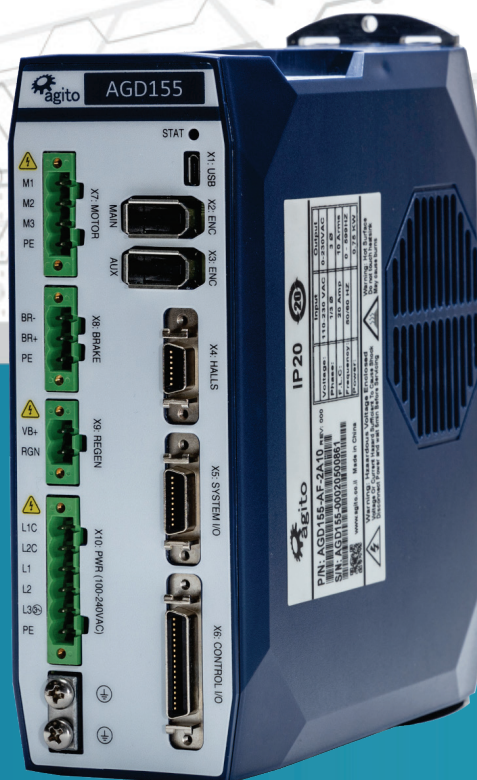




**EtherCAT<sup>®</sup>**

# AGD155-EC

## 240 VAC Servo Drive

**EtherCAT Reference Manual**



[www.agito-akribis.com](http://www.agito-akribis.com)

Member of Akribis Systems group

## Revision History

| Version | Description                       | Date          |
|---------|-----------------------------------|---------------|
| 1.1     | Added chapter - PCSuite Operation | 9 June 2023   |
| 1.0     | Initial release.                  | 18 April 2023 |

## Contact Information

Manufacturer Agito Akribis Systems Ltd., Member of Akribis Systems Group  
Address 6 Yad-Harutsim St., P.O.Box 7172, Kfar-Saba 4464103  
Email [agito.info@akribis-sys.com](mailto:agito.info@akribis-sys.com)  
Website [www.agito-akribis.com](http://www.agito-akribis.com)

## Copyright Notice

©2023 Agito Akribis Systems Ltd.

All rights reserved. This work may not be edited in any form or by any means without written permission of Agito Akribis Systems Ltd.

## Products Rights

AGDx, AGCx, AGMx, AGAx, AGIOx, and AGLx are products designed by Agito Akribis Systems Ltd. in Israel. Sales of the products are licensed to Akribis Systems Pte Ltd. under intercompany license agreement.

Agito Akribis Systems Ltd. has full rights to distribute above products worldwide.

## Disclaimer

This product documentation was accurate and reliable at the time of its release.

Agito Akribis Systems Ltd. reserves the right to change the specifications of the product described in this manual without notice at any time.

## Trademarks

Agito PCSuite is a trademark of Agito Akribis Systems Ltd.

Beckhoff®, TwinCAT®, EtherCAT®, are registered trademarks of and licensed by Beckhoff Automation GmbH.

CiA® and CANopen® are registered trademarks of the CAN in Automation User's Group.

## Warranty

This product is warranted to be free of defects in material and workmanship and conforms to the specifications listed in this manual, for a period of 12 months from the shipment date from factory.

# Contents

|          |                                                   |           |
|----------|---------------------------------------------------|-----------|
| <b>1</b> | <b>Introduction</b>                               | <b>6</b>  |
| 1.1      | About this Manual                                 | 6         |
| 1.2      | Product Description                               | 6         |
| <b>2</b> | <b>AGD155-EC Hardware Installation</b>            | <b>7</b>  |
| <b>3</b> | <b>CANopen over EtherCAT (CoE) Basic Concepts</b> | <b>9</b>  |
| 3.1      | CANopen over EtherCAT (CoE) Protocol              | 9         |
| 3.2      | Node Addresses                                    | 9         |
| 3.3      | Object Dictionary                                 | 9         |
| 3.4      | Service Data Objects (SDOs)                       | 10        |
| 3.5      | Process Data Objects (PDOs)                       | 10        |
| 3.6      | PDO Mapping                                       | 11        |
| 3.7      | EtherCAT State Machine (ESM)                      | 12        |
| 3.8      | Power State Machine                               | 13        |
| 3.9      | Cycle Time                                        | 14        |
| 3.10     | EtherCAT Slave Information (ESI)                  | 14        |
| <b>4</b> | <b>AGD155-EC Operation Modes</b>                  | <b>16</b> |
| 4.1      | Profile Position Mode                             | 16        |
| 4.2      | Homing Mode                                       | 17        |
| 4.3      | Cyclic Synchronous Position Mode                  | 17        |
| <b>5</b> | <b>AGD155-EC Configuration using TwinCAT3</b>     | <b>19</b> |
| 5.1      | Connectivity with AGD155-EC                       | 19        |
| 5.2      | ESI File Update                                   | 25        |
| 5.3      | Master-based Homing Configuration                 | 28        |
| <b>6</b> | <b>PCSuite Operation</b>                          | <b>32</b> |
| 6.1      | AGD155-EC EtherCAT Interface                      | 32        |
| 6.2      | EtherCAT Tool Functionality                       | 32        |
| 6.3      | Read/Write EtherCAT Objects                       | 34        |
| <b>7</b> | <b>Object Dictionary</b>                          | <b>36</b> |
| 7.1      | Communication Objects (1000h to 1FFFh)            | 36        |
|          | 1000h: Device Type                                | 36        |
|          | 1001h: Error Register                             | 36        |
|          | 1008h: Device Name                                | 37        |
|          | 1009h: Hardware Version                           | 37        |
|          | 100Ah: Software Version                           | 38        |
|          | 1018h: Identity                                   | 38        |
|          | 10F1h: Error Settings                             | 40        |
|          | 10F8h: Timestamp Object                           | 41        |
|          | 1600h: Receive PDO Mapping Parameter 1            | 42        |
|          | 1601h: Receive PDO Mapping Parameter 2            | 44        |
|          | 1602h: Receive PDO Mapping Parameter 3            | 46        |
|          | 1603h: Receive PDO Mapping Parameter 4            | 48        |
|          | 1A00h: Transmit PDO Mapping Parameter 1           | 50        |
|          | 1A01h: Transmit PDO Mapping Parameter 2           | 53        |
|          | 1A02h: Transmit PDO Mapping Parameter 3           | 55        |
|          | 1A03h: Transmit PDO Mapping Parameter 4           | 57        |
|          | 1C00h: Sync Manager Communication Type            | 59        |
|          | 1C12h: Sync Manager 2 PDO Assignment              | 61        |
|          | 1C13h: Sync Manager 3 PDO Assignment              | 62        |
|          | 1C32h: Sync Manager Output Parameter              | 64        |
|          | 1C33h: Sync Manager Input Parameter               | 65        |

|     |                                                |    |
|-----|------------------------------------------------|----|
| 7.2 | Manufacturer Specific Objects (2000h to 5FFFh) | 67 |
|     | 2410h: Analog Input 1 Value                    | 67 |
|     | 2411h: Analog Input 1 Dead Band                | 67 |
|     | 2412h: Analog Input 1 Gain                     | 68 |
|     | 2413h: Analog Input 1 Low Pass Filter          | 68 |
|     | 2414h: Analog Input 1 Offset                   | 69 |
|     | 2415h: Analog Input 1 Mute Range               | 69 |
|     | 2416h: Analog Input 2 Value                    | 70 |
|     | 2417h: Analog Input 2 Dead Band                | 70 |
|     | 2418h: Analog Input 2 Gain                     | 71 |
|     | 2419h: Analog Input 2 Low Pass Filter          | 71 |
|     | 241Ah: Analog Input 2 Offset                   | 72 |
|     | 241Bh: Analog Input 2 Mute Range               | 72 |
|     | 2421h: Hard Stop Position Threshold            | 73 |
|     | 2422h: Homing Option                           | 73 |
| 7.3 | CiA 402 Standard Objects (6000h to 6FFFh)      | 74 |
|     | 603Fh: Error Code                              | 74 |
|     | 6040h: ControlWord                             | 74 |
|     | 6041h: StatusWord                              | 75 |
|     | 605Ah: Quick Stop Option Code                  | 76 |
|     | 605Bh: Shutdown Option Code                    | 76 |
|     | 605Ch: Disable Operation Option Code           | 77 |
|     | 605Dh: Halt Option Code                        | 77 |
|     | 605Eh: Fault Reaction Option Code              | 78 |
|     | 6060h: Modes of Operation                      | 78 |
|     | 6061h: Modes of Operation Display              | 79 |
|     | 6062h: Position Demand Value                   | 79 |
|     | 6063h: Position Actual Internal Value          | 80 |
|     | 6064h: Position Actual Value                   | 80 |
|     | 6065h: Following Error Window                  | 81 |
|     | 6066h: Following Error Time Out                | 81 |
|     | 6067h: Position Window                         | 82 |
|     | 6068h: Position Window Time                    | 82 |
|     | 6069h: Velocity Sensor Actual Value            | 83 |
|     | 606Bh: Velocity Demand Value                   | 83 |
|     | 606Ch: Velocity Actual Value                   | 84 |
|     | 606Dh: Velocity Window                         | 84 |
|     | 606Eh: Velocity Window Time                    | 85 |
|     | 606Fh: Velocity Threshold                      | 85 |
|     | 6070h: Velocity Threshold Time                 | 86 |
|     | 6071h: Target Torque                           | 86 |
|     | 6073h: Max Current                             | 87 |
|     | 6074h: Torque Demand Value                     | 87 |
|     | 6075h: Motor Rated Current                     | 88 |
|     | 6076h: Motor Rated Torque                      | 88 |
|     | 6077h: Torque Actual Value                     | 89 |
|     | 6078h: Current Actual Value                    | 89 |
|     | 6079h: DC Link Circuit Voltage                 | 90 |
|     | 607Ah: Target Position                         | 90 |
|     | 607Bh: Position Range Limit                    | 91 |
|     | 607Ch: Home Offset                             | 92 |
|     | 607Dh: Software Position Limit                 | 92 |
|     | 607Eh: Polarity                                | 93 |
|     | 607Fh: Max Profile Velocity                    | 94 |
|     | 6080h: Max Motor Speed                         | 94 |
|     | 6081h: Profile Velocity                        | 95 |
|     | 6082h: End Velocity                            | 95 |

|                                            |            |
|--------------------------------------------|------------|
| 6083h: Profile Acceleration                | 96         |
| 6084h: Profile Deceleration                | 96         |
| 6085h: Quick Stop Deceleration             | 97         |
| 6087h: Torque Slope                        | 98         |
| 608Fh: Position Encoder Resolution         | 98         |
| 6091h: Gear Ratio                          | 99         |
| 6092h: Feed Constant                       | 100        |
| 6098h: Homing Method                       | 101        |
| 6099h: Homing Speeds                       | 103        |
| 609Ah: Homing Acceleration                 | 104        |
| 60A8h: SI Unit Position                    | 104        |
| 60B0h: Position Offset                     | 105        |
| 60B1h: Velocity Offset                     | 105        |
| 60B2h: Torque Offset                       | 106        |
| 60B8h: Touch Probe Function                | 106        |
| 60B9h: Touch Probe Status                  | 107        |
| 60BAh: Touch Probe 1 Positive Value        | 108        |
| 60BBh: Touch Probe 1 Negative Value        | 109        |
| 60BCh: Touch Probe 2 Positive Value        | 109        |
| 60BDh: Touch Probe 2 Negative Value        | 110        |
| 60C0h: Interpolation Sub mode select       | 110        |
| 60C1h: Interpolation Data Record           | 111        |
| 60C2h: Interpolation Time Period           | 112        |
| 60C4h: Interpolation Data Configuration    | 113        |
| 60C5h: Max Acceleration                    | 116        |
| 60C6h: Max Deceleration                    | 116        |
| 60D0h: Touch Probe Source                  | 117        |
| 60D5h: Touch Probe 1 Positive Edge Counter | 118        |
| 60D6h: Touch Probe 1 Negative Edge Counter | 118        |
| 60D7h: Touch Probe 2 Positive Edge Counter | 119        |
| 60D8h: Touch Probe 2 Negative Edge Counter | 119        |
| 60F2h: Positioning Option Code             | 120        |
| 60F4h: Following Error Actual Value        | 121        |
| 60FCh: Position Demand Internal Value      | 121        |
| 60FDh: Digital Inputs                      | 122        |
| 60FEh: Digital Outputs                     | 123        |
| 60FFh: Target Velocity                     | 124        |
| 6502h: Supported Drive Modes               | 124        |
| <b>8 Errors</b>                            | <b>126</b> |

# 1 Introduction

---

## 1.1 About this Manual

---

This manual describes the implementation of CiA 402 and CiA 301 in the AGD155-EC drive. This manual is intended for skilled personnel who have been trained to operate, program and maintain the equipment described.

## 1.2 Product Description

---

The AGD155-EC is a 240 VAC intelligent drive with an EtherCAT (EoE) interface compliant with the CiA 402 drive profile.

The AGD155-EC can drive many types of motors, such as voice coil, brushed, and brushless, including direct-drive linear and rotary motors. The drive provides numerous digital and analog inputs and outputs for application interfaces. It also supports various incremental and absolute encoders.

Advanced features include position event, position lock (capture), error mapping, dual-loop control, closed-loop force mode, and ultra-precision modes.

The AGD155-EC includes programming capabilities, and supports up to 8 multi-threading tasks, each of which can be configured with a different priority. It can also serve as a full-featured single-axis standalone controller.

The AGD155-EC also supports analog input  $\pm 10V$  current or velocity commands, and pulse and direction position commands.

Agito PCSuite software is used for configuration and tuning via an Ethernet port on the drive.



Figure 1. AGD155-EC

## 2 AGD155-EC Hardware Installation



### Note

Refer to the *AGD155 Product Manual* for complete technical details and installation instructions.

EtherCAT communication ports are located on the top panel of the AGD155-EC. The input port is used for incoming EtherCAT communication, and the output port is used for outgoing communication. These ports must be connected properly to ensure reliable communication.

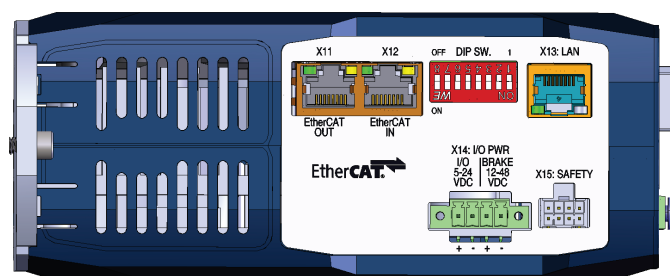


Figure 2. AGD155-EC EtherCAT communication ports

Ethernet cables that meet the requirements of category 5 (CAT5) or better must be used to connect EtherCAT devices. The cables must be shielded with twisted pairs and have metal shielded RJ45 connectors.

EtherCAT uses 4 wires for signal transfer. The pinout must comply with the specifications detailed in the [Guideline for Planning, Assembling and Commissioning of EtherCAT Networks](#) (document ETG.1600), as follows:

| Pin | Core color | Signal | Description         |
|-----|------------|--------|---------------------|
| 1   | yellow     | TD +   | Transmission Data + |
| 2   | orange     | TD -   | Transmission Data - |
| 3   | white      | RD +   | Receiver Data +     |
| 6   | blue       | RD -   | Receiver Data -     |

The EtherCAT master (PLC or motion controller) must be installed as the first node in the network. The master device's EtherCAT output port must be connected to the EtherCAT input port of the first AGD155-EC in the network.

The EtherCAT output port of the first AGD155-EC EtherCAT must be connected to the EtherCAT input port of the second AGD155-EC EtherCAT, and so on. In total, the EtherCAT network supports up to 65,535 devices.

Optionally, the last node on the network can be connected to master's input port for redundancy (providing the master can support this functionality).

Other EtherCAT nodes, such as I/O, encoders, and other EtherCAT compatible devices can be connected to the same network.



Figure 3. EtherCAT network with AGD155-EC drives

## 3 CANopen over EtherCAT (CoE) Basic Concepts

---

### 3.1 CANopen over EtherCAT (CoE) Protocol

---

CANopen is a communication protocol and network standard used in industrial automation and control systems. It enables multiple devices, regardless of their manufacturers or vendors, to communicate with each other over a CAN bus.

EtherCAT is an industrial Ethernet technology that enables high-speed communication between devices. CANopen over EtherCAT (CoE) protocol enables the use of CANopen protocol on an EtherCAT network. By exploiting the speed and flexibility of EtherCAT, CoE extends the functionality of CANopen.

CoE protocol uses the same communication mechanisms as those defined in CANopen standard EN 50325-4, such as object dictionary, SDOs, PDOs, PDO mapping and the CiA 402 power state machine.

A key feature of EtherCAT is its ability to support distributed control and automation systems, in which multiple devices work together to perform a particular task. This is achieved through a network topology in which a master controller coordinates the activities of all other devices (slaves) on the network.

The AGD155-EC is compliant with the CiA 402 device profile specifications for CANopen over EtherCAT.

### 3.2 Node Addresses

---

Every device on the EtherCAT network has a unique 16-bit node address (node ID). During the network configuration process, the EtherCAT master controller automatically assigns node IDs as it establishes communication with devices on the network. Node addresses are assigned in a hierarchical manner based on the topology of the network.

The unique address of each node allows the master controller to communicate with individual devices, and exchange data with them quickly and efficiently.

AGD155-EC does not support manual node address allocation.

### 3.3 Object Dictionary

---

Every device on the EtherCAT network has its own object dictionary.

An object dictionary is a structured set of data that provides a standardized way to configure communication and application parameters for devices, to enable devices to communicate and exchange data.

Objects are parameters that define the device's configuration, status, capabilities, and what data it can exchange with other devices on the network.

Each object in the object dictionary is addressed using a 16-bit index and a 8-bit sub-index.

The object dictionary is organized into several segments, each with a specific purpose and range of index values:

- Communication-specific (index 0x1000 – 0x1FFF). Parameters such as node ID, baud rate, and network address (as defined by CiA 301 standard).

- Manufacturer-specific (index 0x2000 – 0x2FFF). Data such as model number, configuration data, status, and diagnostics.
- Device profile (index 0x6000 – 0x6FFF). Standard objects supported by servo drives (as defined by CiA 402 standard).

### 3.4 Service Data Objects (SDOs)

---

SDOs are data exchange mechanisms that enable a master controller to read and set values in slave devices on the EtherCAT network. SDOs are used to access all object dictionaries, and are transmitted in non-cyclic communication between devices.

SDOs are not time-critical, and therefore can be used for configuration and setup tasks that are processed outside of the real-time cycle.

Communication is always initiated by the master controller, which acts as an SDO client. However, communication is described from the perspective of the slave device. **Read** from an object dictionary means an SDO upload to the master, and **write** to an object dictionary entry means an SDO download to the slave.

### 3.5 Process Data Objects (PDOs)

---

PDOs are packets of data that is exchanged in real-time between EtherCAT devices. Each PDO can carry one or more variables, such as sensor data, motor control commands, or other types of control signals.

PDOs are transmitted cyclically by the EtherCAT master controller to all slaves on the network. The slaves read or write the data in the PDOs as required, and then the PDOs are sent back to the master controller for processing.

There are two types of PDOs:

- Transmit PDOs (TPDOs) send actual values from slave devices to the EtherCAT master controller.
- Receive PDOs (RPDOs) receive data from the EtherCAT master controller.

PDOs are sent at fast speeds (up to 16,000 times per second), enabling real-time communication in applications that require immediate and accurate data exchange between devices.

### 3.6 PDO Mapping

PDO mapping defines which objects are transmitted between the master controller and the slave devices.

PDO mapping defines the data structure and layout of the process data objects (PDOs) of a device in an EtherCAT network.

- The number and type of variables included in the PDO.
- The size and data format of each variable.
- The starting byte position and bit position of each variable within the PDO.
- The direction of data flow; that is, whether the PDO is used for reading data from a slave device or writing data to a slave device.

In the mapping table, index 0x1600 – 0x17FF are for RPDOs, and index 0x1A00 – 0x1BFF are for TPDOs.

AGD155-EC supports 4 RPDOs and 4 TPDOs. Up to 6 objects can be assigned to a single PDO.

AGD155-EC boots up with pre-defined default PDO mapping, shown in the table below. The mapping can be changed by the EtherCAT master in PRE-OP state.

#### Default PDO Mapping in AGD155-EC

| Mapping Object         | Default Mapped Objects                                                                                   |
|------------------------|----------------------------------------------------------------------------------------------------------|
| RPDO 1 (object 0x1600) | 0x6040 - Control word<br>0x607A - Target position<br>0x6060 - Mode of operation                          |
| RPDO 2 (object 0x1601) | 0x60B8 – Touch probe function                                                                            |
| RPDO 3 (object 0x1602) | 0x607C – Home offset<br>0x6098 – Home method<br>0x609A - Home Acceleration                               |
| RPDO 4 (object 0x1603) | Empty                                                                                                    |
| TPDO 1 (object 0x1A00) | 0x6041 – Status word<br>0x6064 – Position actual value<br>0x6061 – Modes of operation display            |
| TPDO 2 (object 0x1A01) | 0x60B9 – Touch probe status<br>0x60BA – Touch probe 1 position positive value<br>0x60FD – Digital inputs |
| TPDO 3 (object 0x1A02) | Empty                                                                                                    |
| TPDO 4 (object 0x1A03) | Empty                                                                                                    |

### 3.7 EtherCAT State Machine (ESM)

The EtherCAT state machine (ESM) controls the operational state of the EtherCAT slave device.

Slave functions are accessible or executable depending on its state. To change the state of the slave device, the master controller must send specific instructions to the slave.

The instructions are written to the slave's embedded control register (ESC). In the AGD155-EC, for example:

- If the AGD155-EC device parameters are configured appropriately for the requested state, AGD155-EC will acknowledge the state by setting a register (AL Status) in the ESC.
- If parameters are not invalid, AGD155-EC will set the error flag in the AL Status register, and write an error code to the AL Status Code register.

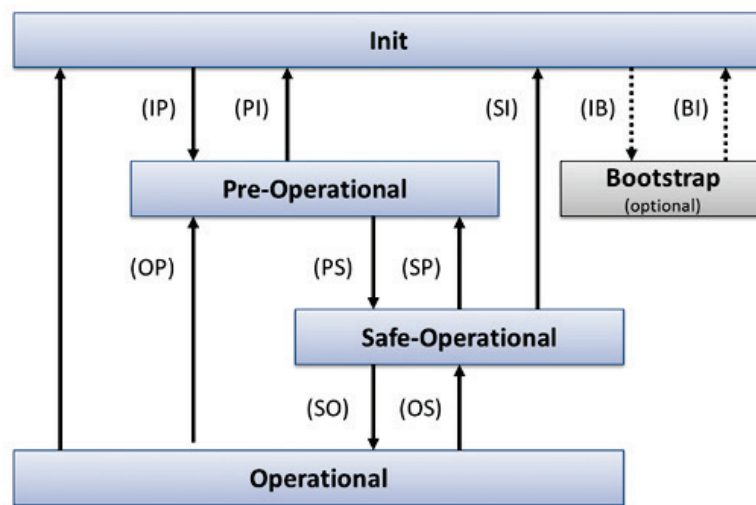


Figure 4. EtherCAT state machine (ESM)

| State                      | Description and AGD155-EC Functionality                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Initialization (INIT)      | <p>The device is powered on and initialized.</p> <p>The device performs self-tests and initializes its internal state variables.</p> <p>The master controller has access only to the slave's control register (ESC).</p> <p>On the application layer, SDO and PDO communication are not available.</p>                                                                                                                                                                            |
| Pre-operational (PRE-OP)   | <p>The device is ready to communicate with the EtherCAT network, but it is not yet actively exchanging data.</p> <p>The device can be configured and tested, and parameters can be set.</p> <p>The master controller configures PDO mapping.</p> <p>On the application layer, SDO communication is available, but PDO communication is not available.</p>                                                                                                                         |
| Safe operational (SAFE-OP) | <p>The device actively exchanges data with the EtherCAT network, but it is in a safe mode. This means the device has limited functionality and cannot perform certain operations that could be unsafe.</p> <p>In this state the master evaluates TPDOs from the drive, but does not update RPDOs.</p> <p>On the application layer, both SDO and PDO communication are available, but PDO data is not processed.</p> <p>AGD155-EC cannot be enabled and motion is not allowed.</p> |

| State                | Description and AGD155-EC Functionality                                                                                                                                                                                                                                                                                         |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operational (OP)     | The device is fully operational and can perform all necessary functions. The device actively exchanges data with the EtherCAT network and can be used for real-time control and monitoring.<br>On the application layer, both SDO and PDO communication are available.<br>AGD155-EC can be enabled and execute motion commands. |
| Bootstrap (optional) | In this state, slave firmware can be updated. This state is optional.<br>AGD155-EC does not support Bootstrap functionality.                                                                                                                                                                                                    |

### 3.8 Power State Machine

The power state machine, defined in standard CiA 402, controls the behavior of a drive's power system. The state machine defines a set of power states, and specifies the conditions that allow the drive to transition between those states.

To switch to the Operation Enabled state, a drive such as the AGD155-EC, must first pass through the state machine.

State changes are requested in object 0x6040 (controlword). The actual state of the state machine is indicated in object 0x6041 (statusword).

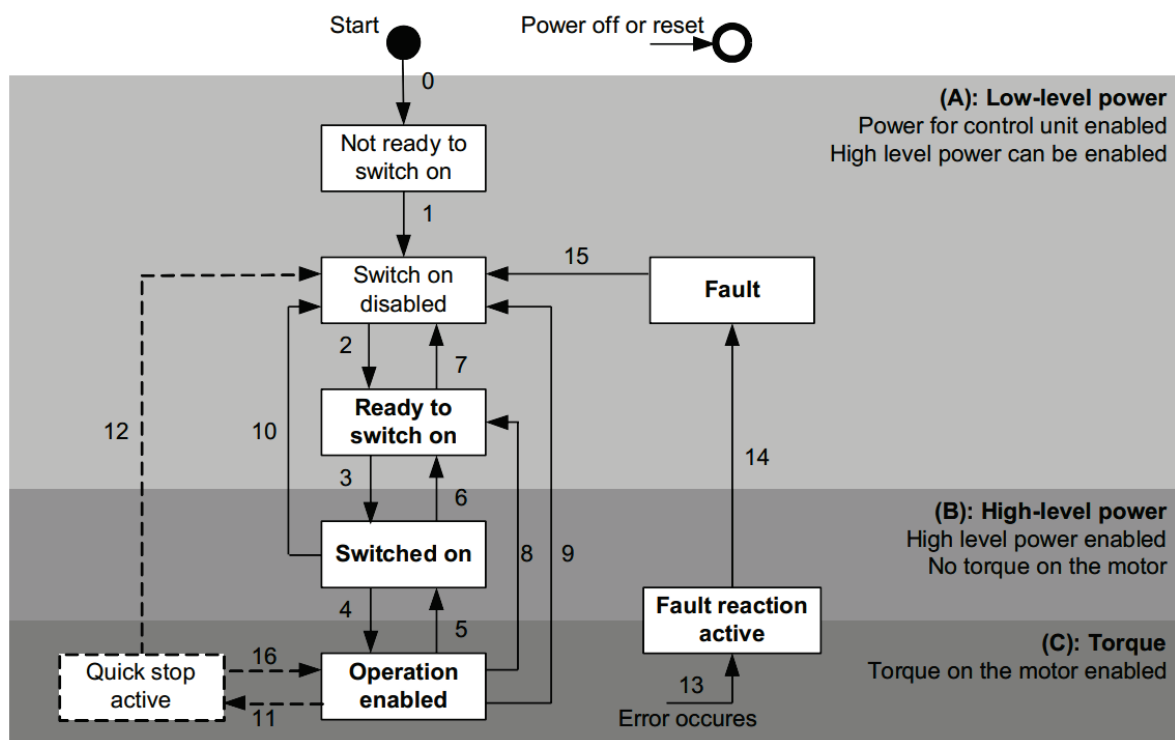


Figure 5. Drive power state machine

The following table shows which bits of object 0x6040 are used for the transitions.

| Command                                                                                              | Bits of the controlword                                                           |       |       |       |       | Transitions     |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-----------------|
|                                                                                                      | Bit 7                                                                             | Bit 3 | Bit 2 | Bit 1 | Bit 0 |                 |
| Shutdown                                                                                             | 0                                                                                 | X     | 1     | 1     | 0     | 2,6,8           |
| Switch on                                                                                            | 0                                                                                 | 0     | 1     | 1     | 1     | 3               |
| Switch on + enable operation                                                                         | 0                                                                                 | 1     | 1     | 1     | 1     | 3 + 4<br>(NOTE) |
| Disable voltage                                                                                      | 0                                                                                 | X     | X     | 0     | X     | 7,9,10,12       |
| Quick stop                                                                                           | 0                                                                                 | X     | 0     | 1     | X     | 7,10,11         |
| Disable operation                                                                                    | 0                                                                                 | 0     | 1     | 1     | 1     | 5               |
| Enable operation                                                                                     | 0                                                                                 | 1     | 1     | 1     | 1     | 4,16            |
| Fault reset                                                                                          |  | X     | X     | X     | X     | 15              |
| NOTE Automatic transition to enable operation state after executing switched on state functionality. |                                                                                   |       |       |       |       |                 |

Figure 6. Command coding

### 3.9 Cycle Time

EtherCAT communication is cyclic synchronous – messages are transmitted continuously at fixed intervals (cycles) between the EtherCAT master controller and the slave devices.

The EtherCAT master controller sends the target parameters (position, velocity, or torque) to the AGD155-EC according to the configured PDO update cycle time.

AGD155-EC supports cycle times in  $2^n$  multiples of 62.5µs. For example, 62.5, 125, 250, 500, 1000, 2000, 4000, 8000, and so on. The minimal cycle time is 62.5µs.

### 3.10 EtherCAT Slave Information (ESI)

The EtherCAT slave information file (ESI file) defines properties of a slave device that are specifically relevant to EtherCAT and the application. The ESI file is provided by the device manufacturer in XML format.

The ESI includes:

- Vendor ID. A unique identifier assigned to the manufacturer of the slave device.
- Product code. Identifies the specific product or model of the slave device.
- Revision number. Identifies the firmware or hardware revision of the slave device.
- Serial number. A unique identifier assigned to each slave device by the manufacturer.
- Configuration data. Information about the slave device's configuration, such as the number of input and output channels.
- Process data object (PDO) mapping. Defines the PDO mapping for the slave device.
- Sync manager configuration. Defines the configuration of the EtherCAT sync manager for the slave device.
- Distributed clocks. Information about the slave device's clock synchronization settings.

Most master controllers have a specific folder for the XML file. After the file is saved to the folder, the controller must be restarted to load the ESI data.

When a slave device is connected to an EtherCAT network, the master controller accesses the ESI data (from device EEPROM and/or the XML file in the controller), and uses it to configure and communicate with the slave.

The AGD155-EC is supplied with its ESI file on a factory-burned EEPROM. Updated ESIs can be downloaded as XML files from the product webpage. The EEPROM image in the drive and the XML file in the master must contain identical data. The ESI file can generate an EEPROM image that can be downloaded to the slave.

If you update the AGD155-EC firmware, you must also reburn the EEPROM containing the ESI.

Customized firmware for the AGD155-EC is always supplied with a suitable XML file.

## 4 AGD155-EC Operation Modes

AGD155-EC supports the following EtherCAT operation modes:

- 1 – Profile position mode (PP)
- 6 – Homing mode
- 8 – Cyclic synchronous position mode (CSP)

Object 0x6060 is used to set modes of operation by controller. Object 0x6061 is used to display the actual mode of operation in the drive.

It is possible to switch between operations modes on the fly, while the motor is enabled and stopped.

### 4.1 Profile Position Mode

The Profile Position mode uses the drive's internal profile generator.

AGD155-EC can be configured for trapezoidal or S-curve point-to-point profiles.

The EtherCAT master defines the move distance, speed, acceleration, deceleration, and jerk.

Blended motion profiles can be generated by updating the target position before the move is completed.

Profile Position mode is for point-to-point, non-coordinated motions.

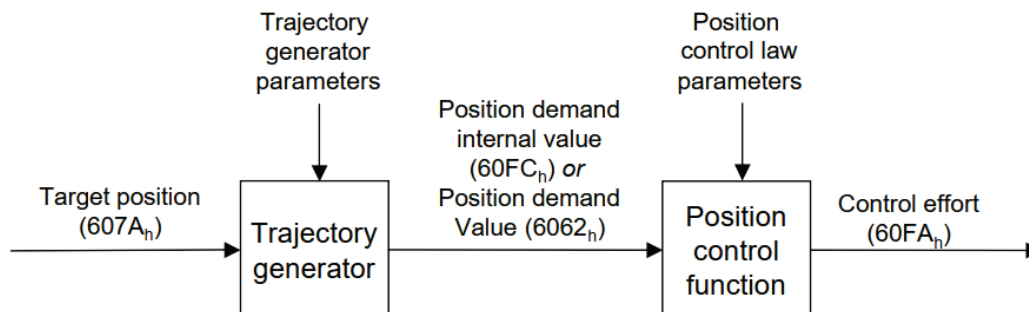


Figure 7.

Motion is started by the New Set Point bit in the controlword (object 0x6040).

Motion is ended when the Target Reached bit in statusword (object 0x6041) is set to 1.

## 4.2 Homing Mode

The Homing mode is used to define and execute the method by which a drive seeks the home position (also called the reference point or zero point).

There are various methods of achieving this using limit switches at the ends of travel or a home switch (zero-point switch) in mid-travel. Most methods also use the index (zero) pulse train from an incremental encoder. The drive's internal profile generator is used for the homing motion.

The AGD155-EC can be configured for trapezoidal, or S-curve point-to-point profiles.

The EtherCAT master defines the homing sequence, speed, acceleration, and deceleration.

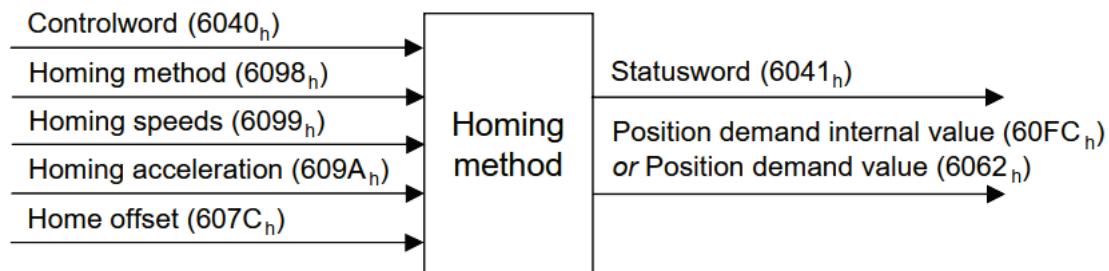


Figure 8.

Motion is started by the Home Operation Start bit in the controlword (object 0x6040 ). Homing is achieved when the Target Reached and the Homing Attained bits in status word (object 0x6041) are set to 1.

**Note:** Some EtherCAT controllers implement the Homing mode internally in the master. In such instances, the drive typically operates in CSP mode and the drive's touch probe is used to capture the position of the homing reference signal. In addition, all parameters related to homing are set in the EtherCAT controller.

## 4.3 Cyclic Synchronous Position Mode

The Cyclic Synchronous Position mode is a cyclic and synchronous mode of operation. In this mode the EtherCAT master controller sends the target position values to the drive at every PDO cycle time. The AGD155-EC has a cycle time of 62.5  $\mu$ s.

The EtherCAT PDO cycle time is usually slower, meaning the AGD155-EC receives a PDO with updated target position every  $N$  cycles of the position loop. Therefore, the AGD155-EC interpolates the target position from the EtherCAT master to  $N$  internal position commands.

AGD155-EC supports linear and cubic interpolation.

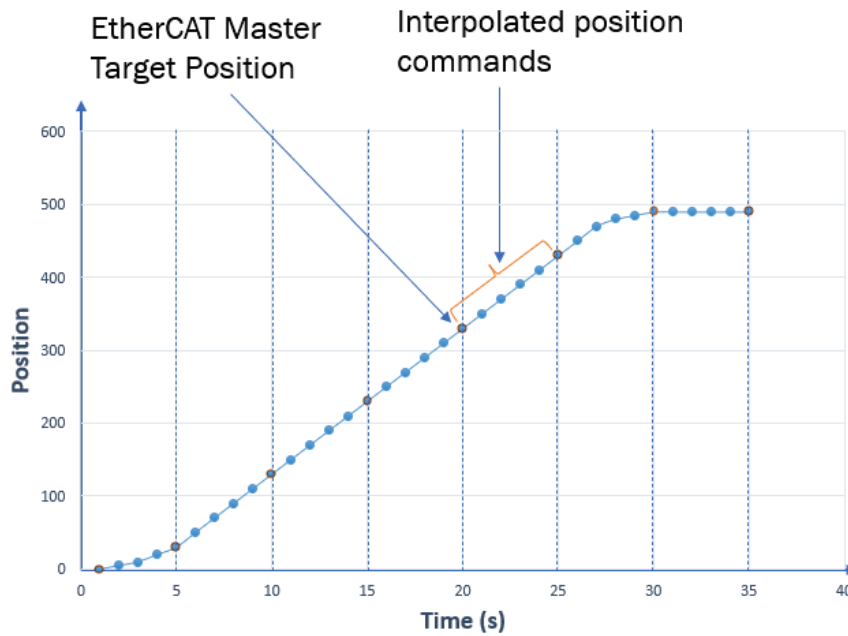


Figure 9.

The drive performs position control, velocity control and torque control. Optionally, additive velocity and torque values can be provided by the EtherCAT master to allow for velocity and/or torque feedforward. Measured by sensors, the drive may report actual values of position, velocity, and torque to the EtherCAT master.

The drive's control diagram is shown in the following figure.

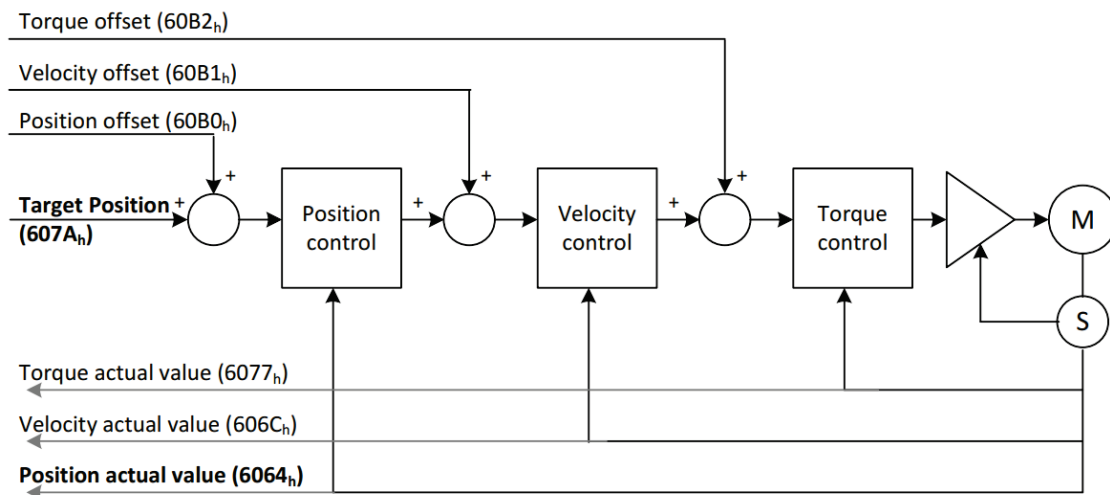


Figure 10.

## 5 AGD155-EC Configuration using TwinCAT3

For TwinCAT 3, ESI files are found in the folder **C:\TwinCAT\3.1\Config\Io\EtherCAT** or a similar path under the TwinCAT 3 installation folder.

**Note:** The configuration instructions assume the following:

- You are using a Beckhoff IPC/PLC or a computer equipped with a network card supported by TwinCAT.
- TwinCAT3 is installed.

### 5.1 Connectivity with AGD155-EC

1. Using Agito PCSuite, make sure the motor is running (perform setup, phasing, current loop and position tuning).
2. Copy the file **AGD155-EC\_ESI.xml** to the folder **C:\TwinCAT\3.1\Config\Io\EtherCAT**
3. Activate TwinCAT TcXaeShell.
4. Create a new project.
5. Connect to Beckhoff PLC:
  - In the navigation menu, make sure [project name]RefManual > SYSTEM is selected.
  - In the General tab, click **Choose Target**.

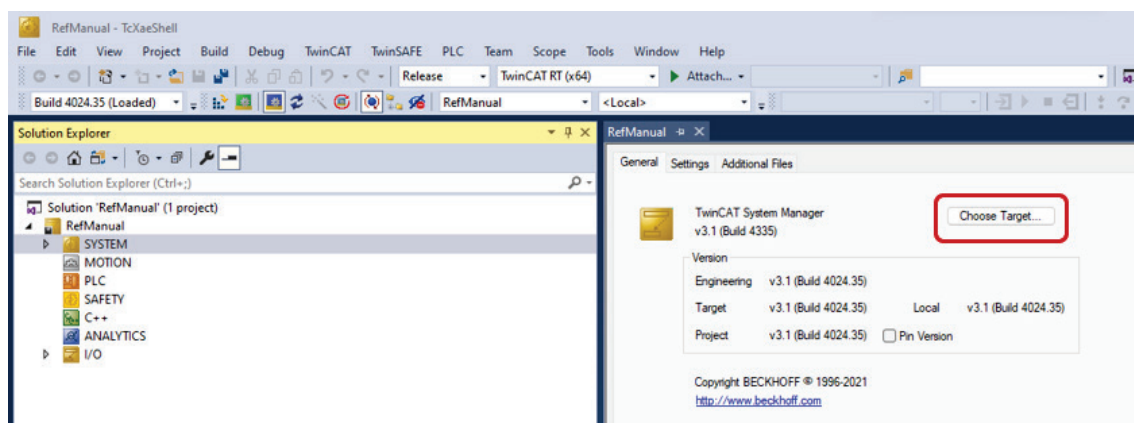


Figure 11.

- Select the PLC that is connected to the PC, and click OK.
- If the PLC does not appear in the list under Local, click **Search (Ethernet)**.

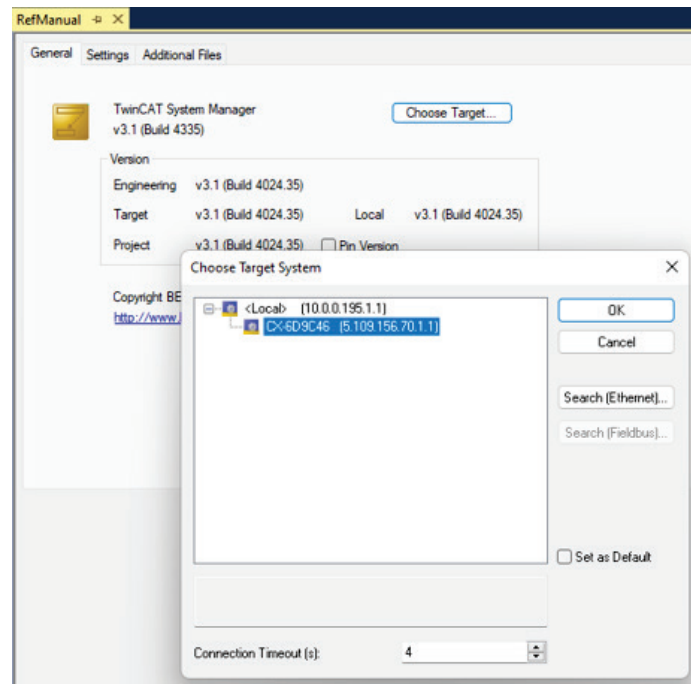


Figure 12.

## 6. Connect to the AGD155-EC:

- In the navigation menu, expand I/O, right-click **Devices**, and select **Scan**.

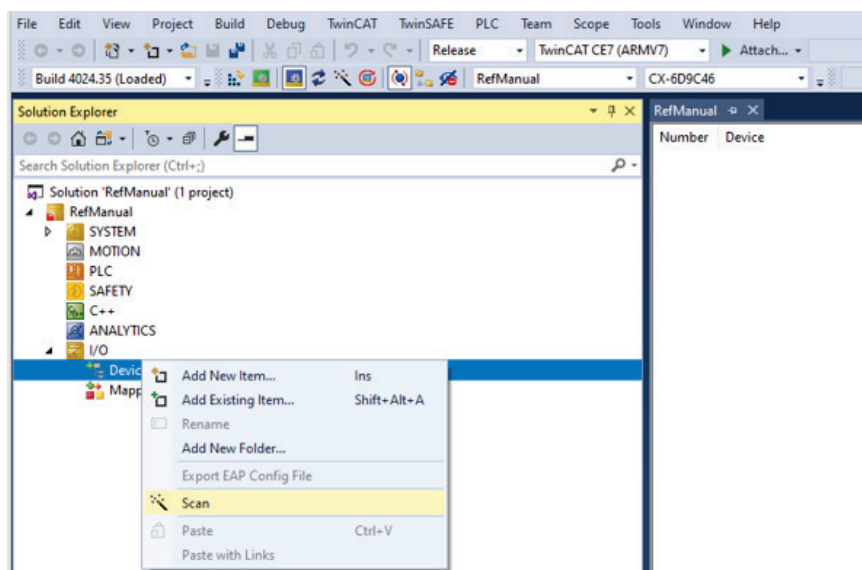


Figure 13.

- Select a device that is compatible with EtherCAT, and click OK.

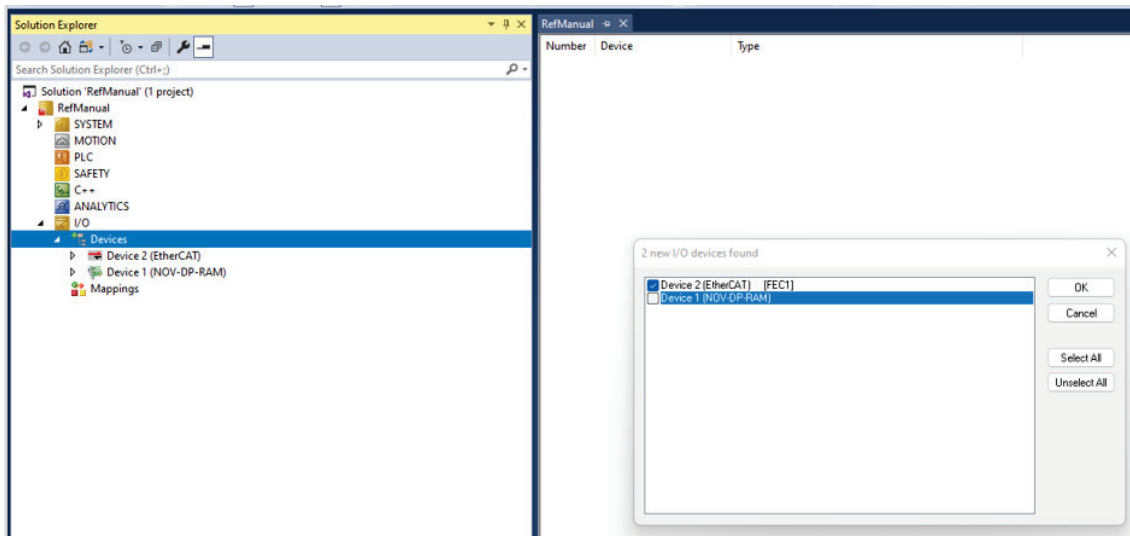


Figure 14.

- At the prompt to scan for boxes (devices), click Yes.

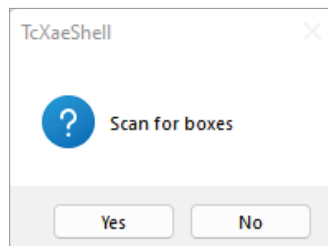


Figure 15.

- Select **NC – Configuration**, and click OK.

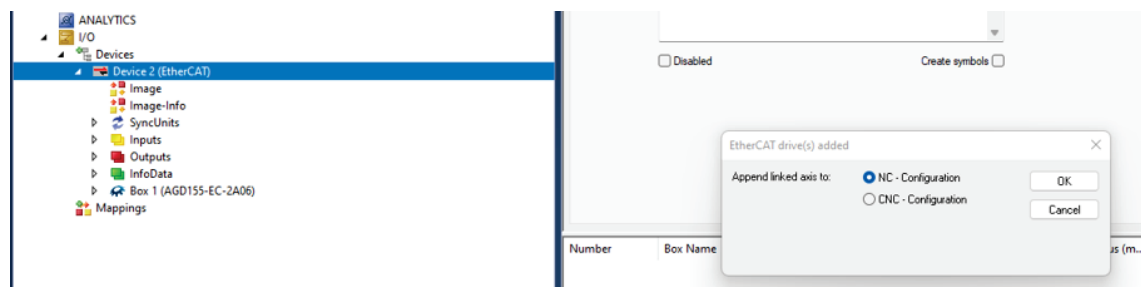


Figure 16.

- At the prompt to **Activate Free Run**, click No.
- If the configuration procedure is successful, TwinCAT adds **Box 1 (AGD155-EC)**.
- 

At the end of this procedure, xxx is displayed in the navigation pane, with all components (TPDO and RPDO) listed and automatically linked to the box/device xxx.

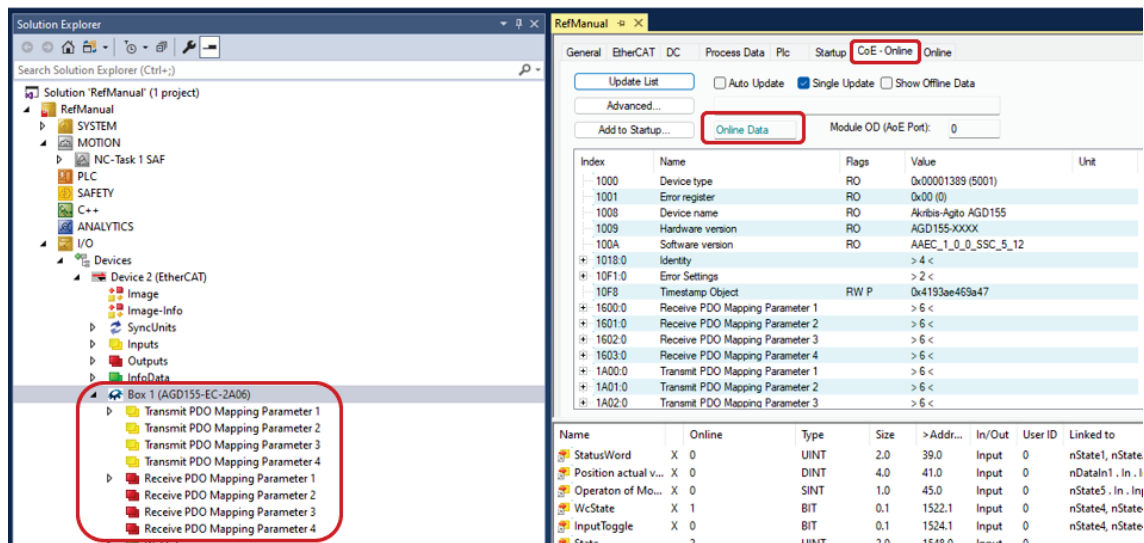


Figure 17.

11. Make sure **Box 1 (AGD155-EC)** is selected.
12. In the CoE-Online tab, the Online Data button is blue. This indicates that communication is established.
13. In the tab **DC** (distributed clock), configure the Distributed Clock settings:

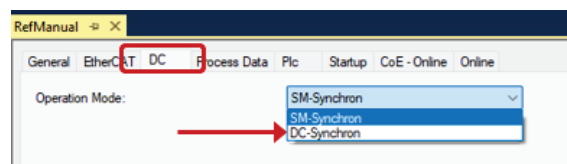


Figure 18.

- Select Operation Mode **DC-Synchron**, and click **Advanced Settings**.
- Make sure SYNC 0 is enabled. In this example, the Setup Cycle Time is 2000  $\mu$ s. You can use 1000, 2000, 4000.

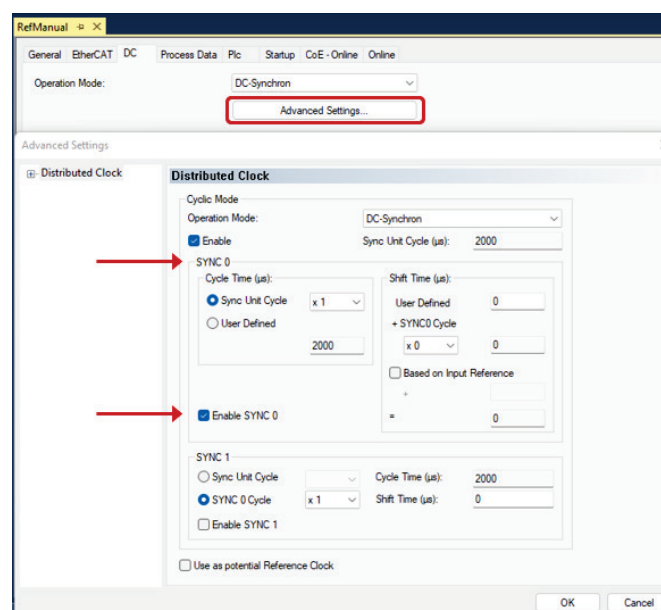


Figure 19.

## AGD155-EC Configuration using TwinCAT3

14. In the toolbar, click the **Activate Configuration** button.

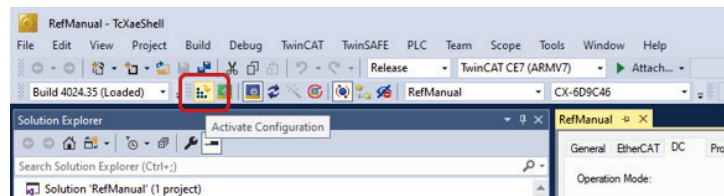


Figure 20.

15. At the prompt to activate, click OK.

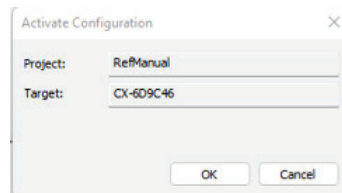


Figure 21.

16. At the prompt to restart, click OK.

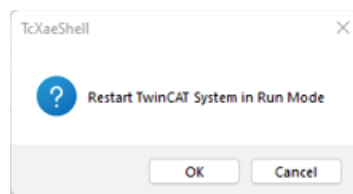


Figure 22.

17. In the navigation menu, select Motion > NC-Task > Axes > Axis 1 > **Enc**.

18. In the **Parameter** tab:

- Set Scaling Factor Numerator to 1. Press **Download**.
- Set Position Limits Monitoring to False. Press **Download**.

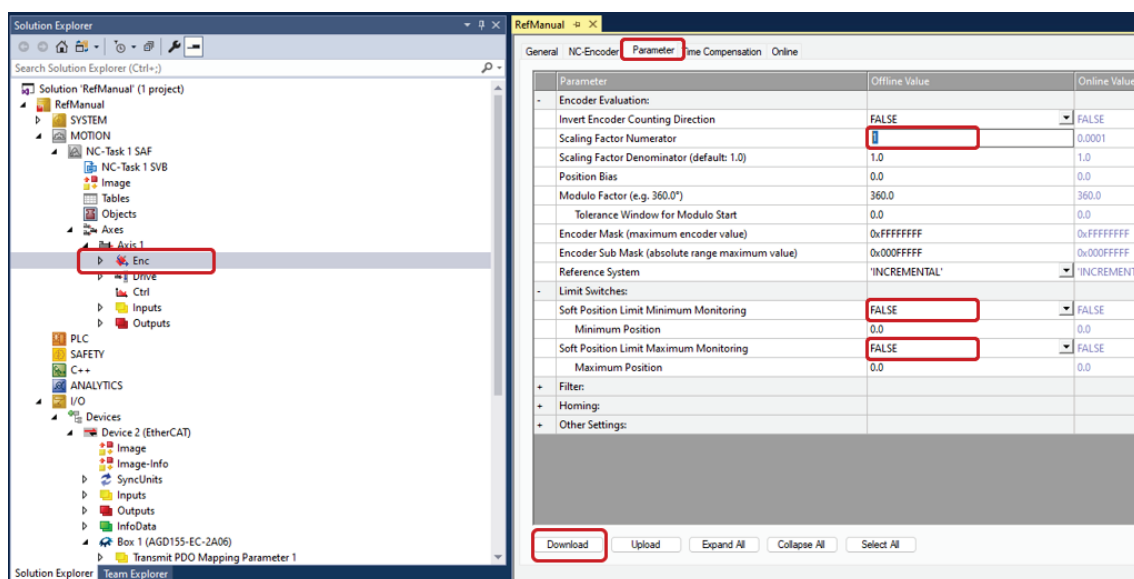


Figure 23.

19. In the navigation menu, select Motion > NC-Task > Axes > **Axis 1**.

20. In the **Parameter** tab:

- Set Position Monitoring options to **False**. Click **Download**.

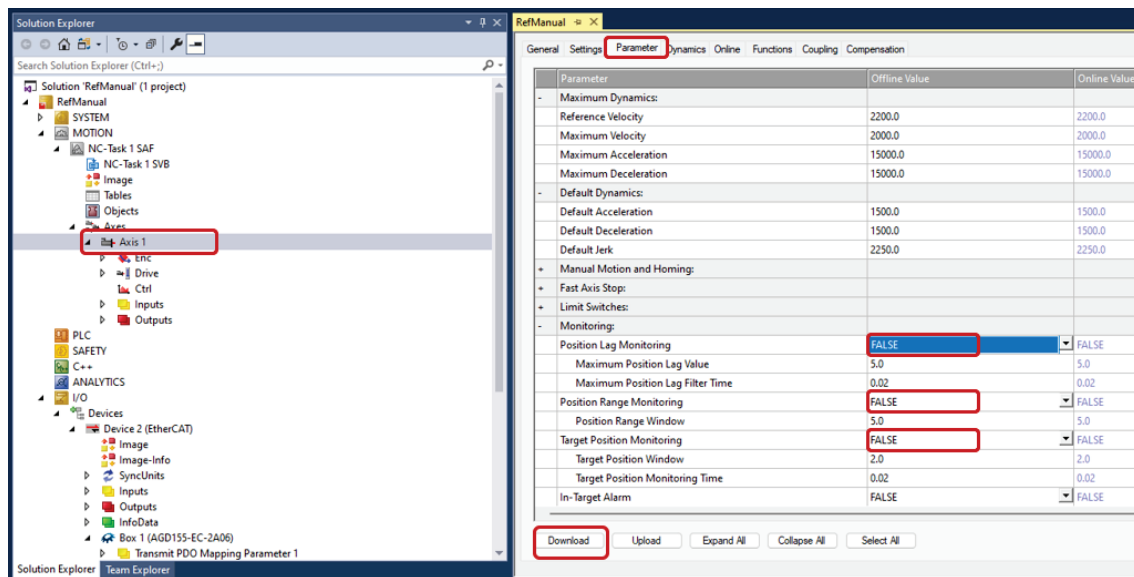


Figure 24.

21. In the **Online** tab:

- In the Enabling pane, click **Set**.
- Select all Set Enabling options, and click OK. (*Motor is enabled*)

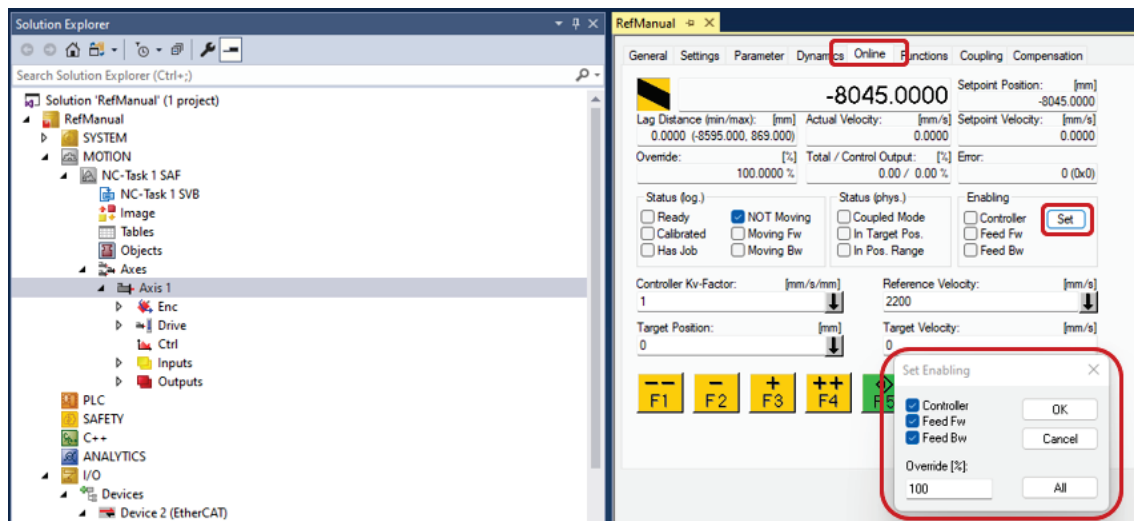


Figure 25.

22. In the **NC:Online** tab, use the buttons:

- F2, F3, F4 to jog the motor
- F5, F6 to start PTP motion
- F8 to reset alarm

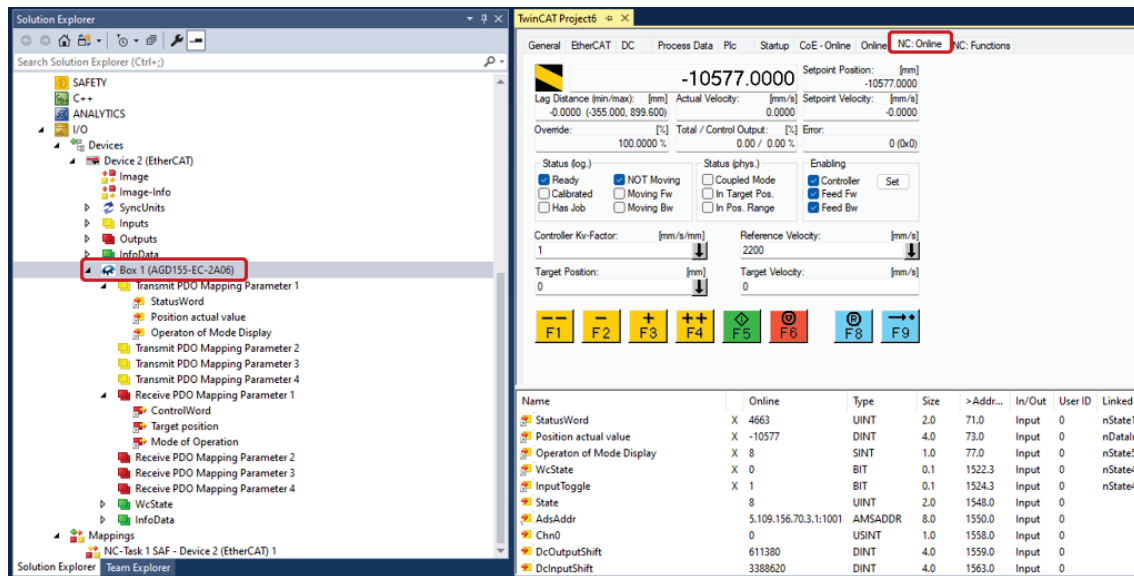


Figure 26.

## 5.2 ESI File Update

The EtherCAT slave information (ESI) file EEPROM image must match the XML file.

If the **AGD155-EC** firmware is upgraded in the field, the EEPROM in **AGD155-EC** must also be updated.

1. Copy the file **AGD155-EC\_ESI.xml** to the folder **C:\TwinCAT\3.1\Config\Io\EtherCAT**, or a similar path within the TwinCAT 3 installation folder.
2. Establish communication with TwinCAT 3 – Repeat steps 2 through 6 in the section *Connectivity with AGD155-EC*.
3. Open the **Online** tab.

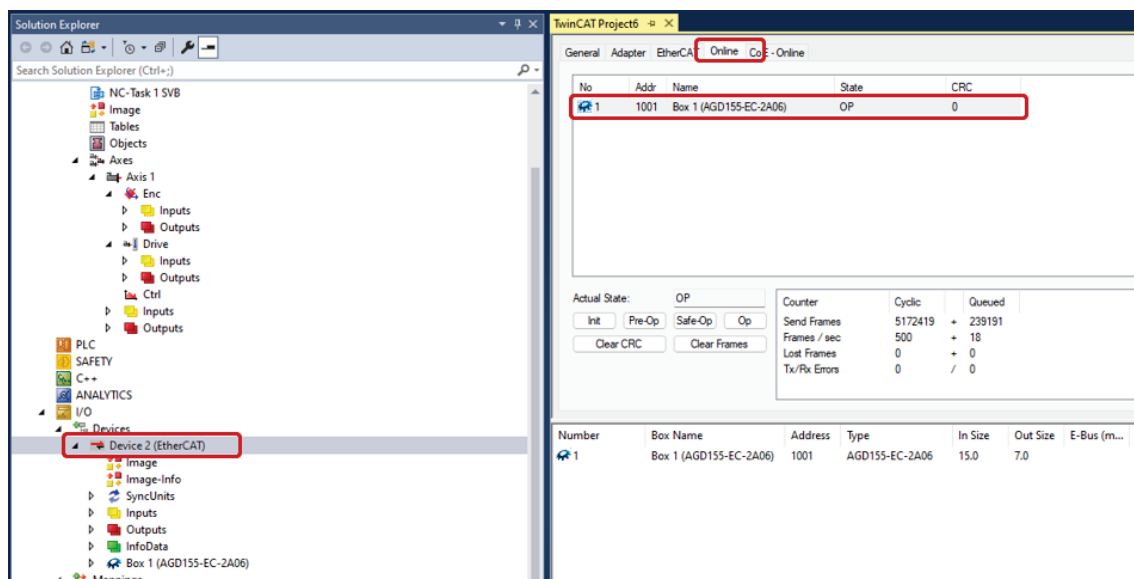


Figure 27.

4. Right-click on AGD155-EC (Box 1), and select **Request PREOP state**.

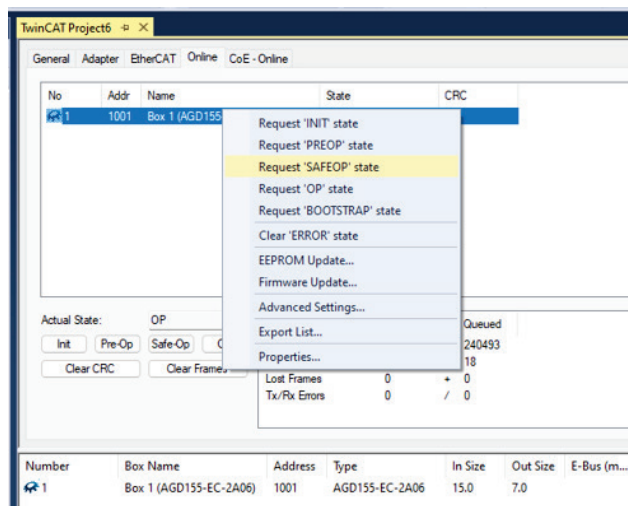


Figure 28.

The drive State field in the Onlap tab will display PRE-OP.

5. Right-click on AGD155-EC (Box 1), and select **EEPROM Update**.

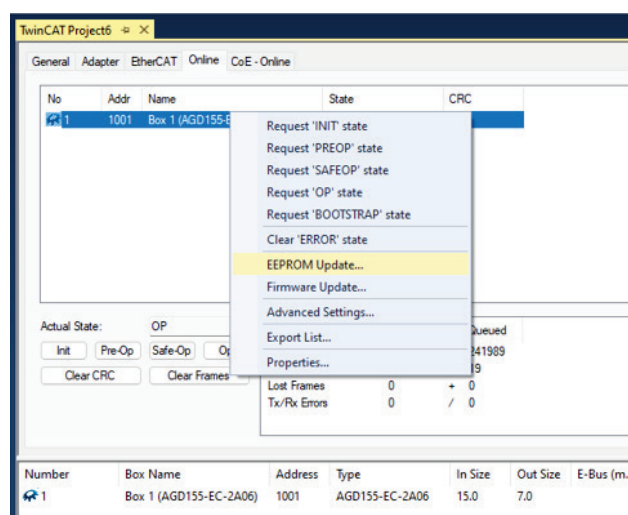


Figure 29.

- The Write EEPROM dialog box opens.  
Select **AGD155-EC EtherCAT Slave**, and click OK.

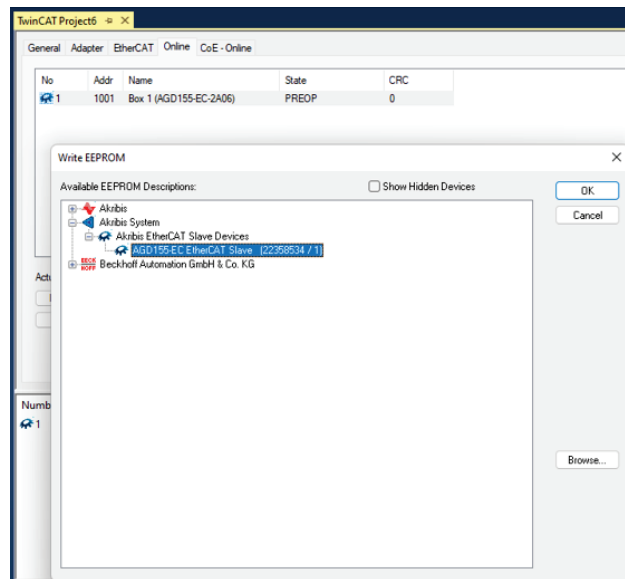


Figure 30.

- Watch the progress bar at the bottom right of the screen, and wait until the programming is completed.

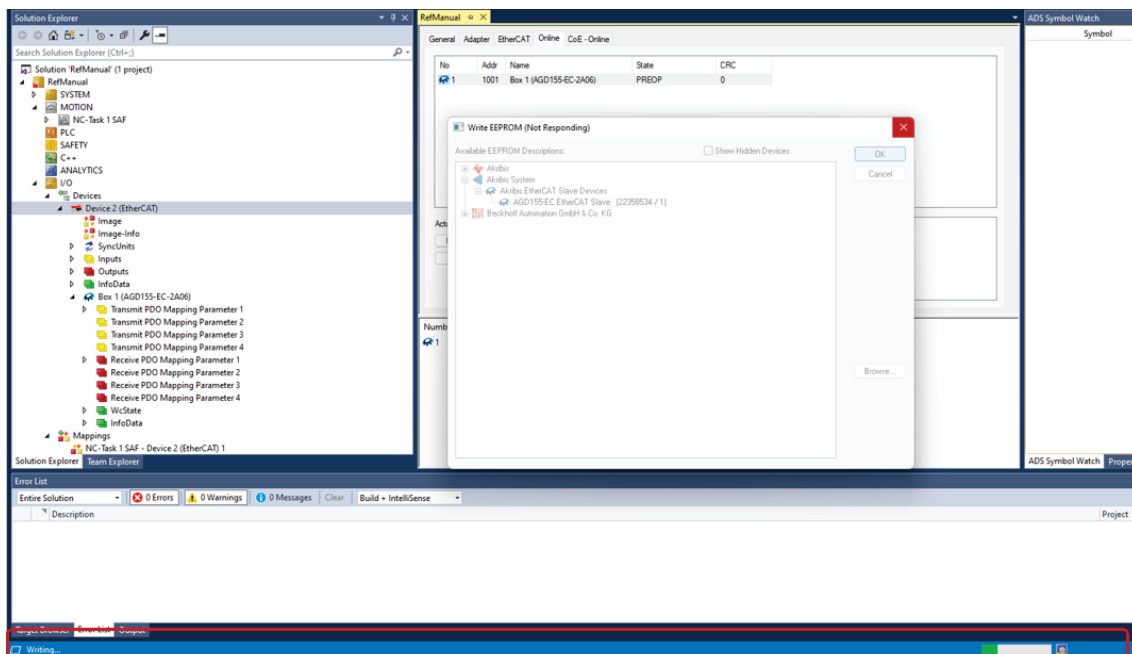


Figure 31.

## 5.3 Master-based Homing Configuration

Homing is the process of moving a motion device to a known and repeatable position.

In EtherCAT, master-based homing is initiated and controlled by an EtherCAT master controller, typically a PLC or a motion controller. The master sends homing commands to the drive over the EtherCAT network, specifying the homing method, direction, speed, and other parameters.

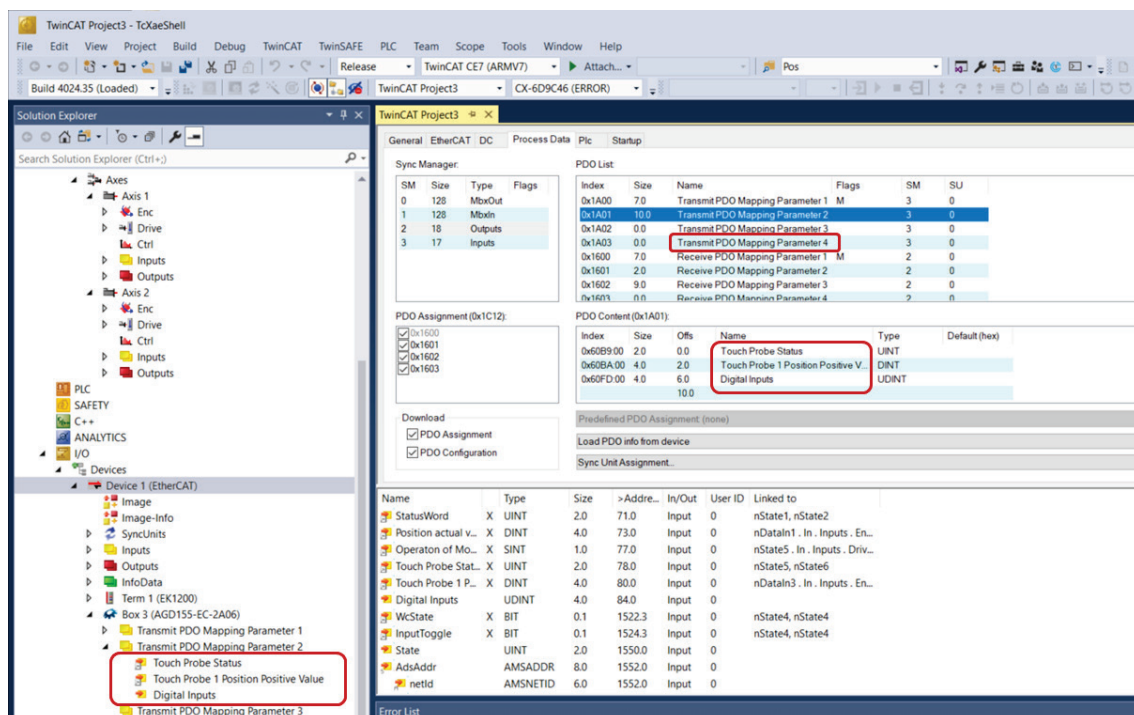
The drive executes the homing move while the master controller monitors feedback signals from the device's position sensors. The master compares the actual position of the motion device with the expected position, and makes corrections for any deviations.

In master-based homing, TPDOs are typically used for transmitting data from the slave to the master controller. The TPDO provides the data needed by the master to determine the current position of the slave device and to perform the homing process.

The master uses the RPDO to send control commands to the slave device, adjusting its position and velocity as needed.

**TPDOs** required for the homing process:

- 0x60B9 - Touch Probe Status
- 0x60BA - Touch Probe 1 Position Positive Value
- 0x60FD - Digital Inputs



The screenshot shows the TwinCAT3 software interface. The 'PDO List' table is visible, showing the mapping of TPDOs to the device's internal registers. The 'PDO Content (0x1A01)' table shows the values for the TPDOs. The 'Device 1 (EtherCAT)' tree shows the configuration of the device, with the TPDOs highlighted in red.

| Index  | Size | Name                             | Flags | SM | SU |
|--------|------|----------------------------------|-------|----|----|
| 0x1A00 | 7.0  | Transmit PDO Mapping Parameter 1 | M     | 3  | 0  |
| 0x1A01 | 10.0 | Transmit PDO Mapping Parameter 2 |       | 3  | 0  |
| 0x1A02 | 0.0  | Transmit PDO Mapping Parameter 3 |       | 3  | 0  |
| 0x1A03 | 0.0  | Transmit PDO Mapping Parameter 4 |       | 3  | 0  |
| 0x1600 | 7.0  | Receive PDO Mapping Parameter 1  | M     | 2  | 0  |
| 0x1601 | 2.0  | Receive PDO Mapping Parameter 2  |       | 2  | 0  |
| 0x1602 | 9.0  | Receive PDO Mapping Parameter 3  |       | 2  | 0  |
| 0x1603 | 0.0  | Receive PDO Mapping Parameter 4  |       | 2  | 0  |

| Index     | Size | Offs | Name                                 | Type  | Default (hex) |
|-----------|------|------|--------------------------------------|-------|---------------|
| 0x60B9.00 | 2.0  | 0.0  | Touch Probe Status                   | UINT  |               |
| 0x60BA.00 | 4.0  | 2.0  | Touch Probe 1 Position Positive V... | DINT  |               |
| 0x60FD.00 | 4.0  | 6.0  | Digital Inputs                       | UDINT |               |

Figure 32.

RPDO required for the homing process:

- 0x60B8 - Touch Probe Function

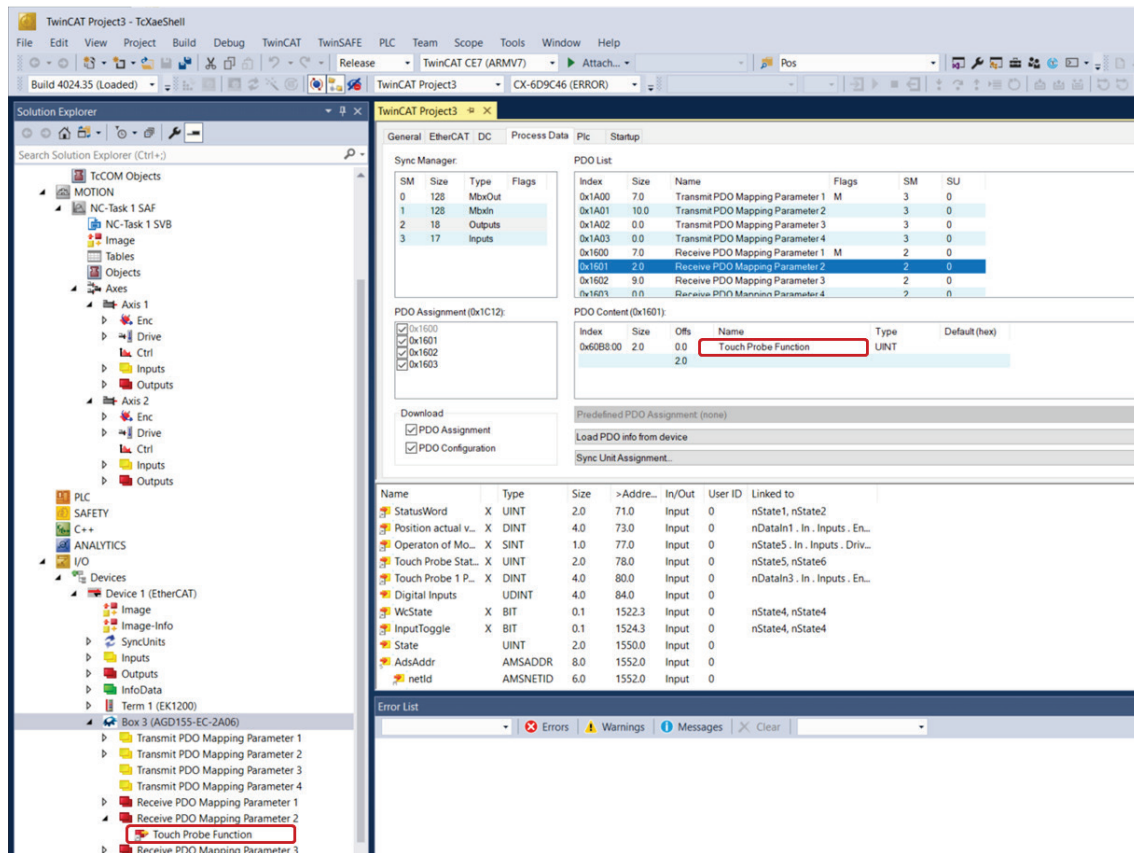


Figure 33.

To configure the master-based homing process:

1. In the navigation menu, select Motion > NC-Task > Axes > Axis 1 > Enc.
2. In the Parameter tab, define the Homing settings; select options from the Reference Mode (Sync condition) and Homing Sensor Source menus.

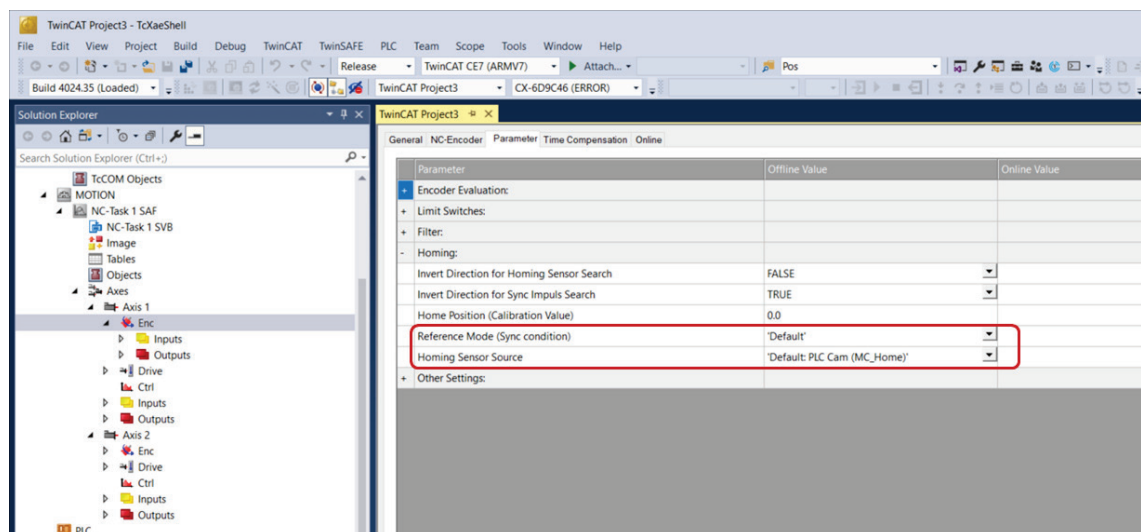


Figure 34.

For example, select a simple homing procedure that only uses a limit switch, and set the direction according to the application requirements.

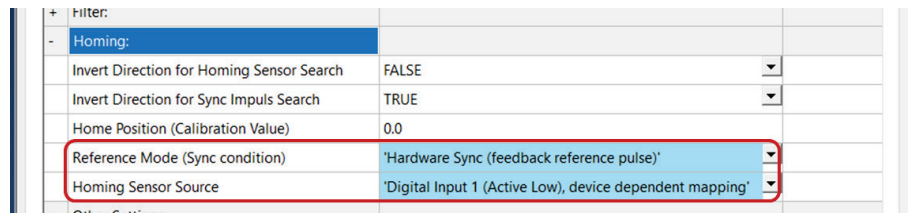


Figure 35.

3. Optionally, set additional parameters, such as search speed, acceleration, and so on.
  - In the navigation menu, select Motion > NC-Task > Axes > **Axis 1**
4. Connect the limit switches used for homing to the actual hardware (Link **Digital Inputs** (PDO object 0x60FD) to **nState8**).
  - In the navigation menu, drill down under Axis 1, and select **nState8**.

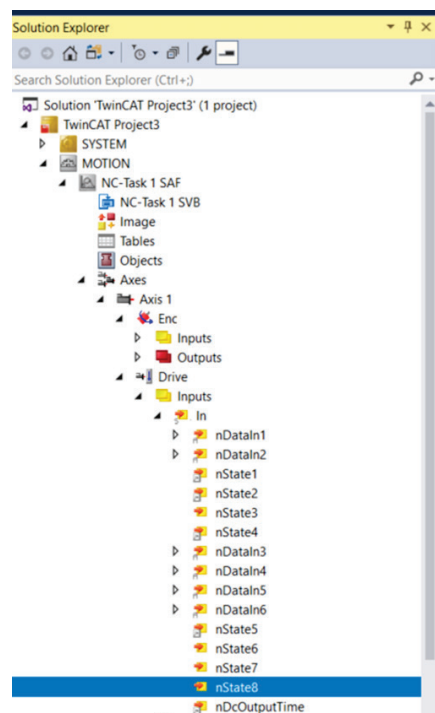


Figure 36.

- In the Variable tab, select **Linked To**.
- Select **Digital Inputs**.
- In the dialog box, change the Offset to **16** (to link it to the manufacturer's specific bits), and click OK.

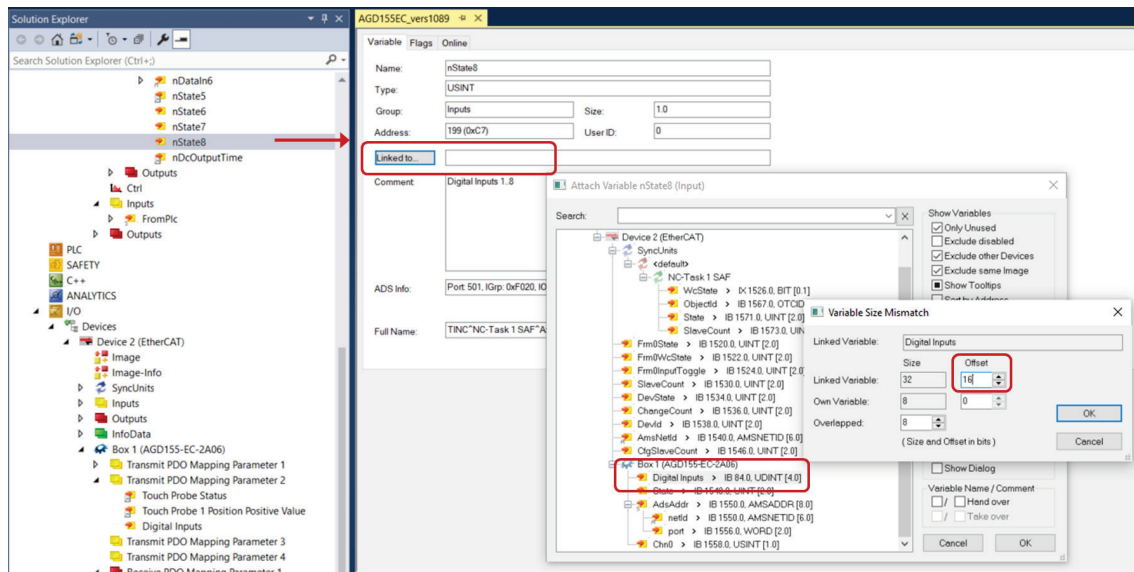


Figure 37.

5. Use Agito PCSuite to check the connection: Change the value of the inputs' logic and see if PDO Digital Inputs also changes.

To initiate homing manually, go to the Online tab:

- In the Enabling pane, click **Set**.
- Select all Set Enabling options, and click OK.

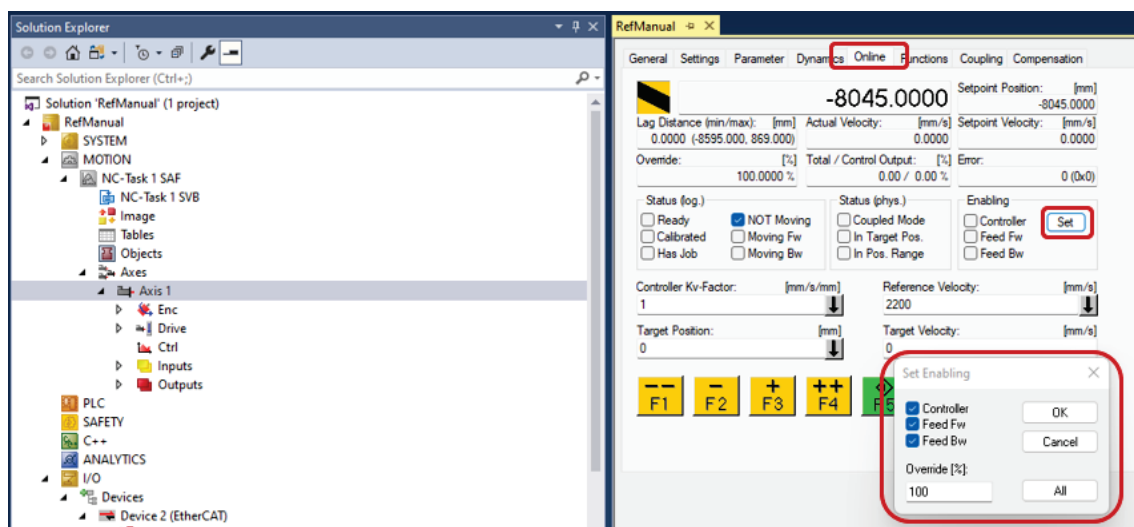


Figure 38.

- Press **F9** to start homing.

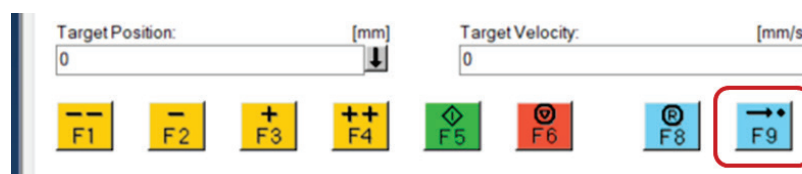


Figure 39.

## 6 PCSuite Operation

### 6.1 AGD155-EC EtherCAT Interface

The AGD155-EC drive has an EtherCAT interface, which theoretically could be used for configuration and tuning by an EtherCAT controller. However, third-party controller software do not provide a dedicated GUI optimized for AGD155-EC. It is therefore simpler to use the Agito PCSuite software via the drive's Ethernet/USB interface to perform drive configuration, tuning, troubleshooting, parameter download, and firmware/FPGA updates. The drive's EtherCAT interface is used for control commands and variables.

Agito PCSuite is required only for drive setup. Once all parameters are set and gains are tuned, you can disconnect Agito PCSuite and run the drive by means of the EtherCAT interface only.

#### AGD155-EC communication interfaces

| Communication Interface | Tasks                                                                                                  | Software                             |
|-------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------|
| EtherCAT                | Real time motion control tasks, such as Cyclic Synchronized Position/Velocity/Torque, homing, and more | Controller software such as TwinCAT3 |
| Ethernet/USB            | Parameter configuration, commissioning, gains tuning, firmware/FPGA, recording and troubleshooting.    | Agito PCSuite                        |

For details on all standard Agito PCSuite operations, refer to the *Agito PCSuite User Manual* and to the product manual. This manual focuses on Agito PCSuite EtherCAT functionalities.

### 6.2 EtherCAT Tool Functionality

The EtherCAT tool in Agito PCSuite is accessed from the Motion toolset.

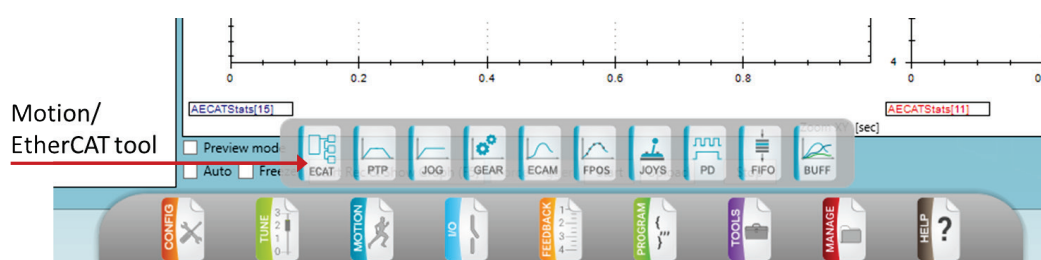


Figure 40.

The Agito PCSuite EtherCAT screen is used for monitoring and troubleshooting EtherCAT operations from the AGD155-EC side. It provides access to EtherCAT related operations, such as modes, PDO objects, controlword, and statusword.

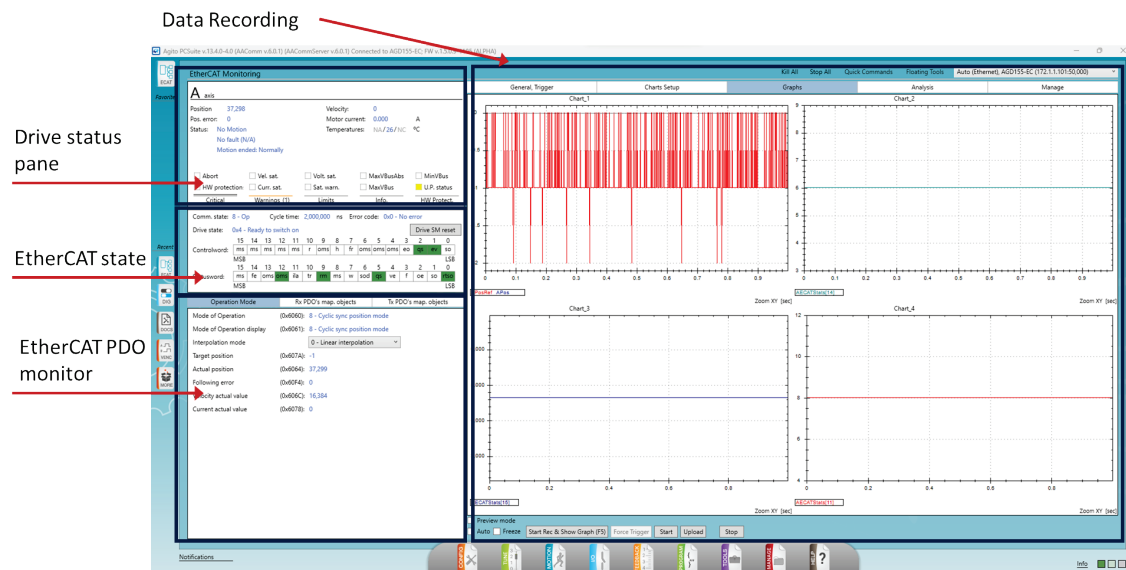


Figure 41.

The EtherCAT screen has four panes:

- **Status pane.** The drive status pane is included in most Tune and Motion tool screens. It is also available as a floating window, accessible from the Floating Tools menu.
- **EtherCAT state pane.** Displays EtherCAT and CiA 402 state machine actual states, actual EtherCAT cycle time, statusword and controlword.
- **EtherCAT PDO pane.** The pane has 3 tabs:
  - Operation mode. Displays objects applicable to the operation mode.
  - RxPDO actual mapping
  - TxPDO actual mapping
- **Data Recording.** This pane is used for real time variables recording, and records EtherCAT statuses and standard variables.

To record the EtherCAT status:

1. In the **Charts Setup** tab:
  - From the Category list, select **EtherCAT**.

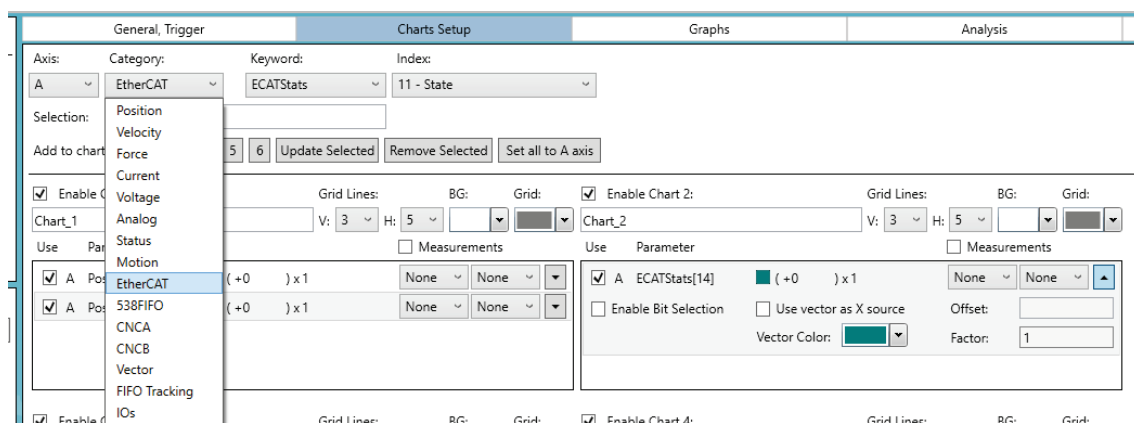


Figure 42.

- From the Index list, select the variable to record.

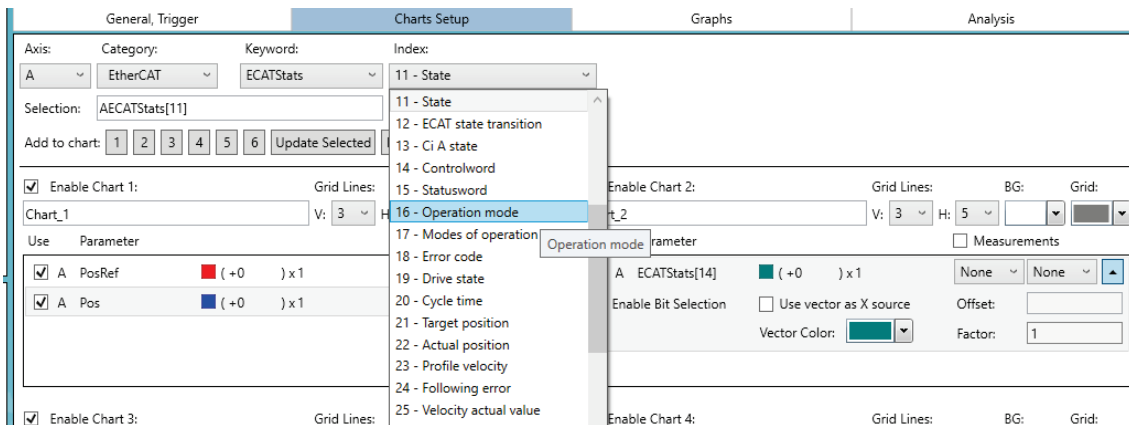


Figure 43.

- In the **General, Trigger** tab:

- Configure the recording duration.
- Configure the recording resolution.
- Press **Start Recording**.

## 6.3 Read/Write EtherCAT Objects

In some cases, typically when troubleshooting, it can be helpful to read/write a particular object from/to the object dictionary. While this can be done through the EtherCAT interface, there may be instances where you cannot access to the EtherCAT controller interface. In such instances, you can use the Agito PCSuite Terminal to read from and write to objects.

The **read** command: **SDO(object,sub-index)**

where:

- object** is the object index number in the object dictionary.
- sub-index** is the required sub-index

The **write** command: **SDO(object,sub-index)=value**

where:

- object** is the object index number in the object dictionary.
- sub-index** is the required sub-index
- value** is the value to assign to the object

The following figure shows some examples of read and write commands.

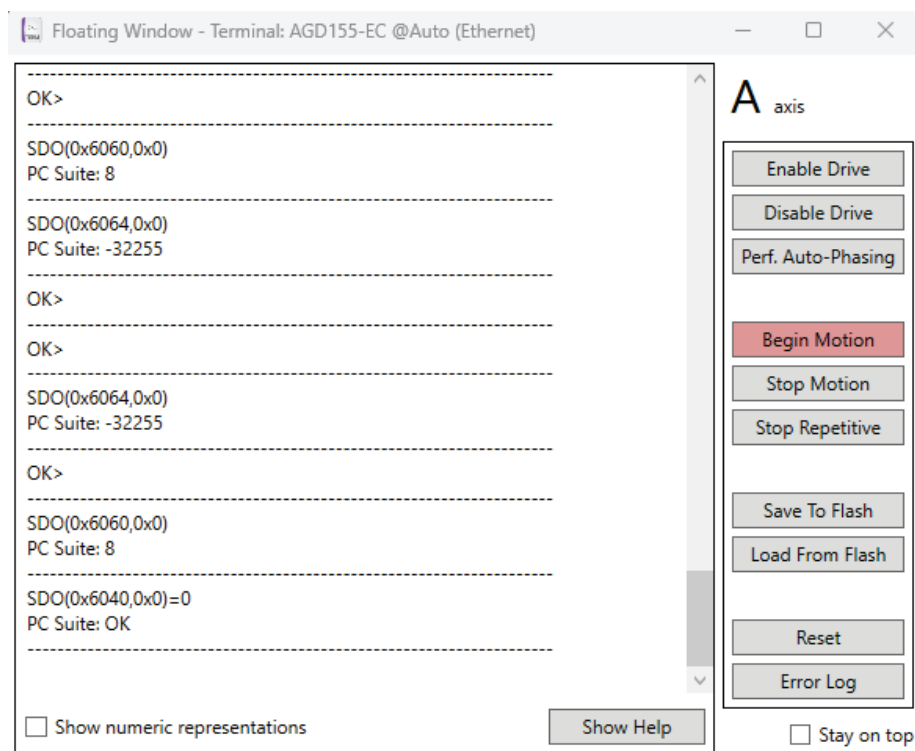


Figure 44.

## 7 Object Dictionary

### 7.1 Communication Objects (1000h to 1FFFh)

#### 1000h: Device Type

This object indicates the type of device and its functionality.

##### Object Description

|             |             |
|-------------|-------------|
| Index       | 1000h       |
| Name        | Device Type |
| Object Code | Variable    |
| Data Type   | Unsigned32  |

##### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/O             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 5001            |
| Save to NVRAM   | No              |
| Units           | NA              |
| PCSuite Keyword | NA              |

#### 1001h: Error Register

This object reports error information.

It is a field of 8 bits, each of which indicates a particular type of error. If a bit is set to 1, the specified error has occurred.

The generic error bit must be implemented. The other bits are optional.

##### Description

| 7                     | 6        | 5                       | 4                   | 3           | 2       | 1       | 0             |
|-----------------------|----------|-------------------------|---------------------|-------------|---------|---------|---------------|
| manufacturer specific | reserved | device profile specific | communication error | temperature | voltage | current | generic error |

##### Object Description

|             |                |
|-------------|----------------|
| Index       | 1001h          |
| Name        | Error Register |
| Object Code | Variable       |
| Data Type   | Unsigned8      |

##### Entry Description

|           |     |
|-----------|-----|
| Sub-Index | 00h |
|-----------|-----|

|                 |          |
|-----------------|----------|
| Access          | R/O      |
| PDO Mapping     | No       |
| Value Range     | 0 to 255 |
| Default Value   | 0        |
| Save to NVRAM   | No       |
| Units           | NA       |
| PCSuite Keyword | NA       |

### 1008h: Device Name

This object indicates the device name assigned by manufacturer.

#### Object Description

|             |             |
|-------------|-------------|
| Index       | 1008h       |
| Name        | Device Name |
| Object Code | Variable    |
| Data Type   | String      |

#### Entry Description

|                 |                      |
|-----------------|----------------------|
| Sub-Index       | 00h                  |
| Access          | R/O                  |
| PDO Mapping     | No                   |
| Value Range     | NA                   |
| Default Value   | Akribis-Agito AGD155 |
| Save to NVRAM   | No                   |
| Units           | NA                   |
| PCSuite Keyword | NA                   |

### 1009h: Hardware Version

This object indicates the device hardware version number.

#### Object Description

|             |                  |
|-------------|------------------|
| Index       | 1009h            |
| Name        | Hardware Version |
| Object Code | Variable         |
| Data Type   | String           |

**Entry Description**

|                 |             |
|-----------------|-------------|
| Sub-Index       | 00h         |
| Access          | R/O         |
| PDO Mapping     | No          |
| Value Range     | NA          |
| Default Value   | AGD155-XXXX |
| Save to NVRAM   | No          |
| Units           | NA          |
| PCSuite Keyword | NA          |

**100Ah: Software Version**

This object indicates the software version number.

**Object Description**

|             |                  |
|-------------|------------------|
| Index       | 100Ah            |
| Name        | Software Version |
| Object Code | Variable         |
| Data Type   | String           |

**Entry Description**

|                 |                     |
|-----------------|---------------------|
| Sub-Index       | 00h                 |
| Access          | R/O                 |
| PDO Mapping     | No                  |
| Value Range     | NA                  |
| Default Value   | AAEC_1_0_0_SSC_5_12 |
| Save to NVRAM   | No                  |
| Units           | NA                  |
| PCSuite Keyword | NA                  |

**1018h: Identity**

This object reports general information about the device, such as vendor ID, product code, revision and serial number.

**Object Description**

|             |          |
|-------------|----------|
| Index       | 1018h    |
| Name        | Identity |
| Object Code | Variable |
| Data Type   | Record   |

**Entry Description**

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 1 to 4       |
| Default Value   | 4            |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 01h             |
| Description     | Vendor ID       |
| Data Type       | Unsigned32      |
| Access          | R/O             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0x0E69          |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 02h             |
| Description     | Product Code    |
| Data Type       | Unsigned32      |
| Access          | R/O             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 22347776        |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|             |                 |
|-------------|-----------------|
| Sub-Index   | 03h             |
| Description | Revision        |
| Data Type   | Unsigned32      |
| Access      | R/O             |
| PDO Mapping | No              |
| Value Range | 0 to 4294967295 |

|                 |     |
|-----------------|-----|
| Default Value   | 4   |
| Save to NVRAM   | Yes |
| Units           | NA  |
| PCSuite Keyword | NA  |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 04h             |
| Description     | Serial Number   |
| Data Type       | Unsigned32      |
| Access          | R/O             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

## 10F1h: Error Settings

This object reports error setting information for the device.

### Object Description

|             |                |
|-------------|----------------|
| Index       | 10F1h          |
| Name        | Error Settings |
| Object Code | Variable       |
| Data Type   | Record         |

### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | Subindex 000 |
| Data Type       | Unsigned8    |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 2            |
| Default Value   | 2            |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | NA           |

|             |                      |
|-------------|----------------------|
| Sub-Index   | 01h                  |
| Description | Local Error Reaction |
| Data Type   | Unsigned32           |

|                 |                 |
|-----------------|-----------------|
| Access          | R/O             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 1               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                          |
|-----------------|--------------------------|
| Sub-Index       | 02h                      |
| Description     | Sync Error Counter Limit |
| Data Type       | Unsigned32               |
| Access          | R/O                      |
| PDO Mapping     | No                       |
| Value Range     | 0 to 4294967295          |
| Default Value   | 4                        |
| Save to NVRAM   | Yes                      |
| Units           | NA                       |
| PCSuite Keyword | NA                       |

### 10F8h: Timestamp Object

This object defines the timestamp in the drive.

#### Object Description

|             |                  |
|-------------|------------------|
| Index       | 10F8             |
| Name        | Timestamp Object |
| Object Code | Variable         |
| Data Type   | Unsigned64       |

#### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/W        |
| PDO Mapping     | TPDO       |
| Value Range     | 0 to 65536 |
| Default Value   | 0          |
| Save to NVRAM   | No         |
| Units           | NA         |
| PCSuite Keyword | NA         |

## 1600h: Receive PDO Mapping Parameter 1

This object defines the mapping parameters for the PDOs the device is able to receive. (RPDO1)  
Each RxPDO Mapping Parameter can map up to 6 objects.

### Object Description

|             |                                 |
|-------------|---------------------------------|
| Index       | 1600h                           |
| Name        | Receive PDO Mapping Parameter 1 |
| Object Code | Variable                        |
| Data Type   | Record                          |

### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | Subindex 000 |
| Data Type       | Unsigned8    |
| Access          | R/W          |
| PDO Mapping     | No           |
| Value Range     | 0 to 64      |
| Default Value   | 3            |
| Save to NVRAM   | Yes          |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                         |
|-----------------|-------------------------|
| Sub-Index       | 01h                     |
| Description     | Mapping Entry 1         |
| Data Type       | Unsigned32              |
| Access          | R/W                     |
| PDO Mapping     | No                      |
| Value Range     | 0 to 4294967295         |
| Default Value   | Mapping to Object 6040h |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|               |                         |
|---------------|-------------------------|
| Sub-Index     | 02h                     |
| Description   | Mapping Entry 2         |
| Data Type     | Unsigned32              |
| Access        | R/W                     |
| PDO Mapping   | No                      |
| Value Range   | 0 to 4294967295         |
| Default Value | Mapping to Object 607Ah |
| Save to NVRAM | Yes                     |

|                 |    |
|-----------------|----|
| Units           | NA |
| PCSuite Keyword | NA |

|                 |                         |
|-----------------|-------------------------|
| Sub-Index       | 03h                     |
| Description     | Mapping Entry 3         |
| Data Type       | Unsigned32              |
| Access          | R/W                     |
| PDO Mapping     | No                      |
| Value Range     | 0 to 4294967295         |
| Default Value   | Mapping to Object 6060h |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 04h             |
| Description     | Mapping Entry 4 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 05h             |
| Description     | Mapping Entry 5 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|             |                 |
|-------------|-----------------|
| Sub-Index   | 06h             |
| Description | Mapping Entry 6 |
| Data Type   | Unsigned32      |
| Access      | R/W             |

|                 |                 |
|-----------------|-----------------|
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

### 1601h: Receive PDO Mapping Parameter 2

This object defines the mapping parameters for the PDOs the device is able to receive. (RPDO2)

#### Object Description

|             |                                 |
|-------------|---------------------------------|
| Index       | 1601h                           |
| Name        | Receive PDO Mapping Parameter 2 |
| Object Code | Variable                        |
| Data Type   | Record                          |

#### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | Subindex 000 |
| Data Type       | Unsigned8    |
| Access          | R/W          |
| PDO Mapping     | No           |
| Value Range     | 0 to 64      |
| Default Value   | 1            |
| Save to NVRAM   | Yes          |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                         |
|-----------------|-------------------------|
| Sub-Index       | 01h                     |
| Description     | Mapping Entry 1         |
| Data Type       | Unsigned32              |
| Access          | R/W                     |
| PDO Mapping     | No                      |
| Value Range     | 0 to 4294967295         |
| Default Value   | Mapping to Object 60B8h |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|           |     |
|-----------|-----|
| Sub-Index | 02h |
|-----------|-----|

|                 |                 |
|-----------------|-----------------|
| Description     | Mapping Entry 2 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 03h             |
| Description     | Mapping Entry 3 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 04h             |
| Description     | Mapping Entry 4 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|               |                 |
|---------------|-----------------|
| Sub-Index     | 05h             |
| Description   | Mapping Entry 5 |
| Data Type     | Unsigned32      |
| Access        | R/W             |
| PDO Mapping   | No              |
| Value Range   | 0 to 4294967295 |
| Default Value | 0               |
| Save to NVRAM | Yes             |

|                 |    |
|-----------------|----|
| Units           | NA |
| PCSuite Keyword | NA |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 06h             |
| Description     | Mapping Entry 6 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

### 1602h: Receive PDO Mapping Parameter 3

This object defines the mapping parameters for the PDOs the device is able to receive. (RPDO3)

#### Object Description

|             |                                 |
|-------------|---------------------------------|
| Index       | 1602h                           |
| Name        | Receive PDO Mapping Parameter 3 |
| Object Code | Variable                        |
| Data Type   | Record                          |

#### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/W          |
| PDO Mapping     | No           |
| Value Range     | 1 to 64      |
| Default Value   | 3            |
| Save to NVRAM   | Yes          |
| Units           | NA           |
| PCSuite Keyword | NA           |

|             |                 |
|-------------|-----------------|
| Sub-Index   | 01h             |
| Description | Mapping Entry 1 |
| Data Type   | Unsigned32      |
| Access      | R/W             |
| PDO Mapping | No              |

|                 |                         |
|-----------------|-------------------------|
| Value Range     | 0 to 4294967295         |
| Default Value   | Mapping to Object 607Ch |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|                 |                         |
|-----------------|-------------------------|
| Sub-Index       | 02h                     |
| Description     | Mapping Entry 2         |
| Data Type       | Unsigned32              |
| Access          | R/W                     |
| PDO Mapping     | No                      |
| Value Range     | 0 to 4294967295         |
| Default Value   | Mapping to Object 6098h |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|                 |                         |
|-----------------|-------------------------|
| Sub-Index       | 03h                     |
| Description     | Mapping Entry 3         |
| Data Type       | Unsigned32              |
| Access          | R/W                     |
| PDO Mapping     | No                      |
| Value Range     | 0 to 4294967295         |
| Default Value   | Mapping to Object 609Ah |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 04h             |
| Description     | Mapping Entry 4 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|           |     |
|-----------|-----|
| Sub-Index | 05h |
|-----------|-----|

|                 |                 |
|-----------------|-----------------|
| Description     | Mapping Entry 5 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 06h             |
| Description     | Mapping Entry 6 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

### 1603h: Receive PDO Mapping Parameter 4

This object defines the mapping parameters for the PDOs the device is able to receive. (RPDO4)

#### Object Description

|             |                                 |
|-------------|---------------------------------|
| Index       | 1603h                           |
| Name        | Receive PDO Mapping Parameter 4 |
| Object Code | Variable                        |
| Data Type   | Record                          |

#### Entry Description

|               |              |
|---------------|--------------|
| Sub-Index     | 00h          |
| Description   | SubIndex 000 |
| Data Type     | Unsigned8    |
| Access        | R/W          |
| PDO Mapping   | No           |
| Value Range   | 1 to 64      |
| Default Value | 0            |
| Save to NVRAM | Yes          |
| Units         | NA           |

|                 |    |
|-----------------|----|
| PCSuite Keyword | NA |
|-----------------|----|

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 01h             |
| Description     | Mapping Entry 1 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 02h             |
| Description     | Mapping Entry 2 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 03h             |
| Description     | Mapping Entry 3 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|             |                 |
|-------------|-----------------|
| Sub-Index   | 04h             |
| Description | Mapping Entry 4 |
| Data Type   | Unsigned32      |
| Access      | R/W             |
| PDO Mapping | No              |

|                 |                 |
|-----------------|-----------------|
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 05h             |
| Description     | Mapping Entry 5 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 06h             |
| Description     | Mapping Entry 6 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

### 1A00h: Transmit PDO Mapping Parameter 1

This object defines the mapping parameters for the PDOs the device is able to transmit. (TPDO1)  
Each TxPDO Mapping Parameter can map up to 6 objects.

#### Object Description

|             |                                  |
|-------------|----------------------------------|
| Index       | 1A00h                            |
| Name        | Transmit PDO Mapping Parameter 1 |
| Object Code | Variable                         |
| Data Type   | Record                           |

#### Entry Description

|           |     |
|-----------|-----|
| Sub-Index | 00h |
|-----------|-----|

|                 |              |
|-----------------|--------------|
| Description     | Subindex 000 |
| Data Type       | Unsigned8    |
| Access          | R/W          |
| PDO Mapping     | No           |
| Value Range     | 1 to 64      |
| Default Value   | 6            |
| Save to NVRAM   | Yes          |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                         |
|-----------------|-------------------------|
| Sub-Index       | 01h                     |
| Description     | Mapping Entry 1         |
| Data Type       | Mapping to Object 6041h |
| Access          | R/W                     |
| PDO Mapping     | No                      |
| Value Range     | 0 to 4294967295         |
| Default Value   | 268452192               |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|                 |                         |
|-----------------|-------------------------|
| Sub-Index       | 02h                     |
| Description     | Mapping Entry 2         |
| Data Type       | Unsigned32              |
| Access          | R/W                     |
| PDO Mapping     | No                      |
| Value Range     | 0 to 4294967295         |
| Default Value   | Mapping to Object 6064h |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|               |                         |
|---------------|-------------------------|
| Sub-Index     | 03h                     |
| Description   | Mapping Entry 3         |
| Data Type     | Unsigned32              |
| Access        | R/W                     |
| PDO Mapping   | No                      |
| Value Range   | 0 to 4294967295         |
| Default Value | Mapping to Object 6061h |
| Save to NVRAM | Yes                     |

|                 |    |
|-----------------|----|
| Units           | NA |
| PCSuite Keyword | NA |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 04h             |
| Description     | Mapping Entry 4 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 05h             |
| Description     | Mapping Entry 5 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 06h             |
| Description     | Mapping Entry 6 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

## 1A01h: Transmit PDO Mapping Parameter 2

This object defines the mapping parameters for the PDOs the device is able to transmit. (TPDO2)

### Object Description

|             |                                  |
|-------------|----------------------------------|
| Index       | 1A01h                            |
| Name        | Transmit PDO Mapping Parameter 2 |
| Object Code | Variable                         |
| Data Type   | Record                           |

### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/W          |
| PDO Mapping     | No           |
| Value Range     | 1 to 64      |
| Default Value   | 3            |
| Save to NVRAM   | Yes          |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                         |
|-----------------|-------------------------|
| Sub-Index       | 01h                     |
| Description     | Mapping Entry 1         |
| Data Type       | Unsigned32              |
| Access          | R/W                     |
| PDO Mapping     | No                      |
| Value Range     | 0 to 4294967295         |
| Default Value   | Mapping to Object 60B9h |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|               |                         |
|---------------|-------------------------|
| Sub-Index     | 02h                     |
| Description   | Mapping Entry 2         |
| Data Type     | Unsigned32              |
| Access        | R/W                     |
| PDO Mapping   | No                      |
| Value Range   | 0 to 4294967295         |
| Default Value | Mapping to Object 60BAh |
| Save to NVRAM | Yes                     |
| Units         | NA                      |

|                 |    |
|-----------------|----|
| PCSuite Keyword | NA |
|-----------------|----|

|                 |                         |
|-----------------|-------------------------|
| Sub-Index       | 03h                     |
| Description     | Mapping Entry 3         |
| Data Type       | Unsigned32              |
| Access          | R/W                     |
| PDO Mapping     | No                      |
| Value Range     | 0 to 4294967295         |
| Default Value   | Mapping to Object 60FDh |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 04h             |
| Description     | Mapping Entry 4 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 05h             |
| Description     | Mapping Entry 5 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|             |                 |
|-------------|-----------------|
| Sub-Index   | 06h             |
| Description | Mapping Entry 6 |
| Data Type   | Unsigned32      |
| Access      | R/W             |
| PDO Mapping | No              |

|                 |                 |
|-----------------|-----------------|
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

### 1A02h: Transmit PDO Mapping Parameter 3

This object defines the mapping parameters for the PDOs the device is able to transmit. (TPDO3)

#### Object Description

|             |                                  |
|-------------|----------------------------------|
| Index       | 1A02h                            |
| Name        | Transmit PDO Mapping Parameter 3 |
| Object Code | Variable                         |
| Data Type   | Record                           |

#### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/W          |
| PDO Mapping     | No           |
| Value Range     | 1 to 64      |
| Default Value   | 2            |
| Save to NVRAM   | Yes          |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                         |
|-----------------|-------------------------|
| Sub-Index       | 01h                     |
| Description     | Mapping Entry 1         |
| Data Type       | Unsigned32              |
| Access          | R/W                     |
| PDO Mapping     | No                      |
| Value Range     | 0 to 4294967295         |
| Default Value   | Mapping to Object 2410h |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|             |                 |
|-------------|-----------------|
| Sub-Index   | 02h             |
| Description | Mapping Entry 2 |

|                 |                         |
|-----------------|-------------------------|
| Data Type       | Unsigned32              |
| Access          | R/W                     |
| PDO Mapping     | No                      |
| Value Range     | 0 to 4294967295         |
| Default Value   | Mapping to Object 2416h |
| Save to NVRAM   | Yes                     |
| Units           | NA                      |
| PCSuite Keyword | NA                      |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 03h             |
| Description     | Mapping Entry 3 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 04h             |
| Description     | Mapping Entry 4 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|               |                 |
|---------------|-----------------|
| Sub-Index     | 05h             |
| Description   | Mapping Entry 5 |
| Data Type     | Unsigned32      |
| Access        | R/W             |
| PDO Mapping   | No              |
| Value Range   | 0 to 4294967295 |
| Default Value | 0               |
| Save to NVRAM | Yes             |
| Units         | NA              |

|                 |                 |
|-----------------|-----------------|
| PCSuite Keyword | NA              |
| Sub-Index       | 06h             |
| Description     | Mapping Entry 6 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

### 1A03h: Transmit PDO Mapping Parameter 4

This object defines the mapping parameters for the PDOs the device is able to transmit. (TPDO4)

#### Object Description

|             |                                  |
|-------------|----------------------------------|
| Index       | 1A03h                            |
| Name        | Transmit PDO Mapping Parameter 4 |
| Object Code | Variable                         |
| Data Type   | Record                           |

#### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/W          |
| PDO Mapping     | No           |
| Value Range     | 1 to 64      |
| Default Value   | 0            |
| Save to NVRAM   | Yes          |
| Units           | NA           |
| PCSuite Keyword | NA           |

|             |                 |
|-------------|-----------------|
| Sub-Index   | 01h             |
| Description | Mapping Entry 1 |
| Data Type   | Unsigned32      |
| Access      | R/W             |
| PDO Mapping | No              |
| Value Range | 0 to 4294967295 |

|                 |     |
|-----------------|-----|
| Default Value   | 0   |
| Save to NVRAM   | Yes |
| Units           | NA  |
| PCSuite Keyword | NA  |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 02h             |
| Description     | Mapping Entry 2 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 03h             |
| Description     | Mapping Entry 3 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 04h             |
| Description     | Mapping Entry 1 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|             |                 |
|-------------|-----------------|
| Sub-Index   | 05h             |
| Description | Mapping Entry 2 |

|                 |                 |
|-----------------|-----------------|
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 06h             |
| Description     | Mapping Entry 3 |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

## 1C00h: Sync Manager Communication Type

This object defines the assignment of the four EtherCAT Sync Managers.

### Object Description

|             |                   |
|-------------|-------------------|
| Index       | 1C00h             |
| Name        | Sync Manager Type |
| Object Code | Array             |
| Data Type   | Unsigned8         |

### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 0 to 20      |
| Default Value   | 4            |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |               |
|-----------------|---------------|
| Sub-Index       | 01h           |
| Description     | Sub-index 001 |
| Data Type       | Unsigned8     |
| Access          | R/O           |
| PDO Mapping     | No            |
| Value Range     | 0 to 4        |
| Default Value   | 1             |
| Save to NVRAM   | No            |
| Units           | NA            |
| PCSuite Keyword | NA            |

|                 |               |
|-----------------|---------------|
| Sub-Index       | 02h           |
| Description     | Sub-index 002 |
| Data Type       | Unsigned8     |
| Access          | R/O           |
| PDO Mapping     | No            |
| Value Range     | 0 to 4        |
| Default Value   | 2             |
| Save to NVRAM   | No            |
| Units           | NA            |
| PCSuite Keyword | NA            |

|                 |               |
|-----------------|---------------|
| Sub-Index       | 03h           |
| Description     | Sub-index 003 |
| Data Type       | Unsigned8     |
| Access          | R/O           |
| PDO Mapping     | No            |
| Value Range     | 0 to 4        |
| Default Value   | 3             |
| Save to NVRAM   | No            |
| Units           | NA            |
| PCSuite Keyword | NA            |

|             |               |
|-------------|---------------|
| Sub-Index   | 04h           |
| Description | Sub-index 004 |
| Data Type   | Unsigned8     |
| Access      | R/O           |
| PDO Mapping | No            |
| Value Range | 0 to 4        |

|                 |    |
|-----------------|----|
| Default Value   | 4  |
| Save to NVRAM   | No |
| Units           | NA |
| PCSuite Keyword | NA |

### 1C12h: Sync Manager 2 PDO Assignment

This object defines the activated RPDO mappings (see 1600h to 1603h) and is written by the EtherCAT master.

#### Object Description

|             |                               |
|-------------|-------------------------------|
| Index       | 1C12h                         |
| Name        | Sync Manager 2 PDO Assignment |
| Object Code | Array                         |
| Data Type   | Unsigned16                    |

#### Entry Description

|                 |                          |
|-----------------|--------------------------|
| Sub-Index       | 00h                      |
| Description     | Number of assigned RPDOs |
| Data Type       | Unsigned8                |
| Access          | R/W                      |
| PDO Mapping     | No                       |
| Value Range     | 0 to 20                  |
| Default Value   | 4                        |
| Save to NVRAM   | Yes                      |
| Units           | NA                       |
| PCSuite Keyword | NA                       |

|                 |               |
|-----------------|---------------|
| Sub-Index       | 01h           |
| Description     | Sub-index 001 |
| Data Type       | Unsigned16    |
| Access          | R/W           |
| PDO Mapping     | No            |
| Value Range     | 0 to 65535    |
| Default Value   | 1600h         |
| Save to NVRAM   | Yes           |
| Units           | NA            |
| PCSuite Keyword | NA            |

|             |               |
|-------------|---------------|
| Sub-Index   | 02h           |
| Description | Sub-index 002 |
| Data Type   | Unsigned16    |

|                 |            |
|-----------------|------------|
| Access          | R/W        |
| PDO Mapping     | No         |
| Value Range     | 0 to 65535 |
| Default Value   | 1601h      |
| Save to NVRAM   | Yes        |
| Units           | NA         |
| PCSuite Keyword | NA         |

|                 |               |
|-----------------|---------------|
| Sub-Index       | 03h           |
| Description     | Sub-index 003 |
| Data Type       | Unsigned16    |
| Access          | R/W           |
| PDO Mapping     | No            |
| Value Range     | 0 to 65535    |
| Default Value   | 1602h         |
| Save to NVRAM   | Yes           |
| Units           | NA            |
| PCSuite Keyword | NA            |

|                 |               |
|-----------------|---------------|
| Sub-Index       | 04h           |
| Description     | Sub-index 004 |
| Data Type       | Unsigned16    |
| Access          | R/W           |
| PDO Mapping     | No            |
| Value Range     | 0 to 65535    |
| Default Value   | 1603h         |
| Save to NVRAM   | Yes           |
| Units           | NA            |
| PCSuite Keyword | NA            |

### 1C13h: Sync Manager 3 PDO Assignment

This object defines the activated TPDO mappings (see 1A00h to 1A03h) and is written by the EtherCAT master.

#### Object Description

|             |                               |
|-------------|-------------------------------|
| Index       | 603Fh                         |
| Name        | Sync Manager 3 PDO Assignment |
| Object Code | Array                         |
| Data Type   | Unsigned16                    |

**Entry Description**

|                 |                          |
|-----------------|--------------------------|
| Sub-Index       | 00h                      |
| Description     | Number of assigned TPDOs |
| Data Type       | NA                       |
| Access          | R/W                      |
| PDO Mapping     | No                       |
| Value Range     | 0 to 20                  |
| Default Value   | 4                        |
| Save to NVRAM   | Yes                      |
| Units           | NA                       |
| PCSuite Keyword | NA                       |

|                 |               |
|-----------------|---------------|
| Sub-Index       | 01h           |
| Description     | Sub-index 001 |
| Data Type       | Unsigned16    |
| Access          | R/W           |
| PDO Mapping     | No            |
| Value Range     | 0 to 65535    |
| Default Value   | 1A00h         |
| Save to NVRAM   | Yes           |
| Units           | NA            |
| PCSuite Keyword | NA            |

|                 |               |
|-----------------|---------------|
| Sub-Index       | 02h           |
| Description     | Sub-index 002 |
| Data Type       | Unsigned16    |
| Access          | R/W           |
| PDO Mapping     | No            |
| Value Range     | 0 to 65535    |
| Default Value   | 1A01h         |
| Save to NVRAM   | Yes           |
| Units           | NA            |
| PCSuite Keyword | NA            |

|             |               |
|-------------|---------------|
| Sub-Index   | 03h           |
| Description | Sub-index 003 |
| Data Type   | Unsigned16    |
| Access      | R/W           |
| PDO Mapping | No            |
| Value Range | 0 to 65535    |

|                 |       |
|-----------------|-------|
| Default Value   | 1A02h |
| Save to NVRAM   | Yes   |
| Units           | NA    |
| PCSuite Keyword | NA    |

|                 |               |
|-----------------|---------------|
| Sub-Index       | 04h           |
| Description     | Sub-index 004 |
| Data Type       | Unsigned16    |
| Access          | R/W           |
| PDO Mapping     | No            |
| Value Range     | 0 to 65535    |
| Default Value   | 1A03h         |
| Save to NVRAM   | Yes           |
| Units           | NA            |
| PCSuite Keyword | NA            |

### 1C32h: Sync Manager Output Parameter

This object defines the synchronization parameters for TPDO mapping for EtherCAT (see 1C12h). It is set by the EtherCAT master.

#### Object Description

|             |                     |
|-------------|---------------------|
| Index       | 1C32h               |
| Name        | SM output parameter |
| Object Code | Record              |
| Data Type   | Unsigned16          |

#### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 0 to 255     |
| Default Value   | 20           |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | NA           |

|             |                      |
|-------------|----------------------|
| Sub-Index   | 01h                  |
| Description | Synchronization Type |

|                 |            |
|-----------------|------------|
| Data Type       | Unsigned16 |
| Access          | R/W        |
| PDO Mapping     | No         |
| Value Range     | 0 to 65535 |
| Default Value   | 1024       |
| Save to NVRAM   | Yes        |
| Units           | NA         |
| PCSuite Keyword | NA         |

|                 |                                 |
|-----------------|---------------------------------|
| Sub-Index       | 02h                             |
| Description     | Synchronization Types supported |
| Data Type       | Unsigned32                      |
| Access          | R/O                             |
| PDO Mapping     | No                              |
| Value Range     | 0 to 4294967295                 |
| Default Value   | 1280                            |
| Save to NVRAM   | Yes                             |
| Units           | NA                              |
| PCSuite Keyword | NA                              |

|                 |                    |
|-----------------|--------------------|
| Sub-Index       | 03h                |
| Description     | Minimum Cycle Time |
| Data Type       | Unsigned32         |
| Access          | R/O                |
| PDO Mapping     | No                 |
| Value Range     | 0 to 4294967295    |
| Default Value   | 547424000          |
| Save to NVRAM   | Yes                |
| Units           | NA                 |
| PCSuite Keyword | NA                 |

### 1C33h: Sync Manager Input Parameter

This object defines the synchronization parameters for RPDO mapping for EtherCAT (see 1C13h). It is set by the EtherCAT master.

#### Object Description

|             |                    |
|-------------|--------------------|
| Index       | 1C33h              |
| Name        | SM input parameter |
| Object Code | Record             |
| Data Type   | Unsigned16         |

**Entry Description**

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 0 to 255     |
| Default Value   | 20           |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                      |
|-----------------|----------------------|
| Sub-Index       | 01h                  |
| Description     | Synchronization Type |
| Data Type       | Unsigned16           |
| Access          | R/W                  |
| PDO Mapping     | No                   |
| Value Range     | 0 to 65535           |
| Default Value   | 1024                 |
| Save to NVRAM   | Yes                  |
| Units           | NA                   |
| PCSuite Keyword | NA                   |

|                 |                                 |
|-----------------|---------------------------------|
| Sub-Index       | 02h                             |
| Description     | Synchronization Types supported |
| Data Type       | Integer32                       |
| Access          | R/W                             |
| PDO Mapping     | No                              |
| Value Range     | -2147483648 to 2147483647       |
| Default Value   | 1280                            |
| Save to NVRAM   | Yes                             |
| Units           | NA                              |
| PCSuite Keyword | NA                              |

|             |                           |
|-------------|---------------------------|
| Sub-Index   | 03h                       |
| Description | Minimum Cycle Time        |
| Data Type   | Integer32                 |
| Access      | R/W                       |
| PDO Mapping | No                        |
| Value Range | -2147483648 to 2147483647 |

|                 |           |
|-----------------|-----------|
| Default Value   | 547424000 |
| Save to NVRAM   | Yes       |
| Units           | NA        |
| PCSuite Keyword | NA        |

## 7.2 Manufacturer Specific Objects (2000h to 5FFFh)

### 2410h: Analog Input 1 Value

This object contains the value of analog input port 1. This is the value returned after adding offset (object 2414h), and applying low pass filter (object 2413h), gain (object 2412h), and dead band (object 2411h).

#### Object Description

|             |                      |
|-------------|----------------------|
| Index       | 2410h                |
| Name        | Analog Input 1 Value |
| Object Code | Variable             |
| Data Type   | Integer32            |

#### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/O        |
| PDO Mapping     | TPDO       |
| Value Range     | 0 to 9     |
| Default Value   | 0          |
| Save to NVRAM   | No         |
| Units           | NA         |
| PCSuite Keyword | AlnPort[1] |

### 2411h: Analog Input 1 Dead Band

This object defines a value range ( $\pm$ ) that forces the analog input value to zero, after filter1 (object 2413h) and offset1 (object 2414h).

If the absolute value of analog input value is equal to or smaller than the dead band, the analog input value is forced to 0.

#### Object Description

|             |                          |
|-------------|--------------------------|
| Index       | 2411h                    |
| Name        | Analog Input 1 Dead Band |
| Object Code | Variable                 |
| Data Type   | Unsigned32               |

#### Entry Description

|           |     |
|-----------|-----|
| Sub-Index | 00h |
|-----------|-----|

|                 |                 |
|-----------------|-----------------|
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 2147483647 |
| Default Value   | 0               |
| Save to NVRAM   | No              |
| Units           | mV              |
| PCSuite Keyword | AlnDB[1]        |

### 2412h: Analog Input 1 Gain

This object defines the analog input value gain.

#### Object Description

|             |                     |
|-------------|---------------------|
| Index       | 2412h               |
| Name        | Analog Input 1 Gain |
| Object Code | Variable            |
| Data Type   | Integer32           |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 2147483647 |
| Default Value   | 1               |
| Save to NVRAM   | No              |
| Units           | NA              |
| PCSuite Keyword | AlnGain[1]      |

### 2413h: Analog Input 1 Low Pass Filter

This object defines a first order filter that is applied to the analog input as read from the A/D.

#### Object Description

|             |                                |
|-------------|--------------------------------|
| Index       | 2413h                          |
| Name        | Analog Input 1 Low Pass Filter |
| Object Code | Variable                       |
| Data Type   | Unsigned32                     |

#### Entry Description

|             |                 |
|-------------|-----------------|
| Sub-Index   | 00h             |
| Access      | R/W             |
| PDO Mapping | No              |
| Value Range | 0 to 4294967295 |

|                 |            |
|-----------------|------------|
| Default Value   | 100        |
| Save to NVRAM   | No         |
| Units           | Hz         |
| PCSuite Keyword | AlnFilt[1] |

### 2414h: Analog Input 1 Offset

This object defines an offset to be added to the analog input value.

#### Object Description

|             |                       |
|-------------|-----------------------|
| Index       | 2414h                 |
| Name        | Analog Input 1 Offset |
| Object Code | Variable              |
| Data Type   | Integer32             |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/W                       |
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | No                        |
| Units           | mV                        |
| PCSuite Keyword | AlnOffset[1]              |

### 2415h: Analog Input 1 Mute Range

This object defines a value range ( $\pm$ ) that forces the analog input reading to 0.

#### Object Description

|             |                           |
|-------------|---------------------------|
| Index       | 2415h                     |
| Name        | Analog Input 1 Mute Range |
| Object Code | Variable                  |
| Data Type   | Unsigned32                |

#### Entry Description

|               |                 |
|---------------|-----------------|
| Sub-Index     | 00h             |
| Access        | R/W             |
| PDO Mapping   | No              |
| Value Range   | 0 to 2147483647 |
| Default Value | 0               |
| Save to NVRAM | No              |
| Units         | mV              |

|                 |                 |
|-----------------|-----------------|
| PCSuite Keyword | AlnMuteRange[1] |
|-----------------|-----------------|

### 2416h: Analog Input 2 Value

This object contains the value of analog input port 2. This is the value returned after adding offset (object 241Ah), and applying low pass filter (object 2419h), gain (object 2418h), and dead band (object 2417h).

#### Object Description

|             |                      |
|-------------|----------------------|
| Index       | 2416h                |
| Name        | Analog Input 2 Value |
| Object Code | Variable             |
| Data Type   | Integer32            |

#### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/O        |
| PDO Mapping     | TPDO       |
| Value Range     | 0 to 9     |
| Default Value   | 0          |
| Save to NVRAM   | No         |
| Units           | NA         |
| PCSuite Keyword | AlnPort[2] |

### 2417h: Analog Input 2 Dead Band

This object defines a value range ( $\pm$ ) that forces the analog input value to zero, after filter1 (object 2419h) and offset1 (object 241Ah).

If the absolute value of analog input value is equal to or smaller than the dead band, the analog input value is forced to 0.

#### Object Description

|             |                          |
|-------------|--------------------------|
| Index       | 2417h                    |
| Name        | Analog Input 2 Dead Band |
| Object Code | Variable                 |
| Data Type   | Unsigned32               |

#### Entry Description

|               |                 |
|---------------|-----------------|
| Sub-Index     | 00h             |
| Access        | R/W             |
| PDO Mapping   | No              |
| Value Range   | 0 to 2147483647 |
| Default Value | 0               |
| Save to NVRAM | No              |

|                 |          |
|-----------------|----------|
| Units           | mV       |
| PCSuite Keyword | AlnDB[2] |

### 2418h: Analog Input 2 Gain

This object defines the analog input value gain.

#### Object Description

|             |                     |
|-------------|---------------------|
| Index       | 2418h               |
| Name        | Analog Input 2 Gain |
| Object Code | Variable            |
| Data Type   | Integer32           |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 2147483647 |
| Default Value   | 1               |
| Save to NVRAM   | No              |
| Units           | NA              |
| PCSuite Keyword | AlnGain[2]      |

### 2419h: Analog Input 2 Low Pass Filter

This object defines a first order filter frequency that is applied to the analog input as read from the A/D.

#### Object Description

|             |                                |
|-------------|--------------------------------|
| Index       | 2419h                          |
| Name        | Analog Input 2 Low Pass Filter |
| Object Code | Variable                       |
| Data Type   | Unsigned32                     |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | No              |
| Units           | Hz              |
| PCSuite Keyword | AlnFilt[2]      |

### 241Ah: Analog Input 2 Offset

This object defines an offset to be added to the analog input value.

#### Object Description

|             |                       |
|-------------|-----------------------|
| Index       | 241Ah                 |
| Name        | Analog Input 2 Offset |
| Object Code | Variable              |
| Data Type   | Integer32             |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/W                       |
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | No                        |
| Units           | mV                        |
| PCSuite Keyword | AlnOffset[2]              |

### 241Bh: Analog Input 2 Mute Range

This object defines a value range ( $\pm$ ) that forces the analog input reading to 0.

#### Object Description

|             |                           |
|-------------|---------------------------|
| Index       | 241Bh                     |
| Name        | Analog Input 2 Mute Range |
| Object Code | Variable                  |
| Data Type   | Unsigned32                |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 2147483647 |
| Default Value   | 0               |
| Save to NVRAM   | No              |
| Units           | mV              |
| PCSuite Keyword | AlnMuteRange[2] |

## 2421h: Hard Stop Position Threshold

This object defines the position error threshold during homing (hard stop by high error).

### Object Description

|             |                              |
|-------------|------------------------------|
| Index       | 2421h                        |
| Name        | Hard Stop Position Threshold |
| Object Code | Variable                     |
| Data Type   | Unsigned16                   |

### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/W        |
| PDO Mapping     | RPDO       |
| Value Range     | 0 to 65536 |
| Default Value   | 0          |
| Save to NVRAM   | No         |
| Units           | User units |
| PCSuite Keyword | NA         |

## 2422h: Homing Option

This object defines the homing option for the homing sequence.

### Description

|                           |              |
|---------------------------|--------------|
| 1                         | 0            |
| Jog to Lock then to Index | Jog to Index |

### Object Description

|             |               |
|-------------|---------------|
| Index       | 2422h         |
| Name        | Homing Option |
| Object Code | Variable      |
| Data Type   | Integer 8     |

### Entry Description

|                 |        |
|-----------------|--------|
| Sub-Index       | 00h    |
| Access          | R/W    |
| PDO Mapping     | RPDO   |
| Value Range     | 0 to 1 |
| Default Value   | 1      |
| Save to NVRAM   | No     |
| Units           | NA     |
| PCSuite Keyword | NA     |

## 7.3 CiA 402 Standard Objects (6000h to 6FFFh)

### 603Fh: Error Code

This object reports the error code of the last error that occurred in the drive.

The object value is reset when bit 7 (fault reset) in object 6040h is set.

For the Error Code List, please refer to Appendix 1.

#### Object Description

|             |            |
|-------------|------------|
| Index       | 603Fh      |
| Name        | Error Code |
| Object Code | Variable   |
| Data Type   | Unsigned16 |

#### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/O        |
| PDO Mapping     | TPDO       |
| Value Range     | 0 to 65536 |
| Default Value   | 0          |
| Save to NVRAM   | No         |
| Units           | NA         |
| PCSuite Keyword | NA         |

### 6040h: ControlWord

This object controls the CiA 402 power state machine. The object sends commands to the drive.

For more info, refer to the section *Power State Machine*.

#### Description

|                       |          |                         |      |             |
|-----------------------|----------|-------------------------|------|-------------|
| 15–11                 | 10       | 9                       | 8    | 7           |
| manufacturer specific | reserved | operation mode specific | halt | fault reset |

|                         |                  |            |                |           |
|-------------------------|------------------|------------|----------------|-----------|
| 6–4                     | 3                | 2          | 1              | 0         |
| operation mode specific | enable operation | quick stop | enable voltage | switch on |

#### Object Description

|             |             |
|-------------|-------------|
| Index       | 6040h       |
| Name        | ControlWord |
| Object Code | Variable    |
| Data Type   | Unsigned16  |

**Entry Description**

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/W        |
| PDO Mapping     | RPDO       |
| Value Range     | 0 to 65536 |
| Default Value   | 0          |
| Save to NVRAM   | Yes        |
| Units           | NA         |
| PCSuite Keyword | NA         |

**6041h: StatusWord**

This object reports the status of the CiA 402 power state machine.

**Description**

|                       |                         |                       |                |                   |                       |                    |
|-----------------------|-------------------------|-----------------------|----------------|-------------------|-----------------------|--------------------|
| 15–14                 | 13–12                   | 11                    | 10             | 9                 | 8                     | 7                  |
| manufacturer specific | operation mode specific | internal limit active | target reached | remote            | manufacturer specific | warning            |
| 6                     | 5                       | 4                     | 3              | 2                 | 1                     | 0                  |
| switch on disabled    | quick stop              | voltage enabled       | fault          | operation enabled | switch on             | ready to switch on |

**Object Description**

|             |            |
|-------------|------------|
| Index       | 6041h      |
| Name        | StatusWord |
| Object Code | Variable   |
| Data Type   | Unsigned16 |

**Entry Description**

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/O        |
| PDO Mapping     | TPDO       |
| Value Range     | 0 to 65536 |
| Default Value   | 0          |
| Save to NVRAM   | No         |
| Units           | NA         |
| PCSuite Keyword | NA         |

### 605Ah: Quick Stop Option Code

The object contains the action that is to be executed on a transition of the CiA 402 Power State Machine to the Quick Stop state.

When the value equals 0 to 8, the voltage to motor will be disabled and motor will be coasting.

#### Object Description

|             |                        |
|-------------|------------------------|
| Index       | 605Ah                  |
| Name        | Quick stop option code |
| Object Code | Variable               |
| Data Type   | Integer16              |

#### Entry Description

|                 |     |
|-----------------|-----|
| Sub-Index       | 00h |
| Access          | R/W |
| PDO Mapping     | No  |
| Value Range     | 0   |
| Default Value   | 0   |
| Save to NVRAM   | Yes |
| Units           | NA  |
| PCSuite Keyword | NA  |

### 605Bh: Shutdown Option Code

This object defines the action to be executed on a transition of the CiA 402 power state machine from the Operation Enabled state to the Ready to Switch On state.

Only value 0 (Disable Drive Function) is supported.

#### Object Description

|             |                      |
|-------------|----------------------|
| Index       | 605Bh                |
| Name        | Shutdown Option Code |
| Object Code | Variable             |
| Data Type   | Integer16            |

#### Entry Description

|                 |     |
|-----------------|-----|
| Sub-Index       | 00h |
| Access          | R/W |
| PDO Mapping     | No  |
| Value Range     | 0   |
| Default Value   | 0   |
| Save to NVRAM   | Yes |
| Units           | NA  |
| PCSuite Keyword | NA  |

### 605Ch: Disable Operation Option Code

This object defines the action to be executed on a transition of the CiA 402 power state machine from the Operation Enabled state to the Switched On state.

Only value 0 (Disable Drive Function) is supported.

#### Object Description

|             |                               |
|-------------|-------------------------------|
| Index       | 605Ch                         |
| Name        | Disable Operation Option Code |
| Object Code | Variable                      |
| Data Type   | Integer16                     |

#### Entry Description

|                 |     |
|-----------------|-----|
| Sub-Index       | 00h |
| Access          | R/W |
| PDO Mapping     | No  |
| Value Range     | 0   |
| Default Value   | 0   |
| Save to NVRAM   | Yes |
| Units           | NA  |
| PCSuite Keyword | NA  |

### 605Dh: Halt Option Code

This object defines the action to be executed if bit 8 (Halt) is set in object 6040h (ControlWord).

Only value 0 (Disable Drive Function) is supported.

#### Object Description

|             |                  |
|-------------|------------------|
| Index       | 605Dh            |
| Name        | Halt Option Code |
| Object Code | Variable         |
| Data Type   | Integer16        |

#### Entry Description

|                 |     |
|-----------------|-----|
| Sub-Index       | 00h |
| Access          | R/W |
| PDO Mapping     | No  |
| Value Range     | 0   |
| Default Value   | 0   |
| Save to NVRAM   | Yes |
| Units           | NA  |
| PCSuite Keyword | NA  |

### 605Eh: Fault Reaction Option Code

This object indicates what action is performed when a fault is detected in the drive.

This object defines the action to be executed when a fault (excluding communication faults) causes the drive to switch to Fault Reaction Active.

Only value 0 (Disable Drive Function) is supported.

#### Object Description

|             |                            |
|-------------|----------------------------|
| Index       | 605Eh                      |
| Name        | Fault Reaction Option Code |
| Object Code | Variable                   |
| Data Type   | Integer16                  |

#### Entry Description

|                 |     |
|-----------------|-----|
| Sub-Index       | 00h |
| Access          | R/W |
| PDO Mapping     | No  |
| Value Range     | 0   |
| Default Value   | 0   |
| Save to NVRAM   | Yes |
| Units           | NA  |
| PCSuite Keyword | NA  |

### 6060h: Modes of Operation

This object sets the mode of operation.

#### Description

|           |                              |          |                    |          |                                         |            |
|-----------|------------------------------|----------|--------------------|----------|-----------------------------------------|------------|
| -128 to 0 | +1                           | +2 to +5 | +6                 | +7       | +8                                      | +9 to +127 |
| Reserved  | <b>Profile position mode</b> | Reserved | <b>Homing mode</b> | Reserved | <b>Cyclic synchronous position mode</b> | Reserved   |

#### Object Description

|             |                    |
|-------------|--------------------|
| Index       | 6060h              |
| Name        | Modes of Operation |
| Object Code | Variable           |
| Data Type   | Integer8           |

#### Entry Description

|             |      |
|-------------|------|
| Sub-Index   | 00h  |
| Access      | R/W  |
| PDO Mapping | RPDO |

|                 |         |
|-----------------|---------|
| Value Range     | 1, 6, 8 |
| Default Value   | 8       |
| Save to NVRAM   | Yes     |
| Units           | NA      |
| PCSuite Keyword | NA      |

### 6061h: Modes of Operation Display

This object reports the actual mode of operation.

#### Object Description

|             |                            |
|-------------|----------------------------|
| Index       | 6061h                      |
| Name        | Modes of Operation Display |
| Object Code | Variable                   |
| Data Type   | Integer8                   |

#### Entry Description

|                 |             |
|-----------------|-------------|
| Sub-Index       | 00h         |
| Access          | R/O         |
| PDO Mapping     | TPDO        |
| Value Range     | -128 to 127 |
| Default Value   | 0           |
| Save to NVRAM   | No          |
| Units           | NA          |
| PCSuite Keyword | NA          |

### 6062h: Position Demand Value

This object indicates the demanded position value, in user-defined units.

#### Object Description

|             |                       |
|-------------|-----------------------|
| Index       | 6062h                 |
| Name        | Position Demand Value |
| Object Code | Variable              |
| Data Type   | Integer32             |

#### Entry Description

|               |                           |
|---------------|---------------------------|
| Sub-Index     | 00h                       |
| Access        | R/O                       |
| PDO Mapping   | No                        |
| Value Range   | -2147483648 to 2147483647 |
| Default Value | 0                         |
| Save to NVRAM | No                        |

|                 |            |
|-----------------|------------|
| Units           | User units |
| PCSuite Keyword | PosRef     |

### 6063h: Position Actual Internal Value

This object indicates the actual value of the encoder, in increments.

If necessary, the data unit may be transformed from user-defined units to increments.

#### Object Description

|             |                                |
|-------------|--------------------------------|
| Index       | 6063h                          |
| Name        | Position Actual Internal Value |
| Object Code | Variable                       |
| Data Type   | Integer32                      |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/O                       |
| PDO Mapping     | TPDO                      |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | No                        |
| Units           | User units                |
| PCSuite Keyword | Pos                       |

### 6064h: Position Actual Value

This object indicates the actual position of the encoder, in user-defined units.

#### Object Description

|             |                       |
|-------------|-----------------------|
| Index       | 6064h                 |
| Name        | Position Actual Value |
| Object Code | Variable              |
| Data Type   | Integer32             |

#### Entry Description

|               |                           |
|---------------|---------------------------|
| Sub-Index     | 00h                       |
| Access        | R/O                       |
| PDO Mapping   | TPDO                      |
| Value Range   | -2147483648 to 2147483647 |
| Default Value | 0                         |
| Save to NVRAM | No                        |
| Units         | User units                |

|                 |     |
|-----------------|-----|
| PCSuite Keyword | Pos |
|-----------------|-----|

### 6065h: Following Error Window

This object defines the range of tolerated position values symmetrically to the demanded position value.

If the actual position value is out of the following error window, a following error occurs.

#### Object Description

|             |                        |
|-------------|------------------------|
| Index       | 6065h                  |
| Name        | Following Error Window |
| Object Code | Variable               |
| Data Type   | Unsigned32             |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | RPDO            |
| Value Range     | 0 to 4294967295 |
| Default Value   | 16777216        |
| Save to NVRAM   | Yes             |
| Units           | User units      |
| PCSuite Keyword | InTargetTol     |

### 6066h: Following Error Time Out

This object defines the duration of a following error condition that produces a following error message.

#### Object Description

|             |                          |
|-------------|--------------------------|
| Index       | 6066h                    |
| Name        | Following Error Time Out |
| Object Code | Variable                 |
| Data Type   | Unsigned16               |

#### Entry Description

|               |             |
|---------------|-------------|
| Sub-Index     | 00h         |
| Access        | R/W         |
| PDO Mapping   | No          |
| Value Range   | 0 to 65535  |
| Default Value | 0           |
| Save to NVRAM | Yes         |
| Units         | millisecond |

|                 |              |
|-----------------|--------------|
| PCSuite Keyword | InTargetTime |
|-----------------|--------------|

### 6067h: Position Window

This object defines the range of tolerated position values symmetrically relative to the target position. If the actual value of the position encoder is within the position window, the target position is regarded as reached.

#### Object Description

|             |                 |
|-------------|-----------------|
| Index       | 6067h           |
| Name        | Position Window |
| Object Code | Variable        |
| Data Type   | Unsigned32      |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | RPDO            |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | User units      |
| PCSuite Keyword | MaxPosErr       |

### 6068h: Position Window Time

This object defines the time during which the actual position within the position window is measured.

#### Object Description

|             |                      |
|-------------|----------------------|
| Index       | 6068h                |
| Name        | Position Window Time |
| Object Code | Variable             |
| Data Type   | Unsigned16           |

#### Entry Description

|               |             |
|---------------|-------------|
| Sub-Index     | 00h         |
| Access        | R/W         |
| PDO Mapping   | No          |
| Value Range   | 0 to 65535  |
| Default Value | 2560        |
| Save to NVRAM | Yes         |
| Units         | millisecond |

|                 |              |
|-----------------|--------------|
| PCSuite Keyword | InTargetTime |
|-----------------|--------------|

### 6069h: Velocity Sensor Actual Value

This object indicates the value read from a velocity sensor.

#### Object Description

|             |                              |
|-------------|------------------------------|
| Index       | 6069h                        |
| Name        | Velocity sensor actual value |
| Object Code | Variable                     |
| Data Type   | Unsigned32                   |

#### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/O        |
| PDO Mapping     | No         |
| Value Range     | 0 to 65535 |
| Default Value   | 0          |
| Save to NVRAM   | Yes        |
| Units           | User units |
| PCSuite Keyword | NA         |

### 606Bh: Velocity Demand Value

This object indicates the output value of the trajectory generator. It is the demanded value for the velocity controller. The value is given in the user-defined velocity units.

#### Object Description

|             |                       |
|-------------|-----------------------|
| Index       | 606Bh                 |
| Name        | Velocity Demand Value |
| Object Code | Variable              |
| Data Type   | Integer32             |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/O                       |
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | No                        |
| Units           | User units                |
| PCSuite Keyword | VelRef                    |

### 606Ch: Velocity Actual Value

This object reports the actual speed, in user-defined velocity units.

#### Object Description

|             |                       |
|-------------|-----------------------|
| Index       | 606Ch                 |
| Name        | Velocity Actual Value |
| Object Code | Variable              |
| Data Type   | Integer32             |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/O                       |
| PDO Mapping     | TPDO                      |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | No                        |
| Units           | User units                |
| PCSuite Keyword | Vel[2]                    |

### 606Dh: Velocity Window

This object defines the range of tolerated velocity values symmetrically relative to the target velocity. The value is given in user-defined velocity units.

If the actual velocity value is within the velocity window, this target velocity is regarded as reached.

#### Object Description

|             |                 |
|-------------|-----------------|
| Index       | 606Dh           |
| Name        | Velocity Window |
| Object Code | Variable        |
| Data Type   | Unsigned16      |

#### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/W        |
| PDO Mapping     | No         |
| Value Range     | 0 to 65535 |
| Default Value   | 0          |
| Save to NVRAM   | Yes        |
| Units           | User units |
| PCSuite Keyword | NA         |

### 606Eh: Velocity Window Time

This object defines the time during which the actual velocity within the velocity window is measured. The value is given in milliseconds.

#### Object Description

|             |                      |
|-------------|----------------------|
| Index       | 606Eh                |
| Name        | Velocity Window Time |
| Object Code | Variable             |
| Data Type   | Unsigned16           |

#### Entry Description

|                 |             |
|-----------------|-------------|
| Sub-Index       | 00h         |
| Access          | R/W         |
| PDO Mapping     | No          |
| Value Range     | 0 to 65535  |
| Default Value   | 0           |
| Save to NVRAM   | Yes         |
| Units           | millisecond |
| PCSuite Keyword | NA          |

### 606Fh: Velocity Threshold

This object defines the velocity threshold. The value is given in user-defined velocity units.

**Note:** This object is not implemented. Although it is declared in ESI file, the function is not supported.

#### Object Description

|             |                    |
|-------------|--------------------|
| Index       | 606Fh              |
| Name        | Velocity Threshold |
| Object Code | Variable           |
| Data Type   | Unsigned16         |

#### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/W        |
| PDO Mapping     | No         |
| Value Range     | 0 to 65535 |
| Default Value   | 0          |
| Save to NVRAM   | Yes        |
| Units           | User units |
| PCSuite Keyword | NA         |

### 6070h: Velocity Threshold Time

This object defines the velocity threshold time. The value is given in milliseconds.  
See object 606Fh (velocity threshold).

#### Object Description

|             |                         |
|-------------|-------------------------|
| Index       | 6070h                   |
| Name        | Velocity Threshold Time |
| Object Code | Variable                |
| Data Type   | Unsigned16              |

#### Entry Description

|                 |             |
|-----------------|-------------|
| Sub-Index       | 00h         |
| Access          | R/W         |
| PDO Mapping     | No          |
| Value Range     | 0 to 65535  |
| Default Value   | 0           |
| Save to NVRAM   | Yes         |
| Units           | millisecond |
| PCSuite Keyword | NA          |

### 6071h: Target Torque

This object defines the target torque for the Profile Torque and Cyclic Synchronous Torque modes.

**Note:** This object is not implemented. Although it is declared in ESI file, the function is not supported.

#### Object Description

|             |               |
|-------------|---------------|
| Index       | 6071h         |
| Name        | Target Torque |
| Object Code | Variable      |
| Data Type   | Integer16     |

#### Entry Description

|                 |                                                |
|-----------------|------------------------------------------------|
| Sub-Index       | 00h                                            |
| Access          | R/W                                            |
| PDO Mapping     | RPDO                                           |
| Value Range     | -32768 to 32767                                |
| Default Value   | 0                                              |
| Save to NVRAM   | Yes                                            |
| Units           | 0.001 x MICON (one-thousandth of rated torque) |
| PCSuite Keyword | NA                                             |

**6073h: Max Current**

This object defines the maximum permissible torque-creating current in the motor. The value is given per thousand of rated current.

**Object Description**

|             |             |
|-------------|-------------|
| Index       | 6073h       |
| Name        | Max Current |
| Object Code | Variable    |
| Data Type   | Unsigned16  |

**Entry Description**

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Access          | R/W          |
| PDO Mapping     | No           |
| Value Range     | 0 to 65535   |
| Default Value   | 0            |
| Save to NVRAM   | Yes          |
| Units           | MICONT/1000  |
| PCSuite Keyword | MaxMotorCurr |

**6074h: Torque Demand Value**

This object indicates the output value of the trajectory generator. The value is given per thousand of rated torque.

**Object Description**

|             |                     |
|-------------|---------------------|
| Index       | 6074h               |
| Name        | Torque Demand Value |
| Object Code | Variable            |
| Data Type   | Integer16           |

**Entry Description**

|                 |                          |
|-----------------|--------------------------|
| Sub-Index       | 00h                      |
| Access          | R/O                      |
| PDO Mapping     | TPDO                     |
| Value Range     | -32768 to 32767          |
| Default Value   | 0                        |
| Save to NVRAM   | No                       |
| Units           | millinewton meter (mN·m) |
| PCSuite Keyword | NA                       |

### 6075h: Motor Rated Current

This object defines the motor rated current.

The object value is taken from the motor nameplate and is given in milliamperes.

#### Object Description

|             |                     |
|-------------|---------------------|
| Index       | 6075h               |
| Name        | Motor Rated Current |
| Object Code | Variable            |
| Data Type   | Unsigned32          |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 2623733760      |
| Save to NVRAM   | Yes             |
| Units           | mA              |
| PCSuite Keyword | PeakCL          |

### 6076h: Motor Rated Torque

This object defines the motor rated torque.

The object value is taken from the motor nameplate and is given in millinewton meter.

#### Object Description

|             |                    |
|-------------|--------------------|
| Index       | 6076h              |
| Name        | Motor Rated Torque |
| Object Code | Variable           |
| Data Type   | Unsigned32         |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | mNm             |
| PCSuite Keyword | NA              |

### 6077h: Torque Actual Value

This object indicates the actual torque value. It corresponds to the instantaneous torque in the motor.

**Note:** This object is not implemented. Although it is declared in ESI file, the function is not supported.

#### Object Description

|             |                     |
|-------------|---------------------|
| Index       | 6077h               |
| Name        | Torque Actual Value |
| Object Code | Variable            |
| Data Type   | Integer16           |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/O             |
| PDO Mapping     | TPDO            |
| Value Range     | -32768 to 32767 |
| Default Value   | 0               |
| Save to NVRAM   | No              |
| Units           | User units      |
| PCSuite Keyword | NA              |

### 6078h: Current Actual Value

This object indicates the actual value of the current. It corresponds to the instantaneous current in the motor.

#### Object Description

|             |                      |
|-------------|----------------------|
| Index       | 6078h                |
| Name        | Current Actual Value |
| Object Code | Variable             |
| Data Type   | Integer16            |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/O             |
| PDO Mapping     | TPDO            |
| Value Range     | -32768 to 32767 |
| Default Value   | 0               |
| Save to NVRAM   | No              |
| Units           | User units      |
| PCSuite Keyword | MotorCurr       |

### 6079h: DC Link Circuit Voltage

This object indicates the instantaneous DC link circuit voltage in the drive. The value is given in mV.

#### Object Description

|             |                         |
|-------------|-------------------------|
| Index       | 6079h                   |
| Name        | DC Link Circuit Voltage |
| Object Code | Variable                |
| Data Type   | Unsigned32              |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/O             |
| PDO Mapping     | TPDO            |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | No              |
| Units           | mV              |
| PCSuite Keyword | VBus            |

### 607Ah: Target Position

This object defines the target position in user-defined units for the Profile Position and Cyclic Synchronous Position modes.

#### Object Description

|             |                 |
|-------------|-----------------|
| Index       | 607Ah           |
| Name        | Target Position |
| Object Code | Variable        |
| Data Type   | Integer32       |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/W                       |
| PDO Mapping     | RPDO                      |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | User units                |
| PCSuite Keyword | FIFOPosTrgt               |

## 607Bh: Position Range Limit

This object contains the minimum and maximum positions in user-defined units.

### Object Description

|             |                      |
|-------------|----------------------|
| Index       | 607Bh                |
| Name        | Position range limit |
| Object Code | Variable             |
| Data Type   | Integer32            |

### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Name            | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 2            |
| Default Value   | 2            |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 01h                       |
| Name            | Min position range limit  |
| Data Type       | Integer32                 |
| Access          | R/W                       |
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | User units                |
| PCSuite Keyword | NA                        |

|               |                           |
|---------------|---------------------------|
| Sub-Index     | 02h                       |
| Name          | Max position range limit  |
| Data Type     | Integer32                 |
| Access        | R/O                       |
| PDO Mapping   | No                        |
| Value Range   | -2147483648 to 2147483647 |
| Default Value | 0                         |
| Save to NVRAM | Yes                       |
| Units         | User units                |

|                 |    |
|-----------------|----|
| PCSuite Keyword | NA |
|-----------------|----|

### 607Ch: Home Offset

This object defines the difference between the zero position for the application and the machine home position (found during homing). During homing, the machine home position is found. Once the homing is completed, the zero position is offset from the home position by adding the home offset to the home position.

#### Object Description

|             |             |
|-------------|-------------|
| Index       | 607Ch       |
| Name        | Home Offset |
| Object Code | Variable    |
| Data Type   | Integer32   |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/W                       |
| PDO Mapping     | RPDO                      |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | User units                |
| PCSuite Keyword | NA                        |

### 607Dh: Software Position Limit

This object indicates the maximal and minimal software position limits.  
Defines the limits for the demanded position value and the actual position value.

#### Object Description

|             |                         |
|-------------|-------------------------|
| Index       | 607Dh                   |
| Name        | Software Position Limit |
| Object Code | Array                   |
| Data Type   | Integer32               |

#### Entry Description

|             |              |
|-------------|--------------|
| Sub-Index   | 00h          |
| Name        | SubIndex 000 |
| Data Type   | Unsigned8    |
| Access      | R/W          |
| PDO Mapping | No           |
| Value Range | 2            |

|                 |    |
|-----------------|----|
| Default Value   | 2  |
| Save to NVRAM   | No |
| Units           | NA |
| PCSuite Keyword | NA |

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 01h                       |
| Name            | Min Position Limit        |
| Data Type       | Integer32                 |
| Access          | R/O                       |
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | User units                |
| PCSuite Keyword | NA                        |

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 02h                       |
| Name            | Max Position Limit        |
| Data Type       | Integer32                 |
| Access          | R/O                       |
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | User units                |
| PCSuite Keyword | NA                        |

## 607Eh: Polarity

This object defines whether the demanded position value is multiplied by 1 or by -1. The polarity flag has no influence on the homing mode.

### Description

This object is organized bit-wise. The bits have the following meaning:

|                   |          |
|-------------------|----------|
| 7                 | 6 to 0   |
| Position polarity | reserved |

Bit value 0: multiply the demand value by 1

Bit value 1: multiply the demand value by -1

### Object Description

|       |          |
|-------|----------|
| Index | 607Eh    |
| Name  | Polarity |

|             |           |
|-------------|-----------|
| Object Code | Variable  |
| Data Type   | Unsigned8 |

**Entry Description**

|                 |          |
|-----------------|----------|
| Sub-Index       | 00h      |
| Access          | R/W      |
| PDO Mapping     | No       |
| Value Range     | 0 to 192 |
| Default Value   | 0        |
| Save to NVRAM   | Yes      |
| Units           | NA       |
| PCSuite Keyword | NA       |

**607Fh: Max Profile Velocity**

This object defines the maximum velocity in either direction during a profiled motion. The value is given in the same physical unit as the Profile Velocity object (6081h).

**Object Description**

|             |                      |
|-------------|----------------------|
| Index       | 607Fh                |
| Name        | Max Profile Velocity |
| Object Code | Variable             |
| Data Type   | Unsigned32           |

**Entry Description**

|                 |                  |
|-----------------|------------------|
| Sub-Index       | 00h              |
| Access          | R/W              |
| PDO Mapping     | No               |
| Value Range     | 10 to 4294967295 |
| Default Value   | 16777216         |
| Save to NVRAM   | Yes              |
| Units           | User units       |
| PCSuite Keyword | MaxVel           |

**6080h: Max Motor Speed**

This object defines the maximum speed for the motor in either direction. The value is given in rotations per minute or user-defined velocity units.

**Object Description**

|             |                 |
|-------------|-----------------|
| Index       | 6080h           |
| Name        | Max Motor Speed |
| Object Code | Variable        |

|           |            |
|-----------|------------|
| Data Type | Unsigned32 |
|-----------|------------|

**Entry Description**

|                 |                   |
|-----------------|-------------------|
| Sub-Index       | 00h               |
| Access          | R/W               |
| PDO Mapping     | No                |
| Value Range     | 0 to 4294967295   |
| Default Value   | 0                 |
| Save to NVRAM   | Yes               |
| Units           | rpm or user units |
| PCSuite Keyword | NA                |

**6081h: Profile Velocity**

This object defines the maximum travel speed, in user-defined velocity units.

**CiA:** the velocity normally attained at the end of the acceleration ramp during a profiled motion. It applies to both directions of motion.

**Object Description**

|             |                  |
|-------------|------------------|
| Index       | 6081h            |
| Name        | Profile Velocity |
| Object Code | Variable         |
| Data Type   | Unsigned32       |

**Entry Description**

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | RPDO            |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | User units      |
| PCSuite Keyword | Speed           |

**6082h: End Velocity**

Specifies the speed at the end of the traveled ramp in user-defined units.

**Object Description**

|             |              |
|-------------|--------------|
| Index       | 6082h        |
| Name        | End velocity |
| Object Code | Variable     |
| Data Type   | Unsigned32   |

**Entry Description**

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | RPDO            |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | User units      |
| PCSuite Keyword | NA              |

**6083h: Profile Acceleration**

This object defines the maximum acceleration during a profiled motion in user-defined units.

**Object Description**

|             |                      |
|-------------|----------------------|
| Index       | 6083h                |
| Name        | Profile Acceleration |
| Object Code | Variable             |
| Data Type   | Unsigned32           |

**Entry Description**

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | RPDO            |
| Value Range     | 0 to 4294967295 |
| Default Value   | 2693136640      |
| Save to NVRAM   | Yes             |
| Units           | User units      |
| PCSuite Keyword | Accel           |

**6084h: Profile Deceleration**

This object defines the maximum deceleration during a profiled motion.

If this parameter is not supported, then the value of object 6083h (profile acceleration) is used for deceleration.

**Note:** This object is not implemented. Although it is declared in ESI file, the function is not supported.

**Object Description**

|             |                      |
|-------------|----------------------|
| Index       | 6084h                |
| Name        | Profile Deceleration |
| Object Code | Variable             |
| Data Type   | Unsigned32           |

**Entry Description**

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | RPDO            |
| Value Range     | 0 to 4294967295 |
| Default Value   | 2693136640      |
| Save to NVRAM   | Yes             |
| Units           | User units      |
| PCSuite Keyword | Decel           |

**6085h: Quick Stop Deceleration**

This object defines the deceleration used to stop the motor when the quick stop state is activated.

**Object Description**

|             |                         |
|-------------|-------------------------|
| Index       | 6085h                   |
| Name        | Quick Stop Deceleration |
| Object Code | Variable                |
| Data Type   | Unsigned32              |

**Entry Description**

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 2693136640      |
| Save to NVRAM   | Yes             |
| Units           | User units      |
| PCSuite Keyword | EmrgDec         |

### 6087h: Torque Slope

This object defines the torque rate of change.

**Note:** This object is not implemented. Although it is declared in ESI file, the function is not supported.

#### Object Description

|             |              |
|-------------|--------------|
| Index       | 6087h        |
| Name        | Torque Slope |
| Object Code | Variable     |
| Data Type   | Unsigned32   |

#### Entry Description

|                 |               |
|-----------------|---------------|
| Sub-Index       | 00h           |
| Access          | R/W           |
| PDO Mapping     | RPDO          |
| Value Range     | 1 to 30000000 |
| Default Value   | 0             |
| Save to NVRAM   | Yes           |
| Units           | User units    |
| PCSuite Keyword | NA            |

### 608Fh: Position Encoder Resolution

This object defines the encoder increments and the number of motor revolutions. Encoder resolution is defined as *encoder\_increments/motor\_revolutions*.

#### Object Description

|             |                             |
|-------------|-----------------------------|
| Index       | 608Fh                       |
| Name        | Position Encoder Resolution |
| Object Code | Array                       |
| Data Type   | Unsigned32                  |

#### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/W          |
| PDO Mapping     | No           |
| Value Range     | 2            |
| Default Value   | 2            |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | EncRes       |

|                 |                       |
|-----------------|-----------------------|
| Sub-Index       | 01h                   |
| Description     | Encoder increments    |
| Data Type       | Unsigned32            |
| Access          | R/W                   |
| PDO Mapping     | No                    |
| Value Range     | 1 to 4294967295       |
| Default Value   | 16777216              |
| Save to NVRAM   | Yes                   |
| Units           | Lines per Revolutions |
| PCSuite Keyword | NA                    |

|                 |                   |
|-----------------|-------------------|
| Sub-Index       | 02h               |
| Description     | Motor revolutions |
| Data Type       | Unsigned32        |
| Access          | R/W               |
| PDO Mapping     | No                |
| Value Range     | 1 to 4294967295   |
| Default Value   | 16777216          |
| Save to NVRAM   | Yes               |
| Units           | NA                |
| PCSuite Keyword | NA                |

## 6091h: Gear Ratio

This object defines the number of motor shaft revolutions and the number of driving shaft revolutions. The gear ratio is defined as *motor\_shaft\_revolutions/driving\_shaft\_revolutions*.

### Object Description

|             |            |
|-------------|------------|
| Index       | 6091h      |
| Name        | Gear Ratio |
| Object Code | Array      |
| Data Type   | Unsigned32 |

### Entry Description

|               |              |
|---------------|--------------|
| Sub-Index     | 00h          |
| Description   | SubIndex 000 |
| Data Type     | Unsigned8    |
| Access        | R/W          |
| PDO Mapping   | No           |
| Value Range   | 2            |
| Default Value | 2            |

|                 |    |
|-----------------|----|
| Save to NVRAM   | No |
| Units           | NA |
| PCSuite Keyword | NA |

|                 |                   |
|-----------------|-------------------|
| Sub-Index       | 01h               |
| Description     | Motor revolutions |
| Data Type       | Unsigned32        |
| Access          | R/W               |
| PDO Mapping     | No                |
| Value Range     | 1 to 4294967295   |
| Default Value   | 16777216          |
| Save to NVRAM   | Yes               |
| Units           | NA                |
| PCSuite Keyword | NA                |

|                 |                   |
|-----------------|-------------------|
| Sub-Index       | 02h               |
| Description     | Shaft revolutions |
| Data Type       | Unsigned32        |
| Access          | R/W               |
| PDO Mapping     | No                |
| Value Range     | 1 to 4294967295   |
| Default Value   | 16777216          |
| Save to NVRAM   | Yes               |
| Units           | NA                |
| PCSuite Keyword |                   |

## 6092h: Feed Constant

This object defines the feed constant, which is the measurement distance per one revolution of the driving shaft of the gearbox. The feed constant is defined as *feed/driving\_shaft\_revolutions*.

### Object Description

|             |               |
|-------------|---------------|
| Index       | 6092h         |
| Name        | Feed Constant |
| Object Code | Array         |
| Data Type   | Unsigned32    |

### Entry Description

|             |              |
|-------------|--------------|
| Sub-Index   | 00h          |
| Description | SubIndex 000 |
| Data Type   | Unsigned8    |
| Access      | R/W          |

|                 |    |
|-----------------|----|
| PDO Mapping     | No |
| Value Range     | 2  |
| Default Value   | 2  |
| Save to NVRAM   | No |
| Units           | NA |
| PCSuite Keyword | NA |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 01h             |
| Description     | Feed            |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 1 to 4294967295 |
| Default Value   | 16777216        |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                   |
|-----------------|-------------------|
| Sub-Index       | 02h               |
| Description     | Shaft revolutions |
| Data Type       | Unsigned32        |
| Access          | R/W               |
| PDO Mapping     | No                |
| Value Range     | 1 to 4294967295   |
| Default Value   | 16777216          |
| Save to NVRAM   | Yes               |
| Units           | NA                |
| PCSuite Keyword | NA                |

### 6098h: Homing Method

This object defines the method used for the homing procedure.

Negative for linear/ counterclockwise for rotary

Positive for linear/clockwise for rotary

The following methods are supported:

- **-4:** Homing on hard stop by high error (negative direction). Using this method, need to confirm hard stop threshold. Will set position to 0 at hard stop.
- **-3:** Homing on hard stop by high error (positive direction). Using this method, need to confirm hard stop threshold. Will set position to 0 at hard stop.

- **-2:** Homing on hard stop by high error to index pulse (negative direction). Using this method, need to confirm hard stop threshold. Once the hard stop is reached, the movement reverses direction. The home position will be at the first index pulse.
- **-1:** Homing on hard stop by high error to index pulse (positive direction). Using this method, need to confirm hard stop threshold. Once the hard stop is reached, the movement reverses direction. The home position will be at the first index pulse.
- **1:** Homing on negative limit switch and index pulse. Using this method, the initial direction of movement is towards the negative limit switch if the negative limit switch is inactive (here: low). Once the negative limit switch is reached, the movement reverses direction. The home position will be at the first index pulse.
- **2:** Homing on positive limit switch and index pulse. Using this method, the initial direction of movement is towards the positive limit switch if the positive limit switch is inactive (here: low). Once the positive limit switch is reached, the movement reverses direction. The home position will be at the first index pulse.
- **3 and 4:** Homing on positive home switch and index pulse. Using these methods, the initial direction of movement shall be dependent on the state of the home switch. The home position shall be at the index pulse to either to the left or the right of the point where the home switch changes state. If the initial position is situated so that the direction of movement shall reverse during homing, the point at which the reversal takes place is anywhere after a change of state of the home switch.
- **5 and 6:** Homing on negative home switch and index pulse. Using these, the initial direction of movement shall be dependent on the state of the home switch. The home position shall be at the index pulse to either to the left or the right of the point where the home switch changes state. If the initial position is situated so that the direction of movement shall reverse during homing, the point at which the reversal takes place is anywhere after a change of state of the home switch.
- **33 and 34:** Homing on index pulse. Using these methods, the direction of homing is negative (33) or positive (34). The home position will be at the index pulse found in the selected direction.
- **37:** Homing on current position. In this method, the position sensor information (converted in user-defined position units) shall be taken to be the home position.

#### Object Description

|             |               |
|-------------|---------------|
| Index       | 6098h         |
| Name        | Homing Method |
| Object Code | Variable      |
| Data Type   | Integer8      |

#### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/W        |
| PDO Mapping     | RPDO       |
| Value Range     | -192 to 36 |
| Default Value   | 1          |
| Save to NVRAM   | Yes        |
| Units           | NA         |
| PCSuite Keyword | NA         |

## 6099h: Homing Speeds

This object defines the speeds to be used during the homing procedure, in user-defined velocity units.

### Object Description

|             |              |
|-------------|--------------|
| Index       | 6099h        |
| Name        | Homing Speed |
| Object Code | Array        |
| Data Type   | Unsigned32   |

### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 2            |
| Default Value   | 2            |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 01h             |
| Description     | SubIndex 001    |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | RPDO            |
| Value Range     | 0 to 4294967295 |
| Default Value   | 738263040       |
| Save to NVRAM   | Yes             |
| Units           | User units      |
| PCSuite Keyword | NA              |

|               |                 |
|---------------|-----------------|
| Sub-Index     | 02h             |
| Description   | SubIndex 002    |
| Data Type     | Unsigned32      |
| Access        | R/W             |
| PDO Mapping   | RPDO            |
| Value Range   | 0 to 4294967295 |
| Default Value | 1476526080      |
| Save to NVRAM | Yes             |

|                 |            |
|-----------------|------------|
| Units           | User units |
| PCSuite Keyword | NA         |

### 609Ah: Homing Acceleration

This object defines the acceleration and deceleration to be used during the homing procedure.

#### Object Description

|             |                     |
|-------------|---------------------|
| Index       | 609Ah               |
| Name        | Homing Acceleration |
| Object Code | Variable            |
| Data Type   | Unsigned32          |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | RPDO            |
| Value Range     | 0 to 4294967295 |
| Default Value   | 16777216        |
| Save to NVRAM   | Yes             |
| Units           | User units      |
| PCSuite Keyword | NA              |

### 60A8h: SI Unit Position

This object defines the user-defined position units.

#### Object Description

|             |                  |
|-------------|------------------|
| Index       | 60A8h            |
| Name        | SI Unit Position |
| Object Code | Variable         |
| Data Type   | Unsigned32       |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 509             |
| Save to NVRAM   | Yes             |
| Units           | User units      |
| PCSuite Keyword | NA              |

### 60B0h: Position Offset

This object defines the offset of the target position.

#### Object Description

|             |                 |
|-------------|-----------------|
| Index       | 60B0h           |
| Name        | Position Offset |
| Object Code | Variable        |
| Data Type   | Integer32       |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/W                       |
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | User units                |
| PCSuite Keyword | FIFOPosPosOf              |

### 60B1h: Velocity Offset

This object defines the offset for the velocity value.

#### Object Description

|             |                 |
|-------------|-----------------|
| Index       | 60B1h           |
| Name        | Velocity Offset |
| Object Code | Variable        |
| Data Type   | Integer32       |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/W                       |
| PDO Mapping     | RPDO                      |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | User units                |
| PCSuite Keyword | FIFOPosVelOf              |

## 60B2h: Torque Offset

This object defines the offset for the torque value.

### Object Description

|             |               |
|-------------|---------------|
| Index       | 60B2h         |
| Name        | Torque Offset |
| Object Code | Variable      |
| Data Type   | Integer16     |

### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | RPDO            |
| Value Range     | -32768 to 32767 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | FIFOPosCurrOf   |

## 60B8h: Touch Probe Function

This object defines the function of the touch probe.

### Description

This object is organized bit-wise. The bits have the following meaning:

| Bit  | Value | Definition                                                   |
|------|-------|--------------------------------------------------------------|
| 0    | 0     | Switch off touch probe 1                                     |
|      | 1     | Enable touch probe 1                                         |
| 1    | 0     | Trigger first event                                          |
|      | 1     | Reserved                                                     |
| 3, 2 | 00b   | Trigger with touch probe 1 input                             |
|      | 01b   | Trigger with zero impulse signal or position encoder         |
|      | 10b   | Touch probe source as defined in object 60D0h, sub-index 01h |
|      | 11b   | Reserved                                                     |
| 4    | 0     | Switch off sampling at positive edge of touch probe 1        |
|      | 1     | Enable sampling at positive edge of touch probe 1            |
| 5    | 0     | Switch off sampling at negative edge of touch probe 1        |
|      | 1     | Enable sampling at negative edge of touch probe 1            |
| 7, 6 | -     | Reserved                                                     |
| 8    | 0     | Switch off touch probe 2                                     |
|      | 1     | Enable touch probe 2                                         |
| 9    | 0     | Trigger first event                                          |

| Bit    | Value | Definition                                                   |
|--------|-------|--------------------------------------------------------------|
|        | 1     | Continuous                                                   |
| 11, 10 | 00b   | Trigger with touch probe 2 input                             |
|        | 01b   | Trigger with zero impulse signal or position encoder         |
|        | 10b   | Touch probe source as defined in object 60D0h, sub-index 02h |
|        | 11b   | Reserved                                                     |
| 12     | 0     | Switch off sampling at positive edge of touch probe 2        |
|        | 1     | Enable sampling at positive edge of touch probe 2            |
| 13     | 0     | Switch off sampling at negative edge of touch probe 2        |
|        | 1     | Enable sampling at negative edge of touch probe 2            |
| 15, 14 | -     | Reserved                                                     |

### Object Description

|             |                      |
|-------------|----------------------|
| Index       | 60B8h                |
| Name        | Touch Probe Function |
| Object Code | Variable             |
| Data Type   | Unsigned16           |

### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/W        |
| PDO Mapping     | RPDO       |
| Value Range     | 0 to 65535 |
| Default Value   | 0          |
| Save to NVRAM   | Yes        |
| Units           | User units |
| PCSuite Keyword | NA         |

### 60B9h: Touch Probe Status

This object indicates the status of the touch probe.

#### Description

This object is organized bit-wise. The bits have the following meaning:

| Bit | Value | Definition                                  |
|-----|-------|---------------------------------------------|
| 0   | 0     | Touch probe 1 is switched off               |
|     | 1     | Touch probe 1 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 |

| Bit      | Value | Definition                                  |
|----------|-------|---------------------------------------------|
| 3 to 5   | 0     | Reserved                                    |
| 7, 6     | -     | Reserved                                    |
| 8        | 0     | Touch probe 2 is switched off               |
|          | 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       | 00b   | Touch probe 2 no negative edge value stored |
|          | 01b   | Touch probe 2 negative edge position stored |
| 11 to 13 | 0     | Reserved                                    |

### Object Description

|             |                    |
|-------------|--------------------|
| Index       | 60B9h              |
| Name        | Touch Probe Status |
| Object Code | Variable           |
| Data Type   | Unsigned16         |

### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/O        |
| PDO Mapping     | TPDO       |
| Value Range     | 0 to 65535 |
| Default Value   | 0          |
| Save to NVRAM   | No         |
| Units           | NA         |
| PCSuite Keyword | NA         |

### 60BAh: Touch Probe 1 Positive Value

This object indicates the position value of touch probe 1 at the positive edge.

### Object Description

|             |                              |
|-------------|------------------------------|
| Index       | 60BAh                        |
| Name        | Touch Probe 1 Positive Value |
| Object Code | Variable                     |
| Data Type   | Integer32                    |

### Entry Description

|             |      |
|-------------|------|
| Sub-Index   | 00h  |
| Access      | R/O  |
| PDO Mapping | TPDO |

|                 |                           |
|-----------------|---------------------------|
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | No                        |
| Units           | User units                |
| PCSuite Keyword | NA                        |

### 60BBh: Touch Probe 1 Negative Value

This object indicates the position value of touch probe 1 at the negative edge.

#### Object Description

|             |                              |
|-------------|------------------------------|
| Index       | 60BBh                        |
| Name        | Touch Probe 1 Negative Value |
| Object Code | Variable                     |
| Data Type   | Integer32                    |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/O                       |
| PDO Mapping     | TPDO                      |
| Value Range     | 0                         |
| Default Value   | -2147483648 to 2147483647 |
| Save to NVRAM   | No                        |
| Units           | User units                |
| PCSuite Keyword | NA                        |

### 60BCh: Touch Probe 2 Positive Value

This object indicates the position value of touch probe 2 at the positive edge.

#### Object Description

|             |                              |
|-------------|------------------------------|
| Index       | 60BCh                        |
| Name        | Touch Probe 2 Positive Value |
| Object Code | Variable                     |
| Data Type   | Integer32                    |

#### Entry Description

|               |                           |
|---------------|---------------------------|
| Sub-Index     | 00h                       |
| Access        | R/O                       |
| PDO Mapping   | TPDO                      |
| Value Range   | -2147483648 to 2147483647 |
| Default Value | 0                         |
| Save to NVRAM | No                        |

|                 |            |
|-----------------|------------|
| Units           | User units |
| PCSuite Keyword | NA         |

### 60BDh: Touch Probe 2 Negative Value

This object indicates the position value of touch probe 2 at the negative edge.

#### Object Description

|             |                              |
|-------------|------------------------------|
| Index       | 60BDh                        |
| Name        | Touch Probe 2 Negative Value |
| Object Code | Variable                     |
| Data Type   | Integer32                    |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/O                       |
| PDO Mapping     | TPDO                      |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | No                        |
| Units           | User units                |
| PCSuite Keyword | NA                        |

### 60C0h: Interpolation Sub mode select

This object defines the selected interpolation mode.

If linear interpolation is the only algorithm available, it is not necessary to implement this object.

If linear interpolation mode is selected, the interpolation data given in object 60C1h is used.

#### Object Description

|             |                               |
|-------------|-------------------------------|
| Index       | 60C0h                         |
| Name        | Interpolation Sub mode select |
| Object Code | Variable                      |
| Data Type   | Integer16                     |

#### Entry Description

|               |        |
|---------------|--------|
| Sub-Index     | 00h    |
| Access        | R/W    |
| PDO Mapping   | No     |
| Value Range   | 0 to 3 |
| Default Value | 0      |
| Save to NVRAM | No     |
| Units         | NA     |

|                 |             |
|-----------------|-------------|
| PCSuite Keyword | FIFOPosType |
|-----------------|-------------|

### 60C1h: Interpolation Data Record

This object defines data words, which are necessary to perform the interpolation algorithm. The number of data words in the record is defined by interpolation data configuration. The interpretation of the data words in interpolation data record may vary with the different possible interpolation modes as set by the interpolation sub mode select.

#### Object Description

|             |                           |
|-------------|---------------------------|
| Index       | 60C1h                     |
| Name        | Interpolation Data Record |
| Object Code | Variable                  |
| Data Type   | Integer32                 |

#### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | NA           |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 1 to 254     |
| Default Value   | 4            |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 01h                       |
| Description     | Data Record 1             |
| Data Type       | Integer32                 |
| Access          | R/W                       |
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | NA                        |
| PCSuite Keyword | NA                        |

|             |               |
|-------------|---------------|
| Sub-Index   | 02h           |
| Description | Data Record 2 |
| Data Type   | Integer32     |
| Access      | R/W           |

|                 |                           |
|-----------------|---------------------------|
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | NA                        |
| PCSuite Keyword | NA                        |

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 03h                       |
| Description     | Data Record 3             |
| Data Type       | Integer32                 |
| Access          | R/W                       |
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | NA                        |
| PCSuite Keyword | NA                        |

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 04h                       |
| Description     | Data Record 4             |
| Data Type       | Integer32                 |
| Access          | R/W                       |
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | NA                        |
| PCSuite Keyword | NA                        |

### 60C2h: Interpolation Time Period

This object defines the interpolation cycle time. The interpolation time period (sub-index 01h) value is given in  $10^{(\text{interpolation time index})}$  second.

#### Object Description

|             |                                  |
|-------------|----------------------------------|
| Index       | 60C2h                            |
| Name        | Interpolation time period        |
| Object Code | Record                           |
| Data Type   | Interpolation time period record |

**Entry Description**

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 2            |
| Default Value   | 2            |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                                                    |
|-----------------|----------------------------------------------------|
| Sub-Index       | 01h                                                |
| Description     | Interpolation time period value                    |
| Data Type       | Unsigned8                                          |
| Access          | R/W                                                |
| PDO Mapping     | No                                                 |
| Value Range     | 1 to 255                                           |
| Default Value   | 2                                                  |
| Save to NVRAM   | Yes                                                |
| Units           | 10 <sup>^(interpolation time index)</sup> [second] |
| PCSuite Keyword | NA                                                 |

|                 |                          |
|-----------------|--------------------------|
| Sub-Index       | 02h                      |
| Description     | Interpolation time index |
| Data Type       | Integer8                 |
| Access          | R/W                      |
| PDO Mapping     | No                       |
| Value Range     | -128 to 63               |
| Default Value   | FD                       |
| Save to NVRAM   | Yes                      |
| Units           | NA                       |
| PCSuite Keyword | NA                       |

**60C4h: Interpolation Data Configuration**

This object defines the maximum buffer size and how interpolation data is organized in the buffer. It also provides objects to define the size of the data record and to clear the buffers.

This object enables the drive device to receive the required data in advance. It also is used to store the positions and further data sent by the control device.

**Object Description**

|             |                                         |
|-------------|-----------------------------------------|
| Index       | 60C4h                                   |
| Name        | Interpolation Data Configuration        |
| Object Code | Record                                  |
| Data Type   | Interpolation data configuration record |

**Entry Description**

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 6            |
| Default Value   | 7            |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                     |
|-----------------|---------------------|
| Sub-Index       | 01h                 |
| Description     | Maximum buffer size |
| Data Type       | Integer32           |
| Access          | R/O                 |
| PDO Mapping     | No                  |
| Value Range     | 0 to 4294967295     |
| Default Value   | 16777216            |
| Save to NVRAM   | No                  |
| Units           | NA                  |
| PCSuite Keyword | NA                  |

|                 |                    |
|-----------------|--------------------|
| Sub-Index       | 02h                |
| Description     | Actual buffer size |
| Data Type       | Integer32          |
| Access          | R/W                |
| PDO Mapping     | No                 |
| Value Range     | 0 to 1             |
| Default Value   | 0                  |
| Save to NVRAM   | Yes                |
| Units           | NA                 |
| PCSuite Keyword | NA                 |

|                 |                     |
|-----------------|---------------------|
| Sub-Index       | 03h                 |
| Description     | Buffer organization |
| Data Type       | Unsigned8           |
| Access          | R/W                 |
| PDO Mapping     | No                  |
| Value Range     | 0 to 1              |
| Default Value   | 0                   |
| Save to NVRAM   | Yes                 |
| Units           | NA                  |
| PCSuite Keyword | NA                  |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 04h             |
| Description     | Buffer position |
| Data Type       | Unsigned16      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0               |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|                 |                     |
|-----------------|---------------------|
| Sub-Index       | 05h                 |
| Description     | Size of data record |
| Data Type       | Unsigned8           |
| Access          | W/O                 |
| PDO Mapping     | No                  |
| Value Range     | 0                   |
| Default Value   | 0                   |
| Save to NVRAM   | Yes                 |
| Units           | NA                  |
| PCSuite Keyword | NA                  |

|               |              |
|---------------|--------------|
| Sub-Index     | 06h          |
| Description   | Buffer clear |
| Data Type     | Unsigned8    |
| Access        | W/O          |
| PDO Mapping   | No           |
| Value Range   | 0 to 4       |
| Default Value | 1            |

|                 |     |
|-----------------|-----|
| Save to NVRAM   | Yes |
| Units           | NA  |
| PCSuite Keyword | NA  |

### 60C5h: Max Acceleration

This object defines the maximum acceleration. It is used to limit the acceleration to an acceptable value to prevent damage to the motor and moving parts.

#### Object Description

|             |                  |
|-------------|------------------|
| Index       | 60C5h            |
| Name        | Max Acceleration |
| Object Code | Variable         |
| Data Type   | Unsigned32       |

#### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 4294967295      |
| Save to NVRAM   | Yes             |
| Units           | User units      |
| PCSuite Keyword | MaxAcc          |

### 60C6h: Max Deceleration

This object defines the maximum deceleration. It is used to limit the deceleration to an acceptable value to prevent damage to the motor and moving parts.

The value is given in the same physical units as object 60C5 (max acceleration).

#### Object Description

|             |                  |
|-------------|------------------|
| Index       | 60C6h            |
| Name        | Max Deceleration |
| Object Code | Variable         |
| Data Type   | Unsigned32       |

#### Entry Description

|               |                 |
|---------------|-----------------|
| Sub-Index     | 00h             |
| Access        | R/W             |
| PDO Mapping   | No              |
| Value Range   | 0 to 4294967295 |
| Default Value | 4294967295      |

|                 |            |
|-----------------|------------|
| Save to NVRAM   | Yes        |
| Units           | User units |
| PCSuite Keyword | MaxAcc     |

## 60D0h: Touch Probe Source

This object defines the source of the touch probe functions.

### Description

|          |                     |                     |          |
|----------|---------------------|---------------------|----------|
| 0        | 1                   | 2                   | 3 – 255  |
| Reserved | Touch probe 1 input | Touch probe 2 input | Reserved |

### Object Description

|             |                    |
|-------------|--------------------|
| Index       | 60D0h              |
| Name        | Touch probe source |
| Object Code | Variable           |
| Data Type   | Unsigned8          |

### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 2            |
| Default Value   | 2            |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | NA           |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 01h             |
| Description     | TP1 source      |
| Data Type       | Integer32       |
| Access          | R/O             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | No              |
| Units           | NA              |
| PCSuite Keyword | NA              |

|           |     |
|-----------|-----|
| Sub-Index | 02h |
|-----------|-----|

|                 |            |
|-----------------|------------|
| Description     | TP2 source |
| Data Type       | Integer32  |
| Access          | R/W        |
| PDO Mapping     | No         |
| Value Range     | 0 to 1     |
| Default Value   | 0          |
| Save to NVRAM   | Yes        |
| Units           | NA         |
| PCSuite Keyword | NA         |

### 60D5h: Touch Probe 1 Positive Edge Counter

This object provides a continuous counter that is incremented with each positive edge at touch probe 1. The counter is valid only if the touch probe input is enabled (60B8h, bit 0 = 1b). For single event measuring, only the value of bit 0 is evaluated. For continuous measuring, the value is an unsigned 16-bit value with overflow.

#### Object Description

|             |                                     |
|-------------|-------------------------------------|
| Index       | 60D5h                               |
| Name        | Touch Probe 1 Positive Edge Counter |
| Object Code | Variable                            |
| Data Type   | Unsigned16                          |

#### Entry Description

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/O        |
| PDO Mapping     | TPDO       |
| Value Range     | 0 to 65535 |
| Default Value   | 0          |
| Save to NVRAM   | No         |
| Units           | NA         |
| PCSuite Keyword | NA         |

### 60D6h Touch Probe 1 Negative Edge Counter

This object provides a continuous counter that is incremented with each negative edge at touch probe 1. The counter is valid only if the touch probe input is enabled (60B8h, bit 0 = 1b). For single event measuring, only the value of bit 0 is evaluated. For continuous measuring, the value is an unsigned 16-bit value with overflow.

#### Object Description

|             |                                     |
|-------------|-------------------------------------|
| Index       | 60D6h                               |
| Name        | Touch Probe 1 Negative Edge Counter |
| Object Code | Variable                            |

|           |            |
|-----------|------------|
| Data Type | Unsigned16 |
|-----------|------------|

**Entry Description**

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/O        |
| PDO Mapping     | TPDO       |
| Value Range     | 0 to 65535 |
| Default Value   | 0          |
| Save to NVRAM   | No         |
| Units           | NA         |
| PCSuite Keyword | NA         |

**60D7h Touch Probe 2 Positive Edge Counter**

This object provides a continuous counter that is incremented with each positive edge at touch probe 2. The counter is valid only if the touch probe input is enabled (60B8h, bit 8 = 1b). For single event measuring, only the value of bit 0 is evaluated. For continuous measuring, the value is an unsigned 16-bit value with overflow.

**Object Description**

|             |                                     |
|-------------|-------------------------------------|
| Index       | 60D7h                               |
| Name        | Touch Probe 2 Positive Edge Counter |
| Object Code | Variable                            |
| Data Type   | Unsigned16                          |

**Entry Description**

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/O        |
| PDO Mapping     | TPDO       |
| Value Range     | 0          |
| Default Value   | 0 to 65535 |
| Save to NVRAM   | No         |
| Units           | NA         |
| PCSuite Keyword | NA         |

**60D8h Touch Probe 2 Negative Edge Counter**

This object provides a continuous counter that is incremented with each negative edge at touch probe 2. The counter is valid only if the touch probe input is enabled (60B8h, bit 8 = 1b). For single event measuring, only the value of bit 0 is evaluated. For continuous measuring, the value is an unsigned 16-bit value with overflow.

**Object Description**

|       |       |
|-------|-------|
| Index | 60D8h |
|-------|-------|

|             |                                     |
|-------------|-------------------------------------|
| Name        | Touch Probe 2 Negative Edge Counter |
| Object Code | Variable                            |
| Data Type   | Unsigned16                          |

**Entry Description**

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/O        |
| PDO Mapping     | TPDO       |
| Value Range     | 0 to 65535 |
| Default Value   | 0          |
| Save to NVRAM   | No         |
| Units           | NA         |
| PCSuite Keyword | NA         |

**60F2h Positioning Option Code**

This object defines the positioning behavior as described by the profile positioning mode or the interpolated positioning mode.

**Note:** This object is not implemented. Although it is declared in ESI file, the function is not supported.

**Description**

| 15                    | 14–12    | 11–8      | 7–6                          | 5–4                     | 3–2                       | 1–0             |
|-----------------------|----------|-----------|------------------------------|-------------------------|---------------------------|-----------------|
| manufacturer specific | reserved | LP option | Rotary axis direction option | Request-response option | Change immediately option | Relative option |

**Object Description**

|             |                         |
|-------------|-------------------------|
| Index       | 60F2h                   |
| Name        | Positioning Option Code |
| Object Code | Variable                |
| Data Type   | Unsigned16              |

**Entry Description**

|                 |            |
|-----------------|------------|
| Sub-Index       | 00h        |
| Access          | R/W        |
| PDO Mapping     | No         |
| Value Range     | 0 to 65535 |
| Default Value   | 0          |
| Save to NVRAM   | Yes        |
| Units           | NA         |
| PCSuite Keyword | NA         |

### 60F4h Following Error Actual Value

This object indicates the actual value of the following error.

#### Object Description

|             |                              |
|-------------|------------------------------|
| Index       | 60F4h                        |
| Name        | Following Error Actual Value |
| Object Code | Variable                     |
| Data Type   | Integer32                    |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/O                       |
| PDO Mapping     | TPDO                      |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | No                        |
| Units           | User units                |
| PCSuite Keyword | PosErr                    |

### 60FCh: Position Demand Internal Value

This object indicates the output of the trajectory generator in profile position mode. This value is given in increments of the position encoder.

#### Object Description

|             |                                |
|-------------|--------------------------------|
| Index       | 60FCh                          |
| Name        | Position Demand Internal Value |
| Object Code | Variable                       |
| Data Type   | Integer32                      |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/O                       |
| PDO Mapping     | No                        |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | No                        |
| Units           | Increments                |
| PCSuite Keyword | NA                        |

## 60FDh: Digital Inputs

This object represents the logical input levels.

### Description

| 31–16         | 15–3     | 2           | 1                     | 0                     |
|---------------|----------|-------------|-----------------------|-----------------------|
| Input 1 to 16 | reserved | home switch | positive limit switch | negative limit switch |

| Field                            | Value | Definition                        |
|----------------------------------|-------|-----------------------------------|
| Negative limit switch            | 0b    | Negative limit switch not reached |
|                                  | 1b    | Negative limit switch reached     |
| Positive limit switch            | 0b    | Positive limit switch not reached |
|                                  | 1b    | Positive limit switch reached     |
| Home switch                      | 0b    | Home switch not reached           |
|                                  | 1b    | Home switch reached               |
| Reserved (each bit)              | 0b    | Reserved                          |
| Manufacturer specific (each bit) | 0b    | Function not activated            |
|                                  | 1b    | Function activated                |

### Object Description

|             |                |
|-------------|----------------|
| Index       | 60FDh          |
| Name        | Digital Inputs |
| Object Code | Variable       |
| Data Type   | Unsigned32     |

### Entry Description

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/O             |
| PDO Mapping     | TPDO            |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | No              |
| Units           | NA              |
| PCSuite Keyword | DInPort         |

## 60FEh: Digital Outputs

This object controls the digital outputs. This object represents the logical input levels.

**Note:** This object is not implemented. Although it is declared in ESI file, the function is not supported.

### Object Description

|             |                 |
|-------------|-----------------|
| Index       | 60FEh           |
| Name        | Digital Outputs |
| Object Code | Array           |
| Data Type   | Unsigned32      |

### Entry Description

|                 |              |
|-----------------|--------------|
| Sub-Index       | 00h          |
| Description     | SubIndex 000 |
| Data Type       | Unsigned8    |
| Access          | R/O          |
| PDO Mapping     | No           |
| Value Range     | 2            |
| Default Value   | 2            |
| Save to NVRAM   | No           |
| Units           | NA           |
| PCSuite Keyword | DOutPort     |

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 01h             |
| Description     | Digital Outputs |
| Data Type       | Unsigned32      |
| Access          | R/W             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 0               |
| Save to NVRAM   | Yes             |
| Units           | NA              |
| PCSuite Keyword | NA              |

|               |                      |
|---------------|----------------------|
| Sub-Index     | 02h                  |
| Description   | Digital Outputs Mask |
| Data Type     | Unsigned32           |
| Access        | R/W                  |
| PDO Mapping   | No                   |
| Value Range   | 0 to 4294967295      |
| Default Value | 0                    |
| Save to NVRAM | Yes                  |

|                 |    |
|-----------------|----|
| Units           | NA |
| PCSuite Keyword | NA |

### 60FFh: Target Velocity

In this object, the target speed for the Profile Velocity and Cyclic Synchronous Velocity modes is entered in user-defined velocity units.

This object defines the target velocity and is used as input for the trajectory generator.

#### Object Description

|             |                 |
|-------------|-----------------|
| Index       | 60FFh           |
| Name        | Target Velocity |
| Object Code | Variable        |
| Data Type   | Integer32       |

#### Entry Description

|                 |                           |
|-----------------|---------------------------|
| Sub-Index       | 00h                       |
| Access          | R/W                       |
| PDO Mapping     | RPDO                      |
| Value Range     | -2147483648 to 2147483647 |
| Default Value   | 0                         |
| Save to NVRAM   | Yes                       |
| Units           | User units                |
| PCSuite Keyword | Speed                     |

### 6502h: Supported Drive Modes

The object indicates the operating modes (see object 6060h) supported by the drive.

#### Description

| 31–16                 | 15–8     | 7                                       | 6        | 5                  | 4–1      | 0                            |
|-----------------------|----------|-----------------------------------------|----------|--------------------|----------|------------------------------|
| Manufacturer-specific | reserved | <b>cyclic synchronous position mode</b> | reserved | <b>homing mode</b> | reserved | <b>profile position mode</b> |

Bit value 0: Not supported

Bit value 1: Supported

#### Object Description

|             |                       |
|-------------|-----------------------|
| Index       | 60FFh                 |
| Name        | Supported Drive Modes |
| Object Code | Variable              |
| Data Type   | Unsigned32            |

**Entry Description**

|                 |                 |
|-----------------|-----------------|
| Sub-Index       | 00h             |
| Access          | R/O             |
| PDO Mapping     | No              |
| Value Range     | 0 to 4294967295 |
| Default Value   | 3707830272      |
| Save to NVRAM   | No              |
| Units           | NA              |
| PCSuite Keyword | NA              |

## 8 Errors

| Error Name                                        | Error Code | Error Description                             |
|---------------------------------------------------|------------|-----------------------------------------------|
| ERROR_SHORT_CIRCUIT_EARTH_LEAKAGE_INPUT           | 0x2110     | Short circuit/earth leakage (input)           |
| ERROR_EARTH_LEAKAGE_INPUT                         | 0x2120     | Earth leakage (input)                         |
| ERROR_EARTH_LEAKAGE_PHASE_L1                      | 0x2121     | Earth leakage phase L1                        |
| ERROR_EARTH_LEAKAGE_PHASE_L2                      | 0x2122     | Earth leakage phase L2                        |
| ERROR_EARTH_LEAKAGE_PHASE_L3 *****                | 0x2123     | Earth leakage phase L3                        |
| ERROR_SHORT_CIRCUIT_INPUT                         | 0x2130     | Short circuit (input)                         |
| ERROR_SHORT_CIRCUIT_PHASES_L1_L2                  | 0x2131     | Short circuit phases L1-L2                    |
| ERROR_SHORT_CIRCUIT_PHASES_L2_L3                  | 0x2132     | Short circuit phases L2-L3                    |
| ERROR_SHORT_CIRCUIT_PHASES_L3_L1                  | 0x2133     | Short circuit phases L3-L1                    |
| ERROR_INTERNAL_CURRENT_NO1                        | 0x2211     | Internal current 1                            |
| ERROR_INTERNAL_CURRENT_NO2                        | 0x2212     | Internal current 2                            |
| ERROR_OVER_CURRENT_IN_RAMP_FUNCTION               | 0x2213     | Over-current in ramp function                 |
| ERROR_OVER_CURRENT_IN_THE_SEQUENCE                | 0x2214     | Over-current in the sequence                  |
| ERROR_CONTINUOUS_OVER_CURRENT_DEVICE_INTERNAL     | 0x2220     | Continuous over-current (internal device)     |
| ERROR_CONTINUOUS_OVER_CURRENT_DEVICE_INTERNAL_NO1 | 0x2221     | Continuous over-current internal device 1     |
| ERROR_CONTINUOUS_OVER_CURRENT_DEVICE_INTERNAL_NO2 | 0x2222     | Continuous over-current internal device 2     |
| ERROR_SHORT_CIRCUIT_EARTH_LEAKAGE_DEVICE_INTERNAL | 0x2230     | Short circuit/earth leakage (internal device) |
| ERROR_EARTH_LEAKAGE_DEVICE_INTERNAL               | 0x2240     | Earth leakage (internal device)               |
| ERROR_SHORT_CIRCUIT_DEVICE_INTERNAL               | 0x2250     | Short circuit (internal device)               |
| ERROR_CONTINUOUS_OVER_CURRENT                     | 0x2310     | Continuous over current                       |
| ERROR_CONTINUOUS_OVER_CURRENT_NO1                 | 0x2311     | Continuous over current 1                     |
| ERROR_CONTINUOUS_OVER_CURRENT_NO2                 | 0x2312     | Continuous over current 2                     |
| ERROR_SHORT_CIRCUIT_EARTH_LEAKAGE_MOTOR_SIDE      | 0x2320     | Short circuit/earth leakage (motor-side)      |
| ERROR_EARTH_LEAKAGE_MOTOR_SIDE                    | 0x2330     | Earth leakage (motor-side)                    |
| ERROR_EARTH_LEAKAGE_PHASE_U                       | 0x2331     | Earth leakage phase U                         |
| ERROR_EARTH_LEAKAGE_PHASE_V                       | 0x2332     | Earth leakage phase V                         |
| ERROR_EARTH_LEAKAGE_PHASE_W                       | 0x2333     | Earth leakage phase W                         |
| ERROR_SHORT_CIRCUIT_MOTOR_SIDE                    | 0x2340     | Short circuit (motor-side)                    |
| ERROR_SHORT_CIRCUIT_PHASES_U_V                    | 0x2341     | Short circuit phases U-V                      |
| ERROR_EARTH_LEAKAGE_PHASE_V_W                     | 0x2342     | Earth leakage phase V-W                       |
| ERROR_EARTH_LEAKAGE_PHASE_W_U                     | 0x2343     | Earth leakage phase W-U                       |
| ERROR_LOAD_LEVEL_FAULT_I2T_THERMAL_STATE          | 0x2350     | Load level fault (I2t, thermal state)         |
| ERROR_LOAD_LEVEL_WARNING_I2T_THERMAL_STATE        | 0x2351     | Load level warning (I2t, thermal state)       |
| ERROR_MAINS_OVER_VOLTAGE                          | 0x3110     | Mains over-voltage                            |

| Error Name                         | Error Code | Error Description            |
|------------------------------------|------------|------------------------------|
| ERROR_MAINS_OVER_VOLTAGE_PHASE_L1  | 0x3111     | Mains over-voltage phase L1  |
| ERROR_MAINS_OVER_VOLTAGE_PHASE_L2  | 0x3112     | Mains over-voltage phase L2  |
| ERROR_MAINS_OVER_VOLTAGE_PHASE_L3  | 0x3113     | Mains over-voltage phase L3  |
| ERROR_MAINS_UNDER_VOLTAGE          | 0x3120     | Mains under-voltage          |
| ERROR_MAINS_UNDER_VOLTAGE_PHASE_L1 | 0x3121     | Mains under-voltage phase L1 |
| ERROR_MAINS_UNDER_VOLTAGE_PHASE_L2 | 0x3122     | Mains under-voltage phase L2 |
| ERROR_MAINS_UNDER_VOLTAGE_PHASE_L3 | 0x3123     | Mains under-voltage phase L3 |
| ERROR_PHASE_FAILURE                | 0x3130     | Phase failure                |
| ERROR_PHASE_FAILURE_L1             | 0x3131     | Phase failure L1             |
| ERROR_PHASE_FAILURE_L2             | 0x3132     | Phase failure L2             |
| ERROR_PHASE_FAILURE_L3             | 0x3133     | Phase failure L3             |
| ERROR_PHASE_SEQUENCE               | 0x3134     | Phase sequence               |
| ERROR_MAINS_FREQUENCY              | 0x3140     | Mains frequency              |
| ERROR_MAINS_FREQUENCY_TOO_GREAT    | 0x3141     | Mains frequency too great    |
| ERROR_MAINS_FREQUENCY_TOO_SMALL    | 0x3142     | Mains frequency too small    |
| ERROR_DC_LINK_OVER_VOLTAGE         | 0x3210     | DC link over-voltage         |
| ERROR_OVER_VOLTAGE_NO_1            | 0x3211     | Over-voltage 1               |
| ERROR_OVER_VOLTAGE_NO_2            | 0x3212     | Over voltage 2               |
| ERROR_DC_LINK_UNDER_VOLTAGE        | 0x3220     | DC link under-voltage        |
| ERROR_UNDER_VOLTAGE_NO_1           | 0x3221     | Under-voltage 1              |
| ERROR_UNDER_VOLTAGE_NO_2           | 0x3222     | Under-voltage 2              |
| ERROR_LOAD_ERROR                   | 0x3230     | Load error                   |
| ERROR_OUTPUT_OVER_VOLTAGE          | 0x3310     | Output over-voltage          |
| ERROR_OUTPUT_OVER_VOLTAGE_PHASE_U  | 0x3311     | Output over-voltage phase U  |
| ERROR_OUTPUT_OVER_VOLTAGE_PHASE_V  | 0x3312     | Output over-voltage phase V  |
| ERROR_OUTPUT_OVER_VOLTAGE_PHASE_W  | 0x3313     | Output over-voltage phase W  |
| ERROR_ARMATURE_CIRCUIT             | 0x3320     | Armature circuit             |
| ERROR_ARMATURE_CIRCUIT_INTERRUPTED | 0x3321     | Armature circuit interrupted |
| ERROR_FIELD_CIRCUIT                | 0x3330     | Field circuit error          |
| ERROR_FIELD_CIRCUIT_INTERRUPTED    | 0x3331     | Field circuit interrupted    |
| ERROR_EXCESS_AMBIENT_TEMPERATURE   | 0x4110     | Ambient temperature too high |
| ERROR_TOO_LOW_AMBIENT_TEMPERATURE  | 0x4120     | Ambient temperature too low  |
| ERROR_TEMPERATURE_SUPPLY_AIR       | 0x4130     | Supply air temperature       |
| ERROR_TEMPERATURE_AIR_OUTLET       | 0x4140     | Air outlet temperature       |
| ERROR_EXCESS_TEMPERATURE_DEVICE    | 0x4210     | Device temperature too high  |
| ERROR_TOO_LOW_TEMPERATURE_DEVICE   | 0x4220     | Device temperature too low   |
| ERROR_TEMPERATURE_DRIVE            | 0x4300     | Temperature drive error      |
| ERROR_EXCESS_TEMPERATURE_DRIVE     | 0x4310     | Drive temperature too high   |
| ERROR_TOO_LOW_TEMPERATURE_DRIVE    | 0x4320     | Drive temperature too low    |
| ERROR_TEMPERATURE_SUPPLY           | 0x4400     | Supply temperature error     |
| ERROR_EXCESS_TEMPERATURE_SUPPLY    | 0x4410     | Supply temperature too high  |

| Error Name                            | Error Code | Error Description                       |
|---------------------------------------|------------|-----------------------------------------|
| ERROR_TOO_LOW_TEMPERATURE_SUPPLY      | 0x4420     | Supply temperature too low              |
| ERROR_SUPPLY_ERROR                    | 0x5100     | Supply error                            |
| ERROR_SUPPLY_LOW_VOLTAGE              | 0x5110     | Supply low voltage                      |
| ERROR_U1_SUPPLY_15V                   | 0x5111     | U1 = supply +15V/-15V                   |
| ERROR_U2_SUPPLY_24_V                  | 0x5112     | U2 = supply +24 V                       |
| ERROR_U3_SUPPLY_5_V                   | 0x5113     | U3 = supply +5 V                        |
| ERROR_U4_MANUFACTURER_SPECIFIC        | 0x5114     | U4 = manufacturer-specific error        |
| ERROR_U5_MANUFACTURER_SPECIFIC        | 0x5115     | U5 = manufacturer-specific error        |
| ERROR_U6_MANUFACTURER_SPECIFIC        | 0x5116     | U6 = manufacturer-specific error        |
| ERROR_U7_MANUFACTURER_SPECIFIC        | 0x5117     | U7 = manufacturer-specific error        |
| ERROR_U8_MANUFACTURER_SPECIFIC        | 0x5118     | U8 = manufacturer-specific error        |
| ERROR_U9_MANUFACTURER_SPECIFIC        | 0x5119     | U9 = manufacturer-specific error        |
| ERROR_SUPPLY_INTERMEDIATE_CIRCUIT     | 0x5120     | Supply intermediate circuit             |
| ERROR_CONTROL_MEASUREMENT_CIRCUIT     | 0x5210     | Measurement circuit                     |
| ERROR_CONTROL_COMPUTING_CIRCUIT       | 0x5220     | Computing circuit                       |
| ERROR_OPERATING_UNIT                  | 0x5300     | Operating unit error                    |
| ERROR_POWER_SECTION                   | 0x5400     | Power section error                     |
| ERROR_OUTPUT_STAGES                   | 0x5410     | Output stages error                     |
| ERROR_CHOPPER                         | 0x5420     | Chopper error                           |
| ERROR_INPUT_STAGES                    | 0x5430     | Input stages error                      |
| ERROR_CONTACTS_ERROR                  | 0x5440     | Contacts error                          |
| ERROR_CONTACT_1_MANUFACTURER_SPECIFIC | 0x5441     | Contact 1 = manufacturer-specific error |
| ERROR_CONTACT_2_MANUFACTURER_SPECIFIC | 0x5442     | Contact 2 = manufacturer-specific error |
| ERROR_CONTACT_3_MANUFACTURER_SPECIFIC | 0x5443     | Contact 3 = manufacturer-specific error |
| ERROR_CONTACT_4_MANUFACTURER_SPECIFIC | 0x5444     | Contact 4 = manufacturer-specific error |
| ERROR_CONTACT_5_MANUFACTURER_SPECIFIC | 0x5445     | Contact 5 = manufacturer-specific error |
| ERROR_FUSES_ERROR                     | 0x5450     | Fuses error                             |
| ERROR_S1_L1                           | 0x5451     | S1 = I1 error                           |
| ERROR_S2_L2                           | 0x5452     | S2 = I2 error                           |
| ERROR_S3_L3                           | 0x5453     | S3 = I3 error                           |
| ERROR_S4_MANUFACTURER_SPECIFIC        | 0x5454     | S4 = manufacturer-specific error        |
| ERROR_S5_MANUFACTURER_SPECIFIC        | 0x5455     | S5 = manufacturer-specific error        |
| ERROR_S6_MANUFACTURER_SPECIFIC        | 0x5456     | S6 = manufacturer-specific error        |
| ERROR_S7_MANUFACTURER_SPECIFIC        | 0x5457     | S7 = manufacturer-specific error        |
| ERROR_S8_MANUFACTURER_SPECIFIC        | 0x5458     | S8 = manufacturer-specific error        |
| ERROR_S9_MANUFACTURER_SPECIFIC        | 0x5459     | S9 = manufacturer-specific error        |
| ERROR_HARDWARE_MEMORY                 | 0x5500     | Hardware memory error                   |
| ERROR_RAM                             | 0x5510     | RAM error                               |
| ERROR_ROM_EPROM                       | 0x5520     | ROM/EPROM error                         |
| ERROR_EEPROM                          | 0x5530     | EEPROM error                            |
| ERROR_SOFTWARE_RESET_WATCHDOG         | 0x6010     | Software reset (watchdog)               |

| Error Name                               | Error Code       | Error Description                      |
|------------------------------------------|------------------|----------------------------------------|
| ERROR_DATA_RECORD_NO_1_TO_NO_15          | 0x6301_TO_0x630F |                                        |
| ERROR_LOSS_OF_PARAMETERS                 | 0x6310           | Loss of parameters                     |
| ERROR_PARAMETER_ERROR                    | 0x6320           | Parameter error                        |
| ERROR_POWER_ERROR                        | 0x7100           | Power error                            |
| ERROR_BRAKE_CHOPPER                      | 0x7110           | Brake chopper                          |
| ERROR_FAILURE_BRAKE_CHOPPER              | 0x7111           | Failure brake chopper                  |
| ERROR_OVER_CURRENT_BRAKE_CHOPPER         | 0x7112           | Over-current brake chopper             |
| ERROR_PROTECTIVE_CIRCUIT_BRAKE_CHOPPER   | 0x7113           | Protective circuit brake chopper error |
| ERROR_MOTOR_ERROR                        | 0x7120           | Motor error                            |
| ERROR_MOTOR_BLOCKED                      | 0x7121           | Motor blocked error                    |
| ERROR_MOTOR_ERROR_OR_COMMUTATION_MALFUNC | 0x7122           | Motor error or commutation malfunction |
| ERROR_MOTOR_TILTED                       | 0x7123           | Motor tilted                           |
| ERROR_MEASUREMENT_CIRCUIT                | 0x7200           | Measurement circuit                    |
| ERROR_SENSOR_ERROR                       | 0x7300           | Sensor error                           |
| ERROR_TACHO_FAULT                        | 0x7301           | Tacho fault                            |
| ERROR_TACHO_WRONG_POLARITY               | 0x7302           | Tacho incorrect polarity               |
| ERROR_RESOLVER_1_FAULT                   | 0x7303           | Resolver 1 fault                       |
| ERROR_RESOLVER_2_FAULT                   | 0x7304           | Resolver 2 fault                       |
| ERROR_INCREMENTAL_SENSOR_1_FAULT         | 0x7305           | Incremental sensor 1 fault             |
| ERROR_INCREMENTAL_SENSOR_2_FAULT         | 0x7306           | Incremental sensor 2 fault             |
| ERROR_INCREMENTAL_SENSOR_3_FAULT         | 0x7307           | Incremental sensor 3 fault             |
| ERROR_SPEED                              | 0x7310           | Speed error                            |
| ERROR_POSITION                           | 0x7320           | Position error                         |
| ERROR_COMPUTATION_CIRCUIT                | 0x7400           | Computation circuit                    |
| ERROR_COMMUNICATION                      | 0x7500           | Communication error                    |
| ERROR_SERIAL_INTERFACE_NO_1              | 0x7510           | Serial interface 1 error               |
| ERROR_SERIAL_INTERFACE_NO_2              | 0x7520           | Serial interface 2 error               |
| ERROR_DATA_STORAGE_EXTERNAL              | 0x7600           | Data storage (external) error          |
| ERROR_TORQUE_CONTROL                     | 0x8300           | Torque control error                   |
| ERROR_EXCESS_TORQUE                      | 0x8311           | Excessive torque error                 |
| ERROR_DIFFICULT_START_UP                 | 0x8312           | Difficult start up error               |
| ERROR_STANDSTILL_TORQUE                  | 0x8313           | Standstill torque error                |
| ERROR_INSUFFICIENT_TORQUE                | 0x8321           | Insufficient torque error              |
| ERROR_TORQUE_FAULT                       | 0x8331           | Torque fault                           |
| ERROR_VELOCITY_SPEED_CONTROLLER          | 0x8400           | Velocity speed controller              |
| ERROR_POSITION_CONTROLLER                | 0x8500           | Position controller                    |
| ERROR_POSITIONING_CONTROLLER             | 0x8600           | Positioning controller                 |
| ERROR_FOLLOWING_ERROR                    | 0x8611           | Following error                        |
| ERROR_REFERENCE_LIMIT                    | 0x8612           | Reference limit                        |

| Error Name                    | Error Code | Error Description         |
|-------------------------------|------------|---------------------------|
| ERROR_SYNC_CONTROLLER         | 0x8700     | Sync controller           |
| ERROR_WINDING_CONTROLLER      | 0x8800     | Winding controller        |
| ERROR_PROCESS_DATA_MONITORING | 0x8900     | Process data monitoring   |
| ERROR_DECELERATION            | 0xF001     | Deceleration error        |
| ERROR_SUB_SYNCHRONOUS_RUN     | 0xF002     | Sub-synchronous run error |
| ERROR_STROKE_OPERATION        | 0xF003     | Stroke operation error    |
| ERROR_CONTROL                 | 0xF004     |                           |

