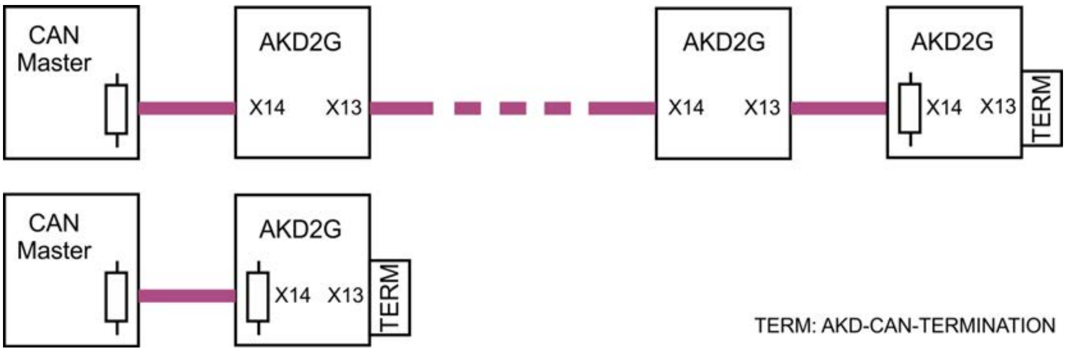
2.2.1.4 Node Address for CAN-Bus

The node address can be set by using parameter **CANBUS.NODEID** in WorkBench.

NOTE After changing the node address, you must turn off the 24 V auxiliary supply for the drive and then turn it on again.

2.2.1.5 CAN-Bus Termination

The last bus device on both ends of the CAN-Bus system must have termination resistors. The AKD2G has built-in 132 Ω resistors that can be activated by connecting pins 1 and 6. An optional termination plug is available for AKD2G (*AKD-CAN-TERMINATION*). The optional termination plug is an RJ25 connector with an enclosed wire jumper between pins 1&6. The termination plug should be inserted into the X13 connector of the last drive in the CAN network.



NOTE Remove the termination connector if the AKD2G is not the last CAN-Bus device and use X13 for connecting the next CAN node.

2.2.2 Ethernet Fieldbus Interface Connector X11/X12

The Ethernet fieldbus interface has two RJ45 connectors.

- RJ45 with built-in green/red dual-color LED
- EtherCAT®

NOTICE

Do not connect the Service line for the PC with the set up software to the Ethernet fieldbus interface X11/X12. The service Ethernet cable must be connected to X20.

Ethernet fieldbus interface X11/X12 pinout depends on the used protocol. Refer to the matching fieldbus communication manual.

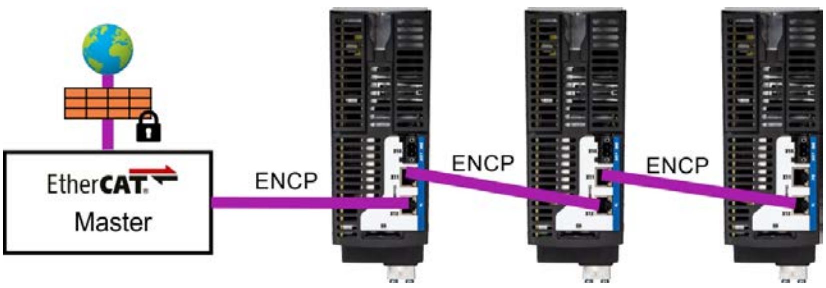
2.2.3 EtherCAT and Safety over EtherCAT

AKD2G drives (connectivity option **E**) can be connected as slaves to the EtherCAT network by using RJ45 connectors X11 (out port) and X12 (in port). The communication status is indicated by the built-in connector LEDs.

	Connector	Name	Function
	X11 Out	ERR	Returns potentials communication failures: Off = No Error Blinking = Invalid configuration Single Flash = Local error Double Flash = Process data watchdog
	X11 Out	Link/Activity	On/Blinking: Physical link/Data Traffic on. Static off = No link.
	X12 In	RUN	Returns the device state: Off = INIT Blinking = PRE-OPERATIONAL Single Flash = SAFE-OPERATIONAL On = OPERATIONAL Flickering = Initialization or BOOTSTRAP
	X12 In	Link/Activity	On/Blinking: Physical link/Data Traffic on. Static off = No link.

Bus topology example (EtherCAT)

Kollmorgen suggests using Kollmorgen European Network of Collaborative Practice (ENCP) cables. For more system solutions, see the WorkBench Online Webhelp.



2.3 Setup

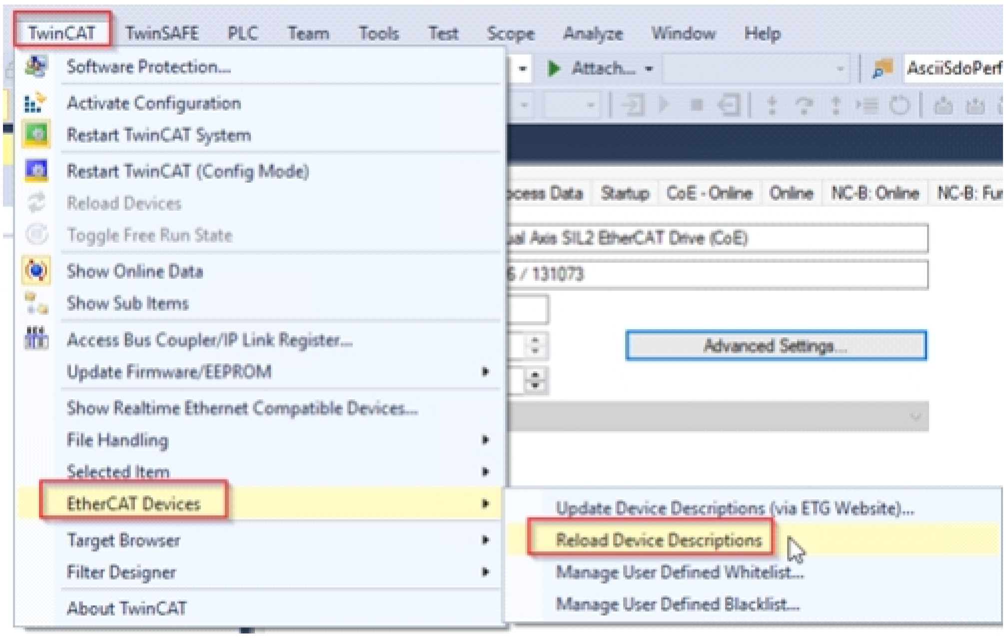
2.3.1 EtherCAT Slave Information (ESI) File

This XML file describes the EtherCAT specifics and application specific features of the drive. Revision changes on drive software are reflected in the ESI by the Revision Number. This file is used by the controller to identify the drive. Most controllers have a specific folder for the ESI file. Once the file is placed in the folder, the controller must be restarted in order to load the ESI file's contents (or the controller has a mechanism to reload device descriptions).

The ESI file contains, but not limited to, the following information:

- Vendor Id – Kollmorgen is 106
- Device Information – Type (Drive), Product Code, Revision No
- State Machine Timeouts
- Mailbox Configuration – Timeouts, Size, Start Address
- Object Dictionary
  - Also called CANopen over EtherCAT (CoE) Objects
  - Each Object Defines - Data Types, Index, Subindex, Names, Bit Offset, Read/Write Attribute, PDO map attribute
- PDO Flexible Mapping – Assign any PDO mappable CANopen object.
- PDO Fixed Mapping – PDOs that contain a predefined set of CANopen objects.
- Mailbox Initialization Sequence
- Distributed Clock Setting

For TwinCAT 3, ESI files are found in folder "`C:\TwinCAT\3.1\Config\Io\EtherCAT`" or similar path under your TwinCAT 3 installation folder. Also, TwinCat 3 has a mechanism to reload device descriptions as shown below:



2.3.2 Setup for TwinCAT 3

Before you set up the drive, make sure the following are complete:

- The AKD2G is configured with WorkBench and the servomotor moves.
- A correctly configured EtherCAT card is present in the master.
- TwinCAT software from Beckhoff (NC/PTP-Mode setup) is installed. Install first the TwinCAT System Manager, restart your PC, then install the option package NC/PTP-Mode.
- The XML description of the drive is available in the firmware zipped file, on the Kollmorgen website or by using the ECAT.PRINTESI command and editing the contents.
- An AKD2G EtherCAT slave is connected to the EtherCAT master PC.
- The TwinCAT system manager resides in Config-Mode. The current mode of the system manager appears at the bottom right of the TwinCAT main-screen window.

Copy the XML description of the drive to the TwinCAT system (usually to the folder C:\TwinCAT\3.1\Config\IO\EtherCAT or a similar path under your TwinCAT 3 installation folder) and restart the TwinCAT system since TwinCAT analyzes all device description files during startup.

2.3.2.1 Overview

This section provides steps to:

- import the XML file into TwinCAT 3
- provide steps necessary to establish EtherCAT communications and
- perform a basic test using the online console in TwinCAT to enable or disable the AKD2G drive
- make a position move
- jog in both directions

This procedure uses a dual axis model of AKD2G with corresponding screenshots. For single axis models only Axis 1 under NC Task and only PDOs under I/O > Devices > Device x (EtherCAT) > Drive x (AKD2G…) > Inputs or Outputs and any CANopen over EtherCAT (CoE) objects applicable to Axis 1.

The drive identified and added to the project tree during "Scan for Boxes" (➜ p. 37) set may differ by description and SIL number depending on your hardware model.

2.3.2.2 Acquire an XML File

Before beginning, first acquire the correct XML (device description) file compatible with the firmware version in the AKD2G drive.

Use one of the following acquisition methods:

- "Website Download" (➜ p. 33)
- "WorkBench ESI File Generation" (➜ p. 33)
- "ECAT.PRINTESI Command in WorkBench Terminal" (➜ p. 34)*

*The Website Download and WorkBench Tools ESI File Generation are the preferred methods. The ECAT.PRINTESI Command is not the prefered method but provided for reference.

In earlier firmware versions, there were older style ESI/XML files with an abbreviated naming convention (for example, AKD2G-SPE_02-04.xml) and the file grew to include all beta releases. If the latest release was used then the minor versions did not matter; however, it became confusing with different versions of the file with the same name.

Kollmorgen now provides an ESI/XML file in the FW zip file for a particular firmware revision. The XML file (for example, AKD2G-SPE_02-04-06-002.xml) contains definitions that work for all six drive model families. This file is compatible with any drive resident with 02-04-06-002 firmware or later.

2.3.2.2.1 Website Download

To download the latest firmware release and associated files, go to [Kollmorgen Support].

1. Click on AKD2G Servo Drive Firmware appropriate for your drive model.
2. Once the download is complete, click on the Fieldbus folder.

The Fieldbus folder contains the historical XML files zipped for download.

IMPORTANT

Use the XML file contained in the same zip file as the firmware for the drive or download the firmware to the drive so it matches the correlated XML file.

The Fieldbus folder contains the historical list of XML files.

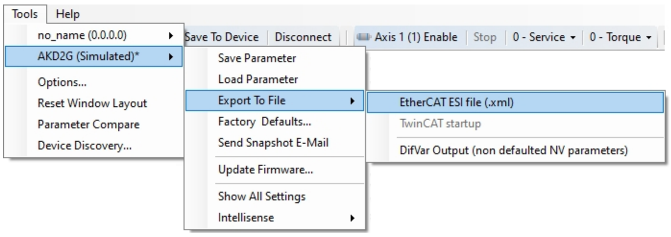
NOTE

Old firmware cannot be used with a new XML file. The XML file and firmware versions must match or, in the case of using an old firmware, an old XML file is necessary so an archive is included for previous versions.

2.3.2.2.2 WorkBench ESI File Generation

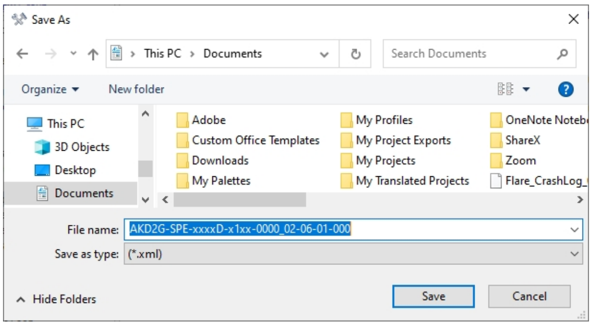
WorkBench can export an ESI file from a selected AKD2G EtherCAT" /> drive, similar to the ECAT.PRINTESI command. This functionality is accessed from the Tools menu.

1. In WorkBench, click **Tools** > your project > **Export to File** > **EtherCAT ESI file (.xml)**.



2. Select a location to save the file, and choose a **File name**.

   The default name is the device type followed by the firmware version, i.e. AKD2G-SPE_MM-mm, where MM is the major version and mm is the minor version. An example is shown below.



3. Click **Save**.

2.3.2.2.3 ECAT.PRINTESI Command in WorkBench Terminal

Before beginning, make sure the terminal has been cleared. To clear, right-click in the WorkBenchTerminal while online and click **Clear**.

1. Type `ECAT.PRINTESI` in the terminal and press **Enter**. There may be a delay while the data is uploaded from the drive to the Terminal.
2. The ESI (XML) file data is printed to the Terminal console.
3. Right-click in the terminal, click **Select All** and select **Copy** to copy the contents to the clipboard.
4. Use a text editor, such as Notepad, to paste the data and then delete the following lines:

   The first line: `-->ECAT.PRINTESI`
   The last line: `-->`

   NOTE
   Do not to delete any other characters from the printout.
5. Select **File**.
6. Click **Save**.
7. When naming and saving the file, use the .xml file extension and save to the PC.

See ECAT.PRINTESI for more information.

2.3.2.3 TwinCAT 3 Startup

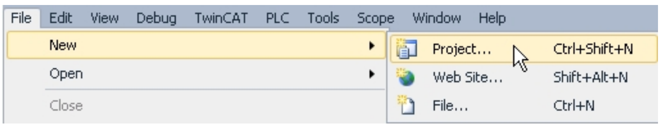
After completing the steps to "Acquire an XML File" (➜ p. 32), follow the steps below for the startup.

1. Insert the XML file in the correct TwinCAT 3 File directory on the TwinCAT 3 PC.

   Put the acquired XML file in the following directory: “C:\TwinCAT\3.1\Config\Io\EtherCAT.”
2. Launch TwinCAT 3 by clicking on the TwinCAT icon then click “TwinCAT XAE” to start the TwinCAT software.

   The TwinCAT start screen appears.
3. Start a new project by clicking File > New > Project.

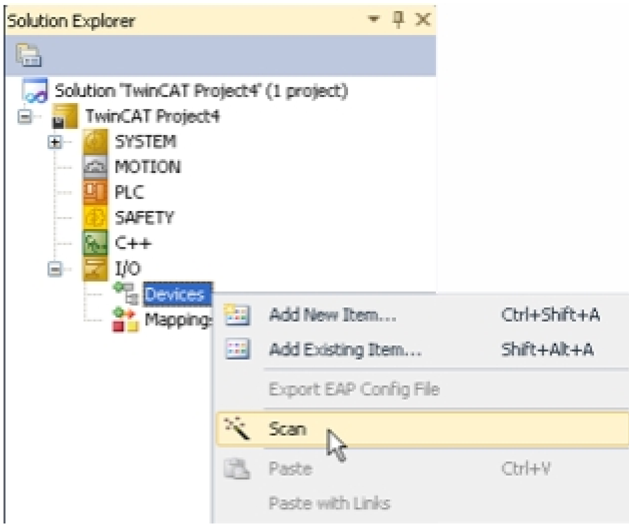
   

   To continue, follow the steps in "Scan for Devices" (➜ p. 35).

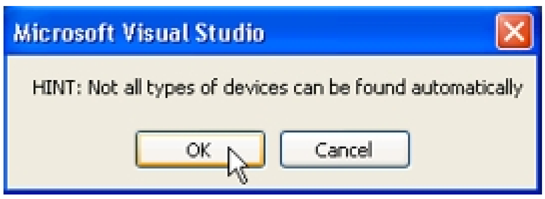
2.3.2.4 Scan for Devices

A scan is needed for the Ethernet adapter used for the EtherCAT communication.

1. In the tree on the left, click the TwinCAT project.
2. Click to expand **I/O**.
3. Right-click on **Devices**.
4. Click **Scan**.

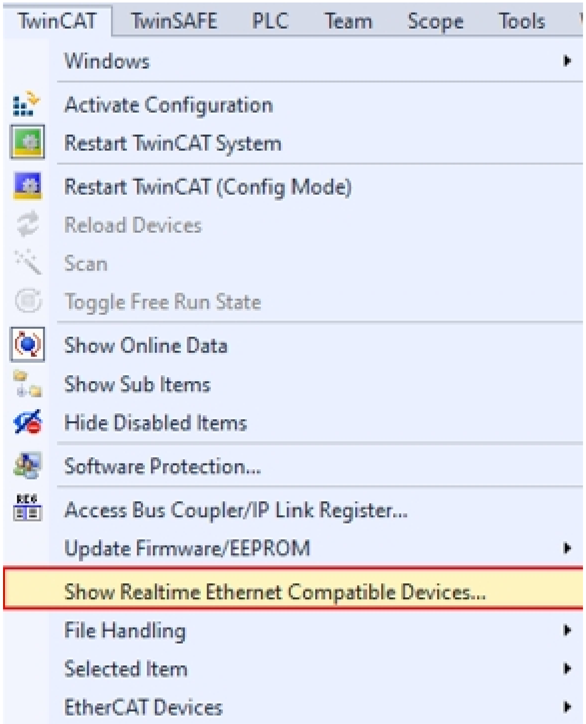


5. A pop-up appears indicating not all devices are automatically found. Click **OK**.



6. Check the Select the Intel® Pro/100M network adapter and click **OK** in the scan results.

If there are no new I/O devices, Device x(EtherCAT) [adapter] found then click the TwinCAT tab, click **Show Realtime Ethernet Compatible Devices** and follow the Beckhoff/TwinCAT 3 instructions for installing an adapter.



The Ethernet Adapters dialog indicates Compatible Devices that can be installed. In this case, the Ethernet port was already installed (indicated under the Installed and ready to use devices [realtime capable] with TwinCAT in the name).

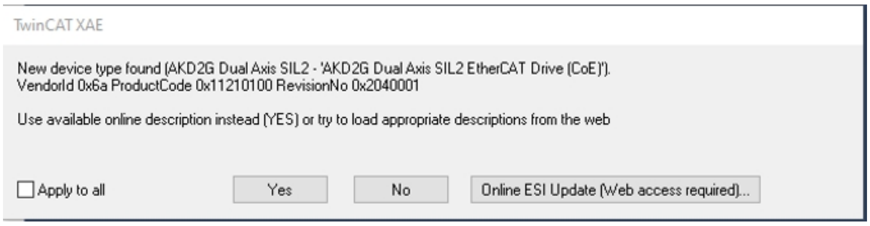
To continue, follow the steps in "Scan for Boxes" (➜ p. 37).

2.3.2.5 Scan for Boxes

A scan is needed for matches of the ESI version and the drive's firmware.

- Click **Yes** to scan for boxes (AKD drives).

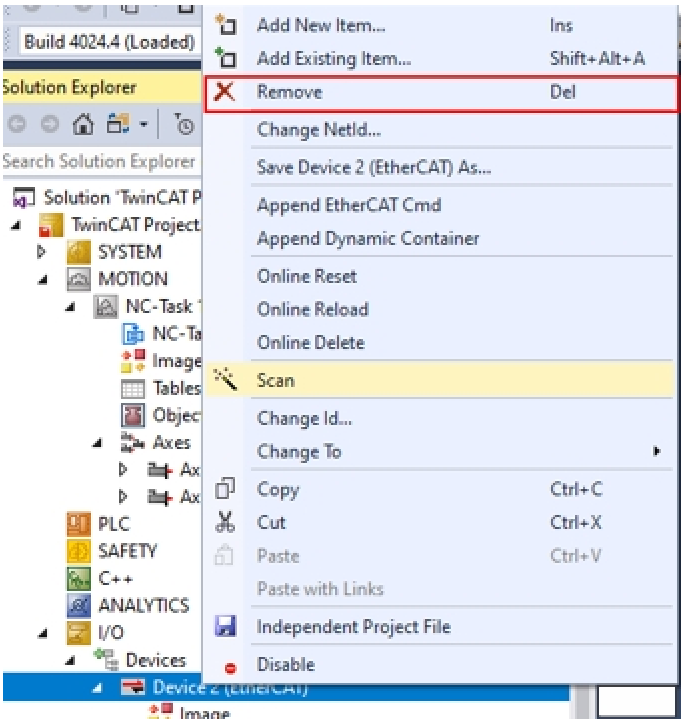
- If this is **successful**, a pop-up appears. For the next steps, go to "Append a Linked Axis to a NC Axis" (➔ p. 38).
- If **unsuccessful**, a screen appears indicating a mismatch between the ESI version and the drive's firmware. This needs to be resolved before scanning or rescanning for boxes again.



How to Resolve

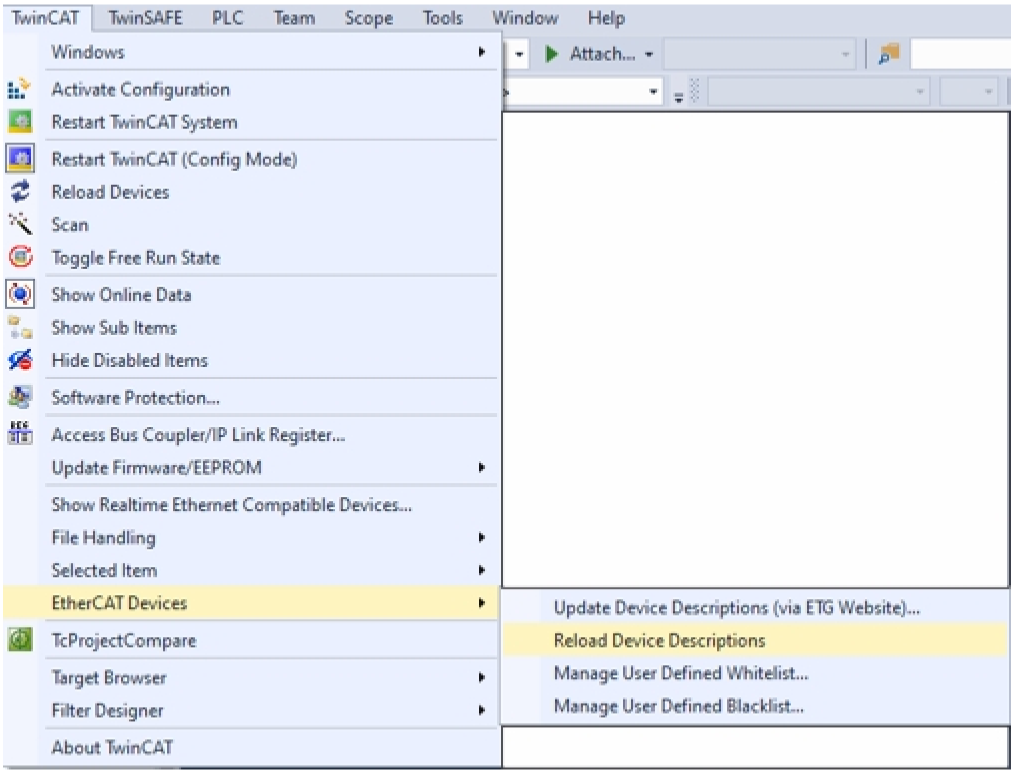
Click **No** to resolve then replace the XML file in the TwinCAT directory with the correct one by following these steps.

1. In the tree on the left, click the TwinCAT project.
2. Click to expand **I/O**.
3. Right-click on **Devices**.
4. Right-click on **Device x (EtherCAT)** and click **Remove**.



Once the correct XML file is added to the TwinCAT folder, reload the device descriptions following these steps.

1. Click the TwinCAT tab.
2. Click **EtherCAT Devices** > **Reload Device Descriptions**.

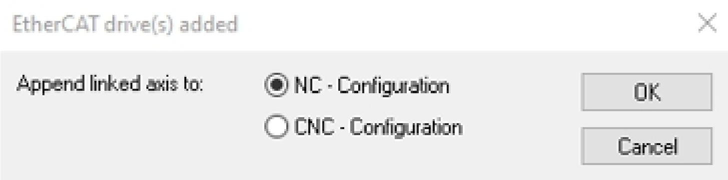


3. Repeat the previous process, right-click on **Devices** in the project tree, scan and then scan for boxes.

2.3.2.6 Append a Linked Axis to a NC Axis

Append a linked axis, the AKD2G drive, to a NC axis.

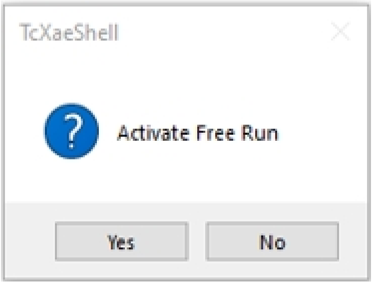
Click the **NC - Configuration** radio button and click **OK**.



To continue, follow the steps in "Activate Free Run" (➔ p. 39).

2.3.2.7 Activate Free Run

Click **No** to avoid activating free run mode.



To continue, follow the steps in "View NC-Task, Axis, and Drive 1" (➜ p. 39).

2.3.2.8 View NC-Task, Axis, and Drive 1

This section describes options for viewing the NC-task, axis and drive.

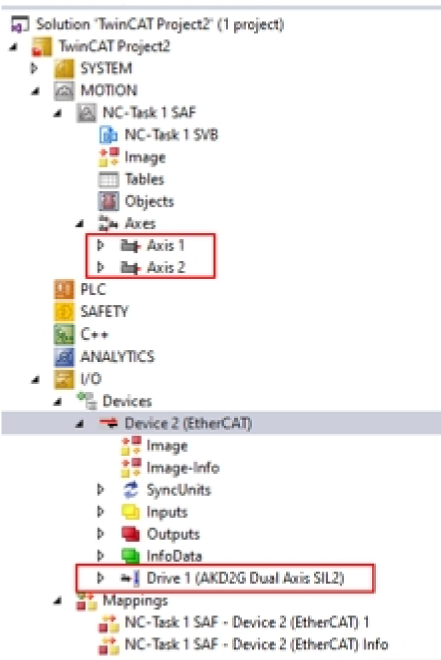
The following are options for viewing:

- "View NC-Task, Axis and Drive 1 (AKD2GDual Axis SIL2) " (➜ p. 39)
- "View PDO Objects Mapped for Drive x (AKD2G Dual Axis SIL2) " (➜ p. 40)
- "View PDO Mapping Mapped by an XML File" (➜ p. 41)

2.3.2.8.1 View NC-Task, Axis and Drive 1 (AKD2GDual Axis SIL2)

This procedure uses a dual axis model of AKD2G. The drive identified and added to the project tree during the "Scan for Boxes" (➜ p. 37) set may differ by description and SIL number depending on your hardware model. For single axis models only Axis 1 is applicable.

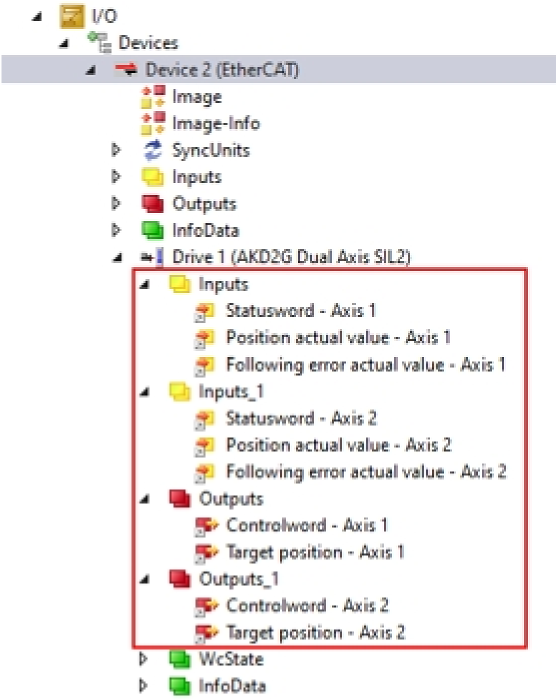
The following shows the tree expanded under NC-Task and Device x (AKD2G Dual Axis SIL2) to demonstrate the primary locations created by importing the device into TwinCAT 3.



2.3.2.8.2 View PDO Objects Mapped for Drive x (AKD2G Dual Axis SIL2)

The PDO objects for each axis appear in the tree on the left under the TwinCAT project > I/O > Devices > Device 2 (EtherCAT) > Drive 1 (AKD2G Dual Axis SIL2) as in the example shown below.

Notice the convention of Inputs or Outputs for Axis 1 and Inputs_1 and Outputs_2 for Axis 2.

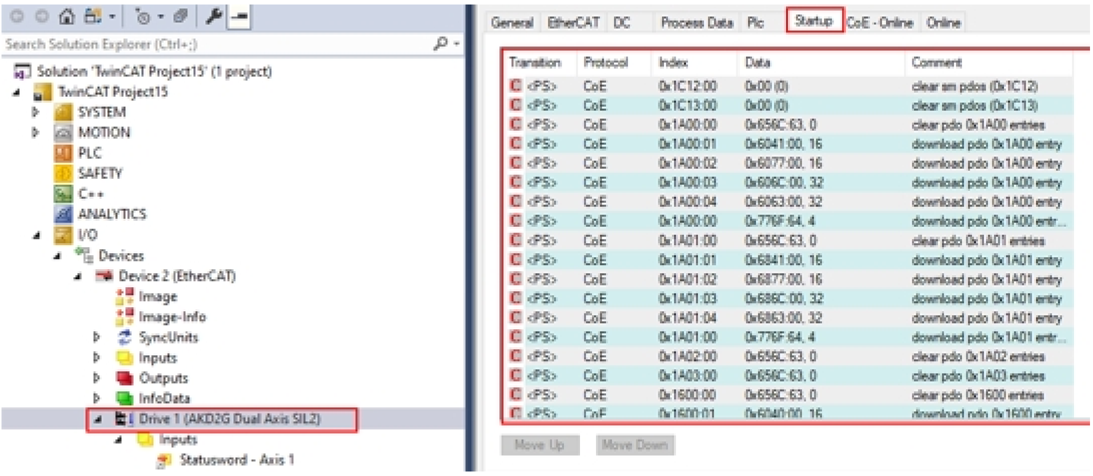


2.3.2.8.3 View PDO Mapping Mapped by an XML File

The PDO Mapping is done at startup and the content is set by the XML file. However edits can be made manually in the Startup list or in the PDO mapping under the Process Data tab. For more details on PDO Mapping, see "Fixed PDO Mappings" (➜ p. 92) and "Flexible PDO Mapping" (➜ p. 94).

1. In the tree on the left, go to the TwinCAT project > I/O > Devices > Device 2 (EtherCAT).
2. Double-click on **Drive 1 (AKD2G Dual Axis SIL2)**
3. Click the **Startup** tab on the right.

In the Startup tab in TwinCAT, notice the Startup List content that appears are SDOs for mapping the PDOs and the content.



The tables below show PDO objects mapped by XML.

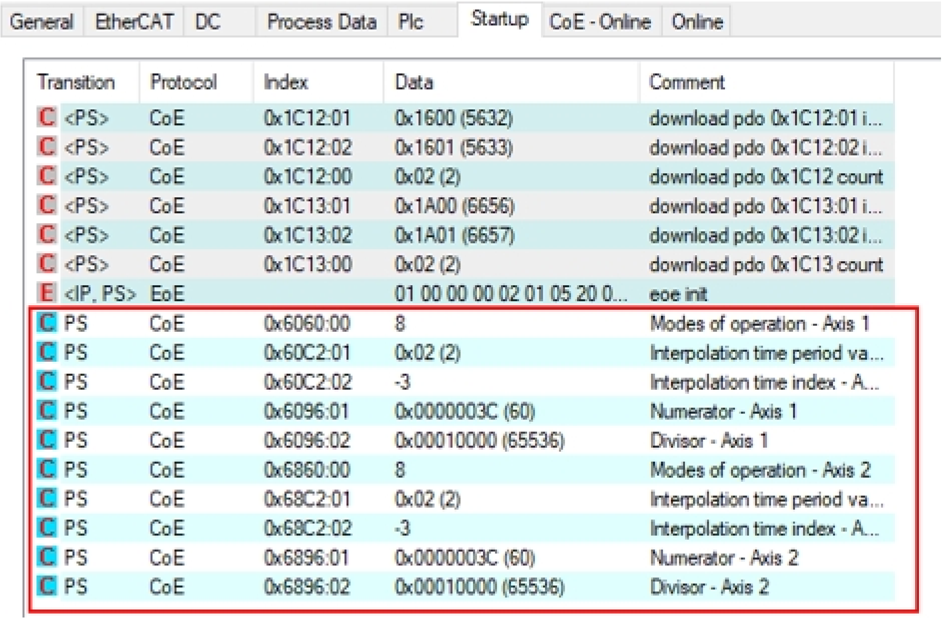
PDO Outputs

Objects	Subindex	Description
0x6040, 0x6840	0	Controlword
0x607A, 0x687A	0	Target Position

PDO Inputs

Objects	Subindex	Description
0x6041, 0x6841	0	Statusword
0x6064, 0x6864	0	Position Actual Value
0x60F4, 0x68F4	0	Following Error Actual Value

The SDOs that initialize the following objects for each axis are indicated in the red box below.



Transition	Protocol	Index	Data	Comment
C <PS>	CoE	0x1C12:01	0x1600 (5632)	download pdo 0x1C12:01 i...
C <PS>	CoE	0x1C12:02	0x1601 (5633)	download pdo 0x1C12:02 i...
C <PS>	CoE	0x1C12:00	0x02 (2)	download pdo 0x1C12 count
C <PS>	CoE	0x1C13:01	0x1A00 (6656)	download pdo 0x1C13:01 i...
C <PS>	CoE	0x1C13:02	0x1A01 (6657)	download pdo 0x1C13:02 i...
C <PS>	CoE	0x1C13:00	0x02 (2)	download pdo 0x1C13 count
E <IP, PS>	EoE		01 00 00 00 02 01 05 20 0...	eoe init
C PS	CoE	0x6060:00	8	Modes of operation - Axis 1
C PS	CoE	0x60C2:01	0x02 (2)	Interpolation time period va...
C PS	CoE	0x60C2:02	-3	Interpolation time index - A...
C PS	CoE	0x6096:01	0x0000003C (60)	Numerator - Axis 1
C PS	CoE	0x6096:02	0x00010000 (65536)	Divisor - Axis 1
C PS	CoE	0x6860:00	8	Modes of operation - Axis 2
C PS	CoE	0x68C2:01	0x02 (2)	Interpolation time period va...
C PS	CoE	0x68C2:02	-3	Interpolation time index - A...
C PS	CoE	0x6896:01	0x0000003C (60)	Numerator - Axis 2
C PS	CoE	0x6896:02	0x00010000 (65536)	Divisor - Axis 2

Below are the CoE objects initialized values by Startup that are set by an XML file.

Objects	Subindex	Description	Value
0x6060, 0x6860	0	Modes of Operation	0x08 (Cyclic Synchronous Position)
0x60C2, 0x68C2	1	Interpolation Time Period Value	0x02
0x60C2, 0x68C2	2	Interpolation Time Index	-3
0x6096, 0x6896	1	Velocity Factor-Numerator	60
0x6096, 0x6896	2	Velocity Factor-Divisor	65536

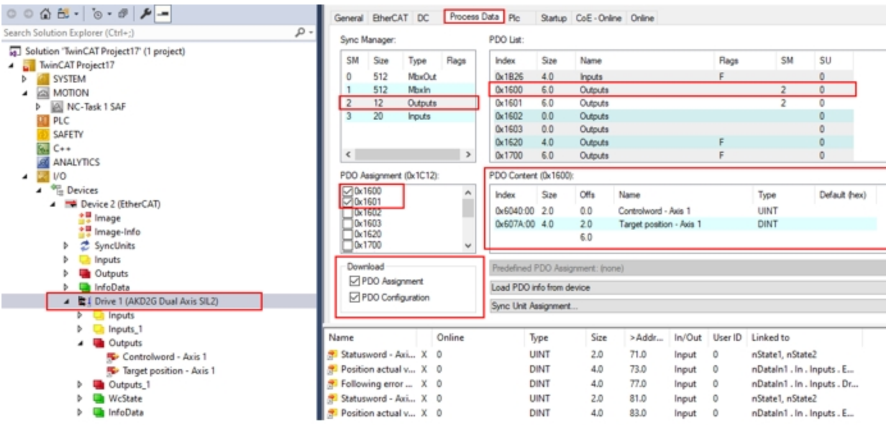
2.3.2.8.4.1 Output PDO Mapped Content Axis 1 (Controlword and Target Position)

1. In the tree on the left, go to the TwinCAT project > I/O > Devices > Device 2 (EtherCAT).
2. Double-click **Drive 1 (AKD2G Dual Axis SIL2)**.
3. Click the **Process Data** tab.
4. Under the Sync Manager, click **Outputs**.
5. Under the PDO Assigment, check the **PDO Assignment** and **PDO Configuration** check boxes.

NOTE

The default PDO output assignments are 0x1600 and 0x1601 checked below. Click on 0x1600 in the PDO List to display the PDO Content for that PDO. The default mapping is 0x6040 (Controlword Axis 1) and 0x607A (Target Position Axis 1).

Axis 1 PDO Output Mapping



2.3.2.8.5.2 Output PDO Mapped Content Axis 2 (Controlword and Target Position)

Click on 0x1601 in the PDO List to display the PDO content for that PDO. The default mapping is 0x6840 (Controlword Axis 2) and 0x687A (Target Position Axis 2). With a single axis AKD2G the mapping for 1601 is empty with no PDO content.

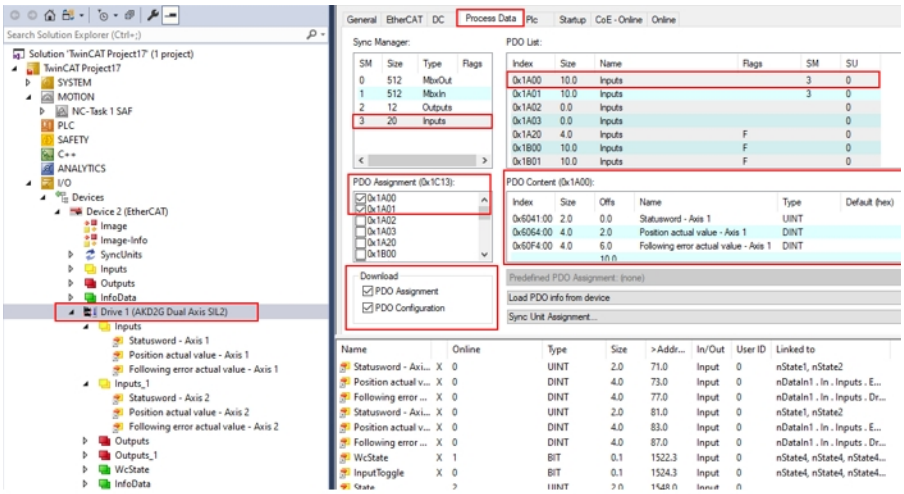
2.3.2.8.6.3 Input PDO Mapped Content Axis 1 (Statusword, Position Actual Value, Following Error Actual Value)

1. In the tree on the left, go to the TwinCAT project > I/O > Devices > Device 2 (EtherCAT).
2. Double-click **Drive 1 (AKD2G Dual Axis SIL2)**.
3. Click the **Process Data** tab.
4. Under the Sync Manager, click **Inputs**.
5. Under the PDO Assigment, check the **PDO Assignment** and **PDO Configuration** check boxes.

NOTE

The default PDO input assignments are 0x1A00 and 0x1A01 checked below. Click on 0x1A00 in the PDO List to display the PDO content for that PDO. The default mapping is 0x6041 (Statusword Axis 1), 0x6064 (Position Actual Value Axis 1) and 0x60F4 (Following Error Actual Value Axis 1).

Axis 1 PDO Input Mapping



2.3.2.8.7.4 Input PDO Mapped Content Axis 2 (Statusword, Position Actual Value, Following Error Actual Value)

Click on 0x1A01 in the PDO List to display the PDO content for that PDO. The default mapping is 0x6841 (statusword axis 2), 0x6864 (position actual value axis 2) and 0x68F4 (following error actual value axis 2).

To continue, follow the steps in "View PDO Linking" (➔ p. 44).

2.3.2.9 View PDO Linking

This section describes how to view the inputs and outputs. This allows drive inputs and outputs to be linked to the NC-Task and axis.

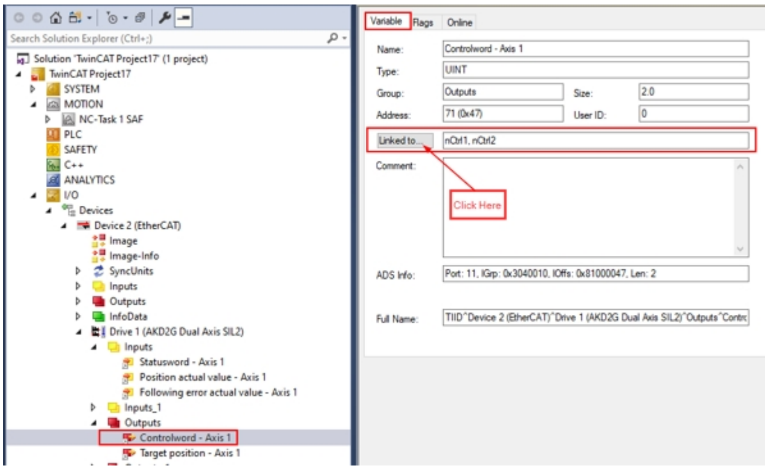
- "Output PDO Linking to Axis 1" (➜ p. 44)
- "Input PDO Linking Axis 1" (➜ p. 46)
- "View Axis 2 PDO Mapping and Linking" (➜ p. 49)

2.3.2.9.1 Output PDO Linking to Axis 1

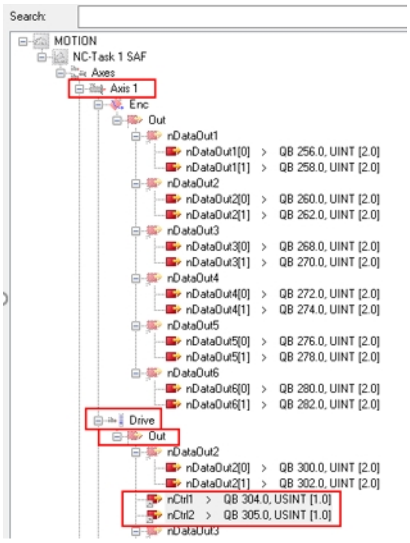
Controlword Axis 1

This describes the output linking for Controlword Axis 1.

To view how the PDO objects are linked, in the tree on the left, go to the TwinCAT project > I/O > Device 2 (EtherCAT) > Drive 1 AKD2G Dual Axis SIL2 > Outputs > Controlword Axis1. Click **Linked to**.



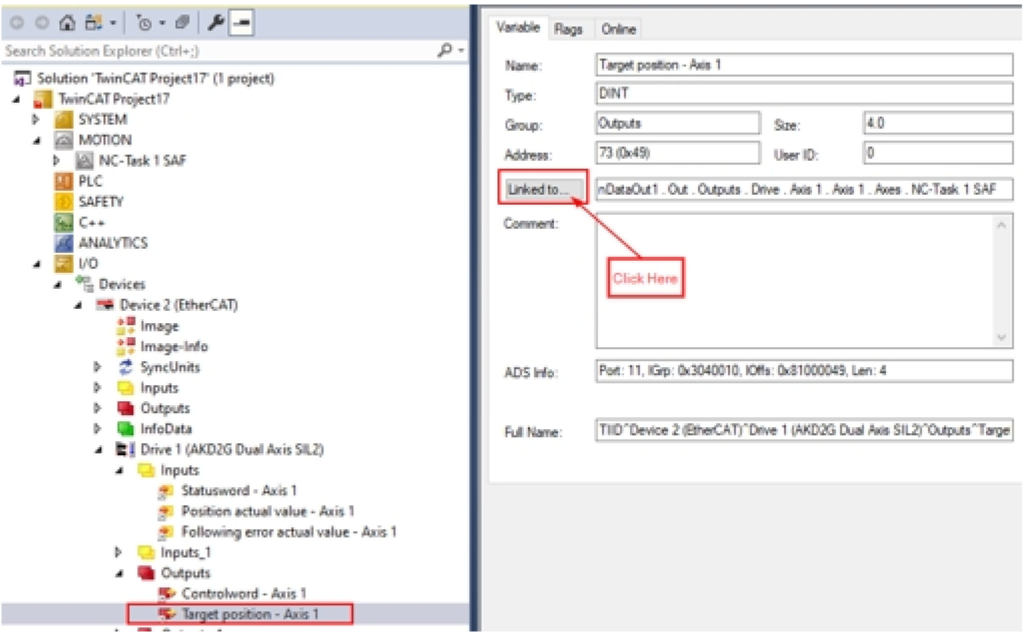
Drive 1 > Outputs > Controlword-Axis1 >Linked to



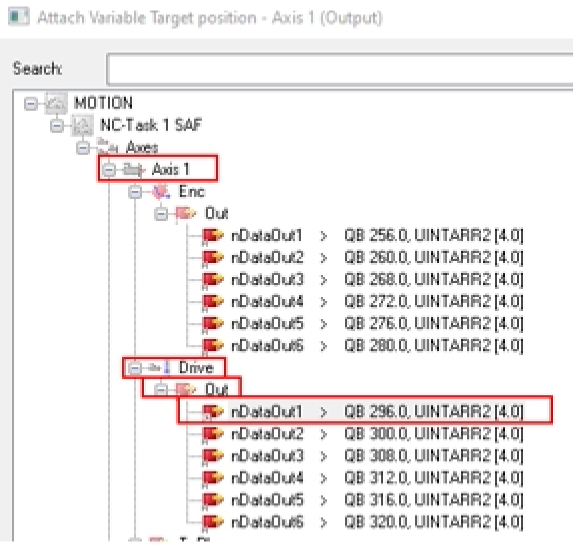
Target Position Axis 1

This describes the output linking for Target Position Axis 1.

To view how the PDO objects are linked, in the tree on the left, go to the TwinCAT project > I/O > Devices > Device 2 (EtherCAT) > Drive 1 AKD2G Dual Axis SIL2 > Outputs > Target Position Axis1. Click **Linked to**.



Drive 1 > Outputs > Target Position Axis1 Linked to

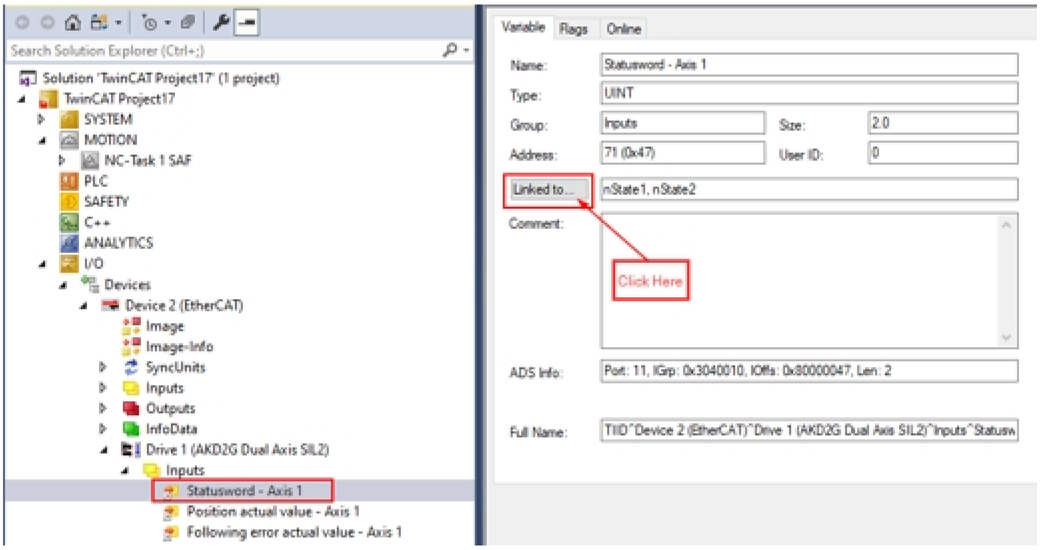


2.3.2.9.2 Input PDO Linking Axis 1

Statusword Axis 1

This describes the input linking for Statusword Axis 1.

To view how the PDO objects are linked, in the tree on the left, go to the TwinCAT project > I/O > Devices > Device 2 (EtherCAT) > Drive 1 AKD2G Dual Axis SIL2 > Inputs > Statusword Axis1. Click **Linked to**.

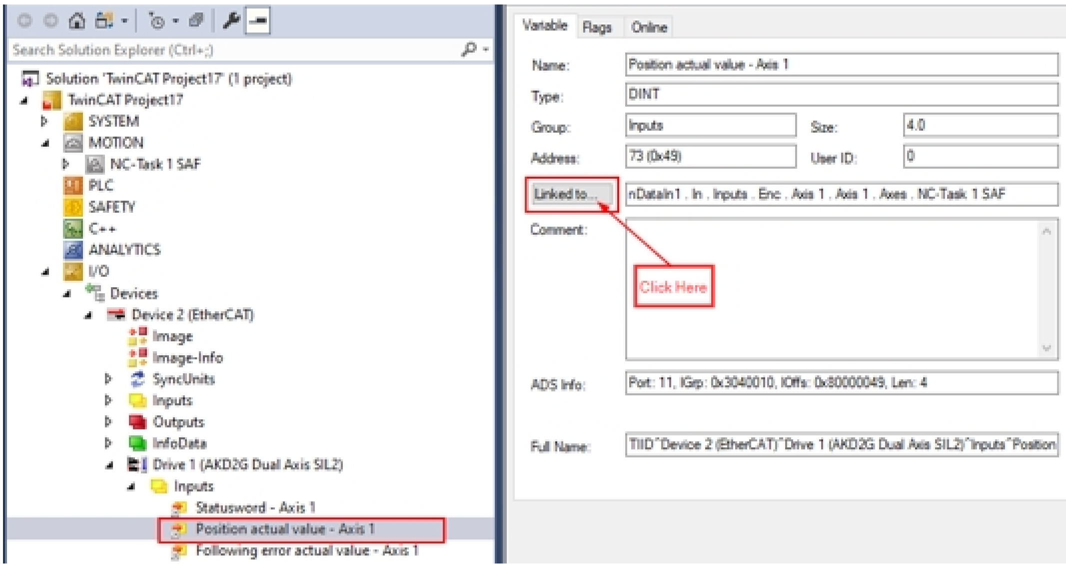


Drive 1> Inputs > Statusword Axis 1 > Linked to.

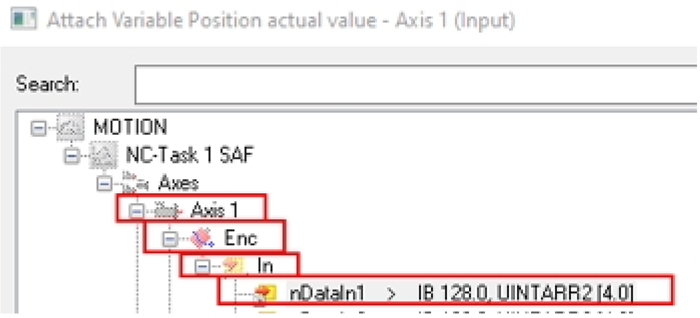
Position Actual Value Axis 1

This describes the input linking for Position Actual Value Axis 1.

To view how the PDO objects are linked, in the tree on the left, go to the TwinCAT project > I/O > Devices > Device 2 (EtherCAT) > Drive 1 AKD2G Dual Axis SIL2 > Inputs > Position Actual Value Axis1. Click **Linked to**.



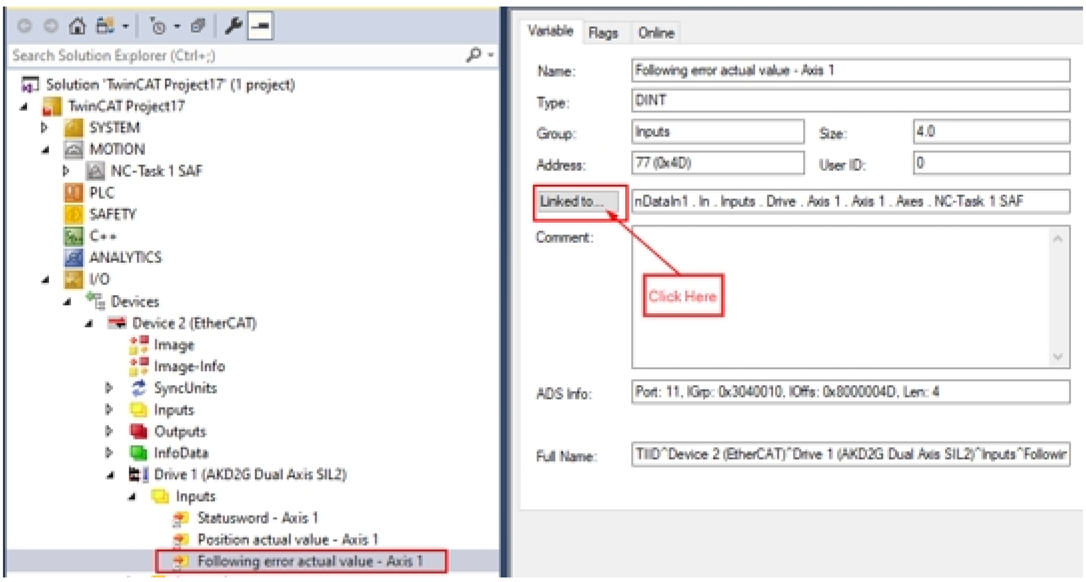
Drive 1 > Inputs > Position Actual Value Axis 1 > Linked to.



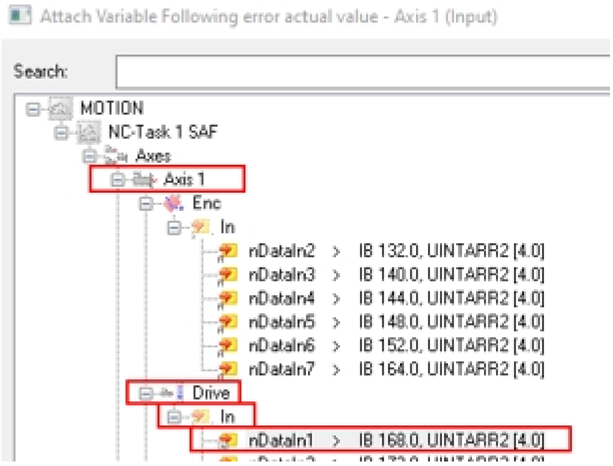
Following Error Actual Value Axis 1

This describes the input linking for Following Error Actual Value Axis 1.

To view how the PDO objects are linked, in the tree on the left, go to the TwinCAT project > I/O > Devices > Device 2 (EtherCAT) > Drive 1 AKD2G Dual Axis SIL2 > Inputs > Following Error Actual Value Axis1. Click **Linked to**.



Drive 1 > Inputs > Following Error Actual Value Axis 1 > Linked to.

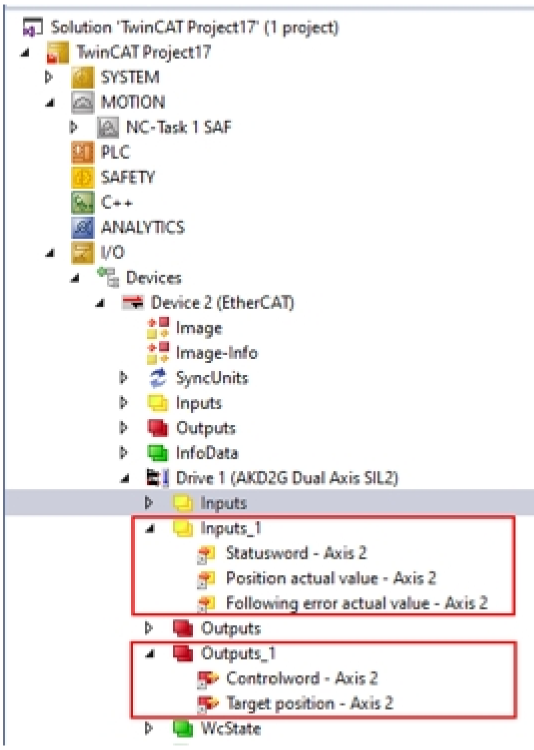

Attach Variable Following error actual value - Axis 1 (Input)
Search:
MOTION
NC-Task 1 SAF
Axes
Axis 1
Enc
In
nDataIn2 > IB 132.0, UINTARR2 [4.0]
nDataIn3 > IB 140.0, UINTARR2 [4.0]
nDataIn4 > IB 144.0, UINTARR2 [4.0]
nDataIn5 > IB 148.0, UINTARR2 [4.0]
nDataIn6 > IB 152.0, UINTARR2 [4.0]
nDataIn7 > IB 164.0, UINTARR2 [4.0]
Drive
In
nDataIn1 > IB 168.0, UINTARR2 [4.0]

2.3.2.9.3 View Axis 2 PDO Mapping and Linking

This describes the viewing for Axis 2 PDO mapping and linking. Expand the following as shown below. Repeat these steps for Axis 1 to view the Axis 2 PDO mapping and linking.

To view how the PDO objects are linked, do the following:

1. In the tree on the left go to the TwinCAT project > MOTION > NC-Task 1 SAF.
2. In the tree on the left go to the TwinCAT project > I/O > Devices > Device 2 (EtherCAT) > Drive 1 AKD2G Dual Axis SIL2 > Inputs_1.
3. In the tree on the left go to the TwinCAT project > I/O > Devices > Device 2 (EtherCAT) > Drive 1 AKD2G Dual Axis SIL2 > Outputs_1.

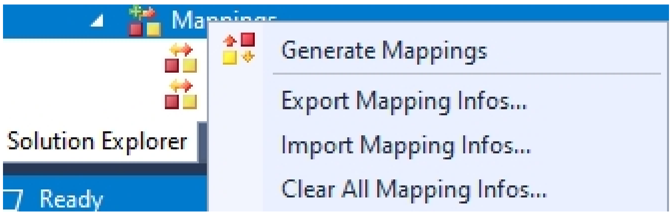


To continue, follow the steps in "Generate Mappings" (➜ p. 50).

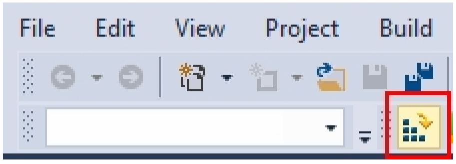
2.3.2.10 Generate Mappings

This section describes how to generate mappings.

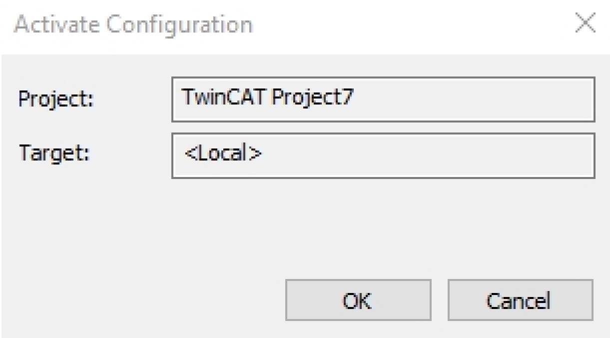
1. Right-click **Mappings** in the project tree and click **Generate Mappings**.



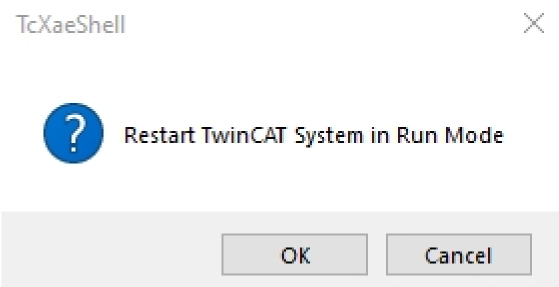
2. Click **Activate Configuration** in the toolbar.



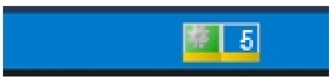
3. Click **OK** to activate the configuration.



4. Click **OK** to start run mode.



5. The TwinCAT 3 icon in the bottom status bar turns green while in run mode.



To continue, follow the steps in "TwinCAT 3 Scaling" (➜ p. 51).

2.3.2.11 TwinCAT 3 Scaling

As an example, these descriptions scale each axis for these units:

- Position-Degrees
- Velocity-Degrees/Sec
- Acceleration-Degrees/Sec^2

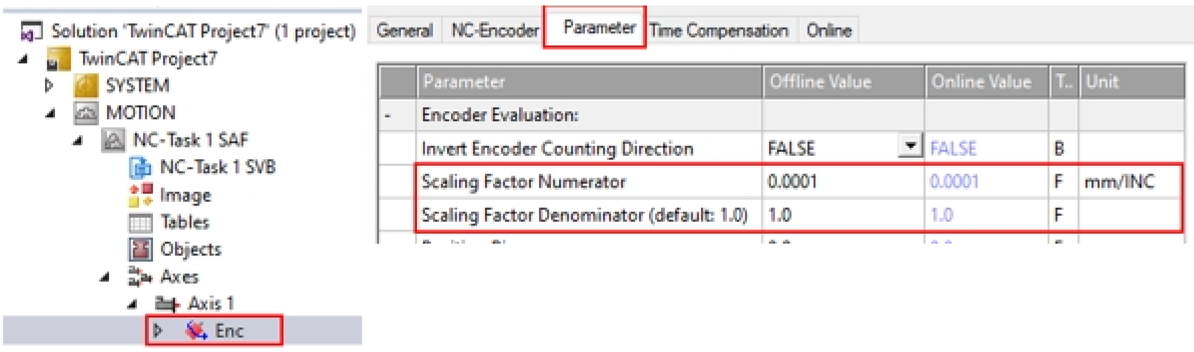
NOTE

This assumes the scale factor values for the AKD2G drive's CANopen dictionary by default or set in the TwinCAT 2 Startup.

Scaling Axis 1

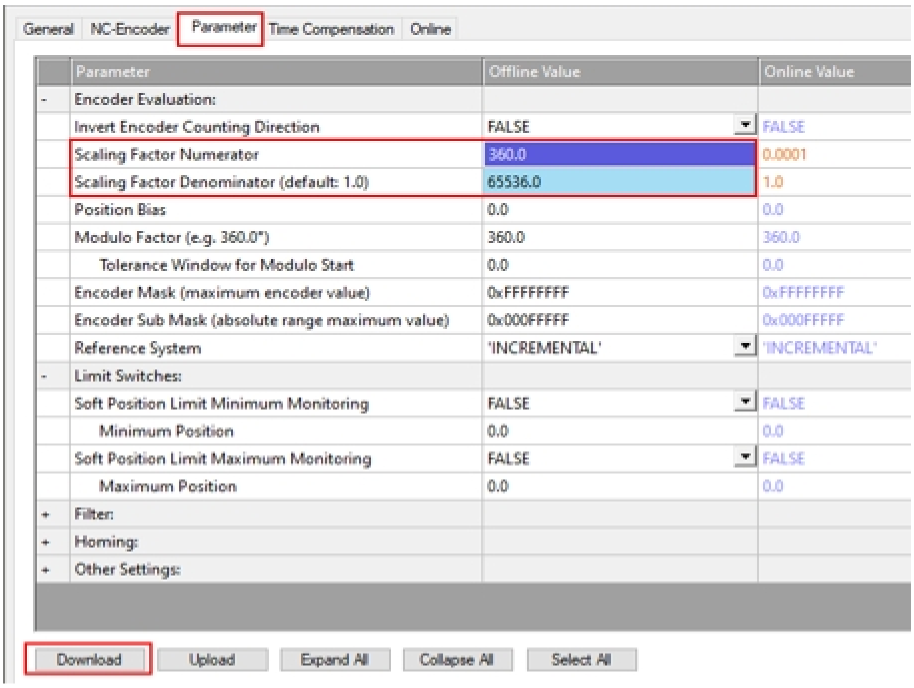
To scale Axis 1, in the tree on the left go to the TwinCAT project > NC-Task 1-SAF > Axes > Axis 1 > Enc.

1. Click the **Parameter** tab on the right.
2. Click the **Encoder Evaluation** arrow to view the options. The Scale Factor Numerator and Denominator values can be changed under the Offline Value.

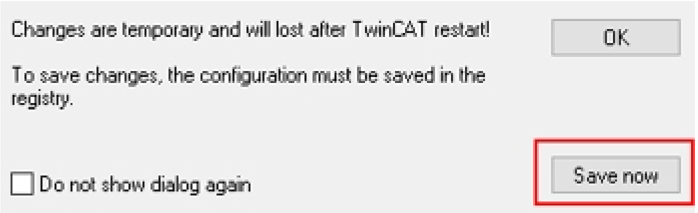


3. If changes are made and highlighted, click **Download**.

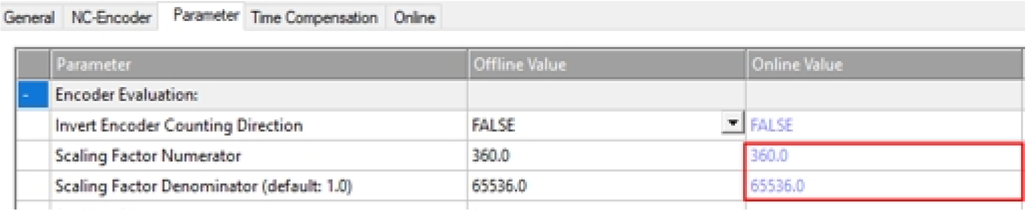
   As an example below, the offline values were changed and highlighted. The **Download** button is activated.



4. Click **Save now** to save the changes.



The Online values change appears.



Scaling Axis 2

Repeat steps used for Axis 1 using Axis 2.

To continue, follow the steps in "Change Displayed Units " (➜ p. 53).

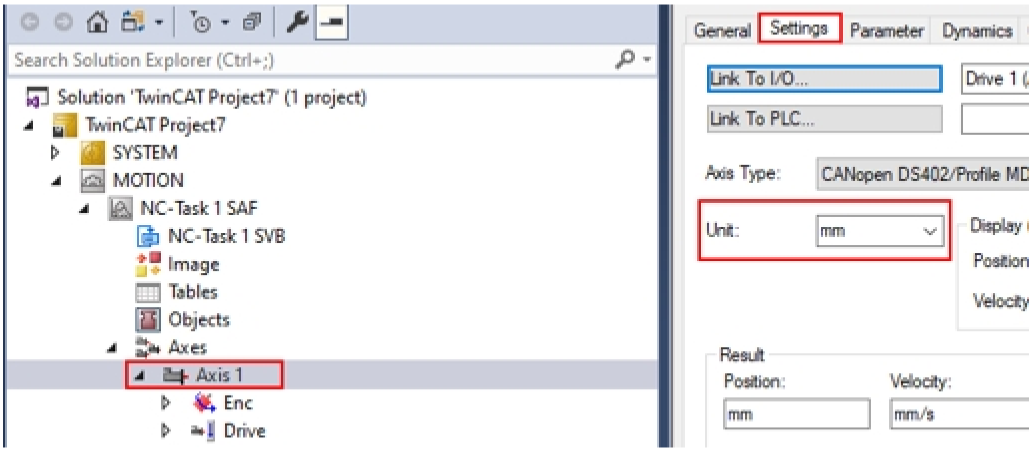
2.3.2.12 Change Displayed Units

This section describes how to change the displayed units in TwinCAT 3 from mm to degrees.

Axis 1

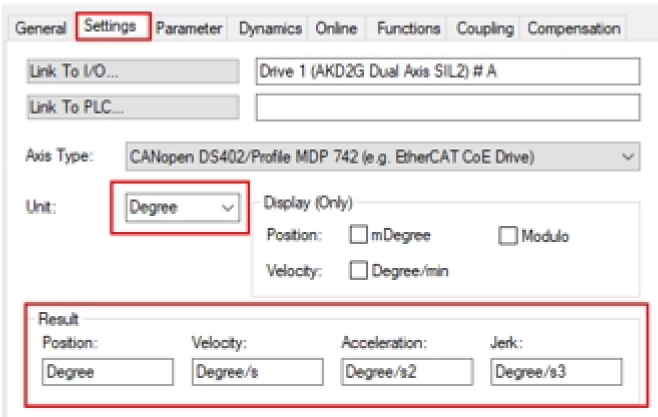
In the tree on the left, go to the TwinCAT project > MOTION > NC-Task 1 SAF > Axes > Axis 1

1. Click the **Settings** tab on the right.



2. Click the **Unit** drop-down and select **Degree**.

The change appears in the Result section.



Axis 2

Repeat steps used for Axis 1 using Axis 2.

To continue, follow the steps in "Manual Velocity for Fast and Slow Settings" (➔ p. 54).

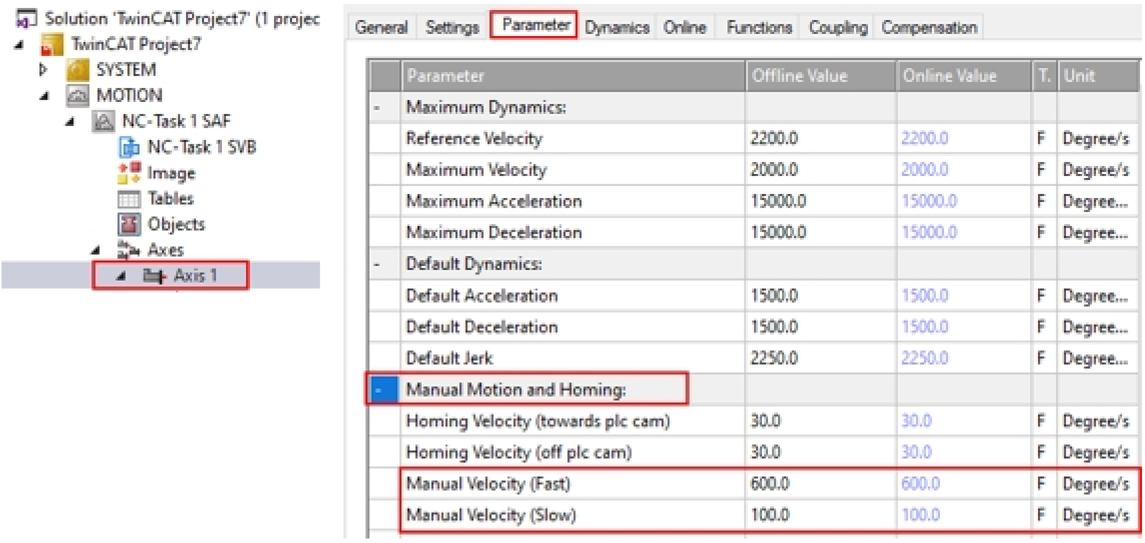
2.3.2.13 Manual Velocity for Fast and Slow Settings

Set the Manual Velocity for fast and slow settings.

Units Axis 1

In the tree on the left, go to the TwinCAT project > MOTION > NC-Task 1 SAF > Axes > Axis 1

1. Click the **Parameter** tab on the right.
2. Click the **Manual Motion and Homing** arrow to view the options.



Unit Axis 2

Repeat steps used for Axis 1 using Axis 2.

To continue, follow the steps in "Setup WorkBench Units" (➔ p. 55).

2.3.2.14 Setup WorkBench Units

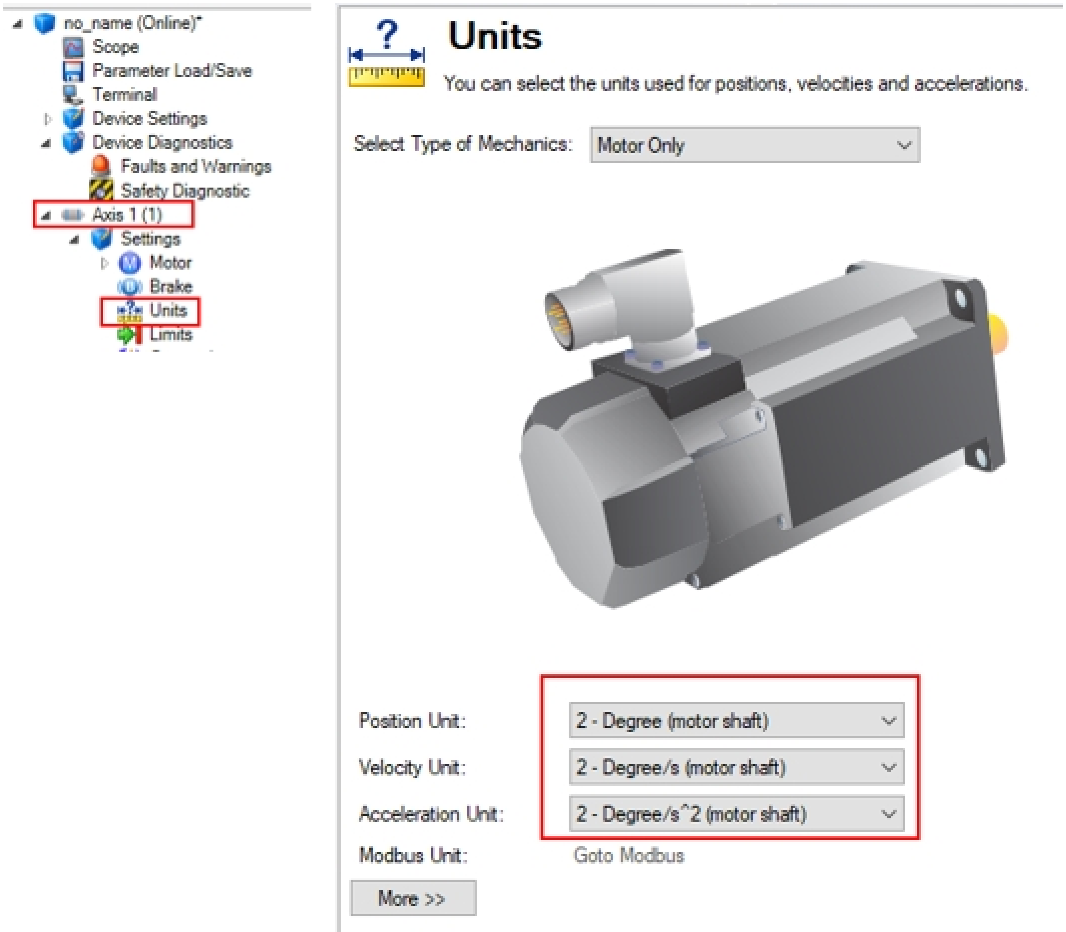
This section describes the setup for WorkBench to both read degrees, degrees/s, and degrees/s^2.

In the example below, TwinCAT 3 and WorkBench are both set to read degrees, degrees/s, and degrees /s^2.

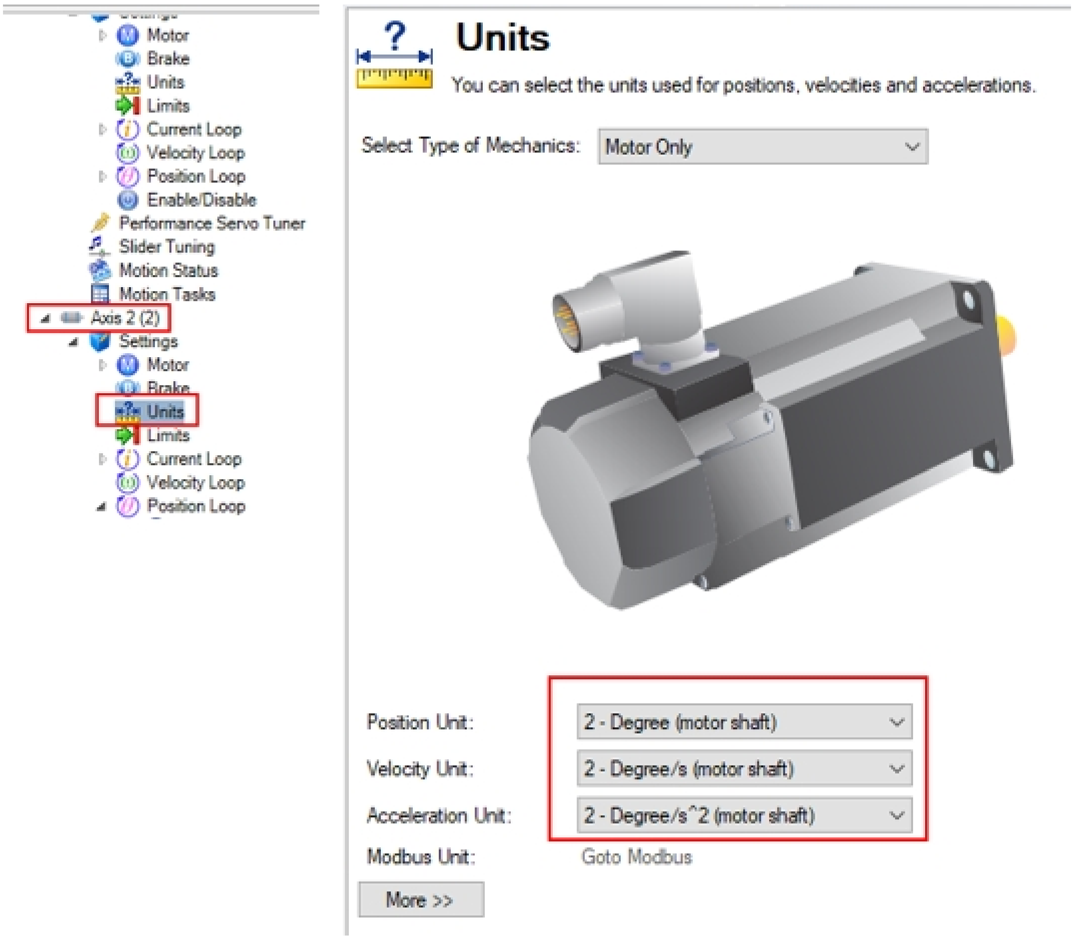
Use WorkBench in these steps.

1. Open a project in WorkBench.
2. In the tree on the left, go to Device Diagnostics > Settings > Units.

   For Axis 1



For Axis 2



To continue, follow the steps in "Use the TwinCAT 3 Online Console" (➜ p. 57).

2.3.2.15 Use the TwinCAT 3 Online Console

There are two locations for the online console for each axis in the TwinCAT 3 software.

- "Location 1" (➜ p. 57)
- "Location 2" (➜ p. 58)

This topic also includes:

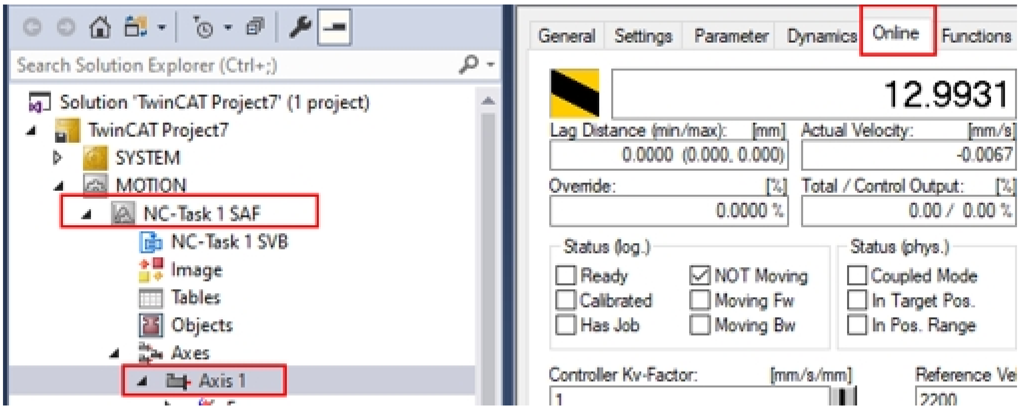
- "Enable an Axis" (➜ p. 59)
- "Start a Position Move " (➜ p. 60)
- "Jog Slow and Fast in Both Directions" (➜ p. 62)

2.3.2.15.1 Location 1

Location 1 includes the online console for axis 1 and 2.

Axis 1

1. In the tree on the left, go to the TwinCAT project > MOTION > NC-Task 1 SAF > Axes > Axis 1.
2. Click the **Online** tab on the right.



Axis 2

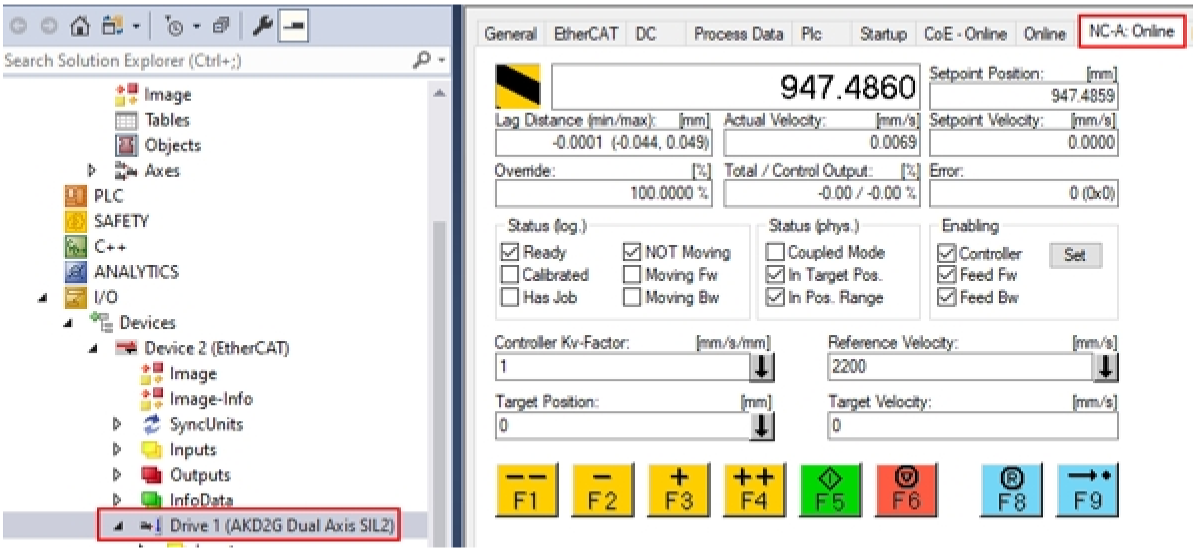
Repeat steps used for Axis 1 using Axis 2.

2.3.2.15.2 Location 2

Location 2 includes the online console for axis 1 and 2.

Axis 1

1. In the tree on the left, go to the TwinCAT project > I/O > Device 2 (EtherCAT) > Drive 1 AKD2G Dual Axis SIL2.
2. Click the **NC-A Online** tab on the right.



Axis 2

Repeat steps used for Axis 1 and replace NC-A Online with NC-B Online.

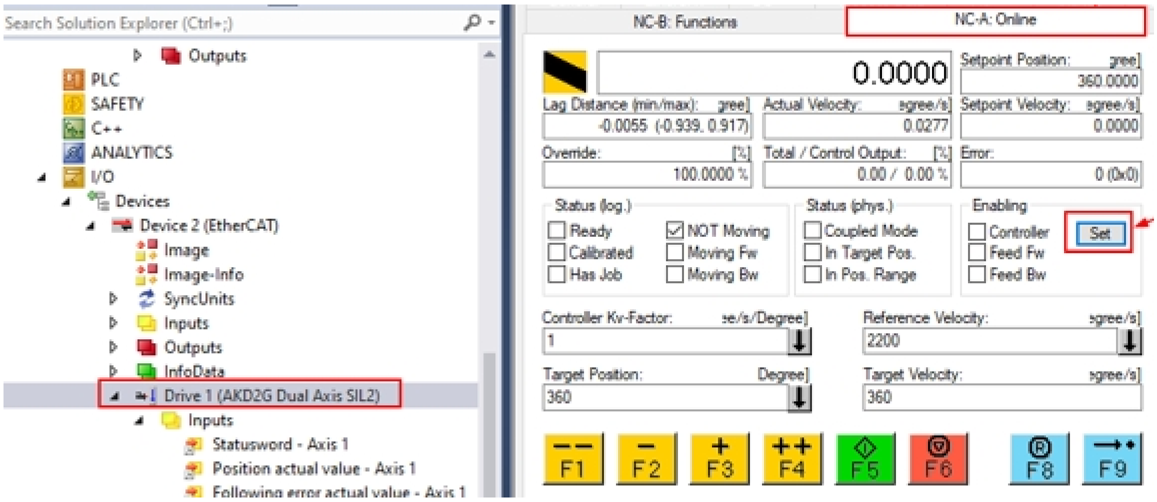
2.3.2.15.3 Enable an Axis

Enable Axis 1

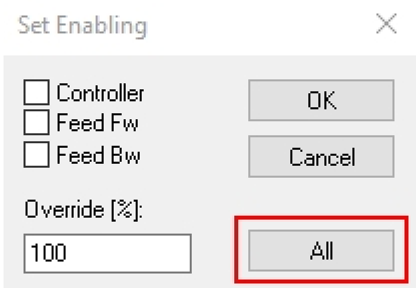
From WorkBench, both axes' **SW** (software enables) are off as shown on the status bar below.

Use TwinCAT 3 in these steps.

1. For Axis 1, in the tree on the left, go to the TwinCAT project > I/O > Device 2 (EtherCAT) > Drive 1 AKD2G Dual Axis SIL2.
2. Click the **NC-A Online** tab on the right.
3. Click **Set**.



4. Click **All** in Set Enabling to enable all options.



The WorkBench status bar appears as shown below.

Enable Axis 2

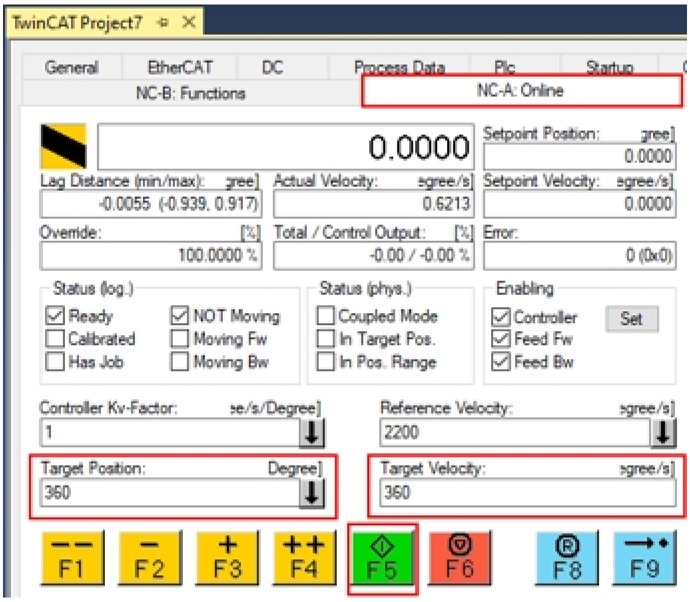
Repeat steps used for Axis 1 and replace NC-A Online with NC-B Online.

2.3.2.15.4 Start a Position Move

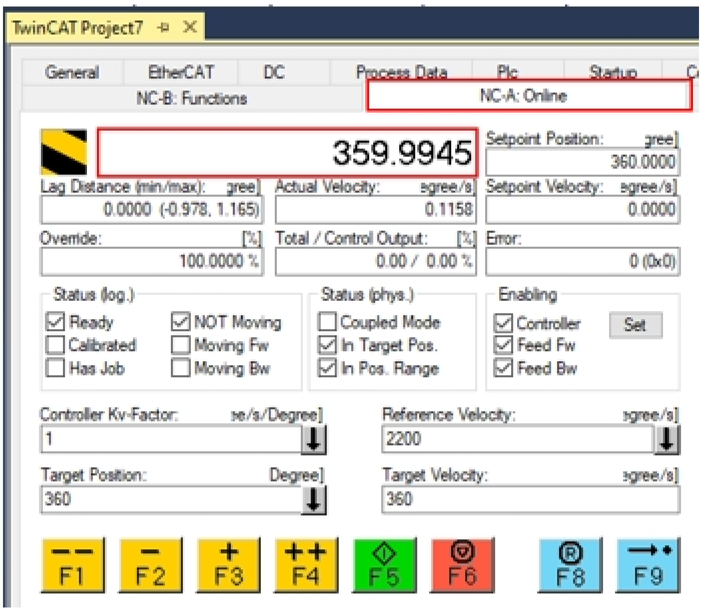
The Target Position field is in degrees and the Target Velocity is in degrees/sec. The image below shows a target position of 360 degrees at a rate of 360 degrees/s.

Axis 1

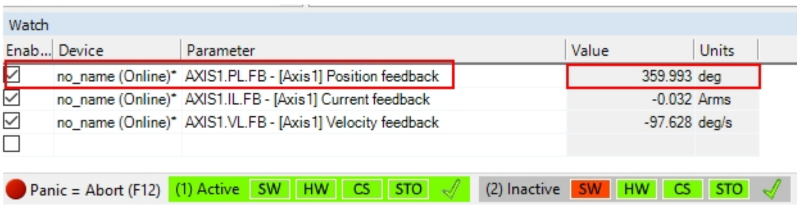
1. In the tree on the left go to the TwinCAT project > I/O > Device 2 (EtherCAT) > Drive 1 AKD2G Dual Axis SIL2.
2. Click the **NC-A Online** tab on the right.
3. Click **F5**.



The display changes as shown below.



The WorkBench watch and status bar appear as shown below.



Axis 2

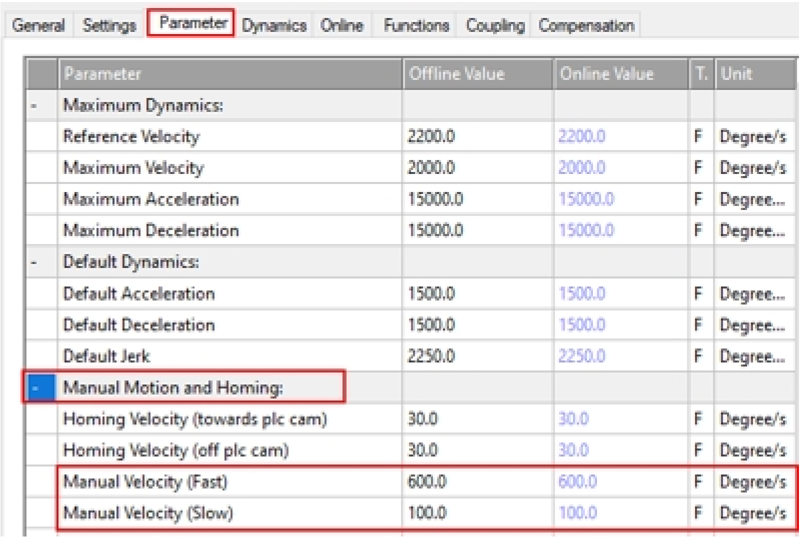
Repeat steps used for Axis 1 and replace NC-A Online with NC-B Online.

2.3.2.15.5 Jog Slow and Fast in Both Directions

Axis 1

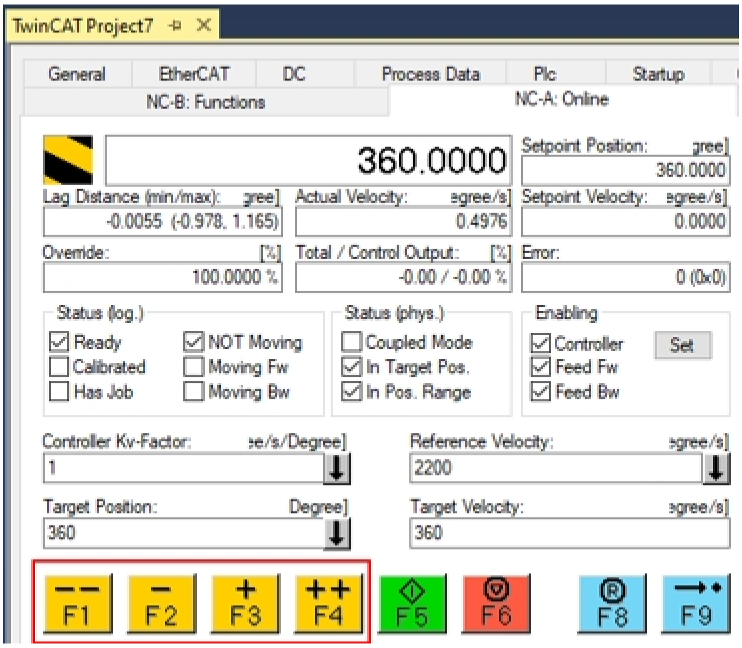
To move, or jog, the axis in the positive or negative direction at the fast or slow manual speeds, use the following steps.

1. In the tree on the left, go to the TwinCAT project > MOTION > NC-Task 1 SAF > Axes > Axis 1.
2. Click the **Parameter** tab on the right.
3. Click on the **Manual Motion and Homing** arrow for the options.



The F buttons in the NC-A Functions tab are described below.

- F1 (--) moves the axis at the fast velocity in the negative direction.
- F2 (-) moves the axis at the slow velocity in the negative direction.
- F3 (+) moves the axis at the slow velocity in the positive direction.
- F4 (++) moves the axis at the fast velocity in the positive direction.



Axis 2

Repeat steps used for Axis 1 using Axis 2 and replace NC-A Online with NC-B Online.

2.3.3 Drive Setup with One Cable (only EtherCAT Connection)

This section is a quick start guide to setup a WorkBench over TwinCAT system and make a motor spin under the system.

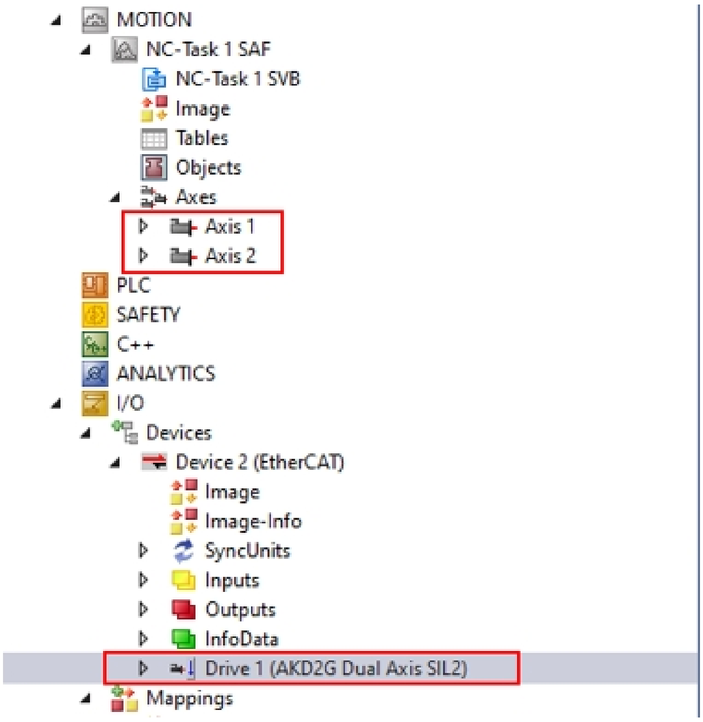
This chapter does not give any specific details on TwinCAT system or WorkBench but gives guidelines and information on how TwinCAT master and WorkBench work together.

Steps to configure a WorkBench over TwinCAT system are:

- TwinCAT and WorkBench configuration
- Connecting to a drive using WorkBench
- Configuring and enabling a drive

2.3.3.1 TwinCAT and WorkBench Configuration

The EtherCAT network must be setup and managed using the TwinCAT System Manager. To connect to a drive and enable it, the drive must be loaded under the I/O Devices node in TwinCAT System Manager and an axis must be added to NC - Configuration.



To connect to the drives using WorkBench over TwinCAT, the drive's state machine must be in one of the following current states:

- Pre-Op
- Safe-Op
- Op state

TIP

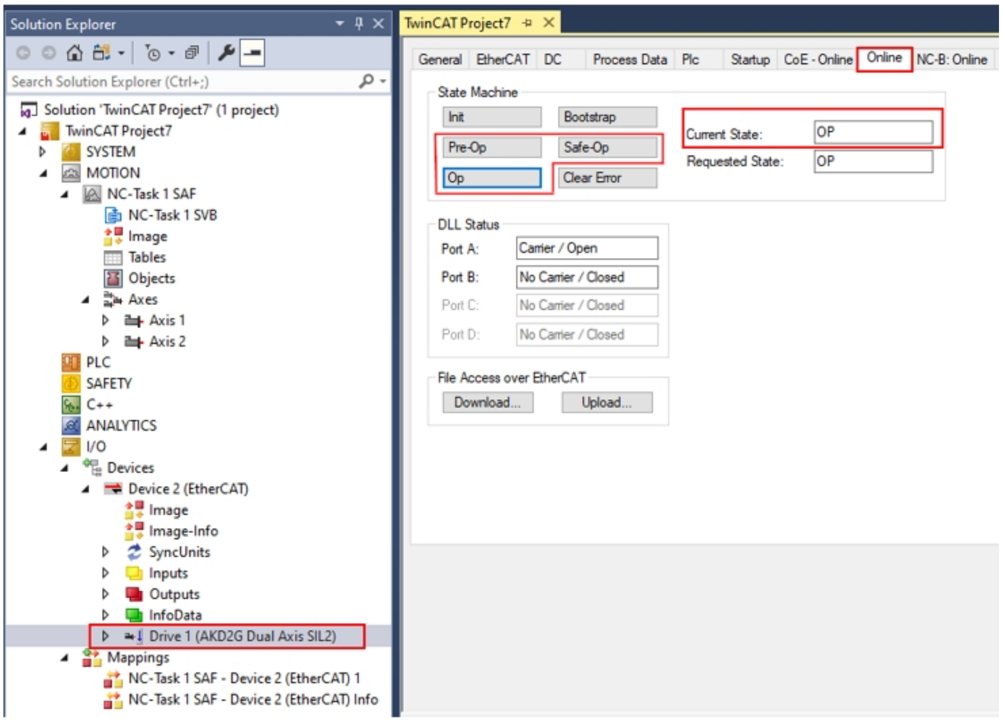
Workbench will not connect over TwinCAT if the current state is:

- Init
- Bootstrap

NOTE

If the current state is changed to Init or Bootstrap while WorkBench is connected, WorkBench will disconnect.

A state machine for a drive can be accessed from the Online tab for the corresponding drive under the I/O Configuration > I/O Devices > Device [x] > Drive [x] node.

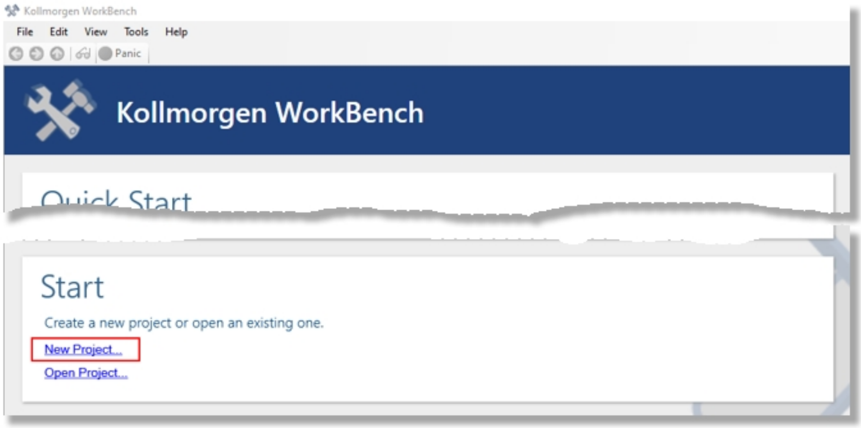


2.3.3.2 Connect to a Drive Using WorkBench (Online TwinCAT)

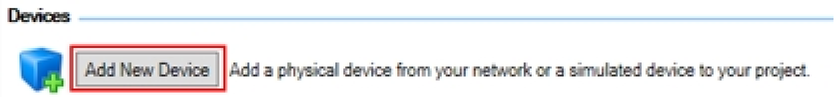
The installation process for WorkBench must be installed on the same machine as TwinCAT. Communication to the drive is through the TwinCAT master and cannot connect WorkBench to the master remotely.

To connect to a drive, a TwinCAT device must be added in WorkBench.

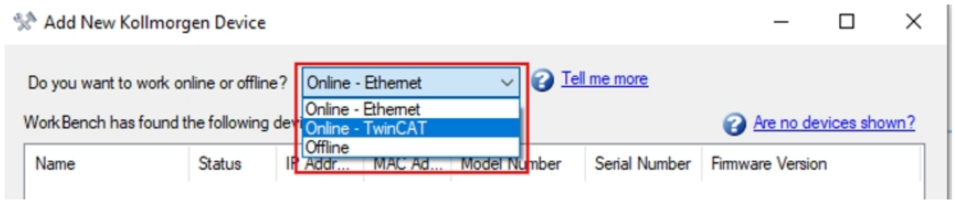
1. Open WorkBench and click **New Project.**



2. Click **Add New Device**.

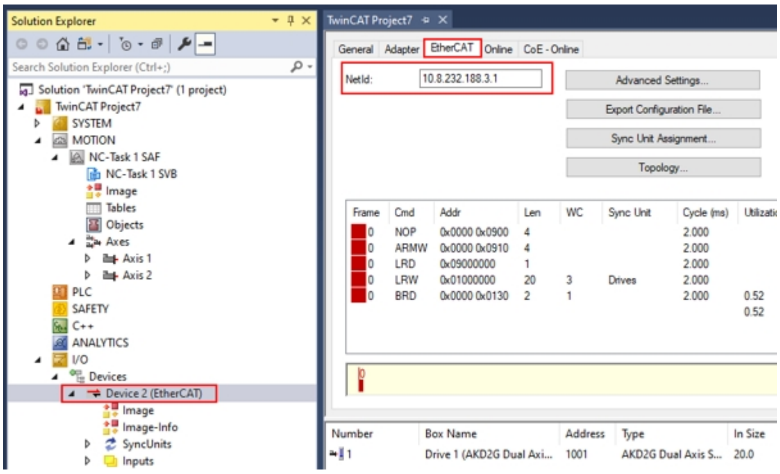


3. Select **Online-TwinCAT** from the **Do you want to work online or offline** drop-down.



4. Enter the TwinCAT Project AmsNetID.

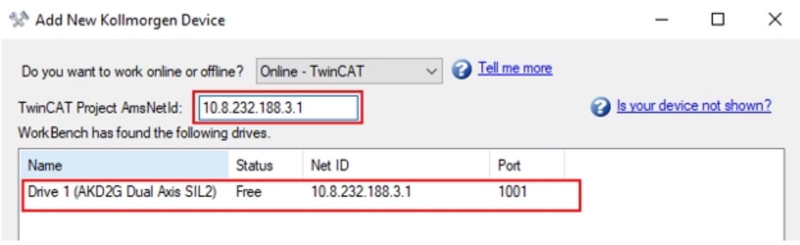
5. Locate the Net ID in TwinCAT3 under the path I/O Configuration > I/O Devices > Device [x] node and the EtherCAT tab.



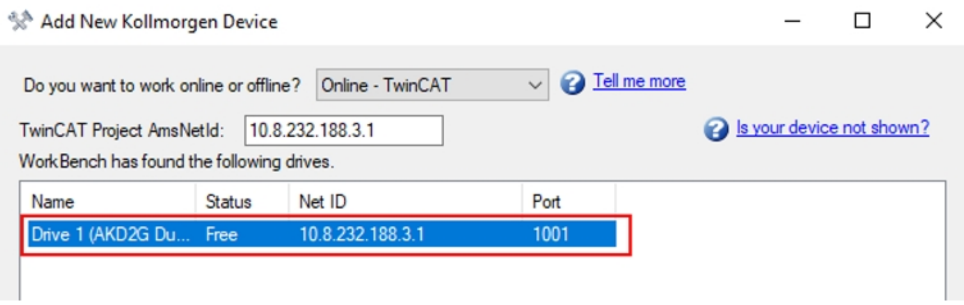
6. Remember the Net ID by copying it or writing it down.
7. Paste or manually enter the NetID into the field in WorkBench as shown below. A list of drives WorkBench has found over the TwinCAT connection appears under **WorkBench has found the following drives**.

NOTE

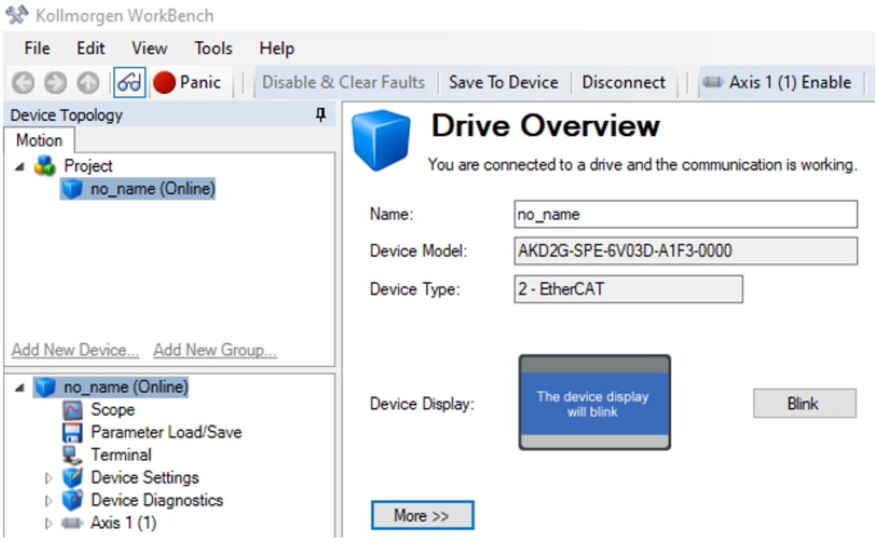
The drive name, status, Net ID and port number are provided.



8. From the list of found drives, click the drive and click **OK** to connect.

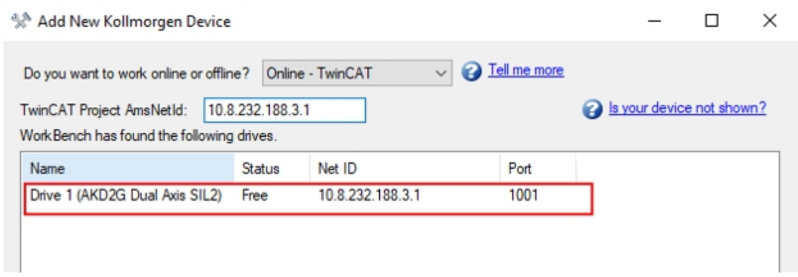


WorkBench will connect and be online with the drive.

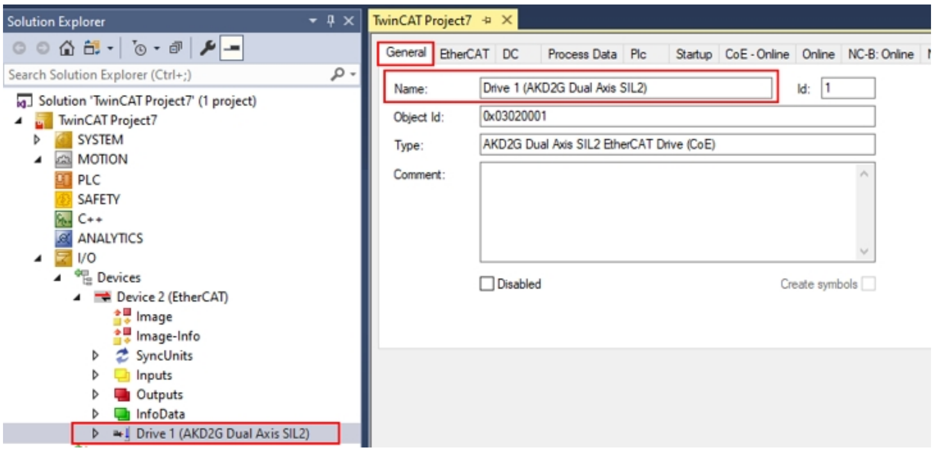


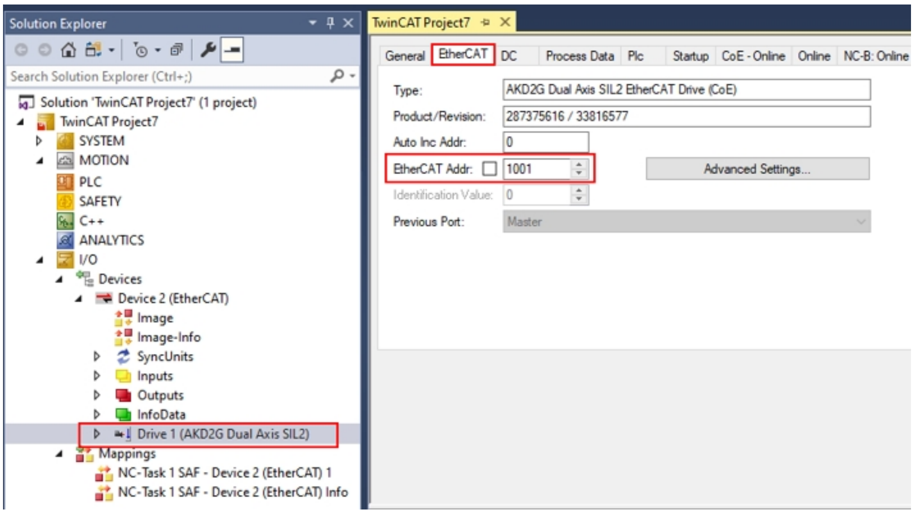
NOTE

The name, Net ID and port number information comes from the TwinCAT master configuration file (the name may differ from the drive name returned by the DRV.NAME command). The status indicates if there is already a device created in WorkBench already connected to that drive.



9. Locate the drive name using the TwinCAT System Manager. The drive name and port number are in the General and EtherCAT tabs respectively for the corresponding drive under the I/O Configuration > I/O Devices > Device [x] > Drive [x] node.





ⓘIMPORTANT

This information comes from the TwinCAT master and its configuration file but not from the drive. If the TwinCAT configuration does not reflect the actual network configuration, a drive maybe listed in WorkBench which is not be powered up or connected in the EtherCAT network, or there may be a drive powered up and connected to the TwinCAT network but not shown in the WorkBench list.

2.3.3.3 Configure and Enable a Drive

Once connected with WorkBench, a drive can be configured using the functions of WorkBench.

With WorkBench over TwinCAT, you cannot download new firmware in the drive. To download new firmware in the drive, use the File over EtherCAT (FoE) feature of TwinCAT server.

NOTICE

If the cyclic communication of the TwinCAT master is enabled, it is possible that some commands sent by WorkBench using the ASCII channel are overwritten by the TwinCAT master. The drive enable command has no effect if sent from WorkBench because the controlword is mapped.

Using TwinCAT, enable the drive following these steps.

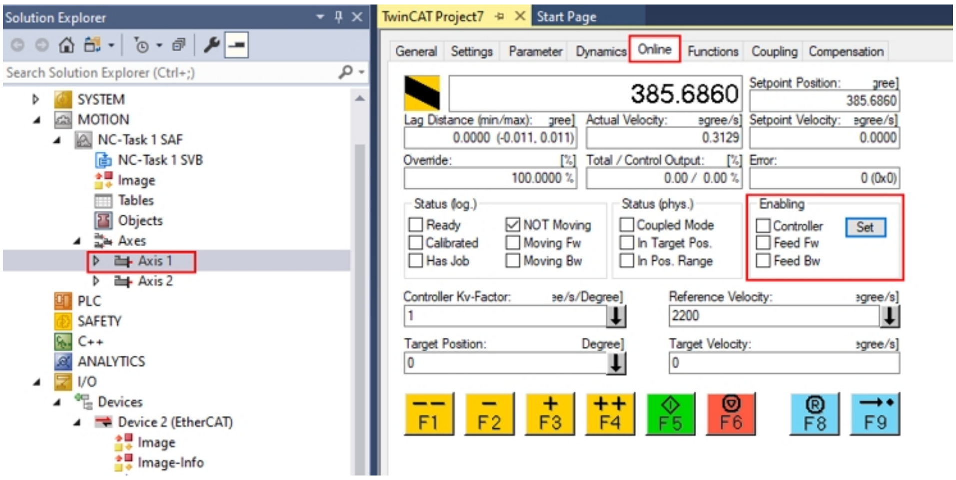
There are 2 locations for enabling and both are described below.

- Under NC Configuration > Axes > Axis[x] node > Online tab
- Under I/O Devices > Device[x] (EtherCAT) > Drive[x] (AKD2G) > NC-A:Online tab or NC-B:Online tab.

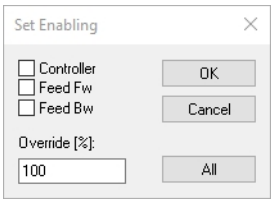
2.3.3.3.1 Location 1 (Axis 1 Example)

Under NC Configuration > Axes > Axis [x] node, click the Online tab, where Axis [x] node=Axis 1.

Click **Set** in the Enabling section.

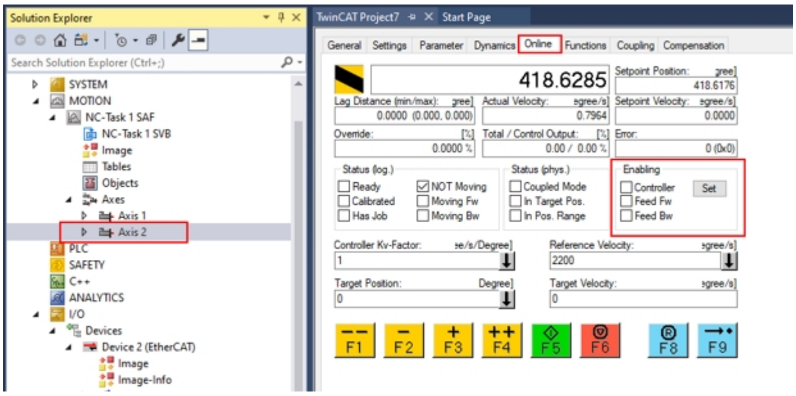


In the **Set Enabling** dialog box, check **Controller** to enable the drive (or uncheck to disable the drive) and click **OK**.



Repeat for Axis 2 using the path:

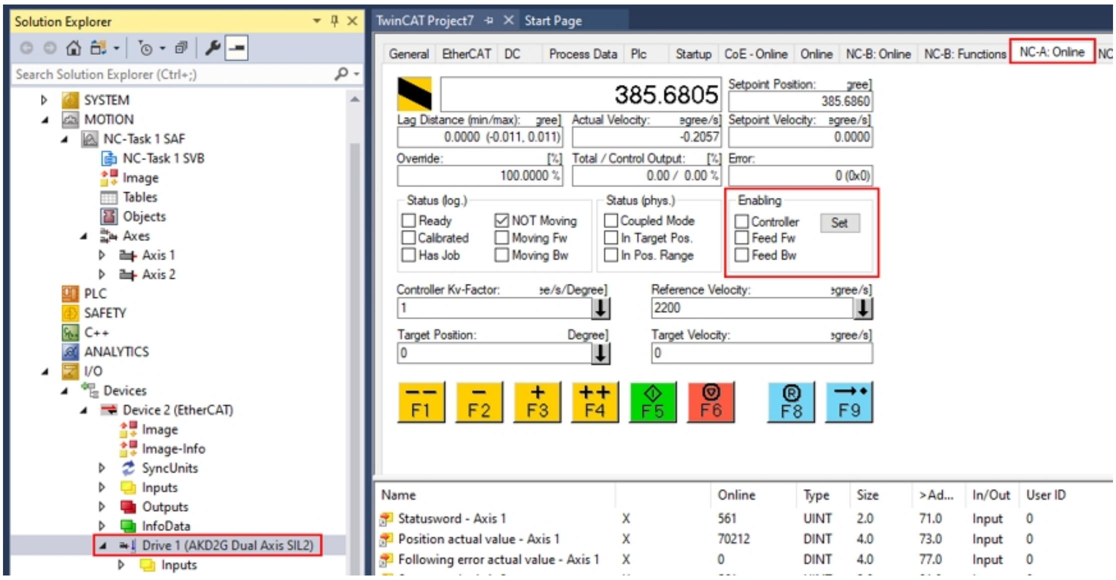
NC Configuration > Axes > Axis[x] node > Online tab, where Axis[x] node=Axis 2.



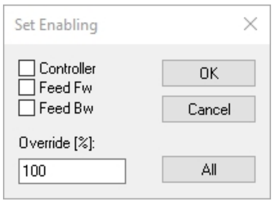
2.3.3.3.2 Location 2 (Axis 1 Example)

Under I/O Devices > Device[x] (EtherCAT) > Drive[x] (AKD2G), click the NC-A:Online tab.

Click **Set** in the Enabling section.

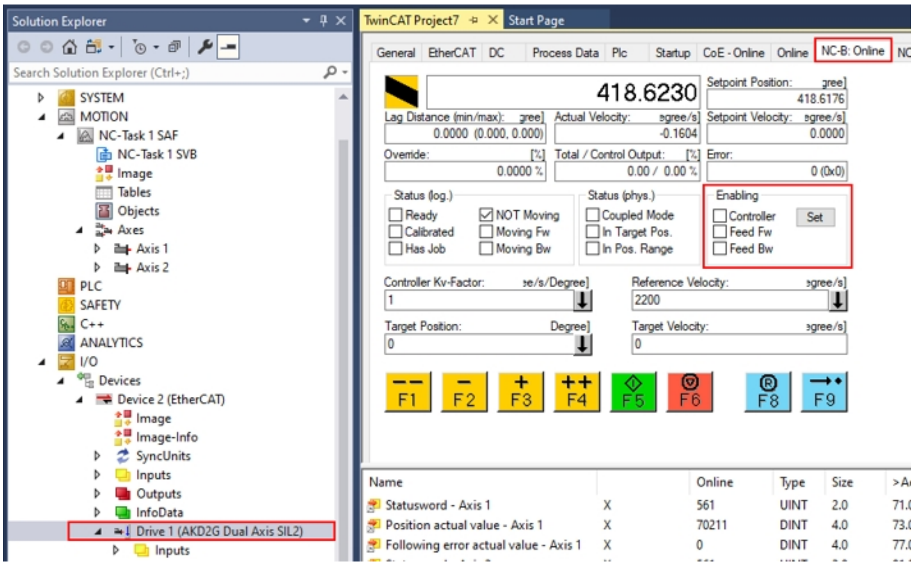


In the **Set Enabling** dialog box, check **Controller** to enable the drive (or uncheck to disable the drive) and click **OK**.



Repeat for Axis 2 using the path:

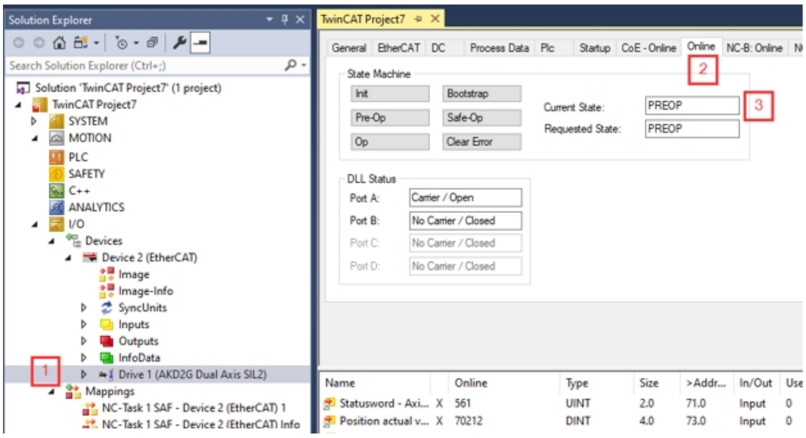
Under I/O Devices > Device[x] (EtherCAT) > Drive[x] (AKD2G), click the NC-B:Online tab.


Solution Explorer
Search Solution Explorer (Ctrl+;)
SYSTEM
MOTION
NC-Task 1 SAF
NC-Task 1 SVB
Image
Tables
Objects
Axes
Axis 1
Axis 2
PLC
SAFETY
C++
ANALYTICS
I/O
Devices
Device 2 (EtherCAT)
Image
Image-Info
SyncUnits
Inputs
Outputs
InfoData
Drive 1 (AKD2G Dual Axis SIL2)
Inputs
TwinCAT Project7
Start Page
General
EtherCAT
DC
Process Data
Plc
Startup
CoE - Online
Online
NC-B: Online
418.6230
Setpoint Position:
418.6176
Lag Distance (min/max):
0.0000 (0.000, 0.000)
Actual Velocity:
-0.1604
Setpoint Velocity:
0.0000
Override:
0.0000 %
Total / Control Output:
0.00 / 0.00 %
Error:
0 (0x0)
Status (log.)
Ready
Calibrated
Has Job
NOT Moving
Moving Fw
Moving Bw
Status (phys.)
Coupled Mode
In Target Pos.
In Pos. Range
Enabling
Controller
Feed Fw
Feed Bw
Set
Controller Kv-Factor:
1
Reference Velocity:
2200
Target Position:
Degree]
0
Target Velocity:
0
F1
F2
F3
F4
F5
F6
F8
F9
Name
Online
Type
Size
Statusword - Axis 1
X
561
UINT
2.0
Position actual value - Axis 1
X
70211
DINT
4.0
Following error actual value - Axis 1
X
0
DINT
4.0

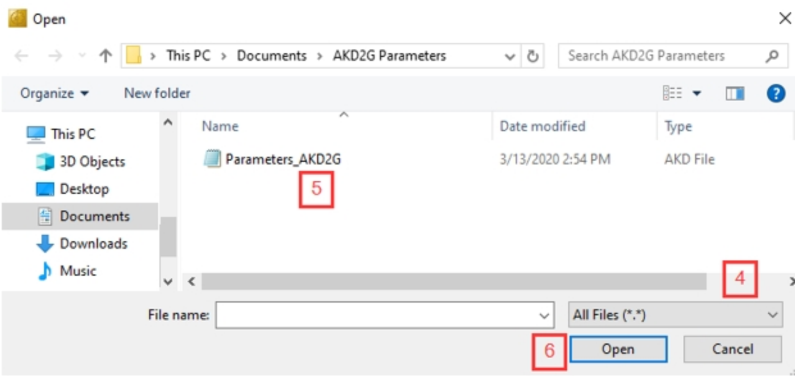
2.3.3.4 Download an *.akd Parameter File using File access over EtherCAT (FoE) with TwinCAT

Download a parameter file to the AKD2G drive over EtherCAT.

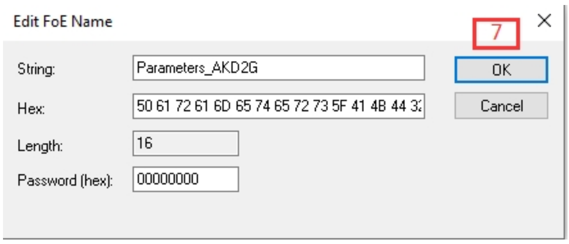
1. Select the drive where you want to perform the download.
2. Click the **Online** tab.
3. Make sure TwinCAT3 is in one of the following states before downloading the file.
   - INIT
   - PREOP
   - SAFEOP
4. Click **Download**.



5. Click **All Files (*.*)** to view all parameter types. Look for the parameter file ending in .akd.
6. Select the file.
7. Click **Open** to start the download.



8. Click **OK**.



The progress bar indicates the file transfer.

2.3.3.5 Setup Ethernet over EtherCAT (EoE)

If you are using firmware version 02-03-01-000 or later and your EtherCAT master supports Ethernet over EtherCAT (EoE), a WorkBench connection to your drive can be established without connecting to the drive's service port.

NOTE

If the service port and EoE network interface are used in parallel, the service port network interface is configured to be in a different subnet than the EoE network interface. Running both network interface in the same subnet is NOT supported.

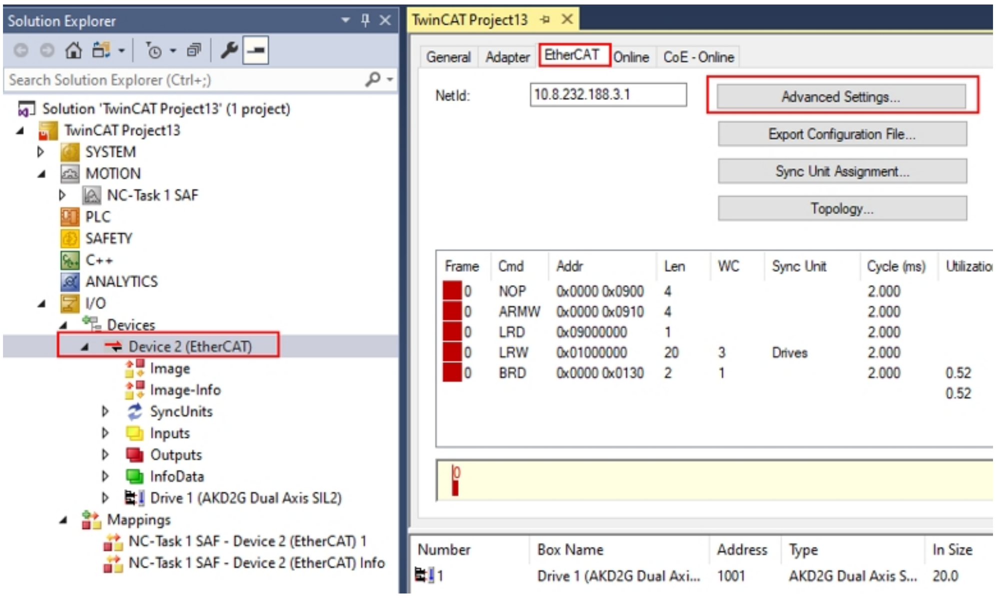
The master uses the EtherCAT mailbox to forward the Ethernet traffic from the PC to the drive allowing access the drive as if it was connected over Ethernet.

The following uses a TwinCAT master as an example.

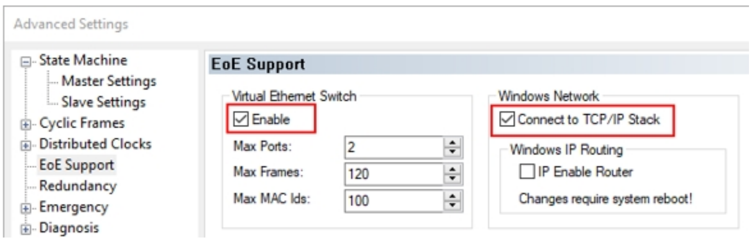
2.3.3.5.1 EtherCAT Device Settings

Make sure your EtherCAT device has EoE enabled. TwinCAT has a dedicated EoE Support page inside the EtherCAT device settings.

1. Double-click on Device x (EtherCAT) in the project tree on the left and click the **EtherCAT** tab.
2. Click **Advanced Settings**.

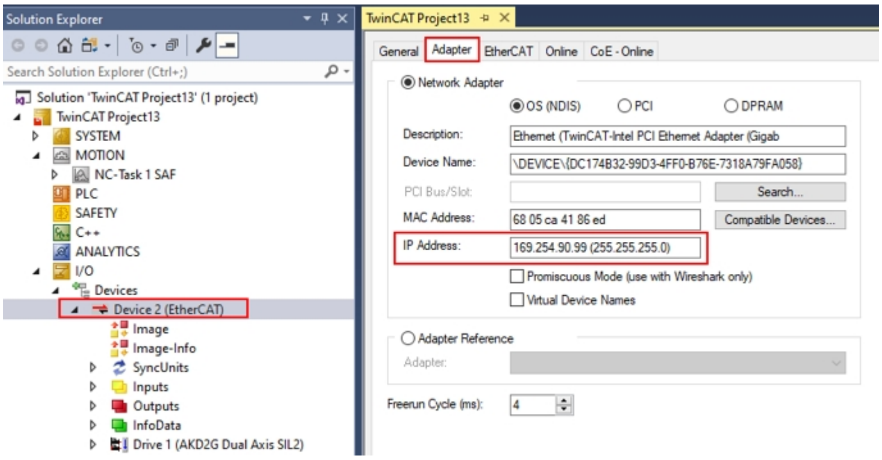


3. Check **Virtual Ethernet Switch** and **Connect to TCP/IP Stack** under Windows Network and click **OK**.



NOTE

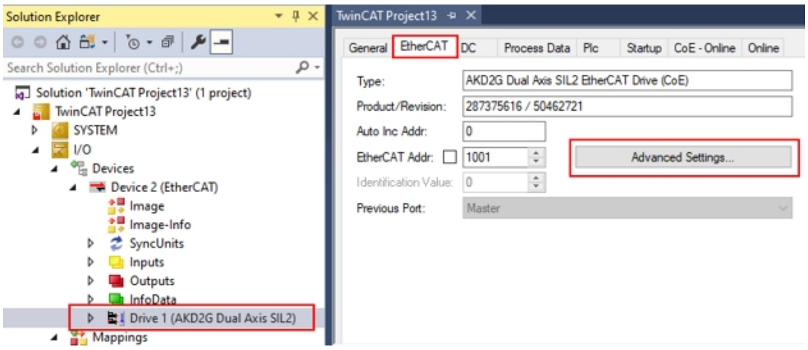
The network adapter's IP address for TwinCAT 3 appears on the **Adapter** tab of Device x (EtherCAT).



2.3.3.5.2 Drive Settings

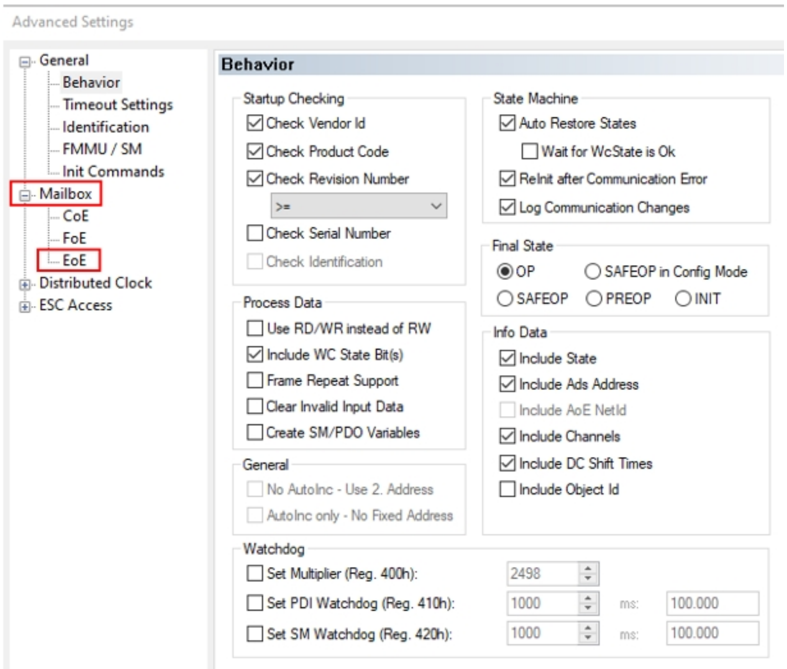
After setting up the EtherCAT device, enable EoE for the drive.

1. Click on the Drive x (AKD2G) in the project tree under I/O > Devices > Device x (EtherCAT) > Drive x (AKD2G).

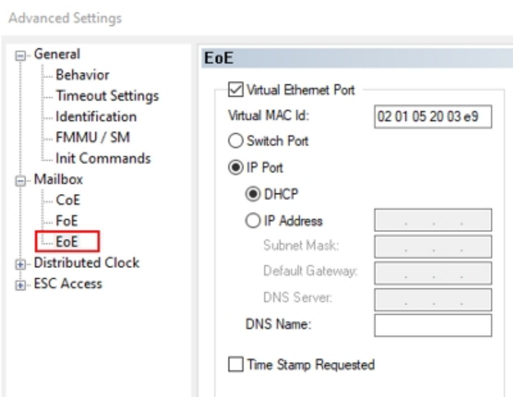


2. In TwinCAT, there is an EOE page in the drive's mailbox settings. If the EOE page does not appear, add the drive to the EtherCAT network again using the latest device description.

3. Click **Mailbox** to expand and click **EoE**.



4. To enable EoE on the drive, check **Virtual Ethernet Port**, select **IP Port** and **IP Address**, enter a valid IP address and subnet mask.



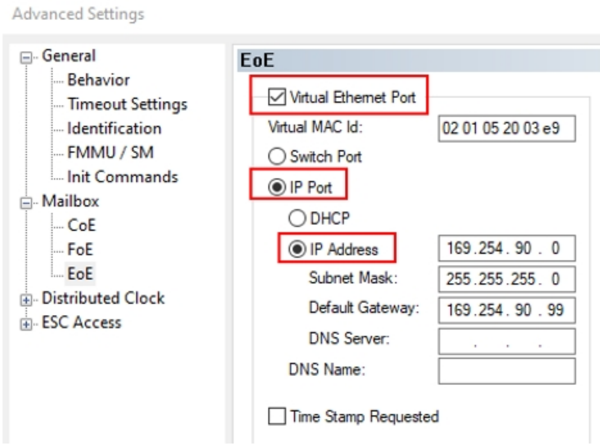
5. Click the IP Address radio button to switch from DHCP to IP Address. TwinCAT 3 auto-populates an IP address.

NOTE

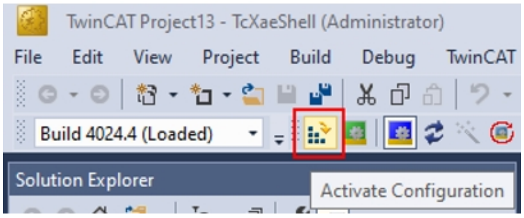
The Default Gateway is the IP address of the TwinCAT 3 Adapter and the IP address and subnet mask follow the same format.

These network settings vary with customer network addressing.

6. Click **OK**.

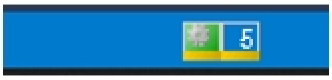


7. Click **Activate Configuration**.



8. Click **OK** in the Activate Configuration dialog box.
9. Click **OK** to restart the TwinCAT system in run mode.

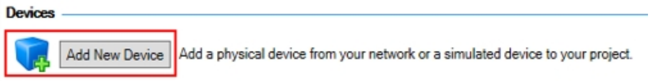
   The TwinCAT 3 status bar indicates run mode and execution.



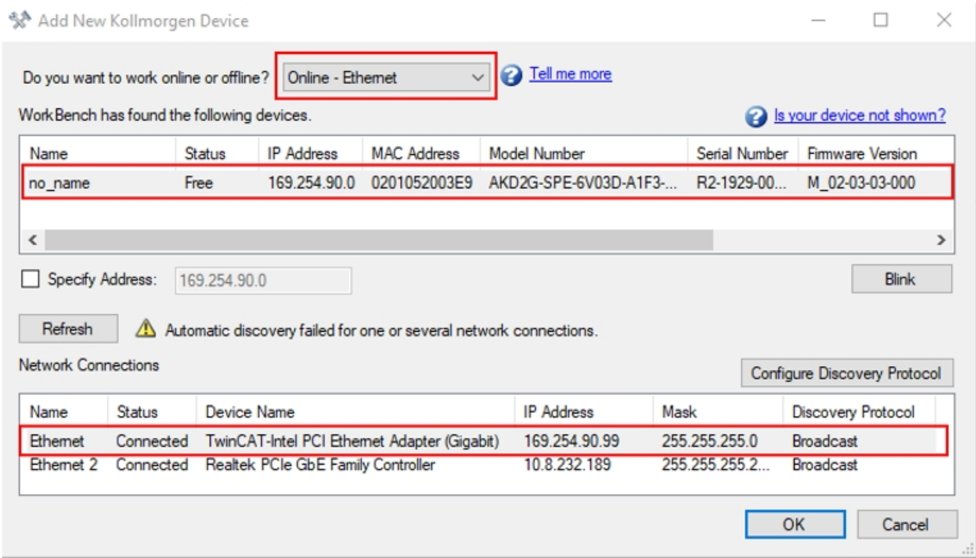
2.3.3.5.3 Connecting to the Drive

The drive is now accessible over WorkBench using EoE.

1. Open WorkBench and click **Add New Device**.

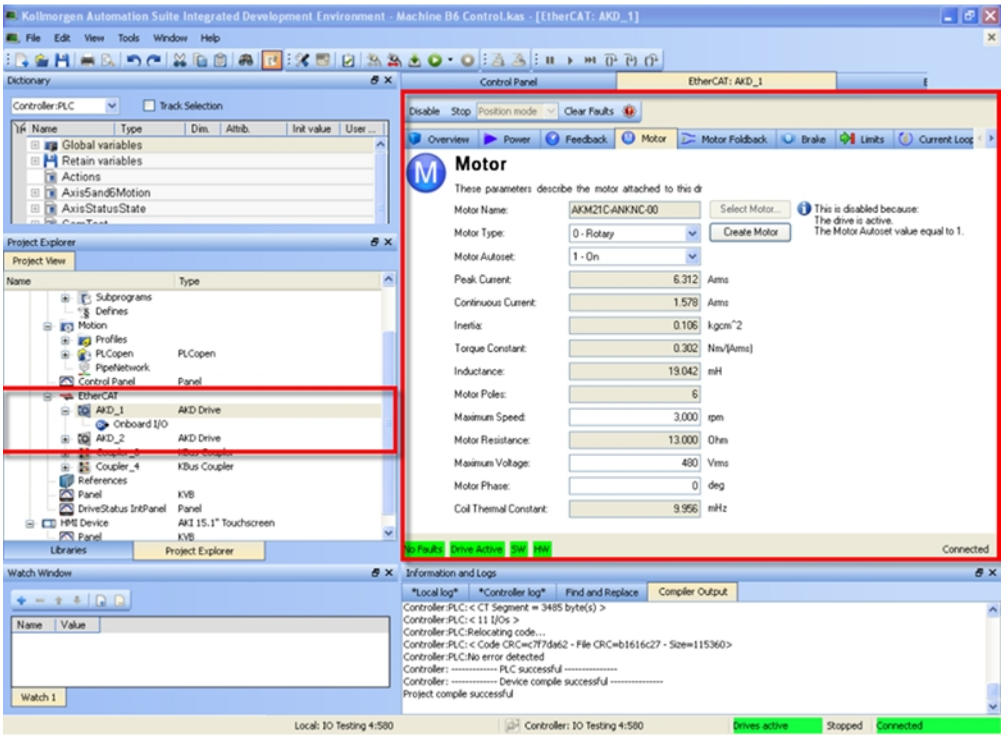


2. Make sure the discovery protocol is enabled for the network interface in the subnet configured for the drive in the previous step. Connect to the drive as if it were connected over the service port.



2.3.3.6 Setup via KAS IDE

If you are using a Kollmorgen Automation Suite (KAS) system, the AKD2G setup is completely integrated into the KAS Integrated Development Environment (IDE) as shown below.



For further information on the setup for a KAS system, see the following sections in the KAS documentation:

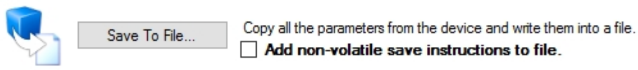
- *KAS IDE User Manual*: See Add and Configure Drive.
- *KAS Online Help*: See Using the KAS IDE > Creating a Project > Step 3 - Add and Configure Drive.

2.3.3.7 Download Parameter File over EtherCAT (FoE) with KAS IDE

The Parameter Load/Save file can be downloaded over FoE in PREOP state.

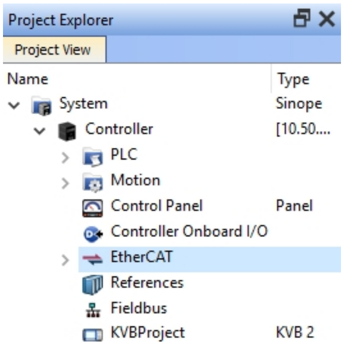
NOTE

By default, parameters are not saved automatically after download. Save instructions can be added to the file when created using WorkBench by checking **Add non-volatile save instructions to file**.



Example using KAS

1. Under **Project Explorer**, navigate to **EtherCAT** and double-click.

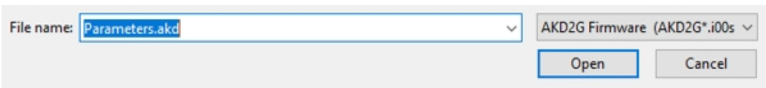


2. Select drive and click **Upgrade Firmware**.

3. Browse to the directory where the file is saved.

NOTE

The file will not appear in the browser because of the filters.



4. Type the file name and click **Open**.

2.3.4 EtherCAT Configuration Parameters

Keyword	Description
ECAT.ALIAS	Sets the "Configured Station Alias" (➜ p. 86) address.
ECAT.ENEMCYREQ	Enables or disables the EtherCAT emergency messaging.
ECAT.INFO	Outputs diagnostic information for determining status of the EtherCAT connection.
ECAT.INPUTSHIFT	Allows for viewing of the current input offset time from the Phase-Locked Loop (PLL) reference.
ECAT.INPUTSHIFTU	Allows for modifying how long after the PLL synchronization reference occurs that the EtherCAT input data (TxPDO) is prepared.
ECAT.PLLMODE	Reads the PLL mode. In normal operation, the PLL synchronizes the Sync Manager 0 signal to the drive's 16 kHz (position and velocity loops) interrupt using DC.
ECAT.PLLOFFSET	Applies an offset to the PLL before triggering the position loop. This value is used when using Distributed Clocks (DC) for synchronization.
ECAT.PLLOFFSETNODC	Applies an offset to the PLL before triggering the position loop.
ECAT.PLLSTATE	Reads the state of the PLL.
ECAT.POSLOOPTIME	Allows viewing and recording of the DC time of the first position loop after the PLL reference.
ECAT.PRINTESI	From the terminal in WorkBench, prints the "EtherCAT Slave Information (ESI) File" (➜ p. 31).
ECAT.RXDONETIME	Allows viewing and recording of the DC time when the drive completes processing the output packet (RxPDO).
ECAT.STATE	Reads the state of the "EtherCAT State Machine" (➜ p. 81).
ECAT.SYNC0TIME	Allows viewing and recording the current cycle's DC Sync0 time.
ECAT.TXDONETIME	Allows viewing and recording the DC time when the drive completes updating the input packet data (TxPDO).
ECAT.USEPLL	Configures usage of the PLL when the EtherCAT-master uses only the SYNC manager events to synchronize the EtherCAT slaves.

Also see CANopen Configuration Parameters.

3 Communications

3.1 EtherCAT State Machine

The AL control, AL status and AL status code registers are responsible for communication phase run-up (also referred to as EtherCAT status change) for current status display and for any fault messages. The drive responds to every EtherCAT interface transition request made by the AL control register with the AL Status and AL Status Code registers. Any fault messages are displayed in the AL status code register.

A status change within the AL control register is polled within the AKD2G which means that an AL control event does not lead to a HW interrupt within the drive.

AL Control (Address 0x0120:0x0121)

Command	Address	Bit	ZA Drive	ZA ECAT	Description
Status	0x120	3 to 0	R/O	W/O	0x01: Init Request 0x02: PreOperational Request 0x03: Bootstrap Mode Request 0x04: Safe Operational Request 0x08: Operational Request
Acknowledgment	0x120	4	R/O	W/O	0x00: No fault acknowledgment 0x01: Fault acknowledgment (positive edge)
Reserved	0x120	7 to 5	R/O	W/O	-
Applic. specific	0x120	15 to 8	R/O	W/O	-

AL Status (Address 0x0130:0x0131)

Command	Address	Bit	ZA Drive	ZA ECAT	Description
Status	0x130	3 to 0	W/O	R/O	0x01: Init
0x02: PreOperational					
0x03: Bootstrap Mode					
0x04: Safe Operational					
0x08: Operational					
Status change	0x130	4	W/O	R/O	0x00: Acknowledgement 0x01: Error, e.g., forbidden transition
Reserved	0x130	7 to 5	W/O	R/O	-
Applic. specific	0x130	15 to 8	W/O	R/O	-

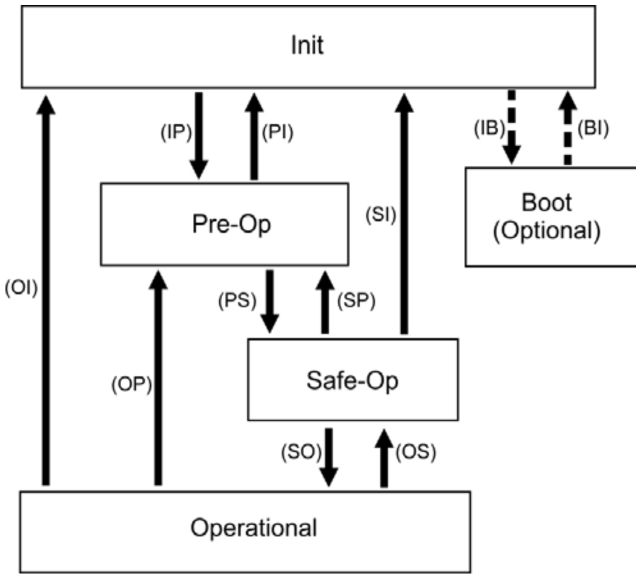
AL Status Code (Address 0x0134:0x0135)

Command	Address	Bit	ZA Drive	ZA ECAT	Description
Status	0x134	7 to 0	W/O	R/O	See table below
Status	0x135	7 to 0	W/O	R/O	See table below

Code	Description	Current Status (Status change)	Resulting Status
0x0000	No error	All	Current Status
0x0011	Invalid requested state change	I -> S, I -> O, P -> O, O -> B, S -> B, P -> B	Current Status + E
0x0017	Invalid sync manager configuration	I -> P, P -> S	Current Status + E

No other codes are supported.

3.1.1 EtherCAT Communication Phases



INIT: Initialization, no communication. EEPROM emulation will be activated.

PRE-OP: Mailbox active, slave parameterization and startup parameters

SAFE-OP: Cyclical actual values are transferred and the drive tries to synchronize.

OPERATIONAL : Cyclical setpoints are processed, torque enable can be activated and the drive must be synchronized.

Individual communication transitions

Transition	AL Control (Bit 3 to 0)	Description
(IB)	0x03	-
(BI)	-	-
(IP)	0x02	AKD2G reads the SyncManager 0 & 1 configuration and verifies the value of the start-address and the length. The AKD2G prepares itself for handling SyncManager 0 events.
(PI)	0x01	-
(PS)	0x04	AKD2G reads the SyncManager 2 & 3 configuration and verifies the value of the start-address and the length.
(SP)	0x02	-
(SI)	0x01	-
(SO)	0x08	The SnycManager 2 hardware interrupt will be enabled by the drive.
(OS)	0x04	Deactivation of SyncManager 2 hardware interrupt.
(OP)	0x02	Deactivation of SyncManager 2 hardware interrupt.
(OI)	0x01	Deactivation of SyncManager 2 hardware interrupt.

3.2 Application Layer (AL) Events

Communication between the drive and the EtherCAT FPGA can be interrupt-driven. The interrupt enable register and the AL event register are responsible for the EtherCAT interface interrupt functionality.

There are two events which lead to a HW interrupt within the drive: the EEPROM emulation event and the SyncManager 2 event. The actual values of the drive (SyncManager 3 data) are written without any AL event request during each HW IRQ, e.g., triggered by a SyncManager 2 event. The Mailbox exchange between the master and the AKD2G is completely handled by polling the AL event register within the background task of the drive.

The drive activates individual EtherCAT interface events when the corresponding bit of the interrupt enable register is set to 1. When it is set to 0, the hardware interrupts and the specific events are deactivated.

Interrupt Enable Register (Address 0x0204:0x0205)

Command	Address	Bit	ZA Drive	ZA ECAT	Description
AL Control Event	0x204	0	R/W	R/O	Activation of AL control event for phase run-up
-	0x204	1	R/W	R/O	Reserved
Sync0 DC Distributed Clock	0x204	2	R/W	R/O	Activation of distributed clock (DC) sync 0 interrupts for entire communication
Sync1 DC Distributed Clock	0x204	3	R/W	R/O	Activation of distributed clock (DC) sync 1 interrupts for entire communication
SyncManager activation register change	0x204	4	R/W	R/O	Activation of ‘SyncManager activation register change’ IRQ.
EEPROM emulation event	0x204	5	R/W	R/O	Activation of the EEPROM emulation interrupts.
-	0x204	3 to 7	R/W	R/O	Reserved
Sync Manager 0 Event (Mail Out Event)	0x205	0	R/W	R/O	Activation of output event mailbox (SDO, Sync Manager 0) for object channel.
Sync Manager 1 Event (Mail In Event)	0x205	1	R/W	R/O	Activation of input event mailbox (SDO, Sync Manager 1) for object channel.
Sync Manager 2 Event (Pro Out Event)	0x205	2	R/W	R/O	Activation of output event process data (PDO, card's cyclical setpoints)
Sync Manager 3 Event (Pro In Event)	0x205	3	R/W	R/O	Activation of input event process data (PDO, drive's cyclical actual values)
-	0x205	4 to 7	R/W	R/O	Reserved

When the relevant bit of the AL event request register is set to 1, the EtherCAT interface tells the drive which event to process by the AKD2G.

AL Event Request (Address 0x0220:0x0221)

Command	Address	Bit	ZA Drive	ZA ECAT	Description
AL Control Event	0x220	0	R/O	R/W	Processing of AL control event for phase run-up
Sync0 Distributed Clock (DC) Event	0x220	2	R/O	R/W	Processing of a distributed clock (DC) event
Sync1 Distributed Clock (DC) Event	0x220	3	R/O	R/W	Processing of a distributed clock (DC) event
SyncManager activation register change	0x220	4	R/O	R/W	The content of the SyncManager activation register has been changed.
EEPROM emulation event	0x220	5	R/O	R/W	Processing of an EEPROM emulation event in order to identify the AKD within the network.
-	0x220	6 to 7	R/O	R/W	Reserved
Sync Manager 0 Event	0x221	0	R/O	R/W	Mailbox request (SDO, Sync Manager 0) for object channel.
Sync Manager 1 Event	0x221	1	R/O	R/W	Mailbox response (SDO, Sync Manager 1) for object channel.
Sync Manager 2 Event	0x201	2	R/O	R/W	Process data output (PDO, card's cyclical setpoints)
Sync Manager 3 Event	0x201	3	R/O	R/W	Process data input (PDO, drive's cyclical actual values)
Sync Manager 4 –					
Sync Manager 7 Event	0x221	4 to 7	R/O	R/W	Reserved
Sync Manager 8 –					
Sync Manager 15 Event	0x222	0 to 7	R/O	R/W	Reserved

3.3 EtherCAT Slave Controller (SCE) Registers

The table below gives the addresses of individual registers in the FPGA memory. The data is provided in little-endian format, with the 'least significant byte" occupying the lowest address. A detailed description of all registers and FPGA memory locations is available in the “EtherCAT Slave Controller” description of the EtherCAT user organization (www.EtherCAT.org).

Address	Length (Byte)	Description	ZA ECAT*	ZA Drive*
0x0120	2	AL Control	R/W	R/O
0x0130	2	AL Status	R/O	R/W
0x0134	2	AL Status Code	R/O	R/W
0x0204	2	Interrupt Enable Register	R/O	R/W
0x0220	2	AL Event (IRQ Event)	R/W	R/O
0x0800	8	Sync Manager 0 (Mail Out Control Register)	R/W	R/O
0x0808	8	Sync Manager 1 (Mail In Control Register)	R/W	R/O
0x0810	8	Sync Manager 2 (Process data Output Control Register)	R/W	R/O
0x0818	8	Sync Manager 3 (Process data Input Control Register)	R/W	R/O
0x0820	8	Sync Manager 4	R/W	R/O
0x0828	8	Sync Manager 5	R/W	R/O
0x0830	8	Sync Manager 6	R/W	R/O
0x0838	8	Sync Manager 7	R/W	R/O
0x0840	8	Sync Manager 8	R/W	R/O
0x1100	Max. 64	ProOut Buffer (Process data Output, setpoints ECAT)	R/W	R/O
0x1140	Max. 64	ProIn (Process data Input, act. values ECAT)	R/O	R/W
0x1800	up to 512** up to 1024**	Mail Out Buffer (Object Channel Buffer ECAT, byte-length is specified in the device description file)	R/W	R/O
0x1C00	up to 512** up to 1024**	Mail In Buffer (Object Channel Buffer Drive, byte-length is specified in the device description file)	R/O	R/W

* ZA ECAT = Access mode EtherCAT

* ZA Drive = Access mode drive

** depends on firmware version and revision number

3.4 SII EEProm - EtherCAT Slave Information

AKD2G has a built-in emulated EEProm. This EEProm can be read by the EtherCAT master to get some information about drive properties, like PDO-information, drive name, serial numbers and communication-specific attributes.

They are organized in categories. There are two manufacturer-specific categories implemented in the AKD2G:

- Category 0x0800: Holds a string with the model type in the format AKD2G-P00000-NxxC-0000
- Category 0x0801: Holds the firmware version in the format 0x_xx-xx-yyy

3.5 Configured Station Alias

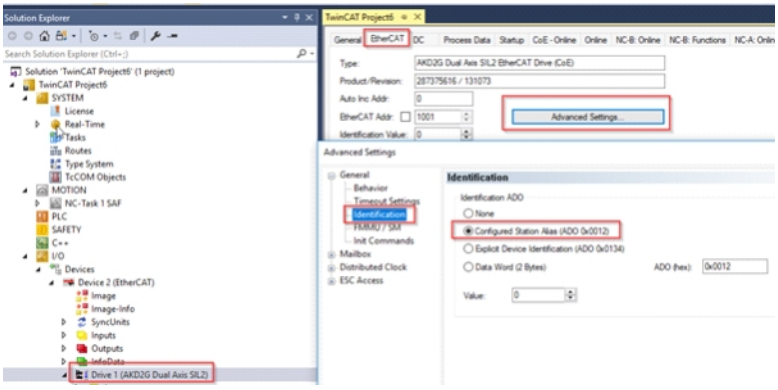
EtherCAT devices can have up to two Configured Station addresses:

- Configured Station address – assigned by the master
- Configured Station Alias address – assigned by the drive using ECAT.ALIAS and stored in non-volatile memory. When the master loads the SII EEPROM on power up, the alias is sent to the master.

The slave (drive) is addressed if the EtherCAT address matches the Configured Station Address or Configured Station Alias.

Steps to change the Configured Station Alias address:

1. Use command ECAT.ALIAS to set the drive’s Configured Station Alias address.
2. Configure the master to use the Configured Station Alias address. Below is an example using TwinCat 3:



3. Power cycle the drive.

3.6 Mailbox Handling

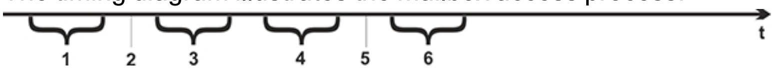
With EtherCAT, acyclical data traffic (object channel or SDO channel) is called mailbox.

This system is based around the master:

Mailbox Output: The master (EtherCAT controller) sends data to the slave (drive). This is essentially a (read/write) request from the master. Mailbox output operates via Sync Manager 0.

Mailbox Input: The slave (drive) sends data to the master (EtherCAT controller). The master reads the slave's response. Mailbox input operates via Sync Manager 1.

Timing diagram: The timing diagram illustrates the mailbox access process:



1. The EtherCAT master writes the mailbox request to the mail-out buffer.
2. On the next interrupt, the EtherCAT interface activates a Sync Manager 0 event (mailbox output event) in the AL event register.
3. The drive reads 16 bytes from the mail-out buffer and copies them to the internal mailbox output array.
4. The drive identifies new data in the internal mailbox output array and performs an SDO access to the object requested by the EtherCAT interface. The response from the drive is written to an internal mailbox input array.
5. The drive deletes all data in the internal mailbox output array so that a new mailbox access attempt can be made.
6. The drive copies the response telegram from the internal mailbox input array to the mail-in buffer of the EtherCAT interface.

3.7 Adjust EtherCAT Cycle Time

The cycle time to be used in the drive for the cyclical setpoints and actual values can either be stored in the CANOPEN.SAMPLEPERIOD command in the amplifier or configured in the startup phase. This happens via SDO mailbox access to objects 60C2 subindex 1 and 2.

Subindex 2, known as the interpolation time index, defines the power of ten of the time value (e.g. -3 means 10-3 or milliseconds) while subindex 1, known as interpolation time units, gives the number of units (e.g. 4 means 4 units).

You can run a 2 ms cycle using various combinations. For example,

Index = -3, Units = 2 or
Index = -4, Units = 20 etc.

The CANOPEN.SAMPLEPERIOD command is counted in multiples of 62.5us microseconds within the device. This means, for example that 2 ms equates to CANOPEN.SAMPLEPERIOD value of 32.

3.8 Maximum Cycle Times Depend on Operation Mode

The minimum cycle time for the drive depends on the drive configuration (second actual position value encoder latch functionality enabled and so on).

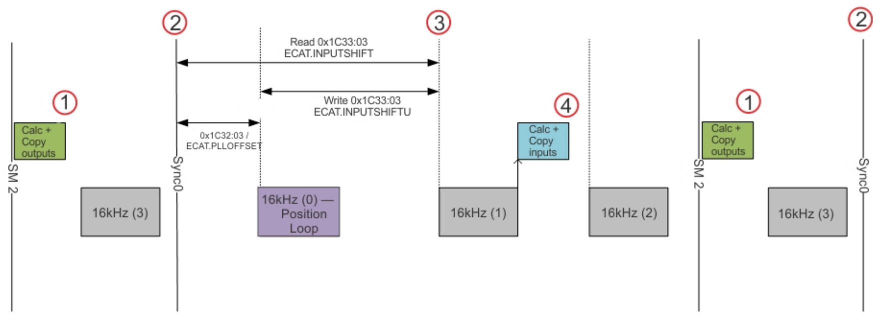
Interface	Cycle Time AKD2G
Position	≥ 0.25 ms (≥ 250 µs)
Velocity	≥ 0.25 ms (≥ 250 µs)
Torque	≥ 0.25 ms (≥ 250 µs)

3.9 Synchronization

3.9.1 Synchronization Behavior with Distributed Clocks (DC) Enabled

With DC enabled by the EtherCAT master, the drive synchronizes to the master's Sync0 signal.

Below is an example of a synchronized fieldbus cycle with 4kHz cycle time:



1. ECAT.RXDONETIME
2. ECAT.SYNC0TIME
3. ECAT.POSLOOPTIME
4. ECAT.TXDONETIME

These two keywords/EtherCAT objects can be used to influence the synchronization behavior of the drive.

- ECAT.PLLOFFSET (Index 1C32h Sub-Index 3): Configures a delay between the Sync0 signal (2) and the 16kHz interrupt that runs the position loop (3) up to 250 uS. If the SM2 event has too much jitter or occurs too close the Sync0, the position loop may run before processing updated data. This offset can be adjusted to shift the position loop to allow more time to process the data.
  - After modifying this value, the EtherCAT state machine must be reset back to PREOP to resynchronize the Phase-Locked Loop (PLL).
- ECAT.INPUTSHIFTU (Index 1C33h Sub-Index 3): Configures the offset between the first 16kHz after the Sync0 signal and the 16kHz interrupt that triggers the TxPDO. A value of -1 means the drive calculates the offset automatically once the drive synchronizes in OP to be 125 to 187 uS before the drive expects the SM2 event. If the packet jitter is low and consistent, the default timing should be sufficient to provide the latest feedback data in the input packet. If packet jitter is too large, the input time may need to be shifted to account for the jitter.
  - The diagram above shows timing with ECAT.INPUTSHIFTU set to 62,500 ns. If ECAT.INPUTSHIFTU was the default -1, the input packet is triggered in 16kHz tick 0 because it calculates two 16kHz samples from when the SM2 event occurs at (1).
  - The value, while in ns, is required to be written by a factor of 62,500 ns (16kHz intervals)
  - When writing ECAT.INPUTSHIFTU, the value does not account for the PLL offset, while reading ECAT.INPUTSHIFT includes the PLL offset in the time.
  - The EtherCAT object, when written, writes the user offset time (ECAT.INPUTSHIFTU). When read, it reads the actual offset time (ECAT.INPUTSHIFT) and may not match the written value exactly.

Diagnostic keywords can be used to read DC system timestamps of certain events that help determine the correct synchronization settings:

1. ECAT.RXDONETIME: The time the drive finished copying Rx PDO data from the master.
2. ECAT.SYNC0TIME: The time of the Sync0 signal.
3. ECAT.POSLOOPTIME: Start time of the 16kHz interrupt that runs the position loop.
4. ECAT.TXDONETIME: The time the drive finished calculating and copying TxPDO data to be sent in the next cyclic frame.
5. ECAT.INPUTSHIFT: Shows the current input offset in ns after sync0 is used for sending PLC inputs. This value is only valid once in OP after the drive has synchronized to the master.
6. CANOPEN.LOOPBACK: There are PDO mappable objects 'Rx Loopback' (300Bh sub-index 4) and 'Tx Loopback' (300Bh sub-index 3) that can be monitored from the Programmable Logic Controller (PLC) to verify synchronization. When the Rx Loopback is updated from the PLC, the drive should mirror the value in the Tx Loopback back to the PLC on the next fieldbus cycle. If the value does not

match the Rx Loopback then synchronization should be investigated as it means the drive is not transmitting updated data correctly in relation to the received data.

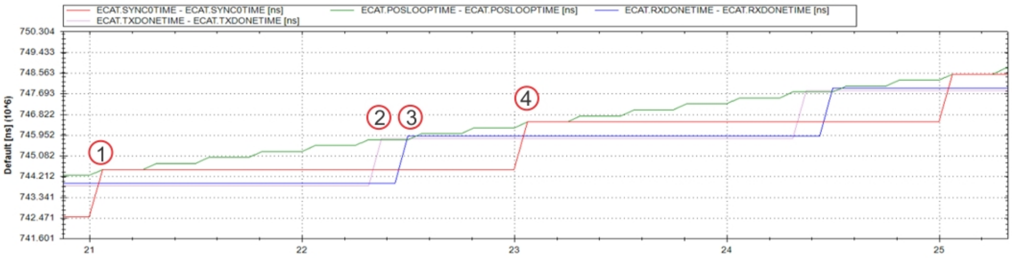
3.9.2 Synchronization Behavior with DC Disabled

1. When DC is disabled, the synchronization behavior is configured with the keyword ECAT.USEPLL.
2. With ECAT.USEPLL set to the default value of 1, the drive will synchronize the position loop to the SyncManager2 event. The SyncManager2 event is created when the EtherCAT Master sends a new packet of command values to the drive while the network is in the Operational state, which occurs once per fieldbus cycle.
3. With ECAT.USEPLL set to 0, the drive is not synchronized to the master and uses a local timer.
4. ECAT.PLLMODE is read to determine the synchronization method currently used by the drive.
5. ECAT.PLLOFFSETNODC can be used to adjust where the drive latches the output values with respect to the SM2 event. By default, the offset is set to 125uS to allow for some packet jitter.

3.9.3 Example WorkBench Synchronization Measurements and Adjustments

Default

Using a default project in TwinCAT running at 2 ms, it configures an SM2 offset of ~600uS prior to sync0. The drive aligns the position loop with sync0 and configures the input offset to be ~125 uS prior to the SM2 event. A recording can be setup in WorkBench using the system time keywords mentioned above to view how the drive responds and verifies the events line up correctly as shown below.

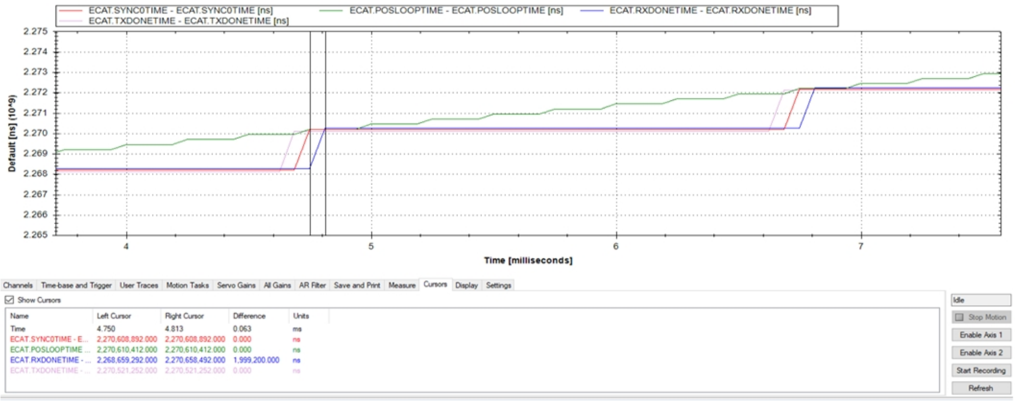


- At time (1) Sync0 is 744,503,524 ns, the position loop runs at 744,505,084 ns: 1.56 uS after sync0.
- At time (2) TXDONETIME (PLC inputs) is prepared at 745,806,603 ns: 1.303 ms after sync0 and ~125uS prior to the SM2/RXDONETIME event as configured by default in the drive.
- At time (3) RXDONETIME (PLC outputs) is processed at 745,918,323 ns: 1.414 ms after sync0, ~600uS prior to the next sync0, as configured in TwinCAT.
- At time (4) the next Sync0 cycle starts at 746,503,524 ns: exactly 2 ms after the previous cycle.

PLL Offset

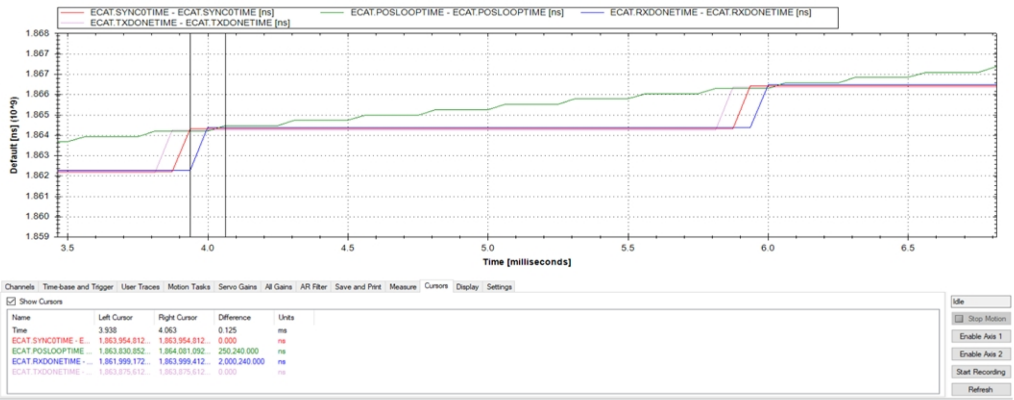
If RXDONETIME is inconsistent, indicating SM2 jitter, and overruns Sync0/POSLOOP times, an offset can be applied to the drive PLL to shift where the position loop occurs with respect to Sycn0.

The recording below shows the RXDONETIME (blue) completing after the POSLOOPTIME (green), indicating the SM2 event was received too late to apply outputs in the position loop associated with Sync0.



Set ECAT.PLLOFFSET = 125000 ns to shift the position loop to occur after Sync0 by 125 uS which causes it to occur after the RXDONETIME.

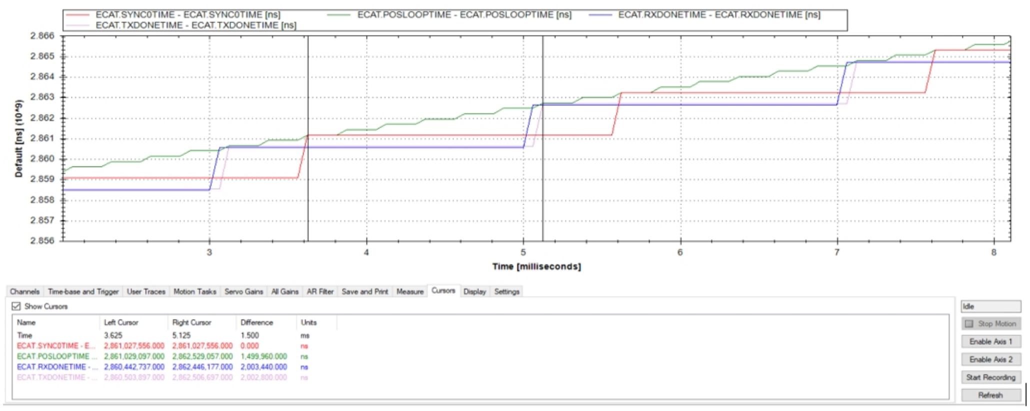
In the recording below, now RXDONETIME (blue) occurrs before the POSLOOPTIME (green) indicates the position loop is running with the latest data.



Input Shift

If TXDONETIME occurs after the SM2 time due to SM2 jitter, it can be shifted to occur prior to the SM2 event for better synchronization.

In the recording below, the TXDONETIME (purple) occurs after RXDONETIME (blue). The PLC receives the previous cycle’s feedback data because the input packet is filled out at the SM2 event time, which is only a few microseconds before RXDONETIME.



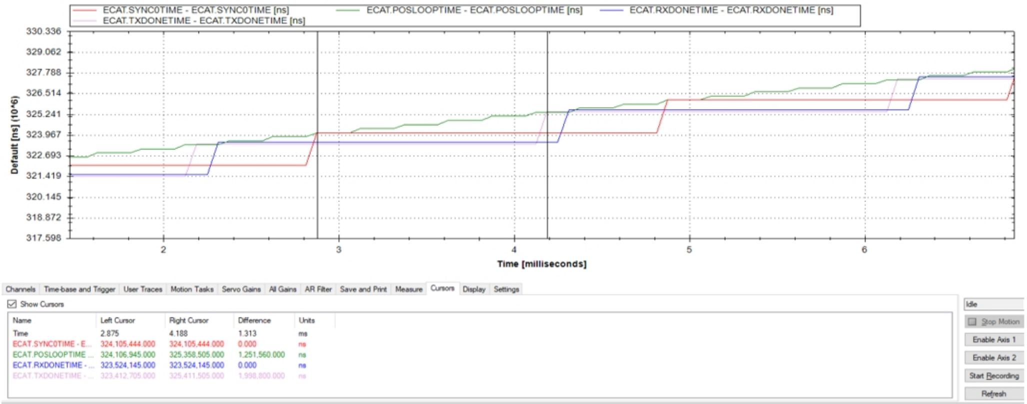
The TXDONETIME should be well before RXDONETIME. If there is jitter in RXDONETIME, make sure to shift TXDONETIME by enough to account for it. For this example, TXDONETIME is 125 uS before RXDONETIME. Determine what value to set ECAT.INPUTSHIFTU to be a time from Sync0 prior to RXDONETIME time by 125 uS.

Use the recording to determine the value:

Rx sync0 offset – 125,000 ns > (RXDONETIME – SYNC0TIME) – 125,000 ns > (2,446,177 ns – 1,027,556 ns) – 125,000 ns > 1,418,621 ns – 125,000 ns = 1,293,621 ns.

Because the drive can only transmit on a 16kHz tick, adjust this time to a factor of 62,500 ns. In this case, round down and set ECAT.INPUTSHIFTU = 1,250,000 ns.

In the recording below, the TXDONETIME (purple) now indicates it has completed 1.313 ms after Sync0 (red) and 125 uS before RXDONETIME (blue). The Tx was triggered at 1.250ms as configured and completed by the next 16kHz recording tick.



3.10 Fixed PDO Mappings

If the EtherCAT master in use does not support dynamic mapping, various ready-to-use mappings can be selected for cyclic data exchange using 1C12h RxPDO assignment and "1C13h TxPDO assignment" (➜ p. 354). If the master permits, dynamic mapping should be preferred as the maps can be customized to meet exact needs. Using dynamic mapping does not impact performance and performs equivalent to fixed maps.

17xxh objects are used for drive input maps and 1Bxxh objects are used for drive output maps.

Use the sequence below to select the fixed command value mapping 1700h via SDOs:

1. SDO write access to object 1C12h Sub0 Data:0x00
2. SDO write access to object 1C12h Sub1 Data:0x1700
3. SDO write access to object 1C12h Sub0 Data:0x01

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

Drive fixed maps

"1620h RxPDO fixed mapping parameter 0x1620" (➜ p. 339)	Digital Outputs ("3601h Digital output control" (➜ p. 377))
"1A20h TxPDO fixed mapping parameter 0x1a20" (➜ p. 347)	Digital Input states ("3580h Digital input states" (➜ p. 373))

Per axis fixed maps (2nd axis uses 20h offsets, ie: 1700h is axis 1 and 1720h is axis 2)

1700h RxPDO fixed mapping parameter 0x1700	CSP map: Controlword (6040h, 6840h Controlword - Axis #), Target Position (607Ah, 687Ah Target position - Axis #)
1701h RxPDO fixed mapping parameter 0x1701	PV map: Controlword ("6040h, 6840h Controlword - Axis #" (➜ p. 447)), Target Velocity ("60FFh, 68FFh Target velocity - Axis #" (➜ p. 521))
"1702h RxPDO fixed mapping parameter 0x1702" (➜ p. 340)	1702h PT map: Controlword ("6040h, 6840h Controlword - Axis #" (➜ p. 447)), Target Torque ("6071h, 6871h Target torque - Axis #" (➜ p. 465))
1703h	Reserved
"1704h RxPDO fixed mapping parameter 0x1704" (➜ p. 340)	Touch Probe Control ("60BBh, 68BBh Touch probe 1 position negative value - Axis #" (➜ p. 493))
"1B00h TxPDO fixed mapping parameter 0x1b00" (➜ p. 347)	CSP map: Statusword ("6041h, 6841h Statusword - Axis #" (➜ p. 450)), Position Actual ("6064h, 6864h Position actual value - Axis #" (➜ p. 457)), Following Error ("60F4h, 68F4h Following error actual value - Axis #" (➜ p. 518))
"1B01h TxPDO fixed mapping parameter 0x1b01" (➜ p. 348)	PV map: Statusword ("6041h, 6841h Statusword - Axis #" (➜ p. 450)), Position Actual ("6064h, 6864h Position actual value - Axis #" (➜ p. 457)), Velocity Actual ("606Ch, 686Ch Velocity actual value - Axis #" (➜ p. 460))
"1B02h TxPDO fixed mapping parameter 0x1b02" (➜ p. 348)	PT map: Statusword ("6041h, 6841h Statusword - Axis #" (➜ p. 450)), Position Actual ("6064h, 6864h Position actual value - Axis #" (➜ p. 457)), Torque Actual ("6077h, 6877h Torque actual value - Axis #" (➜ p. 469))
"1B03h TxPDO fixed mapping parameter 0x1b03" (➜ p. 349)	Touch Probe Status ("60B9h, 68B9h Touch probe status - Axis #" (➜ p. 491))

"1B04h TxPDO fixed mapping parameter 0x1b04" (➜ p. 349)	Touch Probe 1 Position Positive Value ("60BAh, 68BAh Touch probe 1 position positive value - Axis #" (➜ p. 492)), Touch Probe 1 Position Negative Value ("60BBh, 68BBh Touch probe 1 position negative value - Axis #" (➜ p. 493))
"1B05h TxPDO fixed mapping parameter 0x1b05" (➜ p. 349)	Touch Probe 2 Position Positive Value ("60BCh, 68BCh Touch probe 2 position positive value - Axis #" (➜ p. 494)), Touch Probe 2 Position Negative Value ("60BDh, 68BDh Touch probe 2 position negative value - Axis #" (➜ p. 495))
"1B06h TxPDO fixed mapping parameter 0x1b06" (➜ p. 350)	Digital Inputs ("60FDh, 68FDh Digital inputs - Axis #" (➜ p. 520))

3.11 Flexible PDO Mapping

Dynamic PDO mapping allows for customizing the PDOs to fit customer needs. There is no performance impact using flexible mapping vs fixed mapping. Flexible mapping allows for greater flexibility and is preferred over using the fixed maps when possible. Some EtherCAT masters may be unable to use flexible mappings.

Objects available for PDO mappings are listed in the object dictionary table.

Restrictions of flexible mapping:

- Depending on the desired cycle time, PDO sizes are limited to the following:
  - 1ms and faster: 14 total mapped objects in each direction
  - 2ms and slower: 30 total mapped objects in each direction
- Up to 30 objects per PDO are permitted if the above limits are followed

To configure flexible maps:

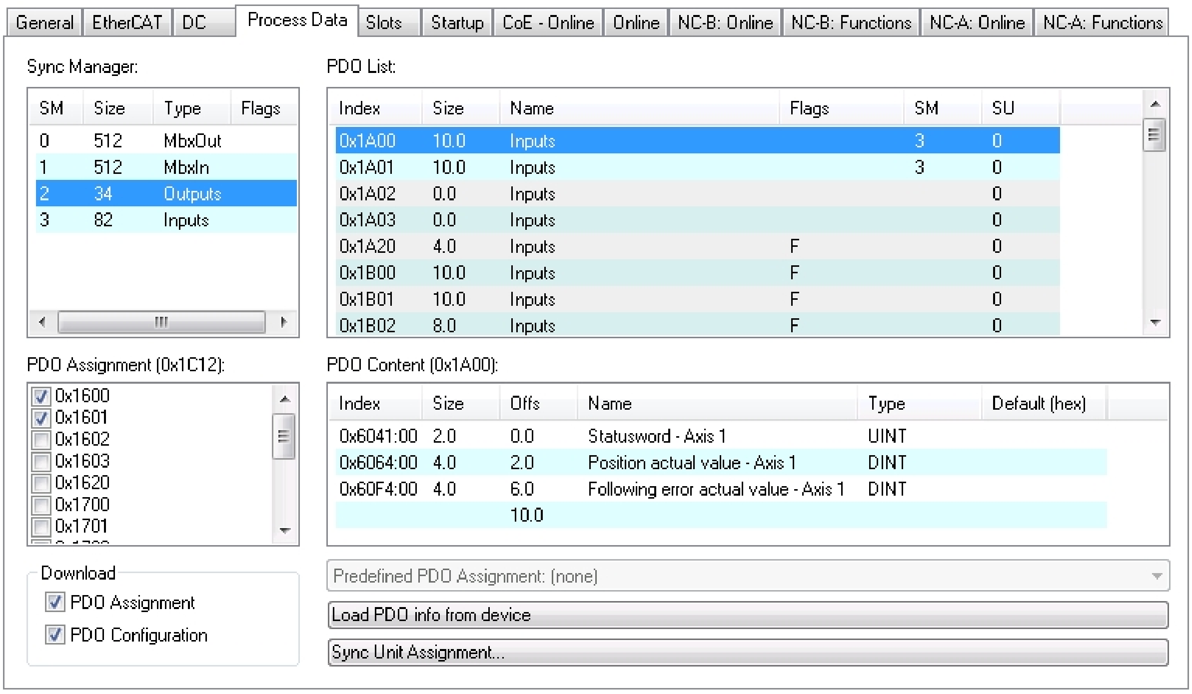
- Clear the mapping selection to enable it to be changed (write 0 to object "1C12h RxPDO assignment" (➜ p. 353) sub 0 and "1C13h TxPDO assignment" (➜ p. 354) sub 0)
  - Objects can be mapped to 1600-1603h for drive outputs and "1A00h-1A03h TxPDO mapping parameter N" (➜ p. 343) for inputs. Each index is a separate PDO.
  - Write 0 to sub-index 0 to clear the PDO map and permit updating
  - Write each following sub-index with the desired object entry
  - Write the number of objects back to sub-index 0 to complete the mapping
  - If any objects are not PDO mappable, an error will be received
- Write 1C12h sub 1 to 4 with the PDOs ("1600h-1603h RxPDO mapping parameter N" (➜ p. 335)) that should be used in receive direction of the drive (set point values).
- Write 1C13h sub 1 to 4 with the PDOs ("1A00h-1A03h TxPDO mapping parameter N" (➜ p. 343)) that should be used in transmit direction of the drive (actual values).
- Write 1C12h sub 0 and 1C13h sub 0 with the number of mapped PDOs that were setup.

3.11.1 Padding

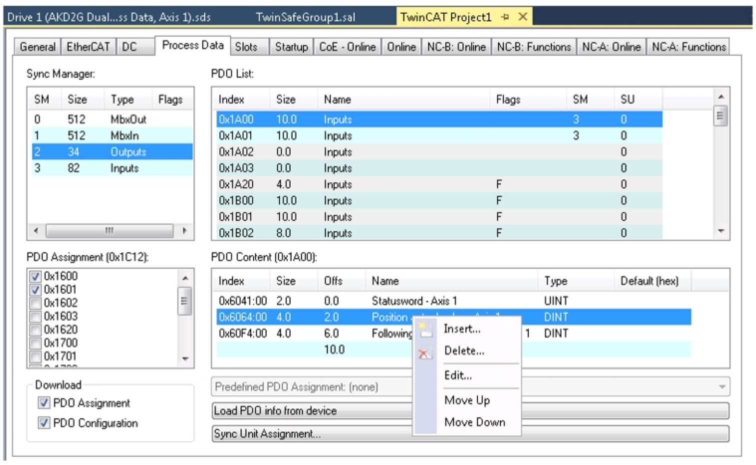
The AKD2G uses byte alignment on PDOs. If more than byte alignment is required, padding objects can be inserted into PDO maps. This is achieved by mapping index 0000h sub 0 and specifying the size. For example, setting a PDO entry with 00000010h assigns 16 bits of padding (2 bytes) and 00000008h assigns 8 bits of padding (1 byte). The smallest amount of padding allowed is 1 byte.

3.11.2 TwinCAT 3 Dynamic PDO Example

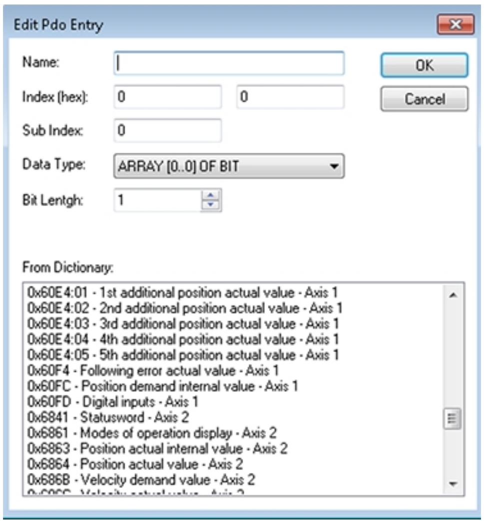
The cyclic data is visible in the PDO-assignment window for the Inputs and Outputs of the Sync Managers. The default PDO settings use the dynamic PDOs "1600h-1603h RxPDO mapping parameter N" (➜ p. 335)/"1A00h-1A03h TxPDO mapping parameter N" (➜ p. 343) for axis 1 and on dual axis drives 1601h/1A01h are mapped for axis 2 with the objects necessary for cyclic synchronous position mode control.



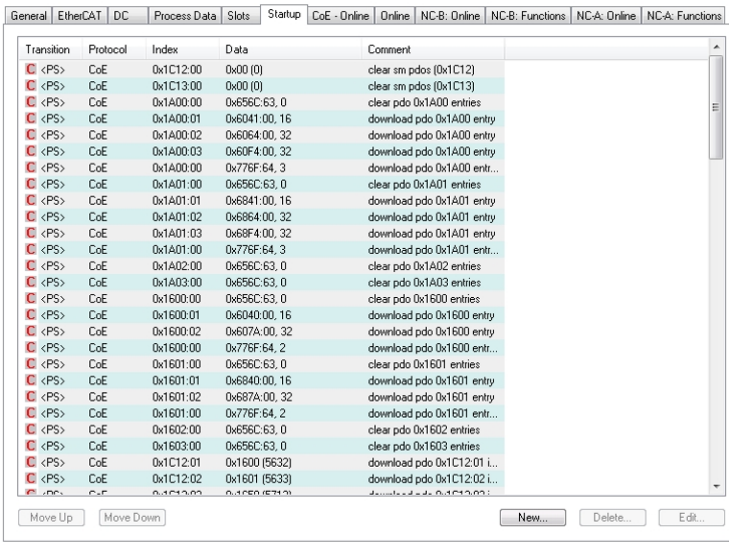
The PDO maps can be changed by selecting the desired PDO and right clicking in the PDO content window. Existing entries can be changed or deleted, and new entries can be inserted between existing or appended to the end.



A list of mappable objects is shown. The list only shows objects that can be mapped in the direction of the map being changed. For example, attempting to insert an object on the input PDO 1A00h only shows objects that can be mapped in the direction from the drive to the controller, as shown below.



As the PDO map is changed, the startup script is automatically updated by TwinCAT to send to the drive during the PREOP to SAFEOP transition.


General | EtherCAT | DC | Process Data | Slots | Startup | CoE - Online | Online | NC-B: Online | NC-B: Functions | NC-A: Online | NC-A: Functions

Transition	Protocol	Index	Data	Comment
C <PS>	CoE	0x1C12:00	0x00 (0)	clear sm pdos (0x1C12)
C <PS>	CoE	0x1C13:00	0x00 (0)	clear sm pdos (0x1C13)
C <PS>	CoE	0x1A00:00	0x656C:63, 0	clear pdo 0x1A00 entries
C <PS>	CoE	0x1A00:01	0x6041:00, 16	download pdo 0x1A00 entry
C <PS>	CoE	0x1A00:02	0x6064:00, 32	download pdo 0x1A00 entry
C <PS>	CoE	0x1A00:03	0x60F4:00, 32	download pdo 0x1A00 entry
C <PS>	CoE	0x1A00:00	0x776F:64, 3	download pdo 0x1A00 entr...
C <PS>	CoE	0x1A01:00	0x656C:63, 0	clear pdo 0x1A01 entries
C <PS>	CoE	0x1A01:01	0x6841:00, 16	download pdo 0x1A01 entry
C <PS>	CoE	0x1A01:02	0x6864:00, 32	download pdo 0x1A01 entry
C <PS>	CoE	0x1A01:03	0x68F4:00, 32	download pdo 0x1A01 entry
C <PS>	CoE	0x1A01:00	0x776F:64, 3	download pdo 0x1A01 entr...
C <PS>	CoE	0x1A02:00	0x656C:63, 0	clear pdo 0x1A02 entries
C <PS>	CoE	0x1A03:00	0x656C:63, 0	clear pdo 0x1A03 entries
C <PS>	CoE	0x1600:00	0x656C:63, 0	clear pdo 0x1600 entries
C <PS>	CoE	0x1600:01	0x6040:00, 16	download pdo 0x1600 entry
C <PS>	CoE	0x1600:02	0x607A:00, 32	download pdo 0x1600 entry
C <PS>	CoE	0x1600:00	0x776F:64, 2	download pdo 0x1600 entr...
C <PS>	CoE	0x1601:00	0x656C:63, 0	clear pdo 0x1601 entries
C <PS>	CoE	0x1601:01	0x6840:00, 16	download pdo 0x1601 entry
C <PS>	CoE	0x1601:02	0x687A:00, 32	download pdo 0x1601 entry
C <PS>	CoE	0x1601:00	0x776F:64, 2	download pdo 0x1601 entr...
C <PS>	CoE	0x1602:00	0x656C:63, 0	clear pdo 0x1602 entries
C <PS>	CoE	0x1603:00	0x656C:63, 0	clear pdo 0x1603 entries
C <PS>	CoE	0x1C12:01	0x1600 (5632)	download pdo 0x1C12:01 i...
C <PS>	CoE	0x1C12:02	0x1601 (5633)	download pdo 0x1C12:02 i...

Move Up | Move Down | New... | Delete... | Edit...

The meaning of the data (for example 0x60410010 in the mapping of 1A00h sub 1) is as follows:

- 6041h is the index of the DS402 statusword.
- 00h is the sub-index of the DS402 statusword.
- 10h is the number of bits for this entry, i.e., 16 bits or 2 bytes.

4 CANopen over EtherCAT (CoE)

4.1 Drive Profile - DS402

4.1.1 CANopen Configuration Parameters

4.1.1.1 Drive Parameters

Keyword	CANopen Object	Description
CANOPEN.LOOPBACK		Allows viewing when the loopback object is updated in the drive.
CANOPEN.MONITORSYNC		Verifies the SYNC message (PDO on EtherCAT) is received or faults.
CANOPEN.SAMPLEPERIOD	"60C2h, 68C2h Interpolation time period - Axis #" (➜ p. 496)	Fieldbus cyclic rate (time between PDO updates).
CANOPEN.STATE		NMT State of a CAN bus device.
CANOPEN.WORKBENCHUNITS	"300Bh CANOPEN.*" (➜ p. 363)	Configures the drive to use either WorkBenchunits (AXIS#.UNIT.*) or CANopen Scaling.

4.1.1.2 Axis Parameters

4.1.1.2.1 Control

Keyword	CANopen Object	Description
AXIS#.CANOPEN.CONTROLWORD	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	CANopen controlword; various bits to enable and run an axis.
AXIS#.CANOPEN.STATUSEDGETIME		Configures a time interval during which certain bits in the DS402 statusword are guaranteed to be zero after receiving a corresponding command.
AXIS#.CANOPEN.STATUSWORD	"6041h, 6841h Statusword - Axis #" (➜ p. 450)	CANopen statusword; various bits containing the status of an axis.

4.1.1.2.2 Acceleration

Keyword	CANopen Object	Description
AXIS#.CANOPEN.ACCSCALEDENOM	"6097h, 6897h Acceleration factor - Axis #" (➜ p. 481)	Used in the conversion between acceleration values passed within SDO and PDO messages and the drives internal units.
AXIS#.CANOPEN.ACCSCALENUM	"6097h, 6897h Acceleration factor - Axis #" (➜ p. 481)	Used in the conversion between acceleration values passed within SDO and PDO messages and the drives internal units.

4.1.1.2.3 Position

Keyword	CANopen Object	Description
AXIS#.CANOPEN.GEARPRIMARY.MOTORREV	"6091h, 6891h Gear ratio - Axis #" (➔ p. 478)	Count of motor shaft revolutions for the primary position gearing ratio calculation.
AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV	"6091h, 6891h Gear ratio - Axis #" (➔ p. 478)	Driving shaft revolutions for the primary position gear ratio calculation.
AXIS#.CANOPEN.FCPRIMARY.FEED	"6092h, 6892h Feed constant - Axis #" (➔ p. 479)	Feed for the primary position feed constant calculation.
AXIS#.CANOPEN.FCPRIMARY.SHAFTREV	"6092h, 6892h Feed constant - Axis #" (➔ p. 479)	Driving shaft revolutions for the primary position feed constant calculation.
AXIS#.CANOPEN.INTERPOLATEMODE		Configures the method (linear, square, cubic) used to interpolate between position setpoints.
AXIS#.CANOPEN.PERRMODE	"6041h, 6841h Statusword - Axis #" (➔ p. 450)	Configures the behavior of bit 13 of the DS402 statusword in position error mode.
AXIS#.CANOPEN.PSCALE	"5003h, 5103h AXIS#.CANOPEN.*" (➔ p. 402)	Sets the resolution of position values back to the controller in 32-bit counts per revolution of position values.
AXIS#.CANOPEN.TARPOSMODE		Configures the behavior of the DS402 statusword bit 10 (target reached) in Profile Position Mode.

4.1.1.2.4 Additional Position Feedbacks

Keyword	CANopen Object	Description
AXIS#.CANOPEN.GEAR#.MOTORREV	"60E8h, 68E8h Additional gear ratio - motor revolutions - Axis #" (➜ p. 510)	Additional feedback count of motor shaft revolutions for the additional feedback gearing ratio calculation.
AXIS#.CANOPEN.GEAR#.SHAFTREV	"60EDh, 68EDh Additional gear ratio - shaft revolutions - Axis #" (➜ p. 514)	Additional feedback count of driving shaft revolutions for the additional feedback gearing ratio calculation.
AXIS#.CANOPEN.FC#.FEED	"60E9h, 68E9h Additional feed constant - feed - Axis #" (➜ p. 512)	Additional feedback feed constant calculation.
AXIS#.CANOPEN.FC#.SHAFTREV	"60EEh, 68EEh Additional feed constant - shaft revolutions - Axis #" (➜ p. 516)	Additional feedback driving shaft revolutions for the additional feedback feed constant calculation.

4.1.1.2.5 Velocity

Keyword	CANopen Object	Description
AXIS#.CANOPEN.VELSCALEDENOM	"6096h, 6896h Velocity factor - Axis #" (➜ p. 480)	Denominator of the velocity scale factor.
AXIS#.CANOPEN.VELSCALENUM	"6096h, 6896h Velocity factor - Axis #" (➜ p. 480)	Numerator of the velocity scale factor.

4.1.2 DS402 State Machine

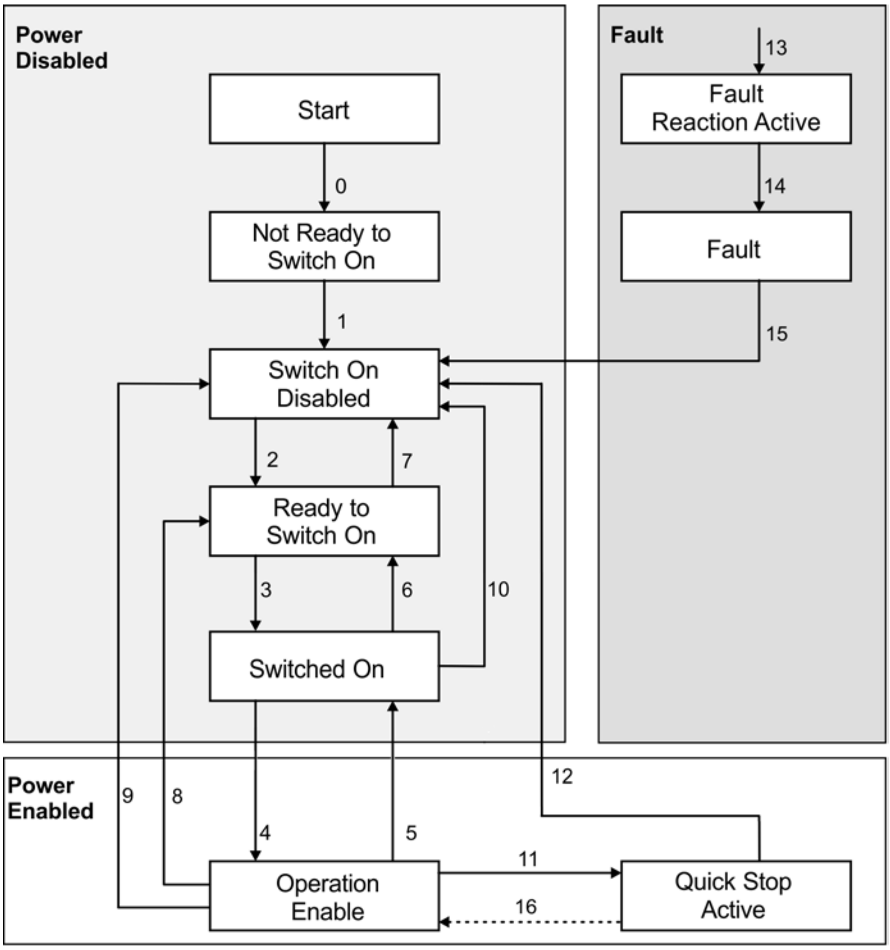
The device control of the AKD2G can be used to carry out all the motion functions in the corresponding modes. The control of the AKD2G is implemented through a mode-dependent state machine. The mode of operation is set through object "6060h, 6860h Modes of operation - Axis #" (➜ p. 454). There are separate state machines for each axis.

- Object "6060h, 6860h Modes of operation - Axis #" (➜ p. 454) controls the state machine.
- Object "6061h, 6861h Modes of operation display - Axis #" (➜ p. 455) indicates the states of the state machine.

NOTE

The fieldbus state machine controls the axis as long as AXIS#.CMDSOURCE is equal to “Fieldbus”. To enable the axis using WorkBench and bypass the DS402 state machine, a command source other than “fieldbus” should be selected for AXIS#.CMDSOURCE. During commissioning and performing initial procedures like tuning, it is recommended the fieldbus master is OFF (not running) or not connected and the command source is “Service”.

4.1.2.1 State Machine (DS402)



4.1.2.2 State Machine Description

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.
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.

4.1.2.3 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 controlword (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 controlword (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
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 controlword must be cleared by the host.
16	Bit 2 is set	Motion function is reenabled as long as the quick stop action has completed and standstill has been reached.

4.1.2.4 Controlword Object 6040h

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

Bit assignment in controlword

Bit	Name
0	Switch on
1	Disable voltage
2	Quick stop
3	Enable operation
4	Operation mode specific
5	Operation mode specific
6	Operation mode specific
7	Reset fault (only effective for faults)
8	Pause/halt
9	Operation mode specific
10	Reserved
11	AXIS#.CANOPEN.CONTROLBIT11.MODE
12	AXIS#.CANOPEN.CONTROLBIT12.MODE
13	AXIS#.CANOPEN.CONTROLBIT13.MODE
14	AXIS#.CANOPEN.CONTROLBIT14.MODE
15	AXIS#.CANOPEN.CONTROLBIT15.MODE

Controlword bits 11-15 mode

Controlword bits 11-15 are defined to be manufacturer specific by the DS402 standard. For AKD2G, specific modes can be set for each bit that defines the behavior. See AXIS#.CANOPEN.CONTROLBIT##.MODE for available mode descriptions.

Commands in the controlword

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 controlword

The following table shows the mode-dependent bits in the controlword. Only manufacturer-specific modes are supported at present. The individual modes are set by object "6060h, 6860h Modes of operation - Axis #" (➜ p. 454).

Operation Mode	No.	Bit 4	Bit 5	Bit 6	Bit 9
Analog velocity	FEh	reserved	reserved	reserved	reserved
Analog torque	FFh	reserved	reserved	reserved	reserved
Profile position mode (pp)	01h	New set-point	Use new set-point immediately	0 - Absolute move 1 - Relative move	Blend / On-the-fly move once target position is reached
Profile velocity mode (pv)	03h	reserved	reserved	reserved	reserved
Profile torque mode (tq)	04h	reserved	reserved	reserved	reserved
Homing mode (hm)	06h	Start homing operation	reserved	reserved	reserved
Cyclic sync position Mode (csp)	08h	reserved	reserved	reserved	reserved
Cyclic sync velocity mode (csv)	09h	reserved	reserved	reserved	reserved

Description of the remaining bits in the controlword

The remaining bits in the controlword 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.

4.1.2.5 Statusword 6041h

The momentary state of the state machine can be readwith the aid of the statusword.

Index	Sub-Index	Data Type	Access	PDO Mappable	Description
0x6041	0	Unsigned16	RW	TxPDO	Drive state machine statusword

Bit assignment in the statusword

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 value. In Profile Position Mode and Homing Mode the position window is set using AXIS#.SETTLE.P. The behavior can be configured by AXIS#.CANOPEN.TARPOSMODE. In Profile velocity and Analog velocity modes, this bit is set when AXIS#.VL.FB is within the window set using the object "606Dh, 686Dh Velocity window - Axis #" (➔ p. 461) sub 0 and a window time is set using object "606Eh, 686Eh Velocity window time - Axis #" (➔ p. 463) sub 0. The bit is also set on coming to standstill on Halt bit (bit 8 of Controlword = 1) or after Quickstop (bit 2 of Controlword = 0) with quick stop option code 5 or 6.
11	Internal limit active	This bit is controlled by the conditions below: • Set if motion is being commanded into a limit switch and clears when moving out of a limit switch. • Set if a controlled stop is in progress (SS1, action table, etc) and clears once the controlled stop is complete. **NOTE** The drive is usually disabled at the end of most controlled stop actions and this bit will clear. • Set while Wake and Shake is active.

Bit	Name	Description
12	Operation mode specific (reserved)	See Mode-dependent bits in the statusword (➔ p. 108)
13	Operation mode specific (reserved)	See Mode-dependent bits in the statusword (➔ p. 108)
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 statusword

The following table shows the mode-dependent bits in the statusword. The individual modes are set by object "6060h, 6860h Modes of operation - Axis #" (➔ p. 454).

Modes of Operation	No.	Bit 12	Bit 13
Analog velocity	FEh	This bit is 1 while the motor is at standstill (see AXIS#.ZEROREACHED).	Not used
Analog torque	FFh	This bit is 1 while the motor is at standstill (see AXIS#.ZEROREACHED).	Not used
Profile position mode (pp)	01h	Set-point acknowledge	Following error

Modes of Operation	No.	Bit 12	Bit 13
Profile velocity (pv)	03h	This bit is 1 while the motor is at standstill (see AXIS#.ZEROREACHED).	Not used
Homing mode (hm)	06h	Homing attained	Homing 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
Cyclic sync velocity mode (csv)	09h	This bit stays 1 as long as the drive is following velocity set-points	Not used

4.1.3 Operation Modes

CanOpen Mode of operation	AKD2G Mode of operation	Description
Analog velocity	AXIS#.OPMODE 1 (Velocity) AXIS#.CMDSOURCE 1 (Fieldbus)	6060h = -2 In this mode, the analog input is used to directly control the velocity command. The scaling of voltage to velocity is set via AXIS#.VL.AINSCALE (5011h sub 9). Acceleration/Deceleration is limited by AXIS#.VL.AINACC (5011h sub 33) and AXIS#.VL.AINDEC (5011h sub 34). The analog input used is set with AXIS#.VL.AINSOURCE (5011h sub 32).
Analog torque	AXIS#.OPMODE 0 (Torque) AXIS#.CMDSOURCE 1 (Fieldbus)	6060h = -1 In this mode, the analog input is used to directly control the current command. The scaling of voltage to current is set via AXIS#.IL.AINSCALE (500Ah sub 20). The analog input used is set with AXIS#.IL.AINSOURCE (500Ah sub 21).
Profile position	AXIS#.OPMODE 2 (Position) AXIS#.CMDSOURCE 1 (Fieldbus)	6060h = 1 In this mode, the master sets up the target position ("607Ah, 687Ah Target position - Axis #" (➔ p. 470)), acceleration ("6083h, 6883h Profile acceleration - Axis #" (➔ p. 475)), deceleration ("6084h, 6884h Profile deceleration - Axis #" (➔ p. 476)), and velocity setpoint ("6081h, 6881h Profile velocity in pp-mode - Axis #" (➔ p. 474)) for the axis to follow. The move is triggered by the controlword ("6040h, 6840h Controlword - Axis #" (➔ p. 447)) bit.
Profile velocity	AXIS#.OPMODE 1 (Velocity) AXIS#.CMDSOURCE 1 (Fieldbus)	6060h = 3 In this mode, the master sends target velocity command values (60FFh) and the axis will ramp to the set velocity using the profile acceleration ("6083h, 6883h Profile acceleration - Axis #" (➔ p. 475)) and deceleration ("6084h, 6884h Profile deceleration - Axis #" (➔ p. 476)) values.
Homing mode	AXIS#.OPMODE 2 (Position) AXIS#.CMDSOURCE 1 (Fieldbus)	6060h = 6 In this mode, homing can be done by the drive using the homing method object "6098h, 6898h Homing mode - Axis #" (➔ p. 482)
Torque	AXIS#.OPMODE 0 (Torque) AXIS#.CMDSOURCE 1 (Fieldbus)	6060h = 4 In this mode, the master commands torque using the target torque object "6071h, 6871h Target torque - Axis #" (➔ p. 465). Units are in % of drive peak torque.
Cyclic synchronous position	AXIS#.OPMODE 2 (Position) AXIS#.CMDSOURCE 1 (Fieldbus)	6060h = 8 In this mode, the master calculates move profile and commands motion with cyclic position points using the target position object "607Ah, 687Ah Target position - Axis #" (➔ p. 470). The axis will interpolate between position updates at 4kHz using the slope between prior points.
Cyclic synchronous velocity	AXIS#.OPMODE 1 (Velocity) AXIS#.CMDSOURCE 1 (Fieldbus)	6060h = 9 In this mode, the master sends velocity commands using 60FFh. The axis will interpolate between velocity updates at 16kHz. The velocity will ramp to the specified command if the slope between the two velocity updates is within the accleration rate defined by the profile acceleration"6083h, 6883h Profile acceleration - Axis #" (➔ p. 475) and deceleration "6084h, 6884h Profile deceleration - Axis #" (➔ p. 476) values. Otherwise the ramp will be clamped by the defined accleration rates.

4.1.3.1 Analog Velocity Mode

This mode allows controlling the velocity command directly using an analog input. As soon as the mode is set and the axis is enabled, the voltage on the analog input is converted into the velocity command to control the motor.

The current to voltage scaling is set with AXIS#.VL.AINSCALE (5011h sub 9), the acceleration and deceleration are limited by AXIS#.VL.AINACC (5011h sub 33) and AXIS#.VL.AINDEC (5011h sub 34), and the desired analog input to use can be set with AXIS#.VL.AINSOURCE (5011h sub 32).

Statusword ("6041h, 6841h Statusword - Axis #" (➜ p. 450)) bits for target reached (bit 10) and zero speed (bit 12) are set in this mode.

Controlword ("6040h, 6840h Controlword - Axis #" (➜ p. 447)) bit 8 for halting stops/resumes motion.

4.1.3.2 Analog Torque Mode

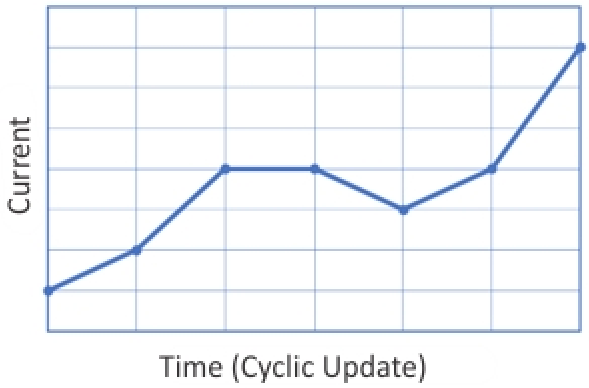
This mode allows controlling the current command directly using an analog input. As soon as the mode is set and the axis is enabled, the voltage on the analog input is converted into the current command to control the motor.

The current to voltage scaling is set with AXIS#.VL.AINSCALE (500Ah sub 20) and the desired analog input to use can be set with AXIS#.VL.AINSOURCE (500Ah sub 21).

Statusword ("6041h, 6841h Statusword - Axis #" (➜ p. 450)) bit for zero speed (bit 12) are set in this mode.

Controlword ("6040h, 6840h Controlword - Axis #" (➜ p. 447)) bit 8 for halting stops/resumes motion.

4.1.3.3 Profile Torque Mode



Axis	Object	Value
Axis 1	6060h "6060h, 6860h Modes of operation - Axis #" (➜ p. 454)	4
Axis 2	6068h "6060h, 6860h Modes of operation - Axis #" (➜ p. 454)	4

Fieldbus

Profile Torque Mode is supported by the following fieldbuses:

- CAN bus/CANopen
- EtherCAT/CANopen over EtherCAT (CoE)

4.1.3.3.1 Description

Profile Torque Mode is a CANopen (DS402) mode of operation used for real-time torque (current) control. The CANopen objects define the settings for this move. With this mode, the torque command is sent from the master to the current loop in the slave drive. The drive operates in torque mode. The drive commands the specified current to the motor.

4.1.3.3.2.1 Drive Opmode and Command Source

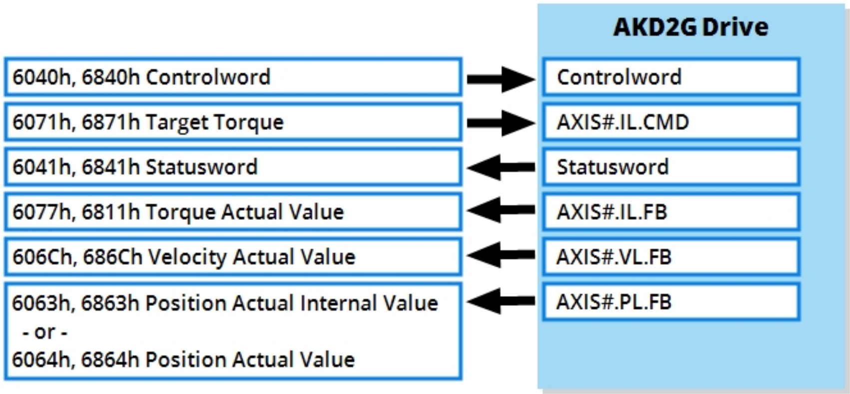
The AKD2G opmode and command source are automatically configured when the Modes of operation is set through objects "6060h, 6860h Modes of operation - Axis #" (➜ p. 454).

Drive Command	Value
AXIS#.OPMODE	0 - Torque
AXIS#.CMDSOURCE	1 - Fieldbus

Motion Settings:

- Target torque
- Maximum torque
- Torque slope
- Scaling

4.1.3.3.3.2 Common PDO Data



Essential Objects

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"6071h, 6871h Target torque - Axis #" (➜ p. 465)	0h	Target torque	AXIS#.IL.CMD	Signed16	Read/Write
"6072h, 6872h Max torque - Axis #" (➜ p. 466)	0h	Max torque	AXIS#.IL.LIMITP / AXIS#.IL.LIMITN	Unsigned32	Read/Write
"6087h, 6887h Torque slope - Axis #" (➜ p. 477)	0h	Torque slope	AXIS#.IL.RATELIMITU	Unsigned32	Read/Write
"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0h	Controlword	N/A	Unsigned16	Read/Write

Useful Objects

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"6041h, 6841h Statusword - Axis #" (➜ p. 450)	0h	Statusword	N/A	Unsigned16	Read Only
"6077h, 6877h Torque actual value - Axis #" (➜ p. 469)	0h	Torque actual value	AXIS#.IL.FB	Signed16	Read Only
"6063h, 6863h Position actual internal value - Axis #" (➜ p. 456)	0h	Position actual internal value	AXIS#.PL.FB	Signed32	Read Only
"6064h, 6864h Position actual value - Axis #" (➜ p. 457)	0h	Position actual value	AXIS#.PL.FB	Signed32	Read Only

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"606Ch, 686Ch Velocity actual value - Axis #" (➜ p. 460)	0h	Velocity actual value	AXIS#.VL.FB	Signed32	Read Only
"605Ah, 685Ah Quick stop option code - Axis #" (➜ p. 453)	0h	Quick stop option code	N/A	Signed16	Read/Write
"5000h, 5100h AXIS#.*" (➜ p. 399)	4h	Axis specific objects	AXIS#.MOTIONSTAT	Unsigned32	Read Only

4.1.3.3.4.3 Motion Functionality

Profile Torque Mode follows the CANopen (DS402) State Machine. The drive must be in Operation enable state to act on the target torque command.

The Controlword is used to control the state machine and command motion. See objects "6040h, 6840h Controlword - Axis #" (➜ p. 447) and "6041h, 6841h Statusword - Axis #" (➜ p. 450).

Controlword Bits	Motion Function
Bit 2	Stop motion (Quick stop)
Bit 8	Pause/halt

Controlword Bit 2 (Quick Stop):

- Does **not** use object "605Ah, 685Ah Quick stop option code - Axis #" (➜ p. 453)
- Commands dynamic braking and disables the drive
- Sets current command = 0 (AXIS#.IL.CMD = 0)
- Does **not** remember the previous setpoint
- To resume from Quick Stop, step through the state machine until operation enable

Controlword Bit	Value	Function
Bit 2	0	Stops motion
Bit 2	1	Allows motion

Controlword Bit 8 (Halt):

- Pauses/halts motion
- Sets current command = 0 (AXIS#.IL.CMD = 0)
- Remembers previous setpoint
- Continues the move using the latest setpoint when bit 8 is turned off
- Deceleration ramp (rate of decrease of current) is set by object "6087h, 6887h Torque slope - Axis #" (➜ p. 477)

Controlword Bit	Value	Function
Bit 8	0	Allows/resumes motion
Bit 8	1	Pauses motion

Status

The Statusword ("6041h, 6841h Statusword - Axis #" (➜ p. 450)) can be read for handshaking purposes. It can indicate a fault or warning condition, status of the power stage, home attained, setpoint acknowledged, target position reached, etc.

Mode-Specific Statusword Bits

Statusword Bits	Status
Bit 10	Target reached
Bit 12	Standstill

Statusword Bit	Value	Controlword Bit 8 Value	Function
Bit 10	0	0	Target torque not reached
		1	Axis decelerating
Bit 10	1	0	Target torque reached
		1	Velocity = 0
Bit 12	0		Motor is moving.
Bit 12	1		Motor is at standstill.

Example Sequence of Events

Step	Object Name	Object	Sub-index	User Value
Set operation mode	Modes of operation	"6060h, 6860h Modes of operation - Axis #" (➜ p. 454)	0	0x04h
Set parameters	Max torque	"6072h, 6872h Max torque - Axis #" (➜ p. 466)	0	User specified
	Torque slope	"6087h, 6887h Torque slope - Axis #" (➜ p. 477)	0	User specified
Ready for switch-on	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x06h
Operation enable	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x0Fh
Send target torque	Target torque	"6071h, 6871h Target torque - Axis #" (➜ p. 465)	0	User specified
Halt	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x10Fh
Resume from halt	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x0Fh
Quick stop	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x0Bh
Resume from quick stop	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x06h->0x0Fh
Send target torque	Target torque	"6071h, 6871h Target torque - Axis #" (➜ p. 465)	0	User specified
Send new target torque	Target torque	"6071h, 6871h Target torque - Axis #" (➜ p. 465)	0	User specified

Monitor

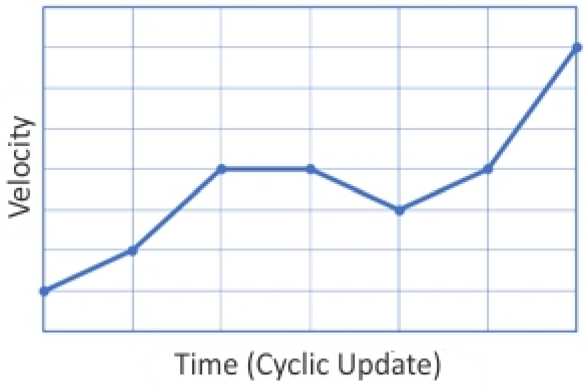
Step	Object Name	Object	Sub-index	Value
Read status	Statusword bit 12 (motor moving)	"6041h, 6841h Statusword - Axis #" (➜ p. 450)	0	0 or 1
Read status	Statusword bit 10 (target reached)	"6041h, 6841h Statusword - Axis #" (➜ p. 450)	0	0 or 1
Read torque actual value	Torque actual value	"6077h, 6877h Torque actual value - Axis #" (➜ p. 469)	0	
Read position actual internal value	Position actual internal value	"6063h, 6863h Position actual internal value - Axis #" (➜ p. 456)	0	
Read position actual value	Position actual value	"6064h, 6864h Position actual value - Axis #" (➜ p. 457)	0	

4.1.3.3.5.4 CANopen Scaling

The motion setpoints and actual values can be scaled using CANopen objects or the associated drive parameters. These include values for position, velocity, acceleration, deceleration and current (torque). See "CANopen Scaling" (➜ p. 146).

Scale factors affect the values of the motion setpoint objects and should be set prior to writing/changing the setpoint objects.

4.1.3.4 Profile Velocity Mode



Axis	Object	Value
Axis 1	6060h"6060h, 6860h Modes of operation - Axis #" (➜ p. 454)	3
Axis 2	6068h "6060h, 6860h Modes of operation - Axis #" (➜ p. 454)	3

Fieldbus

Profile Velocity Mode is supported by the following fieldbuses:

- CAN bus/CANopen
- EtherCAT/CANopen over EtherCAT (CoE)

4.1.3.4.1 Description

Profile Velocity Mode is a CANopen (DS402) mode of operation used for real-time velocity (jog) moves. The CANopen objects define the settings for this move. With this mode, the velocity command is sent from the master to the velocity loop in the slave drive. The drive operates in velocity mode. The motor will immediately ramp to the target velocity using the profile acceleration and deceleration settings.

4.1.3.4.2.1 Drive Opmode and Command Source

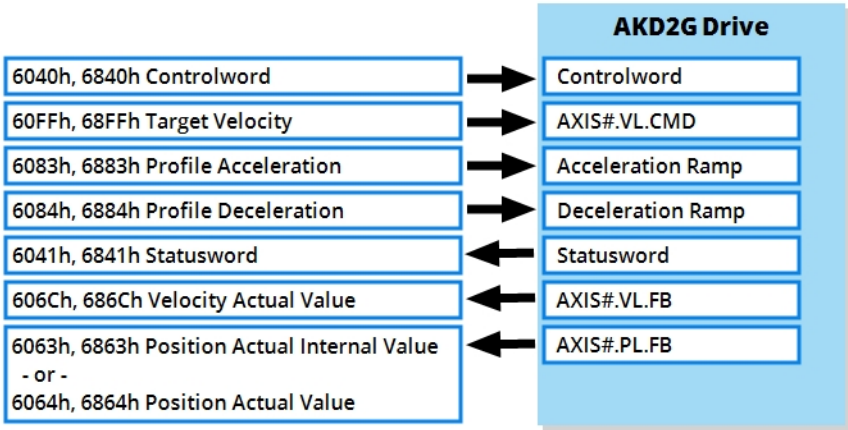
The AKD2G opmode and command source are automatically configured when the Mode of operation is set through objects "6060h, 6860h Modes of operation - Axis #" (➜ p. 454).

Drive Command	Value
AXIS#.OPMODE	1 - Velocity
AXIS#.CMDSOURCE	1 - Fieldbus

Motion Settings:

- Target velocity
- Profile acceleration
- Profile deceleration
- Scaling

4.1.3.4.3.2 Common PDO Data



Essential Objects

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"60FFh, 68FFh Target velocity - Axis #" (➜ p. 521)	0h	Target velocity	AXIS#.VL.CMD	Signed32	Read/Write
"6083h, 6883h Profile acceleration - Axis #" (➜ p. 475)	0h	Profile acceleration	AXIS#.FBUS.ACC	Unsigned32	Read/Write
"6084h, 6884h Profile deceleration - Axis #" (➜ p. 476)	0h	Profile deceleration	AXIS#.FBUS.DEC	Unsigned32	Read/Write
"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0h	Controlword	AXIS#.CANOPEN.CONTROLWORD	Unsigned16	Read/Write

Useful Objects

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"6041h, 6841h Statusword - Axis #" (➜ p. 450)	0h	Statusword	AXIS#.CANOPEN.STATUSWORD	Unsigned16	Read Only

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"6063h, 6863h Position actual internal value - Axis #" (➔ p. 456)	0h	Position actual internal value	AXIS#.PL.FB	Signed32	Read Only
"6064h, 6864h Position actual value - Axis #" (➔ p. 457)	0h	Position actual value	AXIS#.PL.FB	Signed32	Read Only
"606Ch, 686Ch Velocity actual value - Axis #" (➔ p. 460)	0h	Velocity actual value	AXIS#.VL.FB	Signed32	Read Only
"606Bh, 686Bh Velocity demand value - Axis #" (➔ p. 459)	0h	Velocity demand value	AXIS#.VL.CMD	Signed32	Read Only
"606Dh, 686Dh Velocity window - Axis #" (➔ p. 461)	0h	Velocity window	N/A	Unsigned16	Read/Write
"606Eh, 686Eh Velocity window time - Axis #" (➔ p. 463)	0h	Velocity window time	N/A	Unsigned16	Read/Write
"605Ah, 685Ah Quick stop option code - Axis #" (➔ p. 453)	0h	Quick stop option code	N/A	Signed16	Read/Write
"5000h, 5100h AXIS#.*" (➔ p. 399)	4h	Axis specific objects	AXIS#.MOTIONSTAT	Unsigned32	Read Only

4.1.3.4.4.3 Motion Functionality

Profile Velocity Mode follows the CANopen (DS402) State Machine. The drive must be in Operation enable state to act on the target velocity command.

The Controlword is used to control the state machine and command motion. See objects "6040h, 6840h Controlword - Axis #" (➜ p. 447) and "6041h, 6841h Statusword - Axis #" (➜ p. 450).

Controlword Bits	Motion Function
Bit 2	Stop motion (Quick stop)
Bit 8	Pause/halt

Controlword Bit 2 (Quick stop):

- Defined by object "605Ah, 685Ah Quick stop option code - Axis #" (➜ p. 453)
- Sets velocity command = 0 (AXIS#.VL.CMD = 0)
- Does **not** remember the previous setpoint
- To resume from Quick Stop, step through the state machine until operation enable

Controlword Bit	Value	Function
Bit 2	0	Stops motion
Bit 2	1	Allows motion

Controlword Bit 8 (Halt):

- Pauses/halts motion
- Sets velocity command = 0 (AXIS#.VL.CMD = 0)
- Remembers previous setpoint
- Continues the move using the latest setpoint when bit 8 is turned off
- Deceleration ramp is set by object "6084h, 6884h Profile deceleration - Axis #" (➜ p. 476)

Controlword Bit	Value	Function
Bit 8	0	Allows/resumes motion
Bit 8	1	Pauses motion

Status

Statusword ("6041h, 6841h Statusword - Axis #" (➜ p. 450)) can be read for handshaking purposes. It can indicate a fault or warning condition, status of the power stage, home attained, setpoint acknowledged, target position reached, etc.

Mode-Specific Statusword Bits

Statusword Bits	Status
Bit 10	Target reached
Bit 12	Standstill

Statusword bit 10 (Target reached) sensitivity is set by objects "606Dh, 686Dh Velocity window - Axis #" (➜ p. 461) and "606Eh, 686Eh Velocity window time - Axis #" (➜ p. 463).

Statusword Bit	Value	Controlword Bit 8 Value	Function
Bit 10	0	0	Target not reached
		1	Axis decelerating

Statusword Bit	Value	Controlword Bit 8 Value	Function
Bit 10	1	0	Target reached
		1	Velocity = 0

Statusword Bit	Value	Function
Bit 12	0	Motor is moving.
Bit 12	1	Motor is at standstill.

Example Sequence of Events

Step	Object Name	Object	Sub-index	User Value
Set operation mode	Modes of operation	"6060h, 6860h Modes of operation - Axis #" (➔ p. 454)	0	0x03h
Set parameters	Profile acceleration	"6083h, 6883h Profile acceleration - Axis #" (➔ p. 475)	0	User specified
	Profile deceleration	"6084h, 6884h Profile deceleration - Axis #" (➔ p. 476)	0	User specified
Ready for switch-on	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x06h
Operation enable	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x0Fh
Send target velocity	Target velocity	"60FFh, 68FFh Target velocity - Axis #" (➔ p. 521)	0	User specified
Halt	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x10Fh
Resume from halt	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x0Fh
Quick stop	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x0Bh
Resume from Quick stop	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x0Fh or 0x06h->0x0Fh
Send target velocity	Target velocity	"60FFh, 68FFh Target velocity - Axis #" (➔ p. 521)	0	User specified

Monitor

Step	Object Name	Object	Sub-index	Value
Read status	Statusword bit 12 (motor moving)	"6041h, 6841h Statusword - Axis #" (➔ p. 450)	0	0 or 1
Read status	Statusword bit 10 (target reached)	"6041h, 6841h Statusword - Axis #" (➔ p. 450)	0	0 or 1
Read velocity actual	Velocity actual value	"606Ch, 686Ch Velocity actual value - Axis #" (➔ p. 460)	0	

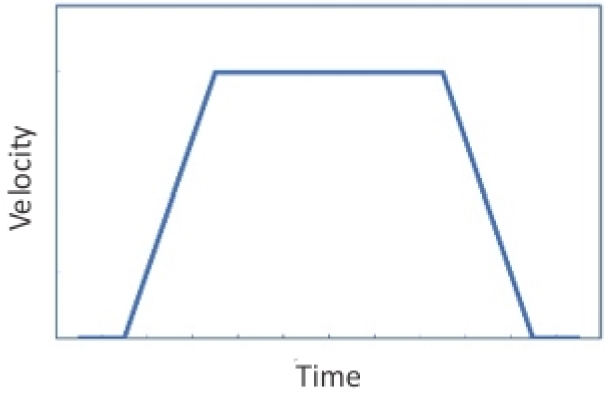
Step	Object Name	Object	Sub-index	Value
Read position actual internal value	Position actual internal value	"6063h, 6863h Position actual internal value - Axis #" (➜ p. 456)	0	
Read position actual value	Position actual value	"6064h, 6864h Position actual value - Axis #" (➜ p. 457)	0	

4.1.3.4.5.4 CANopen Scaling

The motion setpoints and actual values can be scaled using CANopen objects or the associated drive parameters. These include values for position, velocity, acceleration, deceleration and current (torque). See "CANopen Scaling" (➜ p. 146).

Scale factors affect the values of the motion setpoint objects and should be set prior to writing/changing the setpoint objects.

4.1.3.5 Profile Position Mode



Axis	Object	Value
Axis 1	6060h (see "6060h, 6860h Modes of operation - Axis #" on page 454)	1
Axis 2	6860h (see "6060h, 6860h Modes of operation - Axis #" on page 454)	1

Fieldbus

Profile Position Mode is supported by the following fieldbuses:

- CAN bus/CANopen
- EtherCAT/CANopen over EtherCAT (CoE)

4.1.3.5.1.1 Description

Profile Position Mode is a CANopen (DS402) mode of operation used for point to point moves. The CANopen objects define the motion profile like a motion task saved in the drive. However, the profile is not contained in any of the drive’s motion tasks.

4.1.3.5.2.2 Drive Opmode and Command Source

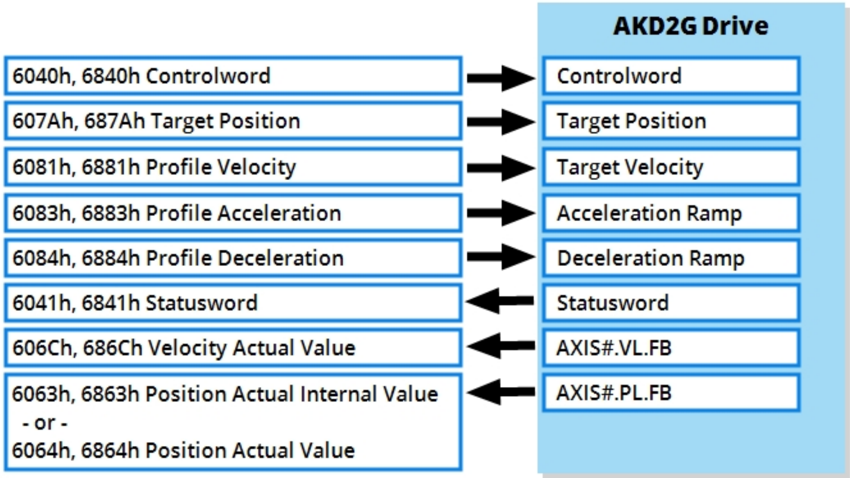
The AKD2G opmode and command source are automatically configured when the mode of operation is set through objects "6060h, 6860h Modes of operation - Axis #" (➜ p. 454).

Drive Command	Value
AXIS#.OPMODE	2 - Position
AXIS#.CMDSOURCE	1 - Fieldbus

Motion Settings:

- Absolute or relative
- Target position or distance
- Profile velocity
- Profile acceleration
- Profile deceleration
- Scaling

4.1.3.5.3.3 Common PDO Data



Essential Objects

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"607Ah, 687Ah Target position - Axis #" (➜ p. 470)	0h	Target position	AXIS#.FBUS.P	Signed32	Read/Write
"6081h, 6881h Profile velocity in pp-mode - Axis #" (➜ p. 474)	0h	Profile velocity	AXIS#.FBUS.V	Unsigned32	Read/Write
"6083h, 6883h Profile acceleration - Axis #" (➜ p. 475)	0h	Profile acceleration	AXIS#.FBUS.ACC	Unsigned32	Read/Write
"6084h, 6884h Profile deceleration - Axis #" (➜ p. 476)	0h	Profile deceleration	AXIS#.FBUS.DEC	Unsigned32	Read/Write
"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0h	Controlword	AXIS#.CANOPEN.CONTROLWORD	Unsigned16	Read/Write

Useful Objects

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"6041h, 6841h Statusword - Axis #" (➜ p. 450)	0h	Statusword	AXIS#.CANOPEN.STATUSWORD	Unsigned16	Read Only
"6063h, 6863h Position actual internal value - Axis #" (➜ p. 456)	0h	Position actual internal value	AXIS#.PL.FB	Signed32	Read Only
"6064h, 6864h Position actual value - Axis #" (➜ p. 457)	0h	Position actual value	AXIS#.PL.FB	Signed32	Read Only
"606Ch, 686Ch Velocity actual value - Axis #" (➜ p. 460)	0h	Velocity actual value	AXIS#.VL.FB	Signed32	Read Only
"605Ah, 685Ah Quick stop option code - Axis #" (➜ p. 453)	0h	Quick stop option code	N/A	Signed16	Read/Write
"5000h, 5100h AXIS#.*" (➜ p. 399)	4h	Axis specific objects	AXIS#.MOTIONSTAT	Unsigned32	Read Only

4.1.3.5.4.4 Motion Functionality

Profile Position Mode follows the CANopen (DS402) State Machine. The drive must be in Operation enable state prior to issuing a start motion command. The profile can be defined while in other states.

The Controlword is used to control the state machine and command motion. See objects "6040h, 6840h Controlword - Axis #" (➜ p. 447) and "6041h, 6841h Statusword - Axis #" (➜ p. 450).

Controlword Bits	Motion Function
Bit 2	Stop motion (Quick stop)
Bit 4	Starts the move
Bit 5	Starts from standstill or starts immediately
Bit 6	Absolute or relative move type

Controlword Bits	Motion Function
Bit 8	Pause/halt
Bit 9	Starts from standstill or blend / on-the-fly move

Controlword Bit 2 (Quick Stop):

- Defined by object "605Ah, 685Ah Quick stop option code - Axis #" (➜ p. 453) where the deceleration ramp is defined by object "6084h, 6884h Profile deceleration - Axis #" (➜ p. 476) or AXIS#.CS.DEC depending on the value of the Quick stop option code
- Sets velocity command = 0 (AXIS#.VL.CMD = 0)
- Does **not** remember previous setpoint
- To resume from Quick stop, step through the state machine

Controlword Bit	Value	Function
Bit 2	0	Stops motion
Bit 2	1	Allows motion

Controlword Bit 4:

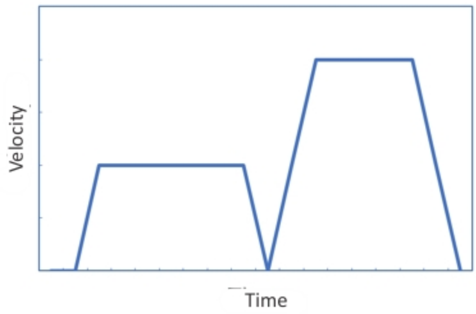
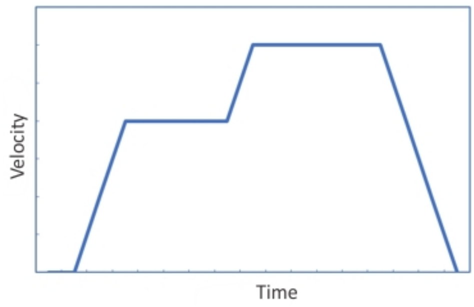
- Starts the move
- Uses the current profile settings when bit 4 is set
- Edge triggered, active high (toggle off and on again to start the next move)
- Can be taken low during the move without stopping the move

Controlword Bit	Value	Function
Bit 4	0	Reset this bit before triggering the next move or restarting a move Does not stop motion
Bit 4	1	Starts the move on rising edge

Controlword Bit 5:

• Sets the behavior of how the profile move is started when bit 4 is set.

Controlword Bit	Value	Function
Bit 5	0	Start after current move completion • Waits for the current move to complete before starting the move • Bit 9 determines whether motion stops between the moves
Bit 5	1	Start immediately • Move will start immediately, causing interruption (termination) of the previous move • Velocity will immediately ramped to the new profile “on the fly” • Motion will not stop if the new move is in the same direction as the current move

Bit 5 = 0	Bit 5 = 1
	

Controlword Bit 6:

- Used to select between absolute and relative move types
- Absolute moves will move the motor to the target position regardless of the current position
- Relative moves will move the motor a specified distance
- Relative move direction is based on the sign of the target position value

Controlword Bit	Value	Function
Bit 6	0	Absolute move
Bit 6	1	Relative move

Controlword Bit 8 (Halt):

- Pauses/halts motion
- Sets velocity command = 0 (AXIS#.VL.CMD = 0)
- Remembers previous setpoint
- When bit 8 is turned off, the move will continue regardless of bit 4
- Deceleration ramp is set by object "6084h, 6884h Profile deceleration - Axis #" (➜ p. 476)

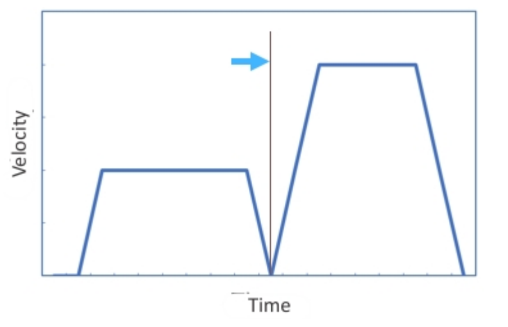
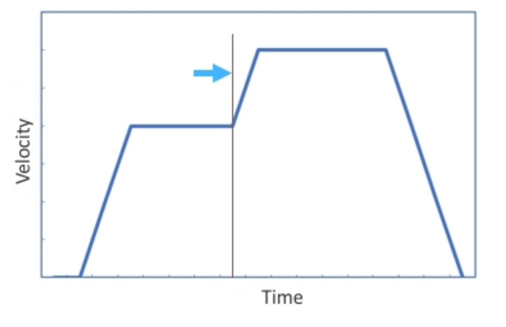
Controlword Bit	Value	Function
Bit 8	0	Allows/resumes motion
Bit 8	1	Pauses motion

Controlword Bit 9:

- Allows blending moves together when setting a new setpoint with bit 4 while one is in progress
- Requires that Bit 5 = 0

Controlword Bit	Value	Function
Bit 9	0	Start from standstill • Waits for previous move to complete before starting the move • Motion must be stopped before starting the move.

Controlword Bit	Value	Function
Bit 9	1	Blends from current move into the next move • Behaves like AXIS#.MT.TRANSITION type 2 blend into acceleration • The in-progress move's velocity is maintained until the target position is reached • Once the target position is reached, velocity will be ramped following the new setpoint's trajectory • If the new trajectory cannot be completed with the specified values (for example: the previous velocity is moving too fast to be able to decelerate to 0 and reach the new target position), the axis will ramp to 0 and trigger fault 6004

Bit 9 = 0	Bit 9 = 1
	

NOTE

If bit 5 (Start immediately) is set, it will override the bit 9 behavior and the new setpoint will start immediately without continuing to its current target.

Status

The Statusword ("6041h, 6841h Statusword - Axis #" (➜ p. 450)) can be read for handshaking purposes. It can indicate a fault or warning condition, status of the power stage, home attained, setpoint acknowledged, target position reached, etc.

Mode-Specific Statusword Bits

Statusword Bits	Status
Bit 10	Target position reached (within AXIS#.SETTLE.P) The behavior can be configured by AXIS#.CANOPEN.TARPOSMODE.
Bit 12	Setpoint acknowledge
Bit 13	Following error

Statusword Bit	Value	Controlword Bit 8 Value	Function
Bit 10	0	0	Target position not reached
		1	Axis decelerating
Bit 10	1	0	Target position reached
		1	Velocity dropped to AXIS#.ZEROV
Bit 12	0		Previous setpoint already processed; waiting for new setpoint.
Bit 12	1		Previous setpoint still in process; setpoint overwriting will be accepted. Bit 12 stays high after the move is complete, as long as Controlword bit 4 is high. Bit 12 turns off when Controlword bit 4 is turned off.
Bit 13	0		No following error.
Bit 13	1		This bit is set when the drive faults with F6001 “following error magnitude.”

Example Sequence of Events

Step	Object Name	Object	Sub-index	User Value
Set operation mode	Modes of operation	"6060h, 6860h Modes of operation - Axis #" (➜ p. 454)	0	0x01h
Set parameters	Target position	"605Ah, 685Ah Quick stop option code - Axis #" (➜ p. 453)	0	User specified
	Profile velocity	"6081h, 6881h Profile velocity in pp-mode - Axis #" (➜ p. 474)	0	User specified
	Profile acceleration	"6083h, 6883h Profile acceleration - Axis #" (➜ p. 475)	0	User specified
	Profile deceleration	"6084h, 6884h Profile deceleration - Axis #" (➜ p. 476)	0	User specified

Step	Object Name	Object	Sub-index	User Value
Ready for switch-on	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x06h
Operation enable	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x0Fh
Option1: Start from Standstill and Absolute Move				
Start from standstill (bit 5=0); absolute move (bit 6=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x0Fh
Start move (bit 4=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x1Fh
Halt (bit 8=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x11Fh
Resume from halt (bit 8=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)		0x1Fh
Quick stop (bit 2=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x1Bh
Resume from Quick stop	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	Step through state machine
Option 2: Start from Standstill and Relative Move				
Start from standstill (bit 5=0); relative move (bit 6=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x4Fh
Start move (bit 4=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x5Fh
Halt (bit 8=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x15Fh
Resume from halt (bit 8=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x5Fh
Quick stop (bit 2=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x5Bh
Resume from Quick stop	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	Step through state machine
Option 3: Start Immediate and Absolute Move				
Start immediate (bit 5=1); absolute move (bit 6=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x2Fh
Start move (bit 4=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x3Fh
Halt (bit 8=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x13F
Resume from halt (bit 8=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x3Fh

Step	Object Name	Object	Sub-index	User Value
Quick stop (bit 2=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x3Bh
Resume from Quick stop	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	Step through state machine
Option 4: Start Immediate and Relative Move				
Start immediate (bit 5=1); relative move (bit 6=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x6Fh
Start move (bit 4=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x7F
Halt (bit 8=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x17F
Resume from halt (bit 8=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x7F
Quick stop (bit 2=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x7B
Resume from Quick stop	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	Step through state machine
Reset Start Move Bit Any Time During or After Move				
Option 1 Start from standstill and absolute move	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x0Fh
Option 2 Start from standstill and relative move	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x4Fh
Option 3 Start immediate and absolute move	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x2Fh
Option 4 Start immediate and relative move	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x6Fh

Monitor

Step	Object Name	Object	Sub-index	Value
Read status	Statusword bit 12 (setpoint acknowledge)	"6041h, 6841h Statusword - Axis #" (➔ p. 450)	0	0 or 1
Read status	Statusword bit 13 (following error)	"6041h, 6841h Statusword - Axis #" (➔ p. 450)	0	0 or 1
Read status	Statusword bit 10 (target reached)	"6041h, 6841h Statusword - Axis #" (➔ p. 450)	0	0 or 1
Read position actual internal value	Position actual internal value	"6063h, 6863h Position actual internal value - Axis #" (➔ p. 456)	0	

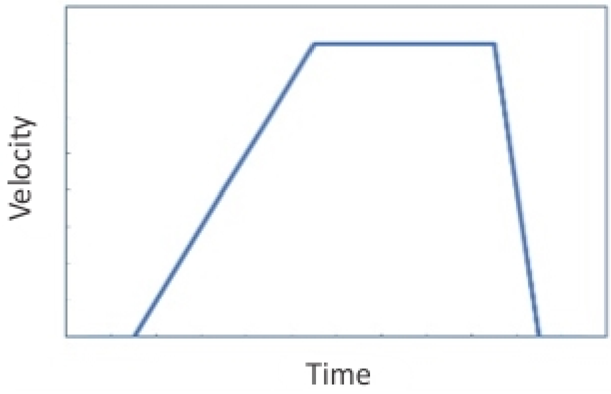
Step	Object Name	Object	Sub-index	Value
Read position actual value	Position actual value	"6064h, 6864h Position actual value - Axis #" (➜ p. 457)	0	

4.1.3.5.5.5 CANopen Scaling

The motion setpoints and actual values can be scaled using CANopen objects or the associated drive parameters. These include values for position, velocity, acceleration, deceleration and current (torque). See "CANopen Scaling" (➜ p. 146) for details.

Scale factors affect the values of the motion setpoint objects and should be set prior to writing/changing the setpoint objects.

4.1.3.6 Homing Mode



Axis	Object	Value
Axis 1	6060h "6060h, 6860h Modes of operation - Axis #" (➜ p. 454)	6
Axis 2	6860h"6060h, 6860h Modes of operation - Axis #" (➜ p. 454)	6

Fieldbus

Homing Mode is supported by the following fieldbuses:

- CAN bus/CANopen
- EtherCAT/CANopen over EtherCAT (CoE)

4.1.3.6.1 Description

Homing Mode is a CANopen (DS402) mode of operation used for moving the motor to a reference position. The CANopen objects define the settings for the homing move. In this mode, homing can be done by the drive using the homing method object. There are various methods of achieving this using limit switches at the ends of travel or a home switch in mid-travel, and most of the methods also use the index pulse or zero mark of the feedback device. There are two speeds: the faster speed is used to find the home switch and the slower speed is used to find the index pulse or zero mark. See Homing.

4.1.3.6.2 Drive Opmode and Command Source

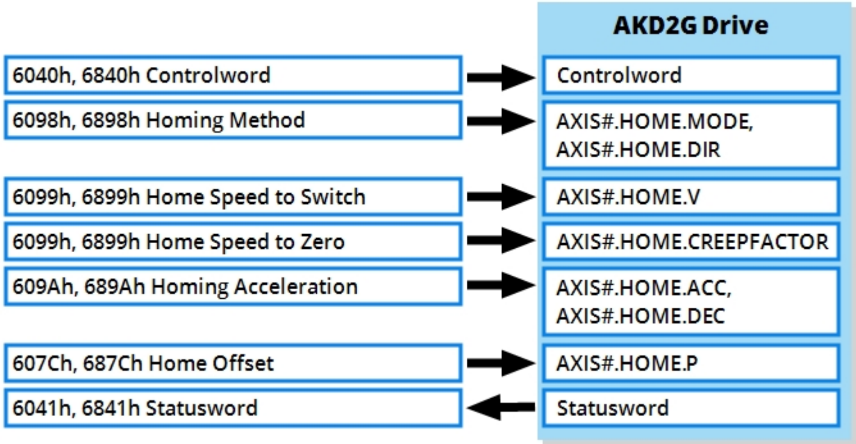
The AKD2G opmode and command source are automatically configured when the Mode of operation is set through objects "6060h, 6860h Modes of operation - Axis #" (➜ p. 454).

Drive Command	Value
AXIS#.OPMODE	2 - Position
AXIS#.CMDSOURCE	1 - Fieldbus

Motion Settings:

- Homing method
- Homing speed
- Homing acceleration and deceleration
- Scaling

4.1.3.6.3 Common PDO Data



Essential Objects

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"6098h, 6898h Homing mode - Axis #" (➜ p. 482)	0h	Homing method	AXIS#.HOME.MODE, AXIS#.HOME.DIR	Signed8	Read/Write
"6099h, 6899h Homing speeds - Axis #" (➜ p. 484)	1h	Homing speed to switch	AXIS#.HOME.V	Unsigned32	Read/Write
"6099h, 6899h Homing speeds - Axis #" (➜ p. 484)	2h	Homing speed to zero	AXIS#.HOME.CREEPFACTOR	Unsigned32	Read/Write
"609Ah, 689Ah Homing acceleration - Axis #" (➜ p. 485)	0h	Homing acceleration	AXIS#.HOME.ACC, AXIS#.HOME.DEC	Unsigned32	Read/Write
"607Ch, 687Ch Home offset - Axis #" (➜ p. 472)	0h	Home offset	AXIS#.HOME.P	Signed32	Read/Write
"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0h	Controlword	AXIS#.CANOPEN.CONTROLWORD	Unsigned16	Read/Write

Useful Objects

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"6041h, 6841h Statusword - Axis #" (➜ p. 450)	0h	Statusword	AXIS#.CANOPEN.STATUSWORD	Unsigned16	Read Only
"6063h, 6863h Position actual internal value - Axis #" (➜ p. 456)	0h	Position actual internal value	AXIS#.PL.FB	Signed32	Read Only
"6064h, 6864h Position actual value - Axis #" (➜ p. 457)	0h	Position actual value	AXIS#.PL.FB	Signed32	Read Only
"606Ch, 686Ch Velocity actual value - Axis #" (➜ p. 460)	0h	Velocity actual value	AXIS#.VL.FB	Signed32	Read Only
"605Ah, 685Ah Quick stop option code - Axis #" (➜ p. 453)	0h	Quick stop option code	N/A	Signed16	Read/Write
"500Ah, 510Ah AXIS#.IL.*" (➜ p. 422)	4h	Axis specific objects	AXIS#.MOTIONSTAT	Unsigned32	Read Only

4.1.3.6.4 Motion Functionality

Homing Mode follows the CANopen (DS402) State Machine. The drive must be in Operation enable state prior to issuing a start motion command. The homing settings can be defined while in other states.

The Controlword is used to control the state machine and command motion. See objects "6040h, 6840h Controlword - Axis #" (➜ p. 447) and "6041h, 6841h Statusword - Axis #" (➜ p. 450).

Controlword Bits	Motion Function
Bit 2	Allow/stop motion (Quick stop)
Bit 6	Start/stop homing procedure
Bit 8	Pause/halt

Controlword Bit 2 (Quick Stop):

- Executed when bit 2 is low (=0)
- Defined by object "605Ah, 685Ah Quick stop option code - Axis #" (➜ p. 453)
- Sets velocity command = 0 (AXIS#.VL.CMD = 0)
- Resumes from Quick stop (bit 2 reset 0->1) and will **not** automatically restart homing
- To resume from Quick stop, step through the state machine

Controlword Bit	Value	Function
Bit 2	0	Stops motion
Bit 2	1	Allows motion

Controlword Bit 4:

- Starts/stops the homing procedure
- Uses the current homing settings when bit 4 is set (=1).
- Level Triggered – stops motion when bit 4 is low (=0), using AXIS#.HOME.DEC (object "609Ah, 689Ah Homing acceleration - Axis #" (➜ p. 485))
- From stop, setting bit 4 high again (0->1) will restart (resume) the homing procedure

Controlword Bit	Value	Function
Bit 4	0	Stops homing procedure
Bit 4	1	Starts homing procedure

Controlword Bit 8:

- Pauses/halts motion when bit 8 =1
- Sets velocity command = 0 (AXIS#.VL.CMD = 0)
- Remembers previous homing settings
- When bit 8 is turned off (=0), homing will continue if bit 4 is still on (=1)
- Deceleration ramp is set by object "609Ah, 689Ah Homing acceleration - Axis #" (➜ p. 485), using the active value when homing was started.

Controlword Bit	Value	Function
Bit 8	0	Allows/resumes homing procedure
Bit 8	1	Pauses homing procedure

Status

The Statusword ("6041h, 6841h Statusword - Axis #" (➜ p. 450)) can be read for handshaking purposes. It can indicate a fault or warning condition, status of the power stage, home attained, setpoint acknowledged, target position reached, etc.

Mode-Specific Statusword Bits

Statusword Bits	Status
Bit 10	Target reached (within AXIS#.SETTLE.P)
Bit 12	Homing attained (home found)
Bit 13	Homing error

Bit 13	Bit 12	Bit 10	Definition
0	0	0	Homing procedure is in progress
0	0	1	Homing procedure is interrupted or not started
0	1	0	Homing is attained but outside target window
0	1	1	Homing procedure completed successfully
1	0	0	Homing error occurred; velocity is not 0
1	0	1	Homing error occurred; velocity is 0 (target reached)
1	1	X	Reserved

4.1.3.6.5 Example Sequence of Events

Step	Object Name	Object	Sub-index	User Value
Set operation mode	Modes of operation	"6060h, 6860h Modes of operation - Axis #" (➔ p. 454)	0	0x06h
Set parameters	Homing method	"6098h, 6898h Homing mode - Axis #" (➔ p. 482)	0	User specified
	Homing speed	"6099h, 6899h Homing speeds - Axis #" (➔ p. 484)	1	User specified
	Homing speed (for index/zero)	"6099h, 6899h Homing speeds - Axis #" (➔ p. 484)	2	User specified
	Homing acceleration	"609Ah, 689Ah Homing acceleration - Axis #" (➔ p. 485)	0	User specified
Ready for switch-on	Controlword	"6060h, 6860h Modes of operation - Axis #" (➔ p. 454)	0	0x06h
Operation enable	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x0Fh
Start homing procedure command (bit 4=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x1Fh
Stop home procedure using start/stop home (bit 4=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x0Fh
Continue home procedure using start/stop home (bit 4=1)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x1Fh
Stop home procedure using halt (bit 8=1) and start/stop (bit 4=1) (homing active)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x11Fh
Continue home procedure using halt (Bit 8=0) and start/stop home (bit 4=1) (homing active)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x01h
Stop homing procedure using quick stop (Bit 2=0)	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x1Bh

Step	Object Name	Object	Sub-index	User Value
Continue homing procedure from quick stop (bit 2=0) by stepping through state machine	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x06->0x0F->0x1F or 0x0F->0x1F (step through state machine)
Monitor home attained	Statusword bit 12	"6041h, 6841h Statusword - Axis #" (➜ p. 450)	0	Wait for bit 12=1 (Home attained)
Reset start home procedure command (bit 4=0) after home attained	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x0Fh

Monitor

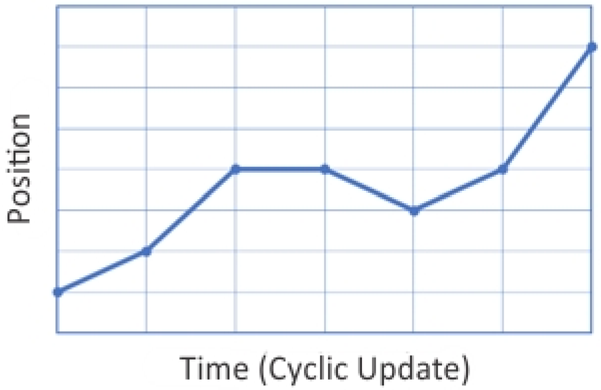
Step	Object Name	Object	Sub-index	Value
Read status	Statusword bit 12 (home attained)	"6041h, 6841h Statusword - Axis #" (➜ p. 450)	0	0 or 1
Read status	Statusword bit 13 (homing error)	"6041h, 6841h Statusword - Axis #" (➜ p. 450)	0	0 or 1
Read status	Statusword bit 10 (target reached)	"6041h, 6841h Statusword - Axis #" (➜ p. 450)	0	0 or 1
Read position actual internal value	Position actual internal value	"6063h, 6863h Position actual internal value - Axis #" (➜ p. 456)	0	
Read position actual value	Position actual value	"6064h, 6864h Position actual value - Axis #" (➜ p. 457)	0	

4.1.3.6.6 CANopen Scaling

The motion setpoints and actual values can be scaled using CANopen objects or the associated drive parameters. These include values for position, velocity, acceleration, deceleration and current (torque). See "CANopen Scaling" (➜ p. 146).

Scale factors affect the values of the motion setpoint objects and should be set prior to writing/changing the setpoint objects.

4.1.3.7 Cyclic Synchronous Position Mode



Axis	Object	Value
Axis 1	6060h "6060h, 6860h Modes of operation - Axis #" (➜ p. 454)	8
Axis 2	6860h "6060h, 6860h Modes of operation - Axis #" (➜ p. 454)	8

Fieldbus

Cyclic Synchronous Position Mode is supported by the following fieldbuses:

- CAN bus/CANopen
- EtherCAT/CANopen over EtherCAT (CoE)

4.1.3.7.1 Description

Cyclic Synchronous Position Mode is a CANopen (DS402) mode of operation used for real-time position moves. The CANopen objects define the settings for this move. With this mode, the trajectory generator is handled in the master controller not in the slave drive. The master sends target position setpoints (absolute position values) to the drive on a regular communication update cycle. The drive uses the previous target and the current target to interpolate the profile necessary for reaching the new target in the required time. Optionally, the master can also provide velocity and torque offset values to the drive as feedforwards for the velocity loop and current loop.

The system must be synchronized for the drive to process the position setpoints at the appropriate time. EtherCAT uses the Distributed Clocks and PLL see "Synchronization" on page 88. CANopen (CAN bus) uses the SYNC Telegram. Please see the corresponding sections of the documentation for explanation of these synchronization methods.

4.1.3.7.2 Drive Opmode and Command Source

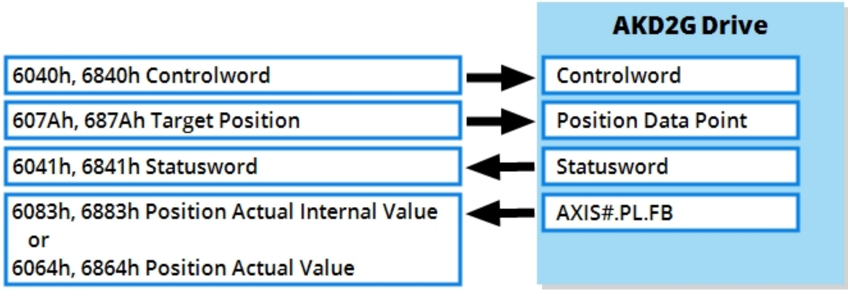
The AKD2G opmode and command source are automatically configured when the Mode of operation is set through objects "6060h, 6860h Modes of operation - Axis #" (➜ p. 454).

Drive Command	Value
AXIS#.OPMODE	2 - Position
AXIS#.CMDSOURCE	1 - Fieldbus

Motion Settings:

- Target position
- Interpolation time period
- Interpolation time index
- Synchronization
- Scaling

4.1.3.7.3 Common PDO Data



Essential Objects

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"607Ah, 687Ah Target position - Axis #" (➔ p. 470)	0h	Target position	AXIS#.FBUS.PL.CMD	Signed8	Read/Write
"60C2h, 68C2h Interpolation time period - Axis #" (➔ p. 496)	1h	Interpolation time period	CANOPEN.SAMPLEPERIOD	Unsigned32	Read/Write
"60C2h, 68C2h Interpolation time period - Axis #" (➔ p. 496)	2h	Interpolation time index	CANOPEN.SAMPLEPERIOD	Unsigned32	Read/Write
"6064h, 6864h Position actual value - Axis #" (➔ p. 457)	0h	Position actual value	AXIS#.PL.FB	Unsigned32	Read/Write
"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0h	Controlword	AXIS#.CANOPEN.CONTROLWORD	Unsigned16	Read/Write

Useful Objects

Index	Sub-index	Object Name	Drive Command	Data Type	Access
"6041h, 6841h Statusword - Axis #" (➔ p. 450)	0h	Statusword	AXIS#.CANOPEN.STATUSWORD	Unsigned16	Read Only
"6063h, 6863h Position actual internal value - Axis #" (➔ p. 456)	0h	Position actual internal value	AXIS#.PL.FB	Signed32	Read Only
"6064h, 6864h Position actual value - Axis #" (➔ p. 457)	0h	Position actual value	AXIS#.PL.FB	Signed32	Read Only
"606Ch, 686Ch Velocity actual value - Axis #" (➔ p. 460)	0h	Velocity actual value	AXIS#.VL.FB	Signed32	Read Only
"60B1h, 68B1h Velocity offset - Axis #" (➔ p. 487)	0h	Velocity offset	AXIS#.FBUS.VL.FF	Signed32	Read/Write
"60B2h, 68B2h Torque offset - Axis #" (➔ p. 488)	0h	Torque offset	AXIS#.FBUS.IL.FF	Signed16	Read/Write
"605Ah, 685Ah Quick stop option code - Axis #" (➔ p. 453)	0h	Quick stop option code	N/A	Signed16	Read/Write
"5000h, 5100h AXIS#.*" (➔ p. 399)	4h	Axis specific objects	AXIS#.MOTIONSTAT	Unsigned32	Read Only

4.1.3.7.4 Motion Functionality

Cyclic Synchronous Position Mode follows the CANopen (DS402) State Machine. The drive must be in Operation enable state to act on the cyclic target position setpoints. Target position setpoints of continuously streamed to the drive each update cycle. If the drive is not operation enabled or is unable to move, then the position error will increase, eventually generating a fault in the drive.

The Controlword is used to control the state machine and command motion. See objects "6040h, 6840h Controlword - Axis #" (➜ p. 447) and "6041h, 6841h Statusword - Axis #" (➜ p. 450).

Controlword Bits	Motion Function
Bit 2	Stop motion (Quick stop)
Bit 8	Not used in Cyclic synchronous position mode (no function)

Controlword Bit 2 (Quick Stop):

- Defined by object "605Ah, 685Ah Quick stop option code - Axis #" (➜ p. 453)
- Sets velocity command = 0 (AXIS#.VL.CMD = 0)
- Does **not** remember previous setpoint
- To resume from Quick stop, step through the state machine

Controlword Bit	Value	Function
Bit 2	0	Stops motion
Bit 2	1	Allows motion

Controlword Bit 8 (Pause/Halt):

- Bit 8 has no function in Cyclic synchronous position mode.
- Pause/Halt is not applicable in Cyclic synchronous position mode since the master controls the position command. To stop or pause motion, the master needs to keep sending the same position value. The drive will follow the position command remaining at standstill.

Status

Statusword ("6041h, 6841h Statusword - Axis #" (➜ p. 450)) can be read for handshaking purposes. It can indicate a fault or warning condition, status of the power stage, home attained, setpoint acknowledged, target position reached, etc.

Mode-Specific Statusword Bits

Statusword Bits	Status
Bit 10	Reserved.
Bit 12	Drive is following the position setpoint.
Bit 13	Following error (fault condition).

Statusword Bit	Value	Function
Bit 12	0	Drive is **not** following the position setpoint.
Bit 12	1	Drive is following the position setpoint (even at standstill).

Statusword Bit	Value	Function
Bit 13	0	No following error.
Bit 13	1	Following error.

Example Sequence of Events

Step	Object Name	Object	Sub-index	User Value
Set operation mode	Modes of operation	"6060h, 6860h Modes of operation - Axis #" (➜ p. 454)	0	0x08h
Set parameters	Max position error	"6065h, 6865h Following error window - Axis #" (➜ p. 458)	0	User specified
	Min position limit	"607Dh, 687Dh Software position limit - Axis #" (➜ p. 473)	1	User specified
	Min position limit	"607Dh, 687Dh Software position limit - Axis #" (➜ p. 473)	2	User specified
Ready for switch-on	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x06h
Operation enable	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x0Fh
Send target position setpoints	Target position	"607Ah, 687Ah Target position - Axis #" (➜ p. 470)	0	Setpoints based on motion profile
Quick stop bit 2=0	Controlword	"6040h, 6840h Controlword - Axis #" (➜ p. 447)	0	0x0Bh

Step	Object Name	Object	Sub-index	User Value
Resume from quick stop	Controlword	"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0	0x06h->0x0Fh (Step Through state machine)

Monitor

Step	Object Name	Object	Sub-index	Value
Read status	Statusword bit 12 (following setpoint)	"6041h, 6841h Statusword - Axis #" (➔ p. 450)	0	0 or 1
Read status	Statusword bit 13 (following error)	"6041h, 6841h Statusword - Axis #" (➔ p. 450)	0	0 or 1
Read position actual internal value	Position actual internal value	"6063h, 6863h Position actual internal value - Axis #" (➔ p. 456)	0	
Read position actual value	Position actual value	"6064h, 6864h Position actual value - Axis #" (➔ p. 457)	0	

4.1.3.7.5.1 CANopen Scaling

The motion setpoints and actual values can be scaled using CANopen objects or the associated drive parameters. These include values for position, velocity, acceleration, deceleration and current (torque). See "CANopen Scaling" (➔ p. 146).

Scale factors affect the values of the motion setpoint objects and should be set prior to writing/changing the setpoint objects.

4.1.4 CANopen Scaling

Scaling of position, velocity, and acceleration values are calculated differently depending on the setting of CANOPEN.WORKBENCHUNITS. When this is set to 0 (default), the CANopen scaling factors are used as 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 to leave CANOPEN.WORKBENCHUNITS at 0 to use CANopen scaling. When set to 1, the values returned by fieldbus objects may or may not be scaled 1000:1 to improve resolution. See CANopen Object Table for which values are scaled 1:1 vs 1000:1 in WorkBench.

This topic has the following sections:

4.1.4.1 Scaling and Various Objects

4.1.4.1.1 CANopen Position Scaling using 6091h/6092h

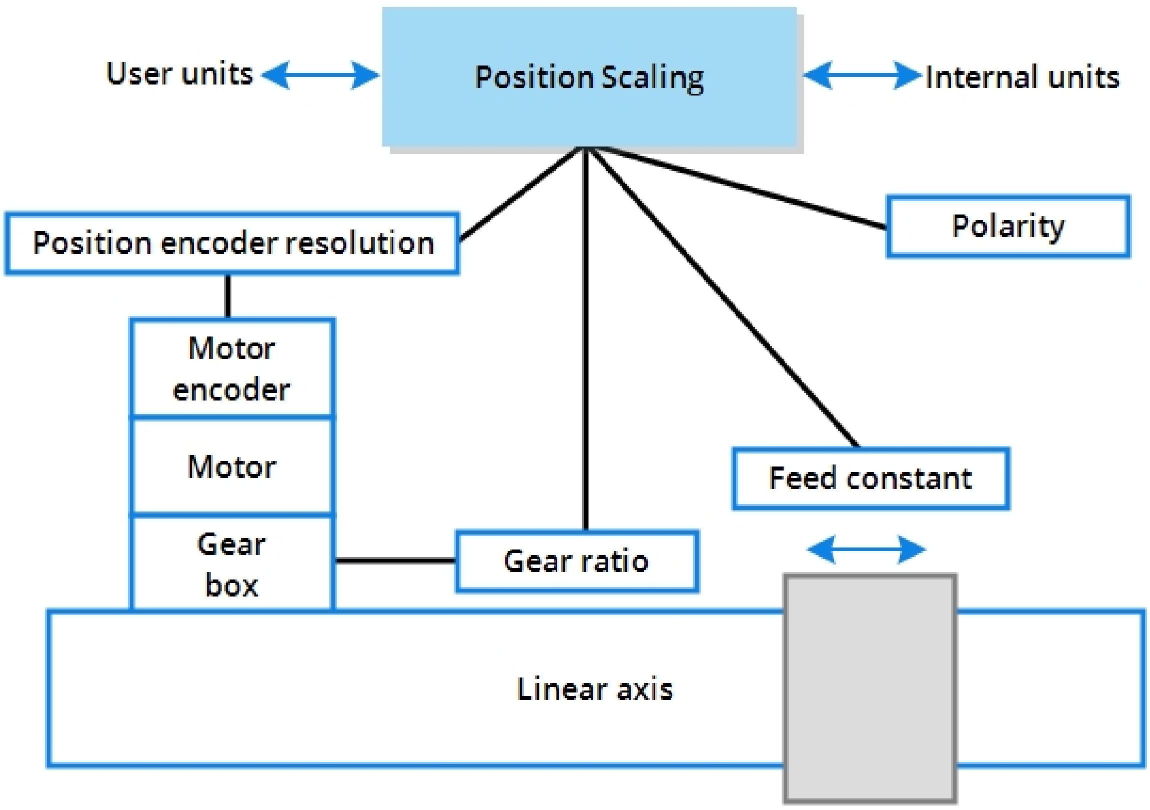


Figure 2-1: CANopen position scaling concept diagram

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

$$position\ value = \frac{(position\ internal\ value\ *\ feed\ constant)}{(position\ encoder\ resolution\ *\ gear\ ratio)}$$

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:

$$position\ value = \frac{(position\ value * position\ encoder\ resolution\ *\ gear\ ratio)}{feed\ constant}$$

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.

4.1.4.2 6091h – 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		
"6091h, 6891h Gear ratio - Axis #" (➔ p. 478)	0	Unsigned8	Highest sub-index supported (always 3)	
	1	Unsigned32	Motor revolutions - Axis 1	AXIS#.CANOPEN.GEARPRIMARY.MOTORREV
	2	Unsigned32	Shaft revolutions - Axis 1	AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV

4.1.4.3 6092h – 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		
"6092h, 6892h Feed constant - Axis #" (➔ p. 479)	0	Unsigned8	Highest sub-index supported (always 3)	
	1	Unsigned32	Feed - Axis 1	AXIS#.CANOPEN.FCPRIMARY.FEED
	2	Unsigned32	Shaft revolutions - Axis 1	AXIS#.CANOPEN.FCPRIMARY.SHAFTREV

4.1.4.4 Position Counts (actual position internal 6063h)

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 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)
```

4.1.4.5 CANopen Velocity Scaling Using 6096h

All velocity values over CANopen use the scaling defined by object "6096h, 6896h Velocity factor - Axis #" (➔ p. 480), velocity factor. Velocity values are presented as position units/s where position units are defined by the objects above ("6091h, 6891h Gear ratio - Axis #" (➔ p. 478)/"6092h, 6892h Feed constant - Axis #" (➔ p. 479)).

$$Velocity\ factor = Velocity\ Numerator\ /\ Velocity\ Denominator$$

$$Velocity\ value = \frac{(velocity\ internal\ value * feed\ constant)}{(encoder\ resolution\ *\ gear\ ratio)\ velocity\ factor}$$

or:

$$Velocity\ value = (position\ value/sec) * velocity\ factor$$

Index	Sub-Index	Data Type	
"6096h, 6896h Velocity factor - Axis #" (➔ p. 480)	0	Unsigned8	Highest sub-index supported (always 3)
	1	Unassigned32	Velocity Factor Numerator - Axis 1
	2	Unassigned32	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.

4.1.4.6 CANopen Acceleration Scaling Using 6097h

All acceleration values over CANopen use the scaling factor defined by object "6097h, 6897h Acceleration factor - Axis #" (➔ p. 481), acceleration factor. Acceleration values are presented as velocity units/s, where velocity units are defined by the objects above ("6091h, 6891h Gear ratio - Axis #" (➔ p. 478)/"6092h, 6892h Feed constant - Axis #" (➔ p. 479)/"6096h, 6896h Velocity factor - Axis #" (➔ p. 480)).

$$acceleration\ value = \frac{velocity\ value}{s} acceleration\ factor$$

$$acceleration\ factor\ = \frac{acceleration\ factor\ numerator}{acceleration\ factor\ denominator}$$

Index	Sub-Index	Data Type		
"6097h, 6897h Acceleration factor - Axis #" (➔ p. 481)	1	Unsigned32	Acceleration Factor Numerator – Axis 1	AXIS#.CANOPEN.ACCSCALENUM
	2	Unsigned32	Acceleration Factor Denominator – Axis 1	AXIS#.CANOPEN.ACCSCALEDENOM

4.1.4.7 CANopen Scaling Examples

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 factor numerator)
0x6096S2 = 1 (velocity factor denominator)
```

To give a target position of 180 degrees, one would command object "607Ah, 687Ah Target position - Axis #" (➜ p. 470) 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, command object "60FFh, 68FFh Target velocity - Axis #" (➜ p. 521) 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 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 factor numerator) - seconds in a minute to con-
vert counts per second to counts per minute
0x6096S2 = 36000 (velocity factor denominator) - counts per rev to con-
vert counts per second to revs per second
```

To give a target position of 180 degrees, command object "607Ah, 687Ah Target position - Axis #" (➜ p. 470) 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, command object "60FFh, 68FFh Target velocity - Axis #" (➜ p. 521) 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 the counts per second value needed. Then apply the velocity factor to the counts per second value which gives the RPM.

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

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, command object "607Ah, 687Ah Target position - Axis #" (➜ p. 470) to 180.

To give a target velocity of 100rpm, command object "60FFh, 68FFh Target velocity - Axis #" (➜ p. 521) to 100.

4.1.4.8 Position Scaling

4.1.4.8.1 Quick Setup

Use objects "6091h, 6891h Gear ratio - Axis #" (➜ p. 478) and "6092h, 6892h Feed constant - Axis #" (➜ p. 479) to set the position scaling to match the mechanical system.

Object 6091h Sub-index 1 = gearbox input revolutions (motor revs)
Object 6091h Sub-index 2 = gearbox output shaft revolutions
Object 6092h Sub-index 1 = number of units per shaft rev
Object 6092h Sub-index 2 = number of shaft revs

Alternatively, these values can be set in the AKD2G Drive.

AXIS#.CANOPEN.GEARPRIMARY.MOTORREV = gearbox input revolutions (motor revs)
AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV = gearbox output shaft revolutions
AXIS#.CANOPEN.FCPRIMARY.FEED = number of units per shaft rev
AXIS#.CANOPEN.FCPRIMARY.SHAFTREV = number of shaft revs

Mechanics	6091h Sub 1	6091h Sub 2	6092h Sub 1	6092h Sub 2
	Gear Ratio-Motor Rev	Gear Ratio-Shaft Rev	Feed Con-stant-Feed	Feed Constant-Shaft Rev
5:1 gearbox, 10mm/rev ball screw, in mm	5	1	10	1
15:1 gearbox, 5mm/rev ball screw, in microns	15	1	5000	1
2.5:1 timing belt, 8 rev/in ball screw, in 1/1000 inch	5	2	1000	8
17:1 gearbox, 4.532 inch/rev conveyor, in 1/1000 inch	17	1	4532	1
3:1 gearbox, 35.4 mm/rev conveyor, in mm	3	1	354	10
50:1 gearbox, rotary table, in degrees	50	1	360	1
Direct drive in 1/100 degrees	1	1	36000	1
Generic units, 65536 per rev	1	1	65536	1

4.1.4.8.2 Detailed Explanation

4.1.4.8.3.1 General Formulas

Given	Convert to
Motor/Drive required value (physical units)	Command value in master (fieldbus units)
Feedback value in master (fieldbus units)	Motor/Drive actual value (physical units)

Setpoint: Calculate the position command in the master given a required motor position setpoint
$fieldbus\ position = physical\ position * \left[\frac{feed\ constant}{encoder\ resolution * gear\ ratio}\right]$
Object 6064h: Calculate the motor feedback position given a feedback position value in the master
$physical\ position = fieldbus\ position * \left[\frac{encoder\ resolution * gear\ ratio}{feed\ constant}\right]$
Object 6063h: Calculate the motor feedback position given a feedback position value in the master
$physical\ position\ (revs) = \frac{fieldbus\ position\ (counts)}{2^{AXIS\#.CANOPEN.PSCALE}\left(\frac{counts}{rev}\right)}$

4.1.4.8.4.2 Dual Axis

As with other CAN objects corresponding to axis-specific commands in a dual axis drive, objects 60xxh are for Axis 1 and objects 68xxh are for Axis 2. The formulas below are shown for Axis 1. Use objects 68xxh for Axis 2.

4.1.4.8.5.3 Feed Constant

The Feed Constant sets the position resolution in the fieldbus. The *feed* specifies the number of counts and the *driving shaft revolutions* specifies the number of revs. The units are counts/rev. The Feed Constant can be any arbitrary value. It does not need to be associated with any physical units or scaling. The master controller can be programmed in 65536 counts/rev or 10000 counts/rev, etc. It is purely arbitrary.

$$feed\ constant = \frac{feed}{driving\ shaft\ revolutions}$$

$$feed\ constant = \frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV} = \frac{6092h\ Sub\ 1}{6092h\ Sub\ 2}$$

4.1.4.8.6.4 Encoder Resolution

Position encoder resolution used in these calculations is always 2^32 counts/revolution for the internal AKD2G position values regardless of the actual feedback resolution.

$$encoder\ resolution = 2^{32}\ counts/rev$$

4.1.4.8.7.5 Gear Ratio

The Gear Ratio is a position ratio that can be used to scale the fieldbus position resolution. It can be used to account for a physical gear ratio but it is not necessarily related to physical mechanics. It can be arbitrary. It can be set to any value regardless of the system mechanics.

$$gear\ ratio = \frac{motor\ shaft\ revolutions}{driving\ shaft\ revolutions}$$

$$gear\ ratio = \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV} = \frac{6091h\ sub\ 1}{6091h\ sub\ 2}$$

4.1.4.8.8.6 Complete Formulas

Convert to fieldbus units
$fieldbus\ position = physical\ position * \left[\frac{\frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV}}{2^{3}2 * \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV}}\right]$
$fieldbus\ position = physical\ position * \left[\frac{\frac{6092h\ sub\ 1}{6092h\ sub\ 2}}{2^{3}2 * \frac{6091\ sub\ 1}{6091\ sub\ 2}}\right]$
Convert to physical units
$physical\ position = fieldbus\ position * \left[\frac{2^{3}2 * \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV}}{\frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV}}\right]$
$physical\ position = fieldbus\ position * \left[\frac{2^{32} * \frac{6091\ sub\ 1}{6091\ sub\ 2}}{\frac{6092h\ sub\ 1}{6092h\ sub\ 2}}\right]$

4.1.4.8.9.7 Real-World Units

Fieldbus position is always in units of *counts*. All position values in the formulas must be in units of counts, converting between fieldbus position (counts) and physical position (counts).

A physical position scale of 2^32 physical counts/rev is used in the conversion between counts and real-world units.

Physical position can be converted to/from any physical units including:

- inches
- mm
- degrees

Units	Conversion from real-world units to counts for physical position "X"
inches	$physical\ position\ (counts) = X\ inches * \left(\frac{2^{32} counts}{rev}\right) * \left(Y \frac{revs}{inch}\right)$
mm	$physical\ position\ (counts) = X\ mm * \left(\frac{\frac{2^{32} counts}{rev}}{Y \frac{mm}{rev}}\right)$
degrees	$physical\ position\ (counts) = X\ deg * \left(\frac{\frac{2^{32} counts}{rev}}{360 \frac{deg}{rev}}\right)$

Example 1

- Desired Target Position = 180 degrees
- Fieldbus Position units in counts based on 65536 counts/rev

Values assumed:

Object	Sub-index	Drive Command	Value
"6092h, 6892h Feed constant - Axis #" (➜ p. 479)	1	AXIS#.CANOPEN.FCPRIMARY.FEED	65536
"6092h, 6892h Feed constant - Axis #" (➜ p. 479)	2	AXIS#.CANOPEN.FCPRIMARY.SHAFTREV	1
"6091h, 6891h Gear ratio - Axis #" (➜ p. 478)	1	AXIS#.CANOPEN.GEARPRIMARY.MOTORREV	1
"6091h, 6891h Gear ratio - Axis #" (➜ p. 478)	2	AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV	1

Formula for physical position in degrees; feed constant = 65536
$fieldbus\ position\ (counts) = physical\ position\ (deg) * \left(\frac{65536}{360}\right)$

Derivation:

Convert position from desired real-world units to counts based on 2^32 physical counts per rev.

$$physical\ position\ (counts) = 180\ deg * \frac{\frac{2^{32} counts}{rev}}{360 \frac{deg}{rev}}$$

Convert from physical units to fieldbus units.

$$fieldbus\ position = physical\ position * \left[\frac{\frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV}}{2^{32} * \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV}} \right]$$

$$fieldbus\ position = physical\ position\ (counts) * \left[\frac{\frac{65536\ counts}{1\ rev} * \frac{1}{1}}{2^{32} counts/rev * \frac{1\ rev}{1\ rev}} \right]$$

$$fieldbus\ position = physical\ position\ (counts) * \left[\frac{65536\ counts/rev}{2^{32} counts/rev} \right]$$

Substituting physical position (counts):

$$fieldbus\ position = 180\ deg * \frac{\frac{2^{32} counts}{rev}}{360 \frac{deg}{rev}} * \left[\frac{65536\ counts/rev}{2^{32} counts/rev} \right]$$

$$fieldbus\ position = 180\ deg * \left[\frac{65536 \frac{counts}{rev}}{360 \frac{deg}{rev}} \right]$$

$$fieldbus\ position = 32768\ counts$$

This means a position command of 32768 sent over the fieldbus will command a target position of 180 degrees.

Example 2

- Fieldbus Position units in counts equivalent to hundredths of a degree (36,000 increments per rev)
- Desired Target Position = 180 degrees

Values assumed:

Object	Sub-index	Drive Command	Value
"6092h, 6892h Feed constant - Axis #" (➔ p. 479)	1	AXIS#.CANOPEN.FCPRIMARY.FEED	36000
"6092h, 6892h Feed constant - Axis #" (➔ p. 479)	2	AXIS#.CANOPEN.FCPRIMARY.SHAFTREV	1
"6091h, 6891h Gear ratio - Axis #" (➔ p. 478)	1	AXIS#.CANOPEN.GEARPRIMARY.MOTORREV	1
"6091h, 6891h Gear ratio - Axis #" (➔ p. 478)	2	AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV	1

Formula for physical position in degrees; feed constant = 36000 counts/rev
$fieldbus\ position\ (counts) = physical\ Position\ (deg) * 100$

Derivation:

Convert position from desired real-world units to counts, based on 2^32 physical counts per rev.

$$physical\ position\ \ (counts) = 180\ deg * \frac{\frac{2^{32} counts}{rev}}{360 \frac{deg}{rev}}$$

Convert from physical units to fieldbus units.

$$fieldbus\ position = physical\ position * \left[\frac{\frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV}}{2^{32} * \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV}} \right]$$

$$fieldbus\ position = physical\ position\ (counts) * \left[\frac{\frac{36000\ counts}{1\ rev}}{2^{32} counts/rev * \frac{1\ rev}{1\ rev}} \right]$$

$$fieldbus\ position = physical\ position\ (counts) * \left[\frac{36000\ counts/rev}{2^{32} counts/rev} \right]$$

$$fieldbus\ position = 180\ deg * \frac{\frac{2^{32} counts}{rev}}{360\ * \frac{deg}{rev}} * \left[\frac{36000\ counts/rev}{2^{32} counts/rev} \right]$$

$$fieldbus\ position = 180\ deg * 100\ (counts/\,\mathrm{deg})$$

$$fieldbus\ position = 18000\ (counts)$$

Example 3

- Ball screw lead = 2 mm/rev
- Gearbox ratio = 5:1
- Desired Target Position = 25000 microns
- Fieldbus Position units in counts equivalent to microns

Values assumed:

Object	Sub-index	Drive Command	Value
"6092h, 6892h Feed constant - Axis #" (➔ p. 479)	1	AXIS#.CANOPEN.FCPRIMARY.FEED	2000
"6092h, 6892h Feed constant - Axis #" (➔ p. 479)	2	AXIS#.CANOPEN.FCPRIMARY.SHAFTREV	1
"6091h, 6891h Gear ratio - Axis #" (➔ p. 478)	1	AXIS#.CANOPEN.GEARPRIMARY.MOTORREV	5

Object	Sub-index	Drive Command	Value
"6091h, 6891h Gear ratio - Axis #" (➜ p. 478)	2	AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV	1

Formula for physical position in microns; feed constant = 2000 counts/rev; 5:1 gear ratio
$fieldbus\ position\ \ (counts) = physical\ position\ \ (microns)$

Derivation:

Convert position from desired real-world units to counts based on 2^32 physical counts per rev.

$$physical\ position\ \ (counts) = 25\ mm * \frac{\frac{2^{32} counts}{rev}}{2\frac{mm}{rev}} * 5$$

Convert from physical units to fieldbus units.

$$fieldbus\ position = physical\ position * \left[\frac{\frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV}}{2^{32} * \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV}}\right]$$

$$fieldbus\ position = physical\ position\ (counts) * \left[\frac{\frac{2000\ counts}{1\ rev}}{2^{32} counts/rev * \frac{5\ rev}{1\ rev}}\right]$$

$$fieldbus\ position = physical\ position\ (counts) * \left[\frac{2000\ counts/rev}{\frac{2^{32} counts}{rev} * 5}\right]$$

$$fieldbus\ position = 25\ mm * \frac{\frac{2^{32} counts}{rev}}{2\frac{mm}{rev}} * 5 * \left[\frac{2000\ counts/rev}{\frac{2^{32} counts}{rev} * 5}\right]$$

$$fieldbus\ position = 25\ mm * 1000\ (counts/mm)$$

$$fieldbus\ position = 25000\ (counts)$$

Object 6063h Position Actual Internal Value:

Object "6063h, 6863h Position actual internal value - Axis #" (➜ p. 456) value is based on 1 rev = 2^ (AXIS#.CANOPEN.PSCALE). (Not taking into account a physical gear ratio.)

$$physical\ position\ \ (revs) = \frac{fieldbus\ position\ (counts)}{2^{AXIS\#.CANOPEN.PSCALE}\left(\frac{counts}{rev}\right)}$$

4.1.4.9 Object 6064h Position Actual Value

Object "6064h, 6864h Position actual value - Axis #" (➜ p. 457) value is based on DS402 feed constant, gear ratio and encoder resolution.

$$physical\ position = fieldbus\ position * \left[\frac{2^{3}2 * \dfrac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV}}{\dfrac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV}} \right]$$

4.1.4.9.1.1 Object 60E4h (FB#.P)

Each subindex (1 to 5) of object "60E4h, 68E4h Additional position actual value - Axis #" (➜ p. 509) corresponds to the position value (FB#.P) of each feedback (1 to 5). These can be scaled independently using the following objects or commands. They are independent from the scaling of the target setpoints and primary feedback (AXIS#.PL.FB).

Object "60E4h, 68E4h Additional position actual value - Axis #" (➜ p. 509):

Sub-index	Command	Description
1	FB1.P	Additional Position Actual Value 1
2	FB2.P	Additional Position Actual Value 2
3	FB3.P	Additional Position Actual Value 3
4	FB4.P	Additional Position Actual Value 4
5	FB5.P	Additional Position Actual Value 5

Object "60E8h, 68E8h Additional gear ratio - motor revolutions - Axis #" (➜ p. 510):

Sub-index	Command	Description
1	AXIS#.CANOPEN.GEAR1.MOTORREV	Additional Gear Ratio Motor Revolutions 1
2	AXIS#.CANOPEN.GEAR2.MOTORREV	Additional Gear Ratio Motor Revolutions 2
3	AXIS#.CANOPEN.GEAR3.MOTORREV	Additional Gear Ratio Motor Revolutions 3
4	AXIS#.CANOPEN.GEAR4.MOTORREV	Additional Gear Ratio Motor Revolutions 4
5	AXIS#.CANOPEN.GEAR5.MOTORREV	Additional Gear Ratio Motor Revolutions 5

Object "60E9h, 68E9h Additional feed constant - feed - Axis #" (➜ p. 512):

Sub-index	Command	Description
1	AXIS#.CANOPEN.FC1.FEED	Additional Feed Constant - Feed 1
2	AXIS#.CANOPEN.FC2.FEED	Additional Feed Constant - Feed 2
3	AXIS#.CANOPEN.FC3.FEED	Additional Feed Constant - Feed 3
4	AXIS#.CANOPEN.FC4.FEED	Additional Feed Constant - Feed 4
5	AXIS#.CANOPEN.FC5.FEED	Additional Feed Constant - Feed 5

Object "60EDh, 68EDh Additional gear ratio - shaft revolutions - Axis #" (➜ p. 514):

Sub-index	Command	Description
1	AXIS#.CANOPEN.GEAR1.SHAFTREV	Additional Gear Ratio Shaft Revolutions 1
2	AXIS#.CANOPEN.GEAR2.SHAFTREV	Additional Gear Ratio Shaft Revolutions 2
3	AXIS#.CANOPEN.GEAR3.SHAFTREV	Additional Gear Ratio Shaft Revolutions 3
4	AXIS#.CANOPEN.GEAR4.SHAFTREV	Additional Gear Ratio Shaft Revolutions 4
5	AXIS#.CANOPEN.GEAR5.SHAFTREV	Additional Gear Ratio Shaft Revolutions 5

Object "60EEh, 68EEh Additional feed constant - shaft revolutions - Axis #" (➜ p. 516):

Sub-index	Command	Description
1	AXIS#.CANOPEN.FC1.SHAFTREV	Additional Feed Constant - Shaft Revolutions 1
2	AXIS#.CANOPEN.FC2.SHAFTREV	Additional Feed Constant - Shaft Revolutions 2
3	AXIS#.CANOPEN.FC3.SHAFTREV	Additional Feed Constant - Shaft Revolutions 3
4	AXIS#.CANOPEN.FC4.SHAFTREV	Additional Feed Constant - Shaft Revolutions 4
5	AXIS#.CANOPEN.FC5.SHAFTREV	Additional Feed Constant - Shaft Revolutions 5

4.1.4.9.2.2 Complete Formulas

Convert to fieldbus units for x = 1 to 5
$60E4\ sub\ x = FBx.P * \left[\dfrac{\dfrac{AXIS\#.CANOPEN.FCx.FEED}{AXIS\#.CANOPEN.FCx.SHAFTREV}}{2^32 * \dfrac{AXIS\#.CANOPEN.GEARx.MOTORREV}{AXIS\#.CANOPEN.GEARx.SHAFTREV}} \right]$
$60E4\ sub\ x = FBx.P * \left[\dfrac{\dfrac{60E9h\ sub\ x}{60EEh\ sub\ x}}{2^32 * \dfrac{60E8\ sub\ x}{60ED\ sub\ x}} \right]$
Convert to physical units for x = 1 to 5
$FBx.P = 60E4\ sub\ x * \left[\dfrac{2^32 * \dfrac{AXIS\#.CANOPEN.GEARx.MOTORREV}{AXIS\#.CANOPEN.GEARx.SHAFTREV}}{\dfrac{AXIS\#.CANOPEN.FCx.FEED}{AXIS\#.CANOPEN.FCx.SHAFTREV}} \right]$
$FBx.P = 60E4\ sub\ x * \left[\dfrac{2^32 * \dfrac{60E8\ sub\ x}{60ED\ sub\ x}}{\dfrac{60E9h\ sub\ x}{60EEh\ sub\ x}} \right]$

4.1.4.10 Velocity Scaling

4.1.4.10.1 Quick Setup

Use objects "6091h, 6891h Gear ratio - Axis #" (➜ p. 478) and "6092h, 6892h Feed constant - Axis #" (➜ p. 479) to set the position scaling to match the mechanical system.

Use object "6096h, 6896h Velocity factor - Axis #" (➜ p. 480) to set the velocity factor.

- Object 6091h Sub-index 1 = gearbox input revolutions (motor revs)
- Object 6091h Sub-index 2 = gearbox output shaft revolutions
- Object 6092h Sub-index 1 = number of units per shaft rev
- Object 6092h Sub-index 2 = number of shaft revs
- Object 6096h Sub-index 1 = velocity factor numerator
- Object 6096h Sub-index 2 = velocity factor denominator

Alternatively, these values can be set in the AKD2G drive.

- AXIS#.CANOPEN.GEARPRIMARY.MOTORREV = gearbox input revolutions (motor revs)
- AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV = gearbox output shaft revolutions
- AXIS#.CANOPEN.FCPRIMARY.FEED = number of units per shaft rev
- AXIS#.CANOPEN.FCPRIMARY.SHAFTREV = number of shaft revs
- AXIS#.CANOPEN.VELSCALENUM = velocity factor numerator
- AXIS#.CANOPEN.VELSCALEDENOM = velocity factor denominator

Velocity Unit	6096h Sub 1	6096h Sub 2
Position unit/second	1	1
Position unit/minute	60	1
RPS (gearbox output)	Feed Constant denominator	Feed Constant numerator
RPM (gearbox output)	60 * Feed Constant denominator	Feed Constant numerator
RPS (motor shaft)	Gear Ratio numerator/Feed Constant denominator	Feed Constant numerator/Gear Ratio denominator
RPM (motor shaft)	60 * Gear Ratio numerator/Feed Constant denominator	Feed Constant numerator/Gear Ratio denominator

NOTE

Velocity units are for the output shaft of the gearbox. For motor shaft rpm or rps, set the velocity factor to account for the gear ratio.

Comparison of velocity factors for different velocity units:

Mechanics	6091h Sub 1	6091h Sub 2	6092h Sub 1	6092h Sub 2	6096h Sub 1	6096h Sub 2
	Gear Ratio-Motor Rev	Gear Ratio-Shaft Rev	Feed Constant-Feed	Feed Constant-Shaft Rev	Velocity Factor Numerator	Velocity Factor Denom-inator
15:1 gearbox, 5mm/rev ball screw, in microns and microns/s	15	1	5000	1	1	1
15:1 gearbox, 5mm/rev ball screw, in microns and microns/min	15	1	5000	1	60	1
15:1 gearbox, 5mm/rev ball screw, in microns and mm/s	15	1	5000	1	1	1000 (microns/mm)
15:1 gearbox, 5mm/rev ball screw, in microns and mm/min	15	1	5000	1	60	1000 (microns/mm)
15:1 gearbox, 5mm/rev ball screw, in microns and rps (motor shaft)	15	1	5000	1	15	5000
15:1 gearbox, 5mm/rev ball screw, in microns and rpm (motor shaft)	15	1	5000	1	60*15=900	5000

Other examples:

Mechanics	6091h Sub 1	6091h Sub 2	6092h Sub 1	6092h Sub 2	6096h Sub 1	6096h Sub 2
	Gear Ratio-Motor Rev	Gear Ratio-Shaft Rev	Feed Constant-Feed	Feed Constant-Shaft Rev	Velocity Factor Numerator	Velocity Factor Denom-inator
5:1 gearbox, 10mm/rev ball screw, in mm and mm/s	5	1	10	1	1	1
15:1 gearbox, 5mm/rev ball screw, in microns and rps (motor shaft)	15	1	5000	1	15	5000
2.5:1 timing belt, 8 rev/in ball screw, in 1/1000 inch and rpm (motor shaft)	5	2	1000	8	60*5=300	125*2=250

Mechanics	6091h Sub 1	6091h Sub 2	6092h Sub 1	6092h Sub 2	6096h Sub 1	6096h Sub 2
	Gear Ratio-Motor Rev	Gear Ratio-Shaft Rev	Feed Constant-Feed	Feed Constant-Shaft Rev	Velocity Factor Numerator	Velocity Factor Denominator
17:1 gearbox, 4.532 inch/rev conveyor, in 1/1000 inch and feed/min	17	1	4532	1	60	1
3:1 gearbox, 35.4 mm/rev conveyor, in mm and mm/s	3	1	354	10	1	1
50:1 gearbox, rotary table, in degrees and deg/min (output)	50	1	360	1	60	1
Direct drive, in 1/100 degrees and deg/s	1	1	36000	1	1	100
Generic units, 65536 per rev and rpm	1	1	65536	1	60	65536

4.1.4.10.2 General Formulas

Given	Convert to
Motor/Drive required value (physical units)	Command value in master (fieldbus units)
Feedback value in master (fieldbus units)	Motor/Drive actual value (physical units)

Calculate the velocity command in the master given a required motor velocity

$$fieldbus\ velocity = physical\ velocity * \left[\frac{feed\ constant * velocity\ factor}{encoder\ resolution * gear\ ratio}\right]$$

Calculate the motor velocity given a feedback velocity value in the master

$$physical\ velocity = fieldbus\ velocity * \left[\frac{encoder\ resolution * gear\ ratio}{feed\ constant * velocity\ factor}\right]$$

4.1.4.10.3.1 Dual Axis

As with other CAN objects corresponding to axis-specific commands in a dual axis drive, objects 60xxh are for Axis 1 and objects 68xxh are for Axis 2. The formulas below are shown for Axis 1. Use objects 68xxh for Axis 2.

4.1.4.10.4.2 Feed Constant

The Feed Constant sets the position resolution in the fieldbus. The *feed* specifies the number of counts and *driving shaft revolutions* specifies the number of revs. The units are counts/rev. The Feed Constant can be any arbitrary value. It does not need to be associated with any physical units or scaling. The master controller can be programmed in 65536 counts/rev or 10000 counts/rev, etc. It is purely arbitrary.

$$feed\ constant = \frac{feed}{driving\ shaft\ revolutions}$$

$$feed\ constant = \frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV} = \frac{6092h\ Sub\ 1}{6092h\ Sub\ 2}$$

4.1.4.10.5.3 Velocity Factor

The Velocity Factor is a unitless factor to put the fieldbus velocity into a value corresponding to other units. Even though the fieldbus velocity units are technically counts/sec, the Velocity Factor can scale the value as if it was in degrees/sec or rpm, etc. If counts/sec (based on Feed Constant and Gear Ratio) are desired, use a Velocity Factor of 1:1.

$$velocity\ factor = \frac{velocity\ factor\ numerator}{velocity\ factor\ denominator}$$

$$velocity\ factor = \frac{AXIS\#.CANOPEN.VELSCALENUM}{AXIS\#.CANOPEN.VELSCALEDENOM} = \frac{6096h\ sub\ 1}{6096h\ sub\ 2}$$

4.1.4.10.6.4 Encoder Resolution

Position encoder resolution used in these calculations is always 2^32 counts/revolution for the internal AKD2G position values regardless of the actual feedback resolution.

$$encoder\ resolution = 2^{32}$$

4.1.4.10.7.5 Gear Ratio

The Gear Ratio is a position ratio that can be used to scale the fieldbus position resolution. It can be used to account for a physical gear ratio but it is not necessarily related to physical mechanics. It can be arbitrary. It can be set to any value regardless of the system mechanics.

$$gear\ ratio = \frac{motor\ shaft\ revolutions}{driving\ shaft\ revolutions}$$

$$gear\ ratio = \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV} = \frac{6091h\ sub\ 1}{6091h\ sub\ 2}$$

4.1.4.10.8 Complete Formulas

Convert to fieldbus units
$fieldbus\ velocity = physical\ velocity * \left[\frac{\frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV} * \frac{AXIS\#.CANOPEN.VELSCALENUM}{AXIS\#.CANOPEN.VELSCALEDENOM}}{2^{32} * \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV}}\right]$
$fieldbus\ velocity = physical\ velocity * \left[\frac{\frac{6092h\ sub\ 1}{6092h\ sub\ 2} * \frac{6096h\ sub\ 1}{6096h\ sub\ 2}}{2^{32} * \frac{6091\ sub\ 1}{6091\ sub\ 2}}\right]$

Convert to physical units
$$physical\ velocity = fieldbus\ velocity * \left[\frac{2^{32} * \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV}}{\frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV} * \frac{AXIS\#.CANOPEN.VELSCALENUM}{AXIS\#.CANOPEN.VELSCALEDENOM}} \right]$$
$$physical\ velocity = fieldbus\ velocity * \left[\frac{2^{32} * \frac{6091\ sub\ 1}{6091\ sub\ 2}}{\frac{6092h\ sub\ 1}{6092h\ sub\ 2} * \frac{6096h\ sub\ 1}{6096h\ sub\ 2}} \right]$$

4.1.4.10.9 Real-World Units

Fieldbus velocity is always in units of *counts/sec*. All velocity values in the formulas must be in units of *counts/sec*, converting between fieldbus velocity (counts/sec) and physical velocity (counts/sec).

Converting physical velocity to/from units of counts/sec and real-world units is based on a physical position scale of 2^32 physical counts/rev.

Physical velocity can be converted to/from any physical units including:

- rpm
- rad/sec
- degrees/sec

Units	Conversion from real-world units to counts/sec for physical velocity “N”
rpm	$physical\ velocity\ (counts/sec) = \frac{N\ revs}{min} * \left(\frac{1\ min}{60\ sec}\right) * \left(\frac{2^{32} counts}{rev}\right)$
rad/sec	$physical\ velocity\ (counts/sec) = \frac{N\ rad}{sec} * \left(\frac{1\ rev}{2pi\ rads}\right) * \left(\frac{2^{32} counts}{rev}\right)$
degrees/sec	$physical\ velocity\ (counts/sec) = \frac{N\ deg}{sec} * \left(\frac{1\ rev}{360\ deg}\right) * \left(\frac{2^{32} counts}{rev}\right)$

Example 1:

- Desired Target Velocity = 100 rpm
- Fieldbus velocity units in counts/sec
- Fieldbus position units in 65536 counts/rev

Values assumed:

Object	Sub-index	Drive Command	Value
"6092h, 6892h Feed constant - Axis #" (➜ p. 479)	1	AXIS#.CANOPEN.FCPRIMARY.FEED	65536
"6092h, 6892h Feed constant - Axis #" (➜ p. 479)	2	AXIS#.CANOPEN.FCPRIMARY.SHAFTREV	1

Object	Sub-index	Drive Command	Value
"6091h, 6891h Gear ratio - Axis #" (➜ p. 478)	1	AXIS#.CANOPEN.GEARPRIMARY.MOTORREV	1
"6091h, 6891h Gear ratio - Axis #" (➜ p. 478)	2	AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV	1
"6096h, 6896h Velocity factor - Axis #" (➜ p. 480)	1	AXIS#.CANOPEN.VELSCALENUM	1
"6096h, 6896h Velocity factor - Axis #" (➜ p. 480)	2	AXIS#.CANOPEN.VELSCALEDENOM	1

Formula for physical velocity in rpm; feed constant = 65536 counts/rev
$fieldbus\ velocity\ (counts/sec) = physical\ velocity\ (rpm) * \left(\frac{65536}{60}\right)$

Derivation:

Convert velocity from desired real-world units to counts/sec based on 2^32 physical counts per rev.

$$physical\ velocity = \frac{100\ revs}{min} * \frac{1\ min}{60\ sec} * \frac{2^{32} counts}{rev}$$

Convert from physical units to fieldbus units.

$$fieldbus\ velocity = physical\ velocity * \left[\frac{\frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV} * \frac{AXIS\#.CANOPEN.VELSCALENUM}{AXIS\#.CANOPEN.VELSCALEDENOM}}{2^{32} * \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV}}\right]$$

$$fieldbus\ velocity = physical\ velocity\ (counts/sec) * \left[\frac{\frac{65536\ counts}{1\ rev} * \frac{1}{1}}{2^{32} counts/rev * \frac{1\ rev}{1\ rev}}\right]$$

$$fieldbus\ velocity = physical\ velocity\ (counts/sec) * \left[\frac{65536\ counts/rev}{2^{32} counts/rev}\right]$$

Substituting physical velocity (counts/sec):

$$fieldbus\ velocity = \frac{100\ revs}{min} * \frac{1\ min}{60\ sec} * \frac{2^{32} counts}{rev} * \left[\frac{65536\ counts/rev}{2^{32} counts/rev}\right]$$

$$fieldbus\ velocity = \frac{100\ revs}{min} * \frac{1\ min}{60\ sec} * \frac{65536\ counts}{rev}$$

$$fieldbus\ velocity = 109267\ counts/sec$$

This means a velocity command of 109267 sent over the fieldbus will command the motor to run at 100 rpm.

Example 2:

- Desired Target Velocity = 200 rpm
- Fieldbus velocity units in counts/sec
- Fieldbus position units in hundredths of a degree (36,000 increments per rev)

Values assumed:

Object	Sub-index	Drive Command	Value
"6092h, 6892h Feed constant - Axis #" (➜ p. 479)	1	AXIS#.CANOPEN.FCPRIMARY.FEED	36000
"6092h, 6892h Feed constant - Axis #" (➜ p. 479)	2	AXIS#.CANOPEN.FCPRIMARY.SHAFTREV	1
"6091h, 6891h Gear ratio - Axis #" (➜ p. 478)	1	AXIS#.CANOPEN.GEARPRIMARY.MOTORREV	1
"6091h, 6891h Gear ratio - Axis #" (➜ p. 478)	2	AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV	1
"6096h, 6896h Velocity factor - Axis #" (➜ p. 480)	1	AXIS#.CANOPEN.VELSCALENUM	60
"6096h, 6896h Velocity factor - Axis #" (➜ p. 480)	2	AXIS#.CANOPEN.VELSCALEDENOM	36000
Formula for physical velocity in rpm; feed constant = 36000 counts/rev; velocity factor = 60/36000			
$fieldbus\ velocity\ (counts/sec) = physical\ velocity\ (rpm)$			

Derivation:

Convert velocity from desired real-world units to counts/sec based on 2^32 physical counts per rev.

$$physical\ velocity = \frac{200\ revs}{min} * \frac{1\ min}{60\ sec} * \frac{2^{32} counts}{rev}$$

Convert from physical units to fieldbus units.

$$fieldbus\ velocity = physical\ velocity * \left[\frac{\frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV} * \frac{AXIS\#.CANOPEN.VELSCALENUM}{AXIS\#.CANOPEN.VELSCALEDENOM}}{2^{32} * \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV}}\right.$$

$$fieldbus\ velocity = physical\ velocity\ (counts/sec) * \left[\frac{\frac{36000\ counts}{1\ rev} * \frac{60}{36000}}{2^{32} counts/rev * \frac{1\ rev}{1\ rev}}\right]$$

$$fieldbus\ velocity = physical\ velocity\ (counts/sec) * \left[\frac{60\ counts/rev}{2^{32} counts/rev}\right]$$

$$fieldbus\ velocity = \frac{200\ revs}{min} * \frac{1\ min}{60\ sec} * \frac{2^{32} counts}{rev} * \left[\frac{60\ counts/rev}{2^{32} counts/rev}\right]$$

$$fieldbus\ velocity = 200\ (counts/sec)$$

Example 3:

- Read Velocity Feedback in rpm
- Fieldbus velocity = 250000 counts/sec
- Fieldbus position units in 65536 counts/rev

Values assumed:

Object	Sub-index	Drive Command	Value
"6092h, 6892h Feed constant - Axis #" (➜ p. 479)	1	AXIS#.CANOPEN.FCPRIMARY.FEED	65536
"6092h, 6892h Feed constant - Axis #" (➜ p. 479)	2	AXIS#.CANOPEN.GEARPRIMARY.MOTORREV	1
"6091h, 6891h Gear ratio - Axis #" (➜ p. 478)	1	AXIS#.CANOPEN.GEARPRIMARY.MOTORREV	1
"6091h, 6891h Gear ratio - Axis #" (➜ p. 478)	2	AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV	1
"6096h, 6896h Velocity factor - Axis #" (➜ p. 480)	1	AXIS#.CANOPEN.VELSCALENUM	1
"6096h, 6896h Velocity factor - Axis #" (➜ p. 480)	2	AXIS#.CANOPEN.VELSCALEDENOM	1

Formula for physical velocity in rpm; feed constant = 65536 counts/rev
$fieldbus\ velocity\ (counts/sec) = physical\ velocity\ (rpm) * \frac{65536}{60}$

Derivation:

Convert from fieldbus units to physical units.

$$physical\ velocity = fieldbus\ velocity * \left[\frac{2^{32} * \frac{AXIS\#.CANOPEN.GEARPRIMARY.MOTORREV}{AXIS\#.CANOPEN.GEARPRIMARY.SHAFTREV}}{\frac{AXIS\#.CANOPEN.FCPRIMARY.FEED}{AXIS\#.CANOPEN.FCPRIMARY.SHAFTREV} * \frac{AXIS\#.CANOPEN.VELSCALENUM}{AXIS\#.CANOPEN.VELSCALEDENOM}}\right]$$

$$physical\ velocity = fieldbus\ velocity * \left[\frac{2^{32} counts/rev * \frac{1\ rev}{1\ rev}}{\frac{65536\ counts}{1\ rev} * \frac{1}{1}}\right]$$

$$physical\ velocity = 250000\ counts/sec * \left[\frac{2^{32} counts/rev * \frac{1\ rev}{1\ rev}}{\frac{65536\ counts}{1\ rev} * \frac{1}{1}}\right]$$

$$physical\ velocity\ (counts/sec) = 250000\ counts/sec * \left[\frac{2^{32} counts/rev}{65536\ counts/rev}\right]$$

$$physical\ velocity\ (counts/sec) = 250000\ counts/sec * 65536$$

$$physical\ velocity\ \ (counts/sec) = 1.638x10^{10}\ counts/sec$$

Convert velocity from counts/sec to desired real-world units based on 2^32 physical counts per rev.

$$physical\ velocity = \frac{1.638x10^{10}\ counts}{sec} * \frac{60\ sec}{min} * \frac{1rev}{2^{32}\ counts}$$

$$physical\ velocity = 289\ rpm$$

4.1.4.11 Acceleration Scaling

4.1.4.11.1 General Formulas

Given	Convert to
Motor/Drive required value (physical units)	Command value in master (fieldbus units)
Feedback value in master (fieldbus units)	Motor/Drive actual value (physical units)
Calculate the acceleration command in the master given a fieldbus velocity and acceleration time	
$fieldbus\ acceleration = \left[\frac{fieldbus\ velocity}{acceleration\ time\ (seconds)}\right] * acceleration\ factor$	

4.1.4.11.2.1 Dual Axis

As with other CAN objects corresponding to axis-specific commands in a dual axis drive, objects 60xxh are for Axis 1 and objects 68xxh are for Axis 2. The formulas below are shown for Axis 1. For Axis 2, use the 68xxh objects.

4.1.4.11.3.2 Acceleration Factor

The Acceleration Factor is a unitless factor to scale the fieldbus acceleration. It can be used to adjust the acceleration scaling for all acceleration objects.

- Increasing the numerator will increase acceleration
- Increasing the denominator will decrease acceleration
- Changing the acceleration factor will automatically change preset values of acceleration objects, such as "6083h, 6883h Profile acceleration - Axis #" (➜ p. 475) or "6084h, 6884h Profile deceleration - Axis #" (➜ p. 476)

$$acceleration\ factor = \frac{acceleration\ factor\ numerator}{acceleration\ factor\ denominator}$$

$$acceleration\ factor = \frac{AXIS\#.CANOPEN.ACCSCALENUM}{AXIS\#.CANOPEN.ACCSCALEDENOM} = \frac{6097h\ sub\ 1}{6097h\ sub\ 2}$$

4.1.4.11.4 Complete Formulas

Convert to fieldbus units
$fieldbus\ acceleration = \left[\frac{fieldbus\ velocity}{acceleration\ time\ (seconds)}\right] * \left[\frac{accel.\ factor\ numerator}{accel.\ factor\ denominator}\right]$
$fieldbus\ acceleration = \left[\frac{fieldbus\ velocity}{accel.\ time\ (seconds)}\right] * \left[\frac{AXIS\#.CANOPEN.ACCSCALENUM}{AXIS\#.CANOPEN.ACCSCALEDENOM}\right]$
$fieldbus\ acceleration = \left[\frac{fieldbus\ velocity}{acceleration\ time\ (seconds)}\right] * \left[\frac{6097h\ sub\ 1}{6097h\ sub\ 2}\right]$

4.1.4.11.5 Real-World Units

See "Velocity Scaling" (➜ p. 161) for the conversion between fieldbus velocity and real-world velocity units.

Example 1:

- Desired Acceleration Time = 5 seconds
- Required Fieldbus Velocity = 120,000 counts/s (See "Velocity Scaling" (➜ p. 161) for converting real-world velocity units.)

Values assumed:

Object	Sub-index	Drive Command	Value
"6097h, 6897h Acceleration factor - Axis #" (➜ p. 481)	1	AXIS#.CANOPEN.ACCSCALENUM	1
"6097h, 6897h Acceleration factor - Axis #" (➜ p. 481)	2	AXIS#.CANOPEN.ACCSCALEDENOM	1

Derivation:

$$fieldbus\ acceleration = \left[\frac{fieldbus\ velocity}{acceleration\ time\ \ (seconds)}\right] * \left[\frac{6097h\ sub\ 1}{6097h\ sub\ 2}\right]$$

$$fieldbus\ acceleration = \left[\frac{120000\ counts/s}{5\ \ (seconds)}\right] * \left[\frac{1}{1}\right]$$

$$fieldbus\ acceleration = 24000\ counts/s^2$$

4.1.4.12 Current Scaling

4.1.4.12.1 General Formulas

Units of current are scaled in 0.1% of rated current or increments of :

$$\frac{Drive's\ continuous\ current\ rating}{1000}$$

Given	Convert to
Motor/Drive required value (physical units)	Command value in master (fieldbus units)
Feedback value in master (fieldbus units)	Motor/Drive actual value (physical units)

Calculate the velocity command in the master given a required motor velocity
$fieldbus\ current = physical\ current * \left(\frac{1000}{continuous\ current\ rating}\right)$

Calculate the motor velocity given a feedback velocity value in the master
$physical\ current = fieldbus\ current * \left(\frac{continuous\ current\ rating}{1000}\right)$

4.1.4.12.2 Specific Formulas

Formulas for a 3A drive
Increments of 0.003 A
$fieldbus\ current = physical\ current\ (A) * \left(\frac{1000}{3}\right)$
$physical\ current\ (A) = fieldbus\ current * \left(\frac{3}{1000}\right)$
Formulas for a 6A drive
Increments of 0.006 A
$fieldbus\ current = physical\ current\ (A) * \left(\frac{1000}{6}\right)$
$physical\ current\ (A) = fieldbus\ current * \left(\frac{6}{1000}\right)$

This applies to objects "6071h, 6871h Target torque - Axis #" (➔ p. 465) (Target Torque), "6072h, 6872h Max torque - Axis #" (➔ p. 466) (Max Torque), "6077h, 6877h Torque actual value - Axis #" (➔ p. 469) (Torque Actual Value), "6087h, 6887h Torque slope - Axis #" (➔ p. 477) (Torque Slope), etc.

4.1.4.12.3.1 Dual Axis

As with other CAN objects corresponding to axis-specific commands in a dual axis drive, objects 60xxh are for Axis 1 and objects 68xxh are for Axis 2. The formulas below are shown for Axis 1. Use objects 68xxh for Axis 2.

Example 1:

- Read current limits (AXIS#.IL.LIMITP) and AXIS#.IL.LIMITN) through the fieldbus
- Object "6072h, 6872h Max torque - Axis #" (➜ p. 466) (Max Torque) = 0x0352 (850 dec)
- 3A continuous current rating
- Convert to amps

$$physical\ current\ (A) = fieldbus\ current * \left(\frac{3}{1000}\right)$$

$$physical\ current\ (A) = 850 * \left(\frac{3}{1000}\right)$$

$$physical\ current\ (A) = 2.55\ amps$$

$$AXIS1.IL.LIMITP = 2.55\ amps$$

$$AXIS1.IL.LIMITN = -2.55\ amps$$

Example 2:

• Set object "6071h, 6871h Target torque - Axis #" (➜ p. 465) (Target Torque) (AXIS#.IL.CMD, current command) though the fieldbus

• Required current command of 0.5 arms

• 3A continuous current rating

• Convert to fieldbus units

$$fieldbus\ current = physical\ current\ (A) * \left(\frac{1000}{3}\right)$$

$$fieldbus\ current = 0.500\ A * \left(\frac{1000}{3}\right)$$

$$fieldbus\ current = 167$$

$$Object\ 6071h\ \ (Target\ Torque)\ \ value = 167\ (dec)\ \ =\ \ 0x00A7$$

Example 3:

- Read torque actual value through the fieldbus
- Object "6077h, 6877h Torque actual value - Axis #" (➜ p. 469) (Torque Actual Value) = 0x0096 (150 dec)
- 3A continuous current rating
- Convert to amps

$$physical\ current\ (A) = fieldbus\ current * \left(\frac{3}{1000}\right)$$

$$physical\ current\ (A) = 150 * \left(\frac{3}{1000}\right)$$

$$physical\ current\ (A) = 0.45\ amps$$

$$AXIS1.IL.FB = 0.45\ amps$$

4.1.5 Touch Probes

Each touch probe can capture two positions, the position on the rising and the position of the falling edge of the trigger input.

The AKD2G touch probes conform with the EtherCAT ETG6010 specification “CiA402 Implementation Directive” and CANopen DS402.

On AKD2G, the touch probes are separate from the drive's position capture channels, CAP1 and CAP2. The touch probes use their own dedicated hardware in the drive. The configuration and status of the touch probes will not be available by the CAP#. keywords.

These are the EtherCAT/CANopen objects AKD2G supports.

Axis 1 Index	Axis 2 Index	Link	Name
60B8h	68B8h	"60B8h, 68B8h Touch probe function - Axis #" (➔ p. 489)	Touch probe function/control
60B9h	68B9h	"60B9h, 68B9h Touch probe status - Axis #" (➔ p. 491)	Touch probe status
60BAh	68BAh	"60BAh, 68BAh Touch probe 1 position positive value - Axis #" (➔ p. 492)	Touch probe 1 position positive value
60BBh	68BBh	"60BBh, 68BBh Touch probe 1 position negative value - Axis #" (➔ p. 493)	Touch probe 1 position negative value
60BCh	68BCh	"60BCh, 68BCh Touch probe 2 position positive value - Axis #" (➔ p. 494)	Touch probe 2 position positive value
60BDh	68BDh	"60BDh, 68BDh Touch probe 2 position negative value - Axis #" (➔ p. 495)	Touch probe 2 position negative value
60D0h	68D0h	"60D0h, 68D0h Touch probe source - Axis #" (➔ p. 497)	Touch probe source
60D1h	68D1h	"60D1h, 68D1h Touch probe 1 time stamp positive value - Axis #" (➔ p. 499)	Touch probe 1 time stamp positive value
60D2h	68D2h	"60D2h, 68D2h Touch probe 1 time stamp negative value - Axis #" (➔ p. 500)	Touch probe 1 time stamp negative value
60D3h	68D3h	"60D3h, 68D3h Touch probe 2 time stamp positive value - Axis #" (➔ p. 501)	Touch probe 2 time stamp positive value
60D4h	68D4h	"60D4h, 68D4h Touch probe 2 time stamp negative value - Axis #" (➔ p. 502)	Touch probe 2 time stamp negative value
60D5h	68D5h	"60D5h, 68D5h Touch probe 1 positive edge counter - Axis #" (➔ p. 503)	Touch probe 1 positive edge counter
60D6h	68D6h	"60D6h, 68D6h Touch probe 1 negative edge counter - Axis #" (➔ p. 504)	Touch probe 1 negative edge counter
60D7h	68D7h	"60D7h, 68D7h Touch probe 2 positive edge counter - Axis #" (➔ p. 505)	Touch probe 2 positive edge counter
60D8h	68D8h	"60D8h, 68D8h Touch probe 2 negative edge counter - Axis #" (➔ p. 506)	Touch probe 2 negative edge counter
60D0h	68D0h	"60D0h, 68D0h Touch probe source - Axis #" (➔ p. 497)	Touch Probe Source

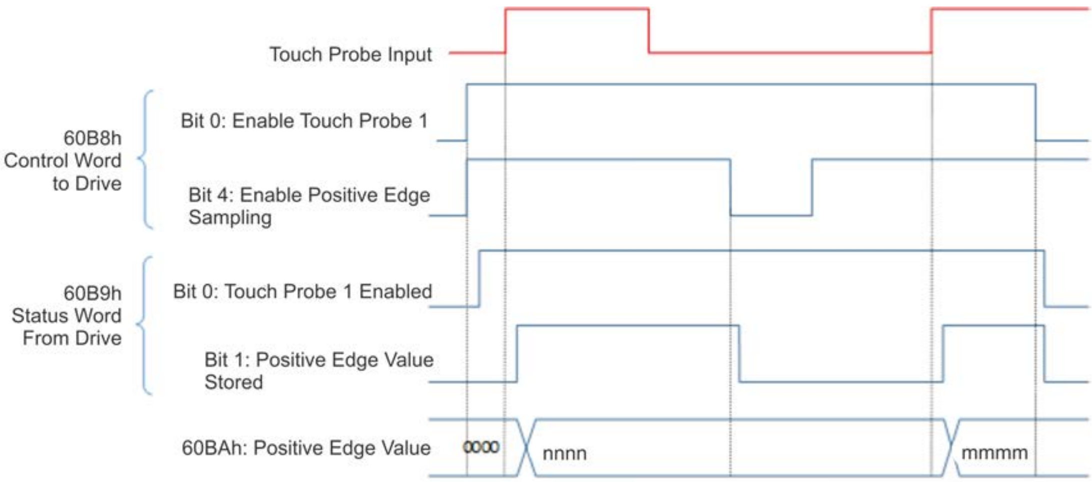
The following table shows how AKD2G signals are mapped to the touch probe source entry in the object dictionary.

NOTE

A few sources appear in both the standard and the manufacturer specific ranges to provide consistency.

60D0h,68D0h	Description
-41 to -42	Z pulse for Axis 1 to 2
-31 to -35	Z pulse for Feedback 1 to 5 As FB1, 2, 4, and 5 do not support Z pulses then these will not be shown. When we support SFA on FB 1 and 2 then Z pulse may be possible. X23 is optional so if not fitted then -33 will not be valid.
-21 to -26	DIO1 to DIO6 When X22 is not fitted options -21 and -22 will not be valid. When X23 is not fitted options -23 to -26 will not be valid.
-1 to -12	DIN1 to DIN12 When X22 is not fitted options -9 to -12 will not be valid.
0	Reserved
1	DIN1. Fast Opto
2	DIN2. Fast Opto
3-4	Reserved
5	Valid if PL.FBSOURCE is using a feedback that supports a Z pulse.
6 to 32767	Reserved

The following diagram shows the sequence for controlling the touch probe feature.



4.2 Cyclical Setpoint and Actual Values

Supported cyclical setpoint values

Name	CANopen object	Data type	Description
Target current	0x2071 sub 0	32 bit	scaled in mA
Latch Controlword	0x20A4 sub 0	UINT16	
Clear digital Input Change Bit	0x20B8	16 bit	
Analog output value	0x3470 sub 3	16 bit	
External feedback position	0x3497 sub 0	32 bit	
CANopen controlword	0x6040 sub 0	UINT16	CANopen controlword
Modes of Operation	0x6060 sub 0	8 bit	DS402 opmode setpoint
Velocity Window	0x606D sub 0	16 bit	
Velocity Window Time	0x606E sub 0	16 bit	
Target Torque	0x6071 sub 0	16 bit	0.1% resolution
Maximum Torque	0x6072 sub 0	16 bit	
Target position	0x607A sub 0	INT32	Used in profile position mode/ cyclic synchronous position mode
Profile position target velocity	0x6081 sub 0	32 bit	related to MT.V
Profile position target acc	0x6083 sub 0	32 bit	related to MT.ACC
Profile position target dec	0x6084 sub 0	32 bit	related to MT.DEC
Velocity feed forward	0x60B1 sub 0	32 bit	
Torque feed forward	0x60B2 sub 0	INT16	
Touch probe function	0x60B8	16 bit	
Position command value	0x60C1 sub 1	INT32	Interpolation data record in IP-mode
Digital outputs	0x60FE sub 1	UINT32	
Velocity command value	0x60FF sub 0	INT32	

Supported cyclical actual values

Name	CANopen object	Data type	Description
Position actual internal value	0x6063 sub 0	INT32	
Velocity actual value	0x606C sub 0	INT32	
CANopen statusword	0x6041 sub 0	UINT16	CANopen statusword
Second position feedback	0x2050 sub 0	INT32	
Digital inputs	0x60FD sub 0	UINT32	
Following error actual value	0x60F4 sub 0	INT32	
Latch position positive edge	0x20A0 sub 0	INT32	
Torque actual value	0x6077 sub 0	INT16	
Latch status	0x20A5 sub 0	UINT16	
Actual Current	0x2077 sub 0	32 bit	scaled in mA
Latch1 negative edge	0x20A1 sub 0	32 bit	
Latch2 Positive	0x20A2 sub 0	32 bit	
Latch2 Negative	0x20A3 sub 0	32 bit	
Latch1 positive/negative edge	0x20A6	32 bit	
Latch 2 positive/negative edge	0x20A7	32 bit	
Modes of Operation	0x6061	8 bit	DS402 opmode status
Position Actual Value	0x6064 sub 0	32 bit	WB/DS402 scale units
Touch probe status	0x60B9 sub 0	16 bit	
Touch probe 1 positive edge pos	0x60BA sub 0	32 bit	
Touch probe 1 negative edge pos	0x60BB sub 0	32 bit	
Touch probe 2 positive edge pos	0x60BC sub 0	32 bit	
Touch probe 2 negative edge pos	0x60BD sub 0	32 bit	
Additional Pos actual value	0x60E4 sub 0	48 bit	
Additional Pos actual value	0x60E4 sub 1	32 bit	
Motor I2t	0x3427 sub 3	32 bit	
Analog output value	0x3470 sub 2	16 bit	
Analog Input value	0x3470 sub 4	16 bit	
Manufacturer status register	0x1002 sub 0	32 bit	

4.3 CANopen Emergency Messages and Error Codes

The drive can notify an EtherCAT master of a fault or warning via the emergency service. It will send a CoE frame with the CoE header's service field set to 1 (Emergency) and the data containing an Emergency Object (EMCY). A separate frame will be sent for every fault and warning that occurred. Additionally, a frame with emergency code 0 will be sent as an indication that all faults and warnings have been cleared.

4.3.1 CANopen Error Codes

CAN Emergency Code	AKD2G Number	Message
3110h	F2015	Bus over voltage FPGA.
3120h	F2000	Vbus read is out of thresholds.
3130h	F2008	Bus capacitor overloaded.
3180h	W2008	Bus capacitor overloaded.
3181h	F2014	AC input phase loss.
3182h	F2016	Gate supply under voltage.
3183h	W1000	Fan stalled.
3190h	F1005	Unrecognized FPGA fault.
3191h	F1006	FPGA cyclic read fault.
3210h	F2006	Bus over voltage.
3220h	F2007	Bus under voltage.
3280h	W2007	Bus under voltage.
3281h	W2010	Regen energy critical.
3282h	F2013	Regen short circuit.
3283h	W2006	Bus over voltage.
37ADh	F4030	SFA model does not support feedback type
4210h	F2500	Control over temperature sensor.
4310h	F2501	Power over temperature sensor.
4382h	F1001	Power board type mismatch detected.
4390h	W2500	Control Over Temp Sensor.
4391h	W2501	Power Over Temp Sensor.
4394h	W2502	Control Under Temp Sensor.
4395h	W2503	Power Under Temp Sensor.
4398h	F2502	Control under temperature sensor.
4399h	F2503	Power under temperature sensor.
5580h	F1100	NV Memory Data (might occur when downloading firmware).
5588h	F1101	Flash directory error.
5590h	F1102	Identity read failed.
5591h	F1103	Invalid MAC Address.
55A1h	F1104	Power board factory settings file read failed.
55A2h	F1105	Power board updateable settings file read failed.
55B0h	F1106	Failure reading Control Board FPGA EDS file.
55B1h	F1107	Power Board Resident FPGA not valid.
55B2h	F1108	Power Board Operational FPGA not valid.
55B3h	F1109	Failure reading Power Board FPGA EDS.
55C4h	F1002	Power Board Communication fault.
55C5h	F1003	Power Board FPGA not configured.
6080h	F3000	Issued command timed out.
6380h	F5005	Drive motor parameters setup incomplete.

CAN Emergency Code	AKD2G Number	Message
6381h	F3001	Failed to default parameters.
7180h	F5000	Motor overheated.
7184h	F5003	Brake applied when it should be released.
7186h	W5000	Motor Temperature high.
7187h	F2011	Voltage exceeds motors rating.
7188h	F2009	Regen near capacity, could not prevent over voltage.
7189h	F5004	Brake released when it should be applied.
718Ah	F2018	Broken Wire Connection to Motor.
7190h	F5001	Brake 1 current out of range.
7191h	W5001	Brake override active.
7192h	F5002	Brake 2 current out of range.
7193h	F5006	Temperature sensor detected open circuit.
7194h	W5007	Brake override active but no brake configured.
7380h	F4100	Feedback: Parity fault.
7381h	F4101	Feedback: Overrun fault.
7382h	F4102	Feedback: Framing fault.
7383h	F4103	Feedback: CRC fault.
7384h	F4104	Feedback: Communication Timeout fault.
7385h	F4105	Feedback: Initialization sequence fault.
7386h	F4106	Feedback: Temperature fault.
7387h	F4107	Feedback: Battery fault.
7388h	F4108	Feedback: Sensor fault.
7389h	F4109	Feedback: Device-unique fault 0.
738Ah	F4110	Feedback: Device-unique fault 1.
738Bh	F4111	Feedback: Analog Signal fault.
738Ch	F4112	Feedback: Broken Wire fault.
738Dh	F4113	Feedback: Power Supply fault.
738Eh	F4114	Feedback: Illegal Hall state (111, 000).
738Fh	F4115	Failed to set feedback type.
7392h	F4116	Failed to read motor parameters from feedback device.
7393h	F4117	SFA communication fault.
7394h	F4118	SFA over current.
7395h	F4119	SFA under voltage.
7396h	F4120	Feedback: Safety fault.
7397h	F3004	Operation in Position Mode with Halls Only feedback not allowed.
7398h	F4121	Feedback: Watchdog fault.
7399h	F4122	Unrecognized feedback fault.
739Ah	F4123	SFA Resident FPGA not valid.
739Bh	F4124	SFA Operational FPGA not valid.
739Ch	F4125	SFA FPGA file read failed.
739Dh	F4126	SFA Factory file read failed.
739Eh	W4100	Feedback parity.
739Fh	W4101	Feedback overrun.
73A0h	W4102	Feedback framing.
73A1h	W4103	Feedback CRC.
73A2h	W4104	Feedback communication timeout.
73A3h	W4105	Feedback initialization sequence.
73A4h	W4106	Feedback temperature.
73A5h	W4107	Feedback battery.

CAN Emergency Code	AKD2G Number	Message
73A6h	W4108	Feedback sensor.
73A7h	W4109	Feedback device-unique warning 0.
73A8h	W4110	Feedback device-unique warning 1.
73A9h	W4111	Gearing feedback source fault.
73C0h	F5500	Wake and Shake - Insufficient movement
73C1h	F5501	Wake and Shake - Excess movement
73C2h	F5502	Wake and Shake - Fine-Coarse delta too large.
73C3h	F5503	Wake and Shake - Over speed
73C4h	F5504	Wake and Shake - Loop angle delta too large.
73C5h	F5505	Wake and Shake - Commutation not initialized.
73C6h	F5506	Wake and Shake - Motor U phase missing.
73C7h	F5507	Wake and Shake - Motor V phase missing.
73C8h	F5508	Wake and Shake - Motor W phase missing.
73C9h	W5500	Wake & Shake configured or active.
73D0h	F5509	Wake and Shake - Validating Positive Movement Failed.
73D1h	F5510	Wake and Shake - Validating Negative Movement Failed.
73D2h	F5511	Wake and Shake - Validating Comm. angle timed out.
73D3h	F5512	Wake and Shake - Validating Comm. angle moved too far - Bad Comm Angle.
73D4h	F5513	Wake and Shake - Validating Comm. angle required more than MOTOR.ICONT
73D5h	F6002	Invalid commutation detected - motor accelerating in the wrong direction. Motor phase may be incorrect.
8130h	F7002	Fieldbus Heartbeat lost.
8180h	W7000	Fieldbus Error Passive.
8311h	F2017	Motor Foldback.
8331h	F2001	Drive Foldback.
8380h	W2001	Drive foldback imminent! Reduce Load.
8381h	W2002	Motor foldback imminent! Reduce Load.
8382h	W2003	Motor I2t load! Reduce load.
8383h	W6008	Using derivative of position when using sensorless feedback type in position mode
8384h	W6004	Zero velocity when using induction sensorless feedback type in torque mode.
8385h	W6027	Current Command Saturated.
8386h	F5514	Wake and Shake - Limit Switch Hit
8480h	F6000	Over speed.
8481h	F6005	Emergency timeout occurred.
8582h	W6006	Positive Limit Switch triggered.
8583h	W6007	Negative Limit Switch triggered.
8611h	F6001	Following error magnitude fault.
8685h	F6003	Instability during autotune.
8688h	W6000	Velocity Limit Violation, Exceeding Max Limit.
8689h	W6009	Following Motion Failed; Check Motion Parameters .
868Ah	W6010	Target Position crossed due to Stop command.
86A0h	W6011	Homing Index pulse not found.
86A1h	W6012	Home switch not found.
86A3h	W6014	Motion Task Activation Failed.
86A4h	W6015	Homing Failed.

CAN Emergency Code	AKD2G Number	Message
86A5h	F6004	Target position was overshot due to invalid motion task activation.
86A8h	W6017	Motion task target position is out of modulo-range.
86A9h	W6018	Motion task target position is out of software-limits.
86AAh	W6019	Invalid bit-combination in the motion-task control-word.
86ABh	W6020	1:1 profile can not be triggered on-the-fly.
86ACh	W6021	Customer profile table is not initialized.
86ADh	W6022	Motion task activation is currently pending.
86AEh	W6002	Homing is needed.
86AFh	W6023	Homing maximum distance exceeded.
8780h	F7001	Fieldbus Sync frames lost.
8781h	W7001	PLL unlocked.
8782h	F7003	PLL failed to acquire lock.
8783h	F7004	PLL lost lock.
8784h	F7005	Fieldbus cyclic setpoints missing.
8785h	F7006	Only on CAN drives: CAN hardware initialization failed.
8AF0h	W6025	Homing and feedback mismatch.
FF00h	W2011	No Power on IO 24V Rail.
FF01h	F7000	Fieldbus Communication lost.
FF02h	F2004	Iu current offset limit exceeded.
FF03h	F2005	Iv current offset limit exceeded.
FF04h	F2010	Regen over power.
FF05h	F3100	MechaWare Model failed to connect Analog Input, fix model.
FF06h	F3101	MechaWare Model failed to connect Analog Output, fix model.
FF07h	F2002	Output over current.
FF08h	F2003	Current sensor short circuit.
FF09h	F3002	Assert check failed.
FF0Ah	F2012	Power stage fault.
FF0Bh	F9000	Safe torque off.
FF0Ch	W9000	Safe torque off.
FF0Dh	F1000	Firmware and FPGA versions are not compatible.
FF0Eh	W6001	Exceeding following error magnitude warning level.
FF10h	W6003	OPMODE incompatible with CMDSOURCE.
FF11h	F1004	Failed to initialize the system.
FF12h	F5100	IL.FBSOURCE has unidentified feedback selected.
FF13h	F5101	VL.FBSOURCE has unidentified feedback selected.
FF14h	F5102	PL.FBSOURCE has unidentified feedback selected.
FF15h	F1007	A Factory MechaWare model failed to load.
FF16h	F1008	A User MechaWare model failed to load.
FF17h	W6028	Gear feedback source is invalid.
FF18h	F6028	Gearing feedback source is invalid.
FF19h	F6006	Current home mode requires HOME.IPEAK to be set.
FF1Ah	W6026	Current homing mode requires HOME.IPEAK to be set by user
FF50h	F9002	SMM Communication Failed.
FF51h	F9003	Incorrect safety card detected.
FF52h	F9004	Safe torque off pulse and standard lines don't match.
FF53h	F9005	Simultaneity Fault: Safe torque off lines don't match each other.
FF54h	W9011	SMM I/O failure detected
FF55h	F9006	SMM in failed state.
FF56h	W9008	Brake Test Time Overflow.

CAN Emergency Code	AKD2G Number	Message
FF57h	W9009	SMM Over Temperature.
FF58h	W9010	SMM State Not Operational.
FF59h	W9007	Safe brake parameters inconsistent
FF5Ah	F9007	Safe brake parameters inconsistent.

5 Object Dictionary

5.1 CANopen Object Table

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
2h	0h	UINT 8	-	-	R/W	Yes	DummyU8
3h	0h	UINT 16	-	-	R/W	Yes	DummyU16
4h	0h	UINT 32	-	-	R/W	Yes	DummyU32
5h	0h	INT8	-	-	R/W	Yes	DummyS8
6h	0h	INT16	-	-	R/W	Yes	DummyS16
7h	0h	INT32	-	-	R/W	Yes	DummyS32
"1000h Device type" (➜ p. 328)	0h	UINT 32	-	-	RO	No	Device type
"1001h Error register" (➜ p. 328)	0h	UINT 8	-	-	RO	No	Error register
"1003h Pre-defined error field" (➜ p. 328)	0h	UINT 8	-	-	R/W	No	Number of errors
	1h	UINT 32	-	-	RO	No	Standard error field
	2h	UINT 32	-	-	RO	No	Standard error field
	3h	UINT 32	-	-	RO	No	Standard error field
	4h	UINT 32	-	-	RO	No	Standard error field
	5h	UINT 32	-	-	RO	No	Standard error field
	6h	UINT 32	-	-	RO	No	Standard error field
	7h	UINT 32	-	-	RO	No	Standard error field
	8h	UINT 32	-	-	RO	No	Standard error field
	9h	UINT 32	-	-	RO	No	Standard error field
	Ah	UINT 32	-	-	RO	No	Standard error field
"1005h COB-ID SYNC" (➜ p. 329)	0h	UINT 32	-	-	R/W	No	COB-ID SYNC
"1006h Communication cycle period" (➜ p. 329)	0h	UINT 32	-	-	R/W	No	Communication cycle period
"1008h Manufacturer device name" (➜ p. 330)	0h	String (40)	-	-	RO	No	Manufacturer device name
"1009h Manufacturer hardware version" (➜ p. 330)	0h	String (6)	-	-	RO	No	Manufacturer hardware version

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"100Ah Manufacturer software version" (➔ p. 330)	0h	String (60)	-	-	RO	No	Manufacturer software version
"100Ch Guard time" (➔ p. 330)	0h	UINT 16	-	-	R/W	No	Guard time
"100Dh Life time factor" (➔ p. 330)	0h	UINT 8	-	-	R/W	No	Life time factor
"1010h Store parameters" (➔ p. 331)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Save all parameters
"1011h Restore default parameters" (➔ p. 331)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Restore all default parameters
"1012h COB-ID Time Stamp" (➔ p. 331)	0h	UINT 32	-	-	R/W	No	COB-ID Time Stamp
1014h	0h	UINT 32	-	-	R/W	No	COB-ID EMCY
"1016h Consumer heartbeat time" (➔ p. 332)	0h	UINT 32	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Consumer heartbeat time
"1017h Producer heartbeat time" (➔ p. 332)	0h	UINT 16	-	-	R/W	No	Producer heartbeat time
"1018h Identity object" (➔ p. 332)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Vendor ID
	2h	UINT 32	-	-	RO	No	Product code
	3h	UINT 32	-	-	RO	No	Revision number
	4h	UINT 32	-	-	RO	No	Serial number
"1026h OS Prompt" (➔ p. 333)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	Yes	StdIn
	2h	UINT 8	-	-	RO	Yes	StdOut
"1200h SDO server parameter 1" (➔ p. 334)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	COB-ID client to server (rx)
	2h	UINT 32	-	-	RO	No	COB-ID server to client (tx)

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1400h-1403h RxPDO COB-IDs" (➜ p. 334)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	COB-ID used by RxPDO 1
	2h	UINT 8	-	-	R/W	No	Transmission type
"1400h-1403h RxPDO COB-IDs" (➜ p. 334)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	COB-ID used by RxPDO 2
	2h	UINT 8	-	-	R/W	No	Transmission type
"1400h-1403h RxPDO COB-IDs" (➜ p. 334)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	COB-ID used by RxPDO 3
	2h	UINT 8	-	-	R/W	No	Transmission type
"1400h-1403h RxPDO COB-IDs" (➜ p. 334)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	COB-ID used by RxPDO 4
	2h	UINT 8	-	-	R/W	No	Transmission type

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1600h-1603h RxPDO mapping parameter N" (➜ p. 335)	0h	UINT 8	-	-	R/W	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Mapping entry 1
	2h	UINT 32	-	-	R/W	No	Mapping entry 2
	3h	UINT 32	-	-	R/W	No	Mapping entry 3
	4h	UINT 32	-	-	R/W	No	Mapping entry 4
	5h	UINT 32	-	-	R/W	No	Mapping entry 5
	6h	UINT 32	-	-	R/W	No	Mapping entry 6
	7h	UINT 32	-	-	R/W	No	Mapping entry 7
	8h	UINT 32	-	-	R/W	No	Mapping entry 8
	9h	UINT 32	-	-	R/W	No	Mapping entry 9
	Ah	UINT 32	-	-	R/W	No	Mapping entry 10
	Bh	UINT 32	-	-	R/W	No	Mapping entry 11
	Ch	UINT 32	-	-	R/W	No	Mapping entry 12
	Dh	UINT 32	-	-	R/W	No	Mapping entry 13
	Eh	UINT 32	-	-	R/W	No	Mapping entry 14
	Fh	UINT 32	-	-	R/W	No	Mapping entry 15
	10h	UINT 32	-	-	R/W	No	Mapping entry 16
	11h	UINT 32	-	-	R/W	No	Mapping entry 17
	12h	UINT 32	-	-	R/W	No	Mapping entry 18
	13h	UINT 32	-	-	R/W	No	Mapping entry 19
	14h	UINT 32	-	-	R/W	No	Mapping entry 20
	15h	UINT 32	-	-	R/W	No	Mapping entry 21
	16h	UINT 32	-	-	R/W	No	Mapping entry 22
	17h	UINT 32	-	-	R/W	No	Mapping entry 23
	18h	UINT 32	-	-	R/W	No	Mapping entry 24

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	R/W	No	Mapping entry 25
	1Ah	UINT 32	-	-	R/W	No	Mapping entry 26
	1Bh	UINT 32	-	-	R/W	No	Mapping entry 27
	1Ch	UINT 32	-	-	R/W	No	Mapping entry 28
	1Dh	UINT 32	-	-	R/W	No	Mapping entry 29
	1Eh	UINT 32	-	-	R/W	No	Mapping entry 30
	1Fh	UINT 32	-	-	R/W	No	Mapping entry 31
	20h	UINT 32	-	-	R/W	No	Mapping entry 32

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1600h-1603h RxPDO mapping parameter N" (➔ p. 335)	0h	UINT 8	-	-	R/W	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Mapping entry 1
	2h	UINT 32	-	-	R/W	No	Mapping entry 2
	3h	UINT 32	-	-	R/W	No	Mapping entry 3
	4h	UINT 32	-	-	R/W	No	Mapping entry 4
	5h	UINT 32	-	-	R/W	No	Mapping entry 5
	6h	UINT 32	-	-	R/W	No	Mapping entry 6
	7h	UINT 32	-	-	R/W	No	Mapping entry 7
	8h	UINT 32	-	-	R/W	No	Mapping entry 8
	9h	UINT 32	-	-	R/W	No	Mapping entry 9
	Ah	UINT 32	-	-	R/W	No	Mapping entry 10
	Bh	UINT 32	-	-	R/W	No	Mapping entry 11
	Ch	UINT 32	-	-	R/W	No	Mapping entry 12
	Dh	UINT 32	-	-	R/W	No	Mapping entry 13
	Eh	UINT 32	-	-	R/W	No	Mapping entry 14
	Fh	UINT 32	-	-	R/W	No	Mapping entry 15
	10h	UINT 32	-	-	R/W	No	Mapping entry 16
	11h	UINT 32	-	-	R/W	No	Mapping entry 17
	12h	UINT 32	-	-	R/W	No	Mapping entry 18
	13h	UINT 32	-	-	R/W	No	Mapping entry 19
	14h	UINT 32	-	-	R/W	No	Mapping entry 20
	15h	UINT 32	-	-	R/W	No	Mapping entry 21
	16h	UINT 32	-	-	R/W	No	Mapping entry 22
	17h	UINT 32	-	-	R/W	No	Mapping entry 23
	18h	UINT 32	-	-	R/W	No	Mapping entry 24

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	R/W	No	Mapping entry 25
	1Ah	UINT 32	-	-	R/W	No	Mapping entry 26
	1Bh	UINT 32	-	-	R/W	No	Mapping entry 27
	1Ch	UINT 32	-	-	R/W	No	Mapping entry 28
	1Dh	UINT 32	-	-	R/W	No	Mapping entry 29
	1Eh	UINT 32	-	-	R/W	No	Mapping entry 30
	1Fh	UINT 32	-	-	R/W	No	Mapping entry 31
	20h	UINT 32	-	-	R/W	No	Mapping entry 32

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1600h-1603h RxPDO mapping parameter N" (➔ p. 335)	0h	UINT 8	-	-	R/W	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Mapping entry 1
	2h	UINT 32	-	-	R/W	No	Mapping entry 2
	3h	UINT 32	-	-	R/W	No	Mapping entry 3
	4h	UINT 32	-	-	R/W	No	Mapping entry 4
	5h	UINT 32	-	-	R/W	No	Mapping entry 5
	6h	UINT 32	-	-	R/W	No	Mapping entry 6
	7h	UINT 32	-	-	R/W	No	Mapping entry 7
	8h	UINT 32	-	-	R/W	No	Mapping entry 8
	9h	UINT 32	-	-	R/W	No	Mapping entry 9
	Ah	UINT 32	-	-	R/W	No	Mapping entry 10
	Bh	UINT 32	-	-	R/W	No	Mapping entry 11
	Ch	UINT 32	-	-	R/W	No	Mapping entry 12
	Dh	UINT 32	-	-	R/W	No	Mapping entry 13
	Eh	UINT 32	-	-	R/W	No	Mapping entry 14
	Fh	UINT 32	-	-	R/W	No	Mapping entry 15
	10h	UINT 32	-	-	R/W	No	Mapping entry 16
	11h	UINT 32	-	-	R/W	No	Mapping entry 17
	12h	UINT 32	-	-	R/W	No	Mapping entry 18
	13h	UINT 32	-	-	R/W	No	Mapping entry 19
	14h	UINT 32	-	-	R/W	No	Mapping entry 20
	15h	UINT 32	-	-	R/W	No	Mapping entry 21
	16h	UINT 32	-	-	R/W	No	Mapping entry 22
	17h	UINT 32	-	-	R/W	No	Mapping entry 23
	18h	UINT 32	-	-	R/W	No	Mapping entry 24

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	R/W	No	Mapping entry 25
	1Ah	UINT 32	-	-	R/W	No	Mapping entry 26
	1Bh	UINT 32	-	-	R/W	No	Mapping entry 27
	1Ch	UINT 32	-	-	R/W	No	Mapping entry 28
	1Dh	UINT 32	-	-	R/W	No	Mapping entry 29
	1Eh	UINT 32	-	-	R/W	No	Mapping entry 30
	1Fh	UINT 32	-	-	R/W	No	Mapping entry 31
	20h	UINT 32	-	-	R/W	No	Mapping entry 32

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1600h-1603h RxPDO mapping parameter N" (➜ p. 335)	0h	UINT 8	-	-	R/W	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Mapping entry 1
	2h	UINT 32	-	-	R/W	No	Mapping entry 2
	3h	UINT 32	-	-	R/W	No	Mapping entry 3
	4h	UINT 32	-	-	R/W	No	Mapping entry 4
	5h	UINT 32	-	-	R/W	No	Mapping entry 5
	6h	UINT 32	-	-	R/W	No	Mapping entry 6
	7h	UINT 32	-	-	R/W	No	Mapping entry 7
	8h	UINT 32	-	-	R/W	No	Mapping entry 8
	9h	UINT 32	-	-	R/W	No	Mapping entry 9
	Ah	UINT 32	-	-	R/W	No	Mapping entry 10
	Bh	UINT 32	-	-	R/W	No	Mapping entry 11
	Ch	UINT 32	-	-	R/W	No	Mapping entry 12
	Dh	UINT 32	-	-	R/W	No	Mapping entry 13
	Eh	UINT 32	-	-	R/W	No	Mapping entry 14
	Fh	UINT 32	-	-	R/W	No	Mapping entry 15
	10h	UINT 32	-	-	R/W	No	Mapping entry 16
	11h	UINT 32	-	-	R/W	No	Mapping entry 17
	12h	UINT 32	-	-	R/W	No	Mapping entry 18
	13h	UINT 32	-	-	R/W	No	Mapping entry 19
	14h	UINT 32	-	-	R/W	No	Mapping entry 20
	15h	UINT 32	-	-	R/W	No	Mapping entry 21
	16h	UINT 32	-	-	R/W	No	Mapping entry 22
	17h	UINT 32	-	-	R/W	No	Mapping entry 23
	18h	UINT 32	-	-	R/W	No	Mapping entry 24

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	R/W	No	Mapping entry 25
	1Ah	UINT 32	-	-	R/W	No	Mapping entry 26
	1Bh	UINT 32	-	-	R/W	No	Mapping entry 27
	1Ch	UINT 32	-	-	R/W	No	Mapping entry 28
	1Dh	UINT 32	-	-	R/W	No	Mapping entry 29
	1Eh	UINT 32	-	-	R/W	No	Mapping entry 30
	1Fh	UINT 32	-	-	R/W	No	Mapping entry 31
	20h	UINT 32	-	-	R/W	No	Mapping entry 32
"1620h RxPDO fixed mapping parameter 0x1620" (➜ p. 339)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
"1700h RxPDO fixed mapping parameter 0x1700" (➜ p. 339)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
"1701h RxPDO fixed mapping parameter 0x1701" (➜ p. 339)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
"1702h RxPDO fixed mapping parameter 0x1702" (➜ p. 340)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
"1704h RxPDO fixed mapping parameter 0x1704" (➜ p. 340)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
"1720h RxPDO fixed mapping parameter 0x1720" (➜ p. 340)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1721h RxPDO fixed mapping parameter 0x1721" (➜ p. 341)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
"1722h RxPDO fixed mapping parameter 0x1722" (➜ p. 341)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
"1724h RxPDO fixed mapping parameter 0x1724" (➜ p. 342)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
"1800h-1803h TxPDO COB-IDs" (➜ p. 342)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	COB-ID used by TxPDO 1
	2h	UINT 8	-	-	R/W	No	Transmission type
	3h	UINT 16	-	-	R/W	No	Inhibit time
	4h	UINT 8	-	-	R/W	No	Reserved
	5h	UINT 16	-	-	R/W	No	Event timer
"1800h-1803h TxPDO COB-IDs" (➜ p. 342)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	COB-ID used by TxPDO 2
	2h	UINT 8	-	-	R/W	No	Transmission type
	3h	UINT 16	-	-	R/W	No	Inhibit time
	4h	UINT 8	-	-	R/W	No	Reserved
	5h	UINT 16	-	-	R/W	No	Event timer

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1800h-1803h TxPDO COB-IDs" (➜ p. 342)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	COB-ID used by TxPDO 3
	2h	UINT 8	-	-	R/W	No	Transmission type
	3h	UINT 16	-	-	R/W	No	Inhibit time
	4h	UINT 8	-	-	R/W	No	Reserved
	5h	UINT 16	-	-	R/W	No	Event timer
"1800h-1803h TxPDO COB-IDs" (➜ p. 342)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	COB-ID used by TxPDO 4
	2h	UINT 8	-	-	R/W	No	Transmission type
	3h	UINT 16	-	-	R/W	No	Inhibit time
	4h	UINT 8	-	-	R/W	No	Reserved
	5h	UINT 16	-	-	R/W	No	Event timer

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1A00h-1A03h TxPDO mapping parameter N" (➜ p. 343)	0h	UINT 8	-	-	R/W	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Mapping entry 1
	2h	UINT 32	-	-	R/W	No	Mapping entry 2
	3h	UINT 32	-	-	R/W	No	Mapping entry 3
	4h	UINT 32	-	-	R/W	No	Mapping entry 4
	5h	UINT 32	-	-	R/W	No	Mapping entry 5
	6h	UINT 32	-	-	R/W	No	Mapping entry 6
	7h	UINT 32	-	-	R/W	No	Mapping entry 7
	8h	UINT 32	-	-	R/W	No	Mapping entry 8
	9h	UINT 32	-	-	R/W	No	Mapping entry 9
	Ah	UINT 32	-	-	R/W	No	Mapping entry 10
	Bh	UINT 32	-	-	R/W	No	Mapping entry 11
	Ch	UINT 32	-	-	R/W	No	Mapping entry 12
	Dh	UINT 32	-	-	R/W	No	Mapping entry 13
	Eh	UINT 32	-	-	R/W	No	Mapping entry 14
	Fh	UINT 32	-	-	R/W	No	Mapping entry 15
	10h	UINT 32	-	-	R/W	No	Mapping entry 16
	11h	UINT 32	-	-	R/W	No	Mapping entry 17
	12h	UINT 32	-	-	R/W	No	Mapping entry 18
	13h	UINT 32	-	-	R/W	No	Mapping entry 19
	14h	UINT 32	-	-	R/W	No	Mapping entry 20
	15h	UINT 32	-	-	R/W	No	Mapping entry 21
	16h	UINT 32	-	-	R/W	No	Mapping entry 22
	17h	UINT 32	-	-	R/W	No	Mapping entry 23
	18h	UINT 32	-	-	R/W	No	Mapping entry 24

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	R/W	No	Mapping entry 25
	1Ah	UINT 32	-	-	R/W	No	Mapping entry 26
	1Bh	UINT 32	-	-	R/W	No	Mapping entry 27
	1Ch	UINT 32	-	-	R/W	No	Mapping entry 28
	1Dh	UINT 32	-	-	R/W	No	Mapping entry 29
	1Eh	UINT 32	-	-	R/W	No	Mapping entry 30
	1Fh	UINT 32	-	-	R/W	No	Mapping entry 31
	20h	UINT 32	-	-	R/W	No	Mapping entry 32

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1A00h-1A03h TxPDO mapping parameter N" (➔ p. 343)	0h	UINT 8	-	-	R/W	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Mapping entry 1
	2h	UINT 32	-	-	R/W	No	Mapping entry 2
	3h	UINT 32	-	-	R/W	No	Mapping entry 3
	4h	UINT 32	-	-	R/W	No	Mapping entry 4
	5h	UINT 32	-	-	R/W	No	Mapping entry 5
	6h	UINT 32	-	-	R/W	No	Mapping entry 6
	7h	UINT 32	-	-	R/W	No	Mapping entry 7
	8h	UINT 32	-	-	R/W	No	Mapping entry 8
	9h	UINT 32	-	-	R/W	No	Mapping entry 9
	Ah	UINT 32	-	-	R/W	No	Mapping entry 10
	Bh	UINT 32	-	-	R/W	No	Mapping entry 11
	Ch	UINT 32	-	-	R/W	No	Mapping entry 12
	Dh	UINT 32	-	-	R/W	No	Mapping entry 13
	Eh	UINT 32	-	-	R/W	No	Mapping entry 14
	Fh	UINT 32	-	-	R/W	No	Mapping entry 15
	10h	UINT 32	-	-	R/W	No	Mapping entry 16
	11h	UINT 32	-	-	R/W	No	Mapping entry 17
	12h	UINT 32	-	-	R/W	No	Mapping entry 18
	13h	UINT 32	-	-	R/W	No	Mapping entry 19
	14h	UINT 32	-	-	R/W	No	Mapping entry 20
	15h	UINT 32	-	-	R/W	No	Mapping entry 21
	16h	UINT 32	-	-	R/W	No	Mapping entry 22
	17h	UINT 32	-	-	R/W	No	Mapping entry 23
	18h	UINT 32	-	-	R/W	No	Mapping entry 24

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	R/W	No	Mapping entry 25
	1Ah	UINT 32	-	-	R/W	No	Mapping entry 26
	1Bh	UINT 32	-	-	R/W	No	Mapping entry 27
	1Ch	UINT 32	-	-	R/W	No	Mapping entry 28
	1Dh	UINT 32	-	-	R/W	No	Mapping entry 29
	1Eh	UINT 32	-	-	R/W	No	Mapping entry 30
	1Fh	UINT 32	-	-	R/W	No	Mapping entry 31
	20h	UINT 32	-	-	R/W	No	Mapping entry 32

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1A00h-1A03h TxPDO mapping parameter N" (➜ p. 343)	0h	UINT 8	-	-	R/W	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Mapping entry 1
	2h	UINT 32	-	-	R/W	No	Mapping entry 2
	3h	UINT 32	-	-	R/W	No	Mapping entry 3
	4h	UINT 32	-	-	R/W	No	Mapping entry 4
	5h	UINT 32	-	-	R/W	No	Mapping entry 5
	6h	UINT 32	-	-	R/W	No	Mapping entry 6
	7h	UINT 32	-	-	R/W	No	Mapping entry 7
	8h	UINT 32	-	-	R/W	No	Mapping entry 8
	9h	UINT 32	-	-	R/W	No	Mapping entry 9
	Ah	UINT 32	-	-	R/W	No	Mapping entry 10
	Bh	UINT 32	-	-	R/W	No	Mapping entry 11
	Ch	UINT 32	-	-	R/W	No	Mapping entry 12
	Dh	UINT 32	-	-	R/W	No	Mapping entry 13
	Eh	UINT 32	-	-	R/W	No	Mapping entry 14
	Fh	UINT 32	-	-	R/W	No	Mapping entry 15
	10h	UINT 32	-	-	R/W	No	Mapping entry 16
	11h	UINT 32	-	-	R/W	No	Mapping entry 17
	12h	UINT 32	-	-	R/W	No	Mapping entry 18
	13h	UINT 32	-	-	R/W	No	Mapping entry 19
	14h	UINT 32	-	-	R/W	No	Mapping entry 20
	15h	UINT 32	-	-	R/W	No	Mapping entry 21
	16h	UINT 32	-	-	R/W	No	Mapping entry 22
	17h	UINT 32	-	-	R/W	No	Mapping entry 23
	18h	UINT 32	-	-	R/W	No	Mapping entry 24

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	R/W	No	Mapping entry 25
	1Ah	UINT 32	-	-	R/W	No	Mapping entry 26
	1Bh	UINT 32	-	-	R/W	No	Mapping entry 27
	1Ch	UINT 32	-	-	R/W	No	Mapping entry 28
	1Dh	UINT 32	-	-	R/W	No	Mapping entry 29
	1Eh	UINT 32	-	-	R/W	No	Mapping entry 30
	1Fh	UINT 32	-	-	R/W	No	Mapping entry 31
	20h	UINT 32	-	-	R/W	No	Mapping entry 32

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1A00h-1A03h TxPDO mapping parameter N" (➜ p. 343)	0h	UINT 8	-	-	R/W	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Mapping entry 1
	2h	UINT 32	-	-	R/W	No	Mapping entry 2
	3h	UINT 32	-	-	R/W	No	Mapping entry 3
	4h	UINT 32	-	-	R/W	No	Mapping entry 4
	5h	UINT 32	-	-	R/W	No	Mapping entry 5
	6h	UINT 32	-	-	R/W	No	Mapping entry 6
	7h	UINT 32	-	-	R/W	No	Mapping entry 7
	8h	UINT 32	-	-	R/W	No	Mapping entry 8
	9h	UINT 32	-	-	R/W	No	Mapping entry 9
	Ah	UINT 32	-	-	R/W	No	Mapping entry 10
	Bh	UINT 32	-	-	R/W	No	Mapping entry 11
	Ch	UINT 32	-	-	R/W	No	Mapping entry 12
	Dh	UINT 32	-	-	R/W	No	Mapping entry 13
	Eh	UINT 32	-	-	R/W	No	Mapping entry 14
	Fh	UINT 32	-	-	R/W	No	Mapping entry 15
	10h	UINT 32	-	-	R/W	No	Mapping entry 16
	11h	UINT 32	-	-	R/W	No	Mapping entry 17
	12h	UINT 32	-	-	R/W	No	Mapping entry 18
	13h	UINT 32	-	-	R/W	No	Mapping entry 19
	14h	UINT 32	-	-	R/W	No	Mapping entry 20
	15h	UINT 32	-	-	R/W	No	Mapping entry 21
	16h	UINT 32	-	-	R/W	No	Mapping entry 22
	17h	UINT 32	-	-	R/W	No	Mapping entry 23
	18h	UINT 32	-	-	R/W	No	Mapping entry 24

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	R/W	No	Mapping entry 25
	1Ah	UINT 32	-	-	R/W	No	Mapping entry 26
	1Bh	UINT 32	-	-	R/W	No	Mapping entry 27
	1Ch	UINT 32	-	-	R/W	No	Mapping entry 28
	1Dh	UINT 32	-	-	R/W	No	Mapping entry 29
	1Eh	UINT 32	-	-	R/W	No	Mapping entry 30
	1Fh	UINT 32	-	-	R/W	No	Mapping entry 31
	20h	UINT 32	-	-	R/W	No	Mapping entry 32
"1A20h TxPDO fixed mapping parameter 0x1a20" (➔ p. 347)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
"1B00h TxPDO fixed mapping parameter 0x1b00" (➔ p. 347)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
	3h	UINT 32	-	-	RO	No	Mapping entry 3
"1B01h TxPDO fixed mapping parameter 0x1b01" (➔ p. 348)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
	3h	UINT 32	-	-	RO	No	Mapping entry 3
"1B02h TxPDO fixed mapping parameter 0x1b02" (➔ p. 348)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
	3h	UINT 32	-	-	RO	No	Mapping entry 3
"1B03h TxPDO fixed mapping parameter 0x1b03" (➔ p. 349)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1B04h TxPDO fixed mapping parameter 0x1b04" (➜ p. 349)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
"1B05h TxPDO fixed mapping parameter 0x1b05" (➜ p. 349)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
"1B06h TxPDO fixed mapping parameter 0x1b06" (➜ p. 350)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
"1B20h TxPDO fixed mapping parameter 0x1b20" (➜ p. 350)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
	3h	UINT 32	-	-	RO	No	Mapping entry 3
"1B21h TxPDO fixed mapping parameter 0x1b21" (➜ p. 351)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
	3h	UINT 32	-	-	RO	No	Mapping entry 3
"1B22h TxPDO fixed mapping parameter 0x1b22" (➜ p. 351)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
	3h	UINT 32	-	-	RO	No	Mapping entry 3
"1B23h TxPDO fixed mapping parameter 0x1b23" (➜ p. 351)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
"1B24h TxPDO fixed mapping parameter 0x1b24" (➜ p. 352)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1B25h TxPDO fixed mapping parameter 0x1b25" (➔ p. 352)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
	2h	UINT 32	-	-	RO	No	Mapping entry 2
"1B26h TxPDO fixed mapping parameter 0x1b26" (➔ p. 352)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Mapping entry 1
"1C00h Sync manager communication type" (➔ p. 353)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	RO	No	Communication type sync manager 1
	2h	UINT 8	-	-	RO	No	Communication type sync manager 2
	3h	UINT 8	-	-	RO	No	Communication type sync manager 3
	4h	UINT 8	-	-	RO	No	Communication type sync manager 4
"1C12h RxPDO assignment" (➔ p. 353)	0h	UINT 8	-	-	R/W	No	Highest sub-index supported
	1h	UINT 16	-	-	R/W	No	RxPDO mapping index 1
	2h	UINT 16	-	-	R/W	No	RxPDO mapping index 2
	3h	UINT 16	-	-	R/W	No	RxPDO mapping index 3
	4h	UINT 16	-	-	R/W	No	RxPDO mapping index 4
	5h	UINT 16	-	-	R/W	No	RxPDO mapping index 5
	6h	UINT 16	-	-	R/W	No	RxPDO mapping index 6
	7h	UINT 16	-	-	R/W	No	RxPDO mapping index 7
	8h	UINT 16	-	-	R/W	No	RxPDO mapping index 8
	9h	UINT 16	-	-	R/W	No	RxPDO mapping index 9
	Ah	UINT 16	-	-	R/W	No	RxPDO mapping index 10

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1C13h TxPDO assignment" (➜ p. 354)	0h	UINT 8	-	-	R/W	No	Highest sub-index supported
	1h	UINT 16	-	-	R/W	No	TxPDO mapping index 1
	2h	UINT 16	-	-	R/W	No	TxPDO mapping index 2
	3h	UINT 16	-	-	R/W	No	TxPDO mapping index 3
	4h	UINT 16	-	-	R/W	No	TxPDO mapping index 4
	5h	UINT 16	-	-	R/W	No	TxPDO mapping index 5
	6h	UINT 16	-	-	R/W	No	TxPDO mapping index 6
	7h	UINT 16	-	-	R/W	No	TxPDO mapping index 7
	8h	UINT 16	-	-	R/W	No	TxPDO mapping index 8
	9h	UINT 16	-	-	R/W	No	TxPDO mapping index 9
	Ah	UINT 16	-	-	R/W	No	TxPDO mapping index 10
"1C32h Output SyncManager Parameter" (➜ p. 355)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 16	-	-	RO	No	Synchronization type
	2h	UINT 32	-	-	RO	No	Cycle time
	3h	UINT 32	-	-	R/W	No	Shift time
	4h	UINT 16	-	-	RO	No	Sync modes supported
	5h	UINT 32	-	-	RO	No	Minimum cycle time
	6h	UINT 32	-	-	RO	No	Calc and copy time
	7h	UINT 32	-	-	RO	No	Minimum delay time
	8h	UINT 16	-	-	R/W	No	Get cycle time
	9h	UINT 32	-	-	RO	No	Delay time
	Ah	UINT 32	-	-	RO	No	Sync0 Cycle Time
	Bh	UINT 16	-	-	RO	No	SM-Event Missed
	Ch	UINT 16	-	-	RO	No	Cycle time too small

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"1C33h Input SyncManager Parameter" (➜ p. 357)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 16	-	-	RO	No	Synchronization type
	2h	UINT 32	-	-	RO	No	Cycle time
	3h	UINT 32	-	-	R/W	No	Shift time
	4h	UINT 16	-	-	RO	No	Sync modes supported
	5h	UINT 32	-	-	RO	No	Minimum cycle time
	6h	UINT 32	-	-	RO	No	Calc and copy time
	7h	UINT 32	-	-	RO	No	Minimum delay time
	8h	UINT 16	-	-	R/W	No	Get cycle time
	9h	UINT 32	-	-	RO	No	Delay time
	Ah	UINT 32	-	-	RO	No	Sync0 Cycle Time
	Bh	UINT 16	-	-	RO	No	SM-Event Missed
	Ch	UINT 16	-	-	RO	No	Cycle time too small
"2F00h Firmware" (➜ p. 360)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Major firmware version
	2h	UINT 32	-	-	RO	No	Minor firmware version
	3h	UINT 32	-	-	RO	No	Firmware revision
	4h	UINT 32	-	-	RO	No	Firmware branch
	5h	String (64)	-	-	RO	No	Firmware version

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
3000h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	String (30)	-	-	R/W	No	DRV.NAME
	2h	String (32)	-	-	R/W	No	DRV.CUSTOMIDENTIFIER
	3h	UINT 32	-	-	RO	No	DRV.NVCHECK
	4h	UINT 32	-	-	Write only	No	DRV.NVSAVE
	5h	UINT 32	-	-	Write only	No	DRV.NVLOAD
	6h	UINT 32	-	-	RO	No	DRV.RUNTIME
	7h	UINT 32	-	-	Write only	No	DRV.RSTVAR
	8h	INT32	-	-	RO	No	DRV.TEMP
	9h	String (32)	-	-	RO	No	Drive HW serial number
"3001h Drive status" (➜ p. 360)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	Yes	Drive status 1
"3007h REGEN.*" (➜ p. 360)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	Yes	REGEN.POWERFILTERED
	2h	UINT 32	-	-	RO	Yes	REGEN.POWER
	3h	INT8	-	-	R/W	No	REGEN.TYPE
	4h	UINT 16	-	-	R/W	No	REGEN.WATTEXT
	5h	UINT 32	1000 :1	-	R/W	No	REGEN.TEXT
	6h	UINT 16	-	-	R/W	No	REGEN.REXT

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"300Ah VBUS.*" (➔ p. 362)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	-	RO	Yes	VBUS.VALUE
	2h	UINT 16	-	-	R/W	No	VBUS.UVFTHRESH
	3h	UINT 16	-	-	R/W	No	VBUS.UVWTHRESH
	4h	UINT 8	-	-	R/W	No	VBUS.UVMODE
	5h	UINT 16	-	-	R/W	No	VBUS.ACNOMINAL
	6h	UINT 16	-	-	R/W	No	VBUS.DCNOMINAL
	7h	UINT 8	-	-	R/W	No	VBUS.DCOPERATION
	8h	UINT 16	-	-	R/W	No	VBUS.OVWTHRESH
	9h	UINT 8	-	-	R/W	No	VBUS.THREEPHASE
"300Bh CANOPEN.*" (➔ p. 363)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	CANOPEN.MONITORSYNC
	2h	UINT 8	-	-	R/W	No	CANOPEN.WORKBENCHUNITS
	3h	UINT 8	-	-	RO	Yes	Tx Loopback
	4h	UINT 8	-	-	R/W	Yes	Rx Loopback
	5h	UINT 8	-	-	R/W	No	CANOPEN.EMCYRESEND

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"300Ch Fault history: fault number" (➜ p. 363)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Fault history: fault number 0
	2h	UINT 32	-	-	RO	No	Fault history: fault number 1
	3h	UINT 32	-	-	RO	No	Fault history: fault number 2
	4h	UINT 32	-	-	RO	No	Fault history: fault number 3
	5h	UINT 32	-	-	RO	No	Fault history: fault number 4
	6h	UINT 32	-	-	RO	No	Fault history: fault number 5
	7h	UINT 32	-	-	RO	No	Fault history: fault number 6
	8h	UINT 32	-	-	RO	No	Fault history: fault number 7
	9h	UINT 32	-	-	RO	No	Fault history: fault number 8
	Ah	UINT 32	-	-	RO	No	Fault history: fault number 9
	Bh	UINT 32	-	-	RO	No	Fault history: fault number 10
	Ch	UINT 32	-	-	RO	No	Fault history: fault number 11
	Dh	UINT 32	-	-	RO	No	Fault history: fault number 12
	Eh	UINT 32	-	-	RO	No	Fault history: fault number 13
	Fh	UINT 32	-	-	RO	No	Fault history: fault number 14
	10h	UINT 32	-	-	RO	No	Fault history: fault number 15
	11h	UINT 32	-	-	RO	No	Fault history: fault number 16
	12h	UINT 32	-	-	RO	No	Fault history: fault number 17
	13h	UINT 32	-	-	RO	No	Fault history: fault number 18
	14h	UINT 32	-	-	RO	No	Fault history: fault number 19

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"300Dh Fault history: fault timestamp" (➜ p. 364)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	Fault history: fault timestamp 0
	2h	UINT 32	-	-	RO	No	Fault history: fault timestamp 1
	3h	UINT 32	-	-	RO	No	Fault history: fault timestamp 2
	4h	UINT 32	-	-	RO	No	Fault history: fault timestamp 3
	5h	UINT 32	-	-	RO	No	Fault history: fault timestamp 4
	6h	UINT 32	-	-	RO	No	Fault history: fault timestamp 5
	7h	UINT 32	-	-	RO	No	Fault history: fault timestamp 6
	8h	UINT 32	-	-	RO	No	Fault history: fault timestamp 7
	9h	UINT 32	-	-	RO	No	Fault history: fault timestamp 8
	Ah	UINT 32	-	-	RO	No	Fault history: fault timestamp 9
	Bh	UINT 32	-	-	RO	No	Fault history: fault timestamp 10
	Ch	UINT 32	-	-	RO	No	Fault history: fault timestamp 11
	Dh	UINT 32	-	-	RO	No	Fault history: fault timestamp 12
	Eh	UINT 32	-	-	RO	No	Fault history: fault timestamp 13
	Fh	UINT 32	-	-	RO	No	Fault history: fault timestamp 14
	10h	UINT 32	-	-	RO	No	Fault history: fault timestamp 15
	11h	UINT 32	-	-	RO	No	Fault history: fault timestamp 16
	12h	UINT 32	-	-	RO	No	Fault history: fault timestamp 17
	13h	UINT 32	-	-	RO	No	Fault history: fault timestamp 18
	14h	UINT 32	-	-	RO	No	Fault history: fault timestamp 19

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"300Eh GANTRY.*" (➜ p. 365)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	Position	RO	No	GANTRY.PL.ERR
	2h	INT32	-	Position	R/W	No	GANTRY.PL.ERRFTHRESH
	3h	INT32	-	Position	R/W	No	GANTRY.PL.ERRWTHRESH
	4h	UINT 8	-	-	R/W	No	GANTRY.HOME.REQUIRED
	5h	UINT 8	-	-	RO	No	GANTRY.STATE
	6h	UINT 16	1000:1	-	R/W	No	GANTRY.PL.ERRTTHRESH
"3010h SD.*" (➜ p. 361)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	SD.LOGEN
"3011h LOG.*" (➜ p. 361)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	LOG.SOURCE
"3012h BRAKE1.*" (➜ p. 361)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	BRAKE1.AXIS
	2h	UINT 8	-	-	R/W	No	BRAKE2.AXIS
"3013h IP.*" (➜ p. 361)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	IP.ADDRESS
	2h	UINT 8	-	-	R/W	No	IP.DEFAULTINTERFACE
	3h	UINT 32	-	-	R/W	No	IP.GATEWAY
	4h	UINT 16	-	-	R/W	No	IP.MODE
	5h	UINT 8	-	-	R/W	No	IP.PROTOCOL
	6h	UINT 32	-	-	R/W	No	IP.SUBNET

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3014h MODBUS.*" (➜ p. 362)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	MODBUS.EN
	2h	UINT 8	-	-	R/W	No	MODBUS.ENDIAN
	3h	UINT 8	-	-	R/W	No	MODBUS.ERRORMODE
	4h	UINT 8	-	-	R/W	No	MODBUS.KEEPALIVE
	5h	UINT 16	-	-	R/W	No	MODBUS.WATCHDOG
"3015h Connector settings" (➜ p. 362)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	X22.MODE
	2h	UINT 8	-	-	R/W	No	X23.MODE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3500h FB1.*" (➔ p. 366)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT16	-	-	R/W	No	FB1.SELECT
	2h	UINT 32	-	-	R/W	No	FB1.ENCLINES
	3h	UINT 16	-	-	R/W	No	FB1.POLES
	4h	UINT 16	1000 :1	-	R/W	No	FB1.RESKTR
	5h	INT32	1000 :1	-	R/W	No	FB1.RESREFPHASE
	6h	UINT 16	-	-	R/W	No	FB1.BITS
	7h	UINT 16	-	-	R/W	No	FB1.CALTHRESHRES
	8h	UINT 16	-	-	R/W	No	FB1.CALTHRESHSINCOS
	9h	INT16	-	-	R/W	No	FB1.LASTIDENTIFIED
	Ah	UINT 32	1000 :1	-	R/W	No	FB1.LINEPITCH
	Bh	UINT 8	-	-	R/W	No	FB1.MECHTYPE
	Ch	UINT 8	-	-	R/W	No	FB1.MULTITURNBITS
	Dh	UINT 8	-	-	R/W	No	FB1.SINGLETURNBITS
	Eh	UINT 8	-	-	R/W	No	FB1.STOREMULTITURN.BITS
	Fh	UINT 8	-	-	R/W	No	FB1.STOREMULTITURN.ENABLE
	10h	UINT 8	-	-	R/W	No	FB1.TRACKINGCAL
	11h	UINT 8	-	-	R/W	No	FB1.INITSIGNED
	12h	UINT 8	-	-	R/W	No	FB1.SSITYPE
	13h	UINT 8	-	-	R/W	No	FB1.MONITOR1.SOURCE
	14h	UINT 8	-	-	R/W	No	FB1.MONITOR2.SOURCE
	15h	INT32	1000 :1	-	RO	Yes	FB1.MONITOR1.DATA
	16h	INT32	1000 :1	-	RO	Yes	FB1.MONITOR2.DATA

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3501h FB2.*" (➔ p. 367)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT16	-	-	R/W	No	FB2.SELECT
	2h	UINT32	-	-	R/W	No	FB2.ENCLINES
	3h	UINT16	-	-	R/W	No	FB2.POLES
	4h	UINT16	1000:1	-	R/W	No	FB2.RESKTR
	5h	INT32	1000:1	-	R/W	No	FB2.RESREFPHASE
	6h	UINT16	-	-	R/W	No	FB2.BITS
	7h	UINT16	-	-	R/W	No	FB2.CALTHRESHRES
	8h	UINT16	-	-	R/W	No	FB2.CALTHRESHSINCOS
	9h	INT16	-	-	R/W	No	FB2.LASTIDENTIFIED
	Ah	UINT32	1000:1	-	R/W	No	FB2.LINEPITCH
	Bh	UINT8	-	-	R/W	No	FB2.MECHTYPE
	Ch	UINT8	-	-	R/W	No	FB2.MULTITURNBITS
	Dh	UINT8	-	-	R/W	No	FB2.SINGLETURNBITS
	Eh	UINT8	-	-	R/W	No	FB2.STOREMULTITURN.BITS
	Fh	UINT8	-	-	R/W	No	FB2.STOREMULTITURN.ENABLE
	10h	UINT8	-	-	R/W	No	FB2.TRACKINGCAL
	11h	UINT8	-	-	R/W	No	FB2.INITSIGNED
	12h	UINT8	-	-	R/W	No	FB2.SSITYPE
	13h	UINT8	-	-	R/W	No	FB2.MONITOR1.SOURCE
	14h	UINT8	-	-	R/W	No	FB2.MONITOR2.SOURCE
	15h	INT32	1000:1	-	RO	Yes	FB2.MONITOR1.DATA
	16h	INT32	1000:1	-	RO	Yes	FB2.MONITOR2.DATA

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3502h FB3.*" (➔ p. 368)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT16	-	-	R/W	No	FB3.SELECT
	2h	UINT32	-	-	R/W	No	FB3.ENCLINES
	3h	UINT16	-	-	R/W	No	FB3.POLES
	4h	UINT16	1000:1	-	R/W	No	FB3.RESKTR
	5h	INT32	1000:1	-	R/W	No	FB3.RESREFPHASE
	6h	UINT16	-	-	R/W	No	FB3.BITS
	7h	UINT16	-	-	R/W	No	FB3.CALTHRESHRES
	8h	UINT16	-	-	R/W	No	FB3.CALTHRESHSINCOS
	9h	INT16	-	-	R/W	No	FB3.LASTIDENTIFIED
	Ah	UINT32	1000:1	-	R/W	No	FB3.LINEPITCH
	Bh	UINT8	-	-	R/W	No	FB3.MECHTYPE
	Ch	UINT8	-	-	R/W	No	FB3.MULTITURNBITS
	Dh	UINT8	-	-	R/W	No	FB3.SINGLETURNBITS
	Eh	UINT8	-	-	R/W	No	FB3.STOREMULTITURN.BITS
	Fh	UINT8	-	-	R/W	No	FB3.STOREMULTITURN.ENABLE
	10h	UINT8	-	-	R/W	No	FB3.TRACKINGCAL
	11h	UINT8	-	-	R/W	No	FB3.INITSIGNED
	12h	UINT8	-	-	R/W	No	FB3.SSITYPE
	13h	UINT8	-	-	R/W	No	FB3.MONITOR1.SOURCE
	14h	UINT8	-	-	R/W	No	FB3.MONITOR2.SOURCE
	15h	INT32	-	-	RO	Yes	FB3.MONITOR1.DATA
	16h	INT32	-	-	RO	Yes	FB3.MONITOR2.DATA

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3503h FB4.*" (➔ p. 369)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT16	-	-	R/W	No	FB4.SELECT
	2h	UINT 32	-	-	R/W	No	FB4.ENCLINES
	3h	UINT 16	-	-	R/W	No	FB4.POLES
	4h	UINT 16	1000 :1	-	R/W	No	FB4.RESKTR
	5h	INT32	1000 :1	-	R/W	No	FB4.RESREFPHASE
	6h	UINT 16	-	-	R/W	No	FB4.BITS
	7h	UINT 16	-	-	R/W	No	FB4.CALTHRESHRES
	8h	UINT 16	-	-	R/W	No	FB4.CALTHRESHSINCOS
	9h	INT16	-	-	R/W	No	FB4.LASTIDENTIFIED
	Ah	UINT 32	1000 :1	-	R/W	No	FB4.LINEPITCH
	Bh	UINT 8	-	-	R/W	No	FB4.MECHTYPE
	Ch	UINT 8	-	-	R/W	No	FB4.MULTITURNBITS
	Dh	UINT 8	-	-	R/W	No	FB4.SINGLETURNBITS
	Eh	UINT 8	-	-	R/W	No	FB4.STOREMULTITURN.BITS
	Fh	UINT 8	-	-	R/W	No	FB4.STOREMULTITURN.ENABLE
	10h	UINT 8	-	-	R/W	No	FB4.TRACKINGCAL
	11h	UINT 8	-	-	R/W	No	FB4.INITSIGNED
	12h	UINT 8	-	-	R/W	No	FB4.SSITYPE
	13h	UINT 8	-	-	R/W	No	FB4.MONITOR1.SOURCE
	14h	UINT 8	-	-	R/W	No	FB4.MONITOR2.SOURCE
	15h	INT32	-	-	RO	Yes	FB4.MONITOR1.DATA
	16h	INT32	-	-	RO	Yes	FB4.MONITOR2.DATA

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3504h FB5.*" (➔ p. 371)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT16	-	-	R/W	No	FB5.SELECT
	2h	UINT32	-	-	R/W	No	FB5.ENCLINES
	3h	UINT16	-	-	R/W	No	FB5.POLES
	4h	UINT16	1000:1	-	R/W	No	FB5.RESKTR
	5h	INT32	1000:1	-	R/W	No	FB5.RESREFPHASE
	6h	UINT16	-	-	R/W	No	FB5.BITS
	7h	UINT16	-	-	R/W	No	FB5.CALTHRESHRES
	8h	UINT16	-	-	R/W	No	FB5.CALTHRESHSINCOS
	9h	INT16	-	-	R/W	No	FB5.LASTIDENTIFIED
	Ah	UINT32	1000:1	-	R/W	No	FB5.LINEPITCH
	Bh	UINT8	-	-	R/W	No	FB5.MECHTYPE
	Ch	UINT8	-	-	R/W	No	FB5.MULTITURNBITS
	Dh	UINT8	-	-	R/W	No	FB5.SINGLETURNBITS
	Eh	UINT8	-	-	R/W	No	FB5.STOREMULTITURN.BITS
	Fh	UINT8	-	-	R/W	No	FB5.STOREMULTITURN.ENABLE
	10h	UINT8	-	-	R/W	No	FB5.TRACKINGCAL
	11h	UINT8	-	-	R/W	No	FB5.INITSIGNED
	12h	UINT8	-	-	R/W	No	FB5.SSITYPE
	13h	UINT8	-	-	R/W	No	FB5.MONITOR1.SOURCE
	14h	UINT8	-	-	R/W	No	FB5.MONITOR2.SOURCE
	15h	INT32	-	-	RO	Yes	FB5.MONITOR1.DATA
	16h	INT32	-	-	RO	Yes	FB5.MONITOR2.DATA

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3510h Feedback 1 faults" (➜ p. 372)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	FB1.FAULT1
	2h	UINT 32	-	-	RO	No	FB1.FAULT2
	3h	UINT 32	-	-	RO	No	FB1.FAULT3
	4h	UINT 32	-	-	RO	No	FB1.FAULT4
	5h	UINT 32	-	-	RO	No	FB1.FAULT5
"3511h Feedback 2 faults" (➜ p. 372)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	FB2.FAULT1
	2h	UINT 32	-	-	RO	No	FB2.FAULT2
	3h	UINT 32	-	-	RO	No	FB2.FAULT3
	4h	UINT 32	-	-	RO	No	FB2.FAULT4
	5h	UINT 32	-	-	RO	No	FB2.FAULT5
"3512h Feedback 3 faults" (➜ p. 372)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	FB3.FAULT1
	2h	UINT 32	-	-	RO	No	FB3.FAULT2
	3h	UINT 32	-	-	RO	No	FB3.FAULT3
	4h	UINT 32	-	-	RO	No	FB3.FAULT4
	5h	UINT 32	-	-	RO	No	FB3.FAULT5
"3513h Feedback 4 faults" (➜ p. 373)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	FB4.FAULT1
	2h	UINT 32	-	-	RO	No	FB4.FAULT2
	3h	UINT 32	-	-	RO	No	FB4.FAULT3
	4h	UINT 32	-	-	RO	No	FB4.FAULT4
	5h	UINT 32	-	-	RO	No	FB4.FAULT5

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3514h Feedback 5 faults" (➜ p. 373)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	FB5.FAULT1
	2h	UINT 32	-	-	RO	No	FB5.FAULT2
	3h	UINT 32	-	-	RO	No	FB5.FAULT3
	4h	UINT 32	-	-	RO	No	FB5.FAULT4
	5h	UINT 32	-	-	RO	No	FB5.FAULT5
"3580h Digital input states" (➜ p. 373)	0h	UINT 32	-	-	RO	Yes	Digital input states
"3590h DIN1.*" (➜ p. 374)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	DIN1.INV
	2h	UINT 8	-	-	R/W	No	DIN1.FILTER
"3591h DIN2.*" (➜ p. 374)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	DIN2.INV
	2h	UINT 8	-	-	R/W	No	DIN2.FILTER
"3592h DIN3.*" (➜ p. 374)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	DIN3.INV
	2h	UINT 8	-	-	R/W	No	DIN3.FILTER
"3593h DIN4.*" (➜ p. 374)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	DIN4.INV
	2h	UINT 8	-	-	R/W	No	DIN4.FILTER
"3594h DIN5.*" (➜ p. 375)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	DIN5.INV
	2h	UINT 8	-	-	R/W	No	DIN5.FILTER
"3595h DIN6.*" (➜ p. 375)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	DIN6.INV
	2h	UINT 8	-	-	R/W	No	DIN6.FILTER

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3596h DIN7.*" (➔ p. 375)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DIN7.INV
	2h	UINT8	-	-	R/W	No	DIN7.FILTER
"3597h DIN8.*" (➔ p. 375)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DIN8.INV
	2h	UINT8	-	-	R/W	No	DIN8.FILTER
"3598h DIN9.*" (➔ p. 375)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DIN9.INV
	2h	UINT8	-	-	R/W	No	DIN9.FILTER
"3599h DIN10.*" (➔ p. 376)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DIN10.INV
	2h	UINT8	-	-	R/W	No	DIN10.FILTER
"359Ah DIN11.*" (➔ p. 376)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DIN11.INV
	2h	UINT8	-	-	R/W	No	DIN11.FILTER
"359Bh DIN12.*" (➔ p. 376)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DIN12.INV
	2h	UINT8	-	-	R/W	No	DIN12.FILTER
"3600h Digital output states" (➔ p. 376)	0h	UINT32	-	-	RO	Yes	Digital output states
"3601h Digital output control" (➔ p. 377)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	-	R/W	Yes	Physical outputs
	2h	UINT32	-	-	R/W	No	Output mask
"360Ah DOUT1.*" (➔ p. 377)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DOUT1.SOURCE
	2h	UINT8	-	-	R/W	No	DOUT1.SOURCEID

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"360Bh DOUT2.*" (➜ p. 377)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DOUT2.SOURCE
	2h	UINT8	-	-	R/W	No	DOUT2.SOURCEID
"360Ch DOUT3.*" (➜ p. 378)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DOUT3.SOURCE
	2h	UINT8	-	-	R/W	No	DOUT3.SOURCEID
"360Dh DOUT4.*" (➜ p. 378)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DOUT4.SOURCE
	2h	UINT8	-	-	R/W	No	DOUT4.SOURCEID
"360Eh DOUT5.*" (➜ p. 378)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DOUT5.SOURCE
	2h	UINT8	-	-	R/W	No	DOUT5.SOURCEID
"360Fh DOUT6.*" (➜ p. 378)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DOUT6.SOURCE
	2h	UINT8	-	-	R/W	No	DOUT6.SOURCEID
"3610h DOUT7.*" (➜ p. 379)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DOUT7.SOURCE
	2h	UINT8	-	-	R/W	No	DOUT7.SOURCEID
"3611h DOUT8.*" (➜ p. 379)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DOUT8.SOURCE
	2h	UINT8	-	-	R/W	No	DOUT8.SOURCEID
"3612h DOUT9.*" (➜ p. 379)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DOUT9.SOURCE
	2h	UINT8	-	-	R/W	No	DOUT9.SOURCEID
"3680h Digital IO states" (➜ p. 379)	0h	UINT32	-	-	RO	Yes	Digital IO states

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"368Ah DIO1.*" (➜ p. 380)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	DIO1.DIR
	2h	UINT 8	-	-	R/W	No	DIO1.INV
	3h	UINT 8	-	-	R/W	No	DIO1.FILTER
	4h	UINT 8	-	-	R/W	Yes	DIO1.STATEU
	5h	UINT 8	-	-	R/W	No	DIO1.SOURCE
	6h	UINT 8	-	-	R/W	No	DIO1.SOURCEID
	7h	UINT 8	-	-	R/W	No	DIO1.TERM
"368Bh DIO2.*" (➜ p. 380)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	DIO2.DIR
	2h	UINT 8	-	-	R/W	No	DIO2.INV
	3h	UINT 8	-	-	R/W	No	DIO2.FILTER
	4h	UINT 8	-	-	R/W	Yes	DIO2.STATEU
	5h	UINT 8	-	-	R/W	No	DIO2.SOURCE
	6h	UINT 8	-	-	R/W	No	DIO2.SOURCEID
	7h	UINT 8	-	-	R/W	No	DIO2.TERM
"368Ch DIO3.*" (➜ p. 380)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	DIO3.DIR
	2h	UINT 8	-	-	R/W	No	DIO3.INV
	3h	UINT 8	-	-	R/W	No	DIO3.FILTER
	4h	UINT 8	-	-	R/W	Yes	DIO3.STATEU
	5h	UINT 8	-	-	R/W	No	DIO3.SOURCE
	6h	UINT 8	-	-	R/W	No	DIO3.SOURCEID
	7h	UINT 8	-	-	R/W	No	DIO3.TERM

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"368Dh DIO4.*" (➜ p. 381)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DIO4.DIR
	2h	UINT8	-	-	R/W	No	DIO4.INV
	3h	UINT8	-	-	R/W	No	DIO4.FILTER
	4h	UINT8	-	-	R/W	Yes	DIO4.STATEU
	5h	UINT8	-	-	R/W	No	DIO4.SOURCE
	6h	UINT8	-	-	R/W	No	DIO4.SOURCEID
	7h	UINT8	-	-	R/W	No	DIO4.TERM
"368Eh DIO5.*" (➜ p. 381)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DIO5.DIR
	2h	UINT8	-	-	R/W	No	DIO5.INV
	3h	UINT8	-	-	R/W	No	DIO5.FILTER
	4h	UINT8	-	-	R/W	Yes	DIO5.STATEU
	5h	UINT8	-	-	R/W	No	DIO5.SOURCE
	6h	UINT8	-	-	R/W	No	DIO5.SOURCEID
	7h	UINT8	-	-	R/W	No	DIO5.TERM
"368Fh DIO6.*" (➜ p. 381)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	DIO6.DIR
	2h	UINT8	-	-	R/W	No	DIO6.INV
	3h	UINT8	-	-	R/W	No	DIO6.FILTER
	4h	UINT8	-	-	R/W	Yes	DIO6.STATEU
	5h	UINT8	-	-	R/W	No	DIO6.SOURCE
	6h	UINT8	-	-	R/W	No	DIO6.SOURCEID
	7h	UINT8	-	-	R/W	No	DIO6.TERM

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3780h AIN1.*" (➔ p. 382)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT16	1000:1	-	RO	Yes	AIN1.VALUE
	2h	UINT32	1000:1	-	R/W	No	AIN1.CUTOFF
	3h	UINT16	-	-	R/W	No	AIN1.DEADBANDMODE
	4h	INT16	1000:1	-	R/W	No	AIN1.DEADBAND
	5h	INT16	1000:1	-	R/W	No	AIN1.OFFSET
"3781h AIN2.*" (➔ p. 382)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT16	1000:1	-	RO	Yes	AIN2.VALUE
	2h	UINT32	1000:1	-	R/W	No	AIN2.CUTOFF
	3h	UINT16	-	-	R/W	No	AIN2.DEADBANDMODE
	4h	INT16	1000:1	-	R/W	No	AIN2.DEADBAND
	5h	INT16	1000:1	-	R/W	No	AIN2.OFFSET
"3800h AOUT1.*" (➔ p. 382)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT16	1000:1	-	RO	Yes	AOUT1.VALUE
	2h	INT16	1000:1	-	R/W	Yes	AOUT1 Fieldbus Value
	3h	UINT8	-	-	R/W	No	AOUT1.SOURCE
	4h	UINT32	1000:1	-	R/W	No	AOUT1.CUTOFF
	5h	INT16	1000:1	-	R/W	No	AOUT1.OFFSET
"3801h AOUT2.*" (➔ p. 383)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT16	1000:1	-	RO	Yes	AOUT2.VALUE
	2h	INT16	1000:1	-	R/W	Yes	AOUT2 Fieldbus Value
	3h	UINT8	-	-	R/W	No	AOUT2.SOURCE
	4h	UINT32	1000:1	-	R/W	No	AOUT2.CUTOFF
	5h	INT16	1000:1	-	R/W	No	AOUT2.OFFSET

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3900h ACTION#.ACTIVE" (➜ p. 383)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	ACTION1.ACTIVE
	2h	UINT 8	-	-	R/W	No	ACTION2.ACTIVE
	3h	UINT 8	-	-	R/W	No	ACTION3.ACTIVE
	4h	UINT 8	-	-	R/W	No	ACTION4.ACTIVE
	5h	UINT 8	-	-	R/W	No	ACTION5.ACTIVE
	6h	UINT 8	-	-	R/W	No	ACTION6.ACTIVE
	7h	UINT 8	-	-	R/W	No	ACTION7.ACTIVE
	8h	UINT 8	-	-	R/W	No	ACTION8.ACTIVE
	9h	UINT 8	-	-	R/W	No	ACTION9.ACTIVE
	Ah	UINT 8	-	-	R/W	No	ACTION10.ACTIVE
	Bh	UINT 8	-	-	R/W	No	ACTION11.ACTIVE
	Ch	UINT 8	-	-	R/W	No	ACTION12.ACTIVE
	Dh	UINT 8	-	-	R/W	No	ACTION13.ACTIVE
	Eh	UINT 8	-	-	R/W	No	ACTION14.ACTIVE
	Fh	UINT 8	-	-	R/W	No	ACTION15.ACTIVE
	10h	UINT 8	-	-	R/W	No	ACTION16.ACTIVE
	11h	UINT 8	-	-	R/W	No	ACTION17.ACTIVE
	12h	UINT 8	-	-	R/W	No	ACTION18.ACTIVE
	13h	UINT 8	-	-	R/W	No	ACTION19.ACTIVE
	14h	UINT 8	-	-	R/W	No	ACTION20.ACTIVE
	15h	UINT 8	-	-	R/W	No	ACTION21.ACTIVE
	16h	UINT 8	-	-	R/W	No	ACTION22.ACTIVE
	17h	UINT 8	-	-	R/W	No	ACTION23.ACTIVE
	18h	UINT 8	-	-	R/W	No	ACTION24.ACTIVE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 8	-	-	R/W	No	ACTION25.ACTIVE
	1Ah	UINT 8	-	-	R/W	No	ACTION26.ACTIVE
	1Bh	UINT 8	-	-	R/W	No	ACTION27.ACTIVE
	1Ch	UINT 8	-	-	R/W	No	ACTION28.ACTIVE
	1Dh	UINT 8	-	-	R/W	No	ACTION29.ACTIVE
	1Eh	UINT 8	-	-	R/W	No	ACTION30.ACTIVE
	1Fh	UINT 8	-	-	R/W	No	ACTION31.ACTIVE
	20h	UINT 8	-	-	R/W	No	ACTION32.ACTIVE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3901h ACTION#.CONDITION" (➜ p. 384)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	ACTION1.CONDITION
	2h	UINT8	-	-	R/W	No	ACTION2.CONDITION
	3h	UINT8	-	-	R/W	No	ACTION3.CONDITION
	4h	UINT8	-	-	R/W	No	ACTION4.CONDITION
	5h	UINT8	-	-	R/W	No	ACTION5.CONDITION
	6h	UINT8	-	-	R/W	No	ACTION6.CONDITION
	7h	UINT8	-	-	R/W	No	ACTION7.CONDITION
	8h	UINT8	-	-	R/W	No	ACTION8.CONDITION
	9h	UINT8	-	-	R/W	No	ACTION9.CONDITION
	Ah	UINT8	-	-	R/W	No	ACTION10.CONDITION
	Bh	UINT8	-	-	R/W	No	ACTION11.CONDITION
	Ch	UINT8	-	-	R/W	No	ACTION12.CONDITION
	Dh	UINT8	-	-	R/W	No	ACTION13.CONDITION
	Eh	UINT8	-	-	R/W	No	ACTION14.CONDITION
	Fh	UINT8	-	-	R/W	No	ACTION15.CONDITION
	10h	UINT8	-	-	R/W	No	ACTION16.CONDITION
	11h	UINT8	-	-	R/W	No	ACTION17.CONDITION
	12h	UINT8	-	-	R/W	No	ACTION18.CONDITION
	13h	UINT8	-	-	R/W	No	ACTION19.CONDITION
	14h	UINT8	-	-	R/W	No	ACTION20.CONDITION
	15h	UINT8	-	-	R/W	No	ACTION21.CONDITION
	16h	UINT8	-	-	R/W	No	ACTION22.CONDITION
	17h	UINT8	-	-	R/W	No	ACTION23.CONDITION
	18h	UINT8	-	-	R/W	No	ACTION24.CONDITION

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 8	-	-	R/W	No	ACTION25.CONDITION
	1Ah	UINT 8	-	-	R/W	No	ACTION26.CONDITION
	1Bh	UINT 8	-	-	R/W	No	ACTION27.CONDITION
	1Ch	UINT 8	-	-	R/W	No	ACTION28.CONDITION
	1Dh	UINT 8	-	-	R/W	No	ACTION29.CONDITION
	1Eh	UINT 8	-	-	R/W	No	ACTION30.CONDITION
	1Fh	UINT 8	-	-	R/W	No	ACTION31.CONDITION
	20h	UINT 8	-	-	R/W	No	ACTION32.CONDITION

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3902h ACTION#.CONDITIONVALUE" (➔ p. 385)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT32	1000:1	-	R/W	No	ACTION1.CONDITIONVALUE
	2h	INT32	1000:1	-	R/W	No	ACTION2.CONDITIONVALUE
	3h	INT32	1000:1	-	R/W	No	ACTION3.CONDITIONVALUE
	4h	INT32	1000:1	-	R/W	No	ACTION4.CONDITIONVALUE
	5h	INT32	1000:1	-	R/W	No	ACTION5.CONDITIONVALUE
	6h	INT32	1000:1	-	R/W	No	ACTION6.CONDITIONVALUE
	7h	INT32	1000:1	-	R/W	No	ACTION7.CONDITIONVALUE
	8h	INT32	1000:1	-	R/W	No	ACTION8.CONDITIONVALUE
	9h	INT32	1000:1	-	R/W	No	ACTION9.CONDITIONVALUE
	Ah	INT32	1000:1	-	R/W	No	ACTION10.CONDITIONVALUE
	Bh	INT32	1000:1	-	R/W	No	ACTION11.CONDITIONVALUE
	Ch	INT32	1000:1	-	R/W	No	ACTION12.CONDITIONVALUE
	Dh	INT32	1000:1	-	R/W	No	ACTION13.CONDITIONVALUE
	Eh	INT32	1000:1	-	R/W	No	ACTION14.CONDITIONVALUE
	Fh	INT32	1000:1	-	R/W	No	ACTION15.CONDITIONVALUE
	10h	INT32	1000:1	-	R/W	No	ACTION16.CONDITIONVALUE
	11h	INT32	1000:1	-	R/W	No	ACTION17.CONDITIONVALUE
	12h	INT32	1000:1	-	R/W	No	ACTION18.CONDITIONVALUE
	13h	INT32	1000:1	-	R/W	No	ACTION19.CONDITIONVALUE
	14h	INT32	1000:1	-	R/W	No	ACTION20.CONDITIONVALUE
	15h	INT32	1000:1	-	R/W	No	ACTION21.CONDITIONVALUE
	16h	INT32	1000:1	-	R/W	No	ACTION22.CONDITIONVALUE
	17h	INT32	1000:1	-	R/W	No	ACTION23.CONDITIONVALUE
	18h	INT32	1000:1	-	R/W	No	ACTION24.CONDITIONVALUE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	INT32	1000:1	-	R/W	No	ACTION25.CONDITIONVALUE
	1Ah	INT32	1000:1	-	R/W	No	ACTION26.CONDITIONVALUE
	1Bh	INT32	1000:1	-	R/W	No	ACTION27.CONDITIONVALUE
	1Ch	INT32	1000:1	-	R/W	No	ACTION28.CONDITIONVALUE
	1Dh	INT32	1000:1	-	R/W	No	ACTION29.CONDITIONVALUE
	1Eh	INT32	1000:1	-	R/W	No	ACTION30.CONDITIONVALUE
	1Fh	INT32	1000:1	-	R/W	No	ACTION31.CONDITIONVALUE
	20h	INT32	1000:1	-	R/W	No	ACTION32.CONDITIONVALUE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3903h ACTION#.RUNCOUNT" (➜ p. 387)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	ACTION1.RUNCOUNT
	2h	UINT 32	-	-	RO	No	ACTION2.RUNCOUNT
	3h	UINT 32	-	-	RO	No	ACTION3.RUNCOUNT
	4h	UINT 32	-	-	RO	No	ACTION4.RUNCOUNT
	5h	UINT 32	-	-	RO	No	ACTION5.RUNCOUNT
	6h	UINT 32	-	-	RO	No	ACTION6.RUNCOUNT
	7h	UINT 32	-	-	RO	No	ACTION7.RUNCOUNT
	8h	UINT 32	-	-	RO	No	ACTION8.RUNCOUNT
	9h	UINT 32	-	-	RO	No	ACTION9.RUNCOUNT
	Ah	UINT 32	-	-	RO	No	ACTION10.RUNCOUNT
	Bh	UINT 32	-	-	RO	No	ACTION11.RUNCOUNT
	Ch	UINT 32	-	-	RO	No	ACTION12.RUNCOUNT
	Dh	UINT 32	-	-	RO	No	ACTION13.RUNCOUNT
	Eh	UINT 32	-	-	RO	No	ACTION14.RUNCOUNT
	Fh	UINT 32	-	-	RO	No	ACTION15.RUNCOUNT
	10h	UINT 32	-	-	RO	No	ACTION16.RUNCOUNT
	11h	UINT 32	-	-	RO	No	ACTION17.RUNCOUNT
	12h	UINT 32	-	-	RO	No	ACTION18.RUNCOUNT
	13h	UINT 32	-	-	RO	No	ACTION19.RUNCOUNT
	14h	UINT 32	-	-	RO	No	ACTION20.RUNCOUNT
	15h	UINT 32	-	-	RO	No	ACTION21.RUNCOUNT
	16h	UINT 32	-	-	RO	No	ACTION22.RUNCOUNT
	17h	UINT 32	-	-	RO	No	ACTION23.RUNCOUNT
	18h	UINT 32	-	-	RO	No	ACTION24.RUNCOUNT

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT32	-	-	RO	No	ACTION25.RUNCOUNT
	1Ah	UINT32	-	-	RO	No	ACTION26.RUNCOUNT
	1Bh	UINT32	-	-	RO	No	ACTION27.RUNCOUNT
	1Ch	UINT32	-	-	RO	No	ACTION28.RUNCOUNT
	1Dh	UINT32	-	-	RO	No	ACTION29.RUNCOUNT
	1Eh	UINT32	-	-	RO	No	ACTION30.RUNCOUNT
	1Fh	UINT32	-	-	RO	No	ACTION31.RUNCOUNT
	20h	UINT32	-	-	RO	No	ACTION32.RUNCOUNT

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3904h ACTION#.SOURCE" (➔ p. 389)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	ACTION1.SOURCE
	2h	UINT8	-	-	R/W	No	ACTION2.SOURCE
	3h	UINT8	-	-	R/W	No	ACTION3.SOURCE
	4h	UINT8	-	-	R/W	No	ACTION4.SOURCE
	5h	UINT8	-	-	R/W	No	ACTION5.SOURCE
	6h	UINT8	-	-	R/W	No	ACTION6.SOURCE
	7h	UINT8	-	-	R/W	No	ACTION7.SOURCE
	8h	UINT8	-	-	R/W	No	ACTION8.SOURCE
	9h	UINT8	-	-	R/W	No	ACTION9.SOURCE
	Ah	UINT8	-	-	R/W	No	ACTION10.SOURCE
	Bh	UINT8	-	-	R/W	No	ACTION11.SOURCE
	Ch	UINT8	-	-	R/W	No	ACTION12.SOURCE
	Dh	UINT8	-	-	R/W	No	ACTION13.SOURCE
	Eh	UINT8	-	-	R/W	No	ACTION14.SOURCE
	Fh	UINT8	-	-	R/W	No	ACTION15.SOURCE
	10h	UINT8	-	-	R/W	No	ACTION16.SOURCE
	11h	UINT8	-	-	R/W	No	ACTION17.SOURCE
	12h	UINT8	-	-	R/W	No	ACTION18.SOURCE
	13h	UINT8	-	-	R/W	No	ACTION19.SOURCE
	14h	UINT8	-	-	R/W	No	ACTION20.SOURCE
	15h	UINT8	-	-	R/W	No	ACTION21.SOURCE
	16h	UINT8	-	-	R/W	No	ACTION22.SOURCE
	17h	UINT8	-	-	R/W	No	ACTION23.SOURCE
	18h	UINT8	-	-	R/W	No	ACTION24.SOURCE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 8	-	-	R/W	No	ACTION25.SOURCE
	1Ah	UINT 8	-	-	R/W	No	ACTION26.SOURCE
	1Bh	UINT 8	-	-	R/W	No	ACTION27.SOURCE
	1Ch	UINT 8	-	-	R/W	No	ACTION28.SOURCE
	1Dh	UINT 8	-	-	R/W	No	ACTION29.SOURCE
	1Eh	UINT 8	-	-	R/W	No	ACTION30.SOURCE
	1Fh	UINT 8	-	-	R/W	No	ACTION31.SOURCE
	20h	UINT 8	-	-	R/W	No	ACTION32.SOURCE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3905h ACTION#.SOURCEID" (➜ p. 390)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	ACTION1.SOURCEID
	2h	UINT 8	-	-	R/W	No	ACTION2.SOURCEID
	3h	UINT 8	-	-	R/W	No	ACTION3.SOURCEID
	4h	UINT 8	-	-	R/W	No	ACTION4.SOURCEID
	5h	UINT 8	-	-	R/W	No	ACTION5.SOURCEID
	6h	UINT 8	-	-	R/W	No	ACTION6.SOURCEID
	7h	UINT 8	-	-	R/W	No	ACTION7.SOURCEID
	8h	UINT 8	-	-	R/W	No	ACTION8.SOURCEID
	9h	UINT 8	-	-	R/W	No	ACTION9.SOURCEID
	Ah	UINT 8	-	-	R/W	No	ACTION10.SOURCEID
	Bh	UINT 8	-	-	R/W	No	ACTION11.SOURCEID
	Ch	UINT 8	-	-	R/W	No	ACTION12.SOURCEID
	Dh	UINT 8	-	-	R/W	No	ACTION13.SOURCEID
	Eh	UINT 8	-	-	R/W	No	ACTION14.SOURCEID
	Fh	UINT 8	-	-	R/W	No	ACTION15.SOURCEID
	10h	UINT 8	-	-	R/W	No	ACTION16.SOURCEID
	11h	UINT 8	-	-	R/W	No	ACTION17.SOURCEID
	12h	UINT 8	-	-	R/W	No	ACTION18.SOURCEID
	13h	UINT 8	-	-	R/W	No	ACTION19.SOURCEID
	14h	UINT 8	-	-	R/W	No	ACTION20.SOURCEID
	15h	UINT 8	-	-	R/W	No	ACTION21.SOURCEID
	16h	UINT 8	-	-	R/W	No	ACTION22.SOURCEID
	17h	UINT 8	-	-	R/W	No	ACTION23.SOURCEID
	18h	UINT 8	-	-	R/W	No	ACTION24.SOURCEID

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 8	-	-	R/W	No	ACTION25.SOURCEID
	1Ah	UINT 8	-	-	R/W	No	ACTION26.SOURCEID
	1Bh	UINT 8	-	-	R/W	No	ACTION27.SOURCEID
	1Ch	UINT 8	-	-	R/W	No	ACTION28.SOURCEID
	1Dh	UINT 8	-	-	R/W	No	ACTION29.SOURCEID
	1Eh	UINT 8	-	-	R/W	No	ACTION30.SOURCEID
	1Fh	UINT 8	-	-	R/W	No	ACTION31.SOURCEID
	20h	UINT 8	-	-	R/W	No	ACTION32.SOURCEID

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3906h ACTION#.SOURCEPARAM" (➜ p. 391)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT32	1000:1	-	R/W	No	ACTION1.SOURCEPARAM
	2h	INT32	1000:1	-	R/W	No	ACTION2.SOURCEPARAM
	3h	INT32	1000:1	-	R/W	No	ACTION3.SOURCEPARAM
	4h	INT32	1000:1	-	R/W	No	ACTION4.SOURCEPARAM
	5h	INT32	1000:1	-	R/W	No	ACTION5.SOURCEPARAM
	6h	INT32	1000:1	-	R/W	No	ACTION6.SOURCEPARAM
	7h	INT32	1000:1	-	R/W	No	ACTION7.SOURCEPARAM
	8h	INT32	1000:1	-	R/W	No	ACTION8.SOURCEPARAM
	9h	INT32	1000:1	-	R/W	No	ACTION9.SOURCEPARAM
	Ah	INT32	1000:1	-	R/W	No	ACTION10.SOURCEPARAM
	Bh	INT32	1000:1	-	R/W	No	ACTION11.SOURCEPARAM
	Ch	INT32	1000:1	-	R/W	No	ACTION12.SOURCEPARAM
	Dh	INT32	1000:1	-	R/W	No	ACTION13.SOURCEPARAM
	Eh	INT32	1000:1	-	R/W	No	ACTION14.SOURCEPARAM
	Fh	INT32	1000:1	-	R/W	No	ACTION15.SOURCEPARAM
	10h	INT32	1000:1	-	R/W	No	ACTION16.SOURCEPARAM
	11h	INT32	1000:1	-	R/W	No	ACTION17.SOURCEPARAM
	12h	INT32	1000:1	-	R/W	No	ACTION18.SOURCEPARAM
	13h	INT32	1000:1	-	R/W	No	ACTION19.SOURCEPARAM
	14h	INT32	1000:1	-	R/W	No	ACTION20.SOURCEPARAM
	15h	INT32	1000:1	-	R/W	No	ACTION21.SOURCEPARAM
	16h	INT32	1000:1	-	R/W	No	ACTION22.SOURCEPARAM
	17h	INT32	1000:1	-	R/W	No	ACTION23.SOURCEPARAM
	18h	INT32	1000:1	-	R/W	No	ACTION24.SOURCEPARAM

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	INT32	1000:1	-	R/W	No	ACTION25.SOURCEPARAM
	1Ah	INT32	1000:1	-	R/W	No	ACTION26.SOURCEPARAM
	1Bh	INT32	1000:1	-	R/W	No	ACTION27.SOURCEPARAM
	1Ch	INT32	1000:1	-	R/W	No	ACTION28.SOURCEPARAM
	1Dh	INT32	1000:1	-	R/W	No	ACTION29.SOURCEPARAM
	1Eh	INT32	1000:1	-	R/W	No	ACTION30.SOURCEPARAM
	1Fh	INT32	1000:1	-	R/W	No	ACTION31.SOURCEPARAM
	20h	INT32	1000:1	-	R/W	No	ACTION32.SOURCEPARAM

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3907h ACTION#.TASK" (➜ p. 393)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	ACTION1.TASK
	2h	UINT8	-	-	R/W	No	ACTION2.TASK
	3h	UINT8	-	-	R/W	No	ACTION3.TASK
	4h	UINT8	-	-	R/W	No	ACTION4.TASK
	5h	UINT8	-	-	R/W	No	ACTION5.TASK
	6h	UINT8	-	-	R/W	No	ACTION6.TASK
	7h	UINT8	-	-	R/W	No	ACTION7.TASK
	8h	UINT8	-	-	R/W	No	ACTION8.TASK
	9h	UINT8	-	-	R/W	No	ACTION9.TASK
	Ah	UINT8	-	-	R/W	No	ACTION10.TASK
	Bh	UINT8	-	-	R/W	No	ACTION11.TASK
	Ch	UINT8	-	-	R/W	No	ACTION12.TASK
	Dh	UINT8	-	-	R/W	No	ACTION13.TASK
	Eh	UINT8	-	-	R/W	No	ACTION14.TASK
	Fh	UINT8	-	-	R/W	No	ACTION15.TASK
	10h	UINT8	-	-	R/W	No	ACTION16.TASK
	11h	UINT8	-	-	R/W	No	ACTION17.TASK
	12h	UINT8	-	-	R/W	No	ACTION18.TASK
	13h	UINT8	-	-	R/W	No	ACTION19.TASK
	14h	UINT8	-	-	R/W	No	ACTION20.TASK
	15h	UINT8	-	-	R/W	No	ACTION21.TASK
	16h	UINT8	-	-	R/W	No	ACTION22.TASK
	17h	UINT8	-	-	R/W	No	ACTION23.TASK
	18h	UINT8	-	-	R/W	No	ACTION24.TASK

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 8	-	-	R/W	No	ACTION25.TASK
	1Ah	UINT 8	-	-	R/W	No	ACTION26.TASK
	1Bh	UINT 8	-	-	R/W	No	ACTION27.TASK
	1Ch	UINT 8	-	-	R/W	No	ACTION28.TASK
	1Dh	UINT 8	-	-	R/W	No	ACTION29.TASK
	1Eh	UINT 8	-	-	R/W	No	ACTION30.TASK
	1Fh	UINT 8	-	-	R/W	No	ACTION31.TASK
	20h	UINT 8	-	-	R/W	No	ACTION32.TASK

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3908h ACTION#.TASKID" (➔ p. 394)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	ACTION1.TASKID
	2h	UINT8	-	-	R/W	No	ACTION2.TASKID
	3h	UINT8	-	-	R/W	No	ACTION3.TASKID
	4h	UINT8	-	-	R/W	No	ACTION4.TASKID
	5h	UINT8	-	-	R/W	No	ACTION5.TASKID
	6h	UINT8	-	-	R/W	No	ACTION6.TASKID
	7h	UINT8	-	-	R/W	No	ACTION7.TASKID
	8h	UINT8	-	-	R/W	No	ACTION8.TASKID
	9h	UINT8	-	-	R/W	No	ACTION9.TASKID
	Ah	UINT8	-	-	R/W	No	ACTION10.TASKID
	Bh	UINT8	-	-	R/W	No	ACTION11.TASKID
	Ch	UINT8	-	-	R/W	No	ACTION12.TASKID
	Dh	UINT8	-	-	R/W	No	ACTION13.TASKID
	Eh	UINT8	-	-	R/W	No	ACTION14.TASKID
	Fh	UINT8	-	-	R/W	No	ACTION15.TASKID
	10h	UINT8	-	-	R/W	No	ACTION16.TASKID
	11h	UINT8	-	-	R/W	No	ACTION17.TASKID
	12h	UINT8	-	-	R/W	No	ACTION18.TASKID
	13h	UINT8	-	-	R/W	No	ACTION19.TASKID
	14h	UINT8	-	-	R/W	No	ACTION20.TASKID
	15h	UINT8	-	-	R/W	No	ACTION21.TASKID
	16h	UINT8	-	-	R/W	No	ACTION22.TASKID
	17h	UINT8	-	-	R/W	No	ACTION23.TASKID
	18h	UINT8	-	-	R/W	No	ACTION24.TASKID

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 8	-	-	R/W	No	ACTION25.TASKID
	1Ah	UINT 8	-	-	R/W	No	ACTION26.TASKID
	1Bh	UINT 8	-	-	R/W	No	ACTION27.TASKID
	1Ch	UINT 8	-	-	R/W	No	ACTION28.TASKID
	1Dh	UINT 8	-	-	R/W	No	ACTION29.TASKID
	1Eh	UINT 8	-	-	R/W	No	ACTION30.TASKID
	1Fh	UINT 8	-	-	R/W	No	ACTION31.TASKID
	20h	UINT 8	-	-	R/W	No	ACTION32.TASKID

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"3909h ACTION#.TASKPARAM" (➜ p. 395)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT32	1000:1	-	R/W	No	ACTION1.TASKPARAM
	2h	INT32	1000:1	-	R/W	No	ACTION2.TASKPARAM
	3h	INT32	1000:1	-	R/W	No	ACTION3.TASKPARAM
	4h	INT32	1000:1	-	R/W	No	ACTION4.TASKPARAM
	5h	INT32	1000:1	-	R/W	No	ACTION5.TASKPARAM
	6h	INT32	1000:1	-	R/W	No	ACTION6.TASKPARAM
	7h	INT32	1000:1	-	R/W	No	ACTION7.TASKPARAM
	8h	INT32	1000:1	-	R/W	No	ACTION8.TASKPARAM
	9h	INT32	1000:1	-	R/W	No	ACTION9.TASKPARAM
	Ah	INT32	1000:1	-	R/W	No	ACTION10.TASKPARAM
	Bh	INT32	1000:1	-	R/W	No	ACTION11.TASKPARAM
	Ch	INT32	1000:1	-	R/W	No	ACTION12.TASKPARAM
	Dh	INT32	1000:1	-	R/W	No	ACTION13.TASKPARAM
	Eh	INT32	1000:1	-	R/W	No	ACTION14.TASKPARAM
	Fh	INT32	1000:1	-	R/W	No	ACTION15.TASKPARAM
	10h	INT32	1000:1	-	R/W	No	ACTION16.TASKPARAM
	11h	INT32	1000:1	-	R/W	No	ACTION17.TASKPARAM
	12h	INT32	1000:1	-	R/W	No	ACTION18.TASKPARAM
	13h	INT32	1000:1	-	R/W	No	ACTION19.TASKPARAM
	14h	INT32	1000:1	-	R/W	No	ACTION20.TASKPARAM
	15h	INT32	1000:1	-	R/W	No	ACTION21.TASKPARAM
	16h	INT32	1000:1	-	R/W	No	ACTION22.TASKPARAM
	17h	INT32	1000:1	-	R/W	No	ACTION23.TASKPARAM
	18h	INT32	1000:1	-	R/W	No	ACTION24.TASKPARAM

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	INT32	1000:1	-	R/W	No	ACTION25.TASKPARAM
	1Ah	INT32	1000:1	-	R/W	No	ACTION26.TASKPARAM
	1Bh	INT32	1000:1	-	R/W	No	ACTION27.TASKPARAM
	1Ch	INT32	1000:1	-	R/W	No	ACTION28.TASKPARAM
	1Dh	INT32	1000:1	-	R/W	No	ACTION29.TASKPARAM
	1Eh	INT32	1000:1	-	R/W	No	ACTION30.TASKPARAM
	1Fh	INT32	1000:1	-	R/W	No	ACTION31.TASKPARAM
	20h	INT32	1000:1	-	R/W	No	ACTION32.TASKPARAM
"390Ah ACTION.RUNNING" (➔ p. 396)	0h	UINT32	-	-	RO	No	ACTION.RUNNING
"4100h USER.INT*" (➔ p. 396)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT16	-	-	R/W	No	USER.INT1
	2h	INT16	-	-	R/W	No	USER.INT2
	3h	INT16	-	-	R/W	No	USER.INT3
	4h	INT16	-	-	R/W	No	USER.INT4
	5h	INT16	-	-	R/W	No	USER.INT5
	6h	INT16	-	-	R/W	No	USER.INT6
	7h	INT16	-	-	R/W	No	USER.INT7
	8h	INT16	-	-	R/W	No	USER.INT8
	9h	INT16	-	-	R/W	No	USER.INT9
	Ah	INT16	-	-	R/W	No	USER.INT10
"4200h IP.DEFAULTINTERFACE" (➔ p. 397)	0h	UINT8	-	-	R/W	No	IP.DEFAULTINTERFACE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"4300h ECAT.*" (➔ p. 397)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	Yes	ECAT.SYNC0TIME
	2h	UINT 32	-	-	RO	Yes	ECAT.RXDONETIME
	3h	UINT 32	-	-	RO	Yes	ECAT.TXDONETIME
	4h	UINT 32	-	-	RO	Yes	ECAT.POSLOOPTIME
	5h	UINT 32	-	-	R/W	No	ECAT.PLLOFFSETNODC
	6h	UINT 8	-	-	R/W	No	ECAT.USEPLL
	7h	UINT 8	-	-	R/W	No	ECAT.ENRXWARN
"4400h CAP1.*" (➔ p. 397)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	CAP1.EDGE
	2h	UINT 8	-	-	R/W	No	CAP1.PREEDGE
	3h	UINT 8	-	-	R/W	No	CAP1.PREMODE
	4h	UINT 8	-	-	R/W	No	CAP1.PRESELECT
	5h	UINT 8	-	-	R/W	No	CAP1.REARM
	6h	UINT 8	-	-	R/W	No	CAP1.SOURCE
	7h	UINT 8	-	-	R/W	No	CAP1.TRIGGER
"4401h CAP2.*" (➔ p. 398)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	CAP2.EDGE
	2h	UINT 8	-	-	R/W	No	CAP2.PREEDGE
	3h	UINT 8	-	-	R/W	No	CAP2.PREMODE
	4h	UINT 8	-	-	R/W	No	CAP2.PRESELECT
	5h	UINT 8	-	-	R/W	No	CAP2.REARM
	6h	UINT 8	-	-	R/W	No	CAP2.SOURCE
	7h	UINT 8	-	-	R/W	No	CAP2.TRIGGER

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"4500h CMP1.*" (➔ p. 398)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	-	R/W	No	CMP1.ADVANCET
	2h	UINT8	-	-	R/W	No	CMP1.MODEN
	3h	UINT8	-	-	R/W	No	CMP1.SOURCE
"4501h CMP2.*" (➔ p. 398)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	-	R/W	No	CMP2.ADVANCET
	2h	UINT8	-	-	R/W	No	CMP2.MODEN
	3h	UINT8	-	-	R/W	No	CMP2.SOURCE
"4600h EEO1.*" (➔ p. 399)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	EEO1.DIR
	2h	UINT32	-	-	R/W	No	EEO1.LINES
	3h	UINT8	-	-	R/W	No	EEO1.MODE
	4h	UINT32	1000:1	-	R/W	No	EEO1.PULSEWIDTH
	5h	UINT8	-	-	R/W	No	EEO1.SOURCE
	6h	UINT8	-	-	R/W	No	EEO1.ZMODE
	7h	UINT32	-	-	R/W	No	EEO1.ZOFFSET
"4601h EEO2.*" (➔ p. 399)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	EEO2.DIR
	2h	UINT32	-	-	R/W	No	EEO2.LINES
	3h	UINT8	-	-	R/W	No	EEO2.MODE
	4h	UINT32	1000:1	-	R/W	No	EEO2.PULSEWIDTH
	5h	UINT8	-	-	R/W	No	EEO2.SOURCE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"5000h, 5100h AXIS#.*" (➜ p. 399)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	String (32)	-	-	R/W	No	AXIS1.NAME
	2h	INT32	-	-	RO	No	Reserved 5000h sub 02h
	3h	INT32	-	-	RO	No	Reserved 5000h sub 03h
	4h	UINT 32	-	-	RO	No	AXIS1.MOTIONSTAT
	5h	UINT 8	-	-	R/W	No	AXIS1.OPMODE
	6h	UINT 8	-	-	R/W	No	AXIS1.DISMODE
	7h	UINT 32	1000 :1	-	R/W	No	AXIS1.DBILIMIT
	8h	UINT 16	-	-	RO	No	AXIS1.DISSOURCES
	9h	UINT 32	-	-	R/W	No	AXIS1.DISTO
	Ah	UINT 8	-	-	R/W	No	AXIS1.ENDEFAULT
	Bh	INT32	1000 :1	-	RO	No	AXIS1.ICONT
	Ch	INT32	1000 :1	-	RO	No	AXIS1.IPEAK
	Dh	UINT 32	-	-	Write only	No	AXIS1.STOP
	Eh	UINT 8	-	-	R/W	No	AXIS1.CMDSOURCE
	Fh	UINT 8	-	-	R/W	No	AXIS1.DIR
	10h	INT32	-	-	RO	No	AXIS1.TEMP
"5001h, 5101h AXIS#.BODE.*" (➜ p. 401)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS1.BODE.INJECTPOINT
	2h	UINT 8	-	-	R/W	No	AXIS1.BODE.PRBDEPTH
	3h	INT32	-	Velocity	R/W	No	AXIS1.BODE.VAMP
"5002h, 5102h AXIS#.CS.*" (➜ p. 401)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	RO	No	AXIS1.CS.STATE
	2h	UINT 32	-	Acceleration	R/W	No	AXIS1.CS.DEC
	3h	UINT 32	-	-	R/W	No	AXIS1.ZEROT
	4h	INT32	-	Velocity	R/W	No	AXIS1.ZEROV
	5h	INT32	-	Acceleration	R/W	No	AXIS1.ZEROACC

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
5003h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS1.CANOPEN.PSCALE
	2h	INT32	-	-	RO	No	Reserved 5003h sub 02h
	3h	UINT 16	-	-	R/W	Yes	Brake control command - Axis 1
	4h	UINT 16	-	-	RO	Yes	Brake status response - Axis 1
	5h	INT32	-	-	R/W	Yes	Target torque (mA) - Axis 1
	6h	UINT 32	-	-	R/W	No	Profile position control - Axis 1
	7h	UINT 8	-	-	R/W	No	AXIS1.CANOPEN.PERRMODE
	8h	UINT 16	-	-	R/W	No	AXIS1.CANOPEN.STATUSEGDETIME
	9h	UINT 8	-	-	R/W	No	AXIS1.CANOPEN.TARPOSMODE
	Ah	UINT 8	-	-	R/W	No	AXIS1.CANOPEN.CONTROLBIT11.MODE
	Bh	UINT 8	-	-	R/W	No	AXIS1.CANOPEN.CONTROLBIT12.MODE
	Ch	UINT 8	-	-	R/W	No	AXIS1.CANOPEN.CONTROLBIT13.MODE
	Dh	UINT 8	-	-	R/W	No	AXIS1.CANOPEN.CONTROLBIT14.MODE
	Eh	UINT 8	-	-	R/W	No	AXIS1.CANOPEN.CONTROLBIT15.MODE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"5004h, 5104h AXIS#.FAULT#" (➔ p. 405)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 16	-	-	RO	No	AXIS1.FAULT1
	2h	UINT 16	-	-	RO	No	AXIS1.FAULT2
	3h	UINT 16	-	-	RO	No	AXIS1.FAULT3
	4h	UINT 16	-	-	RO	No	AXIS1.FAULT4
	5h	UINT 16	-	-	RO	No	AXIS1.FAULT5
	6h	UINT 16	-	-	RO	No	AXIS1.FAULT6
	7h	UINT 16	-	-	RO	No	AXIS1.FAULT7
	8h	UINT 16	-	-	RO	No	AXIS1.FAULT8
	9h	UINT 16	-	-	RO	No	AXIS1.FAULT9
	Ah	UINT 16	-	-	RO	No	AXIS1.FAULT10
"5005h, 5105h AXIS#.FBUS.*" (➔ p. 407)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS1.FBUS.PROTECTION
"5006h, 5106h AXIS#.GEAR.*" (➔ p. 407)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	Acceleration	R/W	No	AXIS1.GEAR.ACC
	2h	UINT 32	-	Acceleration	R/W	No	AXIS1.GEAR.DEC
	3h	UINT 16	-	-	R/W	No	AXIS1.GEAR.IN
	4h	INT16	-	-	R/W	No	AXIS1.GEAR.OUT
	5h	UINT 8	-	-	R/W	No	AXIS1.GEAR.AUTOSTART
	6h	UINT 8	-	-	R/W	No	AXIS1.GEAR.FBSOURCE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"5007h, 5107h AXIS#.SAFE.STO.*" (➜ p. 408)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS1.SAFE.STO.REPORTFAULT
	2h	UINT 8	-	-	RO	Yes	AXIS1.SAFE.STO.ACTIVE
	3h	UINT 8	-	-	RO	Yes	AXIS1.SAFE.STO.A
	4h	UINT 8	-	-	RO	Yes	AXIS1.SAFE.STO.B
	5h	UINT 32	-	-	RO	No	Reserved 5007h sub 05h
	6h	UINT 32	-	-	RO	No	Reserved 5007h sub 06h
	7h	UINT 8	-	-	RO	No	Reserved 5007h sub 07h
	8h	UINT 8	-	-	RO	No	Reserved 5007h sub 08h
	9h	UINT 8	-	-	RO	No	Reserved 5007h sub 09h
	Ah	UINT 32	-	-	RO	No	Reserved 5007h sub 0ah
	Bh	UINT 32	-	-	RO	No	Reserved 5007h sub 0bh
	Ch	UINT 32	-	-	RO	No	Reserved 5007h sub 0ch
	Dh	UINT 8	-	-	RO	No	Reserved 5007h sub 0dh
	Eh	UINT 8	-	-	RO	No	Reserved 5007h sub 0eh
	Fh	UINT 32	-	-	RO	No	Reserved 5007h sub 0fh
	10h	UINT 32	-	-	RO	No	Reserved 5007h sub 10h

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"5008h, 5108h AXIS#.HOME.*" (➔ p. 410)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	-	Write only	No	AXIS1.HOME.SET
	2h	UINT16	-	-	R/W	No	AXIS1.HOME.MODE
	3h	UINT16	-	-	R/W	No	AXIS1.HOME.DIR
	4h	UINT8	-	-	R/W	No	AXIS1.HOME.AUTOMOVE
	5h	INT32	1000:1	-	R/W	No	AXIS1.HOME.IPEAK
	6h	INT32	-	Position	R/W	No	AXIS1.HOME.PERRTHRESH
	7h	UINT32	-	Acceleration	R/W	No	AXIS1.HOME.DEC
	8h	UINT32	-	Acceleration	R/W	No	AXIS1.HOME.ACC
	9h	INT32	-	Position	R/W	No	AXIS1.HOME.DIST
	Ah	UINT8	-	-	R/W	No	AXIS1.HOME.SWITCHSOURCE
	Bh	UINT32	-	-	R/W	No	AXIS1.HOME.CREEPFACTOR
	Ch	UINT32	-	Position	R/W	No	AXIS1.HOME.MAXDIST
	Dh	UINT8	-	-	R/W	No	AXIS1.HOME.MULTITURNMODE
	Eh	UINT32	-	Position	R/W	No	AXIS1.HOME.OFFSETUSER
	Fh	UINT32	-	Position	R/W	No	AXIS1.HOME.P
	10h	UINT32	-	Velocity	R/W	No	AXIS1.HOME.V
"5009h, 5109h AXIS#.HWEN.*" (➔ p. 412)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	AXIS1.HWEN.SOURCE
	2h	UINT8	-	-	R/W	No	AXIS1.HWEN.MODE
	3h	UINT8	-	-	RO	No	AXIS1.HWEN.STATE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"500Ah, 510Ah AXIS#.IL.*" (➜ p. 422)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	1000:1	-	RO	Yes	AXIS1.IL.FB
	2h	UINT 32	1000:1	-	RO	No	AXIS1.IL.KP
	3h	UINT 32	1000:1	-	RO	No	AXIS1.IL.KPDRATIO
	4h	INT32	1000:1	-	R/W	No	AXIS1.IL.LIMITP
	5h	INT32	1000:1	-	R/W	No	AXIS1.IL.LIMITN
	6h	UINT 8	-	-	R/W	No	AXIS1.IL.FBSOURCE
	7h	INT32	1000:1	-	RO	No	AXIS1.IL.DIFOLD
	8h	INT32	1000:1	-	RO	No	AXIS1.IL.FOLDFTHRESH
	9h	INT32	1000:1	-	R/W	No	AXIS1.IL.FOLDFTHRESHU
	Ah	INT32	1000:1	-	R/W	No	AXIS1.IL.FOLDWTHRESH
	Bh	INT32	1000:1	-	R/W	No	AXIS1.IL.FRICTION
	Ch	INT32	1000:1	-	RO	No	AXIS1.IL.IFOLD
	Dh	INT32	1000:1	-	R/W	No	AXIS1.IL.KACCFF
	Eh	INT32	1000:1	-	R/W	No	AXIS1.IL.KVFF
	Fh	INT32	1000:1	-	RO	No	AXIS1.IL.MIFOLD
	10h	INT32	1000:1	-	R/W	No	AXIS1.IL.OFFSET
	11h	UINT 16	-	-	R/W	No	Max peak current - Axis 1
	12h	INT32	1000:1	-	RO	No	AXIS1.IL.DI2T
	13h	INT32	1000:1	-	RO	No	AXIS1.IL.MI2T
	14h	INT32	1000:1	-	R/W	No	AXIS1.IL.AINSCALE
	15h	UINT 8	-	-	R/W	No	AXIS1.IL.AINSOURCE
	16h	UINT 16	1000:1	-	R/W	No	AXIS1.IL.BW
	17h	UINT 8	-	-	R/W	No	AXIS1.IL.PWMQUIET

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"500Bh, 510Bh AXIS#.MOTOR.*" (➜ p. 424)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT16	-	-	RO	Yes	AXIS1.MOTOR.TEMPC
	2h	UINT 32	-	-	RO	Yes	AXIS1.MOTOR.TEMP
	3h	UINT 32	1000 :1	-	R/W	No	AXIS1.MOTOR.KT
	4h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.TYPE
	5h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.AUTOSET
	6h	UINT 16	-	-	R/W	No	AXIS1.MOTOR.VOLTRATED
	7h	UINT 16	-	-	R/W	No	AXIS1.MOTOR.VOLTMIN
	8h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.BRAKE
	9h	UINT 16	-	-	R/W	No	AXIS1.MOTOR.IMTR
	Ah	UINT 16	1000 :1	-	R/W	No	AXIS1.MOTOR.IMID
	Bh	INT32	-	Velocity	R/W	No	AXIS1.MOTOR.VRATED
	Ch	UINT 8	-	-	R/W	No	AXIS1.MOTOR.BRAKECONTROL
	Dh	UINT 8	-	-	R/W	No	AXIS1.MOTOR.BRAKEIMM
	Eh	UINT 32	1000 :1	-	R/W	No	AXIS1.MOTOR.CTF0
	Fh	UINT 8	-	-	R/W	No	AXIS1.MOTOR.FIELDWEAKENING
	10h	UINT 32	1000 :1	-	R/W	No	AXIS1.MOTOR.ICONT
	11h	UINT 32	1000 :1	-	R/W	No	AXIS1.MOTOR.INERTIA
	12h	UINT 32	1000 :1	-	R/W	No	AXIS1.MOTOR.IPEAK
	13h	UINT 32	1000 :1	-	R/W	No	AXIS1.MOTOR.KE
	14h	UINT 32	1000 :1	-	R/W	No	AXIS1.MOTOR.LQLL
	15h	UINT 16	-	-	R/W	No	AXIS1.MOTOR.PHASE
	16h	UINT 32	1000 :1	-	R/W	No	AXIS1.MOTOR.PITCH
	17h	UINT 16	-	-	R/W	No	AXIS1.MOTOR.POLES
	18h	UINT 32	1000 :1	-	R/W	No	AXIS1.MOTOR.R

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.RTYPE
	1Ah	UINT 16	-	-	R/W	No	AXIS1.MOTOR.TBRAKEAPP
	1Bh	UINT 16	-	-	R/W	No	AXIS1.MOTOR.TBRAKERLS
	1Ch	INT32	-	-	R/W	No	AXIS1.MOTOR.TBRAKETO
	1Dh	UINT 32	-	-	R/W	No	AXIS1.MOTOR.TEMPFAULT
	1Eh	UINT 32	-	-	R/W	No	AXIS1.MOTOR.TEMPWARN
	1Fh	UINT 16	-	-	R/W	No	AXIS1.MOTOR.VMAX
	20h	UINT 16	-	-	R/W	No	AXIS1.MOTOR.VOLTMAX
	21h	String (20)	-	-	R/W	No	AXIS1.MOTOR.NAME
	22h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.RSOURCE
	23h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.TEMPSOURCE
	24h	UINT 16	-	-	R/W	No	AXIS1.MOTOR.BRAKEPOWERDELAY
	25h	UINT 16	1000:1	-	R/W	No	AXIS1.MOTOR.BRAKEPOWERLOW
	26h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.BRAKEPOWERSAVING
	27h	UINT 32	1000:1	-	R/W	No	AXIS1.MOTOR.IDMAX
	28h	UINT 32	1000:1	-	R/W	No	AXIS1.MOTOR.LDLL
	29h	UINT 32	1000:1	-	R/W	No	AXIS1.MOTOR.LISAT
	2Ah	INT32	1000:1	-	R/W	No	AXIS1.MOTOR.PHSADVK1
	2Bh	INT32	1000:1	-	R/W	No	AXIS1.MOTOR.PHSADVK2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"500Ch, 510Ch AXIS#.PL.*" (➜ p. 429)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS1.PL.MODPDIR
	2h	INT32	-	Position	R/W	No	AXIS1.PL.ERRWTHRESH
	3h	INT32	-	Position	R/W	No	AXIS1.PL.ERRFTHRESH
	4h	UINT 32	1000 :1	-	R/W	No	AXIS1.PL.KP
	5h	INT32	-	Position	R/W	No	AXIS1.PL.MODP1
	6h	INT32	-	Position	R/W	No	AXIS1.PL.MODP2
	7h	INT32	-	Position	R/W	No	AXIS1.PL.AINSCALE
	8h	UINT 8	-	-	R/W	No	AXIS1.PL.FBSOURCE
	9h	INT32	-	Position	R/W	No	AXIS1.PL.INTOUTMAX
	Ah	UINT 32	1000 :1	-	R/W	No	AXIS1.PL.KI
	Bh	UINT 8	-	-	R/W	No	AXIS1.PL.MODPEN
	Ch	UINT 8	-	-	R/W	No	AXIS1.PL.AINSOURCE
	Dh	INT32	1000 :1	-	R/W	No	AXIS1.PL.KFB
	Eh	INT32	-	Velocity	R/W	No	AXIS1.PL.KITHRESH
	Fh	UINT 32	1000 :1	-	R/W	No	AXIS1.PL.FILTER.FREQ
	10h	UINT 16	1000 :1	-	R/W	No	AXIS1.PL.FILTER.Q
"500Eh, 510Eh AXIS#.SM.*" (➜ p. 431)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	1000 :1	-	R/W	No	AXIS1.SM.I1
	2h	INT32	1000 :1	-	R/W	No	AXIS1.SM.I2
	3h	UINT 16	-	-	R/W	No	AXIS1.SM.MODE
	4h	UINT 16	-	-	R/W	No	AXIS1.SM.T1
	5h	UINT 16	-	-	R/W	No	AXIS1.SM.T2
	6h	INT32	-	Velocity	R/W	No	AXIS1.SM.V1
	7h	INT32	-	Velocity	R/W	No	AXIS1.SM.V2
	8h	UINT 32	-	Acceleration	R/W	No	AXIS1.SM.ACC
	9h	UINT 32	-	Acceleration	R/W	No	AXIS1.SM.DEC

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"500Fh, 510Fh AXIS#.SWLS.*" (➜ p. 431)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS1.SWLS.EN
	2h	UINT 8	-	-	RO	No	AXIS1.SWLS.STATE
	3h	INT32	-	Position	R/W	No	AXIS1.SWLS.LIMIT0
	4h	INT32	-	Position	R/W	No	AXIS1.SWLS.LIMIT1
"5010h, 5110h AXIS#.UNIT.*" (➜ p. 432)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	AXIS1.UNIT.PIN
	2h	UINT 32	-	-	R/W	No	AXIS1.UNIT.POUT
	3h	UINT 8	-	-	R/W	No	AXIS1.UNIT.ACCROTARY
	4h	UINT 8	-	-	R/W	No	AXIS1.UNIT.VROTARY
	5h	UINT 8	-	-	R/W	No	AXIS1.UNIT.PROTARY
	6h	UINT 8	-	-	R/W	No	AXIS1.UNIT.ACCLINEAR
	7h	UINT 8	-	-	R/W	No	AXIS1.UNIT.PLINEAR
	8h	UINT 8	-	-	R/W	No	AXIS1.UNIT.VLINEAR
	9h	String (17)	-	-	R/W	No	AXIS1.UNIT.LABEL

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"5011h, 5111h AXIS#.VL.*" (➜ p. 433)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT32	1000:1	-	R/W	No	AXIS1.VL.KP
	2h	UINT32	1000:1	-	R/W	No	AXIS1.VL.KI
	3h	INT32	-	Velocity	RO	No	AXIS1.VL.FBFILTER
	4h	INT32	1000:1	-	R/W	No	AXIS1.VL.KVFF
	5h	INT32	-	Velocity	RO	No	AXIS1.VL.ERR
	6h	UINT32	-	Velocity	R/W	No	AXIS1.VL.LIMITP
	7h	INT32	-	Velocity	R/W	No	AXIS1.VL.LIMITN
	8h	UINT32	-	Velocity	R/W	No	AXIS1.VL.THRESH
	9h	INT32	1000:1	-	R/W	No	AXIS1.VL.AINSCALE
	Ah	INT32	-	-	RO	No	Reserved 5011h sub 0ah
	Bh	UINT32	1000:1	-	R/W	No	AXIS1.VL.LMJR
	Ch	INT8	-	-	R/W	No	AXIS1.VL.ARTYPE1
	Dh	INT8	-	-	R/W	No	AXIS1.VL.ARTYPE2
	Eh	INT8	-	-	R/W	No	AXIS1.VL.ARTYPE3
	Fh	INT8	-	-	R/W	No	AXIS1.VL.ARTYPE4
	10h	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARPF1
	11h	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARPF2
	12h	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARPF3
	13h	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARPF4
	14h	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARPQ1
	15h	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARPQ2
	16h	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARPQ3
	17h	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARPQ4
	18h	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARZF1
	19h	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARZF2
	1Ah	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARZF3
	1Bh	UINT32	1000:1	-	R/W	No	AXIS1.VL.ARZF4

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	1Ch	UINT 32	1000 :1	-	R/W	No	AXIS1.VL.ARZQ1
	1Dh	UINT 32	1000 :1	-	R/W	No	AXIS1.VL.ARZQ2
	1Eh	UINT 32	1000 :1	-	R/W	No	AXIS1.VL.ARZQ3
	1Fh	UINT 32	1000 :1	-	R/W	No	AXIS1.VL.ARZQ4
	20h	UINT 8	-	-	R/W	No	AXIS1.VL.AINSOURCE
	21h	UINT 32	-	Acceleration 16Khz	R/W	No	AXIS1.VL.AINACC
	22h	UINT 32	-	Acceleration 16Khz	R/W	No	AXIS1.VL.AINDEC
	23h	INT32	1000 :1	-	R/W	No	AXIS1.VL.KFB
	24h	UINT 8	-	-	R/W	No	AXIS1.VL.FBSOURCE
	25h	UINT 8	-	-	R/W	No	AXIS1.VL.KIMODE
"5012h, 5112h AXIS#.WARNING#" (➜ p. 436)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	AXIS1.WARNING1
	2h	UINT 32	-	-	RO	No	AXIS1.WARNING2
	3h	UINT 32	-	-	RO	No	AXIS1.WARNING3

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"5013h, 5113h AXIS#.WS.*" (➜ p. 436)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS1.WS.MODE
	2h	UINT 8	-	-	R/W	No	AXIS1.WS.NUMLOOPS
	3h	UINT 8	-	-	RO	No	AXIS1.WS.STATE
	4h	UINT 8	-	-	R/W	No	AXIS1.WS.T
	5h	UINT 8	-	-	R/W	No	AXIS1.WS.TDELAY1
	6h	UINT 8	-	-	R/W	No	AXIS1.WS.TDELAY2
	7h	UINT 16	-	-	R/W	No	AXIS1.WS.TDELAY3
	8h	UINT 16	-	-	R/W	No	AXIS1.WS.TDELAY4
	9h	UINT 32	-	-	Write only	No	AXIS1.WS.ARM
	Ah	UINT 8	-	-	R/W	No	AXIS1.WS.CHECKMODE
	Bh	INT32	-	Velocity	R/W	No	AXIS1.WS.CHECKV
	Ch	INT32	-	Position	R/W	No	AXIS1.WS.DISTMAX
	Dh	INT32	1000:1	-	R/W	No	AXIS1.WS.IMAX
	Eh	INT32	-	Velocity	R/W	No	AXIS1.WS.VTHRESH
	Fh	INT32	-	Position	R/W	No	AXIS1.WS.DISTMIN
	10h	UINT 16	-	-	R/W	No	AXIS1.WS.CHECKT
	11h	UINT 16	-	-	R/W	No	AXIS1.WS.TIRAMP
	12h	UINT 16	-	-	R/W	No	AXIS1.WS.TSTANDSTILL
	13h	UINT 32	1000:1	-	R/W	No	AXIS1.WS.FREQ
"5014h, 5114h AXIS#.LOAD.*" (➜ p. 438)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	1000:1	-	R/W	No	AXIS1.LOAD.INERTIA

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"5015h, 5115h AXIS#.HWLS.*" (➜ p. 438)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	RO	Yes	AXIS1.HWLS.NEGSTATE
	2h	UINT 8	-	-	RO	Yes	AXIS1.HWLS.POSSTATE
	3h	UINT 8	-	-	R/W	No	AXIS1.HWLS.NEGSOURCE
	4h	UINT 8	-	-	R/W	No	AXIS1.HWLS.POSSOURCE
"5016h, 5116h AXIS#.SETTLE.*" (➜ p. 439)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	Position	R/W	No	AXIS1.SETTLE.P
	2h	UINT 32	-	-	R/W	No	AXIS1.SETTLE.V
"5017h, 5117h AXIS#.OBS.*" (➜ p. 440)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	1000:1	-	R/W	No	AXIS1.OBS.BW
	2h	UINT 8	-	-	R/W	No	AXIS1.OBS.ENABLE
	3h	UINT 32	1000:1	-	R/W	No	AXIS1.OBS.KO
"5018h, 5118h AXIS#.SENSORLESS.*" (➜ p. 440)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	1000:1	-	R/W	No	AXIS1.SENSORLESS.BWU
	2h	UINT 8	-	-	R/W	No	AXIS1.SENSORLESS.ENPHASELEAD
	3h	INT32	1000:1	-	R/W	No	AXIS1.SENSORLESS.FAULTANGLE
	4h	INT32	1000:1	-	R/W	No	AXIS1.SENSORLESS.FAULTTIME
	5h	INT32	1000:1	-	R/W	No	AXIS1.SENSORLESS.ISTART
	6h	INT32	1000:1	-	R/W	No	AXIS1.SENSORLESS.RPMSTART
"5019h, 5119h AXIS#.FIELDWEAKENING.*" (➜ p. 441)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	-	R/W	No	AXIS1.FIELDWEAKENING.CURRFILTERBW
	2h	INT32	-	-	R/W	No	AXIS1.FIELDWEAKENING.LOOPBW
	3h	INT32	-	-	R/W	No	AXIS1.FIELDWEAKENING.VBUSMARGIN
	4h	INT32	-	-	R/W	No	AXIS1.FIELDWEAKENING.VOLTFILTERBW

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"501Bh, 511Bh AXIS#.JOG.*" (➔ p. 442)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	Acceleration	R/W	No	AXIS1.JOG.ACC
	2h	UINT 32	-	Acceleration	R/W	No	AXIS1.JOG.DEC
	3h	UINT 32	-	Velocity	R/W	No	AXIS1.JOG.V
501Ch	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS1.FAULT6004.ACTION
501Dh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS1.ECAT.REPORTWARNINGS
501Eh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS1 RxPDO
	2h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS2 RxPDO
	3h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS3 RxPDO
	4h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS4 RxPDO
	5h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS5 RxPDO
	6h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS6 RxPDO
	7h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS7 RxPDO
	8h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS8 RxPDO
	9h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS9 RxPDO
	Ah	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS10 RxPDO
	Bh	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS11 RxPDO
	Ch	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS12 RxPDO
	Dh	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS13 RxPDO
	Eh	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS14 RxPDO
	Fh	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS15 RxPDO
	10h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS16 RxPDO

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
501Fh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS1 TxPDO
	2h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS2 TxPDO
	3h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS3 TxPDO
	4h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS4 TxPDO
	5h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS5 TxPDO
	6h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS6 TxPDO
	7h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS7 TxPDO
	8h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS8 TxPDO
	9h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS9 TxPDO
	Ah	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS10 TxPDO
	Bh	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS11 TxPDO
	Ch	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS12 TxPDO
	Dh	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS13 TxPDO
	Eh	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS14 TxPDO
	Fh	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS15 TxPDO
	10h	INT32	-	-	R/W	Yes	AXIS1.MW.FBUS16 TxPDO

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
5020h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 0
	2h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 1
	3h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 2
	4h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 3
	5h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 4
	6h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 5
	7h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 6
	8h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 7
	9h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 8
	Ah	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 9
	Bh	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 10
	Ch	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 11
	Dh	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 12
	Eh	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 13
	Fh	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 14
	10h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 15
	11h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 16
	12h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 17
	13h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 18
	14h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 19
	15h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 20
	16h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 21
	17h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 22
	18h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 24
	1Ah	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 25
	1Bh	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 26
	1Ch	UINT 8	-	-	R/W	No	AXIS1.MOTOR.DISAUTOSET 27
50D0h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	1000:1	-	R/W	No	AXIS1.MT.FEEDRATE
	2h	INT8	-	-	RO	No	AXIS1.MT.RUNNINGTASK
	3h	UINT 32	-	-	Write only	No	AXIS1.MT.CLEARALL
	4h	UINT 32	-	-	Write only	No	AXIS1.MT.CONTINUE
	5h	INT32	-	Velocity	RO	No	AXIS1.MT.VCMD

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
50D1h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 0
	2h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 1
	3h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 2
	4h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 3
	5h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 4
	6h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 5
	7h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 6
	8h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 7
	9h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 8
	Ah	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 9
	Bh	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 10
	Ch	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 11
	Dh	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 12
	Eh	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 13
	Fh	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 14
	10h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 15
	11h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 16
	12h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 17
	13h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 18
	14h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 19
	15h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 20
	16h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 21
	17h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 22
	18h	UINT32	-	-	Write only	No	AXIS1.MT.CLEAR 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	Write only	No	AXIS1.MT.CLEAR 24
	1Ah	UINT 32	-	-	Write only	No	AXIS1.MT.CLEAR 25
	1Bh	UINT 32	-	-	Write only	No	AXIS1.MT.CLEAR 26
	1Ch	UINT 32	-	-	Write only	No	AXIS1.MT.CLEAR 27
	1Dh	UINT 32	-	-	Write only	No	AXIS1.MT.CLEAR 28
	1Eh	UINT 32	-	-	Write only	No	AXIS1.MT.CLEAR 29
	1Fh	UINT 32	-	-	Write only	No	AXIS1.MT.CLEAR 30
	20h	UINT 32	-	-	Write only	No	AXIS1.MT.CLEAR 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
50D2h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 0
	2h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 1
	3h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 2
	4h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 3
	5h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 4
	6h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 5
	7h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 6
	8h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 7
	9h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 8
	Ah	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 9
	Bh	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 10
	Ch	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 11
	Dh	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 12
	Eh	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 13
	Fh	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 14
	10h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 15
	11h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 16
	12h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 17
	13h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 18
	14h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 19
	15h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 20
	16h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 21
	17h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 22
	18h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 24
	1Ah	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 25
	1Bh	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 26
	1Ch	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 27
	1Dh	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 28
	1Eh	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 29
	1Fh	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 30
	20h	UINT 32	-	-	Write only	No	AXIS1.MT.MOVE 31

Index	Sub-index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
50D3h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 0
	2h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 1
	3h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 2
	4h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 3
	5h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 4
	6h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 5
	7h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 6
	8h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 7
	9h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 8
	Ah	INT32	-	Velocity	R/W	No	AXIS1.MT.V 9
	Bh	INT32	-	Velocity	R/W	No	AXIS1.MT.V 10
	Ch	INT32	-	Velocity	R/W	No	AXIS1.MT.V 11
	Dh	INT32	-	Velocity	R/W	No	AXIS1.MT.V 12
	Eh	INT32	-	Velocity	R/W	No	AXIS1.MT.V 13
	Fh	INT32	-	Velocity	R/W	No	AXIS1.MT.V 14
	10h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 15
	11h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 16
	12h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 17
	13h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 18
	14h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 19
	15h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 20
	16h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 21
	17h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 22
	18h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 23
	19h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 24
	1Ah	INT32	-	Velocity	R/W	No	AXIS1.MT.V 25
	1Bh	INT32	-	Velocity	R/W	No	AXIS1.MT.V 26
	1Ch	INT32	-	Velocity	R/W	No	AXIS1.MT.V 27
	1Dh	INT32	-	Velocity	R/W	No	AXIS1.MT.V 28
	1Eh	INT32	-	Velocity	R/W	No	AXIS1.MT.V 29
	1Fh	INT32	-	Velocity	R/W	No	AXIS1.MT.V 30
	20h	INT32	-	Velocity	R/W	No	AXIS1.MT.V 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
50D4h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 0
	2h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 1
	3h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 2
	4h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 3
	5h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 4
	6h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 5
	7h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 6
	8h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 7
	9h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 8
	Ah	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 9
	Bh	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 10
	Ch	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 11
	Dh	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 12
	Eh	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 13
	Fh	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 14
	10h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 15
	11h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 16
	12h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 17
	13h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 18
	14h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 19
	15h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 20
	16h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 21
	17h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 22
	18h	UINT32	-	Acceleration	R/W	No	AXIS1.MT.ACC 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.ACC 24
	1Ah	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.ACC 25
	1Bh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.ACC 26
	1Ch	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.ACC 27
	1Dh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.ACC 28
	1Eh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.ACC 29
	1Fh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.ACC 30
	20h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.ACC 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
50D5h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 0
	2h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 1
	3h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 2
	4h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 3
	5h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 4
	6h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 5
	7h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 6
	8h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 7
	9h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 8
	Ah	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 9
	Bh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 10
	Ch	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 11
	Dh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 12
	Eh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 13
	Fh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 14
	10h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 15
	11h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 16
	12h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 17
	13h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 18
	14h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 19
	15h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 20
	16h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 21
	17h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 22
	18h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 24
	1Ah	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 25
	1Bh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 26
	1Ch	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 27
	1Dh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 28
	1Eh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 29
	1Fh	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 30
	20h	UINT 32	-	Acceleration	R/W	No	AXIS1.MT.DEC 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
50D6h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	Position	R/W	No	AXIS1.MT.P 0
	2h	INT32	-	Position	R/W	No	AXIS1.MT.P 1
	3h	INT32	-	Position	R/W	No	AXIS1.MT.P 2
	4h	INT32	-	Position	R/W	No	AXIS1.MT.P 3
	5h	INT32	-	Position	R/W	No	AXIS1.MT.P 4
	6h	INT32	-	Position	R/W	No	AXIS1.MT.P 5
	7h	INT32	-	Position	R/W	No	AXIS1.MT.P 6
	8h	INT32	-	Position	R/W	No	AXIS1.MT.P 7
	9h	INT32	-	Position	R/W	No	AXIS1.MT.P 8
	Ah	INT32	-	Position	R/W	No	AXIS1.MT.P 9
	Bh	INT32	-	Position	R/W	No	AXIS1.MT.P 10
	Ch	INT32	-	Position	R/W	No	AXIS1.MT.P 11
	Dh	INT32	-	Position	R/W	No	AXIS1.MT.P 12
	Eh	INT32	-	Position	R/W	No	AXIS1.MT.P 13
	Fh	INT32	-	Position	R/W	No	AXIS1.MT.P 14
	10h	INT32	-	Position	R/W	No	AXIS1.MT.P 15
	11h	INT32	-	Position	R/W	No	AXIS1.MT.P 16
	12h	INT32	-	Position	R/W	No	AXIS1.MT.P 17
	13h	INT32	-	Position	R/W	No	AXIS1.MT.P 18
	14h	INT32	-	Position	R/W	No	AXIS1.MT.P 19
	15h	INT32	-	Position	R/W	No	AXIS1.MT.P 20
	16h	INT32	-	Position	R/W	No	AXIS1.MT.P 21
	17h	INT32	-	Position	R/W	No	AXIS1.MT.P 22
	18h	INT32	-	Position	R/W	No	AXIS1.MT.P 23
	19h	INT32	-	Position	R/W	No	AXIS1.MT.P 24
	1Ah	INT32	-	Position	R/W	No	AXIS1.MT.P 25
	1Bh	INT32	-	Position	R/W	No	AXIS1.MT.P 26
	1Ch	INT32	-	Position	R/W	No	AXIS1.MT.P 27
	1Dh	INT32	-	Position	R/W	No	AXIS1.MT.P 28
	1Eh	INT32	-	Position	R/W	No	AXIS1.MT.P 29
	1Fh	INT32	-	Position	R/W	No	AXIS1.MT.P 30
	20h	INT32	-	Position	R/W	No	AXIS1.MT.P 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
50D7h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 0
	2h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 1
	3h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 2
	4h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 3
	5h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 4
	6h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 5
	7h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 6
	8h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 7
	9h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 8
	Ah	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 9
	Bh	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 10
	Ch	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 11
	Dh	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 12
	Eh	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 13
	Fh	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 14
	10h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 15
	11h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 16
	12h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 17
	13h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 18
	14h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 19
	15h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 20
	16h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 21
	17h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 22
	18h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 24
	1Ah	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 25
	1Bh	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 26
	1Ch	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 27
	1Dh	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 28
	1Eh	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 29
	1Fh	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 30
	20h	UINT 32	-	-	R/W	No	AXIS1.MT.CNTL 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
50D8h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 0
	2h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 1
	3h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 2
	4h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 3
	5h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 4
	6h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 5
	7h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 6
	8h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 7
	9h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 8
	Ah	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 9
	Bh	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 10
	Ch	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 11
	Dh	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 12
	Eh	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 13
	Fh	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 14
	10h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 15
	11h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 16
	12h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 17
	13h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 18
	14h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 19
	15h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 20
	16h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 21
	17h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 22
	18h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 23
	19h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 24
	1Ah	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 25
	1Bh	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 26
	1Ch	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 27
	1Dh	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 28
	1Eh	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 29
	1Fh	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 30
	20h	INT8	-	-	R/W	No	AXIS1.MT.MTNEXT 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
50D9h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 0
	2h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 1
	3h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 2
	4h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 3
	5h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 4
	6h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 5
	7h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 6
	8h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 7
	9h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 8
	Ah	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 9
	Bh	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 10
	Ch	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 11
	Dh	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 12
	Eh	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 13
	Fh	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 14
	10h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 15
	11h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 16
	12h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 17
	13h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 18
	14h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 19
	15h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 20
	16h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 21
	17h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 22
	18h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 24
	1Ah	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 25
	1Bh	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 26
	1Ch	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 27
	1Dh	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 28
	1Eh	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 29
	1Fh	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 30
	20h	UINT 16	-	-	R/W	No	AXIS1.MT.TNEXT 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
50DAh	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 0
	2h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 1
	3h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 2
	4h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 3
	5h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 4
	6h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 5
	7h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 6
	8h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 7
	9h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 8
	Ah	UINT8	-	-	R/W	No	AXIS1.MT.CAP 9
	Bh	UINT8	-	-	R/W	No	AXIS1.MT.CAP 10
	Ch	UINT8	-	-	R/W	No	AXIS1.MT.CAP 11
	Dh	UINT8	-	-	R/W	No	AXIS1.MT.CAP 12
	Eh	UINT8	-	-	R/W	No	AXIS1.MT.CAP 13
	Fh	UINT8	-	-	R/W	No	AXIS1.MT.CAP 14
	10h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 15
	11h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 16
	12h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 17
	13h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 18
	14h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 19
	15h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 20
	16h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 21
	17h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 22
	18h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 24
	1Ah	UINT8	-	-	R/W	No	AXIS1.MT.CAP 25
	1Bh	UINT8	-	-	R/W	No	AXIS1.MT.CAP 26
	1Ch	UINT8	-	-	R/W	No	AXIS1.MT.CAP 27
	1Dh	UINT8	-	-	R/W	No	AXIS1.MT.CAP 28
	1Eh	UINT8	-	-	R/W	No	AXIS1.MT.CAP 29
	1Fh	UINT8	-	-	R/W	No	AXIS1.MT.CAP 30
	20h	UINT8	-	-	R/W	No	AXIS1.MT.CAP 31
"50EFh, 51EFh Axis# manufacturer status" (➔ p. 443)	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	-	RO	Yes	Axis1 manufacturer status
	2h	UINT8	-	-	RO	Yes	Axis1 manufacturer status bytes 1
	3h	UINT8	-	-	RO	Yes	Axis1 manufacturer status bytes 2
	4h	UINT8	-	-	RO	Yes	Axis1 manufacturer status bytes 3
	5h	UINT8	-	-	RO	Yes	Axis1 manufacturer status bytes 4

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
5100h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	String (32)	-	-	R/W	No	AXIS2.NAME
	2h	INT32	-	-	RO	No	Reserved 5100h sub 02h
	3h	INT32	-	-	RO	No	Reserved 5100h sub 03h
	4h	UINT 32	-	-	RO	No	AXIS2.MOTIONSTAT
	5h	UINT 8	-	-	R/W	No	AXIS2.OPMODE
	6h	UINT 8	-	-	R/W	No	AXIS2.DISMODE
	7h	UINT 32	1000 :1	-	R/W	No	AXIS2.DBILIMIT
	8h	UINT 16	-	-	RO	No	AXIS2.DISSOURCES
	9h	UINT 32	-	-	R/W	No	AXIS2.DISTO
	Ah	UINT 8	-	-	R/W	No	AXIS2.ENDEFAULT
	Bh	INT32	1000 :1	-	RO	No	AXIS2.ICONT
	Ch	INT32	1000 :1	-	RO	No	AXIS2.IPEAK
	Dh	UINT 32	-	-	Write only	No	AXIS2.STOP
	Eh	UINT 8	-	-	R/W	No	AXIS2.CMDSOURCE
	Fh	UINT 8	-	-	R/W	No	AXIS2.DIR
	10h	INT32	-	-	RO	No	AXIS2.TEMP
5101h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS2.BODE.INJECTPOINT
	2h	UINT 8	-	-	R/W	No	AXIS2.BODE.PRBDEPTH
	3h	INT32	-	Velocity	R/W	No	AXIS2.BODE.VAMP
5102h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	RO	No	AXIS2.CS.STATE
	2h	UINT 32	-	Acceleration	R/W	No	AXIS2.CS.DEC
	3h	UINT 32	-	-	R/W	No	AXIS2.ZEROT
	4h	INT32	-	Velocity	R/W	No	AXIS2.ZEROV
	5h	INT32	-	Acceleration	R/W	No	AXIS2.ZEROACC

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
5103h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS2.CANOPEN.PSCALE
	2h	INT32	-	-	RO	No	Reserved 5103h sub 02h
	3h	UINT 16	-	-	R/W	Yes	Brake control command - Axis 2
	4h	UINT 16	-	-	RO	Yes	Brake status response - Axis 2
	5h	INT32	-	-	R/W	Yes	Target torque (mA) - Axis 2
	6h	UINT 32	-	-	R/W	No	Profile position control - Axis 2
	7h	UINT 8	-	-	R/W	No	AXIS2.CANOPEN.PERRMODE
	8h	UINT 16	-	-	R/W	No	AXIS2.CANOPEN.STATUSEGDETIME
	9h	UINT 8	-	-	R/W	No	AXIS2.CANOPEN.TARPOSMODE
	Ah	UINT 8	-	-	R/W	No	AXIS2.CANOPEN.CONTROLBIT11.MODE
	Bh	UINT 8	-	-	R/W	No	AXIS2.CANOPEN.CONTROLBIT12.MODE
	Ch	UINT 8	-	-	R/W	No	AXIS2.CANOPEN.CONTROLBIT13.MODE
	Dh	UINT 8	-	-	R/W	No	AXIS2.CANOPEN.CONTROLBIT14.MODE
	Eh	UINT 8	-	-	R/W	No	AXIS2.CANOPEN.CONTROLBIT15.MODE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
5104h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 16	-	-	RO	No	AXIS2.FAULT1
	2h	UINT 16	-	-	RO	No	AXIS2.FAULT2
	3h	UINT 16	-	-	RO	No	AXIS2.FAULT3
	4h	UINT 16	-	-	RO	No	AXIS2.FAULT4
	5h	UINT 16	-	-	RO	No	AXIS2.FAULT5
	6h	UINT 16	-	-	RO	No	AXIS2.FAULT6
	7h	UINT 16	-	-	RO	No	AXIS2.FAULT7
	8h	UINT 16	-	-	RO	No	AXIS2.FAULT8
	9h	UINT 16	-	-	RO	No	AXIS2.FAULT9
	Ah	UINT 16	-	-	RO	No	AXIS2.FAULT10
5105h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS2.FBUS.PROTECTION
5106h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	Acceleration	R/W	No	AXIS2.GEAR.ACC
	2h	UINT 32	-	Acceleration	R/W	No	AXIS2.GEAR.DEC
	3h	UINT 16	-	-	R/W	No	AXIS2.GEAR.IN
	4h	INT16	-	-	R/W	No	AXIS2.GEAR.OUT
	5h	UINT 8	-	-	R/W	No	AXIS2.GEAR.AUTOSTART
	6h	UINT 8	-	-	R/W	No	AXIS2.GEAR.FBSOURCE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
5107h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS2.SAFE.STO.REPORTFAULT
	2h	UINT 8	-	-	RO	Yes	AXIS2.SAFE.STO.ACTIVE
	3h	UINT 8	-	-	RO	Yes	AXIS2.SAFE.STO.A
	4h	UINT 8	-	-	RO	Yes	AXIS2.SAFE.STO.B
	5h	UINT 32	-	-	RO	No	Reserved 5107h sub 05h
	6h	UINT 32	-	-	RO	No	Reserved 5107h sub 06h
	7h	UINT 8	-	-	RO	No	Reserved 5107h sub 07h
	8h	UINT 8	-	-	RO	No	Reserved 5107h sub 08h
	9h	UINT 8	-	-	RO	No	Reserved 5107h sub 09h
	Ah	UINT 32	-	-	RO	No	Reserved 5107h sub 0ah
	Bh	UINT 32	-	-	RO	No	Reserved 5107h sub 0bh
	Ch	UINT 32	-	-	RO	No	Reserved 5107h sub 0ch
	Dh	UINT 8	-	-	RO	No	Reserved 5107h sub 0dh
	Eh	UINT 8	-	-	RO	No	Reserved 5107h sub 0eh
	Fh	UINT 32	-	-	RO	No	Reserved 5107h sub 0fh
	10h	UINT 32	-	-	RO	No	Reserved 5107h sub 10h

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
5108h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	Write only	No	AXIS2.HOME.SET
	2h	UINT 16	-	-	R/W	No	AXIS2.HOME.MODE
	3h	UINT 16	-	-	R/W	No	AXIS2.HOME.DIR
	4h	UINT 8	-	-	R/W	No	AXIS2.HOME.AUTOMOVE
	5h	INT32	1000:1	-	R/W	No	AXIS2.HOME.IPEAK
	6h	INT32	-	Position	R/W	No	AXIS2.HOME.PERRTHRESH
	7h	UINT 32	-	Acceleration	R/W	No	AXIS2.HOME.DEC
	8h	UINT 32	-	Acceleration	R/W	No	AXIS2.HOME.ACC
	9h	INT32	-	Position	R/W	No	AXIS2.HOME.DIST
	Ah	UINT 8	-	-	R/W	No	AXIS2.HOME.SWITCHSOURCE
	Bh	UINT 32	-	-	R/W	No	AXIS2.HOME.CREEPFACTOR
	Ch	UINT 32	-	Position	R/W	No	AXIS2.HOME.MAXDIST
	Dh	UINT 8	-	-	R/W	No	AXIS2.HOME.MULTITURNMODE
	Eh	UINT 32	-	Position	R/W	No	AXIS2.HOME.OFFSETUSER
	Fh	UINT 32	-	Position	R/W	No	AXIS2.HOME.P
	10h	UINT 32	-	Velocity	R/W	No	AXIS2.HOME.V
5109h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS2.HWEN.SOURCE
	2h	UINT 8	-	-	R/W	No	AXIS2.HWEN.MODE
	3h	UINT 8	-	-	RO	No	AXIS2.HWEN.STATE

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
510Ah	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT32	1000:1	-	RO	Yes	AXIS2.IL.FB
	2h	UINT32	1000:1	-	RO	No	AXIS2.IL.KP
	3h	UINT32	1000:1	-	RO	No	AXIS2.IL.KPDRATIO
	4h	INT32	1000:1	-	R/W	No	AXIS2.IL.LIMITP
	5h	INT32	1000:1	-	R/W	No	AXIS2.IL.LIMITN
	6h	UINT8	-	-	R/W	No	AXIS2.IL.FBSOURCE
	7h	INT32	1000:1	-	RO	No	AXIS2.IL.DIFOLD
	8h	INT32	1000:1	-	RO	No	AXIS2.IL.FOLDFTHRESH
	9h	INT32	1000:1	-	R/W	No	AXIS2.IL.FOLDFTHRESHU
	Ah	INT32	1000:1	-	R/W	No	AXIS2.IL.FOLDWTHRESH
	Bh	INT32	1000:1	-	R/W	No	AXIS2.IL.FRICTION
	Ch	INT32	1000:1	-	RO	No	AXIS2.IL.IFOLD
	Dh	INT32	1000:1	-	R/W	No	AXIS2.IL.KACCFF
	Eh	INT32	1000:1	-	R/W	No	AXIS2.IL.KVFF
	Fh	INT32	1000:1	-	RO	No	AXIS2.IL.MIFOLD
	10h	INT32	1000:1	-	R/W	No	AXIS2.IL.OFFSET
	11h	UINT16	-	-	R/W	No	Max peak current - Axis 2
	12h	INT32	1000:1	-	RO	No	AXIS2.IL.DI2T
	13h	INT32	1000:1	-	RO	No	AXIS2.IL.MI2T
	14h	INT32	1000:1	-	R/W	No	AXIS2.IL.AINSCALE
	15h	UINT8	-	-	R/W	No	AXIS2.IL.AINSOURCE
	16h	UINT16	1000:1	-	R/W	No	AXIS2.IL.BW
	17h	UINT8	-	-	R/W	No	AXIS2.IL.PWMQUIET

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
510Bh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT16	-	-	RO	Yes	AXIS2.MOTOR.TEMPC
	2h	UINT 32	-	-	RO	Yes	AXIS2.MOTOR.TEMP
	3h	UINT 32	1000 :1	-	R/W	No	AXIS2.MOTOR.KT
	4h	UINT 8	-	-	R/W	No	AXIS2.MOTOR.TYPE
	5h	UINT 8	-	-	R/W	No	AXIS2.MOTOR.AUTOSET
	6h	UINT 16	-	-	R/W	No	AXIS2.MOTOR.VOLTRATED
	7h	UINT 16	-	-	R/W	No	AXIS2.MOTOR.VOLTMIN
	8h	UINT 8	-	-	R/W	No	AXIS2.MOTOR.BRAKE
	9h	UINT 16	-	-	R/W	No	AXIS2.MOTOR.IMTR
	Ah	UINT 16	1000 :1	-	R/W	No	AXIS2.MOTOR.IMID
	Bh	INT32	-	Velocity	R/W	No	AXIS2.MOTOR.VRATED
	Ch	UINT 8	-	-	R/W	No	AXIS2.MOTOR.BRAKECONTROL
	Dh	UINT 8	-	-	R/W	No	AXIS2.MOTOR.BRAKEIMM
	Eh	UINT 32	1000 :1	-	R/W	No	AXIS2.MOTOR.CTF0
	Fh	UINT 8	-	-	R/W	No	AXIS2.MOTOR.FIELDWEAKENING
	10h	UINT 32	1000 :1	-	R/W	No	AXIS2.MOTOR.ICONT
	11h	UINT 32	1000 :1	-	R/W	No	AXIS2.MOTOR.INERTIA
	12h	UINT 32	1000 :1	-	R/W	No	AXIS2.MOTOR.IPEAK
	13h	UINT 32	1000 :1	-	R/W	No	AXIS2.MOTOR.KE
	14h	UINT 32	1000 :1	-	R/W	No	AXIS2.MOTOR.LQLL
	15h	UINT 16	-	-	R/W	No	AXIS2.MOTOR.PHASE
	16h	UINT 32	1000 :1	-	R/W	No	AXIS2.MOTOR.PITCH
	17h	UINT 16	-	-	R/W	No	AXIS2.MOTOR.POLES
	18h	UINT 32	1000 :1	-	R/W	No	AXIS2.MOTOR.R

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 8	-	-	R/W	No	AXIS2.MOTOR.RTYPE
	1Ah	UINT 16	-	-	R/W	No	AXIS2.MOTOR.TBRAKEAPP
	1Bh	UINT 16	-	-	R/W	No	AXIS2.MOTOR.TBRAKERLS
	1Ch	INT32	-	-	R/W	No	AXIS2.MOTOR.TBRAKETO
	1Dh	UINT 32	-	-	R/W	No	AXIS2.MOTOR.TEMPFAULT
	1Eh	UINT 32	-	-	R/W	No	AXIS2.MOTOR.TEMPWARN
	1Fh	UINT 16	-	-	R/W	No	AXIS2.MOTOR.VMAX
	20h	UINT 16	-	-	R/W	No	AXIS2.MOTOR.VOLTMAX
	21h	String (20)	-	-	R/W	No	AXIS2.MOTOR.NAME
	22h	UINT 8	-	-	R/W	No	AXIS2.MOTOR.RSOURCE
	23h	UINT 8	-	-	R/W	No	AXIS2.MOTOR.TEMPSOURCE
	24h	UINT 16	-	-	R/W	No	AXIS2.MOTOR.BRAKEPOWERDELAY
	25h	UINT 16	1000:1	-	R/W	No	AXIS2.MOTOR.BRAKEPOWERLOW
	26h	UINT 8	-	-	R/W	No	AXIS2.MOTOR.BRAKEPOWERSAVING
	27h	UINT 32	1000:1	-	R/W	No	AXIS2.MOTOR.IDMAX
	28h	UINT 32	1000:1	-	R/W	No	AXIS2.MOTOR.LDLL
	29h	UINT 32	1000:1	-	R/W	No	AXIS2.MOTOR.LISAT
	2Ah	INT32	1000:1	-	R/W	No	AXIS2.MOTOR.PHSADVK1
	2Bh	INT32	1000:1	-	R/W	No	AXIS2.MOTOR.PHSADVK2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
510Ch	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS2.PL.MODPDIR
	2h	INT32	-	Position	R/W	No	AXIS2.PL.ERRWTHRESH
	3h	INT32	-	Position	R/W	No	AXIS2.PL.ERRFTHRESH
	4h	UINT 32	1000 :1	-	R/W	No	AXIS2.PL.KP
	5h	INT32	-	Position	R/W	No	AXIS2.PL.MODP1
	6h	INT32	-	Position	R/W	No	AXIS2.PL.MODP2
	7h	INT32	-	Position	R/W	No	AXIS2.PL.AINSCALE
	8h	UINT 8	-	-	R/W	No	AXIS2.PL.FBSOURCE
	9h	INT32	-	Position	R/W	No	AXIS2.PL.INTOUTMAX
	Ah	UINT 32	1000 :1	-	R/W	No	AXIS2.PL.KI
	Bh	UINT 8	-	-	R/W	No	AXIS2.PL.MODPEN
	Ch	UINT 8	-	-	R/W	No	AXIS2.PL.AINSOURCE
	Dh	INT32	1000 :1	-	R/W	No	AXIS2.PL.KFB
	Eh	INT32	-	Velocity	R/W	No	AXIS2.PL.KITHRESH
	Fh	UINT 32	1000 :1	-	R/W	No	AXIS2.PL.FILTER.FREQ
	10h	UINT 16	1000 :1	-	R/W	No	AXIS2.PL.FILTER.Q
510Eh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	1000 :1	-	R/W	No	AXIS2.SM.I1
	2h	INT32	1000 :1	-	R/W	No	AXIS2.SM.I2
	3h	UINT 16	-	-	R/W	No	AXIS2.SM.MODE
	4h	UINT 16	-	-	R/W	No	AXIS2.SM.T1
	5h	UINT 16	-	-	R/W	No	AXIS2.SM.T2
	6h	INT32	-	Velocity	R/W	No	AXIS2.SM.V1
	7h	INT32	-	Velocity	R/W	No	AXIS2.SM.V2
	8h	UINT 32	-	Acceleration	R/W	No	AXIS2.SM.ACC
	9h	UINT 32	-	Acceleration	R/W	No	AXIS2.SM.DEC

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
510Fh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS2.SWLS.EN
	2h	UINT 8	-	-	RO	No	AXIS2.SWLS.STATE
	3h	INT32	-	Position	R/W	No	AXIS2.SWLS.LIMIT0
	4h	INT32	-	Position	R/W	No	AXIS2.SWLS.LIMIT1
5110h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	AXIS2.UNIT.PIN
	2h	UINT 32	-	-	R/W	No	AXIS2.UNIT.POUT
	3h	UINT 8	-	-	R/W	No	AXIS2.UNIT.ACCROTARY
	4h	UINT 8	-	-	R/W	No	AXIS2.UNIT.VROTARY
	5h	UINT 8	-	-	R/W	No	AXIS2.UNIT.PROTARY
	6h	UINT 8	-	-	R/W	No	AXIS2.UNIT.ACCLINEAR
	7h	UINT 8	-	-	R/W	No	AXIS2.UNIT.PLINEAR
	8h	UINT 8	-	-	R/W	No	AXIS2.UNIT.VLINEAR
	9h	String (17)	-	-	R/W	No	AXIS2.UNIT.LABEL

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
5111h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	1000 :1	-	R/W	No	AXIS2.VL.KP
	2h	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.KI
	3h	INT32	-	Velocity	RO	No	AXIS2.VL.FBFILTER
	4h	INT32	1000 :1	-	R/W	No	AXIS2.VL.KVFF
	5h	INT32	-	Velocity	RO	No	AXIS2.VL.ERR
	6h	UINT 32	-	Velocity	R/W	No	AXIS2.VL.LIMITP
	7h	INT32	-	Velocity	R/W	No	AXIS2.VL.LIMITN
	8h	UINT 32	-	Velocity	R/W	No	AXIS2.VL.THRESH
	9h	INT32	1000 :1	-	R/W	No	AXIS2.VL.AINSCALE
	Ah	INT32	-	-	RO	No	Reserved 5111h sub 0ah
	Bh	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.LMJR
	Ch	INT8	-	-	R/W	No	AXIS2.VL.ARTYPE1
	Dh	INT8	-	-	R/W	No	AXIS2.VL.ARTYPE2
	Eh	INT8	-	-	R/W	No	AXIS2.VL.ARTYPE3
	Fh	INT8	-	-	R/W	No	AXIS2.VL.ARTYPE4
	10h	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARPF1
	11h	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARPF2
	12h	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARPF3
	13h	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARPF4
	14h	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARPQ1
	15h	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARPQ2
	16h	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARPQ3
	17h	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARPQ4
	18h	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARZF1
	19h	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARZF2
	1Ah	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARZF3
	1Bh	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARZF4

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	1Ch	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARZQ1
	1Dh	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARZQ2
	1Eh	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARZQ3
	1Fh	UINT 32	1000 :1	-	R/W	No	AXIS2.VL.ARZQ4
	20h	UINT 8	-	-	R/W	No	AXIS2.VL.AINSOURCE
	21h	UINT 32	-	Acceleration 16Khz	R/W	No	AXIS2.VL.AINACC
	22h	UINT 32	-	Acceleration 16Khz	R/W	No	AXIS2.VL.AINDEC
	23h	INT32	1000 :1	-	R/W	No	AXIS2.VL.KFB
	24h	UINT 8	-	-	R/W	No	AXIS2.VL.FBSOURCE
	25h	UINT 8	-	-	R/W	No	AXIS2.VL.KIMODE
5112h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	No	AXIS2.WARNING1
	2h	UINT 32	-	-	RO	No	AXIS2.WARNING2
	3h	UINT 32	-	-	RO	No	AXIS2.WARNING3

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
5113h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS2.WS.MODE
	2h	UINT 8	-	-	R/W	No	AXIS2.WS.NUMLOOPS
	3h	UINT 8	-	-	RO	No	AXIS2.WS.STATE
	4h	UINT 8	-	-	R/W	No	AXIS2.WS.T
	5h	UINT 8	-	-	R/W	No	AXIS2.WS.TDELAY1
	6h	UINT 8	-	-	R/W	No	AXIS2.WS.TDELAY2
	7h	UINT 16	-	-	R/W	No	AXIS2.WS.TDELAY3
	8h	UINT 16	-	-	R/W	No	AXIS2.WS.TDELAY4
	9h	UINT 32	-	-	Write only	No	AXIS2.WS.ARM
	Ah	UINT 8	-	-	R/W	No	AXIS2.WS.CHECKMODE
	Bh	INT32	-	Velocity	R/W	No	AXIS2.WS.CHECKV
	Ch	INT32	-	Position	R/W	No	AXIS2.WS.DISTMAX
	Dh	INT32	1000:1	-	R/W	No	AXIS2.WS.IMAX
	Eh	INT32	-	Velocity	R/W	No	AXIS2.WS.VTHRESH
	Fh	INT32	-	Position	R/W	No	AXIS2.WS.DISTMIN
	10h	UINT 16	-	-	R/W	No	AXIS2.WS.CHECKT
	11h	UINT 16	-	-	R/W	No	AXIS2.WS.TIRAMP
	12h	UINT 16	-	-	R/W	No	AXIS2.WS.TSTANDSTILL
	13h	UINT 32	1000:1	-	R/W	No	AXIS2.WS.FREQ
5114h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	1000:1	-	R/W	No	AXIS2.LOAD.INERTIA

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
5115h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	RO	Yes	AXIS2.HWLS.NEGSTATE
	2h	UINT 8	-	-	RO	Yes	AXIS2.HWLS.POSSTATE
	3h	UINT 8	-	-	R/W	No	AXIS2.HWLS.NEGSOURCE
	4h	UINT 8	-	-	R/W	No	AXIS2.HWLS.POSSOURCE
5116h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	Position	R/W	No	AXIS2.SETTLE.P
	2h	UINT 32	-	-	R/W	No	AXIS2.SETTLE.V
5117h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	1000:1	-	R/W	No	AXIS2.OBS.BW
	2h	UINT 8	-	-	R/W	No	AXIS2.OBS.ENABLE
	3h	UINT 32	1000:1	-	R/W	No	AXIS2.OBS.KO
5118h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	1000:1	-	R/W	No	AXIS2.SENSORLESS.BWU
	2h	UINT 8	-	-	R/W	No	AXIS2.SENSORLESS.ENPHASELEAD
	3h	INT32	1000:1	-	R/W	No	AXIS2.SENSORLESS.FAULTANGLE
	4h	INT32	1000:1	-	R/W	No	AXIS2.SENSORLESS.FAULTTIME
	5h	INT32	1000:1	-	R/W	No	AXIS2.SENSORLESS.ISTART
	6h	INT32	1000:1	-	R/W	No	AXIS2.SENSORLESS.RPMSTART
5119h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	-	R/W	No	AXIS2.FIELDWEAKENING.CURRFILTERBW
	2h	INT32	-	-	R/W	No	AXIS2.FIELDWEAKENING.LOOPBW
	3h	INT32	-	-	R/W	No	AXIS2.FIELDWEAKENING.VBUSMARGIN
	4h	INT32	-	-	R/W	No	AXIS2.FIELDWEAKENING.VOLTFILTERBW

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
511Bh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	Acceleration	R/W	No	AXIS2.JOG.ACC
	2h	UINT 32	-	Acceleration	R/W	No	AXIS2.JOG.DEC
	3h	UINT 32	-	Velocity	R/W	No	AXIS2.JOG.V
511Ch	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS2.FAULT6004.ACTION
511Dh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS2.ECAT.REPORTWARNINGS
511Eh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS1 RxPDO
	2h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS2 RxPDO
	3h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS3 RxPDO
	4h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS4 RxPDO
	5h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS5 RxPDO
	6h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS6 RxPDO
	7h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS7 RxPDO
	8h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS8 RxPDO
	9h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS9 RxPDO
	Ah	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS10 RxPDO
	Bh	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS11 RxPDO
	Ch	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS12 RxPDO
	Dh	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS13 RxPDO
	Eh	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS14 RxPDO
	Fh	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS15 RxPDO
	10h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS16 RxPDO

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
511Fh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS1 TxPDO
	2h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS2 TxPDO
	3h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS3 TxPDO
	4h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS4 TxPDO
	5h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS5 TxPDO
	6h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS6 TxPDO
	7h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS7 TxPDO
	8h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS8 TxPDO
	9h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS9 TxPDO
	Ah	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS10 TxPDO
	Bh	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS11 TxPDO
	Ch	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS12 TxPDO
	Dh	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS13 TxPDO
	Eh	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS14 TxPDO
	Fh	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS15 TxPDO
	10h	INT32	-	-	R/W	Yes	AXIS2.MW.FBUS16 TxPDO

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
5120h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 0
	2h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 1
	3h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 2
	4h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 3
	5h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 4
	6h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 5
	7h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 6
	8h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 7
	9h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 8
	Ah	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 9
	Bh	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 10
	Ch	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 11
	Dh	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 12
	Eh	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 13
	Fh	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 14
	10h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 15
	11h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 16
	12h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 17
	13h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 18
	14h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 19
	15h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 20
	16h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 21
	17h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 22
	18h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 24
	1Ah	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 25
	1Bh	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 26
	1Ch	UINT8	-	-	R/W	No	AXIS2.MOTOR.DISAUTOSET 27
51D0h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	1000:1	-	R/W	No	AXIS2.MT.FEEDRATE
	2h	INT8	-	-	RO	No	AXIS2.MT.RUNNINGTASK
	3h	UINT32	-	-	Write only	No	AXIS2.MT.CLEARALL
	4h	UINT32	-	-	Write only	No	AXIS2.MT.CONTINUE
	5h	INT32	-	Velocity	RO	No	AXIS2.MT.VCMD

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
51D1h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 0
	2h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 1
	3h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 2
	4h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 3
	5h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 4
	6h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 5
	7h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 6
	8h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 7
	9h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 8
	Ah	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 9
	Bh	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 10
	Ch	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 11
	Dh	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 12
	Eh	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 13
	Fh	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 14
	10h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 15
	11h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 16
	12h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 17
	13h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 18
	14h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 19
	15h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 20
	16h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 21
	17h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 22
	18h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 24
	1Ah	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 25
	1Bh	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 26
	1Ch	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 27
	1Dh	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 28
	1Eh	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 29
	1Fh	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 30
	20h	UINT 32	-	-	Write only	No	AXIS2.MT.CLEAR 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
51D2h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 0
	2h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 1
	3h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 2
	4h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 3
	5h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 4
	6h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 5
	7h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 6
	8h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 7
	9h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 8
	Ah	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 9
	Bh	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 10
	Ch	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 11
	Dh	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 12
	Eh	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 13
	Fh	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 14
	10h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 15
	11h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 16
	12h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 17
	13h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 18
	14h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 19
	15h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 20
	16h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 21
	17h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 22
	18h	UINT32	-	-	Write only	No	AXIS2.MT.MOVE 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	Write only	No	AXIS2.MT.MOVE 24
	1Ah	UINT 32	-	-	Write only	No	AXIS2.MT.MOVE 25
	1Bh	UINT 32	-	-	Write only	No	AXIS2.MT.MOVE 26
	1Ch	UINT 32	-	-	Write only	No	AXIS2.MT.MOVE 27
	1Dh	UINT 32	-	-	Write only	No	AXIS2.MT.MOVE 28
	1Eh	UINT 32	-	-	Write only	No	AXIS2.MT.MOVE 29
	1Fh	UINT 32	-	-	Write only	No	AXIS2.MT.MOVE 30
	20h	UINT 32	-	-	Write only	No	AXIS2.MT.MOVE 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
51D3h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 0
	2h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 1
	3h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 2
	4h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 3
	5h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 4
	6h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 5
	7h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 6
	8h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 7
	9h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 8
	Ah	INT32	-	Velocity	R/W	No	AXIS2.MT.V 9
	Bh	INT32	-	Velocity	R/W	No	AXIS2.MT.V 10
	Ch	INT32	-	Velocity	R/W	No	AXIS2.MT.V 11
	Dh	INT32	-	Velocity	R/W	No	AXIS2.MT.V 12
	Eh	INT32	-	Velocity	R/W	No	AXIS2.MT.V 13
	Fh	INT32	-	Velocity	R/W	No	AXIS2.MT.V 14
	10h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 15
	11h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 16
	12h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 17
	13h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 18
	14h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 19
	15h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 20
	16h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 21
	17h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 22
	18h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 23
	19h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 24
	1Ah	INT32	-	Velocity	R/W	No	AXIS2.MT.V 25
	1Bh	INT32	-	Velocity	R/W	No	AXIS2.MT.V 26
	1Ch	INT32	-	Velocity	R/W	No	AXIS2.MT.V 27
	1Dh	INT32	-	Velocity	R/W	No	AXIS2.MT.V 28
	1Eh	INT32	-	Velocity	R/W	No	AXIS2.MT.V 29
	1Fh	INT32	-	Velocity	R/W	No	AXIS2.MT.V 30
	20h	INT32	-	Velocity	R/W	No	AXIS2.MT.V 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
51D4h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 0
	2h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 1
	3h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 2
	4h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 3
	5h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 4
	6h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 5
	7h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 6
	8h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 7
	9h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 8
	Ah	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 9
	Bh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 10
	Ch	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 11
	Dh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 12
	Eh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 13
	Fh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 14
	10h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 15
	11h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 16
	12h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 17
	13h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 18
	14h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 19
	15h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 20
	16h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 21
	17h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 22
	18h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 24
	1Ah	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 25
	1Bh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 26
	1Ch	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 27
	1Dh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 28
	1Eh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 29
	1Fh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 30
	20h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.ACC 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
51D5h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 0
	2h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 1
	3h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 2
	4h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 3
	5h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 4
	6h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 5
	7h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 6
	8h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 7
	9h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 8
	Ah	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 9
	Bh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 10
	Ch	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 11
	Dh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 12
	Eh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 13
	Fh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 14
	10h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 15
	11h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 16
	12h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 17
	13h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 18
	14h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 19
	15h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 20
	16h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 21
	17h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 22
	18h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 24
	1Ah	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 25
	1Bh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 26
	1Ch	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 27
	1Dh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 28
	1Eh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 29
	1Fh	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 30
	20h	UINT 32	-	Acceleration	R/W	No	AXIS2.MT.DEC 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
51D6h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	Position	R/W	No	AXIS2.MT.P 0
	2h	INT32	-	Position	R/W	No	AXIS2.MT.P 1
	3h	INT32	-	Position	R/W	No	AXIS2.MT.P 2
	4h	INT32	-	Position	R/W	No	AXIS2.MT.P 3
	5h	INT32	-	Position	R/W	No	AXIS2.MT.P 4
	6h	INT32	-	Position	R/W	No	AXIS2.MT.P 5
	7h	INT32	-	Position	R/W	No	AXIS2.MT.P 6
	8h	INT32	-	Position	R/W	No	AXIS2.MT.P 7
	9h	INT32	-	Position	R/W	No	AXIS2.MT.P 8
	Ah	INT32	-	Position	R/W	No	AXIS2.MT.P 9
	Bh	INT32	-	Position	R/W	No	AXIS2.MT.P 10
	Ch	INT32	-	Position	R/W	No	AXIS2.MT.P 11
	Dh	INT32	-	Position	R/W	No	AXIS2.MT.P 12
	Eh	INT32	-	Position	R/W	No	AXIS2.MT.P 13
	Fh	INT32	-	Position	R/W	No	AXIS2.MT.P 14
	10h	INT32	-	Position	R/W	No	AXIS2.MT.P 15
	11h	INT32	-	Position	R/W	No	AXIS2.MT.P 16
	12h	INT32	-	Position	R/W	No	AXIS2.MT.P 17
	13h	INT32	-	Position	R/W	No	AXIS2.MT.P 18
	14h	INT32	-	Position	R/W	No	AXIS2.MT.P 19
	15h	INT32	-	Position	R/W	No	AXIS2.MT.P 20
	16h	INT32	-	Position	R/W	No	AXIS2.MT.P 21
	17h	INT32	-	Position	R/W	No	AXIS2.MT.P 22
	18h	INT32	-	Position	R/W	No	AXIS2.MT.P 23
	19h	INT32	-	Position	R/W	No	AXIS2.MT.P 24
	1Ah	INT32	-	Position	R/W	No	AXIS2.MT.P 25
	1Bh	INT32	-	Position	R/W	No	AXIS2.MT.P 26
	1Ch	INT32	-	Position	R/W	No	AXIS2.MT.P 27
	1Dh	INT32	-	Position	R/W	No	AXIS2.MT.P 28
	1Eh	INT32	-	Position	R/W	No	AXIS2.MT.P 29
	1Fh	INT32	-	Position	R/W	No	AXIS2.MT.P 30
	20h	INT32	-	Position	R/W	No	AXIS2.MT.P 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
51D7h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 0
	2h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 1
	3h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 2
	4h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 3
	5h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 4
	6h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 5
	7h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 6
	8h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 7
	9h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 8
	Ah	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 9
	Bh	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 10
	Ch	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 11
	Dh	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 12
	Eh	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 13
	Fh	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 14
	10h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 15
	11h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 16
	12h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 17
	13h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 18
	14h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 19
	15h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 20
	16h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 21
	17h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 22
	18h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 24
	1Ah	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 25
	1Bh	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 26
	1Ch	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 27
	1Dh	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 28
	1Eh	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 29
	1Fh	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 30
	20h	UINT 32	-	-	R/W	No	AXIS2.MT.CNTL 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
51D8h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 0
	2h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 1
	3h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 2
	4h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 3
	5h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 4
	6h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 5
	7h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 6
	8h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 7
	9h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 8
	Ah	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 9
	Bh	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 10
	Ch	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 11
	Dh	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 12
	Eh	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 13
	Fh	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 14
	10h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 15
	11h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 16
	12h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 17
	13h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 18
	14h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 19
	15h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 20
	16h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 21
	17h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 22
	18h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 23
	19h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 24
	1Ah	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 25
	1Bh	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 26
	1Ch	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 27
	1Dh	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 28
	1Eh	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 29
	1Fh	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 30
	20h	INT8	-	-	R/W	No	AXIS2.MT.MTNEXT 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
51D9h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 0
	2h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 1
	3h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 2
	4h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 3
	5h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 4
	6h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 5
	7h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 6
	8h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 7
	9h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 8
	Ah	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 9
	Bh	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 10
	Ch	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 11
	Dh	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 12
	Eh	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 13
	Fh	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 14
	10h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 15
	11h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 16
	12h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 17
	13h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 18
	14h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 19
	15h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 20
	16h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 21
	17h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 22
	18h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 24
	1Ah	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 25
	1Bh	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 26
	1Ch	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 27
	1Dh	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 28
	1Eh	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 29
	1Fh	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 30
	20h	UINT 16	-	-	R/W	No	AXIS2.MT.TNEXT 31

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
51DAh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 0
	2h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 1
	3h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 2
	4h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 3
	5h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 4
	6h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 5
	7h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 6
	8h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 7
	9h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 8
	Ah	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 9
	Bh	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 10
	Ch	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 11
	Dh	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 12
	Eh	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 13
	Fh	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 14
	10h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 15
	11h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 16
	12h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 17
	13h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 18
	14h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 19
	15h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 20
	16h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 21
	17h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 22
	18h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 23

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
	19h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 24
	1Ah	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 25
	1Bh	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 26
	1Ch	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 27
	1Dh	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 28
	1Eh	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 29
	1Fh	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 30
	20h	UINT 8	-	-	R/W	No	AXIS2.MT.CAP 31
51EFh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	RO	Yes	Axis2 manufacturer status
	2h	UINT 8	-	-	RO	Yes	Axis2 manufacturer status bytes 1
	3h	UINT 8	-	-	RO	Yes	Axis2 manufacturer status bytes 2
	4h	UINT 8	-	-	RO	Yes	Axis2 manufacturer status bytes 3
	5h	UINT 8	-	-	RO	Yes	Axis2 manufacturer status bytes 4
"6040h, 6840h Controlword - Axis #" (➔ p. 447)	0h	UINT 16	-	-	R/W	Yes	Controlword - Axis 1
"6041h, 6841h Statusword - Axis #" (➔ p. 450)	0h	UINT 16	-	-	RO	Yes	Statusword - Axis 1
"605Ah, 685Ah Quick stop option code - Axis #" (➔ p. 453)	0h	INT16	-	-	R/W	No	Quick stop option code - Axis 1
"6060h, 6860h Modes of operation - Axis #" (➔ p. 454)	0h	INT8	-	-	R/W	Yes	Modes of operation - Axis 1
"6061h, 6861h Modes of operation display - Axis #" (➔ p. 455)	0h	INT8	-	-	RO	Yes	Modes of operation display - Axis 1
"6063h, 6863h Position actual internal value - Axis #" (➔ p. 456)	0h	INT32	-	-	RO	Yes	Position actual internal value - Axis 1
"6064h, 6864h Position actual value - Axis #" (➔ p. 457)	0h	INT32	-	Position	RO	Yes	Position actual value - Axis 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"6065h, 6865h Following error window - Axis #" (➜ p. 458)	0h	UINT 32	-	Position	R/W	No	Following error window - Axis 1
6066h	0h	UINT 16	-	-	R/W	No	Following error time out - Axis 1
"606Bh, 686Bh Velocity demand value - Axis #" (➜ p. 459)	0h	INT32	-	Velocity	RO	Yes	Velocity demand value - Axis 1
"606Ch, 686Ch Velocity actual value - Axis #" (➜ p. 460)	0h	INT32	-	Velocity	RO	Yes	Velocity actual value - Axis 1
"606Dh, 686Dh Velocity window - Axis #" (➜ p. 461)	0h	UINT 16	-	-	R/W	Yes	Velocity window - Axis 1
"606Eh, 686Eh Velocity window time - Axis #" (➜ p. 463)	0h	UINT 16	-	-	R/W	Yes	Velocity window time - Axis 1
"6071h, 6871h Target torque - Axis #" (➜ p. 465)	0h	INT16	-	-	R/W	Yes	Target torque - Axis 1
"6072h, 6872h Max torque - Axis #" (➜ p. 466)	0h	UINT 16	-	-	R/W	Yes	Max torque - Axis 1
"6073h, 6873h Max current - Axis #" (➜ p. 467)	0h	UINT 16	-	-	R/W	No	Max current - Axis 1
"6076h, 6876h Motor rated torque - Axis #" (➜ p. 468)	0h	UINT 32	-	-	RO	No	Motor rated torque - Axis 1
"6077h, 6877h Torque actual value - Axis #" (➜ p. 469)	0h	INT16	-	-	RO	Yes	Torque actual value - Axis 1
"607Ah, 687Ah Target position - Axis #" (➜ p. 470)	0h	INT32	-	-	R/W	Yes	Target position - Axis 1
"607Bh, 687Bh Position range limit - Axis #" (➜ p. 471)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	-	R/W	No	Min position range limit - Axis 1
	2h	INT32	-	-	R/W	No	Max position range limit - Axis 1
"607Ch, 687Ch Home offset - Axis #" (➜ p. 472)	0h	INT32	-	Position	R/W	No	Home offset - Axis 1
"607Dh, 687Dh Software position limit - Axis #" (➜ p. 473)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	Position	R/W	No	Software position limit 1 - Axis 1
	2h	INT32	-	Position	R/W	No	Software position limit 2 - Axis 1
"6081h, 6881h Profile velocity in pp-mode - Axis #" (➜ p. 474)	0h	UINT 32	-	-	R/W	Yes	Profile velocity in pp-mode - Axis 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"6083h, 6883h Profile acceleration - Axis #" (➔ p. 475)	0h	UINT 32	-	-	R/W	Yes	Profile acceleration - Axis 1
"6084h, 6884h Profile deceleration - Axis #" (➔ p. 476)	0h	UINT 32	-	-	R/W	Yes	Profile deceleration - Axis 1
"6087h, 6887h Torque slope - Axis #" (➔ p. 477)	0h	UINT 32	-	-	R/W	No	Torque slope - Axis 1
"6091h, 6891h Gear ratio - Axis #" (➔ p. 478)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Motor revolutions - Axis 1
	2h	UINT 32	-	-	R/W	No	Shaft revolutions - Axis 1
"6092h, 6892h Feed constant - Axis #" (➔ p. 479)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Feed - Axis 1
	2h	UINT 32	-	-	R/W	No	Shaft revolutions - Axis 1
"6096h, 6896h Velocity factor - Axis #" (➔ p. 480)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Numerator - Axis 1
	2h	UINT 32	-	-	R/W	No	Divisor - Axis 1
"6097h, 6897h Acceleration factor - Axis #" (➔ p. 481)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Numerator - Axis 1
	2h	UINT 32	-	-	R/W	No	Divisor - Axis 1
"6098h, 6898h Homing mode - Axis #" (➔ p. 482)	0h	INT8	-	-	R/W	No	Homing mode - Axis 1
"6099h, 6899h Homing speeds - Axis #" (➔ p. 484)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	Velocity	R/W	No	Speed during search for switch - Axis 1
	2h	UINT 32	-	-	R/W	No	Speed during search for zero - Axis 1
"609Ah, 689Ah Homing acceleration - Axis #" (➔ p. 485)	0h	UINT 32	-	-	R/W	No	Homing acceleration - Axis 1
"60B0h, 68B0h Position offset - Axis #" (➔ p. 486)	0h	INT32	-	Position	R/W	Yes	Position offset - Axis 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"60B1h, 68B1h Velocity offset - Axis #" (➔ p. 487)	0h	INT32	-	Velocity	R/W	Yes	Velocity offset - Axis 1
"60B2h, 68B2h Torque offset - Axis #" (➔ p. 488)	0h	INT16	-	-	R/W	Yes	Torque offset - Axis 1
"60B8h, 68B8h Touch probe function - Axis #" (➔ p. 489)	0h	UINT 16	-	-	R/W	Yes	Touch probe function - Axis 1
"60B9h, 68B9h Touch probe status - Axis #" (➔ p. 491)	0h	UINT 16	-	-	RO	Yes	Touch probe status - Axis 1
"60BAh, 68BAh Touch probe 1 position positive value - Axis #" (➔ p. 492)	0h	INT32	-	Position	RO	Yes	Touch probe 1 position positive value - Axis 1
"60BBh, 68BBh Touch probe 1 position negative value - Axis #" (➔ p. 493)	0h	INT32	-	Position	RO	Yes	Touch probe 1 position negative value - Axis 1
"60BCh, 68BCh Touch probe 2 position positive value - Axis #" (➔ p. 494)	0h	INT32	-	Position	RO	Yes	Touch probe 2 position positive value - Axis 1
"60BDh, 68BDh Touch probe 2 position negative value - Axis #" (➔ p. 495)	0h	INT32	-	Position	RO	Yes	Touch probe 2 position negative value - Axis 1
"60C2h, 68C2h Interpolation time period - Axis #" (➔ p. 496)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 8	-	-	R/W	No	Interpolation time period value - Axis 1
	2h	INT8	-	-	R/W	No	Interpolation time index - Axis 1
"60D0h, 68D0h Touch probe source - Axis #" (➔ p. 497)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT16	-	-	R/W	No	Touch probe 1 source - Axis 1
	2h	INT16	-	-	R/W	No	Touch probe 2 source - Axis 1
"60D1h, 68D1h Touch probe 1 time stamp positive value - Axis #" (➔ p. 499)	0h	UINT 32	-	-	RO	Yes	Touch probe 1 time stamp positive value - Axis 1
"60D2h, 68D2h Touch probe 1 time stamp negative value - Axis #" (➔ p. 500)	0h	UINT 32	-	-	RO	Yes	Touch probe 1 time stamp negative value - Axis 1
"60D3h, 68D3h Touch probe 2 time stamp positive value - Axis #" (➔ p. 501)	0h	UINT 32	-	-	RO	Yes	Touch probe 2 time stamp positive value - Axis 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"60D4h, 68D4h Touch probe 2 time stamp negative value - Axis #" (➜ p. 502)	0h	UINT 32	-	-	RO	Yes	Touch probe 2 time stamp negative value - Axis 1
"60D5h, 68D5h Touch probe 1 positive edge counter - Axis #" (➜ p. 503)	0h	UINT 16	-	-	RO	Yes	Touch probe 1 positive edge counter - Axis 1
"60D6h, 68D6h Touch probe 1 negative edge counter - Axis #" (➜ p. 504)	0h	UINT 16	-	-	RO	Yes	Touch probe 1 negative edge counter - Axis 1
"60D7h, 68D7h Touch probe 2 positive edge counter - Axis #" (➜ p. 505)	0h	UINT 16	-	-	RO	Yes	Touch probe 2 positive edge counter - Axis 1
"60D8h, 68D8h Touch probe 2 negative edge counter - Axis #" (➜ p. 506)	0h	UINT 16	-	-	RO	Yes	Touch probe 2 negative edge counter - Axis 1
"60E0h, 68E0h Positive torque limit value - Axis #" (➜ p. 507)	0h	UINT 16	-	-	R/W	Yes	Positive torque limit value - Axis 1
"60E1h, 68E1h Negative torque limit value - Axis #" (➜ p. 508)	0h	UINT 16	-	-	R/W	Yes	Negative torque limit value - Axis 1
"60E4h, 68E4h Additional position actual value - Axis #" (➜ p. 509)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	-	RO	Yes	1st additional position actual value - Axis 1
	2h	INT32	-	-	RO	Yes	2nd additional position actual value - Axis 1
	3h	INT32	-	-	RO	Yes	3rd additional position actual value - Axis 1
	4h	INT32	-	-	RO	Yes	4th additional position actual value - Axis 1
	5h	INT32	-	-	RO	Yes	5th additional position actual value - Axis 1
"60E8h, 68E8h Additional gear ratio - motor revolutions - Axis #" (➜ p. 510)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	1st additional gear ratio - motor revolutions - Axis 1
	2h	UINT 32	-	-	R/W	No	2nd additional gear ratio - motor revolutions - Axis 1
	3h	UINT 32	-	-	R/W	No	3rd additional gear ratio - motor revolutions - Axis 1
	4h	UINT 32	-	-	R/W	No	4th additional gear ratio - motor revolutions - Axis 1
	5h	UINT 32	-	-	R/W	No	5th additional gear ratio - motor revolutions - Axis 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"60E9h, 68E9h Additional feed constant - feed - Axis #" (➔ p. 512)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	1st additional feed constant - feed - Axis 1
	2h	UINT 32	-	-	R/W	No	2nd additional feed constant - feed - Axis 1
	3h	UINT 32	-	-	R/W	No	3rd additional feed constant - feed - Axis 1
	4h	UINT 32	-	-	R/W	No	4th additional feed constant - feed - Axis 1
	5h	UINT 32	-	-	R/W	No	5th additional feed constant - feed - Axis 1
"60EDh, 68EDh Additional gear ratio - shaft revolutions - Axis #" (➔ p. 514)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	1st additional gear ratio - shaft revolutions - Axis 1
	2h	UINT 32	-	-	R/W	No	2nd additional gear ratio - shaft revolutions - Axis 1
	3h	UINT 32	-	-	R/W	No	3rd additional gear ratio - shaft revolutions - Axis 1
	4h	UINT 32	-	-	R/W	No	4th additional gear ratio - shaft revolutions - Axis 1
	5h	UINT 32	-	-	R/W	No	5th additional gear ratio - shaft revolutions - Axis 1
"60EEh, 68EEh Additional feed constant - shaft revolutions - Axis #" (➔ p. 516)	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	1st additional feed constant - shaft revolutions - Axis 1
	2h	UINT 32	-	-	R/W	No	2nd additional feed constant - shaft revolutions - Axis 1
	3h	UINT 32	-	-	R/W	No	3rd additional feed constant - shaft revolutions - Axis 1
	4h	UINT 32	-	-	R/W	No	4th additional feed constant - shaft revolutions - Axis 1
	5h	UINT 32	-	-	R/W	No	5th additional feed constant - shaft revolutions - Axis 1
"60F4h, 68F4h Following error actual value - Axis #" (➔ p. 518)	0h	INT32	-	Position	RO	Yes	Following error actual value - Axis 1
"60FCh, 68FCh Position demand internal value - Axis #" (➔ p. 519)	0h	INT32	-	-	RO	Yes	Position demand internal value - Axis 1
"60FDh, 68FDh Digital inputs - Axis #" (➔ p. 520)	0h	UINT 32	-	-	RO	Yes	Digital inputs - Axis 1
"60FFh, 68FFh Target velocity - Axis #" (➔ p. 521)	0h	INT32	-	-	R/W	Yes	Target velocity - Axis 1

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
"6502h, 6D02h Supported drive modes - Axis #" (➔ p. 522)	0h	UINT 32	-	-	RO	No	Supported drive modes - Axis 1
6840h	0h	UINT 16	-	-	R/W	Yes	Controlword - Axis 2
6841h	0h	UINT 16	-	-	RO	Yes	Statusword - Axis 2
685Ah	0h	INT16	-	-	R/W	No	Quick stop option code - Axis 2
6860h	0h	INT8	-	-	R/W	Yes	Modes of operation - Axis 2
6861h	0h	INT8	-	-	RO	Yes	Modes of operation display - Axis 2
6863h	0h	INT32	-	-	RO	Yes	Position actual internal value - Axis 2
6864h	0h	INT32	-	Position	RO	Yes	Position actual value - Axis 2
6865h	0h	UINT 32	-	Position	R/W	No	Following error window - Axis 2
6866h	0h	UINT 16	-	-	R/W	No	Following error time out - Axis 2
686Bh	0h	INT32	-	Velocity	RO	Yes	Velocity demand value - Axis 2
686Ch	0h	INT32	-	Velocity	RO	Yes	Velocity actual value - Axis 2
686Dh	0h	UINT 16	-	-	R/W	Yes	Velocity window - Axis 2
686Eh	0h	UINT 16	-	-	R/W	Yes	Velocity window time - Axis 2
6871h	0h	INT16	-	-	R/W	Yes	Target torque - Axis 2
6872h	0h	UINT 16	-	-	R/W	Yes	Max torque - Axis 2
6873h	0h	UINT 16	-	-	R/W	No	Max current - Axis 2
6876h	0h	UINT 32	-	-	RO	No	Motor rated torque - Axis 2
6877h	0h	INT16	-	-	RO	Yes	Torque actual value - Axis 2
687Ah	0h	INT32	-	-	R/W	Yes	Target position - Axis 2
687Bh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	-	R/W	No	Min position range limit - Axis 2
	2h	INT32	-	-	R/W	No	Max position range limit - Axis 2
687Ch	0h	INT32	-	Position	R/W	No	Home offset - Axis 2
687Dh	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	Position	R/W	No	Software position limit 1 - Axis 2
	2h	INT32	-	Position	R/W	No	Software position limit 2 - Axis 2
6881h	0h	UINT 32	-	-	R/W	Yes	Profile velocity in pp-mode - Axis 2
6883h	0h	UINT 32	-	-	R/W	Yes	Profile acceleration - Axis 2
6884h	0h	UINT 32	-	-	R/W	Yes	Profile deceleration - Axis 2
6887h	0h	UINT 32	-	-	R/W	No	Torque slope - Axis 2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
6891h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Motor revolutions - Axis 2
	2h	UINT 32	-	-	R/W	No	Shaft revolutions - Axis 2
6892h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Feed - Axis 2
	2h	UINT 32	-	-	R/W	No	Shaft revolutions - Axis 2
6896h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Numerator - Axis 2
	2h	UINT 32	-	-	R/W	No	Divisor - Axis 2
6897h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	-	R/W	No	Numerator - Axis 2
	2h	UINT 32	-	-	R/W	No	Divisor - Axis 2
6898h	0h	INT8	-	-	R/W	No	Homing mode - Axis 2
6899h	0h	UINT 8	-	-	RO	No	Highest sub-index supported
	1h	UINT 32	-	Velocity	R/W	No	Speed during search for switch - Axis 2
	2h	UINT 32	-	-	R/W	No	Speed during search for zero - Axis 2
689Ah	0h	UINT 32	-	-	R/W	No	Homing acceleration - Axis 2
68B0h	0h	INT32	-	Position	R/W	Yes	Position offset - Axis 2
68B1h	0h	INT32	-	Velocity	R/W	Yes	Velocity offset - Axis 2
68B2h	0h	INT16	-	-	R/W	Yes	Torque offset - Axis 2
68B8h	0h	UINT 16	-	-	R/W	Yes	Touch probe function - Axis 2
68B9h	0h	UINT 16	-	-	RO	Yes	Touch probe status - Axis 2
68BAh	0h	INT32	-	Position	RO	Yes	Touch probe 1 position positive value - Axis 2
68BBh	0h	INT32	-	Position	RO	Yes	Touch probe 1 position negative value - Axis 2
68BCh	0h	INT32	-	Position	RO	Yes	Touch probe 2 position positive value - Axis 2
68BDh	0h	INT32	-	Position	RO	Yes	Touch probe 2 position negative value - Axis 2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
68C2h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT8	-	-	R/W	No	Interpolation time period value - Axis 2
	2h	INT8	-	-	R/W	No	Interpolation time index - Axis 2
68D0h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT16	-	-	R/W	No	Touch probe 1 source - Axis 2
	2h	INT16	-	-	R/W	No	Touch probe 2 source - Axis 2
68D1h	0h	UINT32	-	-	RO	Yes	Touch probe 1 time stamp positive value - Axis 2
68D2h	0h	UINT32	-	-	RO	Yes	Touch probe 1 time stamp negative value - Axis 2
68D3h	0h	UINT32	-	-	RO	Yes	Touch probe 2 time stamp positive value - Axis 2
68D4h	0h	UINT32	-	-	RO	Yes	Touch probe 2 time stamp negative value - Axis 2
68D5h	0h	UINT16	-	-	RO	Yes	Touch probe 1 positive edge counter - Axis 2
68D6h	0h	UINT16	-	-	RO	Yes	Touch probe 1 negative edge counter - Axis 2
68D7h	0h	UINT16	-	-	RO	Yes	Touch probe 2 positive edge counter - Axis 2
68D8h	0h	UINT16	-	-	RO	Yes	Touch probe 2 negative edge counter - Axis 2
68E0h	0h	UINT16	-	-	R/W	Yes	Positive torque limit value - Axis 2
68E1h	0h	UINT16	-	-	R/W	Yes	Negative torque limit value - Axis 2
68E4h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	INT32	-	-	RO	Yes	1st additional position actual value - Axis 2
	2h	INT32	-	-	RO	Yes	2nd additional position actual value - Axis 2
	3h	INT32	-	-	RO	Yes	3rd additional position actual value - Axis 2
	4h	INT32	-	-	RO	Yes	4th additional position actual value - Axis 2
	5h	INT32	-	-	RO	Yes	5th additional position actual value - Axis 2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
68E8h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	-	R/W	No	1st additional gear ratio - motor revolutions - Axis 2
	2h	UINT32	-	-	R/W	No	2nd additional gear ratio - motor revolutions - Axis 2
	3h	UINT32	-	-	R/W	No	3rd additional gear ratio - motor revolutions - Axis 2
	4h	UINT32	-	-	R/W	No	4th additional gear ratio - motor revolutions - Axis 2
	5h	UINT32	-	-	R/W	No	5th additional gear ratio - motor revolutions - Axis 2
68E9h	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	-	R/W	No	1st additional feed constant - feed - Axis 2
	2h	UINT32	-	-	R/W	No	2nd additional feed constant - feed - Axis 2
	3h	UINT32	-	-	R/W	No	3rd additional feed constant - feed - Axis 2
	4h	UINT32	-	-	R/W	No	4th additional feed constant - feed - Axis 2
	5h	UINT32	-	-	R/W	No	5th additional feed constant - feed - Axis 2
68EDh	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	-	R/W	No	1st additional gear ratio - shaft revolutions - Axis 2
	2h	UINT32	-	-	R/W	No	2nd additional gear ratio - shaft revolutions - Axis 2
	3h	UINT32	-	-	R/W	No	3rd additional gear ratio - shaft revolutions - Axis 2
	4h	UINT32	-	-	R/W	No	4th additional gear ratio - shaft revolutions - Axis 2
	5h	UINT32	-	-	R/W	No	5th additional gear ratio - shaft revolutions - Axis 2
68EEh	0h	UINT8	-	-	RO	No	Highest sub-index supported
	1h	UINT32	-	-	R/W	No	1st additional feed constant - shaft revolutions - Axis 2
	2h	UINT32	-	-	R/W	No	2nd additional feed constant - shaft revolutions - Axis 2
	3h	UINT32	-	-	R/W	No	3rd additional feed constant - shaft revolutions - Axis 2
	4h	UINT32	-	-	R/W	No	4th additional feed constant - shaft revolutions - Axis 2
	5h	UINT32	-	-	R/W	No	5th additional feed constant - shaft revolutions - Axis 2
68F4h	0h	INT32	-	Position	RO	Yes	Following error actual value - Axis 2

Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable	Name
68FCh	0h	INT32	-	-	RO	Yes	Position demand internal value - Axis 2
68FDh	0h	UINT 32	-	-	RO	Yes	Digital inputs - Axis 2
68FFh	0h	INT32	-	-	R/W	Yes	Target velocity - Axis 2
6D02h	0h	UINT 32	-	-	RO	No	Supported drive modes - Axis 2

5.2 Communication Profile Objects – DS301 (1000-1FFFh)

5.2.1 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
00h	0Ah (servo drive with FSoE functional safety)	0192h (402d)	CANopen over EtherCAT (CoE) with FSoE

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Device type	1000h	0h	Unsigned32	-	-	Read only	No

5.2.2 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 signaled if a bit is set to 1.

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

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Error register	1001h	0h	Unsigned8	-	-	Read only	No

5.2.3 1003h Pre-defined error field

The object 1003h provides an error history with a maximum size of 10 entries.

Sub-index 0 contains the number of errors that have occurred since startup of the drive or since the last reset. The error history can be reset by writing 0 to sub-index 0.

When an EMCY message is sent from the drive, the first four bytes of the message is written into sub-index 1. The previous entries are shifted one sub-index higher and the content in the last sub-index is dropped.

For more information about the EMCY message structure, see EMCY Object.

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Number of errors	1003h	0h	Unsigned8	-	-	Read/Write	No
Standard error field	1003h	1h	Unsigned32	-	-	Read only	No
Standard error field	1003h	2h	Unsigned32	-	-	Read only	No
Standard error field	1003h	3h	Unsigned32	-	-	Read only	No
Standard error field	1003h	4h	Unsigned32	-	-	Read only	No
Standard error field	1003h	5h	Unsigned32	-	-	Read only	No
Standard error field	1003h	6h	Unsigned32	-	-	Read only	No
Standard error field	1003h	7h	Unsigned32	-	-	Read only	No
Standard error field	1003h	8h	Unsigned32	-	-	Read only	No
Standard error field	1003h	9h	Unsigned32	-	-	Read only	No
Standard error field	1003h	Ah	Unsigned32	-	-	Read only	No

5.2.4 1005h COB-ID SYNC

NOTE

CAN bus only

This object defines the COB-ID of the synchronization object (SYNC).

Bit coded information:

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

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
COB-ID SYNC	1005h	0h	Unsigned32	-	-	Read/Write	No

5.2.5 1006h Communication cycle period

NOTE

CAN bus only

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

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Communication cycle period	1006h	0h	Unsigned32	-	-	Read/Write	No

5.2.6 1008h Manufacturer device name

This returns the model number of the drive. This model number is on the label on the side of the drive and available using DRV.INFO.

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Manufacturer device name	1008h	0h	String (40)	-	-	Read only	No

5.2.7 1009h Manufacturer hardware version

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.

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Manufacturer hardware version	1009h	0h	String(6)	-	-	Read only	No

5.2.8 100Ah Manufacturer software version

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

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Manufacturer software version	100Ah	0h	String (60)	-	-	Read only	No

5.2.9 100Ch Guard time

NOTE

CAN bus only

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.

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Guard time	100Ch	0h	Unsigned16	-	-	Read/Write	No

5.2.10 100Dh Life time factor

NOTE

CAN bus only

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

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Life time factor	100Dh	0h	Unsigned8	-	-	Read/Write	No

5.2.11 1010h Store 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".

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1010h	0h	Unsigned8	-	-	Read only	No
Save all parameters	1010h	1h	Unsigned32	-	-	Read/Write	No

5.2.12 1011h Restore default parameters

This object allows the resetting of non-volatile parameters on the drive.

Reading sub-index 1 returns a 1, indicating the drive can reset 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 reset by this object are equivalent to DRV.RSTVAR. The RxPDO and TxPDO mappings "1600h-1603h RxPDO mapping parameter N" (➔ p. 335) and "1A00h-1A03h TxPDO mapping parameter N" (➔ p. 343) are not restored.

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

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1011h	0h	Unsigned8	-	-	Read only	No
Restore all default parameters	1011h	1h	Unsigned32	-	-	Read/Write	No

5.2.13 1012h COB-ID Time Stamp

NOTE

CAN bus only

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

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

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
COB-ID Time Stamp	1012h	0h	Unsigned32	-	-	Read/Write	No

5.2.14 1016h Consumer heartbeat time

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1016h	0h	Unsigned32	-	-	Read only	No
Consumer heartbeat time	1016h	1h	Unsigned32	-	-	Read/Write	No

5.2.15 1017h Producer heartbeat time

NOTE

Can bus only

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

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Producer heartbeat time	1017h	0h	Unsigned16	-	-	Read/Write	No

5.2.16 1018h Identity object

This object contains general information about this device.

5.2.16.0.1 Sub-index 1: Vendor Id

Always returns 0x6A, which is the registered Kollmorgen vendor id with CAN in Automation (CiA) organization.

5.2.16.0.2 Sub-index 2: Product Code

Returns the product code in a bit-encoded format.

Bit	Name	Description
31-28	Drive family	Always 1 for AKD2G stand-alone drives
27-24	Hardware type	1 – Standard hardware
23-20	Axis count	1 or 2 for single or dual axis
19-16	Programmability	Always 1 for AKD2G
12-15	Reserved	
8-11	Safety level	1 – SIL2 STO 2 – SIL3 basic safety functions 3 – SIL3 advanced safety functions
0-7	Reserved	

5.2.16.0.3 Sub-index 3: Revision Number

The upper two bytes contain a unique number to the CANopen interface for the drive.

Byte	Description
3	Firmware minor version (ie: if firmware version is 02-03-01-001, this value is 03)
2	Incrementing revision number that changes when the object mapping is modified for a given minor firmware version
1	Reserved
0	Reserved

5.2.16.0.4 Sub-index 4: Serial Number

This is a globally unique number for each drive to distinguish between identical drives. This 32 bit number is the lower 4 bytes of the drive MAC address on the side label and seen with DRV.INFO.

The serial number, as mentioned in DRV.INFO and on the drive's name plate, is readable via object 3000h sub 9.

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1018h	0h	Unsigned8	-	-	Read only	No
Vendor ID	1018h	1h	Unsigned32	-	-	Read only	No
Product code	1018h	2h	Unsigned32	-	-	Read only	No
Revision number	1018h	3h	Unsigned32	-	-	Read only	No
Serial number	1018h	4h	Unsigned32	-	-	Read only	No

5.2.17 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.

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1026h	0h	Unsigned8	-	-	Read only	No
StdIn	1026h	1h	Unsigned8	-	-	Read/Write	Yes
StdOut	1026h	2h	Unsigned8	-	-	Read only	Yes

5.2.18 1200h SDO server parameter 1

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1200h	0h	Unsigned8	-	-	Read only	No
COB-ID client to server (rx)	1200h	1h	Unsigned32	-	-	Read only	No
COB-ID server to client (tx)	1200h	2h	Unsigned32	-	-	Read only	No

5.2.19 1400h-1403h RxPDO COB-IDs

NOTE

CAN bus only

These objects control the four Rx PDOs going to the drive on CAN bus. The PDO COB-ID can be changed, the PDO can be enabled/disabled, and the transmission type can be set.

5.2.19.0.1 Sub-index 1 COB-ID encoding

Bit	Value	Descrilption
31	0	PDO exists/is valid
	1	PDO does not exist/is not valid
30	0	RTR allowed on this PDO
	1	RTR not allowed on this PDO
29	0	11 bit ID (CAN 2.0A)
	1	29 bit ID (CAN 2.0B) (not supported by AKD2G)
28-11	X	Identifier bits when 29 bit ID is supported (not supported by AKD2G)
10-0	X	Bits 10-0 of COB-ID

5.2.19.0.2 Sub-index 2 Transmission Type

The transmission type has two types, event based of SYNC based:

- A value of 0xFF/255 indicates the PDO is event based, meaning the PDO will be processed when received.
- A value of 0-240 changes the PDO to be SYNC based.
  - 0 means the values will be processed the next SYNC signal
  - 1-240 means that 0-239 SYNC signals are ignored, before one is interpreted

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1400h, 1401h, 1402h, 1403h	0h	Unsigned8	-	-	Read only	No
COB-ID used by RxPDO 4	1400h, 1401h, 1402h, 1403h	1h	Unsigned32	-	-	Read/Write	No
Transmission type	1400h, 1401h, 1402h, 1403h	2h	Unsigned8	-	-	Read/Write	No

5.2.20 1600h-1603h RxPDO mapping parameter N

N has a range 1 to 4 in order of the object.

N has a range 1 to 4 in order of the object.

AKD2G supports four 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.

See "Fixed PDO Mappings" (➜ p. 92) and "Flexible PDO Mapping" (➜ p. 94).

	Index	Sub-Indexes
RxPDO 1	1600h	0 to 32 (8 on CAN bus)
RxPDO 2	1601h	0 to 32 (8 on CAN bus)
RxPDO 3	1602h	0 to 32 (8 on CAN bus)
RxPDO 4	1603h	0 to 32 (8 on CAN bus)

Sub-index 0 contains the number of objects mapped into a PDO. A value of 0 indicates 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)

Example:

1600h sub-index 0 = 2 (2 objects mapped for RX PDO 1)

1600h sub-index 1 = 0x60400010 means index 6040h sub-index 0 (control word), bit length of 16 (2 bytes)

1600h sub-index 2 = 0x607A0020 means index 607Ah sub-index 0 (target position), bit length of 32 (4 bytes)

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1600h, 1601h, 1602h, 1603h	0h	Unsigned8	-	-	Read/Write	No
Mapping entry 1	1600h, 1601h, 1602h, 1603h	1h	Unsigned32	-	-	Read/Write	No
Mapping entry 2	1600h, 1601h, 1602h, 1603h	2h	Unsigned32	-	-	Read/Write	No
Mapping entry 3	1600h, 1601h, 1602h, 1603h	3h	Unsigned32	-	-	Read/Write	No
Mapping entry 4	1600h, 1601h, 1602h, 1603h	4h	Unsigned32	-	-	Read/Write	No
Mapping entry 5	1600h, 1601h, 1602h, 1603h	5h	Unsigned32	-	-	Read/Write	No
Mapping entry 6	1600h, 1601h, 1602h, 1603h	6h	Unsigned32	-	-	Read/Write	No
Mapping entry 7	1600h, 1601h, 1602h, 1603h	7h	Unsigned32	-	-	Read/Write	No
Mapping entry 8	1600h, 1601h, 1602h, 1603h	8h	Unsigned32	-	-	Read/Write	No
Mapping entry 9	1600h, 1601h, 1602h, 1603h	9h	Unsigned32	-	-	Read/Write	No

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Mapping entry 10	1600h, 1601h, 1602h, 1603h	Ah	Unsigned32	-	-	Read/Write	No
Mapping entry 11	1600h, 1601h, 1602h, 1603h	Bh	Unsigned32	-	-	Read/Write	No
Mapping entry 12	1600h, 1601h, 1602h, 1603h	Ch	Unsigned32	-	-	Read/Write	No
Mapping entry 13	1600h, 1601h, 1602h, 1603h	Dh	Unsigned32	-	-	Read/Write	No
Mapping entry 14	1600h, 1601h, 1602h, 1603h	Eh	Unsigned32	-	-	Read/Write	No
Mapping entry 15	1600h, 1601h, 1602h, 1603h	Fh	Unsigned32	-	-	Read/Write	No
Mapping entry 16	1600h, 1601h, 1602h, 1603h	10h	Unsigned32	-	-	Read/Write	No
Mapping entry 17	1600h, 1601h, 1602h, 1603h	11h	Unsigned32	-	-	Read/Write	No
Mapping entry 18	1600h, 1601h, 1602h, 1603h	12h	Unsigned32	-	-	Read/Write	No
Mapping entry 19	1600h, 1601h, 1602h, 1603h	13h	Unsigned32	-	-	Read/Write	No
Mapping entry 20	1600h, 1601h, 1602h, 1603h	14h	Unsigned32	-	-	Read/Write	No

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Mapping entry 21	1600h, 1601h, 1602h, 1603h	15h	Unsigned32	-	-	Read/Write	No
Mapping entry 22	1600h, 1601h, 1602h, 1603h	16h	Unsigned32	-	-	Read/Write	No
Mapping entry 23	1600h, 1601h, 1602h, 1603h	17h	Unsigned32	-	-	Read/Write	No
Mapping entry 24	1600h, 1601h, 1602h, 1603h	18h	Unsigned32	-	-	Read/Write	No
Mapping entry 25	1600h, 1601h, 1602h, 1603h	19h	Unsigned32	-	-	Read/Write	No
Mapping entry 26	1600h, 1601h, 1602h, 1603h	1Ah	Unsigned32	-	-	Read/Write	No
Mapping entry 27	1600h, 1601h, 1602h, 1603h	1Bh	Unsigned32	-	-	Read/Write	No
Mapping entry 28	1600h, 1601h, 1602h, 1603h	1Ch	Unsigned32	-	-	Read/Write	No
Mapping entry 29	1600h, 1601h, 1602h, 1603h	1Dh	Unsigned32	-	-	Read/Write	No
Mapping entry 30	1600h, 1601h, 1602h, 1603h	1Eh	Unsigned32	-	-	Read/Write	No
Mapping entry 31	1600h, 1601h, 1602h, 1603h	1Fh	Unsigned32	-	-	Read/Write	No

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Mapping entry 32	1600h, 1601h, 1602h, 1603h	20h	Unsigned32	-	-	Read/Write	No

5.2.21 1620h RxPDO fixed mapping parameter 0x1620

Fixed map for supporting digital outputs.

Sub-Index	Value	Mapped Value
0	1	One PDO entry
1	0x36010120	3601h sub-index 1 – Digital output bits

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	1620h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1620h	1h	Unsigned32	-	-	Read only	No

5.2.22 1700h RxPDO fixed mapping parameter 0x1700

Fixed map for supporting cyclic synchronous position mode on axis 1.

Sub-Index	Value	Mapped Value
0	2	Two PDO entries
1	0x60400010	6040h – Control Word
2	0x607A0020	607Ah – Target position

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	1700h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1700h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1700h	2h	Unsigned32	-	-	Read only	No

5.2.23 1701h RxPDO fixed mapping parameter 0x1701

Fixed map for supporting velocity mode on axis 1.

Sub-Index	Value	Mapped Value
0	2	Two PDO entries
1	0x60400010	6040h – Control Word

Sub-Index	Value	Mapped Value
2	0x60FF0020	60FFh – Target velocity

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1701h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1701h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1701h	2h	Unsigned32	-	-	Read only	No

5.2.24 1702h RxPDO fixed mapping parameter 0x1702

Fixed map for supporting torque mode on axis 1.

Sub-Index	Value	Mapped Value
0	2	Two PDO entries
1	0x60400010	6040h – Control Word
2	0x60710010	6071h – Target torque

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1702h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1702h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1702h	2h	Unsigned32	-	-	Read only	No

5.2.25 1704h RxPDO fixed mapping parameter 0x1704

Fixed map for supporting touch probe on axis 1.

Sub-Index	Value	Mapped Value
0	1	One PDO entry
1	0x60B80010	60B8h – Touch probe function

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1704h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1704h	1h	Unsigned32	-	-	Read only	No

5.2.26 1720h RxPDO fixed mapping parameter 0x1720

Fixed map for supporting cyclic synchronous position mode on axis 2.

Sub-Index	Value	Mapped Value
0	2	Two PDO entries
1	0x68400010	6840h – Control Word
2	0x687A0020	687Ah – Target position

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1720h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1720h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1720h	2h	Unsigned32	-	-	Read only	No

5.2.27 1721h RxPDO fixed mapping parameter 0x1721

Fixed map for supporting velocity mode on axis 2.

Sub-Index	Value	Mapped Value
0	2	Two PDO entries
1	0x68400010	6840h – Control Word
2	0x68FF0020	68FFh – Target velocity

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1721h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1721h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1721h	2h	Unsigned32	-	-	Read only	No

5.2.28 1722h RxPDO fixed mapping parameter 0x1722

Fixed map for supporting torque mode on axis 2.

Sub-Index	Value	Mapped Value
0	2	Two PDO entries
1	0x68400010	6840h – Control Word
2	0x68710010	6871h – Target torque

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1722h	0h	Unsigned8	-	-	Read only	No

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Mapping entry 1	1722h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1722h	2h	Unsigned32	-	-	Read only	No

5.2.29 1724h RxPDO fixed mapping parameter 0x1724

Fixed map for supporting touch probe on axis 2.

Sub-Index	Value	Mapped Value
0	1	One PDO entry
1	0x68B80010	68B8h – Touch probe function

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1724h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1724h	1h	Unsigned32	-	-	Read only	No

5.2.30 1800h-1803h TxPDO COB-IDs

NOTE

CAN bus only

These objects control the four Tx PDOs coming from the drive on CAN bus.

5.2.30.0.1 Sub-index 1 COB-ID encoding

Bit	Value	Description
31	0	PDO exists/is valid
	1	PDO does not exist/is not valid
30	0	RTR allowed on this PDO
	1	RTR not allowed on this PDO
29	0	11 bit ID (CAN 2.0A)
	1	29 bit ID (CAN 2.0B) (not supported by AKD2G)
28-11	X	Identifier bits when 29 bit ID is supported (not supported by AKD2G)
10-0	X	Bits 10-0 of COB-ID

5.2.30.0.2 Sub-index 2 Transmission Type

There are two transmission types, event based of SYNC based:

- A value of 0xFF/255 indicates the PDO is event based, meaning the PDO will be transmitted when the value of a mapped object within the PDO changes. Sub-index 3 or 5 will additionally modify when the value is sent to help reduce bus load and handle timeout in the object value does not change.

- A value of 0-240 changes the PDO to be SYNC based.
  - 0 means the values will be sent the next SYNC signal
  - 1-240 means that 0-239 SYNC signals are ignored, before one is interpreted and the PDO is sent

5.2.30.0.3 Sub-index 3 Inhibit Time

The inhibit time allows a minimum time between PDO updates for an event triggered PDO. This prevents flooding the bus with traffic if the value is constantly changing. The units are specified in 100 uS increments.

5.2.30.0.4 Sub-index 5 Event Timer

The event timer is used for event based PDOs. It allows to specify a time to send the PDO in the event no mapped objects change to force a PDO update. The units are specified in 1 ms increments.

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1800h, 1801h, 1802h, 1803h	0h	Unsigned8	-	-	Read only	No
COB-ID used by TxPDO 4	1800h, 1801h, 1802h, 1803h	1h	Unsigned32	-	-	Read/Write	No
Transmission type	1800h, 1801h, 1802h, 1803h	2h	Unsigned8	-	-	Read/Write	No
Inhibit time	1800h, 1801h, 1802h, 1803h	3h	Unsigned16	-	-	Read/Write	No
Reserved	1800h, 1801h, 1802h, 1803h	4h	Unsigned8	-	-	Read/Write	No
Event timer	1800h, 1801h, 1802h, 1803h	5h	Unsigned16	-	-	Read/Write	No

5.2.31 1A00h-1A03h TxPDO mapping parameter N

N has a range 1 to 4 in order of the object.

N has a range 1 to 4 in order of the object.

AKD2G supports four 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.

See "Fixed PDO Mappings" (➔ p. 92) and "Flexible PDO Mapping" (➔ p. 94).

	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)

Example:

1A00h sub-index 0 = 3 (3 objects mapped for TX PDO 1)

1A00h sub-index 1 = 0x60410010 means index 6041h sub-index 0 (status word), bit length of 16 (2 bytes)

1A00h sub-index 2 = 0x60640020 means index 6064h sub-index 0 (actual position), bit length of 32 (4 bytes)

1A00h sub-index 3 = 0x60F40020 means index 60F4h sub-index 0 (position error), bit length of 32 (4 bytes)

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1A00h, 1A01h, 1A02h, 1A03h	0h	Unsigned8	-	-	Read/Write	No
Mapping entry 1	1A00h, 1A01h, 1A02h, 1A03h	1h	Unsigned32	-	-	Read/Write	No
Mapping entry 2	1A00h, 1A01h, 1A02h, 1A03h	2h	Unsigned32	-	-	Read/Write	No
Mapping entry 3	1A00h, 1A01h, 1A02h, 1A03h	3h	Unsigned32	-	-	Read/Write	No
Mapping entry 4	1A00h, 1A01h, 1A02h, 1A03h	4h	Unsigned32	-	-	Read/Write	No
Mapping entry 5	1A00h, 1A01h, 1A02h, 1A03h	5h	Unsigned32	-	-	Read/Write	No

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Mapping entry 6	1A00h, 1A01h, 1A02h, 1A03h	6h	Unsigned32	-	-	Read/Write	No
Mapping entry 7	1A00h, 1A01h, 1A02h, 1A03h	7h	Unsigned32	-	-	Read/Write	No
Mapping entry 8	1A00h, 1A01h, 1A02h, 1A03h	8h	Unsigned32	-	-	Read/Write	No
Mapping entry 9	1A00h, 1A01h, 1A02h, 1A03h	9h	Unsigned32	-	-	Read/Write	No
Mapping entry 10	1A00h, 1A01h, 1A02h, 1A03h	Ah	Unsigned32	-	-	Read/Write	No
Mapping entry 11	1A00h, 1A01h, 1A02h, 1A03h	Bh	Unsigned32	-	-	Read/Write	No
Mapping entry 12	1A00h, 1A01h, 1A02h, 1A03h	Ch	Unsigned32	-	-	Read/Write	No
Mapping entry 13	1A00h, 1A01h, 1A02h, 1A03h	Dh	Unsigned32	-	-	Read/Write	No
Mapping entry 14	1A00h, 1A01h, 1A02h, 1A03h	Eh	Unsigned32	-	-	Read/Write	No
Mapping entry 15	1A00h, 1A01h, 1A02h, 1A03h	Fh	Unsigned32	-	-	Read/Write	No
Mapping entry 16	1A00h, 1A01h, 1A02h, 1A03h	10h	Unsigned32	-	-	Read/Write	No

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Mapping entry 17	1A00h, 1A01h, 1A02h, 1A03h	11h	Unsigned32	-	-	Read/Write	No
Mapping entry 18	1A00h, 1A01h, 1A02h, 1A03h	12h	Unsigned32	-	-	Read/Write	No
Mapping entry 19	1A00h, 1A01h, 1A02h, 1A03h	13h	Unsigned32	-	-	Read/Write	No
Mapping entry 20	1A00h, 1A01h, 1A02h, 1A03h	14h	Unsigned32	-	-	Read/Write	No
Mapping entry 21	1A00h, 1A01h, 1A02h, 1A03h	15h	Unsigned32	-	-	Read/Write	No
Mapping entry 22	1A00h, 1A01h, 1A02h, 1A03h	16h	Unsigned32	-	-	Read/Write	No
Mapping entry 23	1A00h, 1A01h, 1A02h, 1A03h	17h	Unsigned32	-	-	Read/Write	No
Mapping entry 24	1A00h, 1A01h, 1A02h, 1A03h	18h	Unsigned32	-	-	Read/Write	No
Mapping entry 25	1A00h, 1A01h, 1A02h, 1A03h	19h	Unsigned32	-	-	Read/Write	No
Mapping entry 26	1A00h, 1A01h, 1A02h, 1A03h	1Ah	Unsigned32	-	-	Read/Write	No
Mapping entry 27	1A00h, 1A01h, 1A02h, 1A03h	1Bh	Unsigned32	-	-	Read/Write	No

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Mapping entry 28	1A00h, 1A01h, 1A02h, 1A03h	1Ch	Unsigned32	-	-	Read/Write	No
Mapping entry 29	1A00h, 1A01h, 1A02h, 1A03h	1Dh	Unsigned32	-	-	Read/Write	No
Mapping entry 30	1A00h, 1A01h, 1A02h, 1A03h	1Eh	Unsigned32	-	-	Read/Write	No
Mapping entry 31	1A00h, 1A01h, 1A02h, 1A03h	1Fh	Unsigned32	-	-	Read/Write	No
Mapping entry 32	1A00h, 1A01h, 1A02h, 1A03h	20h	Unsigned32	-	-	Read/Write	No

5.2.32 1A20h TxPDO fixed mapping parameter 0x1a20

Fixed map for supporting digital inputs.

Sub-Index	Value	Mapped Value
0	1	One PDO entry
1	0x35800020	3580h sub-index 0 – Digital input states

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1A20h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1A20h	1h	Unsigned32	-	-	Read only	No

5.2.33 1B00h TxPDO fixed mapping parameter 0x1b00

Fixed map for supporting cyclic synchronous position mode on axis 1.

Sub-Index	Value	Mapped Value
0	3	Three PDO entries
1	0x60410010	6041h – Status Word
2	0x60640020	6064h – Actual position
3	0x60F40020	60F4h – Position Error

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B00h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B00h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1B00h	2h	Unsigned32	-	-	Read only	No
Mapping entry 3	1B00h	3h	Unsigned32	-	-	Read only	No

5.2.34 1B01h TxPDO fixed mapping parameter 0x1b01

Fixed map for supporting velocity mode on axis 1.

Sub-Index	Value	Mapped Value
0	3	Three PDO entries
1	0x60410010	6041h – Status Word
2	0x60640020	6064h – Actual position
3	0x606C0020	606Ch – Actual velocity

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B01h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B01h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1B01h	2h	Unsigned32	-	-	Read only	No
Mapping entry 3	1B01h	3h	Unsigned32	-	-	Read only	No

5.2.35 1B02h TxPDO fixed mapping parameter 0x1b02

Fixed map for supporting torque mode on axis 1.

Sub-Index	Value	Mapped Value
0	3	Three PDO entries
1	0x60410010	6041h – Status Word
2	0x60640020	6064h – Actual position
3	0x60770010	6077h – Actual torque

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B02h	0h	Unsigned8	-	-	Read only	No

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Mapping entry 1	1B02h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1B02h	2h	Unsigned32	-	-	Read only	No
Mapping entry 3	1B02h	3h	Unsigned32	-	-	Read only	No

5.2.36 1B03h TxPDO fixed mapping parameter 0x1b03

Fixed map for supporting touch probe status on axis 1.

Sub-Index	Value	Mapped Value
0	1	One PDO entry
1	0x60B90010	60B9h – Touch probe status

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B03h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B03h	1h	Unsigned32	-	-	Read only	No

5.2.37 1B04h TxPDO fixed mapping parameter 0x1b04

Fixed map for supporting touch probe 1 on axis 1.

Sub-Index	Value	Mapped Value
0	2	Two PDO entries
1	0x60BA0020	60BAh – Touch probe 1 position positive value
2	0x60BB0020	60BBh – Touch probe 1 position negative value

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B04h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B04h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1B04h	2h	Unsigned32	-	-	Read only	No

5.2.38 1B05h TxPDO fixed mapping parameter 0x1b05

Fixed map for supporting touch probe 2 on axis 1.

Sub-Index	Sub-Index	Mapped Sub-Index
0	2	Two PDO entries
1	0x60BC0020	60BCh – Touch probe 2 position positive value

Sub-Index	Sub-Index	Mapped Sub-Index
2	0x60BD0020	60BDh – Touch probe 2 position negative value

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B05h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B05h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1B05h	2h	Unsigned32	-	-	Read only	No

5.2.39 1B06h TxPDO fixed mapping parameter 0x1b06

Fixed map for supporting drive profile digital inputs on axis 1.

Sub-Index	Value	Mapped Value
0	1	One PDO entry
1	0x60FD0020	60FDh – Drive profile digital inputs

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B06h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B06h	1h	Unsigned32	-	-	Read only	No

5.2.40 1B20h TxPDO fixed mapping parameter 0x1b20

Fixed map for supporting cyclic synchronous position mode on axis 2.

Sub-Index	Value	Mapped Value
0	3	Three PDO entries
1	0x68410010	6841h – Status Word
2	0x68640020	6864h – Actual position
3	0x68F40020	68F4h – Position Error

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B20h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B20h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1B20h	2h	Unsigned32	-	-	Read only	No
Mapping entry 3	1B20h	3h	Unsigned32	-	-	Read only	No

5.2.41 1B21h TxPDO fixed mapping parameter 0x1b21

Fixed map for supporting velocity mode on axis 2.

Sub-Index	Value	Mapped Value
0	3	Three PDO entries
1	0x68410010	6841h – Status Word
2	0x68640020	6864h – Actual position
3	0x686C0020	686Ch – Actual velocity

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B21h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B21h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1B21h	2h	Unsigned32	-	-	Read only	No
Mapping entry 3	1B21h	3h	Unsigned32	-	-	Read only	No

5.2.42 1B22h TxPDO fixed mapping parameter 0x1b22

Fixed map for supporting torque mode on axis 2.

Sub-Index	Value	Mapped Value
0	3	Three PDO entries
1	0x68410010	6841h – Status Word
2	0x68640020	6864h – Actual position
3	0x68770010	6877h – Actual torque

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B22h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B22h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1B22h	2h	Unsigned32	-	-	Read only	No
Mapping entry 3	1B22h	3h	Unsigned32	-	-	Read only	No

5.2.43 1B23h TxPDO fixed mapping parameter 0x1b23

Fixed map for supporting touch probe status on axis 2.

Sub-Index	Value	Mapped Value
0	1	One PDO entry
1	0x68B90010	68B9h – Touch probe status

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B23h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B23h	1h	Unsigned32	-	-	Read only	No

5.2.44 1B24h TxPDO fixed mapping parameter 0x1b24

Fixed map for supporting touch probe 1 on axis 2.

Sub-Index	Value	Mapped Value
0	2	Two PDO entries
1	0x68BA0020	68BAh – Touch probe 1 position positive value
2	0x68BB0020	68BBh – Touch probe 1 position negative value

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B24h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B24h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1B24h	2h	Unsigned32	-	-	Read only	No

5.2.45 1B25h TxPDO fixed mapping parameter 0x1b25

Fixed map for supporting touch probe 2 on axis 2.

Sub-Index	Value	Mapped Value
0	2	Two PDO entries
1	0x68BC0020	68BCh – Touch probe 2 position positive value
2	0x68BD0020	68BDh – Touch probe 2 position negative value

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B25h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B25h	1h	Unsigned32	-	-	Read only	No
Mapping entry 2	1B25h	2h	Unsigned32	-	-	Read only	No

5.2.46 1B26h TxPDO fixed mapping parameter 0x1b26

Fixed map for supporting drive profile digital inputs on axis 2.

Sub-Index	Value	Mapped Value
0	1	One PDO entry
1	0x68FD0020	68FDh – Drive profile digital inputs

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1B26h	0h	Unsigned8	-	-	Read only	No
Mapping entry 1	1B26h	1h	Unsigned32	-	-	Read only	No

5.2.47 1C00h Sync manager communication type

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1C00h	0h	Unsigned8	-	-	Read only	No
Communication type sync manager 1	1C00h	1h	Unsigned8	-	-	Read only	No
Communication type sync manager 2	1C00h	2h	Unsigned8	-	-	Read only	No
Communication type sync manager 3	1C00h	3h	Unsigned8	-	-	Read only	No
Communication type sync manager 4	1C00h	4h	Unsigned8	-	-	Read only	No

5.2.48 1C12h RxPDO assignment

NOTE

EtherCAT only

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

Sub-index 0 is the number of RxPDOs assigned to this sync manager. On AKD2G, a maximum of 10 are allowed.

Sub-indexes 1 to 10 list the RxPDOs in this sync manager.

By default, the free mapping PDOs are set (1600h-1603h) but fixed maps may be used.

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1C12h	0h	Unsigned8	-	-	Read/Write	No
RxPDO mapping index 1	1C12h	1h	Unsigned16	-	-	Read/Write	No

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
RxPDO mapping index 2	1C12h	2h	Unsigned16	-	-	Read/Write	No
RxPDO mapping index 3	1C12h	3h	Unsigned16	-	-	Read/Write	No
RxPDO mapping index 4	1C12h	4h	Unsigned16	-	-	Read/Write	No
RxPDO mapping index 5	1C12h	5h	Unsigned16	-	-	Read/Write	No
RxPDO mapping index 6	1C12h	6h	Unsigned16	-	-	Read/Write	No
RxPDO mapping index 7	1C12h	7h	Unsigned16	-	-	Read/Write	No
RxPDO mapping index 8	1C12h	8h	Unsigned16	-	-	Read/Write	No
RxPDO mapping index 9	1C12h	9h	Unsigned16	-	-	Read/Write	No
RxPDO mapping index 10	1C12h	Ah	Unsigned16	-	-	Read/Write	No

5.2.49 1C13h TxPDO assignment

NOTE

EtherCAT only

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

Sub-index 0 is the number of TxPDOs assigned to this sync manager. On AKD2G, a maximum of 10 are allowed.

Sub-indexes 1 to 10 list the TxPDOs in this sync manager.

By default, the free mapping PDOs are set ("1A00h-1A03h TxPDO mapping parameter N" (➔ p. 343)) but fixed maps may be used.

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1C13h	0h	Unsigned8	-	-	Read/Write	No
TxPDO mapping index 1	1C13h	1h	Unsigned16	-	-	Read/Write	No
TxPDO mapping index 2	1C13h	2h	Unsigned16	-	-	Read/Write	No
TxPDO mapping index 3	1C13h	3h	Unsigned16	-	-	Read/Write	No

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
TxPDO mapping index 4	1C13h	4h	Unsigned16	-	-	Read/Write	No
TxPDO mapping index 5	1C13h	5h	Unsigned16	-	-	Read/Write	No
TxPDO mapping index 6	1C13h	6h	Unsigned16	-	-	Read/Write	No
TxPDO mapping index 7	1C13h	7h	Unsigned16	-	-	Read/Write	No
TxPDO mapping index 8	1C13h	8h	Unsigned16	-	-	Read/Write	No
TxPDO mapping index 9	1C13h	9h	Unsigned16	-	-	Read/Write	No
TxPDO mapping index 10	1C13h	Ah	Unsigned16	-	-	Read/Write	No

5.2.50 1C32h Output SyncManager Parameter

NOTE

EtherCAT only

This object allows configuring the output sync manager synchronization settings.

Name	Sub-Index	Description
Synchronization type	1	0 – Free run 1 –Synchronized on SM2 Event (packet received) 2 – Synchronized on DC Sync0 3 – Synchronized on DC Sync1 (not possible on AKD2G)
Cycle time	2	Configured cycle time from DC sync0 when DC is used or from 60C1h/68C1h
Shift time	3	Time between related event and associated action in ns

<table>
<tr><th>Name</th><th>Sub-Index</th><th>Description</th></tr>
<tr><td>Sync modes supported</td><td>4</td><td>Returns a bit encoded value:
<table>
<tr><th>Bit</th><th>Name</th><th>AKD2G Value</th></tr>
<tr><td>0</td><td>Free run supported</td><td>1</td></tr>
<tr><td>1</td><td>Synchronous supported</td><td>1</td></tr>
<tr><td>4-2</td><td>DC Type supported</td><td>1 (DC Sync0)</td></tr>
<tr><td>6-5</td><td>Shift Settings</td><td>1 (Output shift with local timer)</td></tr>
<tr><td>9-7</td><td>Reserved</td><td>0</td></tr>
<tr><td>10</td><td>Delay time should be measured</td><td>1</td></tr>
<tr><td>11</td><td>Delay time is fixed</td><td>0</td></tr>
<tr><td>13-12</td><td>Reserved</td><td>0</td></tr>
<tr><td>14</td><td>Dynamic cycle times</td><td>0</td></tr>
<tr><td>15</td><td>Reserved</td><td>0</td></tr>
</table></td></tr>
<tr><td>Minimum cycle time</td><td>5</td><td>Minimum cycle time supported in ns (250000 for AKD2G)</td></tr>
<tr><td>Calc and copy time</td><td>6</td><td>Time needed to copy the process data from SM to local memory and perform calculations before using the data</td></tr>
<tr><td>Minimum delay time</td><td>7</td><td>Minimum hardware delay time when using DC Sync0</td></tr>
<tr><td>Get cycle time</td><td>8</td><td>Bit 0:
0: Measurement of local cycle time stopped
1: Measurement of local cycle time started
If written again, the measured values are reset.
Bit 1:
0: ---
1: Reset error counters</td></tr>
<tr><td>Delay time</td><td>9</td><td>Time from receiving the Sync0 trigger to the time value is valid</td></tr>
<tr><td>Sync0 Cycle Time</td><td>10</td><td>Time between two Sync0 signals</td></tr>
<tr><td>SM-Event Missed</td><td>11</td><td>Error counter when an expected SM event did not occur</td></tr>
<tr><td>Cycle time too small</td><td>12</td><td>Error counter when the cycle time is too small; therefore, the drive cycle cannot be completed and data cannot be provided before the next SM event</td></tr>
</table>

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1C32h	0h	Unsigned8	-	-	Read only	No
Synchronization type	1C32h	1h	Unsigned16	-	-	Read only	No
Cycle time	1C32h	2h	Unsigned32	-	-	Read only	No
Shift time	1C32h	3h	Unsigned32	-	-	Read/Write	No
Sync modes supported	1C32h	4h	Unsigned16	-	-	Read only	No
Minimum cycle time	1C32h	5h	Unsigned32	-	-	Read only	No
Calc and copy time	1C32h	6h	Unsigned32	-	-	Read only	No
Minimum delay time	1C32h	7h	Unsigned32	-	-	Read only	No
Get cycle time	1C32h	8h	Unsigned16	-	-	Read/Write	No
Delay time	1C32h	9h	Unsigned32	-	-	Read only	No
Sync0 Cycle Time	1C32h	Ah	Unsigned32	-	-	Read only	No
SM-Event Missed	1C32h	Bh	Unsigned16	-	-	Read only	No
Cycle time too small	1C32h	Ch	Unsigned16	-	-	Read only	No

5.2.51 1C33h Input SyncManager Parameter

NOTE

EtherCAT only

This object allows configuring the input sync manager synchronization settings.

Name	Sub-Index	Description
Synchronization type	1	0 – Free run 1 –Synchronized on SM3 Event 2 – Synchronized on DC Sync0 3 – Synchronized on DC Sync1 (not possible on AKD2G) 0x22 – Synchronous with SM2 Event
Cycle time	2	Configured cycle time from DC sync0 when DC is used or from 60C1h/68C1h
Shift time	3	Time between related event and associated action in ns

<table>
<tr><th>Name</th><th>Sub-Index</th><th>Description</th></tr>
<tr><td>Sync modes supported</td><td>4</td><td>Returns a bit encoded value:
<table>
<tr><th>Bit</th><th>Name</th><th>AKD2G Value</th></tr>
<tr><td>0</td><td>Free run supported</td><td>1</td></tr>
<tr><td>1</td><td>Synchronous supported</td><td>1</td></tr>
<tr><td>4-2</td><td>DC Type supported</td><td>1 (DC Sync0)</td></tr>
<tr><td>6-5</td><td>Shift Settings</td><td>1 (Input shift with local timer)</td></tr>
<tr><td>13-7</td><td>Reserved</td><td>0</td></tr>
<tr><td>14</td><td>Dynamic cycle times</td><td>0</td></tr>
<tr><td>15</td><td>Reserved</td><td>0</td></tr>
</table></td></tr>
<tr><td>Minimum cycle time</td><td>5</td><td>Minimum cycle time supported in ns (250000 for AKD2G)</td></tr>
<tr><td>Calc and copy time</td><td>6</td><td>Time needed to perform data calculations and copy process data to the SM from local memory</td></tr>
<tr><td>Reserved</td><td>7</td><td></td></tr>
<tr><td>Get cycle time</td><td>8</td><td>Bit 0:
0: Measurement of local cycle time stopped
1: Measurement of local cycle time started
If written again, the measured values are reset.
Bit 1:
0: ---
1: Reset error counters</td></tr>
<tr><td>Delay time</td><td>9</td><td>Only used in Sync1 mode (not supported by AKD2G) if input latch is started by the Sync1-event</td></tr>
<tr><td>Sync0 Cycle Time</td><td>10</td><td>Time between two Sync0 signals</td></tr>
<tr><td>SM-Event Missed</td><td>11</td><td>Error counter when an expected SM event did not occur</td></tr>
<tr><td>Cycle time too small</td><td>12</td><td>Error counter when the cycle time is too small; therefore, the drive cycle cannot be completed and data cannot be provided before the next SM event</td></tr>
</table>

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	1C33h	0h	Unsigned8	-	-	Read only	No
Synchronization type	1C33h	1h	Unsigned16	-	-	Read only	No

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Cycle time	1C33h	2h	Unsigned32	-	-	Read only	No
Shift time	1C33h	3h	Unsigned32	-	-	Read/Write	No
Sync modes supported	1C33h	4h	Unsigned16	-	-	Read only	No
Minimum cycle time	1C33h	5h	Unsigned32	-	-	Read only	No
Calc and copy time	1C33h	6h	Unsigned32	-	-	Read only	No
Minimum delay time	1C33h	7h	Unsigned32	-	-	Read only	No
Get cycle time	1C33h	8h	Unsigned16	-	-	Read/Write	No
Delay time	1C33h	9h	Unsigned32	-	-	Read only	No
Sync0 Cycle Time	1C33h	Ah	Unsigned32	-	-	Read only	No
SM-Event Missed	1C33h	Bh	Unsigned16	-	-	Read only	No
Cycle time too small	1C33h	Ch	Unsigned16	-	-	Read only	No

5.3 CANopen Manufacturer Specific Objects (2000-5FFFh)

5.3.1 2F00h Firmware

Name	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	2F00h	0h	Unsigned8	-	-	Read only	No
Major firmware version	2F00h	1h	Unsigned32	-	-	Read only	No
Minor firmware version	2F00h	2h	Unsigned32	-	-	Read only	No
Firmware revision	2F00h	3h	Unsigned32	-	-	Read only	No
Firmware branch	2F00h	4h	Unsigned32	-	-	Read only	No
Firmware version	2F00h	5h	String(64)	-	-	Read only	No

5.3.2 3001h Drive status

This object provides a bit masked overall drive status value.

Bit	Name	Bit	Name	Bit	Name	Bit	Name
0	1 = Feedback 1 Faulted	8	Reserved	16	Reserved	24	Reserved
1	1 = Feedback 2 Faulted	9	Reserved	17	Reserved	25	Reserved
2	1 = Feedback 3 Faulted	10	Reserved	18	Reserved	26	Reserved
3	1 = Feedback 4 Faulted	11	Reserved	19	Reserved	27	Reserved
4	1 = Feedback 5 Faulted	12	Reserved	20	Reserved	28	Reserved
5	1 = Axis 1 Faulted	13	Reserved	21	Reserved	29	Reserved
6	1 = Axis 2 Faulted	14	Reserved	22	Reserved	30	Reserved
7	Reserved	15	Reserved	23	Reserved	31	Reserved

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3001h	0h	Unsigned8	-	-	Read only	No
Drive status 1	3001h	1h	Unsigned32	-	-	Read only	Yes

5.3.3 3007h REGEN.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3007h	0h	Unsigned8	-	-	Read only	No
REGEN.POWERFILTERED	3007h	1h	Unsigned32	-	-	Read only	Yes
REGEN.POWER	3007h	2h	Unsigned32	-	-	Read only	Yes
REGEN.TYPE	3007h	3h	Signed8	-	-	Read/Write	No
REGEN.WATTEXT	3007h	4h	Unsigned16	-	-	Read/Write	No
REGEN.TEXT	3007h	5h	Unsigned32	1000:1	-	Read/Write	No
REGEN.REXT	3007h	6h	Unsigned16	-	-	Read/Write	No

5.3.4 3010h SD.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3010h	0h	Unsigned8	-	-	Read only	No
SD.LOGEN	3010h	1h	Unsigned8	-	-	Read/Write	No

5.3.5 3011h LOG.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3011h	0h	Unsigned8	-	-	Read only	No
LOG.SOURCE	3011h	1h	Unsigned32	-	-	Read/Write	No

5.3.6 3012h BRAKE1.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3012h	0h	Unsigned8	-	-	Read only	No
BRAKE1.AXIS	3012h	1h	Unsigned8	-	-	Read/Write	No
BRAKE2.AXIS	3012h	2h	Unsigned8	-	-	Read/Write	No

5.3.7 3013h IP.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3013h	0h	Unsigned8	-	-	Read only	No
IP.ADDRESS	3013h	1h	Unsigned32	-	-	Read/Write	No
IP.DEFAULTINTERFACE	3013h	2h	Unsigned8	-	-	Read/Write	No
IP.GATEWAY	3013h	3h	Unsigned32	-	-	Read/Write	No
IP.MODE	3013h	4h	Unsigned16	-	-	Read/Write	No
IP.PROTOCOL	3013h	5h	Unsigned8	-	-	Read/Write	No
IP.SUBNET	3013h	6h	Unsigned32	-	-	Read/Write	No

5.3.8 3014h MODBUS.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3014h	0h	Unsigned8	-	-	Read only	No
MODBUS.EN	3014h	1h	Unsigned8	-	-	Read/Write	No
MODBUS.ENDIAN	3014h	2h	Unsigned8	-	-	Read/Write	No
MODBUS.ERRORMODE	3014h	3h	Unsigned8	-	-	Read/Write	No
MODBUS.KEEPALIVE	3014h	4h	Unsigned8	-	-	Read/Write	No
MODBUS.WATCHDOG	3014h	5h	Unsigned16	-	-	Read/Write	No

5.3.9 3015h Connector settings

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3015h	0h	Unsigned8	-	-	Read only	No
X22.MODE	3015h	1h	Unsigned8	-	-	Read/Write	No
X23.MODE	3015h	2h	Unsigned8	-	-	Read/Write	No

5.3.10 300Ah VBUS.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	300Ah	0h	Unsigned8	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
VBUS.VALUE	300Ah	1h	Signed32	-	-	Read only	Yes
VBUS.UVFTHRESH	300Ah	2h	Unsigned16	-	-	Read/Write	No
VBUS.UVWTHRESH	300Ah	3h	Unsigned16	-	-	Read/Write	No
VBUS.UVMODE	300Ah	4h	Unsigned8	-	-	Read/Write	No
VBUS.ACNOMINAL	300Ah	5h	Unsigned16	-	-	Read/Write	No
VBUS.DCNOMINAL	300Ah	6h	Unsigned16	-	-	Read/Write	No
VBUS.DCOPERATION	300Ah	7h	Unsigned8	-	-	Read/Write	No
VBUS.OVWTHRESH	300Ah	8h	Unsigned16	-	-	Read/Write	No
VBUS.THREEPHASE	300Ah	9h	Unsigned8	-	-	Read/Write	No

5.3.11 300Bh CANOPEN.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	300Bh	0h	Unsigned8	-	-	Read only	No
CANOPEN.MONITORSYNC	300Bh	1h	Unsigned8	-	-	Read/Write	No
CANOPEN.WORKBENCHUNITS	300Bh	2h	Unsigned8	-	-	Read/Write	No
Tx Loopback	300Bh	3h	Unsigned8	-	-	Read only	Yes
Rx Loopback	300Bh	4h	Unsigned8	-	-	Read/Write	Yes
CANOPEN.EMCYRESEND	300Bh	5h	Unsigned8	-	-	Read/Write	No

5.3.12 300Ch Fault history: fault number

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	300Ch	0h	Unsigned8	-	-	Read only	No
Fault history: fault number 0	300Ch	1h	Unsigned32	-	-	Read only	No
Fault history: fault number 1	300Ch	2h	Unsigned32	-	-	Read only	No
Fault history: fault number 2	300Ch	3h	Unsigned32	-	-	Read only	No
Fault history: fault number 3	300Ch	4h	Unsigned32	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Fault history: fault number 4	300Ch	5h	Unsigned32	-	-	Read only	No
Fault history: fault number 5	300Ch	6h	Unsigned32	-	-	Read only	No
Fault history: fault number 6	300Ch	7h	Unsigned32	-	-	Read only	No
Fault history: fault number 7	300Ch	8h	Unsigned32	-	-	Read only	No
Fault history: fault number 8	300Ch	9h	Unsigned32	-	-	Read only	No
Fault history: fault number 9	300Ch	Ah	Unsigned32	-	-	Read only	No
Fault history: fault number 10	300Ch	Bh	Unsigned32	-	-	Read only	No
Fault history: fault number 11	300Ch	Ch	Unsigned32	-	-	Read only	No
Fault history: fault number 12	300Ch	Dh	Unsigned32	-	-	Read only	No
Fault history: fault number 13	300Ch	Eh	Unsigned32	-	-	Read only	No
Fault history: fault number 14	300Ch	Fh	Unsigned32	-	-	Read only	No
Fault history: fault number 15	300Ch	10h	Unsigned32	-	-	Read only	No
Fault history: fault number 16	300Ch	11h	Unsigned32	-	-	Read only	No
Fault history: fault number 17	300Ch	12h	Unsigned32	-	-	Read only	No
Fault history: fault number 18	300Ch	13h	Unsigned32	-	-	Read only	No
Fault history: fault number 19	300Ch	14h	Unsigned32	-	-	Read only	No

5.3.13 300Dh Fault history: fault timestamp

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	300Dh	0h	Unsigned8	-	-	Read only	No
Fault history: fault timestamp 0	300Dh	1h	Unsigned32	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Fault history: fault timestamp 1	300Dh	2h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 2	300Dh	3h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 3	300Dh	4h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 4	300Dh	5h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 5	300Dh	6h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 6	300Dh	7h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 7	300Dh	8h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 8	300Dh	9h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 9	300Dh	Ah	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 10	300Dh	Bh	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 11	300Dh	Ch	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 12	300Dh	Dh	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 13	300Dh	Eh	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 14	300Dh	Fh	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 15	300Dh	10h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 16	300Dh	11h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 17	300Dh	12h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 18	300Dh	13h	Unsigned32	-	-	Read only	No
Fault history: fault timestamp 19	300Dh	14h	Unsigned32	-	-	Read only	No

5.3.14 300Eh GANTRY.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	300Eh	0h	Unsigned8	-	-	Read only	No
GANTRY.PL.ERR	300Eh	1h	Signed32	-	Position	Read only	No
GANTRY.PL.ERRFTHRESH	300Eh	2h	Signed32	-	Position	Read/Write	No
GANTRY.PL.ERRWTHRESH	300Eh	3h	Signed32	-	Position	Read/Write	No
GANTRY.HOME.REQUIRED	300Eh	4h	Unsigned8	-	-	Read/Write	No
GANTRY.STATE	300Eh	5h	Unsigned8	-	-	Read only	No
GANTRY.PL.ERRTTHRESH	300Eh	6h	Unsigned16	1000:1	-	Read/Write	No

5.3.15 3500h FB1.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3500h	0h	Unsigned8	-	-	Read only	No
FB1.SELECT	3500h	1h	Signed16	-	-	Read/Write	No
FB1.ENCLINES	3500h	2h	Unsigned32	-	-	Read/Write	No
FB1.POLES	3500h	3h	Unsigned16	-	-	Read/Write	No
FB1.RESKTR	3500h	4h	Unsigned16	1000:1	-	Read/Write	No
FB1.RESREFPHASE	3500h	5h	Signed32	1000:1	-	Read/Write	No
FB1.BITS	3500h	6h	Unsigned16	-	-	Read/Write	No
FB1.CALTHRESHRES	3500h	7h	Unsigned16	-	-	Read/Write	No
FB1.CALTHRESHSINCOS	3500h	8h	Unsigned16	-	-	Read/Write	No
FB1.LASTIDENTIFIED	3500h	9h	Signed16	-	-	Read/Write	No
FB1.LINEPITCH	3500h	Ah	Unsigned32	1000:1	-	Read/Write	No
FB1.MECHTYPE	3500h	Bh	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
FB1.MULTITURNBITS	3500h	Ch	Unsigned8	-	-	Read/Write	No
FB1.SINGLETURNBITS	3500h	Dh	Unsigned8	-	-	Read/Write	No
FB1.STOREMULTITURN.BITS	3500h	Eh	Unsigned8	-	-	Read/Write	No
FB1.STOREMULTITURN.ENABLE	3500h	Fh	Unsigned8	-	-	Read/Write	No
FB1.TRACKINGCAL	3500h	10h	Unsigned8	-	-	Read/Write	No
FB1.INITSIGNED	3500h	11h	Unsigned8	-	-	Read/Write	No
FB1.SSITYPE	3500h	12h	Unsigned8	-	-	Read/Write	No
FB1.MONITOR1.SOURCE	3500h	13h	Unsigned8	-	-	Read/Write	No
FB1.MONITOR2.SOURCE	3500h	14h	Unsigned8	-	-	Read/Write	No
FB1.MONITOR1.DATA	3500h	15h	Signed32	1000:1	-	Read only	Yes
FB1.MONITOR2.DATA	3500h	16h	Signed32	1000:1	-	Read only	Yes

5.3.16 3501h FB2.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3501h	0h	Unsigned8	-	-	Read only	No
FB2.SELECT	3501h	1h	Signed16	-	-	Read/Write	No
FB2.ENCLINES	3501h	2h	Unsigned32	-	-	Read/Write	No
FB2.POLES	3501h	3h	Unsigned16	-	-	Read/Write	No
FB2.RESKTR	3501h	4h	Unsigned16	1000:1	-	Read/Write	No
FB2.RESREFPHASE	3501h	5h	Signed32	1000:1	-	Read/Write	No
FB2.BITS	3501h	6h	Unsigned16	-	-	Read/Write	No
FB2.CALTHRESHRES	3501h	7h	Unsigned16	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
FB2.CALTHRESHSINCOS	3501h	8h	Unsigned16	-	-	Read/Write	No
FB2.LASTIDENTIFIED	3501h	9h	Signed16	-	-	Read/Write	No
FB2.LINEPITCH	3501h	Ah	Unsigned32	1000:1	-	Read/Write	No
FB2.MECHTYPE	3501h	Bh	Unsigned8	-	-	Read/Write	No
FB2.MULTITURNBITS	3501h	Ch	Unsigned8	-	-	Read/Write	No
FB2.SINGLETURNBITS	3501h	Dh	Unsigned8	-	-	Read/Write	No
FB2.STOREMULTITURN.BITS	3501h	Eh	Unsigned8	-	-	Read/Write	No
FB2.STOREMULTITURN.ENABLE	3501h	Fh	Unsigned8	-	-	Read/Write	No
FB2.TRACKINGCAL	3501h	10h	Unsigned8	-	-	Read/Write	No
FB2.INITSIGNED	3501h	11h	Unsigned8	-	-	Read/Write	No
FB2.SSITYPE	3501h	12h	Unsigned8	-	-	Read/Write	No
FB2.MONITOR1.SOURCE	3501h	13h	Unsigned8	-	-	Read/Write	No
FB2.MONITOR2.SOURCE	3501h	14h	Unsigned8	-	-	Read/Write	No
FB2.MONITOR1.DATA	3501h	15h	Signed32	1000:1	-	Read only	Yes
FB2.MONITOR2.DATA	3501h	16h	Signed32	1000:1	-	Read only	Yes

5.3.17 3502h FB3.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3502h	0h	Unsigned8	-	-	Read only	No
FB3.SELECT	3502h	1h	Signed16	-	-	Read/Write	No
FB3.ENCLINES	3502h	2h	Unsigned32	-	-	Read/Write	No
FB3.POLES	3502h	3h	Unsigned16	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
FB3.RESKTR	3502h	4h	Unsigned16	1000:1	-	Read/Write	No
FB3.RESREFPHASE	3502h	5h	Signed32	1000:1	-	Read/Write	No
FB3.BITS	3502h	6h	Unsigned16	-	-	Read/Write	No
FB3.CALTHRESHRES	3502h	7h	Unsigned16	-	-	Read/Write	No
FB3.CALTHRESHSINCOS	3502h	8h	Unsigned16	-	-	Read/Write	No
FB3.LASTIDENTIFIED	3502h	9h	Signed16	-	-	Read/Write	No
FB3.LINEPITCH	3502h	Ah	Unsigned32	1000:1	-	Read/Write	No
FB3.MECHTYPE	3502h	Bh	Unsigned8	-	-	Read/Write	No
FB3.MULTITURNBITS	3502h	Ch	Unsigned8	-	-	Read/Write	No
FB3.SINGLETURNBITS	3502h	Dh	Unsigned8	-	-	Read/Write	No
FB3.STOREMULTITURN.BITS	3502h	Eh	Unsigned8	-	-	Read/Write	No
FB3.STOREMULTITURN.ENABLE	3502h	Fh	Unsigned8	-	-	Read/Write	No
FB3.TRACKINGCAL	3502h	10h	Unsigned8	-	-	Read/Write	No
FB3.INITSIGNED	3502h	11h	Unsigned8	-	-	Read/Write	No
FB3.SSITYPE	3502h	12h	Unsigned8	-	-	Read/Write	No
FB3.MONITOR1.SOURCE	3502h	13h	Unsigned8	-	-	Read/Write	No
FB3.MONITOR2.SOURCE	3502h	14h	Unsigned8	-	-	Read/Write	No
FB3.MONITOR1.DATA	3502h	15h	Signed32	-	-	Read only	Yes
FB3.MONITOR2.DATA	3502h	16h	Signed32	-	-	Read only	Yes

5.3.18 3503h FB4.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3503h	0h	Unsigned8	-	-	Read only	No
FB4.SELECT	3503h	1h	Signed16	-	-	Read/Write	No
FB4.ENCLINES	3503h	2h	Unsigned32	-	-	Read/Write	No
FB4.POLES	3503h	3h	Unsigned16	-	-	Read/Write	No
FB4.RESKTR	3503h	4h	Unsigned16	1000:1	-	Read/Write	No
FB4.RESREFPHASE	3503h	5h	Signed32	1000:1	-	Read/Write	No
FB4.BITS	3503h	6h	Unsigned16	-	-	Read/Write	No
FB4.CALTHRESHRES	3503h	7h	Unsigned16	-	-	Read/Write	No
FB4.CALTHRESHSINCOS	3503h	8h	Unsigned16	-	-	Read/Write	No
FB4.LASTIDENTIFIED	3503h	9h	Signed16	-	-	Read/Write	No
FB4.LINEPITCH	3503h	Ah	Unsigned32	1000:1	-	Read/Write	No
FB4.MECHTYPE	3503h	Bh	Unsigned8	-	-	Read/Write	No
FB4.MULTITURNBITS	3503h	Ch	Unsigned8	-	-	Read/Write	No
FB4.SINGLETURNBITS	3503h	Dh	Unsigned8	-	-	Read/Write	No
FB4.STOREMULTITURN.BITS	3503h	Eh	Unsigned8	-	-	Read/Write	No
FB4.STOREMULTITURN.ENABLE	3503h	Fh	Unsigned8	-	-	Read/Write	No
FB4.TRACKINGCAL	3503h	10h	Unsigned8	-	-	Read/Write	No
FB4.INITSIGNED	3503h	11h	Unsigned8	-	-	Read/Write	No
FB4.SSITYPE	3503h	12h	Unsigned8	-	-	Read/Write	No
FB4.MONITOR1.SOURCE	3503h	13h	Unsigned8	-	-	Read/Write	No
FB4.MONITOR2.SOURCE	3503h	14h	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
FB4.MONITOR1.DATA	3503h	15h	Signed32	-	-	Read only	Yes
FB4.MONITOR2.DATA	3503h	16h	Signed32	-	-	Read only	Yes

5.3.19 3504h FB5.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3504h	0h	Unsigned8	-	-	Read only	No
FB5.SELECT	3504h	1h	Signed16	-	-	Read/Write	No
FB5.ENCLINES	3504h	2h	Unsigned32	-	-	Read/Write	No
FB5.POLES	3504h	3h	Unsigned16	-	-	Read/Write	No
FB5.RESKTR	3504h	4h	Unsigned16	1000:1	-	Read/Write	No
FB5.RESREFPHASE	3504h	5h	Signed32	1000:1	-	Read/Write	No
FB5.BITS	3504h	6h	Unsigned16	-	-	Read/Write	No
FB5.CALTHRESHRES	3504h	7h	Unsigned16	-	-	Read/Write	No
FB5.CALTHRESHSINCOS	3504h	8h	Unsigned16	-	-	Read/Write	No
FB5.LASTIDENTIFIED	3504h	9h	Signed16	-	-	Read/Write	No
FB5.LINEPITCH	3504h	Ah	Unsigned32	1000:1	-	Read/Write	No
FB5.MECHTYPE	3504h	Bh	Unsigned8	-	-	Read/Write	No
FB5.MULTITURNBITS	3504h	Ch	Unsigned8	-	-	Read/Write	No
FB5.SINGLETURNBITS	3504h	Dh	Unsigned8	-	-	Read/Write	No
FB5.STOREMULTITURN.BITS	3504h	Eh	Unsigned8	-	-	Read/Write	No
FB5.STOREMULTITURN.ENABLE	3504h	Fh	Unsigned8	-	-	Read/Write	No
FB5.TRACKINGCAL	3504h	10h	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
FB5.INITSIGNED	3504h	11h	Unsigned8	-	-	Read/Write	No
FB5.SSITYPE	3504h	12h	Unsigned8	-	-	Read/Write	No
FB5.MONITOR1.SOURCE	3504h	13h	Unsigned8	-	-	Read/Write	No
FB5.MONITOR2.SOURCE	3504h	14h	Unsigned8	-	-	Read/Write	No
FB5.MONITOR1.DATA	3504h	15h	Signed32	-	-	Read only	Yes
FB5.MONITOR2.DATA	3504h	16h	Signed32	-	-	Read only	Yes

5.3.20 3510h Feedback 1 faults

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3510h	0h	Unsigned8	-	-	Read only	No
FB1.FAULT1	3510h	1h	Unsigned32	-	-	Read only	No
FB1.FAULT2	3510h	2h	Unsigned32	-	-	Read only	No
FB1.FAULT3	3510h	3h	Unsigned32	-	-	Read only	No
FB1.FAULT4	3510h	4h	Unsigned32	-	-	Read only	No
FB1.FAULT5	3510h	5h	Unsigned32	-	-	Read only	No

5.3.21 3511h Feedback 2 faults

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3511h	0h	Unsigned8	-	-	Read only	No
FB2.FAULT1	3511h	1h	Unsigned32	-	-	Read only	No
FB2.FAULT2	3511h	2h	Unsigned32	-	-	Read only	No
FB2.FAULT3	3511h	3h	Unsigned32	-	-	Read only	No
FB2.FAULT4	3511h	4h	Unsigned32	-	-	Read only	No
FB2.FAULT5	3511h	5h	Unsigned32	-	-	Read only	No

5.3.22 3512h Feedback 3 faults

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3512h	0h	Unsigned8	-	-	Read only	No
FB3.FAULT1	3512h	1h	Unsigned32	-	-	Read only	No
FB3.FAULT2	3512h	2h	Unsigned32	-	-	Read only	No
FB3.FAULT3	3512h	3h	Unsigned32	-	-	Read only	No
FB3.FAULT4	3512h	4h	Unsigned32	-	-	Read only	No
FB3.FAULT5	3512h	5h	Unsigned32	-	-	Read only	No

5.3.23 3513h Feedback 4 faults

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3513h	0h	Unsigned8	-	-	Read only	No
FB4.FAULT1	3513h	1h	Unsigned32	-	-	Read only	No
FB4.FAULT2	3513h	2h	Unsigned32	-	-	Read only	No
FB4.FAULT3	3513h	3h	Unsigned32	-	-	Read only	No
FB4.FAULT4	3513h	4h	Unsigned32	-	-	Read only	No
FB4.FAULT5	3513h	5h	Unsigned32	-	-	Read only	No

5.3.24 3514h Feedback 5 faults

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3514h	0h	Unsigned8	-	-	Read only	No
FB5.FAULT1	3514h	1h	Unsigned32	-	-	Read only	No
FB5.FAULT2	3514h	2h	Unsigned32	-	-	Read only	No
FB5.FAULT3	3514h	3h	Unsigned32	-	-	Read only	No
FB5.FAULT4	3514h	4h	Unsigned32	-	-	Read only	No
FB5.FAULT5	3514h	5h	Unsigned32	-	-	Read only	No

5.3.25 3580h Digital input states

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Digital input states	3580h	0h	Unsigned32	-	-	Read only	Yes

5.3.26 3590h DIN1.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3590h	0h	Unsigned8	-	-	Read only	No
DIN1.INV	3590h	1h	Unsigned8	-	-	Read/Write	No
DIN1.FILTER	3590h	2h	Unsigned8	-	-	Read/Write	No

5.3.27 3591h DIN2.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3591h	0h	Unsigned8	-	-	Read only	No
DIN2.INV	3591h	1h	Unsigned8	-	-	Read/Write	No
DIN2.FILTER	3591h	2h	Unsigned8	-	-	Read/Write	No

5.3.28 3592h DIN3.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3592h	0h	Unsigned8	-	-	Read only	No
DIN3.INV	3592h	1h	Unsigned8	-	-	Read/Write	No
DIN3.FILTER	3592h	2h	Unsigned8	-	-	Read/Write	No

5.3.29 3593h DIN4.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3593h	0h	Unsigned8	-	-	Read only	No
DIN4.INV	3593h	1h	Unsigned8	-	-	Read/Write	No
DIN4.FILTER	3593h	2h	Unsigned8	-	-	Read/Write	No

5.3.30 3594h DIN5.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3594h	0h	Unsigned8	-	-	Read only	No
DIN5.INV	3594h	1h	Unsigned8	-	-	Read/Write	No
DIN5.FILTER	3594h	2h	Unsigned8	-	-	Read/Write	No

5.3.31 3595h DIN6.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3595h	0h	Unsigned8	-	-	Read only	No
DIN6.INV	3595h	1h	Unsigned8	-	-	Read/Write	No
DIN6.FILTER	3595h	2h	Unsigned8	-	-	Read/Write	No

5.3.32 3596h DIN7.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3596h	0h	Unsigned8	-	-	Read only	No
DIN7.INV	3596h	1h	Unsigned8	-	-	Read/Write	No
DIN7.FILTER	3596h	2h	Unsigned8	-	-	Read/Write	No

5.3.33 3597h DIN8.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3597h	0h	Unsigned8	-	-	Read only	No
DIN8.INV	3597h	1h	Unsigned8	-	-	Read/Write	No
DIN8.FILTER	3597h	2h	Unsigned8	-	-	Read/Write	No

5.3.34 3598h DIN9.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	3598h	0h	Unsigned8	-	-	Read only	No
DIN9.INV	3598h	1h	Unsigned8	-	-	Read/Write	No
DIN9.FILTER	3598h	2h	Unsigned8	-	-	Read/Write	No

5.3.35 3599h DIN10.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	3599h	0h	Unsigned8	-	-	Read only	No
DIN10.INV	3599h	1h	Unsigned8	-	-	Read/Write	No
DIN10.FILTER	3599h	2h	Unsigned8	-	-	Read/Write	No

5.3.36 359Ah DIN11.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	359Ah	0h	Unsigned8	-	-	Read only	No
DIN11.INV	359Ah	1h	Unsigned8	-	-	Read/Write	No
DIN11.FILTER	359Ah	2h	Unsigned8	-	-	Read/Write	No

5.3.37 359Bh DIN12.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	359Bh	0h	Unsigned8	-	-	Read only	No
DIN12.INV	359Bh	1h	Unsigned8	-	-	Read/Write	No
DIN12.FILTER	359Bh	2h	Unsigned8	-	-	Read/Write	No

5.3.38 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.

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Digital output states	3600h	0h	Unsigned32	-	-	Read only	Yes

5.3.39 3601h Digital output control

This object permits 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.

5.3.39.1 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.

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3601h	0h	Unsigned8	-	-	Read only	No
Physical outputs	3601h	1h	Unsigned32	-	-	Read/Write	Yes
Output mask	3601h	2h	Unsigned32	-	-	Read/Write	No

5.3.40 360Ah DOUT1.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	360Ah	0h	Unsigned8	-	-	Read only	No
DOUT1.SOURCE	360Ah	1h	Unsigned8	-	-	Read/Write	No
DOUT1.SOURCEID	360Ah	2h	Unsigned8	-	-	Read/Write	No

5.3.41 360Bh DOUT2.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	360Bh	0h	Unsigned8	-	-	Read only	No
DOUT2.SOURCE	360Bh	1h	Unsigned8	-	-	Read/Write	No
DOUT2.SOURCEID	360Bh	2h	Unsigned8	-	-	Read/Write	No

5.3.42 360Ch DOUT3.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	360Ch	0h	Unsigned8	-	-	Read only	No
DOUT3.SOURCE	360Ch	1h	Unsigned8	-	-	Read/Write	No
DOUT3.SOURCEID	360Ch	2h	Unsigned8	-	-	Read/Write	No

5.3.43 360Dh DOUT4.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	360Dh	0h	Unsigned8	-	-	Read only	No
DOUT4.SOURCE	360Dh	1h	Unsigned8	-	-	Read/Write	No
DOUT4.SOURCEID	360Dh	2h	Unsigned8	-	-	Read/Write	No

5.3.44 360Eh DOUT5.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	360Eh	0h	Unsigned8	-	-	Read only	No
DOUT5.SOURCE	360Eh	1h	Unsigned8	-	-	Read/Write	No
DOUT5.SOURCEID	360Eh	2h	Unsigned8	-	-	Read/Write	No

5.3.45 360Fh DOUT6.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	360Fh	0h	Unsigned8	-	-	Read only	No
DOUT6.SOURCE	360Fh	1h	Unsigned8	-	-	Read/Write	No
DOUT6.SOURCEID	360Fh	2h	Unsigned8	-	-	Read/Write	No

5.3.46 3610h DOUT7.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3610h	0h	Unsigned8	-	-	Read only	No
DOUT7.SOURCE	3610h	1h	Unsigned8	-	-	Read/Write	No
DOUT7.SOURCEID	3610h	2h	Unsigned8	-	-	Read/Write	No

5.3.47 3611h DOUT8.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3611h	0h	Unsigned8	-	-	Read only	No
DOUT8.SOURCE	3611h	1h	Unsigned8	-	-	Read/Write	No
DOUT8.SOURCEID	3611h	2h	Unsigned8	-	-	Read/Write	No

5.3.48 3612h DOUT9.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3612h	0h	Unsigned8	-	-	Read only	No
DOUT9.SOURCE	3612h	1h	Unsigned8	-	-	Read/Write	No
DOUT9.SOURCEID	3612h	2h	Unsigned8	-	-	Read/Write	No

5.3.49 3680h Digital IO states

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Digital IO states	3680h	0h	Unsigned32	-	-	Read only	Yes

5.3.50 368Ah DIO1.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	368Ah	0h	Unsigned8	-	-	Read only	No
DIO1.DIR	368Ah	1h	Unsigned8	-	-	Read/Write	No
DIO1.INV	368Ah	2h	Unsigned8	-	-	Read/Write	No
DIO1.FILTER	368Ah	3h	Unsigned8	-	-	Read/Write	No
DIO1.STATEU	368Ah	4h	Unsigned8	-	-	Read/Write	Yes
DIO1.SOURCE	368Ah	5h	Unsigned8	-	-	Read/Write	No
DIO1.SOURCEID	368Ah	6h	Unsigned8	-	-	Read/Write	No
DIO1.TERM	368Ah	7h	Unsigned8	-	-	Read/Write	No

5.3.51 368Bh DIO2.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	368Bh	0h	Unsigned8	-	-	Read only	No
DIO2.DIR	368Bh	1h	Unsigned8	-	-	Read/Write	No
DIO2.INV	368Bh	2h	Unsigned8	-	-	Read/Write	No
DIO2.FILTER	368Bh	3h	Unsigned8	-	-	Read/Write	No
DIO2.STATEU	368Bh	4h	Unsigned8	-	-	Read/Write	Yes
DIO2.SOURCE	368Bh	5h	Unsigned8	-	-	Read/Write	No
DIO2.SOURCEID	368Bh	6h	Unsigned8	-	-	Read/Write	No
DIO2.TERM	368Bh	7h	Unsigned8	-	-	Read/Write	No

5.3.52 368Ch DIO3.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	368Ch	0h	Unsigned8	-	-	Read only	No
DIO3.DIR	368Ch	1h	Unsigned8	-	-	Read/Write	No
DIO3.INV	368Ch	2h	Unsigned8	-	-	Read/Write	No
DIO3.FILTER	368Ch	3h	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
DIO3.STATEU	368Ch	4h	Unsigned8	-	-	Read/Write	Yes
DIO3.SOURCE	368Ch	5h	Unsigned8	-	-	Read/Write	No
DIO3.SOURCEID	368Ch	6h	Unsigned8	-	-	Read/Write	No
DIO3.TERM	368Ch	7h	Unsigned8	-	-	Read/Write	No

5.3.53 368Dh DIO4.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	368Dh	0h	Unsigned8	-	-	Read only	No
DIO4.DIR	368Dh	1h	Unsigned8	-	-	Read/Write	No
DIO4.INV	368Dh	2h	Unsigned8	-	-	Read/Write	No
DIO4.FILTER	368Dh	3h	Unsigned8	-	-	Read/Write	No
DIO4.STATEU	368Dh	4h	Unsigned8	-	-	Read/Write	Yes
DIO4.SOURCE	368Dh	5h	Unsigned8	-	-	Read/Write	No
DIO4.SOURCEID	368Dh	6h	Unsigned8	-	-	Read/Write	No
DIO4.TERM	368Dh	7h	Unsigned8	-	-	Read/Write	No

5.3.54 368Eh DIO5.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	368Eh	0h	Unsigned8	-	-	Read only	No
DIO5.DIR	368Eh	1h	Unsigned8	-	-	Read/Write	No
DIO5.INV	368Eh	2h	Unsigned8	-	-	Read/Write	No
DIO5.FILTER	368Eh	3h	Unsigned8	-	-	Read/Write	No
DIO5.STATEU	368Eh	4h	Unsigned8	-	-	Read/Write	Yes
DIO5.SOURCE	368Eh	5h	Unsigned8	-	-	Read/Write	No
DIO5.SOURCEID	368Eh	6h	Unsigned8	-	-	Read/Write	No
DIO5.TERM	368Eh	7h	Unsigned8	-	-	Read/Write	No

5.3.55 368Fh DIO6.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	368Fh	0h	Unsigned8	-	-	Read only	No
DIO6.DIR	368Fh	1h	Unsigned8	-	-	Read/Write	No
DIO6.INV	368Fh	2h	Unsigned8	-	-	Read/Write	No
DIO6.FILTER	368Fh	3h	Unsigned8	-	-	Read/Write	No
DIO6.STATEU	368Fh	4h	Unsigned8	-	-	Read/Write	Yes
DIO6.SOURCE	368Fh	5h	Unsigned8	-	-	Read/Write	No
DIO6.SOURCEID	368Fh	6h	Unsigned8	-	-	Read/Write	No
DIO6.TERM	368Fh	7h	Unsigned8	-	-	Read/Write	No

5.3.56 3780h AIN1.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3780h	0h	Unsigned8	-	-	Read only	No
AIN1.VALUE	3780h	1h	Signed16	1000:1	-	Read only	Yes
AIN1.CUTOFF	3780h	2h	Unsigned32	1000:1	-	Read/Write	No
AIN1.DEADBANDMODE	3780h	3h	Unsigned16	-	-	Read/Write	No
AIN1.DEADBAND	3780h	4h	Signed16	1000:1	-	Read/Write	No
AIN1.OFFSET	3780h	5h	Signed16	1000:1	-	Read/Write	No

5.3.57 3781h AIN2.*

The following table describes this object.

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3781h	0h	Unsigned8	-	-	Read only	No
AIN2.VALUE	3781h	1h	Signed16	1000:1	-	Read only	Yes
AIN2.CUTOFF	3781h	2h	Unsigned32	1000:1	-	Read/Write	No
AIN2.DEADBANDMODE	3781h	3h	Unsigned16	-	-	Read/Write	No
AIN2.DEADBAND	3781h	4h	Signed16	1000:1	-	Read/Write	No
AIN2.OFFSET	3781h	5h	Signed16	1000:1	-	Read/Write	No

5.3.58 3800h AOUT1.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	3800h	0h	Unsigned8	-	-	Read only	No
AOUT1.VALUE	3800h	1h	Signed16	1000:1	-	Read only	Yes
AOUT1 Fieldbus Value	3800h	2h	Signed16	1000:1	-	Read/Write	Yes
AOUT1.SOURCE	3800h	3h	Unsigned8	-	-	Read/Write	No
AOUT1.CUTOFF	3800h	4h	Unsigned32	1000:1	-	Read/Write	No
AOUT1.OFFSET	3800h	5h	Signed16	1000:1	-	Read/Write	No

5.3.59 3801h AOUT2.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	3801h	0h	Unsigned8	-	-	Read only	No
AOUT2.VALUE	3801h	1h	Signed16	1000:1	-	Read only	Yes
AOUT2 Fieldbus Value	3801h	2h	Signed16	1000:1	-	Read/Write	Yes
AOUT2.SOURCE	3801h	3h	Unsigned8	-	-	Read/Write	No
AOUT2.CUTOFF	3801h	4h	Unsigned32	1000:1	-	Read/Write	No
AOUT2.OFFSET	3801h	5h	Signed16	1000:1	-	Read/Write	No

5.3.60 3900h ACTION#.ACTIVE

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	3900h	0h	Unsigned8	-	-	Read only	No
ACTION1.ACTIVE	3900h	1h	Unsigned8	-	-	Read/Write	No
ACTION2.ACTIVE	3900h	2h	Unsigned8	-	-	Read/Write	No
ACTION3.ACTIVE	3900h	3h	Unsigned8	-	-	Read/Write	No
ACTION4.ACTIVE	3900h	4h	Unsigned8	-	-	Read/Write	No
ACTION5.ACTIVE	3900h	5h	Unsigned8	-	-	Read/Write	No
ACTION6.ACTIVE	3900h	6h	Unsigned8	-	-	Read/Write	No
ACTION7.ACTIVE	3900h	7h	Unsigned8	-	-	Read/Write	No
ACTION8.ACTIVE	3900h	8h	Unsigned8	-	-	Read/Write	No
ACTION9.ACTIVE	3900h	9h	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
ACTION10.ACTIVE	3900h	Ah	Unsigned8	-	-	Read/Write	No
ACTION11.ACTIVE	3900h	Bh	Unsigned8	-	-	Read/Write	No
ACTION12.ACTIVE	3900h	Ch	Unsigned8	-	-	Read/Write	No
ACTION13.ACTIVE	3900h	Dh	Unsigned8	-	-	Read/Write	No
ACTION14.ACTIVE	3900h	Eh	Unsigned8	-	-	Read/Write	No
ACTION15.ACTIVE	3900h	Fh	Unsigned8	-	-	Read/Write	No
ACTION16.ACTIVE	3900h	10h	Unsigned8	-	-	Read/Write	No
ACTION17.ACTIVE	3900h	11h	Unsigned8	-	-	Read/Write	No
ACTION18.ACTIVE	3900h	12h	Unsigned8	-	-	Read/Write	No
ACTION19.ACTIVE	3900h	13h	Unsigned8	-	-	Read/Write	No
ACTION20.ACTIVE	3900h	14h	Unsigned8	-	-	Read/Write	No
ACTION21.ACTIVE	3900h	15h	Unsigned8	-	-	Read/Write	No
ACTION22.ACTIVE	3900h	16h	Unsigned8	-	-	Read/Write	No
ACTION23.ACTIVE	3900h	17h	Unsigned8	-	-	Read/Write	No
ACTION24.ACTIVE	3900h	18h	Unsigned8	-	-	Read/Write	No
ACTION25.ACTIVE	3900h	19h	Unsigned8	-	-	Read/Write	No
ACTION26.ACTIVE	3900h	1Ah	Unsigned8	-	-	Read/Write	No
ACTION27.ACTIVE	3900h	1Bh	Unsigned8	-	-	Read/Write	No
ACTION28.ACTIVE	3900h	1Ch	Unsigned8	-	-	Read/Write	No
ACTION29.ACTIVE	3900h	1Dh	Unsigned8	-	-	Read/Write	No
ACTION30.ACTIVE	3900h	1Eh	Unsigned8	-	-	Read/Write	No
ACTION31.ACTIVE	3900h	1Fh	Unsigned8	-	-	Read/Write	No
ACTION32.ACTIVE	3900h	20h	Unsigned8	-	-	Read/Write	No

5.3.61 3901h ACTION#.CONDITION

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	3901h	0h	Unsigned8	-	-	Read only	No
ACTION1.CONDITION	3901h	1h	Unsigned8	-	-	Read/Write	No
ACTION2.CONDITION	3901h	2h	Unsigned8	-	-	Read/Write	No
ACTION3.CONDITION	3901h	3h	Unsigned8	-	-	Read/Write	No
ACTION4.CONDITION	3901h	4h	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION5.CONDITION	3901h	5h	Unsigned8	-	-	Read/Write	No
ACTION6.CONDITION	3901h	6h	Unsigned8	-	-	Read/Write	No
ACTION7.CONDITION	3901h	7h	Unsigned8	-	-	Read/Write	No
ACTION8.CONDITION	3901h	8h	Unsigned8	-	-	Read/Write	No
ACTION9.CONDITION	3901h	9h	Unsigned8	-	-	Read/Write	No
ACTION10.CONDITION	3901h	Ah	Unsigned8	-	-	Read/Write	No
ACTION11.CONDITION	3901h	Bh	Unsigned8	-	-	Read/Write	No
ACTION12.CONDITION	3901h	Ch	Unsigned8	-	-	Read/Write	No
ACTION13.CONDITION	3901h	Dh	Unsigned8	-	-	Read/Write	No
ACTION14.CONDITION	3901h	Eh	Unsigned8	-	-	Read/Write	No
ACTION15.CONDITION	3901h	Fh	Unsigned8	-	-	Read/Write	No
ACTION16.CONDITION	3901h	10h	Unsigned8	-	-	Read/Write	No
ACTION17.CONDITION	3901h	11h	Unsigned8	-	-	Read/Write	No
ACTION18.CONDITION	3901h	12h	Unsigned8	-	-	Read/Write	No
ACTION19.CONDITION	3901h	13h	Unsigned8	-	-	Read/Write	No
ACTION20.CONDITION	3901h	14h	Unsigned8	-	-	Read/Write	No
ACTION21.CONDITION	3901h	15h	Unsigned8	-	-	Read/Write	No
ACTION22.CONDITION	3901h	16h	Unsigned8	-	-	Read/Write	No
ACTION23.CONDITION	3901h	17h	Unsigned8	-	-	Read/Write	No
ACTION24.CONDITION	3901h	18h	Unsigned8	-	-	Read/Write	No
ACTION25.CONDITION	3901h	19h	Unsigned8	-	-	Read/Write	No
ACTION26.CONDITION	3901h	1Ah	Unsigned8	-	-	Read/Write	No
ACTION27.CONDITION	3901h	1Bh	Unsigned8	-	-	Read/Write	No
ACTION28.CONDITION	3901h	1Ch	Unsigned8	-	-	Read/Write	No
ACTION29.CONDITION	3901h	1Dh	Unsigned8	-	-	Read/Write	No
ACTION30.CONDITION	3901h	1Eh	Unsigned8	-	-	Read/Write	No
ACTION31.CONDITION	3901h	1Fh	Unsigned8	-	-	Read/Write	No
ACTION32.CONDITION	3901h	20h	Unsigned8	-	-	Read/Write	No

5.3.62 3902h ACTION#.CONDITIONVALUE

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3902h	0h	Unsigned8	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION1.CONDITIONVALUE	3902h	1h	Signed32	1000:1	-	Read/Write	No
ACTION2.CONDITIONVALUE	3902h	2h	Signed32	1000:1	-	Read/Write	No
ACTION3.CONDITIONVALUE	3902h	3h	Signed32	1000:1	-	Read/Write	No
ACTION4.CONDITIONVALUE	3902h	4h	Signed32	1000:1	-	Read/Write	No
ACTION5.CONDITIONVALUE	3902h	5h	Signed32	1000:1	-	Read/Write	No
ACTION6.CONDITIONVALUE	3902h	6h	Signed32	1000:1	-	Read/Write	No
ACTION7.CONDITIONVALUE	3902h	7h	Signed32	1000:1	-	Read/Write	No
ACTION8.CONDITIONVALUE	3902h	8h	Signed32	1000:1	-	Read/Write	No
ACTION9.CONDITIONVALUE	3902h	9h	Signed32	1000:1	-	Read/Write	No
ACTION10.CONDITIONVALUE	3902h	Ah	Signed32	1000:1	-	Read/Write	No
ACTION11.CONDITIONVALUE	3902h	Bh	Signed32	1000:1	-	Read/Write	No
ACTION12.CONDITIONVALUE	3902h	Ch	Signed32	1000:1	-	Read/Write	No
ACTION13.CONDITIONVALUE	3902h	Dh	Signed32	1000:1	-	Read/Write	No
ACTION14.CONDITIONVALUE	3902h	Eh	Signed32	1000:1	-	Read/Write	No
ACTION15.CONDITIONVALUE	3902h	Fh	Signed32	1000:1	-	Read/Write	No
ACTION16.CONDITIONVALUE	3902h	10h	Signed32	1000:1	-	Read/Write	No
ACTION17.CONDITIONVALUE	3902h	11h	Signed32	1000:1	-	Read/Write	No
ACTION18.CONDITIONVALUE	3902h	12h	Signed32	1000:1	-	Read/Write	No
ACTION19.CONDITIONVALUE	3902h	13h	Signed32	1000:1	-	Read/Write	No
ACTION20.CONDITIONVALUE	3902h	14h	Signed32	1000:1	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION21.CONDITIONVALUE	3902h	15h	Signed32	1000:1	-	Read/Write	No
ACTION22.CONDITIONVALUE	3902h	16h	Signed32	1000:1	-	Read/Write	No
ACTION23.CONDITIONVALUE	3902h	17h	Signed32	1000:1	-	Read/Write	No
ACTION24.CONDITIONVALUE	3902h	18h	Signed32	1000:1	-	Read/Write	No
ACTION25.CONDITIONVALUE	3902h	19h	Signed32	1000:1	-	Read/Write	No
ACTION26.CONDITIONVALUE	3902h	1Ah	Signed32	1000:1	-	Read/Write	No
ACTION27.CONDITIONVALUE	3902h	1Bh	Signed32	1000:1	-	Read/Write	No
ACTION28.CONDITIONVALUE	3902h	1Ch	Signed32	1000:1	-	Read/Write	No
ACTION29.CONDITIONVALUE	3902h	1Dh	Signed32	1000:1	-	Read/Write	No
ACTION30.CONDITIONVALUE	3902h	1Eh	Signed32	1000:1	-	Read/Write	No
ACTION31.CONDITIONVALUE	3902h	1Fh	Signed32	1000:1	-	Read/Write	No
ACTION32.CONDITIONVALUE	3902h	20h	Signed32	1000:1	-	Read/Write	No

5.3.63 3903h ACTION#.RUNCOUNT

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3903h	0h	Unsigned8	-	-	Read only	No
ACTION1.RUNCOUNT	3903h	1h	Unsigned32	-	-	Read only	No
ACTION2.RUNCOUNT	3903h	2h	Unsigned32	-	-	Read only	No
ACTION3.RUNCOUNT	3903h	3h	Unsigned32	-	-	Read only	No
ACTION4.RUNCOUNT	3903h	4h	Unsigned32	-	-	Read only	No
ACTION5.RUNCOUNT	3903h	5h	Unsigned32	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION6.RUNCOUNT	3903h	6h	Unsigned32	-	-	Read only	No
ACTION7.RUNCOUNT	3903h	7h	Unsigned32	-	-	Read only	No
ACTION8.RUNCOUNT	3903h	8h	Unsigned32	-	-	Read only	No
ACTION9.RUNCOUNT	3903h	9h	Unsigned32	-	-	Read only	No
ACTION10.RUNCOUNT	3903h	Ah	Unsigned32	-	-	Read only	No
ACTION11.RUNCOUNT	3903h	Bh	Unsigned32	-	-	Read only	No
ACTION12.RUNCOUNT	3903h	Ch	Unsigned32	-	-	Read only	No
ACTION13.RUNCOUNT	3903h	Dh	Unsigned32	-	-	Read only	No
ACTION14.RUNCOUNT	3903h	Eh	Unsigned32	-	-	Read only	No
ACTION15.RUNCOUNT	3903h	Fh	Unsigned32	-	-	Read only	No
ACTION16.RUNCOUNT	3903h	10h	Unsigned32	-	-	Read only	No
ACTION17.RUNCOUNT	3903h	11h	Unsigned32	-	-	Read only	No
ACTION18.RUNCOUNT	3903h	12h	Unsigned32	-	-	Read only	No
ACTION19.RUNCOUNT	3903h	13h	Unsigned32	-	-	Read only	No
ACTION20.RUNCOUNT	3903h	14h	Unsigned32	-	-	Read only	No
ACTION21.RUNCOUNT	3903h	15h	Unsigned32	-	-	Read only	No
ACTION22.RUNCOUNT	3903h	16h	Unsigned32	-	-	Read only	No
ACTION23.RUNCOUNT	3903h	17h	Unsigned32	-	-	Read only	No
ACTION24.RUNCOUNT	3903h	18h	Unsigned32	-	-	Read only	No
ACTION25.RUNCOUNT	3903h	19h	Unsigned32	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION26.RUNCOUNT	3903h	1Ah	Unsigned32	-	-	Read only	No
ACTION27.RUNCOUNT	3903h	1Bh	Unsigned32	-	-	Read only	No
ACTION28.RUNCOUNT	3903h	1Ch	Unsigned32	-	-	Read only	No
ACTION29.RUNCOUNT	3903h	1Dh	Unsigned32	-	-	Read only	No
ACTION30.RUNCOUNT	3903h	1Eh	Unsigned32	-	-	Read only	No
ACTION31.RUNCOUNT	3903h	1Fh	Unsigned32	-	-	Read only	No
ACTION32.RUNCOUNT	3903h	20h	Unsigned32	-	-	Read only	No

5.3.64 3904h ACTION#.SOURCE

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3904h	0h	Unsigned8	-	-	Read only	No
ACTION1.SOURCE	3904h	1h	Unsigned8	-	-	Read/Write	No
ACTION2.SOURCE	3904h	2h	Unsigned8	-	-	Read/Write	No
ACTION3.SOURCE	3904h	3h	Unsigned8	-	-	Read/Write	No
ACTION4.SOURCE	3904h	4h	Unsigned8	-	-	Read/Write	No
ACTION5.SOURCE	3904h	5h	Unsigned8	-	-	Read/Write	No
ACTION6.SOURCE	3904h	6h	Unsigned8	-	-	Read/Write	No
ACTION7.SOURCE	3904h	7h	Unsigned8	-	-	Read/Write	No
ACTION8.SOURCE	3904h	8h	Unsigned8	-	-	Read/Write	No
ACTION9.SOURCE	3904h	9h	Unsigned8	-	-	Read/Write	No
ACTION10.SOURCE	3904h	Ah	Unsigned8	-	-	Read/Write	No
ACTION11.SOURCE	3904h	Bh	Unsigned8	-	-	Read/Write	No
ACTION12.SOURCE	3904h	Ch	Unsigned8	-	-	Read/Write	No
ACTION13.SOURCE	3904h	Dh	Unsigned8	-	-	Read/Write	No
ACTION14.SOURCE	3904h	Eh	Unsigned8	-	-	Read/Write	No
ACTION15.SOURCE	3904h	Fh	Unsigned8	-	-	Read/Write	No
ACTION16.SOURCE	3904h	10h	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
ACTION17.SOURCE	3904h	11h	Unsigned8	-	-	Read/Write	No
ACTION18.SOURCE	3904h	12h	Unsigned8	-	-	Read/Write	No
ACTION19.SOURCE	3904h	13h	Unsigned8	-	-	Read/Write	No
ACTION20.SOURCE	3904h	14h	Unsigned8	-	-	Read/Write	No
ACTION21.SOURCE	3904h	15h	Unsigned8	-	-	Read/Write	No
ACTION22.SOURCE	3904h	16h	Unsigned8	-	-	Read/Write	No
ACTION23.SOURCE	3904h	17h	Unsigned8	-	-	Read/Write	No
ACTION24.SOURCE	3904h	18h	Unsigned8	-	-	Read/Write	No
ACTION25.SOURCE	3904h	19h	Unsigned8	-	-	Read/Write	No
ACTION26.SOURCE	3904h	1Ah	Unsigned8	-	-	Read/Write	No
ACTION27.SOURCE	3904h	1Bh	Unsigned8	-	-	Read/Write	No
ACTION28.SOURCE	3904h	1Ch	Unsigned8	-	-	Read/Write	No
ACTION29.SOURCE	3904h	1Dh	Unsigned8	-	-	Read/Write	No
ACTION30.SOURCE	3904h	1Eh	Unsigned8	-	-	Read/Write	No
ACTION31.SOURCE	3904h	1Fh	Unsigned8	-	-	Read/Write	No
ACTION32.SOURCE	3904h	20h	Unsigned8	-	-	Read/Write	No

5.3.65 3905h ACTION#.SOURCEID

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	3905h	0h	Unsigned8	-	-	Read only	No
ACTION1.SOURCEID	3905h	1h	Unsigned8	-	-	Read/Write	No
ACTION2.SOURCEID	3905h	2h	Unsigned8	-	-	Read/Write	No
ACTION3.SOURCEID	3905h	3h	Unsigned8	-	-	Read/Write	No
ACTION4.SOURCEID	3905h	4h	Unsigned8	-	-	Read/Write	No
ACTION5.SOURCEID	3905h	5h	Unsigned8	-	-	Read/Write	No
ACTION6.SOURCEID	3905h	6h	Unsigned8	-	-	Read/Write	No
ACTION7.SOURCEID	3905h	7h	Unsigned8	-	-	Read/Write	No
ACTION8.SOURCEID	3905h	8h	Unsigned8	-	-	Read/Write	No
ACTION9.SOURCEID	3905h	9h	Unsigned8	-	-	Read/Write	No
ACTION10.SOURCEID	3905h	Ah	Unsigned8	-	-	Read/Write	No
ACTION11.SOURCEID	3905h	Bh	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION12.SOURCEID	3905h	Ch	Unsigned8	-	-	Read/Write	No
ACTION13.SOURCEID	3905h	Dh	Unsigned8	-	-	Read/Write	No
ACTION14.SOURCEID	3905h	Eh	Unsigned8	-	-	Read/Write	No
ACTION15.SOURCEID	3905h	Fh	Unsigned8	-	-	Read/Write	No
ACTION16.SOURCEID	3905h	10h	Unsigned8	-	-	Read/Write	No
ACTION17.SOURCEID	3905h	11h	Unsigned8	-	-	Read/Write	No
ACTION18.SOURCEID	3905h	12h	Unsigned8	-	-	Read/Write	No
ACTION19.SOURCEID	3905h	13h	Unsigned8	-	-	Read/Write	No
ACTION20.SOURCEID	3905h	14h	Unsigned8	-	-	Read/Write	No
ACTION21.SOURCEID	3905h	15h	Unsigned8	-	-	Read/Write	No
ACTION22.SOURCEID	3905h	16h	Unsigned8	-	-	Read/Write	No
ACTION23.SOURCEID	3905h	17h	Unsigned8	-	-	Read/Write	No
ACTION24.SOURCEID	3905h	18h	Unsigned8	-	-	Read/Write	No
ACTION25.SOURCEID	3905h	19h	Unsigned8	-	-	Read/Write	No
ACTION26.SOURCEID	3905h	1Ah	Unsigned8	-	-	Read/Write	No
ACTION27.SOURCEID	3905h	1Bh	Unsigned8	-	-	Read/Write	No
ACTION28.SOURCEID	3905h	1Ch	Unsigned8	-	-	Read/Write	No
ACTION29.SOURCEID	3905h	1Dh	Unsigned8	-	-	Read/Write	No
ACTION30.SOURCEID	3905h	1Eh	Unsigned8	-	-	Read/Write	No
ACTION31.SOURCEID	3905h	1Fh	Unsigned8	-	-	Read/Write	No
ACTION32.SOURCEID	3905h	20h	Unsigned8	-	-	Read/Write	No

5.3.66 3906h ACTION#.SOURCEPARAM

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3906h	0h	Unsigned8	-	-	Read only	No
ACTION1.SOURCEPARAM	3906h	1h	Signed32	1000:1	-	Read/Write	No
ACTION2.SOURCEPARAM	3906h	2h	Signed32	1000:1	-	Read/Write	No
ACTION3.SOURCEPARAM	3906h	3h	Signed32	1000:1	-	Read/Write	No
ACTION4.SOURCEPARAM	3906h	4h	Signed32	1000:1	-	Read/Write	No
ACTION5.SOURCEPARAM	3906h	5h	Signed32	1000:1	-	Read/Write	No
ACTION6.SOURCEPARAM	3906h	6h	Signed32	1000:1	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION7.SOURCEPARAM	3906h	7h	Signed32	1000:1	-	Read/Write	No
ACTION8.SOURCEPARAM	3906h	8h	Signed32	1000:1	-	Read/Write	No
ACTION9.SOURCEPARAM	3906h	9h	Signed32	1000:1	-	Read/Write	No
ACTION10.SOURCEPARAM	3906h	Ah	Signed32	1000:1	-	Read/Write	No
ACTION11.SOURCEPARAM	3906h	Bh	Signed32	1000:1	-	Read/Write	No
ACTION12.SOURCEPARAM	3906h	Ch	Signed32	1000:1	-	Read/Write	No
ACTION13.SOURCEPARAM	3906h	Dh	Signed32	1000:1	-	Read/Write	No
ACTION14.SOURCEPARAM	3906h	Eh	Signed32	1000:1	-	Read/Write	No
ACTION15.SOURCEPARAM	3906h	Fh	Signed32	1000:1	-	Read/Write	No
ACTION16.SOURCEPARAM	3906h	10h	Signed32	1000:1	-	Read/Write	No
ACTION17.SOURCEPARAM	3906h	11h	Signed32	1000:1	-	Read/Write	No
ACTION18.SOURCEPARAM	3906h	12h	Signed32	1000:1	-	Read/Write	No
ACTION19.SOURCEPARAM	3906h	13h	Signed32	1000:1	-	Read/Write	No
ACTION20.SOURCEPARAM	3906h	14h	Signed32	1000:1	-	Read/Write	No
ACTION21.SOURCEPARAM	3906h	15h	Signed32	1000:1	-	Read/Write	No
ACTION22.SOURCEPARAM	3906h	16h	Signed32	1000:1	-	Read/Write	No
ACTION23.SOURCEPARAM	3906h	17h	Signed32	1000:1	-	Read/Write	No
ACTION24.SOURCEPARAM	3906h	18h	Signed32	1000:1	-	Read/Write	No
ACTION25.SOURCEPARAM	3906h	19h	Signed32	1000:1	-	Read/Write	No
ACTION26.SOURCEPARAM	3906h	1Ah	Signed32	1000:1	-	Read/Write	No
ACTION27.SOURCEPARAM	3906h	1Bh	Signed32	1000:1	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION28.SOURCEPARAM	3906h	1Ch	Signed32	1000:1	-	Read/Write	No
ACTION29.SOURCEPARAM	3906h	1Dh	Signed32	1000:1	-	Read/Write	No
ACTION30.SOURCEPARAM	3906h	1Eh	Signed32	1000:1	-	Read/Write	No
ACTION31.SOURCEPARAM	3906h	1Fh	Signed32	1000:1	-	Read/Write	No
ACTION32.SOURCEPARAM	3906h	20h	Signed32	1000:1	-	Read/Write	No

5.3.67 3907h ACTION#.TASK

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3907h	0h	Unsigned8	-	-	Read only	No
ACTION1.TASK	3907h	1h	Unsigned8	-	-	Read/Write	No
ACTION2.TASK	3907h	2h	Unsigned8	-	-	Read/Write	No
ACTION3.TASK	3907h	3h	Unsigned8	-	-	Read/Write	No
ACTION4.TASK	3907h	4h	Unsigned8	-	-	Read/Write	No
ACTION5.TASK	3907h	5h	Unsigned8	-	-	Read/Write	No
ACTION6.TASK	3907h	6h	Unsigned8	-	-	Read/Write	No
ACTION7.TASK	3907h	7h	Unsigned8	-	-	Read/Write	No
ACTION8.TASK	3907h	8h	Unsigned8	-	-	Read/Write	No
ACTION9.TASK	3907h	9h	Unsigned8	-	-	Read/Write	No
ACTION10.TASK	3907h	Ah	Unsigned8	-	-	Read/Write	No
ACTION11.TASK	3907h	Bh	Unsigned8	-	-	Read/Write	No
ACTION12.TASK	3907h	Ch	Unsigned8	-	-	Read/Write	No
ACTION13.TASK	3907h	Dh	Unsigned8	-	-	Read/Write	No
ACTION14.TASK	3907h	Eh	Unsigned8	-	-	Read/Write	No
ACTION15.TASK	3907h	Fh	Unsigned8	-	-	Read/Write	No
ACTION16.TASK	3907h	10h	Unsigned8	-	-	Read/Write	No
ACTION17.TASK	3907h	11h	Unsigned8	-	-	Read/Write	No
ACTION18.TASK	3907h	12h	Unsigned8	-	-	Read/Write	No
ACTION19.TASK	3907h	13h	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION20.TASK	3907h	14h	Unsigned8	-	-	Read/Write	No
ACTION21.TASK	3907h	15h	Unsigned8	-	-	Read/Write	No
ACTION22.TASK	3907h	16h	Unsigned8	-	-	Read/Write	No
ACTION23.TASK	3907h	17h	Unsigned8	-	-	Read/Write	No
ACTION24.TASK	3907h	18h	Unsigned8	-	-	Read/Write	No
ACTION25.TASK	3907h	19h	Unsigned8	-	-	Read/Write	No
ACTION26.TASK	3907h	1Ah	Unsigned8	-	-	Read/Write	No
ACTION27.TASK	3907h	1Bh	Unsigned8	-	-	Read/Write	No
ACTION28.TASK	3907h	1Ch	Unsigned8	-	-	Read/Write	No
ACTION29.TASK	3907h	1Dh	Unsigned8	-	-	Read/Write	No
ACTION30.TASK	3907h	1Eh	Unsigned8	-	-	Read/Write	No
ACTION31.TASK	3907h	1Fh	Unsigned8	-	-	Read/Write	No
ACTION32.TASK	3907h	20h	Unsigned8	-	-	Read/Write	No

5.3.68 3908h ACTION#.TASKID

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3908h	0h	Unsigned8	-	-	Read only	No
ACTION1.TASKID	3908h	1h	Unsigned8	-	-	Read/Write	No
ACTION2.TASKID	3908h	2h	Unsigned8	-	-	Read/Write	No
ACTION3.TASKID	3908h	3h	Unsigned8	-	-	Read/Write	No
ACTION4.TASKID	3908h	4h	Unsigned8	-	-	Read/Write	No
ACTION5.TASKID	3908h	5h	Unsigned8	-	-	Read/Write	No
ACTION6.TASKID	3908h	6h	Unsigned8	-	-	Read/Write	No
ACTION7.TASKID	3908h	7h	Unsigned8	-	-	Read/Write	No
ACTION8.TASKID	3908h	8h	Unsigned8	-	-	Read/Write	No
ACTION9.TASKID	3908h	9h	Unsigned8	-	-	Read/Write	No
ACTION10.TASKID	3908h	Ah	Unsigned8	-	-	Read/Write	No
ACTION11.TASKID	3908h	Bh	Unsigned8	-	-	Read/Write	No
ACTION12.TASKID	3908h	Ch	Unsigned8	-	-	Read/Write	No
ACTION13.TASKID	3908h	Dh	Unsigned8	-	-	Read/Write	No
ACTION14.TASKID	3908h	Eh	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION15.TASKID	3908h	Fh	Unsigned8	-	-	Read/Write	No
ACTION16.TASKID	3908h	10h	Unsigned8	-	-	Read/Write	No
ACTION17.TASKID	3908h	11h	Unsigned8	-	-	Read/Write	No
ACTION18.TASKID	3908h	12h	Unsigned8	-	-	Read/Write	No
ACTION19.TASKID	3908h	13h	Unsigned8	-	-	Read/Write	No
ACTION20.TASKID	3908h	14h	Unsigned8	-	-	Read/Write	No
ACTION21.TASKID	3908h	15h	Unsigned8	-	-	Read/Write	No
ACTION22.TASKID	3908h	16h	Unsigned8	-	-	Read/Write	No
ACTION23.TASKID	3908h	17h	Unsigned8	-	-	Read/Write	No
ACTION24.TASKID	3908h	18h	Unsigned8	-	-	Read/Write	No
ACTION25.TASKID	3908h	19h	Unsigned8	-	-	Read/Write	No
ACTION26.TASKID	3908h	1Ah	Unsigned8	-	-	Read/Write	No
ACTION27.TASKID	3908h	1Bh	Unsigned8	-	-	Read/Write	No
ACTION28.TASKID	3908h	1Ch	Unsigned8	-	-	Read/Write	No
ACTION29.TASKID	3908h	1Dh	Unsigned8	-	-	Read/Write	No
ACTION30.TASKID	3908h	1Eh	Unsigned8	-	-	Read/Write	No
ACTION31.TASKID	3908h	1Fh	Unsigned8	-	-	Read/Write	No
ACTION32.TASKID	3908h	20h	Unsigned8	-	-	Read/Write	No

5.3.69 3909h ACTION#.TASKPARAM

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	3909h	0h	Unsigned8	-	-	Read only	No
ACTION1.TASKPARAM	3909h	1h	Signed32	1000:1	-	Read/Write	No
ACTION2.TASKPARAM	3909h	2h	Signed32	1000:1	-	Read/Write	No
ACTION3.TASKPARAM	3909h	3h	Signed32	1000:1	-	Read/Write	No
ACTION4.TASKPARAM	3909h	4h	Signed32	1000:1	-	Read/Write	No
ACTION5.TASKPARAM	3909h	5h	Signed32	1000:1	-	Read/Write	No
ACTION6.TASKPARAM	3909h	6h	Signed32	1000:1	-	Read/Write	No
ACTION7.TASKPARAM	3909h	7h	Signed32	1000:1	-	Read/Write	No
ACTION8.TASKPARAM	3909h	8h	Signed32	1000:1	-	Read/Write	No
ACTION9.TASKPARAM	3909h	9h	Signed32	1000:1	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION10.TASKPARAM	3909h	Ah	Signed32	1000:1	-	Read/Write	No
ACTION11.TASKPARAM	3909h	Bh	Signed32	1000:1	-	Read/Write	No
ACTION12.TASKPARAM	3909h	Ch	Signed32	1000:1	-	Read/Write	No
ACTION13.TASKPARAM	3909h	Dh	Signed32	1000:1	-	Read/Write	No
ACTION14.TASKPARAM	3909h	Eh	Signed32	1000:1	-	Read/Write	No
ACTION15.TASKPARAM	3909h	Fh	Signed32	1000:1	-	Read/Write	No
ACTION16.TASKPARAM	3909h	10h	Signed32	1000:1	-	Read/Write	No
ACTION17.TASKPARAM	3909h	11h	Signed32	1000:1	-	Read/Write	No
ACTION18.TASKPARAM	3909h	12h	Signed32	1000:1	-	Read/Write	No
ACTION19.TASKPARAM	3909h	13h	Signed32	1000:1	-	Read/Write	No
ACTION20.TASKPARAM	3909h	14h	Signed32	1000:1	-	Read/Write	No
ACTION21.TASKPARAM	3909h	15h	Signed32	1000:1	-	Read/Write	No
ACTION22.TASKPARAM	3909h	16h	Signed32	1000:1	-	Read/Write	No
ACTION23.TASKPARAM	3909h	17h	Signed32	1000:1	-	Read/Write	No
ACTION24.TASKPARAM	3909h	18h	Signed32	1000:1	-	Read/Write	No
ACTION25.TASKPARAM	3909h	19h	Signed32	1000:1	-	Read/Write	No
ACTION26.TASKPARAM	3909h	1Ah	Signed32	1000:1	-	Read/Write	No
ACTION27.TASKPARAM	3909h	1Bh	Signed32	1000:1	-	Read/Write	No
ACTION28.TASKPARAM	3909h	1Ch	Signed32	1000:1	-	Read/Write	No
ACTION29.TASKPARAM	3909h	1Dh	Signed32	1000:1	-	Read/Write	No
ACTION30.TASKPARAM	3909h	1Eh	Signed32	1000:1	-	Read/Write	No
ACTION31.TASKPARAM	3909h	1Fh	Signed32	1000:1	-	Read/Write	No
ACTION32.TASKPARAM	3909h	20h	Signed32	1000:1	-	Read/Write	No

5.3.70 390Ah ACTION.RUNNING

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
ACTION.RUNNING	390Ah	0h	Unsigned32	-	-	Read only	No

5.3.71 4100h USER.INT*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	4100h	0h	Unsigned8	-	-	Read only	No
USER.INT1	4100h	1h	Signed16	-	-	Read/Write	No
USER.INT2	4100h	2h	Signed16	-	-	Read/Write	No
USER.INT3	4100h	3h	Signed16	-	-	Read/Write	No
USER.INT4	4100h	4h	Signed16	-	-	Read/Write	No
USER.INT5	4100h	5h	Signed16	-	-	Read/Write	No
USER.INT6	4100h	6h	Signed16	-	-	Read/Write	No
USER.INT7	4100h	7h	Signed16	-	-	Read/Write	No
USER.INT8	4100h	8h	Signed16	-	-	Read/Write	No
USER.INT9	4100h	9h	Signed16	-	-	Read/Write	No
USER.INT10	4100h	Ah	Signed16	-	-	Read/Write	No

5.3.72 4200h IP.DEFAULTINTERFACE

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
IP.DEFAULTINTERFACE	4200h	0h	Unsigned8	-	-	Read/Write	No

5.3.73 4300h ECAT.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	4300h	0h	Unsigned8	-	-	Read only	No
ECAT.SYNC0TIME	4300h	1h	Unsigned32	-	-	Read only	Yes
ECAT.RXDONETIME	4300h	2h	Unsigned32	-	-	Read only	Yes
ECAT.TXDONETIME	4300h	3h	Unsigned32	-	-	Read only	Yes
ECAT.POSLOOPTIME	4300h	4h	Unsigned32	-	-	Read only	Yes
ECAT.PLLOFFSETNODC	4300h	5h	Unsigned32	-	-	Read/Write	No
ECAT.USEPLL	4300h	6h	Unsigned8	-	-	Read/Write	No
ECAT.ENRXWARN	4300h	7h	Unsigned8	-	-	Read/Write	No

5.3.74 4400h CAP1.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	4400h	0h	Unsigned8	-	-	Read only	No
CAP1.EDGE	4400h	1h	Unsigned8	-	-	Read/Write	No
CAP1.PREEDGE	4400h	2h	Unsigned8	-	-	Read/Write	No
CAP1.PREMODE	4400h	3h	Unsigned8	-	-	Read/Write	No
CAP1.PRESELECT	4400h	4h	Unsigned8	-	-	Read/Write	No
CAP1.REARM	4400h	5h	Unsigned8	-	-	Read/Write	No
CAP1.SOURCE	4400h	6h	Unsigned8	-	-	Read/Write	No
CAP1.TRIGGER	4400h	7h	Unsigned8	-	-	Read/Write	No

5.3.75 4401h CAP2.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	4401h	0h	Unsigned8	-	-	Read only	No
CAP2.EDGE	4401h	1h	Unsigned8	-	-	Read/Write	No
CAP2.PREEDGE	4401h	2h	Unsigned8	-	-	Read/Write	No
CAP2.PREMODE	4401h	3h	Unsigned8	-	-	Read/Write	No
CAP2.PRESELECT	4401h	4h	Unsigned8	-	-	Read/Write	No
CAP2.REARM	4401h	5h	Unsigned8	-	-	Read/Write	No
CAP2.SOURCE	4401h	6h	Unsigned8	-	-	Read/Write	No
CAP2.TRIGGER	4401h	7h	Unsigned8	-	-	Read/Write	No

5.3.76 4500h CMP1.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	4500h	0h	Unsigned8	-	-	Read only	No
CMP1.ADVANCET	4500h	1h	Unsigned32	-	-	Read/Write	No
CMP1.MODEN	4500h	2h	Unsigned8	-	-	Read/Write	No
CMP1.SOURCE	4500h	3h	Unsigned8	-	-	Read/Write	No

5.3.77 4501h CMP2.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	4501h	0h	Unsigned8	-	-	Read only	No
CMP2.ADVANCET	4501h	1h	Unsigned32	-	-	Read/Write	No
CMP2.MODEN	4501h	2h	Unsigned8	-	-	Read/Write	No
CMP2.SOURCE	4501h	3h	Unsigned8	-	-	Read/Write	No

5.3.78 4600h EEO1.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	4600h	0h	Unsigned8	-	-	Read only	No
EEO1.DIR	4600h	1h	Unsigned8	-	-	Read/Write	No
EEO1.LINES	4600h	2h	Unsigned32	-	-	Read/Write	No
EEO1.MODE	4600h	3h	Unsigned8	-	-	Read/Write	No
EEO1.PULSEWIDTH	4600h	4h	Unsigned32	1000:1	-	Read/Write	No
EEO1.SOURCE	4600h	5h	Unsigned8	-	-	Read/Write	No
EEO1.ZMODE	4600h	6h	Unsigned8	-	-	Read/Write	No
EEO1.ZOFFSET	4600h	7h	Unsigned32	-	-	Read/Write	No

5.3.79 4601h EEO2.*

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	4601h	0h	Unsigned8	-	-	Read only	No
EEO2.DIR	4601h	1h	Unsigned8	-	-	Read/Write	No
EEO2.LINES	4601h	2h	Unsigned32	-	-	Read/Write	No
EEO2.MODE	4601h	3h	Unsigned8	-	-	Read/Write	No
EEO2.PULSEWIDTH	4601h	4h	Unsigned32	1000:1	-	Read/Write	No
EEO2.SOURCE	4601h	5h	Unsigned8	-	-	Read/Write	No

5.3.80 5000h, 5100h AXIS#.*

The following tables specify the CANopen mapping for several axis specific objects.

5.3.80.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	5000h	0h	Unsigned8	-	-	Read only	No
AXIS1.NAME	5000h	1h	String(32)	-	-	Read/Write	No
Reserved 5000h sub 02h	5000h	2h	Signed32	-	-	Read only	No
Reserved 5000h sub 03h	5000h	3h	Signed32	-	-	Read only	No
AXIS1.MOTIONSTAT	5000h	4h	Unsigned32	-	-	Read only	No
AXIS1.OPMODE	5000h	5h	Unsigned8	-	-	Read/Write	No
AXIS1.DISMODE	5000h	6h	Unsigned8	-	-	Read/Write	No
AXIS1.DBILIMIT	5000h	7h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.DISSOURCES	5000h	8h	Unsigned16	-	-	Read only	No
AXIS1.DISTO	5000h	9h	Unsigned32	-	-	Read/Write	No
AXIS1.ENDEFAULT	5000h	Ah	Unsigned8	-	-	Read/Write	No
AXIS1.ICONT	5000h	Bh	Signed32	1000:1	-	Read only	No
AXIS1.IPEAK	5000h	Ch	Signed32	1000:1	-	Read only	No
AXIS1.STOP	5000h	Dh	Unsigned32	-	-	Write only	No
AXIS1.CMDSOURCE	5000h	Eh	Unsigned8	-	-	Read/Write	No
AXIS1.DIR	5000h	Fh	Unsigned8	-	-	Read/Write	No
AXIS1.TEMP	5000h	10h	Signed32	-	-	Read only	No

5.3.80.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	5100h	0h	Unsigned8	-	-	Read only	No
AXIS2.NAME	5100h	1h	String(32)	-	-	Read/Write	No
Reserved 5000h sub 02h	5100h	2h	Signed32	-	-	Read only	No
Reserved 5000h sub 03h	5100h	3h	Signed32	-	-	Read only	No
AXIS2.MOTIONSTAT	5100h	4h	Unsigned32	-	-	Read only	No
AXIS2.OPMODE	5100h	5h	Unsigned8	-	-	Read/Write	No
AXIS2.DISMODE	5100h	6h	Unsigned8	-	-	Read/Write	No
AXIS2.DBILIMIT	5100h	7h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.DISSOURCES	5100h	8h	Unsigned16	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS2.DISTO	5100h	9h	Unsigned32	-	-	Read/Write	No
AXIS2.ENDEFAULT	5100h	Ah	Unsigned8	-	-	Read/Write	No
AXIS2.ICONT	5100h	Bh	Signed32	1000:1	-	Read only	No
AXIS2.IPEAK	5100h	Ch	Signed32	1000:1	-	Read only	No
AXIS2.STOP	5100h	Dh	Unsigned32	-	-	Write only	No
AXIS2.CMDSOURCE	5100h	Eh	Unsigned8	-	-	Read/Write	No
AXIS2.DIR	5100h	Fh	Unsigned8	-	-	Read/Write	No
AXIS2.TEMP	5100h	10h	Signed32	-	-	Read only	No

5.3.81 5001h, 5101h AXIS#.BODE.*

The following tables specify the CANopen mapping for the axis specific Bode measurement objects.

5.3.81.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5001h	0h	Unsigned8	-	-	Read only	No
AXIS1.BODE.INJECTPOINT	5001h	1h	Unsigned8	-	-	Read/Write	No
AXIS1.BODE.PRBDEPTH	5001h	2h	Unsigned8	-	-	Read/Write	No
AXIS1.BODE.VAMP	5001h	3h	Signed32	-	Velocity	Read/Write	No

5.3.81.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5101h	0h	Unsigned8	-	-	Read only	No
AXIS2.BODE.INJECTPOINT	5101h	1h	Unsigned8	-	-	Read/Write	No
AXIS2.BODE.PRBDEPTH	5101h	2h	Unsigned8	-	-	Read/Write	No
AXIS2.BODE.VAMP	5101h	3h	Signed32	-	Velocity	Read/Write	No

5.3.82 5002h, 5102h AXIS#.CS.*

The following tables specify the CANopen mapping for the axis specific controlled stop objects.

5.3.82.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	5002h	0h	Unsigned8	-	-	Read only	No
AXIS1.CS.STATE	5002h	1h	Unsigned8	-	-	Read only	No
AXIS1.CS.DEC	5002h	2h	Unsigned32	-	Acceleration	Read/Write	No
AXIS1.ZEROT	5002h	3h	Unsigned32	-	-	Read/Write	No
AXIS1.ZEROV	5002h	4h	Signed32	-	Velocity	Read/Write	No
AXIS1.ZEROACC	5002h	5h	Signed32	-	Acceleration	Read/Write	No

5.3.82.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	5102h	0h	Unsigned8	-	-	Read only	No
AXIS2.CS.STATE	5102h	1h	Unsigned8	-	-	Read only	No
AXIS2.CS.DEC	5102h	2h	Unsigned32	-	Acceleration	Read/Write	No
AXIS2.ZEROT	5102h	3h	Unsigned32	-	-	Read/Write	No
AXIS2.ZEROV	5102h	4h	Signed32	-	Velocity	Read/Write	No
AXIS2.ZEROACC	5102h	5h	Signed32	-	Acceleration	Read/Write	No

5.3.83 5003h, 5103h AXIS#.CANOPEN.*

5.3.83.1 Brake Control Command

This object allows the fieldbus to control the brake directly, overriding the drive logic. When the brake state is controlled by the fieldbus, the drive state (enabled, disabled, faulted) will have no effect on the brake, and the fieldbus will be in control.

NOTE

Applying or releasing the brake at the wrong time can be a safety hazard and can destroy your mechanic as well as drive or motor. Unexpected behavior might be possible. It is the responsibility of the customer using this mode to use this function appropriately.

When fieldbus control is disabled, the drive will control the brake as defined by existing AKD brake related parameters. When fieldbus control is enabled, the Brake Command received over the field bus will take effect. If the Brake Command is set to APPLY and the current state is RELEASE, the brake will begin to apply .

The default value of the fieldbus control will be disabled, so that the drive is always in control until the fieldbus is operational. It is recommended that this bit remain 0 except for special operating conditions where the fieldbus will control the brake. When fieldbus communication is lost, the drive will regain control of the brake if the fieldbus had previously taken control.

Enable Fieldbus Control	Serious Failure condition present	Brake Command	Controlled by...	Final Brake State
0	x	x	Drive	Drive
1*	No	0	Fieldbus	Applied
1*	No	1	Fieldbus	Release
x	Yes	0	Drive	Drive

1* indicates that a rising edge was seen since the last time the drive applied the brake.

5.3.83.2 Brake Status Response

The brake command can be controlled using subindex 3h. The following table contains the brake control bit definitions.

Bit	Name	Description
0	Brake Control Status	0 - brake control via 0x345A is disabled or not possible due to drive failure. 1 - enable fieldbus control via this object. This function works edge triggered, i.e., this bit has to have a 0 -> 1 transition to activate the brake control functionality. After a fault the functionality is reset and has to be activated again. The activation can be controlled by subindex 2 bit 0.
1	Brake Status	0 - apply the brake 1 - release the brake **NOTE** When the brake is applied or released, there is a time delay MOTOR.TBRAKEAPP or MOTOR.TBRAKEREL, after the receipt of the command before this status bit changes. The status is always reported: it is not affected by fieldbus control.
2	STO Status	0 - STO is not active (drive may be enabled) 1 - STO is active (drive can not be enabled)
3	HW Enable Status	0 - HW enable is disabled, drive function can not be enabled 1 - HW enable is enabled, drive function can be enabled

5.3.83.3 Target Torque (mA)

The target torque can be specified using subindex 5h as an alternative to DS402 parameter 6071h as the input to the torque controller in profile torque mode. It allows the torque command to be specified in mA instead of percent rated torque.

5.3.83.4 Profile Position Control

This object allows the motion task controlword to be set for custom applications. It is not recommended for general use.

The following tables specify the CANopen mapping for the axis specific objects described above.

5.3.83.5 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5003h	0h	Unsigned8	-	-	Read only	No
AXIS1.CANOPEN.PSCALE	5003h	1h	Unsigned8	-	-	Read/Write	No
Reserved 5003h sub 02h	5003h	2h	Signed32	-	-	Read only	No
Brake control command - Axis 1	5003h	3h	Unsigned16	-	-	Read/Write	Yes
Brake status response - Axis 1	5003h	4h	Unsigned16	-	-	Read only	Yes
Target torque (mA) - Axis 1	5003h	5h	Signed32	-	-	Read/Write	Yes
Profile position control - Axis 1	5003h	6h	Unsigned32	-	-	Read/Write	No
AXIS1.CANOPEN.PERRMODE	5003h	7h	Unsigned8	-	-	Read/Write	No
AXIS1.CANOPEN.STATUSEGDETIME	5003h	8h	Unsigned16	-	-	Read/Write	No
AXIS1.CANOPEN.TARPOSMODE	5003h	9h	Unsigned8	-	-	Read/Write	No
AXIS1.CANOPEN.CONTROLBIT11.MODE	5003h	Ah	Unsigned8	-	-	Read/Write	No
AXIS1.CANOPEN.CONTROLBIT12.MODE	5003h	Bh	Unsigned8	-	-	Read/Write	No
AXIS1.CANOPEN.CONTROLBIT13.MODE	5003h	Ch	Unsigned8	-	-	Read/Write	No
AXIS1.CANOPEN.CONTROLBIT14.MODE	5003h	Dh	Unsigned8	-	-	Read/Write	No
AXIS1.CANOPEN.CONTROLBIT15.MODE	5003h	Eh	Unsigned8	-	-	Read/Write	No

5.3.83.6 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5103h	0h	Unsigned8	-	-	Read only	No
AXIS2.CANOPEN.PSCALE	5103h	1h	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Reserved 5003h sub 02h	5103h	2h	Signed32	-	-	Read only	No
Brake control command - Axis 2	5103h	3h	Unsigned16	-	-	Read/Write	Yes
Brake status response - Axis 2	5103h	4h	Unsigned16	-	-	Read only	Yes
Target torque (mA) - Axis 2	5103h	5h	Signed32	-	-	Read/Write	Yes
Profile position control - Axis 2	5103h	6h	Unsigned32	-	-	Read/Write	No
AXIS2.CANOPEN.PERRMODE	5103h	7h	Unsigned8	-	-	Read/Write	No
AXIS2.CANOPEN.STATUSEGDETIME	5103h	8h	Unsigned16	-	-	Read/Write	No
AXIS2.CANOPEN.TARPOSMODE	5103h	9h	Unsigned8	-	-	Read/Write	No
AXIS2.CANOPEN.CONTROLBIT11.MODE	5103h	Ah	Unsigned8	-	-	Read/Write	No
AXIS2.CANOPEN.CONTROLBIT12.MODE	5103h	Bh	Unsigned8	-	-	Read/Write	No
AXIS2.CANOPEN.CONTROLBIT13.MODE	5103h	Ch	Unsigned8	-	-	Read/Write	No
AXIS2.CANOPEN.CONTROLBIT14.MODE	5103h	Dh	Unsigned8	-	-	Read/Write	No
AXIS2.CANOPEN.CONTROLBIT15.MODE	5103h	Eh	Unsigned8	-	-	Read/Write	No

5.3.84 5004h, 5104h AXIS#.FAULT#

The following tables specify the CANopen mapping for axis specific fault objects.

5.3.84.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5004h	0h	Unsigned8	-	-	Read only	No
AXIS1.FAULT1	5004h	1h	Unsigned16	-	-	Read only	No
AXIS1.FAULT2	5004h	2h	Unsigned16	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS1.FAULT3	5004h	3h	Unsigned16	-	-	Read only	No
AXIS1.FAULT4	5004h	4h	Unsigned16	-	-	Read only	No
AXIS1.FAULT5	5004h	5h	Unsigned16	-	-	Read only	No
AXIS1.FAULT6	5004h	6h	Unsigned16	-	-	Read only	No
AXIS1.FAULT7	5004h	7h	Unsigned16	-	-	Read only	No
AXIS1.FAULT8	5004h	8h	Unsigned16	-	-	Read only	No
AXIS1.FAULT9	5004h	9h	Unsigned16	-	-	Read only	No
AXIS1.FAULT10	5004h	Ah	Unsigned16	-	-	Read only	No

5.3.84.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5104h	0h	Unsigned8	-	-	Read only	No
AXIS2.FAULT1	5104h	1h	Unsigned16	-	-	Read only	No
AXIS2.FAULT2	5104h	2h	Unsigned16	-	-	Read only	No
AXIS2.FAULT3	5104h	3h	Unsigned16	-	-	Read only	No
AXIS2.FAULT4	5104h	4h	Unsigned16	-	-	Read only	No
AXIS2.FAULT5	5104h	5h	Unsigned16	-	-	Read only	No
AXIS2.FAULT6	5104h	6h	Unsigned16	-	-	Read only	No
AXIS2.FAULT7	5104h	7h	Unsigned16	-	-	Read only	No
AXIS2.FAULT8	5104h	8h	Unsigned16	-	-	Read only	No
AXIS2.FAULT9	5104h	9h	Unsigned16	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS2.FAULT10	5104h	Ah	Unsigned16	-	-	Read only	No

5.3.85 5005h, 5105h AXIS#.FBUS.*

The following tables specify the CANopen mapping for the axis specific fieldbus related objects.

5.3.85.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5005h	0h	Unsigned8	-	-	Read only	No
AXIS1.FBUS.PROTECTION	5005h	1h	Unsigned8	-	-	Read/Write	No

5.3.85.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5105h	0h	Unsigned8	-	-	Read only	No
AXIS2.FBUS.PROTECTION	5105h	1h	Unsigned8	-	-	Read/Write	No

5.3.86 5006h, 5106h AXIS#.GEAR.*

The following tables specify the CANopen mapping for the axis specific gearing objects.

5.3.86.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5006h	0h	Unsigned8	-	-	Read only	No
AXIS1.GEAR.ACC	5006h	1h	Unsigned32	-	Acceleration	Read/Write	No
AXIS1.GEAR.DEC	5006h	2h	Unsigned32	-	Acceleration	Read/Write	No
AXIS1.GEAR.IN	5006h	3h	Unsigned16	-	-	Read/Write	No
AXIS1.GEAR.OUT	5006h	4h	Signed16	-	-	Read/Write	No
AXIS1.GEAR.AUTOSTART	5006h	5h	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS1.GEAR.FBSOURCE	5006h	6h	Unsigned8	-	-	Read/Write	No

5.3.86.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5106h	0h	Unsigned8	-	-	Read only	No
AXIS2.GEAR.ACC	5106h	1h	Unsigned32	-	Acceleration	Read/Write	No
AXIS2.GEAR.DEC	5106h	2h	Unsigned32	-	Acceleration	Read/Write	No
AXIS2.GEAR.IN	5106h	3h	Unsigned16	-	-	Read/Write	No
AXIS2.GEAR.OUT	5106h	4h	Signed16	-	-	Read/Write	No
AXIS2.GEAR.AUTOSTART	5106h	5h	Unsigned8	-	-	Read/Write	No
AXIS2.GEAR.FBSOURCE	5106h	6h	Unsigned8	-	-	Read/Write	No

5.3.87 5007h, 5107h AXIS#.SAFE.STO.*

5.3.87.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5007h	0h	Unsigned8	-	-	Read only	No
AXIS1.SAFE.STO.REPORTFAULT	5007h	1h	Unsigned8	-	-	Read/Write	No
AXIS1.SAFE.STO.ACTIVE	5007h	2h	Unsigned8	-	-	Read only	Yes
AXIS1.SAFE.STO.A	5007h	3h	Unsigned8	-	-	Read only	Yes
AXIS1.SAFE.STO.B	5007h	4h	Unsigned8	-	-	Read only	Yes
Reserved 5007h sub 05h	5007h	5h	Unsigned32	-	-	Read only	No
Reserved 5007h sub 06h	5007h	6h	Unsigned32	-	-	Read only	No
Reserved 5007h sub 07h	5007h	7h	Unsigned8	-	-	Read only	No
Reserved 5007h sub 08h	5007h	8h	Unsigned8	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Reserved 5007h sub 09h	5007h	9h	Unsigned8	-	-	Read only	No
Reserved 5007h sub 0ah	5007h	Ah	Unsigned32	-	-	Read only	No
Reserved 5007h sub 0bh	5007h	Bh	Unsigned32	-	-	Read only	No
Reserved 5007h sub 0ch	5007h	Ch	Unsigned32	-	-	Read only	No
Reserved 5007h sub 0dh	5007h	Dh	Unsigned8	-	-	Read only	No
Reserved 5007h sub 0eh	5007h	Eh	Unsigned8	-	-	Read only	No
Reserved 5007h sub 0fh	5007h	Fh	Unsigned32	-	-	Read only	No
Reserved 5007h sub 10h	5007h	10h	Unsigned32	-	-	Read only	No

5.3.87.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5107h	0h	Unsigned8	-	-	Read only	No
AXIS2.SAFE.STO.REPORTFAULT	5107h	1h	Unsigned8	-	-	Read/Write	No
AXIS2.SAFE.STO.ACTIVE	5107h	2h	Unsigned8	-	-	Read only	Yes
AXIS2.SAFE.STO.A	5107h	3h	Unsigned8	-	-	Read only	Yes
AXIS2.SAFE.STO.B	5107h	4h	Unsigned8	-	-	Read only	Yes
Reserved 5007h sub 05h	5107h	5h	Unsigned32	-	-	Read only	No
Reserved 5007h sub 06h	5107h	6h	Unsigned32	-	-	Read only	No
Reserved 5007h sub 07h	5107h	7h	Unsigned8	-	-	Read only	No
Reserved 5007h sub 08h	5107h	8h	Unsigned8	-	-	Read only	No
Reserved 5007h sub 09h	5107h	9h	Unsigned8	-	-	Read only	No
Reserved 5007h sub 0ah	5107h	Ah	Unsigned32	-	-	Read only	No
Reserved 5007h sub 0bh	5107h	Bh	Unsigned32	-	-	Read only	No
Reserved 5007h sub 0ch	5107h	Ch	Unsigned32	-	-	Read only	No
Reserved 5007h sub 0dh	5107h	Dh	Unsigned8	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Reserved 5007h sub 0eh	5107h	Eh	Unsigned8	-	-	Read only	No
Reserved 5007h sub 0fh	5107h	Fh	Unsigned32	-	-	Read only	No
Reserved 5007h sub 10h	5107h	10h	Unsigned32	-	-	Read only	No

5.3.88 5008h, 5108h AXIS#.HOME.*

The following tables specify the CANopen mapping for the axis specific homing objects.

5.3.88.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5008h	0h	Unsigned8	-	-	Read only	No
AXIS1.HOME.SET	5008h	1h	Unsigned32	-	-	Write only	No
AXIS1.HOME.MODE	5008h	2h	Unsigned16	-	-	Read/Write	No
AXIS1.HOME.DIR	5008h	3h	Unsigned16	-	-	Read/Write	No
AXIS1.HOME.AUTOMOVE	5008h	4h	Unsigned8	-	-	Read/Write	No
AXIS1.HOME.IPEAK	5008h	5h	Signed32	1000:1	-	Read/Write	No
AXIS1.HOME.PERRTHRESH	5008h	6h	Signed32	-	Position	Read/Write	No
AXIS1.HOME.DEC	5008h	7h	Unsigned32	-	Acceleration	Read/Write	No
AXIS1.HOME.ACC	5008h	8h	Unsigned32	-	Acceleration	Read/Write	No
AXIS1.HOME.DIST	5008h	9h	Signed32	-	Position	Read/Write	No
AXIS1.HOME.SWITCHSOURCE	5008h	Ah	Unsigned8	-	-	Read/Write	No
AXIS1.HOME.CREEPFACTOR	5008h	Bh	Unsigned32	-	-	Read/Write	No
AXIS1.HOME.MAXDIST	5008h	Ch	Unsigned32	-	Position	Read/Write	No
AXIS1.HOME.MULTITURNMODE	5008h	Dh	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS1.HOME.OFFSETUSER	5008h	Eh	Unsigned32	-	Position	Read/Write	No
AXIS1.HOME.P	5008h	Fh	Unsigned32	-	Position	Read/Write	No
AXIS1.HOME.V	5008h	10h	Unsigned32	-	Velocity	Read/Write	No

5.3.88.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5108h	0h	Unsigned8	-	-	Read only	No
AXIS2.HOME.SET	5108h	1h	Unsigned32	-	-	Write only	No
AXIS2.HOME.MODE	5108h	2h	Unsigned16	-	-	Read/Write	No
AXIS2.HOME.DIR	5108h	3h	Unsigned16	-	-	Read/Write	No
AXIS2.HOME.AUTOMOVE	5108h	4h	Unsigned8	-	-	Read/Write	No
AXIS2.HOME.IPEAK	5108h	5h	Signed32	1000:1	-	Read/Write	No
AXIS2.HOME.PERRTHRESH	5108h	6h	Signed32	-	Position	Read/Write	No
AXIS2.HOME.DEC	5108h	7h	Unsigned32	-	Acceleration	Read/Write	No
AXIS2.HOME.ACC	5108h	8h	Unsigned32	-	Acceleration	Read/Write	No
AXIS2.HOME.DIST	5108h	9h	Signed32	-	Position	Read/Write	No
AXIS2.HOME.SWITCHSOURCE	5108h	Ah	Unsigned8	-	-	Read/Write	No
AXIS2.HOME.CREEPFACTOR	5108h	Bh	Unsigned32	-	-	Read/Write	No
AXIS2.HOME.MAXDIST	5108h	Ch	Unsigned32	-	Position	Read/Write	No
AXIS2.HOME.MULTITURNMODE	5108h	Dh	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS2.HOME.OFFSETUSER	5108h	Eh	Unsigned32	-	Position	Read/Write	No
AXIS2.HOME.P	5108h	Fh	Unsigned32	-	Position	Read/Write	No
AXIS2.HOME.V	5108h	10h	Unsigned32	-	Velocity	Read/Write	No

5.3.89 5009h, 5109h AXIS#.HWEN.*

The following tables specify the CANopen mapping for the axis specific hardware enable objects.

5.3.89.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5009h	0h	Unsigned8	-	-	Read only	No
AXIS1.HWEN.SOURCE	5009h	1h	Unsigned8	-	-	Read/Write	No
AXIS1.HWEN.MODE	5009h	2h	Unsigned8	-	-	Read/Write	No
AXIS1.HWEN.STATE	5009h	3h	Unsigned8	-	-	Read only	No

5.3.89.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5109h	0h	Unsigned8	-	-	Read only	No
AXIS2.HWEN.SOURCE	5109h	1h	Unsigned8	-	-	Read/Write	No
AXIS2.HWEN.MODE	5109h	2h	Unsigned8	-	-	Read/Write	No
AXIS2.HWEN.STATE	5109h	3h	Unsigned8	-	-	Read only	No

5.3.90 5010h, 5110h AXIS#.UNIT.*

The following tables specify the CANopen mapping for the axis specific unit definition objects.

5.3.90.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5010h	0h	Unsigned8	-	-	Read only	No
AXIS1.UNIT.PIN	5010h	1h	Unsigned32	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
AXIS1.UNIT.POUT	5010h	2h	Unsigned32	-	-	Read/Write	No
AXIS1.UNIT.ACCROTARY	5010h	3h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.VROTARY	5010h	4h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.PROTARY	5010h	5h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.ACCLINEAR	5010h	6h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.PLINEAR	5010h	7h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.VLINEAR	5010h	8h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.LABEL	5010h	9h	String(17)	-	-	Read/Write	No

5.3.90.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	5110h	0h	Unsigned8	-	-	Read only	No
AXIS2.UNIT.PIN	5110h	1h	Unsigned32	-	-	Read/Write	No
AXIS2.UNIT.POUT	5110h	2h	Unsigned32	-	-	Read/Write	No
AXIS2.UNIT.ACCROTARY	5110h	3h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.VROTARY	5110h	4h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.PROTARY	5110h	5h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.ACCLINEAR	5110h	6h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.PLINEAR	5110h	7h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.VLINEAR	5110h	8h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.LABEL	5110h	9h	String(17)	-	-	Read/Write	No

5.3.91 5011h, 5111h AXIS#.VL.*

The following tables specify the CANopen mapping for the axis specific velocity loop objects.

5.3.91.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	5011h	0h	Unsigned8	-	-	Read only	No
AXIS1.VL.KP	5011h	1h	Signed32	1000:1	-	Read/Write	No
AXIS1.VL.KI	5011h	2h	Unsigned32	1000:1	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS1.VL.FBFILTER	5011h	3h	Signed32	-	Velocity	Read only	No
AXIS1.VL.KVFF	5011h	4h	Signed32	1000:1	-	Read/Write	No
AXIS1.VL.ERR	5011h	5h	Signed32	-	Velocity	Read only	No
AXIS1.VL.LIMITP	5011h	6h	Unsigned32	-	Velocity	Read/Write	No
AXIS1.VL.LIMITN	5011h	7h	Signed32	-	Velocity	Read/Write	No
AXIS1.VL.THRESH	5011h	8h	Unsigned32	-	Velocity	Read/Write	No
AXIS1.VL.AINSCALE	5011h	9h	Signed32	1000:1	-	Read/Write	No
Reserved 5011h sub 0ah	5011h	Ah	Signed32	-	-	Read only	No
AXIS1.VL.LMJR	5011h	Bh	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARTYPE1	5011h	Ch	Signed8	-	-	Read/Write	No
AXIS1.VL.ARTYPE2	5011h	Dh	Signed8	-	-	Read/Write	No
AXIS1.VL.ARTYPE3	5011h	Eh	Signed8	-	-	Read/Write	No
AXIS1.VL.ARTYPE4	5011h	Fh	Signed8	-	-	Read/Write	No
AXIS1.VL.ARPF1	5011h	10h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPF2	5011h	11h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPF3	5011h	12h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPF4	5011h	13h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPQ1	5011h	14h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPQ2	5011h	15h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPQ3	5011h	16h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPQ4	5011h	17h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZF1	5011h	18h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZF2	5011h	19h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZF3	5011h	1Ah	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZF4	5011h	1Bh	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZQ1	5011h	1Ch	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZQ2	5011h	1Dh	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZQ3	5011h	1Eh	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZQ4	5011h	1Fh	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.AINSOURCE	5011h	20h	Unsigned8	-	-	Read/Write	No
AXIS1.VL.AINACC	5011h	21h	Unsigned32	-	Acceleration 16Khz	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS1.VL.AINDEC	5011h	22h	Unsigned32	-	Acceleration 16Khz	Read/Write	No
AXIS1.VL.KFB	5011h	23h	Signed32	1000:1	-	Read/Write	No
AXIS1.VL.FBSOURCE	5011h	24h	Unsigned8	-	-	Read/Write	No
AXIS1.VL.KIMODE	5011h	25h	Unsigned8	-	-	Read/Write	No

5.3.91.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5111h	0h	Unsigned8	-	-	Read only	No
AXIS2.VL.KP	5111h	1h	Signed32	1000:1	-	Read/Write	No
AXIS2.VL.KI	5111h	2h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.FBFILTER	5111h	3h	Signed32	-	Velocity	Read only	No
AXIS2.VL.KVFF	5111h	4h	Signed32	1000:1	-	Read/Write	No
AXIS2.VL.ERR	5111h	5h	Signed32	-	Velocity	Read only	No
AXIS2.VL.LIMITP	5111h	6h	Unsigned32	-	Velocity	Read/Write	No
AXIS2.VL.LIMITN	5111h	7h	Signed32	-	Velocity	Read/Write	No
AXIS2.VL.THRESH	5111h	8h	Unsigned32	-	Velocity	Read/Write	No
AXIS2.VL.AINSCALE	5111h	9h	Signed32	1000:1	-	Read/Write	No
Reserved 5011h sub 0ah	5111h	Ah	Signed32	-	-	Read only	No
AXIS2.VL.LMJR	5111h	Bh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARTYPE1	5111h	Ch	Signed8	-	-	Read/Write	No
AXIS2.VL.ARTYPE2	5111h	Dh	Signed8	-	-	Read/Write	No
AXIS2.VL.ARTYPE3	5111h	Eh	Signed8	-	-	Read/Write	No
AXIS2.VL.ARTYPE4	5111h	Fh	Signed8	-	-	Read/Write	No
AXIS2.VL.ARPF1	5111h	10h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPF2	5111h	11h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPF3	5111h	12h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPF4	5111h	13h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPQ1	5111h	14h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPQ2	5111h	15h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPQ3	5111h	16h	Unsigned32	1000:1	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS2.VL.ARPQ4	5111h	17h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZF1	5111h	18h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZF2	5111h	19h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZF3	5111h	1Ah	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZF4	5111h	1Bh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZQ1	5111h	1Ch	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZQ2	5111h	1Dh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZQ3	5111h	1Eh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZQ4	5111h	1Fh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.AINSOURCE	5111h	20h	Unsigned8	-	-	Read/Write	No
AXIS2.VL.AINACC	5111h	21h	Unsigned32	-	Acceleration 16Khz	Read/Write	No
AXIS2.VL.AINDEC	5111h	22h	Unsigned32	-	Acceleration 16Khz	Read/Write	No
AXIS2.VL.KFB	5111h	23h	Signed32	1000:1	-	Read/Write	No
AXIS2.VL.FBSOURCE	5111h	24h	Unsigned8	-	-	Read/Write	No
AXIS2.VL.KIMODE	5111h	25h	Unsigned8	-	-	Read/Write	No

5.3.92 5012h, 5112h AXIS#.WARNING#

The following tables specify the CANopen mapping for axis specific warning objects.

5.3.92.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5012h	0h	Unsigned8	-	-	Read only	No
AXIS1.WARNING1	5012h	1h	Unsigned32	-	-	Read only	No
AXIS1.WARNING2	5012h	2h	Unsigned32	-	-	Read only	No
AXIS1.WARNING3	5012h	3h	Unsigned32	-	-	Read only	No

5.3.92.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5112h	0h	Unsigned8	-	-	Read only	No
AXIS2.WARNING1	5112h	1h	Unsigned32	-	-	Read only	No
AXIS2.WARNING2	5112h	2h	Unsigned32	-	-	Read only	No
AXIS2.WARNING3	5112h	3h	Unsigned32	-	-	Read only	No

5.3.93 5013h, 5113h AXIS#.WS.*

The following tables specify the CANopen mapping for the axis specific wake and shake objects.

5.3.93.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5013h	0h	Unsigned8	-	-	Read only	No
AXIS1.WS.MODE	5013h	1h	Unsigned8	-	-	Read/Write	No
AXIS1.WS.NUMLOOPS	5013h	2h	Unsigned8	-	-	Read/Write	No
AXIS1.WS.STATE	5013h	3h	Unsigned8	-	-	Read only	No
AXIS1.WS.T	5013h	4h	Unsigned8	-	-	Read/Write	No
AXIS1.WS.TDELAY1	5013h	5h	Unsigned8	-	-	Read/Write	No
AXIS1.WS.TDELAY2	5013h	6h	Unsigned8	-	-	Read/Write	No
AXIS1.WS.TDELAY3	5013h	7h	Unsigned16	-	-	Read/Write	No
AXIS1.WS.TDELAY4	5013h	8h	Unsigned16	-	-	Read/Write	No
AXIS1.WS.ARM	5013h	9h	Unsigned32	-	-	Write only	No
AXIS1.WS.CHECKMODE	5013h	Ah	Unsigned8	-	-	Read/Write	No
AXIS1.WS.CHECKV	5013h	Bh	Signed32	-	Velocity	Read/Write	No
AXIS1.WS.DISTMAX	5013h	Ch	Signed32	-	Position	Read/Write	No
AXIS1.WS.IMAX	5013h	Dh	Signed32	1000:1	-	Read/Write	No
AXIS1.WS.VTHRESH	5013h	Eh	Signed32	-	Velocity	Read/Write	No
AXIS1.WS.DISTMIN	5013h	Fh	Signed32	-	Position	Read/Write	No
AXIS1.WS.CHECKT	5013h	10h	Unsigned16	-	-	Read/Write	No
AXIS1.WS.TIRAMP	5013h	11h	Unsigned16	-	-	Read/Write	No
AXIS1.WS.TSTANDSTILL	5013h	12h	Unsigned16	-	-	Read/Write	No
AXIS1.WS.FREQ	5013h	13h	Unsigned32	1000:1	-	Read/Write	No

5.3.93.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5113h	0h	Unsigned8	-	-	Read only	No
AXIS2.WS.MODE	5113h	1h	Unsigned8	-	-	Read/Write	No
AXIS2.WS.NUMLOOPS	5113h	2h	Unsigned8	-	-	Read/Write	No
AXIS2.WS.STATE	5113h	3h	Unsigned8	-	-	Read only	No
AXIS2.WS.T	5113h	4h	Unsigned8	-	-	Read/Write	No
AXIS2.WS.TDELAY1	5113h	5h	Unsigned8	-	-	Read/Write	No
AXIS2.WS.TDELAY2	5113h	6h	Unsigned8	-	-	Read/Write	No
AXIS2.WS.TDELAY3	5113h	7h	Unsigned16	-	-	Read/Write	No
AXIS2.WS.TDELAY4	5113h	8h	Unsigned16	-	-	Read/Write	No
AXIS2.WS.ARM	5113h	9h	Unsigned32	-	-	Write only	No
AXIS2.WS.CHECKMODE	5113h	Ah	Unsigned8	-	-	Read/Write	No
AXIS2.WS.CHECKV	5113h	Bh	Signed32	-	Velocity	Read/Write	No
AXIS2.WS.DISTMAX	5113h	Ch	Signed32	-	Position	Read/Write	No
AXIS2.WS.IMAX	5113h	Dh	Signed32	1000:1	-	Read/Write	No
AXIS2.WS.VTHRESH	5113h	Eh	Signed32	-	Velocity	Read/Write	No
AXIS2.WS.DISTMIN	5113h	Fh	Signed32	-	Position	Read/Write	No
AXIS2.WS.CHECKT	5113h	10h	Unsigned16	-	-	Read/Write	No
AXIS2.WS.TIRAMP	5113h	11h	Unsigned16	-	-	Read/Write	No
AXIS2.WS.TSTANDSTILL	5113h	12h	Unsigned16	-	-	Read/Write	No
AXIS2.WS.FREQ	5113h	13h	Unsigned32	1000:1	-	Read/Write	No

5.3.94 5014h, 5114h AXIS#.LOAD.*

The following tables specify the CANopen mapping for the axis specific mechanical load objects.

5.3.94.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5014h	0h	Unsigned8	-	-	Read only	No
AXIS1.LOAD.INERTIA	5014h	1h	Unsigned32	1000:1	-	Read/Write	No

5.3.94.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5114h	0h	Unsigned8	-	-	Read only	No
AXIS2.LOAD.INERTIA	5114h	1h	Unsigned32	1000:1	-	Read/Write	No

5.3.95 5015h, 5115h AXIS#.HWLS.*

The following tables specify the CANopen mapping for the axis specific hardware limit switch objects.

5.3.95.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5015h	0h	Unsigned8	-	-	Read only	No
AXIS1.HWLS.NEGSTATE	5015h	1h	Unsigned8	-	-	Read only	Yes
AXIS1.HWLS.POSSTATE	5015h	2h	Unsigned8	-	-	Read only	Yes
AXIS1.HWLS.NEGSOURCE	5015h	3h	Unsigned8	-	-	Read/Write	No
AXIS1.HWLS.POSSOURCE	5015h	4h	Unsigned8	-	-	Read/Write	No

5.3.95.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5115h	0h	Unsigned8	-	-	Read only	No
AXIS2.HWLS.NEGSTATE	5115h	1h	Unsigned8	-	-	Read only	Yes
AXIS2.HWLS.POSSTATE	5115h	2h	Unsigned8	-	-	Read only	Yes
AXIS2.HWLS.NEGSOURCE	5115h	3h	Unsigned8	-	-	Read/Write	No
AXIS2.HWLS.POSSOURCE	5115h	4h	Unsigned8	-	-	Read/Write	No

5.3.96 5016h, 5116h AXIS#.SETTLE.*

5.3.96.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5016h	0h	Unsigned8	-	-	Read only	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS1.SETTLE.P	5016h	1h	Unsigned32	-	Position	Read/Write	No
AXIS1.SETTLE.V	5016h	2h	Unsigned32	-	-	Read/Write	No

5.3.96.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5116h	0h	Unsigned8	-	-	Read only	No
AXIS2.SETTLE.P	5116h	1h	Unsigned32	-	Position	Read/Write	No
AXIS2.SETTLE.V	5116h	2h	Unsigned32	-	-	Read/Write	No

5.3.97 5017h, 5117h AXIS#.OBS.*

5.3.97.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5017h	0h	Unsigned8	-	-	Read only	No
AXIS1.OBS.BW	5017h	1h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.OBS.ENABLE	5017h	2h	Unsigned8	-	-	Read/Write	No
AXIS1.OBS.KO	5017h	3h	Unsigned32	1000:1	-	Read/Write	No

5.3.97.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5117h	0h	Unsigned8	-	-	Read only	No
AXIS2.OBS.BW	5117h	1h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.OBS.ENABLE	5117h	2h	Unsigned8	-	-	Read/Write	No
AXIS2.OBS.KO	5117h	3h	Unsigned32	1000:1	-	Read/Write	No

5.3.98 5018h, 5118h AXIS#.SENSORLESS.*

5.3.98.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5018h	0h	Unsigned 8	-	-	Read only	No
AXIS1.SENSORLESS.BWU	5018h	1h	Signed32	1000:1	-	Read/Write	No
AXIS1.SENSORLESS.ENPHASELEAD	5018h	2h	Unsigned 8	-	-	Read/Write	No
AXIS1.SENSORLESS.FAULTANGLE	5018h	3h	Signed32	1000:1	-	Read/Write	No
AXIS1.SENSORLESS.FAULTTIME	5018h	4h	Signed32	1000:1	-	Read/Write	No
AXIS1.SENSORLESS.ISTART	5018h	5h	Signed32	1000:1	-	Read/Write	No
AXIS1.SENSORLESS.RPMSTART	5018h	6h	Signed32	1000:1	-	Read/Write	No

5.3.98.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5118h	0h	Unsigned 8	-	-	Read only	No
AXIS2.SENSORLESS.BWU	5118h	1h	Signed32	1000:1	-	Read/Write	No
AXIS2.SENSORLESS.ENPHASELEAD	5118h	2h	Unsigned 8	-	-	Read/Write	No
AXIS2.SENSORLESS.FAULTANGLE	5118h	3h	Signed32	1000:1	-	Read/Write	No
AXIS2.SENSORLESS.FAULTTIME	5118h	4h	Signed32	1000:1	-	Read/Write	No
AXIS2.SENSORLESS.ISTART	5118h	5h	Signed32	1000:1	-	Read/Write	No
AXIS2.SENSORLESS.RPMSTART	5118h	6h	Signed32	1000:1	-	Read/Write	No

5.3.99 5019h, 5119h AXIS#.FIELDWEAKENING.*

5.3.99.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	5019h	0h	Unsigned 8	-	-	Read only	No
AXIS1.FIELDWEAKENING.CURRFILTERBW	5019h	1h	Signed32	-	-	Read/Write	No
AXIS1.FIELDWEAKENING.LOOPBW	5019h	2h	Signed32	-	-	Read/Write	No
AXIS1.FIELDWEAKENING.VBUSMARGIN	5019h	3h	Signed32	-	-	Read/Write	No
AXIS1.FIELDWEAKENING.VOLTFILTERBW	5019h	4h	Signed32	-	-	Read/Write	No

5.3.99.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	5119h	0h	Unsigned 8	-	-	Read only	No
AXIS2.FIELDWEAKENING.CURRFILTERBW	5119h	1h	Signed32	-	-	Read/Write	No
AXIS2.FIELDWEAKENING.LOOPBW	5119h	2h	Signed32	-	-	Read/Write	No
AXIS2.FIELDWEAKENING.VBUSMARGIN	5119h	3h	Signed32	-	-	Read/Write	No
AXIS2.FIELDWEAKENING.VOLTFILTERBW	5119h	4h	Signed32	-	-	Read/Write	No

5.3.100 500Ah, 510Ah AXIS#.IL.*

5.3.100.1 Sub-Index 11h

This object at sub-index 11h is used to limit the positive and negative axis current based on a percent of AXIS#.IPEAK. The range is 0-10,000 and corresponds to 0-100% of AXIS#.IPEAK. When written, it will set both the positive and negative current limits AXIS#.IL.LIMITP / AXIS#.IL.LIMITN. When read, it will read back the smaller of the two limits.

5.3.100.1.1 Example 1: Writing SDO

```
Let AXIS#.IPEAK = 9.0
Write SDO 500Ah, sub 11h = 5,000 (50% IPEAK)
Then
AXIS1.IL.LIMITP = 4.5
AXIS#.IL.LIMITN = -4.5
Ex: 9.0 * (5,000 / 10,000) = 4.5
```

5.3.100.1.2 Example 2: Reading SDO

```
Let AXIS1.IL.LIMITP = 9.0 and AXIS#.IL.LIMITN = -4.5
Read SDO 500Ah, sub 11h = 5,000
Ex: min(abs(9.0), abs(-4.5)) = 4.5 = 5,000
```

5.3.100.2 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	500Ah	0h	Unsigned8	-	-	Read only	No
AXIS1.IL.FB	500Ah	1h	Signed32	1000:1	-	Read only	Yes
AXIS1.IL.KP	500Ah	2h	Unsigned32	1000:1	-	Read only	No
AXIS1.IL.KPDRATIO	500Ah	3h	Unsigned32	1000:1	-	Read only	No
AXIS1.IL.LIMITP	500Ah	4h	Signed32	1000:1	-	Read/Write	No
AXIS1.IL.LIMITN	500Ah	5h	Signed32	1000:1	-	Read/Write	No
AXIS1.IL.FBSOURCE	500Ah	6h	Unsigned8	-	-	Read/Write	No
AXIS1.IL.DIFOLD	500Ah	7h	Signed32	1000:1	-	Read only	No
AXIS1.IL.FOLDFTHRESH	500Ah	8h	Signed32	1000:1	-	Read only	No
AXIS1.IL.FOLDFTHRESHU	500Ah	9h	Signed32	1000:1	-	Read/Write	No
AXIS1.IL.FOLDWTHRESH	500Ah	Ah	Signed32	1000:1	-	Read/Write	No
AXIS1.IL.FRICTION	500Ah	Bh	Signed32	1000:1	-	Read/Write	No
AXIS1.IL.IFOLD	500Ah	Ch	Signed32	1000:1	-	Read only	No
AXIS1.IL.KACCFF	500Ah	Dh	Signed32	1000:1	-	Read/Write	No
AXIS1.IL.KVFF	500Ah	Eh	Signed32	1000:1	-	Read/Write	No
AXIS1.IL.MIFOLD	500Ah	Fh	Signed32	1000:1	-	Read only	No
AXIS1.IL.OFFSET	500Ah	10h	Signed32	1000:1	-	Read/Write	No
Max peak current - Axis 1	500Ah	11h	Unsigned16	-	-	Read/Write	No
AXIS1.IL.DI2T	500Ah	12h	Signed32	1000:1	-	Read only	No
AXIS1.IL.MI2T	500Ah	13h	Signed32	1000:1	-	Read only	No
AXIS1.IL.AINSCALE	500Ah	14h	Signed32	1000:1	-	Read/Write	No
AXIS1.IL.AINSOURCE	500Ah	15h	Unsigned8	-	-	Read/Write	No
AXIS1.IL.BW	500Ah	16h	Unsigned16	1000:1	-	Read/Write	No
AXIS1.IL.PWMQUIET	500Ah	17h	Unsigned8	-	-	Read/Write	No

5.3.100.3 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	510Ah	0h	Unsigned8	-	-	Read only	No
AXIS2.IL.FB	510Ah	1h	Signed32	1000:1	-	Read only	Yes
AXIS2.IL.KP	510Ah	2h	Unsigned32	1000:1	-	Read only	No
AXIS2.IL.KPDRATIO	510Ah	3h	Unsigned32	1000:1	-	Read only	No
AXIS2.IL.LIMITP	510Ah	4h	Signed32	1000:1	-	Read/Write	No
AXIS2.IL.LIMITN	510Ah	5h	Signed32	1000:1	-	Read/Write	No
AXIS2.IL.FBSOURCE	510Ah	6h	Unsigned8	-	-	Read/Write	No
AXIS2.IL.DIFOLD	510Ah	7h	Signed32	1000:1	-	Read only	No
AXIS2.IL.FOLDFTHRESH	510Ah	8h	Signed32	1000:1	-	Read only	No
AXIS2.IL.FOLDFTHRESHU	510Ah	9h	Signed32	1000:1	-	Read/Write	No
AXIS2.IL.FOLDWTHRESH	510Ah	Ah	Signed32	1000:1	-	Read/Write	No
AXIS2.IL.FRICTION	510Ah	Bh	Signed32	1000:1	-	Read/Write	No
AXIS2.IL.IFOLD	510Ah	Ch	Signed32	1000:1	-	Read only	No
AXIS2.IL.KACCFF	510Ah	Dh	Signed32	1000:1	-	Read/Write	No
AXIS2.IL.KVFF	510Ah	Eh	Signed32	1000:1	-	Read/Write	No
AXIS2.IL.MIFOLD	510Ah	Fh	Signed32	1000:1	-	Read only	No
AXIS2.IL.OFFSET	510Ah	10h	Signed32	1000:1	-	Read/Write	No
Max peak current - Axis 2	510Ah	11h	Unsigned16	-	-	Read/Write	No
AXIS2.IL.DI2T	510Ah	12h	Signed32	1000:1	-	Read only	No
AXIS2.IL.MI2T	510Ah	13h	Signed32	1000:1	-	Read only	No
AXIS2.IL.AINSCALE	510Ah	14h	Signed32	1000:1	-	Read/Write	No
AXIS2.IL.AINSOURCE	510Ah	15h	Unsigned8	-	-	Read/Write	No
AXIS2.IL.BW	510Ah	16h	Unsigned16	1000:1	-	Read/Write	No
AXIS2.IL.PWMQUIET	510Ah	17h	Unsigned8	-	-	Read/Write	No

5.3.101 500Bh, 510Bh AXIS#.MOTOR.*

The following tables specify the CANopen mapping for the axis specific motor objects.

5.3.101.1 Axis 1

Command	Index	Sub-Inde-x	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	500Bh	0h	Unsigned8	-	-	Read only	No
AXIS1.MOTOR.TEMPC	500Bh	1h	Signed16	-	-	Read only	Yes
AXIS1.MOTOR.TEMP	500Bh	2h	Unsigned 32	-	-	Read only	Yes
AXIS1.MOTOR.KT	500Bh	3h	Unsigned 32	1000:1	-	Read/Write	No
AXIS1.MOTOR.TYPE	500Bh	4h	Unsigned8	-	-	Read/Write	No
AXIS1.MOTOR.AUTOSET	500Bh	5h	Unsigned8	-	-	Read/Write	No
AXIS1.MOTOR.VOLTRATED	500Bh	6h	Unsigned 16	-	-	Read/Write	No
AXIS1.MOTOR.VOLTMIN	500Bh	7h	Unsigned 16	-	-	Read/Write	No
AXIS1.MOTOR.BRAKE	500Bh	8h	Unsigned8	-	-	Read/Write	No
AXIS1.MOTOR.IMTR	500Bh	9h	Unsigned 16	-	-	Read/Write	No
AXIS1.MOTOR.IMID	500Bh	Ah	Unsigned 16	1000:1	-	Read/Write	No
AXIS1.MOTOR.VRATED	500Bh	Bh	Signed32	-	Velocity	Read/Write	No
AXIS1.MOTOR.BRAKECONTROL	500Bh	Ch	Unsigned8	-	-	Read/Write	No
AXIS1.MOTOR.BRAKEIMM	500Bh	Dh	Unsigned8	-	-	Read/Write	No
AXIS1.MOTOR.CTF0	500Bh	Eh	Unsigned 32	1000:1	-	Read/Write	No
AXIS1.MOTOR.FIELDWEAKENING	500Bh	Fh	Unsigned8	-	-	Read/Write	No
AXIS1.MOTOR.ICONT	500Bh	10h	Unsigned 32	1000:1	-	Read/Write	No
AXIS1.MOTOR.INERTIA	500Bh	11h	Unsigned 32	1000:1	-	Read/Write	No
AXIS1.MOTOR.IPEAK	500Bh	12h	Unsigned 32	1000:1	-	Read/Write	No
AXIS1.MOTOR.KE	500Bh	13h	Unsigned 32	1000:1	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS1.MOTOR.LQLL	500Bh	14h	Unsigned 32	1000:1	-	Read/Write	No
AXIS1.MOTOR.PHASE	500Bh	15h	Unsigned 16	-	-	Read/Write	No
AXIS1.MOTOR.PITCH	500Bh	16h	Unsigned 32	1000:1	-	Read/Write	No
AXIS1.MOTOR.POLES	500Bh	17h	Unsigned 16	-	-	Read/Write	No
AXIS1.MOTOR.R	500Bh	18h	Unsigned 32	1000:1	-	Read/Write	No
AXIS1.MOTOR.RTYPE	500Bh	19h	Unsigned8	-	-	Read/Write	No
AXIS1.MOTOR.TBRAKEAPP	500Bh	1Ah	Unsigned 16	-	-	Read/Write	No
AXIS1.MOTOR.TBRAKERLS	500Bh	1Bh	Unsigned 16	-	-	Read/Write	No
AXIS1.MOTOR.TBRAKETO	500Bh	1Ch	Signed32	-	-	Read/Write	No
AXIS1.MOTOR.TEMPFAULT	500Bh	1Dh	Unsigned 32	-	-	Read/Write	No
AXIS1.MOTOR.TEMPWARN	500Bh	1Eh	Unsigned 32	-	-	Read/Write	No
AXIS1.MOTOR.VMAX	500Bh	1Fh	Unsigned 16	-	-	Read/Write	No
AXIS1.MOTOR.VOLTMAX	500Bh	20h	Unsigned 16	-	-	Read/Write	No
AXIS1.MOTOR.NAME	500Bh	21h	String(20)	-	-	Read/Write	No
AXIS1.MOTOR.RSOURCE	500Bh	22h	Unsigned8	-	-	Read/Write	No
AXIS1.MOTOR.TEMPSOURCE	500Bh	23h	Unsigned8	-	-	Read/Write	No
AXIS1.MOTOR.BRAKEPOWERDELAY	500Bh	24h	Unsigned 16	-	-	Read/Write	No
AXIS1.MOTOR.BRAKEPOWERLOW	500Bh	25h	Unsigned 16	1000:1	-	Read/Write	No
AXIS1.MOTOR.BRAKEPOWERSAVING	500Bh	26h	Unsigned8	-	-	Read/Write	No
AXIS1.MOTOR.IDMAX	500Bh	27h	Unsigned 32	1000:1	-	Read/Write	No

Command	Index	Sub-Inde-x	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS1.MOTOR.LDLL	500Bh	28h	Unsigned 32	1000:1	-	Read/Write	No
AXIS1.MOTOR.LISAT	500Bh	29h	Unsigned 32	1000:1	-	Read/Write	No
AXIS1.MOTOR.PHSADVK1	500Bh	2Ah	Signed32	1000:1	-	Read/Write	No
AXIS1.MOTOR.PHSADVK2	500Bh	2Bh	Signed32	1000:1	-	Read/Write	No

5.3.101.2 Axis 2

Command	Index	Sub-Inde-x	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	510Bh	0h	Unsigned8	-	-	Read only	No
AXIS2.MOTOR.TEMPC	510Bh	1h	Signed16	-	-	Read only	Yes
AXIS2.MOTOR.TEMP	510Bh	2h	Unsigned 32	-	-	Read only	Yes
AXIS2.MOTOR.KT	510Bh	3h	Unsigned 32	1000:1	-	Read/Write	No
AXIS2.MOTOR.TYPE	510Bh	4h	Unsigned8	-	-	Read/Write	No
AXIS2.MOTOR.AUTOSET	510Bh	5h	Unsigned8	-	-	Read/Write	No
AXIS2.MOTOR.VOLTRATED	510Bh	6h	Unsigned 16	-	-	Read/Write	No
AXIS2.MOTOR.VOLTMIN	510Bh	7h	Unsigned 16	-	-	Read/Write	No
AXIS2.MOTOR.BRAKE	510Bh	8h	Unsigned8	-	-	Read/Write	No
AXIS2.MOTOR.IMTR	510Bh	9h	Unsigned 16	-	-	Read/Write	No
AXIS2.MOTOR.IMID	510Bh	Ah	Unsigned 16	1000:1	-	Read/Write	No
AXIS2.MOTOR.VRATED	510Bh	Bh	Signed32	-	Velocity	Read/Write	No
AXIS2.MOTOR.BRAKECONTROL	510Bh	Ch	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Inde-x	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS2.MOTOR.BRAKEIMM	510Bh	Dh	Unsigned8	-	-	Read/Write	No
AXIS2.MOTOR.CTF0	510Bh	Eh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.MOTOR.FIELDWEAKENING	510Bh	Fh	Unsigned8	-	-	Read/Write	No
AXIS2.MOTOR.ICONT	510Bh	10h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.MOTOR.INERTIA	510Bh	11h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.MOTOR.IPEAK	510Bh	12h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.MOTOR.KE	510Bh	13h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.MOTOR.LQLL	510Bh	14h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.MOTOR.PHASE	510Bh	15h	Unsigned16	-	-	Read/Write	No
AXIS2.MOTOR.PITCH	510Bh	16h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.MOTOR.POLES	510Bh	17h	Unsigned16	-	-	Read/Write	No
AXIS2.MOTOR.R	510Bh	18h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.MOTOR.RTYPE	510Bh	19h	Unsigned8	-	-	Read/Write	No
AXIS2.MOTOR.TBRAKEAPP	510Bh	1Ah	Unsigned16	-	-	Read/Write	No
AXIS2.MOTOR.TBRAKERLS	510Bh	1Bh	Unsigned16	-	-	Read/Write	No
AXIS2.MOTOR.TBRAKETO	510Bh	1Ch	Signed32	-	-	Read/Write	No
AXIS2.MOTOR.TEMPFAULT	510Bh	1Dh	Unsigned32	-	-	Read/Write	No
AXIS2.MOTOR.TEMPWARN	510Bh	1Eh	Unsigned32	-	-	Read/Write	No
AXIS2.MOTOR.VMAX	510Bh	1Fh	Unsigned16	-	-	Read/Write	No
AXIS2.MOTOR.VOLTMAX	510Bh	20h	Unsigned16	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
AXIS2.MOTOR.NAME	510Bh	21h	String(20)	-	-	Read/Write	No
AXIS2.MOTOR.RSOURCE	510Bh	22h	Unsigned8	-	-	Read/Write	No
AXIS2.MOTOR.TEMPSOURCE	510Bh	23h	Unsigned8	-	-	Read/Write	No
AXIS2.MOTOR.BRAKEPOWERDELAY	510Bh	24h	Unsigned16	-	-	Read/Write	No
AXIS2.MOTOR.BRAKEPOWERLOW	510Bh	25h	Unsigned16	1000:1	-	Read/Write	No
AXIS2.MOTOR.BRAKEPOWERSAVING	510Bh	26h	Unsigned8	-	-	Read/Write	No
AXIS2.MOTOR.IDMAX	510Bh	27h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.MOTOR.LDLL	510Bh	28h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.MOTOR.LISAT	510Bh	29h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.MOTOR.PHSADVK1	510Bh	2Ah	Signed32	1000:1	-	Read/Write	No
AXIS2.MOTOR.PHSADVK2	510Bh	2Bh	Signed32	1000:1	-	Read/Write	No

5.3.102 500Ch, 510Ch AXIS#.PL.*

The following tables specify the CANopen mapping for the axis specific position loop objects.

5.3.102.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	500Ch	0h	Unsigned8	-	-	Read only	No
AXIS1.PL.MODPDIR	500Ch	1h	Unsigned8	-	-	Read/Write	No
AXIS1.PL.ERRWTHRESH	500Ch	2h	Signed32	-	Position	Read/Write	No
AXIS1.PL.ERRFTHRESH	500Ch	3h	Signed32	-	Position	Read/Write	No
AXIS1.PL.KP	500Ch	4h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.PL.MODP1	500Ch	5h	Signed32	-	Position	Read/Write	No
AXIS1.PL.MODP2	500Ch	6h	Signed32	-	Position	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS1.PL.AINSCALE	500Ch	7h	Signed32	-	Position	Read/Write	No
AXIS1.PL.FBSOURCE	500Ch	8h	Unsigned8	-	-	Read/Write	No
AXIS1.PL.INTOUTMAX	500Ch	9h	Signed32	-	Position	Read/Write	No
AXIS1.PL.KI	500Ch	Ah	Unsigned32	1000:1	-	Read/Write	No
AXIS1.PL.MODPEN	500Ch	Bh	Unsigned8	-	-	Read/Write	No
AXIS1.PL.AINSOURCE	500Ch	Ch	Unsigned8	-	-	Read/Write	No
AXIS1.PL.KFB	500Ch	Dh	Signed32	1000:1	-	Read/Write	No
AXIS1.PL.KITHRESH	500Ch	Eh	Signed32	-	Velocity	Read/Write	No
AXIS1.PL.FILTER.FREQ	500Ch	Fh	Unsigned32	1000:1	-	Read/Write	No
AXIS1.PL.FILTER.Q	500Ch	10h	Unsigned16	1000:1	-	Read/Write	No

5.3.102.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	510Ch	0h	Unsigned8	-	-	Read only	No
AXIS2.PL.MODPDIR	510Ch	1h	Unsigned8	-	-	Read/Write	No
AXIS2.PL.ERRWTHRESH	510Ch	2h	Signed32	-	Position	Read/Write	No
AXIS2.PL.ERRFTHRESH	510Ch	3h	Signed32	-	Position	Read/Write	No
AXIS2.PL.KP	510Ch	4h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.PL.MODP1	510Ch	5h	Signed32	-	Position	Read/Write	No
AXIS2.PL.MODP2	510Ch	6h	Signed32	-	Position	Read/Write	No
AXIS2.PL.AINSCALE	510Ch	7h	Signed32	-	Position	Read/Write	No
AXIS2.PL.FBSOURCE	510Ch	8h	Unsigned8	-	-	Read/Write	No
AXIS2.PL.INTOUTMAX	510Ch	9h	Signed32	-	Position	Read/Write	No
AXIS2.PL.KI	510Ch	Ah	Unsigned32	1000:1	-	Read/Write	No
AXIS2.PL.MODPEN	510Ch	Bh	Unsigned8	-	-	Read/Write	No
AXIS2.PL.AINSOURCE	510Ch	Ch	Unsigned8	-	-	Read/Write	No
AXIS2.PL.KFB	510Ch	Dh	Signed32	1000:1	-	Read/Write	No
AXIS2.PL.KITHRESH	510Ch	Eh	Signed32	-	Velocity	Read/Write	No
AXIS2.PL.FILTER.FREQ	510Ch	Fh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.PL.FILTER.Q	510Ch	10h	Unsigned16	1000:1	-	Read/Write	No

5.3.103 500Eh, 510Eh AXIS#.SM.*

The following tables specify the CANopen mapping for the axis specific service motion objects.

5.3.103.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	500Eh	0h	Unsigned8	-	-	Read only	No
AXIS1.SM.I1	500Eh	1h	Signed32	1000:1	-	Read/Write	No
AXIS1.SM.I2	500Eh	2h	Signed32	1000:1	-	Read/Write	No
AXIS1.SM.MODE	500Eh	3h	Unsigned16	-	-	Read/Write	No
AXIS1.SM.T1	500Eh	4h	Unsigned16	-	-	Read/Write	No
AXIS1.SM.T2	500Eh	5h	Unsigned16	-	-	Read/Write	No
AXIS1.SM.V1	500Eh	6h	Signed32	-	Velocity	Read/Write	No
AXIS1.SM.V2	500Eh	7h	Signed32	-	Velocity	Read/Write	No
AXIS1.SM.ACC	500Eh	8h	Unsigned32	-	Acceleration	Read/Write	No
AXIS1.SM.DEC	500Eh	9h	Unsigned32	-	Acceleration	Read/Write	No

5.3.103.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	510Eh	0h	Unsigned8	-	-	Read only	No
AXIS2.SM.I1	510Eh	1h	Signed32	1000:1	-	Read/Write	No
AXIS2.SM.I2	510Eh	2h	Signed32	1000:1	-	Read/Write	No
AXIS2.SM.MODE	510Eh	3h	Unsigned16	-	-	Read/Write	No
AXIS2.SM.T1	510Eh	4h	Unsigned16	-	-	Read/Write	No
AXIS2.SM.T2	510Eh	5h	Unsigned16	-	-	Read/Write	No
AXIS2.SM.V1	510Eh	6h	Signed32	-	Velocity	Read/Write	No
AXIS2.SM.V2	510Eh	7h	Signed32	-	Velocity	Read/Write	No
AXIS2.SM.ACC	510Eh	8h	Unsigned32	-	Acceleration	Read/Write	No
AXIS2.SM.DEC	510Eh	9h	Unsigned32	-	Acceleration	Read/Write	No

5.3.104 500Fh, 510Fh AXIS#.SWLS.*

The following tables specify the CANopen mapping for axis specific software limit switch objects.

5.3.104.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	500Fh	0h	Unsigned8	-	-	Read only	No
AXIS1.SWLS.EN	500Fh	1h	Unsigned8	-	-	Read/Write	No
AXIS1.SWLS.STATE	500Fh	2h	Unsigned8	-	-	Read only	No
AXIS1.SWLS.LIMIT0	500Fh	3h	Signed32	-	Position	Read/Write	No
AXIS1.SWLS.LIMIT1	500Fh	4h	Signed32	-	Position	Read/Write	No

5.3.104.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	510Fh	0h	Unsigned8	-	-	Read only	No
AXIS2.SWLS.EN	510Fh	1h	Unsigned8	-	-	Read/Write	No
AXIS2.SWLS.STATE	510Fh	2h	Unsigned8	-	-	Read only	No
AXIS2.SWLS.LIMIT0	510Fh	3h	Signed32	-	Position	Read/Write	No
AXIS2.SWLS.LIMIT1	510Fh	4h	Signed32	-	Position	Read/Write	No

5.3.105 5010h, 5110h AXIS#.UNIT.*

The following tables specify the CANopen mapping for the axis specific unit definition objects.

5.3.105.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5010h	0h	Unsigned8	-	-	Read only	No
AXIS1.UNIT.PIN	5010h	1h	Unsigned32	-	-	Read/Write	No
AXIS1.UNIT.POUT	5010h	2h	Unsigned32	-	-	Read/Write	No
AXIS1.UNIT.ACCROTARY	5010h	3h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.VROTARY	5010h	4h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.PROTARY	5010h	5h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.ACCLINEAR	5010h	6h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.PLINEAR	5010h	7h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.VLINEAR	5010h	8h	Unsigned8	-	-	Read/Write	No
AXIS1.UNIT.LABEL	5010h	9h	String(17)	-	-	Read/Write	No

5.3.105.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5110h	0h	Unsigned8	-	-	Read only	No
AXIS2.UNIT.PIN	5110h	1h	Unsigned32	-	-	Read/Write	No
AXIS2.UNIT.POUT	5110h	2h	Unsigned32	-	-	Read/Write	No
AXIS2.UNIT.ACCROTARY	5110h	3h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.VROTARY	5110h	4h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.PROTARY	5110h	5h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.ACCLINEAR	5110h	6h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.PLINEAR	5110h	7h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.VLINEAR	5110h	8h	Unsigned8	-	-	Read/Write	No
AXIS2.UNIT.LABEL	5110h	9h	String(17)	-	-	Read/Write	No

5.3.106 5011h, 5111h AXIS#.VL.*

The following tables specify the CANopen mapping for the axis specific velocity loop objects.

5.3.106.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5011h	0h	Unsigned8	-	-	Read only	No
AXIS1.VL.KP	5011h	1h	Signed32	1000:1	-	Read/Write	No
AXIS1.VL.KI	5011h	2h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.FBFILTER	5011h	3h	Signed32	-	Velocity	Read only	No
AXIS1.VL.KVFF	5011h	4h	Signed32	1000:1	-	Read/Write	No
AXIS1.VL.ERR	5011h	5h	Signed32	-	Velocity	Read only	No
AXIS1.VL.LIMITP	5011h	6h	Unsigned32	-	Velocity	Read/Write	No
AXIS1.VL.LIMITN	5011h	7h	Signed32	-	Velocity	Read/Write	No
AXIS1.VL.THRESH	5011h	8h	Unsigned32	-	Velocity	Read/Write	No
AXIS1.VL.AINSCALE	5011h	9h	Signed32	1000:1	-	Read/Write	No
Reserved 5011h sub 0ah	5011h	Ah	Signed32	-	-	Read only	No
AXIS1.VL.LMJR	5011h	Bh	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARTYPE1	5011h	Ch	Signed8	-	-	Read/Write	No
AXIS1.VL.ARTYPE2	5011h	Dh	Signed8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS1.VL.ARTYPE3	5011h	Eh	Signed8	-	-	Read/Write	No
AXIS1.VL.ARTYPE4	5011h	Fh	Signed8	-	-	Read/Write	No
AXIS1.VL.ARPF1	5011h	10h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPF2	5011h	11h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPF3	5011h	12h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPF4	5011h	13h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPQ1	5011h	14h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPQ2	5011h	15h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPQ3	5011h	16h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARPQ4	5011h	17h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZF1	5011h	18h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZF2	5011h	19h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZF3	5011h	1Ah	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZF4	5011h	1Bh	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZQ1	5011h	1Ch	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZQ2	5011h	1Dh	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZQ3	5011h	1Eh	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.ARZQ4	5011h	1Fh	Unsigned32	1000:1	-	Read/Write	No
AXIS1.VL.AINSOURCE	5011h	20h	Unsigned8	-	-	Read/Write	No
AXIS1.VL.AINACC	5011h	21h	Unsigned32	-	Acceleration 16Khz	Read/Write	No
AXIS1.VL.AINDEC	5011h	22h	Unsigned32	-	Acceleration 16Khz	Read/Write	No
AXIS1.VL.KFB	5011h	23h	Signed32	1000:1	-	Read/Write	No
AXIS1.VL.FBSOURCE	5011h	24h	Unsigned8	-	-	Read/Write	No
AXIS1.VL.KIMODE	5011h	25h	Unsigned8	-	-	Read/Write	No

5.3.106.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5111h	0h	Unsigned8	-	-	Read only	No
AXIS2.VL.KP	5111h	1h	Signed32	1000:1	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS2.VL.KI	5111h	2h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.FBFILTER	5111h	3h	Signed32	-	Velocity	Read only	No
AXIS2.VL.KVFF	5111h	4h	Signed32	1000:1	-	Read/Write	No
AXIS2.VL.ERR	5111h	5h	Signed32	-	Velocity	Read only	No
AXIS2.VL.LIMITP	5111h	6h	Unsigned32	-	Velocity	Read/Write	No
AXIS2.VL.LIMITN	5111h	7h	Signed32	-	Velocity	Read/Write	No
AXIS2.VL.THRESH	5111h	8h	Unsigned32	-	Velocity	Read/Write	No
AXIS2.VL.AINSCALE	5111h	9h	Signed32	1000:1	-	Read/Write	No
Reserved 5011h sub 0ah	5111h	Ah	Signed32	-	-	Read only	No
AXIS2.VL.LMJR	5111h	Bh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARTYPE1	5111h	Ch	Signed8	-	-	Read/Write	No
AXIS2.VL.ARTYPE2	5111h	Dh	Signed8	-	-	Read/Write	No
AXIS2.VL.ARTYPE3	5111h	Eh	Signed8	-	-	Read/Write	No
AXIS2.VL.ARTYPE4	5111h	Fh	Signed8	-	-	Read/Write	No
AXIS2.VL.ARPF1	5111h	10h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPF2	5111h	11h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPF3	5111h	12h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPF4	5111h	13h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPQ1	5111h	14h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPQ2	5111h	15h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPQ3	5111h	16h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARPQ4	5111h	17h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZF1	5111h	18h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZF2	5111h	19h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZF3	5111h	1Ah	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZF4	5111h	1Bh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZQ1	5111h	1Ch	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZQ2	5111h	1Dh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZQ3	5111h	1Eh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.ARZQ4	5111h	1Fh	Unsigned32	1000:1	-	Read/Write	No
AXIS2.VL.AINSOURCE	5111h	20h	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS2.VL.AINACC	5111h	21h	Unsigned32	-	Acceleration 16Khz	Read/Write	No
AXIS2.VL.AINDEC	5111h	22h	Unsigned32	-	Acceleration 16Khz	Read/Write	No
AXIS2.VL.KFB	5111h	23h	Signed32	1000:1	-	Read/Write	No
AXIS2.VL.FBSOURCE	5111h	24h	Unsigned8	-	-	Read/Write	No
AXIS2.VL.KIMODE	5111h	25h	Unsigned8	-	-	Read/Write	No

5.3.107 5012h, 5112h AXIS#.WARNING#

The following tables specify the CANopen mapping for axis specific warning objects.

5.3.107.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5012h	0h	Unsigned8	-	-	Read only	No
AXIS1.WARNING1	5012h	1h	Unsigned32	-	-	Read only	No
AXIS1.WARNING2	5012h	2h	Unsigned32	-	-	Read only	No
AXIS1.WARNING3	5012h	3h	Unsigned32	-	-	Read only	No

5.3.107.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5112h	0h	Unsigned8	-	-	Read only	No
AXIS2.WARNING1	5112h	1h	Unsigned32	-	-	Read only	No
AXIS2.WARNING2	5112h	2h	Unsigned32	-	-	Read only	No
AXIS2.WARNING3	5112h	3h	Unsigned32	-	-	Read only	No

5.3.108 5013h, 5113h AXIS#.WS.*

The following tables specify the CANopen mapping for the axis specific wake and shake objects.

5.3.108.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5013h	0h	Unsigned8	-	-	Read only	No
AXIS1.WS.MODE	5013h	1h	Unsigned8	-	-	Read/Write	No
AXIS1.WS.NUMLOOPS	5013h	2h	Unsigned8	-	-	Read/Write	No
AXIS1.WS.STATE	5013h	3h	Unsigned8	-	-	Read only	No
AXIS1.WS.T	5013h	4h	Unsigned8	-	-	Read/Write	No
AXIS1.WS.TDELAY1	5013h	5h	Unsigned8	-	-	Read/Write	No
AXIS1.WS.TDELAY2	5013h	6h	Unsigned8	-	-	Read/Write	No
AXIS1.WS.TDELAY3	5013h	7h	Unsigned16	-	-	Read/Write	No
AXIS1.WS.TDELAY4	5013h	8h	Unsigned16	-	-	Read/Write	No
AXIS1.WS.ARM	5013h	9h	Unsigned32	-	-	Write only	No
AXIS1.WS.CHECKMODE	5013h	Ah	Unsigned8	-	-	Read/Write	No
AXIS1.WS.CHECKV	5013h	Bh	Signed32	-	Velocity	Read/Write	No
AXIS1.WS.DISTMAX	5013h	Ch	Signed32	-	Position	Read/Write	No
AXIS1.WS.IMAX	5013h	Dh	Signed32	1000:1	-	Read/Write	No
AXIS1.WS.VTHRESH	5013h	Eh	Signed32	-	Velocity	Read/Write	No
AXIS1.WS.DISTMIN	5013h	Fh	Signed32	-	Position	Read/Write	No
AXIS1.WS.CHECKT	5013h	10h	Unsigned16	-	-	Read/Write	No
AXIS1.WS.TIRAMP	5013h	11h	Unsigned16	-	-	Read/Write	No
AXIS1.WS.TSTANDSTILL	5013h	12h	Unsigned16	-	-	Read/Write	No
AXIS1.WS.FREQ	5013h	13h	Unsigned32	1000:1	-	Read/Write	No

5.3.108.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5113h	0h	Unsigned8	-	-	Read only	No
AXIS2.WS.MODE	5113h	1h	Unsigned8	-	-	Read/Write	No
AXIS2.WS.NUMLOOPS	5113h	2h	Unsigned8	-	-	Read/Write	No
AXIS2.WS.STATE	5113h	3h	Unsigned8	-	-	Read only	No
AXIS2.WS.T	5113h	4h	Unsigned8	-	-	Read/Write	No
AXIS2.WS.TDELAY1	5113h	5h	Unsigned8	-	-	Read/Write	No
AXIS2.WS.TDELAY2	5113h	6h	Unsigned8	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS2.WS.TDELAY3	5113h	7h	Unsigned16	-	-	Read/Write	No
AXIS2.WS.TDELAY4	5113h	8h	Unsigned16	-	-	Read/Write	No
AXIS2.WS.ARM	5113h	9h	Unsigned32	-	-	Write only	No
AXIS2.WS.CHECKMODE	5113h	Ah	Unsigned8	-	-	Read/Write	No
AXIS2.WS.CHECKV	5113h	Bh	Signed32	-	Velocity	Read/Write	No
AXIS2.WS.DISTMAX	5113h	Ch	Signed32	-	Position	Read/Write	No
AXIS2.WS.IMAX	5113h	Dh	Signed32	1000:1	-	Read/Write	No
AXIS2.WS.VTHRESH	5113h	Eh	Signed32	-	Velocity	Read/Write	No
AXIS2.WS.DISTMIN	5113h	Fh	Signed32	-	Position	Read/Write	No
AXIS2.WS.CHECKT	5113h	10h	Unsigned16	-	-	Read/Write	No
AXIS2.WS.TIRAMP	5113h	11h	Unsigned16	-	-	Read/Write	No
AXIS2.WS.TSTANDSTILL	5113h	12h	Unsigned16	-	-	Read/Write	No
AXIS2.WS.FREQ	5113h	13h	Unsigned32	1000:1	-	Read/Write	No

5.3.109 5014h, 5114h AXIS#.LOAD.*

The following tables specify the CANopen mapping for the axis specific mechanical load objects.

5.3.109.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5014h	0h	Unsigned8	-	-	Read only	No
AXIS1.LOAD.INERTIA	5014h	1h	Unsigned32	1000:1	-	Read/Write	No

5.3.109.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5114h	0h	Unsigned8	-	-	Read only	No
AXIS2.LOAD.INERTIA	5114h	1h	Unsigned32	1000:1	-	Read/Write	No

5.3.110 5015h, 5115h AXIS#.HWLS.*

The following tables specify the CANopen mapping for the axis specific hardware limit switch objects.

5.3.110.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5015h	0h	Unsigned8	-	-	Read only	No
AXIS1.HWLS.NEGSTATE	5015h	1h	Unsigned8	-	-	Read only	Yes
AXIS1.HWLS.POSSTATE	5015h	2h	Unsigned8	-	-	Read only	Yes
AXIS1.HWLS.NEGSOURCE	5015h	3h	Unsigned8	-	-	Read/Write	No
AXIS1.HWLS.POSSOURCE	5015h	4h	Unsigned8	-	-	Read/Write	No

5.3.110.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5115h	0h	Unsigned8	-	-	Read only	No
AXIS2.HWLS.NEGSTATE	5115h	1h	Unsigned8	-	-	Read only	Yes
AXIS2.HWLS.POSSTATE	5115h	2h	Unsigned8	-	-	Read only	Yes
AXIS2.HWLS.NEGSOURCE	5115h	3h	Unsigned8	-	-	Read/Write	No
AXIS2.HWLS.POSSOURCE	5115h	4h	Unsigned8	-	-	Read/Write	No

5.3.111 5016h, 5116h AXIS#.SETTLE.*

5.3.111.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5016h	0h	Unsigned8	-	-	Read only	No
AXIS1.SETTLE.P	5016h	1h	Unsigned32	-	Position	Read/Write	No
AXIS1.SETTLE.V	5016h	2h	Unsigned32	-	-	Read/Write	No

5.3.111.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5116h	0h	Unsigned8	-	-	Read only	No
AXIS2.SETTLE.P	5116h	1h	Unsigned32	-	Position	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS2.SETTLE.V	5116h	2h	Unsigned32	-	-	Read/Write	No

5.3.112 5017h, 5117h AXIS#.OBS.*

5.3.112.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5017h	0h	Unsigned8	-	-	Read only	No
AXIS1.OBS.BW	5017h	1h	Unsigned32	1000:1	-	Read/Write	No
AXIS1.OBS.ENABLE	5017h	2h	Unsigned8	-	-	Read/Write	No
AXIS1.OBS.KO	5017h	3h	Unsigned32	1000:1	-	Read/Write	No

5.3.112.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5117h	0h	Unsigned8	-	-	Read only	No
AXIS2.OBS.BW	5117h	1h	Unsigned32	1000:1	-	Read/Write	No
AXIS2.OBS.ENABLE	5117h	2h	Unsigned8	-	-	Read/Write	No
AXIS2.OBS.KO	5117h	3h	Unsigned32	1000:1	-	Read/Write	No

5.3.113 5018h, 5118h AXIS#.SENSORLESS.*

5.3.113.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5018h	0h	Unsigned 8	-	-	Read only	No
AXIS1.SENSORLESS.BWU	5018h	1h	Signed32	1000:1	-	Read/Write	No
AXIS1.SENSORLESS.ENPHASELEAD	5018h	2h	Unsigned 8	-	-	Read/Write	No
AXIS1.SENSORLESS.FAULTANGLE	5018h	3h	Signed32	1000:1	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS1.SENSORLESS.FAULTTIME	5018h	4h	Signed32	1000:1	-	Read/Write	No
AXIS1.SENSORLESS.ISTART	5018h	5h	Signed32	1000:1	-	Read/Write	No
AXIS1.SENSORLESS.RPMSTART	5018h	6h	Signed32	1000:1	-	Read/Write	No

5.3.113.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5118h	0h	Unsigned 8	-	-	Read only	No
AXIS2.SENSORLESS.BWU	5118h	1h	Signed32	1000:1	-	Read/Write	No
AXIS2.SENSORLESS.ENPHASELEAD	5118h	2h	Unsigned 8	-	-	Read/Write	No
AXIS2.SENSORLESS.FAULTANGLE	5118h	3h	Signed32	1000:1	-	Read/Write	No
AXIS2.SENSORLESS.FAULTTIME	5118h	4h	Signed32	1000:1	-	Read/Write	No
AXIS2.SENSORLESS.ISTART	5118h	5h	Signed32	1000:1	-	Read/Write	No
AXIS2.SENSORLESS.RPMSTART	5118h	6h	Signed32	1000:1	-	Read/Write	No

5.3.114 5019h, 5119h AXIS#.FIELDWEAKENING.*

5.3.114.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	5019h	0h	Unsigned 8	-	-	Read only	No
AXIS1.FIELDWEAKENING.CURRFILTERBW	5019h	1h	Signed32	-	-	Read/Write	No
AXIS1.FIELDWEAKENING.LOOPBW	5019h	2h	Signed32	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
AXIS1.FIELDWEAKENING.VBUSMARGIN	5019h	3h	Signed32	-	-	Read/Write	No
AXIS1.FIELDWEAKENING.VOLTFILTERBW	5019h	4h	Signed32	-	-	Read/Write	No

5.3.114.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	5119h	0h	Unsigned8	-	-	Read only	No
AXIS2.FIELDWEAKENING.CURRFILTERBW	5119h	1h	Signed32	-	-	Read/Write	No
AXIS2.FIELDWEAKENING.LOOPBW	5119h	2h	Signed32	-	-	Read/Write	No
AXIS2.FIELDWEAKENING.VBUSMARGIN	5119h	3h	Signed32	-	-	Read/Write	No
AXIS2.FIELDWEAKENING.VOLTFILTERBW	5119h	4h	Signed32	-	-	Read/Write	No

5.3.115 501Bh, 511Bh AXIS#.JOG.*

5.3.115.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	501Bh	0h	Unsigned8	-	-	Read only	No
AXIS1.JOG.ACC	501Bh	1h	Unsigned32	-	Acceleration	Read/Write	No
AXIS1.JOG.DEC	501Bh	2h	Unsigned32	-	Acceleration	Read/Write	No
AXIS1.JOG.V	501Bh	3h	Unsigned32	-	Velocity	Read/Write	No

5.3.115.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	511Bh	0h	Unsigned8	-	-	Read only	No
AXIS2.JOG.ACC	511Bh	1h	Unsigned32	-	Acceleration	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
AXIS2.JOG.DEC	511Bh	2h	Unsigned32	-	Acceleration	Read/Write	No
AXIS2.JOG.V	511Bh	3h	Unsigned32	-	Velocity	Read/Write	No

5.3.116 501Ch, 511Ch AXIS#.FAULT6004.*

5.3.116.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	501Ch	0h	Unsigned8	-	-	Read only	No
AXIS1.FAULT6004.ACTION	501Ch	1h	Unsigned8	-	-	Read/Write	No

5.3.116.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	511Ch	0h	Unsigned8	-	-	Read only	No
AXIS2.FAULT6004.ACTION	511Ch	1h	Unsigned8	-	-	Read/Write	No

5.3.117 50EFh, 51EFh Axis# manufacturer status

This object is a collection of status bits for the associated axis (see table below). Each sub-index after the sub-index 1 corresponds to one byte of the 4-byte status value to allow more efficient data packing on the CAN bus network if not all bits are required.

Bit	Name	Bit	Name	Bit	Name	Bit	Name
0	1 = Movement (position/homing) active	8	1 = Warning active	16	1 = Homing move active	24	1 = Controlled stop in progress
1	1 = Reference position set	9	1 = Target velocity reached	17	Drive actual position is within the target position window AXIS#.SETTLE.P.	25	Reserved
2	1 = Brake released	10	Reserved	18	AXIS#.HWLS.POSSTATE	26	1 = SS1_1 is active/requested
3	1 = In position	11	1 = Homing error	19	1 = Disable in process	27	1 = SS1_2 is active/requested
4	1 = Drive disabled	12	1 = Motor stopped	20	AXIS#.HWLS.NEGSTATE	28	1 = SS1_3 is active/requested

Bit	Name	Bit	Name	Bit	Name	Bit	Name
5	1 = Fieldbus setpoints are ignored because of internal action in the drive (like controlled stop)	13	1 = STO active	21	1 when AXIS#.SWLS.STATE is 1 or 3	29	1 = HW enable set
6	1 = Torque limitation active (e.g. Current limit reached, I2t)	14	1 = Power stage enabled	22	1 when AXIS#.SWLS.STATE is 2 or 3	30	1 = Wake and shake is armed and required
7	1 = Controlled stop disable active	15	1 = Fault active	23	1 = Homing move finished	31	1 = Brake is applied or being applied; no set-points allowed

5.3.117.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	50EFh	0h	Unsigned8	-	-	Read only	No
Axis1 manufacturer status	50EFh	1h	Unsigned32	-	-	Read only	Yes
Axis1 manufacturer status bytes 1	50EFh	2h	Unsigned8	-	-	Read only	Yes
Axis1 manufacturer status bytes 2	50EFh	3h	Unsigned8	-	-	Read only	Yes
Axis1 manufacturer status bytes 3	50EFh	4h	Unsigned8	-	-	Read only	Yes
Axis1 manufacturer status bytes 4	50EFh	5h	Unsigned8	-	-	Read only	Yes

5.3.117.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	51EFh	0h	Unsigned8	-	-	Read only	No
Axis2 manufacturer status	51EFh	1h	Unsigned32	-	-	Read only	Yes
Axis2 manufacturer status bytes 1	51EFh	2h	Unsigned8	-	-	Read only	Yes
Axis2 manufacturer status bytes 2	51EFh	3h	Unsigned8	-	-	Read only	Yes

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Axis2 manufacturer status bytes 3	51EFh	4h	Unsigned8	-	-	Read only	Yes
Axis2 manufacturer status bytes 4	51EFh	5h	Unsigned8	-	-	Read only	Yes

5.4 Drive Profile Objects – DS402 (6000-6FFFh)

5.4.1 6040h, 6840h Controlword - Axis

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

Bit assignment in controlword

Bit	Name
0	Switch on
1	Disable voltage
2	Quick stop
3	Enable operation
4	Operation mode specific
5	Operation mode specific
6	Operation mode specific
7	Reset fault (only effective for faults)
8	Pause/halt
9	Operation mode specific
10	Reserved
11	AXIS#.CANOPEN.CONTROLBIT11.MODE
12	AXIS#.CANOPEN.CONTROLBIT12.MODE
13	AXIS#.CANOPEN.CONTROLBIT13.MODE
14	AXIS#.CANOPEN.CONTROLBIT14.MODE
15	AXIS#.CANOPEN.CONTROLBIT15.MODE

Controlword bits 11-15 mode

Controlword bits 11-15 are defined to be manufacturer specific by the DS402 standard. For AKD2G, specific modes can be set for each bit that defines the behavior. See AXIS#.CANOPEN.CONTROLBIT##.MODE for available mode descriptions.

Commands in the controlword

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 controlword

The following table shows the mode-dependent bits in the controlword. Only manufacturer-specific modes are supported at present. The individual modes are set by object "6060h, 6860h Modes of operation - Axis #" (➜ p. 454).

Operation Mode	No.	Bit 4	Bit 5	Bit 6	Bit 9
Analog velocity	FEh	reserved	reserved	reserved	reserved
Analog torque	FFh	reserved	reserved	reserved	reserved
Profile position mode (pp)	01h	New set-point	Use new set-point immediately	0 - Absolute move 1 - Relative move	Blend / On-the-fly move once target position is reached
Profile velocity mode (pv)	03h	reserved	reserved	reserved	reserved
Profile torque mode (tq)	04h	reserved	reserved	reserved	reserved
Homing mode (hm)	06h	Start homing operation	reserved	reserved	reserved
Cyclic sync position Mode (csp)	08h	reserved	reserved	reserved	reserved
Cyclic sync velocity mode (csv)	09h	reserved	reserved	reserved	reserved

Description of the remaining bits in the controlword

The remaining bits in the controlword 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.

5.4.1.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Controlword - Axis 1	6040h	0h	Unsigned16	-	-	Read/Write	Yes

5.4.1.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Controlword - Axis 2	6840h	0h	Unsigned16	-	-	Read/Write	Yes

5.4.2 6041h, 6841h Statusword - Axis

The momentary state of the state machine can be readwith the aid of the statusword.

Index	Sub-Index	Data Type	Access	PDO Mappable	Description
0x6041	0	Unsigned16	RW	TxPDO	Drive state machine statusword

Bit assignment in the statusword

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 value. In Profile Position Mode and Homing Mode the position window is set using AXIS#.SETTLE.P. The behavior can be configured by AXIS#.CANOPEN.TARPOSMODE. In Profile velocity and Analog velocity modes, this bit is set when AXIS#.VL.FB is within the window set using the object "606Dh, 686Dh Velocity window - Axis #" (➔ p. 461) sub 0 and a window time is set using object "606Eh, 686Eh Velocity window time - Axis #" (➔ p. 463) sub 0. The bit is also set on coming to standstill on Halt bit (bit 8 of Controlword = 1) or after Quickstop (bit 2 of Controlword = 0) with quick stop option code 5 or 6.
11	Internal limit active	This bit is controlled by the conditions below: • Set if motion is being commanded into a limit switch and clears when moving out of a limit switch. • Set if a controlled stop is in progress (SS1, action table, etc) and clears once the controlled stop is complete. **NOTE** The drive is usually disabled at the end of most controlled stop actions and this bit will clear. • Set while Wake and Shake is active.

Bit	Name	Description
12	Operation mode specific (reserved)	See Mode-dependent bits in the statusword (➜ p. 451)
13	Operation mode specific (reserved)	See Mode-dependent bits in the statusword (➜ p. 451)
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 statusword

The following table shows the mode-dependent bits in the statusword. The individual modes are set by object "6060h, 6860h Modes of operation - Axis #" (➜ p. 454).

Modes of Operation	No.	Bit 12	Bit 13
Analog velocity	FEh	This bit is 1 while the motor is at standstill (see AXIS#.ZEROREACHED).	Not used
Analog torque	FFh	This bit is 1 while the motor is at standstill (see AXIS#.ZEROREACHED).	Not used
Profile position mode (pp)	01h	Set-point acknowledge	Following error

Modes of Operation	No.	Bit 12	Bit 13
Profile velocity (pv)	03h	This bit is 1 while the motor is at standstill (see AXIS#.ZEROREACHED).	Not used
Homing mode (hm)	06h	Homing attained	Homing 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
Cyclic sync velocity mode (csv)	09h	This bit stays 1 as long as the drive is following velocity set-points	Not used

5.4.2.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Statusword - Axis 1	6041h	0h	Unsigned16	-	-	Read only	Yes

5.4.2.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Statusword - Axis 2	6841h	0h	Unsigned16	-	-	Read only	Yes

5.4.3 605Ah, 685Ah Quick stop option code - Axis

The object controls how the drive responds to the quick stop bit in the controlword (6040h).

Value	
1	Perform a stop using profile deceleration ramp (6084h) and transition into Switch On Disabled state, axis will disable.
2	Perform a stop using AXIS#.CS.DEC deceleration ramp and transition into Switch On Disabled state, axis will disable (Default).
5	Perform a stop using profile deceleration ramp (6084h) and stay in Quick Stop Active, axis will stay enabled.
6	Perform a stop using AXIS#.CS.DEC deceleration ramp and stay in Quick Stop Active, axis will stay enabled.

5.4.3.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Quick stop option code - Axis 1	605Ah	0h	Signed16	-	-	Read/Write	No

5.4.3.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Quick stop option code - Axis 2	685Ah	0h	Signed16	-	-	Read/Write	No

5.4.4 6060h, 6860h Modes of operation - Axis

This object is used to set the operating mode. Depending on the mode of operation, specific setpoint objects and bits within the controlword (6040h) and statusword (6041h) are used. To confirm an operation mode is active, use the mode of operation display object (6061h).

Depending on the mode, some setpoints may need to be re-sent after switching modes. For example, the homing velocity in mode 6 - Homing mode.

⚠WARNING **Automatic Restart!**

NOTE

Depending on the mode, if the mode is switched while the axis is enabled, the axis may move unexpectedly. Verify axis is disabled or setpoints are zeroed out when switching modes.

Value (hex)	Mode
-2	Analog velocity mode
-1	Analog torque mode
1	Profile position mode
3	Profile velocity mode
4	Profile torque mode
6	Homing mode
8	Cyclic synchronous position mode
9	Cyclic synchronous velocity mode

5.4.4.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Modes of operation - Axis 1	6060h	0h	Signed8	-	-	Read/Write	Yes

5.4.4.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Modes of operation - Axis 2	6860h	0h	Signed8	-	-	Read/Write	Yes

5.4.5 6061h, 6861h Modes of operation display - Axis

This displays the current mode of operation. This is used to confirm a mode that has been set with mode of operation object 6060h.

5.4.5.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Modes of operation display - Axis 1	6061h	0h	Signed8	-	-	Read only	Yes

5.4.5.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Modes of operation display - Axis 2	6861h	0h	Signed8	-	-	Read only	Yes

5.4.6 6063h, 6863h Position actual internal value - Axis

This provides the value of AXIS#.PL.FB in 32-bit counts. The value returned can be scaled with AXIS#.CANOPEN.PSCALE. By default, it is in 2^(32-PSCALE) -->2^(32-20) -->2^12 counts per rev.

5.4.6.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Position actual internal value - Axis 1	6063h	0h	Signed32	-	-	Read only	Yes

5.4.6.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Position actual internal value - Axis 2	6863h	0h	Signed32	-	-	Read only	Yes

5.4.7 6064h, 6864h Position actual value - Axis

This provides the value of AXIS#.PL.FB scaled in CANopen units. The resolution can be altered by the gearing factors of the position controller (object 6091/6092). By default, it will be in 2^16 counts per rev.

See CANopen Scaling for more information.

5.4.7.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Position actual value - Axis 1	6064h	0h	Signed32	-	Position	Read only	Yes

5.4.7.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Position actual value - Axis 2	6864h	0h	Signed32	-	Position	Read only	Yes

5.4.8 6065h, 6865h Following error window - Axis

The following error window defines a range of tolerated position values symmetrically to the position demand value. A following error might occur when a drive is blocked, unreachable profile velocity occurs, or at wrong closed loop coefficients. If the value of the following error window is 0, the following control is switched off.

5.4.8.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Following error window - Axis 1	6065h	0h	Unsigned32	-	Position	Read/Write	No

5.4.8.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Following error window - Axis 2	6865h	0h	Unsigned32	-	Position	Read/Write	No

5.4.9 606Bh, 686Bh Velocity demand value - Axis

This object gets the commanded velocity AXIS#.VL.CMD in CANopen velocity units.

See CANopen Scaling.

5.4.9.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Velocity demand value - Axis 1	606Bh	0h	Signed32	-	Velocity	Read only	Yes

5.4.9.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Velocity demand value - Axis 2	686Bh	0h	Signed32	-	Velocity	Read only	Yes

5.4.10 606Ch, 686Ch Velocity actual value - Axis

This object returns the velocity feedback AXIS#.VL.FB in CANopen velocity units.

See CANopen Scaling.

5.4.10.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Velocity actual value - Axis 1	606Ch	0h	Signed32	-	Velocity	Read only	Yes

5.4.10.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Velocity actual value - Axis 2	686Ch	0h	Signed32	-	Velocity	Read only	Yes

5.4.11 606Dh, 686Dh Velocity window - Axis

This object is used to define the range the actual velocity (606Ch) must be within from the target velocity (60FFh) to set the 'Target Reached' bit of the statusword (6041h).

The bit will be set once the velocity has been within the window for a configured amount of time. The time is set with object 606Eh.

NOTE

This only applies for profile velocity mode.

Example:

Velocity Window (606Dh) = 50 rpm

Velocity Window Time (606Eh) = 10 ms

Target Velocity (60FFh) = 160 rpm

The target reached count starts counting when the actual velocity is within the velocity window (160-50 = 110 rpm to 160 + 50 = 210 rpm). Once the counter reaches the velocity window time value, the target reaches bit is set.

Time (ms)	Actual Velocity (606Ch)	Target Reached Bit (Statusword 6041h)	Target Reached Count (internal)
0	0	0	0
1	20	0	0
2	40	0	0
3	60	0	0
4	80	0	0
5	100	0	0
6	120	0	1
7	140	0	2
8	160	0	3
9	160	0	4
10	160	0	5
11	160	0	6
12	160	0	7
13	160	0	8
14	160	0	9
15	160	1	10
16	160	1	10
17	160	1	10

5.4.11.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Velocity window - Axis 1	606Dh	0h	Unsigned16	-	-	Read/Write	Yes

5.4.11.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Velocity window - Axis 2	686Dh	0h	Unsigned16	-	-	Read/Write	Yes

5.4.12 606Eh, 686Eh Velocity window time - Axis

This object is used to define the amount of time the actual velocity (606Ch) must be within the velocity window (606Dh) to set the 'Target Reached' bit of the statusword (6041h).

NOTE

This only applies for profile velocity mode.

Example:

Velocity Window (606Dh) = 50 rpm

Velocity Window Time (606Eh) = 10 ms

Target Velocity (60FFh) = 160 rpm

The target reached count will start counting as soon as the actual velocity is within the velocity window (160-50 = 110 rpm to 160 + 50 = 210 rpm). Once the counter reaches the velocity window time value, the target reaches bit is set.

Time (ms)	Actual Velocity (606Ch)	Target Reached Bit (Statusword 6041h)	Target Reached Count (internal)
0	0	0	0
1	20	0	0
2	40	0	0
3	60	0	0
4	80	0	0
5	100	0	0
6	120	0	1
7	140	0	2
8	160	0	3
9	160	0	4
10	160	0	5
11	160	0	6
12	160	0	7
13	160	0	8
14	160	0	9
15	160	1	10
16	160	1	10
17	160	1	10

5.4.12.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Velocity window time - Axis 1	606Eh	0h	Unsigned16	-	-	Read/Write	Yes

5.4.12.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Velocity window time - Axis 2	686Eh	0h	Unsigned16	-	-	Read/Write	Yes

5.4.13 6071h, 6871h Target torque - Axis

This parameter is the input value for the torque controller in profile torque mode and the value is given per thousand (1‰) of rated torque.

5.4.13.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Target torque - Axis 1	6071h	0h	Signed16	-	-	Read/Write	Yes

5.4.13.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Target torque - Axis 2	6871h	0h	Signed16	-	-	Read/Write	Yes

5.4.14 6072h, 6872h Max torque - Axis

This value represents the maximum permissible torque creating current in the motor and is given per thousand (1‰) of rated current.

5.4.14.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Max torque - Axis 1	6072h	0h	Unsigned16	-	-	Read/Write	Yes

5.4.14.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Max torque - Axis 2	6872h	0h	Unsigned16	-	-	Read/Write	Yes

5.4.15 6073h, 6873h Max current - Axis

This value represents the maximum permissible torque creating current in the motor and is given per thousand (1‰) of rated current.

5.4.15.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Max current - Axis 1	6073h	0h	Unsigned16	-	-	Read/Write	No

5.4.15.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Max current - Axis 2	6873h	0h	Unsigned16	-	-	Read/Write	No

5.4.16 6076h, 6876h Motor rated torque - Axis

The objects return the motor rated torque in mNm for rotary motors or the motor rated force in mN for linear motors. The values returned are calculated from AXIS#.MOTOR.KT and AXIS#.ICONT.

5.4.16.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Motor rated torque - Axis 1	6076h	0h	Unsigned32	-	-	Read only	No

5.4.16.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Motor rated torque - Axis 2	6876h	0h	Unsigned32	-	-	Read only	No

5.4.17 6077h, 6877h Torque actual value - Axis

The object returns AXIS#.IL.FB scaled in per thousand (1‰) of rated torque.

5.4.17.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Torque actual value - Axis 1	6077h	0h	Signed16	-	-	Read only	Yes

5.4.17.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Torque actual value - Axis 2	6877h	0h	Signed16	-	-	Read only	Yes

5.4.18 607Ah, 687Ah Target position - Axis

This object specifies the target position for the axis scaled in CANopen position units. Depending on the mode of operation and the controlword, the target position is interpreted differently.

In cyclic synchronous position mode, the drive will attempt to move the equivalent distance from the previously received position.

In profile position mode, the target position is interpreted as a relative distance or an absolute position, depending on Bit 6 of the controword.

See CANopen Scaling.

5.4.18.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Target position - Axis 1	607Ah	0h	Signed32	-	-	Read/Write	Yes

5.4.18.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Target position - Axis 2	687Ah	0h	Signed32	-	-	Read/Write	Yes

5.4.19 607Bh, 687Bh Position range limit - Axis

This object indicates the configured maximal and minimal position range limits. It corresponds to the parameters AXIS#.PL.MODP1 and AXIS#.PL.MODP2 and defines the modulo range of movements.

If both subindexes for Min and Max position range limit are set 0 (or if an invalid value is tried to be set) the modulo-functionality is switched off.

5.4.19.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	607Bh	00h	Unsigned8	-	-	Read only	No
Min position range limit - Axis 1	607Bh	01h	Integer32	-	-	Read/Write	No
Max position range limit - Axis 1	607Bh	02h	Integer32	-	-	Read/Write	No

5.4.19.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	687Bh	00h	Unsigned8	-	-	Read only	No
Min position range limit - Axis 2	687Bh	01h	Integer32	-	-	Read/Write	No
Max position range limit - Axis 2	687Bh	02h	Integer32	-	-	Read/Write	No

5.4.20 607Ch, 687Ch Home offset - Axis

This object is the difference between the zero position for the application and the zero point of the machine scaled in CANopen position units. All subsequent absolute motion tasks take account of the reference offset. This is equivalent of AXIS#.HOME.P.

See CANopen Scaling.

5.4.20.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Home offset - Axis 1	607Ch	0h	Signed32	-	Position	Read/Write	No

5.4.20.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Home offset - Axis 2	687Ch	0h	Signed32	-	Position	Read/Write	No

5.4.21 607Dh, 687Dh Software position limit - Axis

This object controls the software position limits scaled in CANopen position units. Sub-index 1 maps to AXIS#.SWLS.LIMIT0 and sub-index 2 maps to AXIS#.SWLS.LIMIT1. When the limit switches are enabled and the actual position triggers on a limit, the drive will stop motion.

NOTE

AXIS#.SWLS.EN (500Fh sub 1) must be set properly to enable the corresponding position limits. Bit 0 enables LIMIT0 and Bit 1 enables LIMIT1.

See Limits.

5.4.21.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	607Dh	0h	Unsigned8	-	-	Read only	No
Software position limit 1 - Axis 1	607Dh	1h	Signed32	-	Position	Read/Write	No
Software position limit 2 - Axis 1	607Dh	2h	Signed32	-	Position	Read/Write	No

5.4.21.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	687Dh	0h	Unsigned8	-	-	Read only	No
Software position limit 1 - Axis 2	687Dh	1h	Signed32	-	Position	Read/Write	No
Software position limit 2 - Axis 2	687Dh	2h	Signed32	-	Position	Read/Write	No

5.4.22 6081h, 6881h Profile velocity in pp-mode - Axis

This object defines the final velocity that should be reached after the acceleration phase of a profile position move. It is scaled in CANopen velocity units.

See CANopen Scaling.

5.4.22.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Profile velocity in pp-mode - Axis 1	6081h	0h	Unsigned32	-	-	Read/Write	Yes

5.4.22.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Profile velocity in pp-mode - Axis 2	6881h	0h	Unsigned32	-	-	Read/Write	Yes

5.4.23 6083h, 6883h Profile acceleration - Axis

This object sets the acceleration ramp to follow when accelerating in profile position and profile velocity modes. It is scaled in CANopen acceleration units.

See CANopen Scaling.

5.4.23.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Profile acceleration - Axis 1	6083h	0h	Unsigned32	-	-	Read/Write	Yes

5.4.23.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Profile acceleration - Axis 2	6883h	0h	Unsigned32	-	-	Read/Write	Yes

5.4.24 6084h, 6884h Profile deceleration - Axis

The braking/deceleration ramp is handled the same as the acceleration ramp (6083h).

5.4.24.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Profile deceleration - Axis 1	6084h	0h	Unsigned32	-	-	Read/Write	Yes

5.4.24.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Profile deceleration - Axis 2	6884h	0h	Unsigned32	-	-	Read/Write	Yes

5.4.25 6087h, 6887h Torque slope - Axis

This object defines the rate of change of torque. The value is given in units of per thousand of rated torque per second. The minimum rate settable for the AKD2G is equivalent to the value of AXIS#.ICONT (= 1000 per mile) per ~ 420 milliseconds equivalent to a value of ~ 2385 per mile/second.

5.4.25.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Torque slope - Axis 1	6087h	0h	Unsigned32	-	-	Read/Write	No

5.4.25.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Torque slope - Axis 2	6887h	0h	Unsigned32	-	-	Read/Write	No

5.4.26 6091h, 6891h Gear ratio - Axis

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.

5.4.26.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	6091h	0h	Unsigned8	-	-	Read only	No
Motor revolutions - Axis 1	6091h	1h	Unsigned32	-	-	Read/Write	No
Shaft revolutions - Axis 1	6091h	2h	Unsigned32	-	-	Read/Write	No

5.4.26.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	6891h	0h	Unsigned8	-	-	Read only	No
Motor revolutions - Axis 2	6891h	1h	Unsigned32	-	-	Read/Write	No
Shaft revolutions - Axis 2	6891h	2h	Unsigned32	-	-	Read/Write	No

5.4.27 6092h, 6892h Feed constant - Axis

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.

5.4.27.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	6092h	0h	Unsigned8	-	-	Read only	No
Feed - Axis 1	6092h	1h	Unsigned32	-	-	Read/Write	No
Shaft revolutions - Axis 1	6092h	2h	Unsigned32	-	-	Read/Write	No

5.4.27.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	6892h	0h	Unsigned8	-	-	Read only	No
Feed - Axis 2	6892h	1h	Unsigned32	-	-	Read/Write	No
Shaft revolutions - Axis 2	6892h	2h	Unsigned32	-	-	Read/Write	No

5.4.28 6096h, 6896h Velocity factor - Axis

This object describes the numerator (sub-index 1) and denominator (sub-index 2) to use for velocity scaling. The velocity factor is applied onto the position value to arrive at a value scaled in position units per second.

By default, both numerator and denominator are both 1, meaning velocity units are in position units per second. If position units are also default, they will be in 2^16 counts per rev and velocity units would be in counts per second. To get velocity in RPM with default position units, the velocity factor would be set to 60 (seconds to minutes) as the numerator and 2^16 (increments per rev) as the denominator.

See CANopen Scaling.

5.4.28.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	6096h	0h	Unsigned8	-	-	Read only	No
Numerator - Axis 1	6096h	1h	Unsigned32	-	-	Read/Write	No
Divisor - Axis 1	6096h	2h	Unsigned32	-	-	Read/Write	No

5.4.28.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	6896h	0h	Unsigned8	-	-	Read only	No
Numerator - Axis 2	6896h	1h	Unsigned32	-	-	Read/Write	No
Divisor - Axis 2	6896h	2h	Unsigned32	-	-	Read/Write	No

5.4.29 6097h, 6897h Acceleration factor - Axis

This object describes the numerator (sub-index 1) and denominator (sub-index 2) to use for acceleration scaling. The acceleration factor is applied onto the velocity value to arrive at a value scaled in position units per second squared.

By default, both numerator and denominator are both 1, meaning acceleration units are in position units per second squared.

See CANopen Scaling.

5.4.29.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	6097h	0h	Unsigned8	-	-	Read only	No
Numerator - Axis 1	6097h	1h	Unsigned32	-	-	Read/Write	No
Divisor - Axis 1	6097h	2h	Unsigned32	-	-	Read/Write	No

5.4.29.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	6897h	0h	Unsigned8	-	-	Read only	No
Numerator - Axis 2	6897h	1h	Unsigned32	-	-	Read/Write	No
Divisor - Axis 2	6897h	2h	Unsigned32	-	-	Read/Write	No

5.4.30 6098h, 6898h Homing mode - Axis

5.4.30.0.1 Description of the homing methods

Choosing a homing method by writing a value to homing method (Object 6098h) will clearly establish:

- the homing signal (P-Stop, N-Stop, reference switch)
- the direction of actuation

and where appropriate

- the position of the index pulse.

The reference position is given by the reference offset (Object 607Ch).

A detailed description of the types of homing movement can be found in the description of WorkBench.

The following homing methods are supported:

Method as per DS402	Brief description: Homing	Command
-128 to -5	Reserved	—
-4	Find reference switch with fast velocity (6099h sub1) and home on reference switch with low velocity (6099h sub 2), positive count direction	AXIS#.HOME.MODE =16, AXIS#.HOME.DIR=0
-3	Find reference switch with fast velocity (6099h sub 1) and home on reference switch with low velocity (6099h sub 2), negative count direction	AXIS#.HOME.MODE =16, AXIS#.HOME.DIR=0
-2	Move to mechanical stop in positive count direction until AXIS1.HOME.PERRTHRESH is exceeded. Current limited by AXIS1.HOME.IPEAK.	AXIS#.HOME.MODE =8, AXIS#.HOME.DIR=1
-1	Move to mechanical stop in negative count direction until AXIS1.HOME.PERRTHRESH is exceeded. Current limited by AXIS1.HOME.IPEAK.	AXIS#.HOME.MODE =8, AXIS#.HOME.DIR=0
0	Reserved	—
1	Homing to negative limit switch, with zeroing, negative count direction	AXIS#.HOME.MODE =2, AXIS#.HOME.DIR=0
2	Homing to positive limit switch, with zeroing, positive count direction	AXIS#.HOME.MODE =2, AXIS#.HOME.DIR=1
3 to 7	Not supported	—
8	Homing to reference switch, with zeroing, positive count direction	AXIS#.HOME.MODE =5, AXIS#.HOME.DIR=1
9 to 11	Not supported	—
12	Homing to reference switch, with zeroing, negative count direction	AXIS#.HOME.MODE =5, AXIS#.HOME.DIR=0

Method as per DS402	Brief description: Homing	Command
13 to 14	Not supported	—
15 to 16	Reserved	—
17	Homing to negative limit switch, without zeroing, negative count direction	AXIS#.HOME.MODE =1, AXIS#.HOME.DIR=0
18	Homing to negative limit switch, without zeroing, positive count direction	AXIS#.HOME.MODE =1, AXIS#.HOME.DIR=1
19 to 23	Not supported	—
24	Homing to reference switch, without zeroing, positive count direction	AXIS#.HOME.MODE =4, AXIS#.HOME.DIR=1
25 to 27	Not supported	—
28	Homing to reference switch, without zeroing, negative count direction	AXIS#.HOME.MODE =4, AXIS#.HOME.DIR=0
29 to 30	Not supported	—
31 to 32	Reserved	—
33	Homing within a single turn, negative count direction. If the feedback has an index pulse, HOME.MODE 11 will be used.	AXIS#.HOME.MODE =7,11 AXIS#.HOME.DIR=0
34	Homing within a single turn, positive count direction. If the feedback has an index pulse, HOME.MODE 11 will be used.	AXIS#.HOME.MODE =7,11 AXIS#.HOME.DIR=1
35	Set reference point at present position	AXIS#.HOME.MODE =0, AXIS#.HOME.DIR=0
36 to 127	Reserved	—

5.4.30.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Homing mode - Axis 1	6098h	0h	Signed8	-	-	Read/Write	No

5.4.30.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Homing mode - Axis 2	6898h	0h	Signed8	-	-	Read/Write	No

5.4.31 6099h, 6899h Homing speeds - Axis

This object contains two sub-indexes to set the velocity to use during homing:

- Sub-index 1: The velocity to use when searching for the limit switch scaled in CANopen velocity units, sets AXIS#.HOME.V,
- Sub-index 2: The speed to use once a limit switch is hit scaled in CANopen velocity units. This must be a value less than the home search speed in sub-index 1. This value gets converted into the percentage value stored in AXIS#.HOME.FEEDRATE.

5.4.31.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	6099h	0h	Unsigned8	-	-	Read only	No
Speed during search for switch - Axis 1	6099h	1h	Unsigned32	-	Velocity	Read/Write	No
Speed during search for zero - Axis 1	6099h	2h	Unsigned32	-	-	Read/Write	No

5.4.31.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	6899h	0h	Unsigned8	-	-	Read only	No
Speed during search for switch - Axis 2	6899h	1h	Unsigned32	-	Velocity	Read/Write	No
Speed during search for zero - Axis 2	6899h	2h	Unsigned32	-	-	Read/Write	No

5.4.32 609Ah, 689Ah Homing acceleration - Axis

This object is the acceleration to use during homing scaled in CANopen acceleration units. This value gets converted into AXIS#.HOME.ACC and AXIS#.HOME.DEC.

5.4.32.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Homing acceleration - Axis 1	609Ah	0h	Unsigned32	-	-	Read/Write	No

5.4.32.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Homing acceleration - Axis 2	689Ah	0h	Unsigned32	-	-	Read/Write	No

5.4.33 60B0h, 68B0h Position offset - Axis

This object sets the velocity loop feed forward scaled in CANopen velocity units. This value can also be viewed from WorkBench using the keyword AXIS#.FBUS.PL.FF. The loops are updated every cyclic fieldbus cycle. The fieldbus controller manages jumps in position command due to this feed forward when starting, stopping, switching opmodes, and all other transitions.

NOTE

SDO access is Read/Write and PDO access is Write Only.

5.4.33.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Position offset - Axis 1	60B0h	0h	Signed32	-	Position	Read/Write	Yes

5.4.33.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Position offset - Axis 2	68B0h	0h	Signed32	-	Position	Read/Write	Yes

5.4.34 60B1h, 68B1h Velocity offset - Axis

This object sets the velocity loop feed forward scaled in CANopen velocity units. This value can also be viewed from WorkBench using the keyword AXIS#.FBUS.VL.FF. The loops are updated every cyclic fieldbus cycle. The fieldbus controller manages jumps in velocity command due to this feed forward when starting, stopping, switching opmodes, and all other transitions.

NOTE

SDO access is Read/Write and PDO access is Write Only.

5.4.34.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Velocity offset - Axis 1	60B1h	0h	Signed32	-	Velocity	Read/Write	Yes

5.4.34.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Velocity offset - Axis 2	68B1h	0h	Signed32	-	Velocity	Read/Write	Yes

5.4.35 60B2h, 68B2h Torque offset - Axis

This object sets a current/torque offset in CANopen torque units per thousand (1‰) of rated torque. Rated torque is the minimum of the peak current of the motor or drive. This value can also be viewed from WorkBench using the keyword AXIS#.FBUS.IL.FF. The loops are updated every cyclic fieldbus cycle. The fieldbus controller manages jumps in current command due to this feed forward when starting, stopping, switching opmodes, and all other transitions.

NOTE

SDO access is Read/Write and PDO access is Write Only.

5.4.35.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Torque offset - Axis 1	60B2h	0h	Signed16	-	-	Read/Write	Yes

5.4.35.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Torque offset - Axis 2	68B2h	0h	Signed16	-	-	Read/Write	Yes

5.4.36 60B8h, 68B8h Touch probe function - Axis

Controls the function of the two touch probes associated with an axis.

See Touch Probes.

Bit	Value	Touch Probe	Description
0	0	1	Disable touch probe 1
	1		Enable touch probe 1
1	0		Trigger first event
	1		Trigger continuous
3, 2	00b		Trigger with touch probe 1 input (DIN1)
	01b		Trigger on zero pulse from feedback
	10b		Trigger defined in object 60D0h sub-index 01h
	11b		Reserved
4	0		Disable sampling at positive edge of touch probe 1
	1		Enable sampling at positive edge of touch probe 1
5	0		Disable sampling at negative edge of touch probe 1
	1		Enable sampling at negative edge of touch probe 1
6, 7	-		Reserved
0	0	2	Disable touch probe 2
	1		Enable touch probe 2
9	0		Trigger first event
	1		Trigger continuous
11, 10	00b		Trigger with touch probe 2 input (DIN2)
	01b		Trigger on zero pulse from feedback
	10b		Trigger defined in object 60D0h sub-index 02h
	11b		Reserved
12	0		Disable sampling at positive edge of the touch probe 2
	1		Enable sampling at positive edge of the touch probe 2
13	0		Disable sampling at negative edge of the touch probe 2
	1		Enable sampling at negative edge of the touch probe 2
14, 15	-		Reserved

5.4.36.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe function - Axis 1	60B8h	0h	Unsigned16	-	-	Read/Write	Yes

5.4.36.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe function - Axis 2	68B8h	0h	Unsigned16	-	-	Read/Write	Yes

5.4.37 60B9h, 68B9h Touch probe status - Axis

The status of the two touch probes associated with an axis. The EtherCAT or CANopen master can use this value to check if 60Bah to 60BDh contain values. If a touch probe is disabled, bit 0, then the latched bits, bits 1 and 2, are always 0.

See Touch Probes.

Bit	Value	Touch Probe	Description
0	0	1	Touch probe is disabled
	1		Touch probe is enabled
1	0		Touch probe 1 no positive edge value stored
	1		Touch probe 1 positive edge position stored
2	0		Touch probe 1 no negative edge value stored
	1		Touch probe 1 negative edge position stored
3 to 7	-		Reserved
8	0	2	Touch probe 2 is disabled
	1		Touch probe 2 is enabled
9	0		Touch probe 2 no positive edge value stored
	1		Touch probe 2 positive edge position stored
10	0		Touch probe 2 no negative edge value stored
	1		Touch probe 2 negative edge position stored
11 to 15	-		Reserved

5.4.37.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe status - Axis 1	60B9h	0h	Unsigned16	-	-	Read only	Yes

5.4.37.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe status - Axis 2	68B9h	0h	Unsigned16	-	-	Read only	Yes

5.4.38 60BAh, 68BAh Touch probe 1 position positive value - Axis

The position latched on the rising edge of the touch probe 1 input.

See Touch Probes.

5.4.38.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Touch probe 1 position positive value - Axis 1	60BAh	0h	Signed32	-	Position	Read only	Yes

5.4.38.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Touch probe 1 position positive value - Axis 2	68BAh	0h	Signed32	-	Position	Read only	Yes

5.4.39 60BBh, 68BBh Touch probe 1 position negative value - Axis

The position latched on the falling edge of the touch probe 1 input.

See Touch Probes.

5.4.39.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 1 position negative value - Axis 1	60BBh	0h	Signed32	-	Position	Read only	Yes

5.4.39.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 1 position negative value - Axis 2	68BBh	0h	Signed32	-	Position	Read only	Yes

5.4.40 60BCh, 68BCh Touch probe 2 position positive value - Axis

The position latched on the rising edge of the touch probe 2 input.

See Touch Probes.

5.4.40.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 position positive value - Axis 1	60BCh	0h	Signed32	-	Position	Read only	Yes

5.4.40.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 position positive value - Axis 2	68BCh	0h	Signed32	-	Position	Read only	Yes

5.4.41 60BDh, 68BDh Touch probe 2 position negative value - Axis

The position latched on the falling edge of the touch probe 2 input.

See Touch Probes.

5.4.41.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 position negative value - Axis 1	60BDh	0h	Signed32	-	Position	Read only	Yes

5.4.41.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 position negative value - Axis 2	68BDh	0h	Signed32	-	Position	Read only	Yes

5.4.42 60C2h, 68C2h Interpolation time period - Axis

This object sets the fieldbus cycle time. The unit (subindex 1) of the time is given in $10^{\text{interpolation time index}}$ seconds.

Only multiples of 1 ms are allowed. The two values set CANOPEN.SAMPLEPERIOD (given in multiples of 62.5 microseconds). Both sub-indexes need to be written to update the value.

The drive uses this time to interpolate between two received setpoints in cyclic synchronous mode as well as used to determine when PDO packets should be sent from the drive.

NOTE

If this time is set to longer the actual fieldbus period PDOs may not be received correctly by the master.

5.4.42.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	60C2h	0h	Unsigned8	-	-	Read only	No
Interpolation time period value - Axis 1	60C2h	1h	Unsigned8	-	-	Read/Write	No
Interpolation time index - Axis 1	60C2h	2h	Signed8	-	-	Read/Write	No

5.4.42.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	68C2h	0h	Unsigned8	-	-	Read only	No
Interpolation time period value - Axis 2	68C2h	1h	Unsigned8	-	-	Read/Write	No
Interpolation time index - Axis 2	68C2h	2h	Signed8	-	-	Read/Write	No

5.4.43 60D0h, 68D0h Touch probe source - Axis

Selects which AKD2G input is used to trigger the touch probe and capture new data.

See Touch Probes.

AKD2G Values for 6#D0h	AKD2G Note
-41 to -42	Z pulse for Axis 1 to 2
-31 to -35	Z pulse for Feedback 1 to 5 As FB1, 2, 4, and 5 do not support Z pulses then these will not be shown. When we support SFA on FB 1 and 2 then Z pulse may be possible. X23 is optional so if not fitted then -33 will not be valid.
-21 to -26	DIO1 to DIO6 When X22 is not fitted options -21 and -22 will not be valid. When X23 is not fitted options -23 to -26 will not be valid.
-1 to -12	DIN1 to DIN12 When X22 is not fitted options -9 to -12 will not be valid.
0	Reserved
1	DIN1. Fast Opto
2	DIN2. Fast Opto
3-4	Reserved
5	Valid if AXIS#.PL.FBSOURCE is using a feedback that supports a Z pulse.
6 to 32767	Reserved

5.4.43.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	60D0h	0h	Unsigned8	-	-	Read only	No
Touch probe 1 source - Axis 1	60D0h	1h	Signed16	-	-	Read/Write	No
Touch probe 2 source - Axis 1	60D0h	2h	Signed16	-	-	Read/Write	No

5.4.43.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	68D0h	0h	Unsigned8	-	-	Read only	No
Touch probe 1 source - Axis 2	68D0h	1h	Signed16	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 source - Axis 2	68D0h	2h	Signed16	-	-	Read/Write	No

5.4.44 60D1h, 68D1h Touch probe 1 time stamp positive value - Axis

The time stamp latched on the rising edge of the touch probe 1 input. This is latched in addition to the position 60BAh, 68BAh.

See Touch Probes.

5.4.44.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Touch probe 1 time stamp positive value - Axis 1	60D1h	0h	Unsigned32	-	-	Read only	Yes

5.4.44.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Touch probe 1 time stamp positive value - Axis 2	68D1h	0h	Unsigned32	-	-	Read only	Yes

5.4.45 60D2h, 68D2h Touch probe 1 time stamp negative value - Axis

The time stamp latched on the falling edge of the touch probe 1 input. This is latched in addition to the position 60BBh, 68BBh.

See Touch Probes.

5.4.45.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 1 time stamp negative value - Axis 1	60D2h	0h	Unsigned32	-	-	Read only	Yes

5.4.45.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 1 time stamp negative value - Axis 2	68D2h	0h	Unsigned32	-	-	Read only	Yes

5.4.46 60D3h, 68D3h Touch probe 2 time stamp positive value - Axis

The time stamp latched on the rising edge of the touch probe 2 input. This is latched in addition to the position 60BCh, 68BCh.

See Touch Probes.

5.4.46.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 time stamp positive value - Axis 1	60D3h	0h	Unsigned32	-	-	Read only	Yes

5.4.46.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 time stamp positive value - Axis 2	68D3h	0h	Unsigned32	-	-	Read only	Yes

5.4.47 60D4h, 68D4h Touch probe 2 time stamp negative value - Axis

The time stamp latched on the falling edge of the touch probe 1 input. This is latched in addition to the position 60BDh, 68BDh.

See Touch Probes.

5.4.47.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 time stamp negative value - Axis 1	60D4h	0h	Unsigned32	-	-	Read only	Yes

5.4.47.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 time stamp negative value - Axis 2	68D4h	0h	Unsigned32	-	-	Read only	Yes

5.4.48 60D5h, 68D5h Touch probe 1 positive edge counter - Axis

A counter that is incremented with each rising edge of the touch probe 1 input.

The counter is only valid if the touch probe 1 is enabled (60B8h, bit 0 = 1b). When configured to capture only the first event only bit 0 changes. When configured for continuous triggering, the value is an unsigned 16-bit value with overflow.

See Touch Probes.

5.4.48.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Touch probe 1 positive edge counter - Axis 1	60D5h	0h	Unsigned16	-	-	Read only	Yes

5.4.48.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Touch probe 1 positive edge counter - Axis 2	68D5h	0h	Unsigned16	-	-	Read only	Yes

5.4.49 60D6h, 68D6h Touch probe 1 negative edge counter - Axis

A counter that is incremented with each falling edge of the touch probe 1 input.

The counter is only valid if the touch probe 1 is enabled (60B8h, bit 0 = 1b). When configured to capture only the first event only bit 0 changes. When configured for continuous triggering, the value is an unsigned 16-bit value with overflow.

See Touch Probes.

5.4.49.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 1 negative edge counter - Axis 1	60D6h	0h	Unsigned16	-	-	Read only	Yes

5.4.49.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 1 negative edge counter - Axis 2	68D6h	0h	Unsigned16	-	-	Read only	Yes

5.4.50 60D7h, 68D7h Touch probe 2 positive edge counter - Axis

A counter that is incremented with each rising edge of the touch probe 2 input.

The counter is only valid if the touch probe 2 is enabled (60B8h, bit 8 = 1b). When configured to capture only the first event only bit 0 changes. When configured for continuous triggering, the value is an unsigned 16-bit value with overflow.

See Touch Probes.

5.4.50.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 positive edge counter - Axis 1	60D7h	0h	Unsigned16	-	-	Read only	Yes

5.4.50.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 positive edge counter - Axis 2	68D7h	0h	Unsigned16	-	-	Read only	Yes

5.4.51 60D8h, 68D8h Touch probe 2 negative edge counter - Axis

A counter that is incremented with each falling edge of the touch probe 2 input.

The counter is only valid if the touch probe 2 is enabled (60B8h, bit 8 = 1b). When configured to capture only the first event only bit 0 changes. When configured for continuous triggering, the value is an unsigned 16-bit value with overflow.

See Touch Probes.

5.4.51.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 negative edge counter - Axis 1	60D8h	0h	Unsigned16	-	-	Read only	Yes

5.4.51.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Touch probe 2 negative edge counter - Axis 2	68D8h	0h	Unsigned16	-	-	Read only	Yes

5.4.52 60E0h, 68E0h Positive torque limit value - Axis

This object configures the maximum motor torque in positive direction. The value is given per thousand (1 ‰) of rated torque. This sets the keyword AXIS#.IL.LIMITP.

5.4.52.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Positive torque limit value - Axis 1	60E0h	0h	Unsigned16	-	-	Read/Write	Yes

5.4.52.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Positive torque limit value - Axis 2	68E0h	0h	Unsigned16	-	-	Read/Write	Yes

5.4.53 60E1h, 68E1h Negative torque limit value - Axis

This object configures the maximum motor torque in negative direction. The value is given per thousand (1 ‰) of rated torque. This sets the keyword AXIS#.IL.LIMITN.

5.4.53.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Negative torque limit value - Axis 1	60E1h	0h	Unsigned16	-	-	Read/Write	Yes

5.4.53.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Negative torque limit value - Axis 2	68E1h	0h	Unsigned16	-	-	Read/Write	Yes

5.4.54 60E4h, 68E4h Additional position actual value - Axis

This object indicates the actual position in user defined units for additional feedbacks. Each sub-index corresponds to a different feedback device (ie: sub-index 1 is FB1.P, sub-index 2 is FB2.P etc).Objects 60E8h, 60E9h, 60EDh and 60EEh are used to scale this value.

NOTE

Depending on the drive model, not all feedbacks will be present. These invalid sub-indexes will return errors when accessed.

See CANopen Scaling.

5.4.54.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	60E4h	0h	Unsigned8	-	-	Read only	No
1st additional position actual value - Axis 1	60E4h	1h	Signed32	-	-	Read only	Yes
2nd additional position actual value - Axis 1	60E4h	2h	Signed32	-	-	Read only	Yes
3rd additional position actual value - Axis 1	60E4h	3h	Signed32	-	-	Read only	Yes
4th additional position actual value - Axis 1	60E4h	4h	Signed32	-	-	Read only	Yes
5th additional position actual value - Axis 1	60E4h	5h	Signed32	-	-	Read only	Yes

5.4.54.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	68E4h	0h	Unsigned8	-	-	Read only	No
1st additional position actual value - Axis 2	68E4h	1h	Signed32	-	-	Read only	Yes
2nd additional position actual value - Axis 2	68E4h	2h	Signed32	-	-	Read only	Yes
3rd additional position actual value - Axis 2	68E4h	3h	Signed32	-	-	Read only	Yes
4th additional position actual value - Axis 2	68E4h	4h	Signed32	-	-	Read only	Yes
5th additional position actual value - Axis 2	68E4h	5h	Signed32	-	-	Read only	Yes

5.4.55 60E8h, 68E8h Additional gear ratio - motor revolutions - Axis

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.

5.4.55.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	60E8h	0h	Unsigned8	-	-	Read only	No
1st additional gear ratio - motor revolutions - Axis 1	60E8h	1h	Unsigned32	-	-	Read/Write	No
2nd additional gear ratio - motor revolutions - Axis 1	60E8h	2h	Unsigned32	-	-	Read/Write	No
3rd additional gear ratio - motor revolutions - Axis 1	60E8h	3h	Unsigned32	-	-	Read/Write	No
4th additional gear ratio - motor revolutions - Axis 1	60E8h	4h	Unsigned32	-	-	Read/Write	No
5th additional gear ratio - motor revolutions - Axis 1	60E8h	5h	Unsigned32	-	-	Read/Write	No

5.4.55.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	68E8h	0h	Unsigned8	-	-	Read only	No
1st additional gear ratio - motor revolutions - Axis 2	68E8h	1h	Unsigned32	-	-	Read/Write	No
2nd additional gear ratio - motor revolutions - Axis 2	68E8h	2h	Unsigned32	-	-	Read/Write	No
3rd additional gear ratio - motor revolutions - Axis 2	68E8h	3h	Unsigned32	-	-	Read/Write	No
4th additional gear ratio - motor revolutions - Axis 2	68E8h	4h	Unsigned32	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
5th additional gear ratio - motor revolutions - Axis 2	68E8h	5h	Unsigned32	-	-	Read/Write	No

5.4.56 60E9h, 68E9h Additional feed constant - feed - Axis

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.

5.4.56.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	60E9h	0h	Unsigned8	-	-	Read only	No
1st additional feed constant - feed - Axis 1	60E9h	1h	Unsigned32	-	-	Read/Write	No
2nd additional feed constant - feed - Axis 1	60E9h	2h	Unsigned32	-	-	Read/Write	No
3rd additional feed constant - feed - Axis 1	60E9h	3h	Unsigned32	-	-	Read/Write	No
4th additional feed constant - feed - Axis 1	60E9h	4h	Unsigned32	-	-	Read/Write	No
5th additional feed constant - feed - Axis 1	60E9h	5h	Unsigned32	-	-	Read/Write	No

5.4.56.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	68E9h	0h	Unsigned8	-	-	Read only	No
1st additional feed constant - feed - Axis 2	68E9h	1h	Unsigned32	-	-	Read/Write	No
2nd additional feed constant - feed - Axis 2	68E9h	2h	Unsigned32	-	-	Read/Write	No
3rd additional feed constant - feed - Axis 2	68E9h	3h	Unsigned32	-	-	Read/Write	No
4th additional feed constant - feed - Axis 2	68E9h	4h	Unsigned32	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
5th additional feed constant - feed - Axis 2	68E9h	5h	Unsigned32	-	-	Read/Write	No

5.4.57 60EDh, 68EDh Additional gear ratio - shaft revolutions - Axis

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.

5.4.57.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	60EDh	0h	Unsigned8	-	-	Read only	No
1st additional gear ratio - shaft revolutions - Axis 1	60EDh	1h	Unsigned32	-	-	Read/Write	No
2nd additional gear ratio - shaft revolutions - Axis 1	60EDh	2h	Unsigned32	-	-	Read/Write	No
3rd additional gear ratio - shaft revolutions - Axis 1	60EDh	3h	Unsigned32	-	-	Read/Write	No
4th additional gear ratio - shaft revolutions - Axis 1	60EDh	4h	Unsigned32	-	-	Read/Write	No
5th additional gear ratio - shaft revolutions - Axis 1	60EDh	5h	Unsigned32	-	-	Read/Write	No

5.4.57.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Mappable
Highest sub-index supported	68EDh	0h	Unsigned8	-	-	Read only	No
1st additional gear ratio - shaft revolutions - Axis 2	68EDh	1h	Unsigned32	-	-	Read/Write	No
2nd additional gear ratio - shaft revolutions - Axis 2	68EDh	2h	Unsigned32	-	-	Read/Write	No
3rd additional gear ratio - shaft revolutions - Axis 2	68EDh	3h	Unsigned32	-	-	Read/Write	No
4th additional gear ratio - shaft revolutions - Axis 2	68EDh	4h	Unsigned32	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
5th additional gear ratio - shaft revolutions - Axis 2	68EDh	5h	Unsigned32	-	-	Read/Write	No

5.4.58 60EEh, 68EEh Additional feed constant - shaft revolutions - Axis

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.

5.4.58.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	60EEh	0h	Unsigned8	-	-	Read only	No
1st additional feed constant - shaft revolutions - Axis 1	60EEh	1h	Unsigned32	-	-	Read/Write	No
2nd additional feed constant - shaft revolutions - Axis 1	60EEh	2h	Unsigned32	-	-	Read/Write	No
3rd additional feed constant - shaft revolutions - Axis 1	60EEh	3h	Unsigned32	-	-	Read/Write	No
4th additional feed constant - shaft revolutions - Axis 1	60EEh	4h	Unsigned32	-	-	Read/Write	No
5th additional feed constant - shaft revolutions - Axis 1	60EEh	5h	Unsigned32	-	-	Read/Write	No

5.4.58.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Highest sub-index supported	68EEh	0h	Unsigned8	-	-	Read only	No
1st additional feed constant - shaft revolutions - Axis 2	68EEh	1h	Unsigned32	-	-	Read/Write	No
2nd additional feed constant - shaft revolutions - Axis 2	68EEh	2h	Unsigned32	-	-	Read/Write	No
3rd additional feed constant - shaft revolutions - Axis 2	68EEh	3h	Unsigned32	-	-	Read/Write	No
4th additional feed constant - shaft revolutions - Axis 2	68EEh	4h	Unsigned32	-	-	Read/Write	No

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
5th additional feed constant - shaft revolutions - Axis 2	68EEh	5h	Unsigned32	-	-	Read/Write	No

5.4.59 60F4h, 68F4h Following error actual value - Axis

This object provides the following error (AXIS#.PL.ERR) in CANopen position units.

See CANopen Scaling.

5.4.59.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Following error actual value - Axis 1	60F4h	0h	Signed32	-	Position	Read only	Yes

5.4.59.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Following error actual value - Axis 2	68F4h	0h	Signed32	-	Position	Read only	Yes

5.4.60 60FCh, 68FCh Position demand internal value - Axis

This object provides the output of the trajectory generator in position modes (AXIS#.PL.CMD) scaled in counts. The value is consistent in scaling to the actual internal position value (6063h).

See CANopen Scaling.

5.4.60.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Position demand internal value - Axis 1	60FCh	0h	Signed32	-	-	Read only	Yes

5.4.60.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Position demand internal value - Axis 2	68FCh	0h	Signed32	-	-	Read only	Yes

5.4.61 60FDh, 68FDh Digital inputs - Axis

This object provides the states of digital inputs, home switch, and limit switches.

Bit	Name	Bit	Name
0	Negative hardware limit switch	21	DIN6.STATE
1	Positive hardware limit switch	22	DIN7.STATE
2	Home switch	23	DIN8.STATE
3-15	Reserved	24	DIN9.STATE
16	DIN1.STATE	25	DIN10.STATE
17	DIN2.STATE	26	DIN11.STATE
18	DIN3.STATE	27	DIN12.STATE
19	DIN4.STATE	28-31	Reserved
20	DIN5.STATE		

5.4.61.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Digital inputs - Axis 1	60FDh	0h	Unsigned32	-	-	Read only	Yes

5.4.61.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Digital inputs - Axis 2	68FDh	0h	Unsigned32	-	-	Read only	Yes

5.4.62 60FFh, 68FFh Target velocity - Axis

The target velocity in CANopen velocity units. Used to specify the velocity command in profile velocity mode.

See CANopen Scaling.

5.4.62.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Target velocity - Axis 1	60FFh	0h	Signed32	-	-	Read/Write	Yes

5.4.62.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Target velocity - Axis 2	68FFh	0h	Signed32	-	-	Read/Write	Yes

5.4.63 6502h, 6D02h Supported drive modes - Axis

This object describes the CANopen operating modes supported by each axis. The AKD2G returns 0xAD for Cyclic Synchronous Position (CSP), Homing Mode (HM), Torque Mode (TQ), Profile Velocity (PV) and Profile Position (PP) modes.

Bit	Description
31-10	Reserved
9	Cyclic Synchronous Torque (Not supported)
8	Cyclic Synchronous Velocity (Not supported)
7	CSP
6	Interpolated Position (Not supported)
5	HM
4	Reserved
3	TQ
2	PV
1	Velocity Mode (Not supported)
0	PP

5.4.63.1 Axis 1

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Supported drive modes - Axis 1	6502h	0h	Unsigned32	-	-	Read only	No

5.4.63.2 Axis 2

Command	Index	Sub-Index	Data Type	Float Scale	Units	Access	PDO Map-pable
Supported drive modes - Axis 2	6D02h	0h	Unsigned32	-	-	Read only	No

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