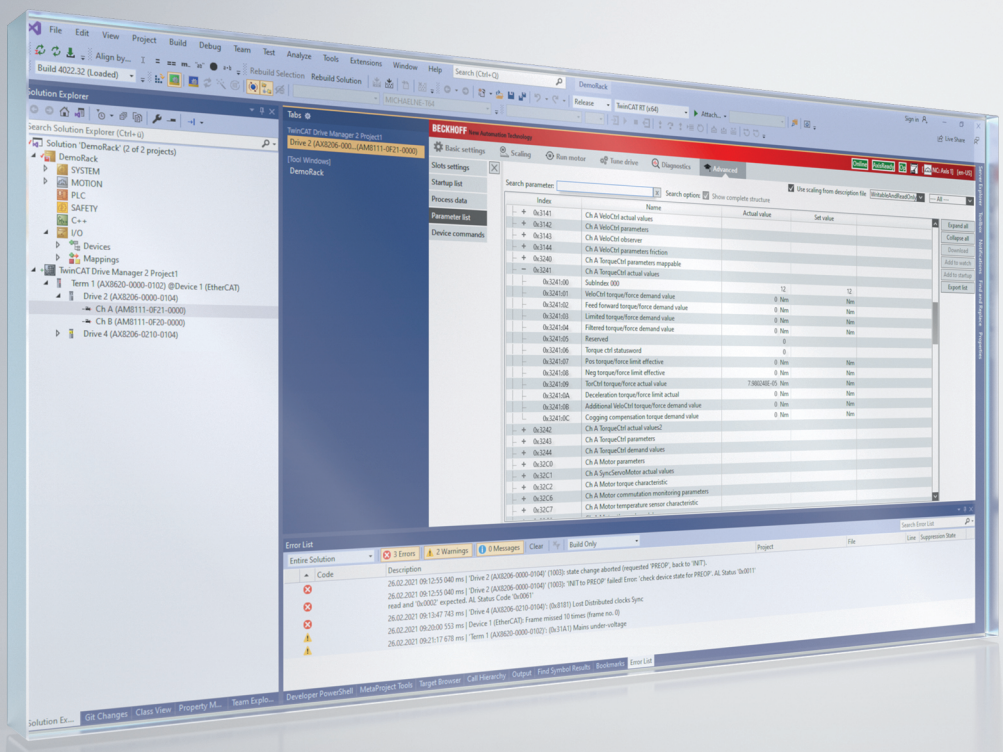
BECKHOFF New Automation Technology

Object Dictionary – Objects of module safety are not included | EN

# AX1106-3101-0000

Object description for Economy servo drive, three-phase, single-axis module, 6.9 A, STO/SS1 (FSoE)



2026-11-10 | Version: FW1.03b0003

# Table of contents

**1 Documentation notes ..... 5**

**2 Object description and parameterization ..... 11**

2.1 Device Objects ..... 11
2.2 Objects of module DeviceMain ..... 25
2.3 Objects of module PowerManagementAC3 ..... 28
2.4 Objects of module AxisMainAX1 ..... 33
2.5 Objects of module Interpolator ..... 49
2.6 Objects of module PositionControl ..... 52
2.7 Objects of module VelocityControl ..... 53
2.8 Objects of module BiquadFilter ..... 58
2.9 Objects of module TorqueControl ..... 65
2.10 Objects of module SynchronousMotor ..... 72
2.11 Objects of module AsynchronousMotor ..... 95
2.12 Objects of module HpfDslRotary ..... 108
2.13 Objects of module SimulationRotary ..... 134
2.14 Objects of module DeviceDebug ..... 136
2.15 Objects of module AxisDebug ..... 140

**3 Basic information Safety applications ..... 145**

3.1 0xF980 | Safe Address ..... 145
3.2 0xF9C0 | Safety Device Info ..... 145
3.3 0xFABB | SETSAFEADDRESS Diag Data ..... 145
3.4 0xFEA0 | CTRL Diag Data ..... 146

# 1 Documentation notes

### Version Info

This reference manual contains the CoE objects and Diag Messages of the following device.

| Description | Value |
|---|---|
| Device | AX1106-3101 |
| ESI Revision | 103 (AX1106-3101-0103) |
| Firmware Version | FW1.03b0003 |

### Explanation of substitutes and symbols

### ESI Modules

ESI modules are used to encapsulate and selectively activate specific functions or properties of a device. They have a separate set of objects and PDOs that are independent of the device's basic object dictionary. When an ESI module is activated, the device object dictionary is extended by the objects and PDOs of the specific module. The device's ESI file contains information about which modules can be used for that device.

### Slots and Supported Modules

A slot is a placeholder for an ESI module. A device can support multiple slots. Only one module can be plugged into a slot. The number of slots supported by a device limits the maximum number of ESI modules that can be plugged into the device simultaneously. Each slot has a predefined subset of modules that can be used. Modules can only be plugged into slots that accept the respective module.

### Multiple Use of a Module

An ESI module can be activated on multiple slots in order to use the functionality it contains multiple times. Each time a module is instantiated, the relevant object indices are incremented depending on the slot group and slot position. This ensures that object indices remain unique even if the module is used multiple times. The increment step is defined in the EtherCAT device and depends on the module and the slot.

### Readability

For orientation purposes independent of the object index, identifiers are used in the names of module objects to make the assignment to a slot and slot group readable. In the configuration tool, these identifiers are replaced by a designation derived from the respective slot and slot group.

### Description of the Identifiers

The following identifiers apply exclusively to objects of ESI modules and not to device objects. When instantiated, objects of an ESI module replace the following identifiers in their object names according to the system described below:

| Substitute | Name | Replaced in the object name by |
|---|---|---|
| [SL] | Slot name | The specific slot name |
| [SG] | Slot group | The specific slot group name |
| %S | Slot number | The specific slot number, starting at 1 |
| %G | Slot group number | The specific slot group number, starting at 1 |
| %C | Slot number within the slot group | The specific slot number within the slot group, starting at 1 |

### Nomenclature

| Name | Description |
|---|---|
| Module | ESI module; a named, separate set of objects and PDOs. |
| Slot | Depending on the context, this refers either to the slot as a whole or to the slot position. |
| Slot group | Depending on the context, this refers either to the slot group number or to the slot group name. |

### Slotconfiguration

| Slot (global) | Slotgroup | Name | Modules |
|---|---|---|---|
| 1 (1) | 0 | DeviceMainSlot | DeviceMain |
| 2 (2) | 0 | PowerManagementSlot | PowerManagementAC3 |
| 3 (3) | 0 | *-- empty --* | |
| 4 (4) | 0 | *-- empty --* | |
| 5 (5) | 0 | *-- empty --* | |
| 6 (6) | 0 | *-- empty --* | |
| 7 (7) | 0 | *-- empty --* | |
| 8 (8) | 0 | *-- empty --* | |
| 9 (9) | 0 | *-- empty --* | |
| 10 (10) | 0 | *-- empty --* | |
| 11 (11) | 0 | SafetySlot | Safety |
| 12 (12) | 0 | *-- empty --* | |
| 13 (13) | 0 | *-- empty --* | |
| 14 (14) | 0 | *-- empty --* | |
| 15 (15) | 0 | *-- empty --* | |
| 16 (16) | 0 | *-- empty --* | |
| 17 (17) | 0 | *-- empty --* | |
| 18 (18) | 0 | *-- empty --* | |
| 19 (19) | 0 | *-- empty --* | |
| 20 (20) | 0 | *-- empty --* | |
| 21 (21) | 0 | *-- empty --* | |
| 22 (22) | 0 | *-- empty --* | |
| 23 (23) | 0 | *-- empty --* | |
| 24 (24) | 0 | *-- empty --* | |
| 25 (25) | 0 | *-- empty --* | |
| 26 (26) | 0 | *-- empty --* | |
| 27 (27) | 0 | *-- empty --* | |
| 28 (28) | 0 | *-- empty --* | |
| 29 (29) | 0 | *-- empty --* | |
| 30 (30) | 0 | *-- empty --* | |
| 31 (31) | 0 | *-- empty --* | |
| 32 (32) | 0 | DeviceDebugSlot *(optional)* | DeviceDebug |
| 1 (33) | 1 | AxisMainSlot | AxisMainAX1 |
| 2 (34) | 1 | *-- empty --* | |
| 3 (35) | 1 | *-- empty --* | |
| 4 (36) | 1 | InterpolatorSlot | Interpolator |
| 5 (37) | 1 | *-- empty --* | |
| 6 (38) | 1 | *-- empty --* | |
| 7 (39) | 1 | PositionControlSlot | PositionControl |
| 8 (40) | 1 | *-- empty --* | |
| 9 (41) | 1 | *-- empty --* | |
| 10 (42) | 1 | *-- empty --* | |
| 11 (43) | 1 | VelocityControlSlot | VelocityControl |
| 12 (44) | 1 | BiquadFilterSlot *(optional)* | BiquadFilter |
| 13 (45) | 1 | *-- empty --* | |

| Slot (global) | Slotgroup | Name | Modules |
|---|---|---|---|
| 14 (46) | 1 | *-- empty --* | |
| 15 (47) | 1 | *-- empty --* | |
| 16 (48) | 1 | *-- empty --* | |
| 17 (49) | 1 | *-- empty --* | |
| 18 (50) | 1 | *-- empty --* | |
| 19 (51) | 1 | TorqueControlSlot | TorqueControl |
| 20 (52) | 1 | *-- empty --* | |
| 21 (53) | 1 | *-- empty --* | |
| 22 (54) | 1 | *-- empty --* | |
| 23 (55) | 1 | MotorSlot | AsynchronousMotor<br>SynchronousMotor |
| 24 (56) | 1 | PrimaryFeedbackSlot<br>*(optional)* | HpfDslRotary<br>SimulationRotary |
| 25 (57) | 1 | *-- empty --* | |
| 26 (58) | 1 | *-- empty --* | |
| 27 (59) | 1 | *-- empty --* | |
| 28 (60) | 1 | *-- empty --* | |
| 29 (61) | 1 | *-- empty --* | |
| 30 (62) | 1 | *-- empty --* | |
| 31 (63) | 1 | *-- empty --* | |
| 32 (64) | 1 | AxisDebugSlot<br>*(optional)* | AxisDebug |

**UnitTable**

A List of the active Units of this Project.

| Index | Name | Symbol |
|---|---|---|
| 0x400 | none | |
| 0x401 | metre | m |
| 0x402 | kilogram | kg |
| 0x403 | second | s |
| 0x404 | ampere | A |
| 0x405 | kelvin | K |
| 0x406 | mole | mol |
| 0x407 | candela | cd |
| 0x410 | Radian | rad |
| 0x411 | Steradin | sr |
| 0x420 | Hertz | Hz |
| 0x421 | Newton | N |
| 0x422 | Pascal | Pa |
| 0x423 | Joule | J |
| 0x424 | Watt | W |
| 0x425 | Coulomb | C |
| 0x426 | Volt | V |
| 0x427 | Farad | F |
| 0x428 | Ohm | Ohm |
| 0x429 | Siemens | S |
| 0x42A | Weber | Wb |
| 0x42B | Tesla | T |

| Index | Name | Symbol |
|---|---|---|
| 0x42C | Henry | H |
| 0x42D | Degree Celsius | °C |
| 0x42E | Lumen | lm |
| 0x42F | Lux | lx |
| 0x430 | bequerel | Bq |
| 0x431 | Gray | Gy |
| 0x432 | Sievert | Sv |
| 0x433 | Katal | kat |
| 0x440 | Grade | g* |
| 0x441 | Angle Degree | ° |
| 0x442 | Angle Minute | ' |
| 0x443 | Angle Second | " |
| 0x444 | Litre | l |
| 0x445 | Are | a |
| 0x446 | Hectare | ha |
| 0x447 | Minute | min |
| 0x448 | Hour | h |
| 0x449 | Day | D |
| 0x44A | Year | a |
| 0x44B | Gram | g |
| 0x44C | Ton | t |
| 0x44E | Bar | bar |
| 0x44F | Poise | P |
| 0x450 | Stokes | St |
| 0x451 | Electron Volt | eV |
| 0x452 | Atomic Mass Unit | u |
| 0x453 | Astronomic Unit | AU |
| 0x454 | Parsec | pc |
| 0x455 | Meter per square second | m/s^2 |
| 0x456 | Newtonmetre | Nm |
| 0x457 | Square second | s^2 |
| 0x458 | Square metre | m^2 |
| 0x459 | Cubic metre | m^3 |
| 0x45A | Pascal second | Pa s |
| 0x45B | Joule per kilogram Kelvin | J/(kg K) |
| 0x45C | Watt per meter Kelvin | W/(m K) |
| 0x45D | Joule per mole Kelvin | J/(m K) |
| 0x45E | Watt per square metre steradian | W((m^2 sr) |
| 0x45F | Katal per cubic metre | kat/m^3 |
| 0x4B0 | Increments | inc |
| 0x4B1 | Revolution | rev |
| 0x4B2 | Revolution speed | rad/s |
| 0x4B3 | Moment of inertia | g cm^2 |
| 0x4B4 | Moment of inertia SI | kg m^2 |
| 0x4B5 | Revolutions/Minute | rpm |
| 0x4B6 | Meter/Second | m/s |
| 0x4B7 | Percent | % |
| 0x4B8 | cubic Second | s^3 |

| Index | Name | Symbol |
|---|---|---|
| 0x4B9 | Digits | dig |
| 0x4BA | Degree/Second | °/s |
| 0x4BB | Revolution acceleration | rad/s^2 |
| 0x4BC | Steps | step |

**ScalingTable**

A List of the active ScalingTypes of this Project.

| Index | Function | Target Datatype |
|---|---|---|
| 0x0 | x * 1 | LREAL |
| 0x208 | x * (1/256)nm | LREAL |
| 0x1210 | x * (360/65536)° | LREAL |
| 0x1211 | x * (360/131072)° | LREAL |
| 0x1212 | x * (360/262144)° | LREAL |
| 0x1213 | x * (360/524288)° | LREAL |
| 0x1214 | x * (360/1048576)° | LREAL |
| 0x1215 | x * (360/2097152)° | LREAL |
| 0x1216 | x * (360/4194304)° | LREAL |
| 0x1217 | x * (360/8388608)° | LREAL |
| 0x1218 | x * (360/16777216)° | LREAL |
| 0x1219 | x * (360/33554432)° | LREAL |
| 0x121A | x * (360/67108864)° | LREAL |
| 0x121B | x * (360/134217728)° | LREAL |
| 0x121C | x * (360/268435456)° | LREAL |
| 0x121D | x * (360/536870912)° | LREAL |
| 0x121E | x * (360/1073741824)° | LREAL |
| 0x121F | x * (360/2147483648)° | LREAL |
| 0x1220 | x * (360/4294967296)° | LREAL |
| 0x1A00 | x * 1E-06 m | LREAL |
| 0x1A01 | x * 1E-07 m | LREAL |
| 0x1A02 | x * 1E-08 m | LREAL |
| 0x1A03 | x * 1E-09 m | LREAL |
| 0x1A04 | x * 1E-10 m | LREAL |
| 0x1A05 | x * 1E-11 m | LREAL |
| 0x1A06 | x * 1E-12 m | LREAL |
| 0x2000 | x * 0.0001 rpm | REAL |
| 0x2100 | x * 1E-07 m/s | REAL |
| 0x3000 | x * 1 °/s^2 | REAL |
| 0x3100 | x * 0.001 m/s^2 | REAL |
| 0x4000 | x * 100 °/s^3 | REAL |
| 0x4100 | x * 0.1 m/s^3 | REAL |
| 0x5000 | x * 1 Nm | REAL |
| 0x5100 | x * 1 N | REAL |
| 0x6210 | x * (360/65536)°/s | LREAL |
| 0x6211 | x * (360/131072)°/s | LREAL |
| 0x6212 | x * (360/262144)°/s | LREAL |
| 0x6213 | x * (360/524288)°/s | LREAL |
| 0x6214 | x * (360/1048576)°/s | LREAL |
| 0x6215 | x * (360/2097152)°/s | LREAL |

| Index | Function | Target Datatype |
|---|---|---|
| 0x6216 | x * (360/4194304)°/s | LREAL |
| 0x6217 | x * (360/8388608)°/s | LREAL |
| 0x6218 | x * (360/16777216)°/s | LREAL |
| 0x6219 | x * (360/33554432)°/s | LREAL |
| 0x621A | x * (360/67108864)°/s | LREAL |
| 0x621B | x * (360/134217728)°/s | LREAL |
| 0x621C | x * (360/268435456)°/s | LREAL |
| 0x621D | x * (360/536870912)°/s | LREAL |
| 0x621E | x * (360/1073741824)°/s | LREAL |
| 0x621F | x * (360/2147483648)°/s | LREAL |
| 0x6220 | x * (360/4294967296)°/s | LREAL |
| 0x6A00 | x * 1E-06 m/s | LREAL |
| 0x6A01 | x * 1E-07 m/s | LREAL |
| 0x6A02 | x * 1E-08 m/s | LREAL |
| 0x6A03 | x * 1E-09 m/s | LREAL |
| 0x6A04 | x * 1E-10 m/s | LREAL |
| 0x6A05 | x * 1E-11 m/s | LREAL |
| 0x6A06 | x * 1E-12 m/s | LREAL |
| 0x7000 | x * 0.0001 rpm/s | REAL |
| 0x7100 | x * 1E-07 m/s^2 | REAL |
| 0x8000 | x * 1 rpm | REAL |
| 0x8100 | x * 1 m/s | REAL |
| 0x9000 | x * 1 Nm/rad/s | REAL |
| 0x9100 | x * 1 N/m/s | REAL |
| 0xA000 | x * 1 Nm/rad | REAL |
| 0xA100 | x * 1 N/m | REAL |
| 0xB000 | x * 1 kg m^2 | REAL |
| 0xB100 | x * 1 kg | REAL |

# 2 Object description and parameterization

### Object directory

All EtherCAT slaves supporting the CoE interface have an object directory containing all parameter, diagnostic, process or other data that can be read or written via EtherCAT.

The object directory can be read via the SDO information service. It is included in the device description file. All EtherCAT slaves should support the SDO information service at least to such an extent that the compact object description of each object can be read (from index 0x1000). This object description contains the data type, the length, the access rights and information as to whether the object can be mapped in a PDO (and therefore can be used as process data).

### Uncomplete list

The following list of objects is not a complete list of all objects. The objects of the module slot "Objects of module Safety" are not included.

This document includes the following indexes from the "Objects of module Safety" group as basic information on handling safety applications:

0xF980 | Safe Address [▶ 145]

0xF9C0 | Safety Device Info [▶ 145]

0xFABB | SETSAFEADDRESS Diag Data [▶ 145]

0xFEA0 | CTRL Diag Data [▶ 146]

## 2.1 Device Objects

### Overview of Objects

0x1000 | Device type [▶ 12]
0x1001 | Error register [▶ 12]
0x1008 | Device name [▶ 12]
0x1009 | Hardware version [▶ 12]
0x100A | Software version [▶ 12]
0x100B | Bootloader version [▶ 12]
0x1018 | Identity [▶ 12]
0x10E2 | Manufacturer-specific Identification Code [▶ 12]
0x10F3 | Diagnosis History [▶ 13]
0x10F8 | Timestamp Object [▶ 17]
0x1C00 | Sync manager type [▶ 17]
0x1C12 | RxPDO assign [▶ 17]
0x1C13 | TxPDO assign [▶ 17]
0x1C14 | RxPDO assign [▶ 18]
0x1C15 | TxPDO assign [▶ 18]
0x1C16 | Safety RxPDO assign [▶ 18]
0x1C17 | Safety TxPDO assign [▶ 18]
0x1C32 | SM output parameter [▶ 19]
0x1C33 | SM input parameter [▶ 19]
0xF008 | Code word [▶ 20]
0xF030 | Configured Module Ident List [▶ 20]
0xF050 | Detected Module Ident List [▶ 22]

### 0x1000 | Device type

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1000:0 | Device type | see ETG.1000.6 EtherCAT specification - CoE | uint32_t | RO | 0x00000192 ($402_{dez}$) |

### 0x1001 | Error register

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1001:0 | Error register | see ETG.1000.6 EtherCAT specification - CoE | uint8_t | RO | 0x00 ($0_{dez}$) |

### 0x1008 | Device name

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1008:0 | Device name | see ETG.1000.6 EtherCAT specification - CoE | STRING | RO | "AX1106-3101" |

### 0x1009 | Hardware version

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1009:0 | Hardware version | see ETG.1000.6 EtherCAT specification - CoE | STRING | RO | "" |

### 0x100A | Software version

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x100A:0 | Software version | see ETG.1000.6 EtherCAT specification - CoE | STRING | RO | "00.00 _" |

### 0x100B | Bootloader version

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x100B:0 | Bootloader version | see ETG.1020 Protocol Enhancements | STRING | RO | "N/A" |

### 0x1018 | Identity

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1018:0 | Identity | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x1018:01 | Vendor ID | | uint32_t | RO | 0x00000002 ($2_{dez}$) |
| 0x1018:02 | Product code | | uint32_t | RO | 0x04526012 ($72507410_{dez}$) |
| 0x1018:03 | Revision | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x1018:04 | Serial number | | uint32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x10E2 | Manufacturer-specific Identification Code

see ETG.1020 Protocol Enhancements

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x10E2:0 | Manufacturer-specific Identification Code | | uint8_t | RO | 0x01 ($1_{dez}$) |
| 0x10E2:01 | SubIndex 001 | | STRING | RO | "" |

### 0x10F3 | Diagnosis History

see ETG.1020 Protocol Enhancements

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x10F3:0 | Diagnosis History | | uint8_t | RO | 0x69 ($105_{dez}$) |
| 0x10F3:01 | Maximum Messages | | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x10F3:02 | Newest Message | | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x10F3:03 | Newest Acknowledged Message | | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x10F3:04 | New Messages Available | | BOOLEAN | RO | 0x00 ($0_{dez}$) |
| 0x10F3:05 | Flags | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x10F3:06 | Diagnosis Message 001 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:07 | Diagnosis Message 002 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:08 | Diagnosis Message 003 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:09 | Diagnosis Message 004 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:0A | Diagnosis Message 005 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:0B | Diagnosis Message 006 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:0C | Diagnosis Message 007 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:0D | Diagnosis Message 008 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:0E | Diagnosis Message 009 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:0F | Diagnosis Message 010 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:10 | Diagnosis Message 011 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:11 | Diagnosis Message 012 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:12 | Diagnosis Message 013 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:13 | Diagnosis Message 014 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:14 | Diagnosis Message 015 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:15 | Diagnosis Message 016 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:16 | Diagnosis Message 017 | | OCTET-STRING[64] | RO | {0} |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x10F3:17 | Diagnosis Message 018 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:18 | Diagnosis Message 019 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:19 | Diagnosis Message 020 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:1A | Diagnosis Message 021 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:1B | Diagnosis Message 022 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:1C | Diagnosis Message 023 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:1D | Diagnosis Message 024 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:1E | Diagnosis Message 025 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:1F | Diagnosis Message 026 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:20 | Diagnosis Message 027 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:21 | Diagnosis Message 028 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:22 | Diagnosis Message 029 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:23 | Diagnosis Message 030 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:24 | Diagnosis Message 031 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:25 | Diagnosis Message 032 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:26 | Diagnosis Message 033 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:27 | Diagnosis Message 034 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:28 | Diagnosis Message 035 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:29 | Diagnosis Message 036 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:2A | Diagnosis Message 037 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:2B | Diagnosis Message 038 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:2C | Diagnosis Message 039 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:2D | Diagnosis Message 040 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:2E | Diagnosis Message 041 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:2F | Diagnosis Message 042 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:30 | Diagnosis Message 043 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:31 | Diagnosis Message 044 | | OCTET-STRING[64] | RO | {0} |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x10F3:32 | Diagnosis Message 045 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:33 | Diagnosis Message 046 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:34 | Diagnosis Message 047 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:35 | Diagnosis Message 048 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:36 | Diagnosis Message 049 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:37 | Diagnosis Message 050 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:38 | Diagnosis Message 051 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:39 | Diagnosis Message 052 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:3A | Diagnosis Message 053 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:3B | Diagnosis Message 054 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:3C | Diagnosis Message 055 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:3D | Diagnosis Message 056 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:3E | Diagnosis Message 057 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:3F | Diagnosis Message 058 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:40 | Diagnosis Message 059 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:41 | Diagnosis Message 060 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:42 | Diagnosis Message 061 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:43 | Diagnosis Message 062 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:44 | Diagnosis Message 063 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:45 | Diagnosis Message 064 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:46 | Diagnosis Message 065 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:47 | Diagnosis Message 066 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:48 | Diagnosis Message 067 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:49 | Diagnosis Message 068 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:4A | Diagnosis Message 069 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:4B | Diagnosis Message 070 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:4C | Diagnosis Message 071 | | OCTET-STRING[64] | RO | {0} |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x10F3:4D | Diagnosis Message 072 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:4E | Diagnosis Message 073 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:4F | Diagnosis Message 074 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:50 | Diagnosis Message 075 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:51 | Diagnosis Message 076 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:52 | Diagnosis Message 077 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:53 | Diagnosis Message 078 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:54 | Diagnosis Message 079 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:55 | Diagnosis Message 080 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:56 | Diagnosis Message 081 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:57 | Diagnosis Message 082 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:58 | Diagnosis Message 083 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:59 | Diagnosis Message 084 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:5A | Diagnosis Message 085 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:5B | Diagnosis Message 086 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:5C | Diagnosis Message 087 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:5D | Diagnosis Message 088 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:5E | Diagnosis Message 089 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:5F | Diagnosis Message 090 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:60 | Diagnosis Message 091 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:61 | Diagnosis Message 092 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:62 | Diagnosis Message 093 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:63 | Diagnosis Message 094 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:64 | Diagnosis Message 095 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:65 | Diagnosis Message 096 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:66 | Diagnosis Message 097 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:67 | Diagnosis Message 098 | | OCTET-STRING[64] | RO | {0} |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x10F3:68 | Diagnosis Message 099 | | OCTET-STRING[64] | RO | {0} |
| 0x10F3:69 | Diagnosis Message 100 | | OCTET-STRING[64] | RO | {0} |

### 0x10F8 | Timestamp Object

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x10F8:0 | Timestamp Object | see ETG.1020 Protocol Enhancements<br>Unit: ns | uint64_t | RO | 0x00000000 00000000 ($0_{dez}$) |

### 0x1C00 | Sync manager type

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C00:0 | Sync manager type | | uint8_t | RO | 0x08 ($8_{dez}$) |
| 0x1C00:01 | SubIndex 001 | | uint8_t | RO | 0x01 ($1_{dez}$) |
| 0x1C00:02 | SubIndex 002 | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x1C00:03 | SubIndex 003 | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x1C00:04 | SubIndex 004 | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x1C00:05 | SubIndex 005 | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x1C00:06 | SubIndex 006 | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x1C00:07 | SubIndex 007 | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x1C00:08 | SubIndex 008 | | uint8_t | RO | 0x04 ($4_{dez}$) |

### 0x1C12 | RxPDO assign

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C12:0 | RxPDO assign | | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x1C12:01 | Subindex 001 | | uint16_t | RW | 0x1620 ($5664_{dez}$) |
| 0x1C12:02 | Subindex 002 | | uint16_t | RW | 0x1623 ($5667_{dez}$) |
| 0x1C12:03 | Subindex 003 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C12:04 | Subindex 004 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C12:05 | Subindex 005 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C12:06 | Subindex 006 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C12:07 | Subindex 007 | | uint16_t | RW | 0x0000 ($0_{dez}$) |

### 0x1C13 | TxPDO assign

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C13:0 | TxPDO assign | | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x1C13:01 | Subindex 001 | | uint16_t | RW | 0x1A20 ($6688_{dez}$) |
| 0x1C13:02 | Subindex 002 | | uint16_t | RW | 0x1A26 ($6694_{dez}$) |
| 0x1C13:03 | Subindex 003 | | uint16_t | RW | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C13:04 | Subindex 004 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C13:05 | Subindex 005 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C13:06 | Subindex 006 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C13:07 | Subindex 007 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C13:08 | Subindex 008 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C13:09 | Subindex 009 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C13:0A | Subindex 010 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C13:0B | Subindex 011 | | uint16_t | RW | 0x0000 ($0_{dez}$) |

### 0x1C14 | RxPDO assign

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C14:0 | RxPDO assign | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x1C15 | TxPDO assign

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C15:0 | TxPDO assign | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x1C16 | Safety RxPDO assign

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C16:0 | Safety RxPDO assign | | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x1C16:01 | Subindex 001 | | uint16_t | RW | 0x17C0 ($6080_{dez}$) |
| 0x1C16:02 | Subindex 002 | | uint16_t | RW | 0x17F0 ($6128_{dez}$) |
| 0x1C16:03 | Subindex 003 | | uint16_t | RW | 0x17FF ($6143_{dez}$) |
| 0x1C16:04 | Subindex 004 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C16:05 | Subindex 005 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C16:06 | Subindex 006 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C16:07 | Subindex 007 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C16:08 | Subindex 008 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C16:09 | Subindex 009 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C16:0A | Subindex 010 | | uint16_t | RW | 0x0000 ($0_{dez}$) |

### 0x1C17 | Safety TxPDO assign

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C17:0 | Safety TxPDO assign | | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x1C17:01 | Subindex 001 | | uint16_t | RW | 0x1BC0 ($7104_{dez}$) |
| 0x1C17:02 | Subindex 002 | | uint16_t | RW | 0x1BF0 ($7152_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C17:03 | Subindex 003 | | uint16_t | RW | 0x1BFF ($7167_{dez}$) |
| 0x1C17:04 | Subindex 004 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C17:05 | Subindex 005 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C17:06 | Subindex 006 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C17:07 | Subindex 007 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C17:08 | Subindex 008 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C17:09 | Subindex 009 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C17:0A | Subindex 010 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C17:0B | Subindex 011 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C17:0C | Subindex 012 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C17:0D | Subindex 013 | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C17:0E | Subindex 014 | | uint16_t | RW | 0x0000 ($0_{dez}$) |

### 0x1C32 | SM output parameter

see ETG.1020 Protocol Enhancements

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C32:0 | SM output parameter | | uint8_t | RO | 0x20 ($32_{dez}$) |
| 0x1C32:01 | Sync mode | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C32:02 | Cycle time | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x1C32:03 | Shift time | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x1C32:04 | Sync modes supported | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x1C32:05 | Minimum cycle time | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x1C32:06 | Calc and copy time | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x1C32:09 | Maximum delay time | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x1C32:0B | SM event missed counter | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x1C32:0C | Cycle exceeded counter | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x1C32:0D | Shift too short counter | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x1C32:20 | Sync error | | BOOLEAN | RO | 0x00 ($0_{dez}$) |

### 0x1C33 | SM input parameter

see ETG.1020 Protocol Enhancements

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C33:0 | SM input parameter | | uint8_t | RO | 0x20 ($32_{dez}$) |
| 0x1C33:01 | Sync mode | | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x1C33:02 | Cycle time | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x1C33:03 | Shift time | | uint32_t | RO | 0x00000000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1C33:04 | Sync modes supported | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x1C33:05 | Minimum cycle time | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x1C33:06 | Calc and copy time | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x1C33:07 | Minimum delay time | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x1C33:09 | Maximum delay time | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x1C33:0B | SM event missed counter | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x1C33:0C | Cycle exceeded counter | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x1C33:0D | Shift too short counter | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x1C33:20 | Sync error | | BOOLEAN | RO | 0x00 ($0_{dez}$) |

### 0xF008 | Code word

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xF008:0 | Code word | | uint32_t | RW | 0x00000000 ($0_{dez}$) |

### 0xF030 | Configured Module Ident List

see ETG.5001.1 MDP GeneralSpec

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xF030:0 | Configured Module Ident List | Min: 0x00 ($0_{dez}$)<br>Max: 0x40 ($64_{dez}$) | uint8_t | RW | 0x40 ($64_{dez}$) |
| 0xF030:01 | SubIndex 001 | | uint32_t | RW | 0x00670064 ($6750308_{dez}$) |
| 0xF030:02 | SubIndex 002 | | uint32_t | RW | 0x00670085 ($6750341_{dez}$) |
| 0xF030:03 | SubIndex 003 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:04 | SubIndex 004 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:05 | SubIndex 005 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:06 | SubIndex 006 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:07 | SubIndex 007 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:08 | SubIndex 008 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:09 | SubIndex 009 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:0A | SubIndex 010 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:0B | SubIndex 011 | | uint32_t | RW | 0x0067E5F0 ($6809072_{dez}$) |
| 0xF030:0C | SubIndex 012 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xF030:0D | SubIndex 013 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:0E | SubIndex 014 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:0F | SubIndex 015 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:10 | SubIndex 016 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:11 | SubIndex 017 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:12 | SubIndex 018 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:13 | SubIndex 019 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:14 | SubIndex 020 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:15 | SubIndex 021 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:16 | SubIndex 022 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:17 | SubIndex 023 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:18 | SubIndex 024 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:19 | SubIndex 025 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:1A | SubIndex 026 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:1B | SubIndex 027 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:1C | SubIndex 028 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:1D | SubIndex 029 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:1E | SubIndex 030 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:1F | SubIndex 031 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:20 | SubIndex 032 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:21 | SubIndex 033 | | uint32_t | RW | 0x006703E8 ($6751208_{dez}$) |
| 0xF030:22 | SubIndex 034 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:23 | SubIndex 035 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:24 | SubIndex 036 | | uint32_t | RW | 0x00670BB8 ($6753208_{dez}$) |
| 0xF030:25 | SubIndex 037 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:26 | SubIndex 038 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:27 | SubIndex 039 | | uint32_t | RW | 0x00671770 ($6756208_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xF030:28 | SubIndex 040 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:29 | SubIndex 041 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:2A | SubIndex 042 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:2B | SubIndex 043 | | uint32_t | RW | 0x00672710 ($6760208_{dez}$) |
| 0xF030:2C | SubIndex 044 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:2D | SubIndex 045 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:2E | SubIndex 046 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:2F | SubIndex 047 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:30 | SubIndex 048 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:31 | SubIndex 049 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:32 | SubIndex 050 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:33 | SubIndex 051 | | uint32_t | RW | 0x00674650 ($6768208_{dez}$) |
| 0xF030:34 | SubIndex 052 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:35 | SubIndex 053 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:36 | SubIndex 054 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:37 | SubIndex 055 | | uint32_t | RW | 0x006755F0 ($6772208_{dez}$) |
| 0xF030:38 | SubIndex 056 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:39 | SubIndex 057 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:3A | SubIndex 058 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:3B | SubIndex 059 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:3C | SubIndex 060 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:3D | SubIndex 061 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:3E | SubIndex 062 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:3F | SubIndex 063 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0xF030:40 | SubIndex 064 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |

**0xF050 | Detected Module Ident List**

see ETG.5001.1 MDP GeneralSpec

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xF050:0 | Detected Module Ident List | | uint8_t | RO | 0x40 ($64_{dez}$) |
| 0xF050:01 | SubIndex 001 | | uint32_t | RO | 0x00670064 ($6750308_{dez}$) |
| 0xF050:02 | SubIndex 002 | | uint32_t | RO | 0x00670085 ($6750341_{dez}$) |
| 0xF050:03 | SubIndex 003 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:04 | SubIndex 004 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:05 | SubIndex 005 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:06 | SubIndex 006 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:07 | SubIndex 007 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:08 | SubIndex 008 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:09 | SubIndex 009 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:0A | SubIndex 010 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:0B | SubIndex 011 | | uint32_t | RO | 0x0067E5F0 ($6809072_{dez}$) |
| 0xF050:0C | SubIndex 012 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:0D | SubIndex 013 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:0E | SubIndex 014 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:0F | SubIndex 015 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:10 | SubIndex 016 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:11 | SubIndex 017 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:12 | SubIndex 018 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:13 | SubIndex 019 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:14 | SubIndex 020 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:15 | SubIndex 021 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:16 | SubIndex 022 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:17 | SubIndex 023 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:18 | SubIndex 024 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:19 | SubIndex 025 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:1A | SubIndex 026 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xF050:1B | SubIndex 027 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:1C | SubIndex 028 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:1D | SubIndex 029 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:1E | SubIndex 030 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:1F | SubIndex 031 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:20 | SubIndex 032 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:21 | SubIndex 033 | | uint32_t | RO | 0x006703E8 ($6751208_{dez}$) |
| 0xF050:22 | SubIndex 034 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:23 | SubIndex 035 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:24 | SubIndex 036 | | uint32_t | RO | 0x00670BB8 ($6753208_{dez}$) |
| 0xF050:25 | SubIndex 037 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:26 | SubIndex 038 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:27 | SubIndex 039 | | uint32_t | RO | 0x00671770 ($6756208_{dez}$) |
| 0xF050:28 | SubIndex 040 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:29 | SubIndex 041 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:2A | SubIndex 042 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:2B | SubIndex 043 | | uint32_t | RO | 0x00672710 ($6760208_{dez}$) |
| 0xF050:2C | SubIndex 044 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:2D | SubIndex 045 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:2E | SubIndex 046 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:2F | SubIndex 047 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:30 | SubIndex 048 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:31 | SubIndex 049 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:32 | SubIndex 050 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:33 | SubIndex 051 | | uint32_t | RO | 0x00674650 ($6768208_{dez}$) |
| 0xF050:34 | SubIndex 052 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:35 | SubIndex 053 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xF050:36 | SubIndex 054 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:37 | SubIndex 055 | | uint32_t | RO | 0x006755F0 ($6772208_{dez}$) |
| 0xF050:38 | SubIndex 056 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:39 | SubIndex 057 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:3A | SubIndex 058 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:3B | SubIndex 059 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:3C | SubIndex 060 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:3D | SubIndex 061 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:3E | SubIndex 062 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:3F | SubIndex 063 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF050:40 | SubIndex 064 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |

## 2.2 Objects of module DeviceMain

### Overview of Objects

0x2C0E | DeviceMain device data cmd
0x2C0F | DeviceMain production settings [▶ 25]
0x2C1E | DeviceMain error counter [▶ 27]
0x2C1F | DeviceMain info [▶ 28]

### 0x2C0F | DeviceMain production settings

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0F:0 | DeviceMain production settings | | uint8_t | RO | 0x80 ($128_{dez}$) |
| 0x2C0F:01 | DC link voltage scaling gain | Unit: m<br>Min: 0x0320 ($800_{dez}$)<br>Max: 0x04B0 ($1200_{dez}$) | int16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0F:02 | DC link voltage offset | Unit: 0,1 V<br>Min: 0xFE0C ($-500_{dez}$)<br>Max: 0x01F4 ($500_{dez}$) | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C0F:03 | Mains voltage scaling gain 1 | Unit: m<br>Min: 0x0320 ($800_{dez}$)<br>Max: 0x04B0 ($1200_{dez}$) | int16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0F:04 | Mains voltage offset 1 | Unit: 0,1 V<br>Min: 0xFE0C ($-500_{dez}$)<br>Max: 0x01F4 ($500_{dez}$) | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C0F:05 | Mains voltage scaling gain 2 | Unit: m<br>Min: 0x0320 ($800_{dez}$) | int16_t | RW | 0x03E8 ($1000_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Max: 0x04B0 ($1200_{dez}$) | | | |
| 0x2C0F:06 | Mains voltage offset 2 | Unit: 0,1 V<br>Min: 0xFE0C ($-500_{dez}$)<br>Max: 0x01F4 ($500_{dez}$) | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C0F:07 | Mains voltage scaling gain 3 | Unit: m<br>Min: 0x0320 ($800_{dez}$)<br>Max: 0x04B0 ($1200_{dez}$) | int16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0F:08 | Mains voltage offset 3 | Unit: 0,1 V<br>Min: 0xFE0C ($-500_{dez}$)<br>Max: 0x01F4 ($500_{dez}$) | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C0F:09 | Phase current scaling gain 1 | Unit: m<br>Min: 0x0320 ($800_{dez}$)<br>Max: 0x04B0 ($1200_{dez}$) | int16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0F:0A | Phase current offset 1 | Unit: mA<br>Min: 0xEC78 ($-5000_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C0F:0B | Phase current scaling gain 2 | Unit: m<br>Min: 0x0320 ($800_{dez}$)<br>Max: 0x04B0 ($1200_{dez}$) | int16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0F:0C | Phase current offset 2 | Unit: mA<br>Min: 0xEC78 ($-5000_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C0F:0D | Phase current scaling gain 3 | Unit: m<br>Min: 0x0320 ($800_{dez}$)<br>Max: 0x04B0 ($1200_{dez}$) | int16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0F:0E | Phase current offset 3 | Unit: mA<br>Min: 0xEC78 ($-5000_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C0F:0F | Phase current scaling gain 4 | Unit: m<br>Min: 0x0320 ($800_{dez}$)<br>Max: 0x04B0 ($1200_{dez}$) | int16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0F:10 | Phase current offset 4 | Unit: mA<br>Min: 0xEC78 ($-5000_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C0F:11 | Phase current scaling gain 5 | Unit: m<br>Min: 0x0320 ($800_{dez}$)<br>Max: 0x04B0 ($1200_{dez}$) | int16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0F:12 | Phase current offset 5 | Unit: mA<br>Min: 0xEC78 ($-5000_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C0F:13 | Phase current scaling gain 6 | Unit: m<br>Min: 0x0320 ($800_{dez}$)<br>Max: 0x04B0 ($1200_{dez}$) | int16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0F:14 | Phase current offset 6 | Unit: mA<br>Min: 0xEC78 ($-5000_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | int16_t | RW | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0F:15 | reserved | | OCTET-STRING[22] | RO | {0} |
| 0x2C0F:80 | Checksum | | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x2C1E | DeviceMain error counter

This object contains internal diagnosis informations.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1E:0 | DeviceMain error counter | | uint8_t | RO | 0x16 ($22_{dez}$) |
| 0x2C1E:01 | Motor overload shut down | This object is a counter, which increments each diagnosis message of type 'Motor overload shut down'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:02 | Motor overtemperature shut down | This object is a counter, which increments each diagnosis message of type 'Motor overtemperature shut down'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:03 | Drive overtemperature shut down | This object is a counter, which increments each diagnosis message of type 'Drive overtemperature shut down'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:04 | Control voltage error | This object is a counter, which increments each diagnosis message of type 'Control voltage error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:05 | Feedback error | This object is a counter, which increments each diagnosis message of type 'Feedback error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:06 | Commutation error | This object is a counter, which increments each diagnosis message of type 'Commutation error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:07 | Overcurrent error | This object is a counter, which increments each diagnosis message of type 'Overcurrent error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:08 | Overvoltage error | This object is a counter, which increments each diagnosis message of type 'Overvoltage error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:09 | Undervoltage error | This object is a counter, which increments each diagnosis message of type 'Undervoltage error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:0A | Power supply phase error | This object is a counter, which increments each diagnosis message of type 'Power supply phase error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:0B | Communication error | This object is a counter, which increments each diagnosis message of type 'Communication error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:0C | TorqueOff with emergency brake | This object is a counter, which increments each diagnosis message of type 'TorqueOff with emergency brake'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:0D | Motor connection error | This object is a counter, which increments each diagnosis message of type 'Motor connection error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:0E | Safety STO error | This object is a counter, which increments each diagnosis message of type 'Safety STO error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1E:0F | Overspeed error | This object is a counter, which increments each diagnosis message of type 'Overspeed error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:10 | Motor Brake connection error | This object is a counter, which increments each diagnosis message of type 'Motor Brake connection error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:11 | DC link connection overcurrent error | This object is a counter, which increments each diagnosis message of type 'DC link connection overcurrent error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:12 | Overvoltage with reaction torque off error | This object is a counter, which increments each diagnosis message of type 'Overvoltage with reaction torque off error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:13 | Mains overvoltage error | This object is a counter, which increments each diagnosis message of type 'Mains overvoltage error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:14 | Mains voltage over chopper threshold error | This object is a counter, which increments each diagnosis message of type 'Mains voltage over chopper threshold error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:15 | Brake resistor not found error | This object is a counter, which increments each diagnosis message of type 'Brake resistor not found error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:16 | Brake resistor overloaded error | This object is a counter, which increments each diagnosis message of type 'Brake resistor overloaded error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |

**0x2C1F | DeviceMain info**

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1F:0 | DeviceMain info | | uint8_t | RO | 0x01 ($1_{dez}$) |
| 0x2C1F:01 | Operating time drive control | | uint32_t | RO | 0x00000000 ($0_{dez}$) |

## 2.3 Objects of module PowerManagementAC3

**Overview of Objects**

0x1A00 | PowerManagementAC3 TxPDO-Map Inputs [▶ 28]
0x2C00 | PowerManagementAC3 statusword [▶ 29]
0x2C02 | PowerManagementAC3 actual voltages [▶ 29]
0x2C04 | PowerManagementAC3 actual data [▶ 29]
0x2C05 | PowerManagementAC3 actual diagnostics [▶ 30]
0x2C07 | PowerManagementAC3 standard parameters [▶ 30]
0x2C09 | PowerManagementAC3 calculated parameters [▶ 32]
0x2C0A | PowerManagementAC3 device info [▶ 32]
0x6079 | DC link circuit voltage [▶ 33]

**0x1A00 | PowerManagementAC3 TxPDO-Map Inputs**

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | PowerManagementAC3 TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C00 | PowerManagementAC3 statusword

This object cointains the status of the module

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:0 | PowerManagementAC3 statusword | | uint8_t | RO | 0x01 ($1_{dez}$) |
| 0x2C00:01 | Statusword | Status bits:<br>- Bit 0: Ready to operate dc output 1<br>- Bit 1: Error active<br>- Bit 2: Warning active<br>- Bit 3: Reserved<br>- Bit 4: Brake chopper active<br>- Bit 5: Fan active<br>- Bit 6: Charging active<br>- Bit 7: Dc out 1 active<br>- Bit 8 - 9: Reserved<br>- Bit 10: Dc out 2 active<br>- Bit 11: Ready to operate dc output 2<br>- Bit 12: Energy recovery active<br>- Bit 13 - 15: Reserved | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x2C02 | PowerManagementAC3 actual voltages

This object contains the actual voltages

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:0 | PowerManagementAC3 actual voltages | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x2C02:01 | Actual mains voltage | Actual RMS-value of mains voltage<br>Unit: V | float | RO | 0.0 |
| 0x2C02:02 | Actual mains L1-L2 voltage | Actual value of mains voltage L1 to N.<br>Unit: V | float | RO | 0.0 |
| 0x2C02:03 | Actual mains L2-L3 voltage | Actual value of mains voltage L2 to L3.<br>Unit: V | float | RO | 0.0 |
| 0x2C02:04 | Actual mains L3-L1 voltage | Actual value of mains voltage L3 to L1.<br>Unit: V | float | RO | 0.0 |

### 0x2C04 | PowerManagementAC3 actual data

This object contains the actual data

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C04:0 | PowerManagementAC3 actual data | | uint8_t | RO | 0x80 ($128_{dez}$) |
| 0x2C04:01 | Actual mains supply frequency (sum of connected phases) | Unit: Hz | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C04:02 | Actual mains supply type | allowed values:<br>• 0: AC 3 phases | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 1: AC 1 phase | | | |
| 0x2C04:80 | Actual brake resistor load utilization | Load utilization at brake resistor.<br>Unit: % | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x2C05 | PowerManagementAC3 actual diagnostics

This object contains the diagnostic values

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C05:0 | PowerManagementAC3 actual diagnostics | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x2C05:01 | DC link state machine | Actual value of Dc link state machine<br>allowed values:<br>• 0: WaitingForCharging<br>• 1: ChargingReady<br>• 2: CheckDcLinkConnection<br>• 3: DcLinkOk<br>• 4: RtO_Run<br>• 5: RtO_ShortPowerLoss<br>• 6: RtO_PowerLoss<br>• 7: RtO_ChargeInOperation<br>• 8: Error_WaitingForDisablingAxis<br>• 9: Error_TorqueOff<br>• 10: Discharge_DcLink<br>• 11: Charging<br>• 50: ForcingModeEntry<br>• 51: ForcingMode<br>• 52: ForcingModeEnd | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C05:02 | Umains state machine | Actual value of Umains state<br>allowed values:<br>• 0: UmainsOff<br>• 1: UmainsOk<br>• 2: UmainsLoss<br>• 3: UmainsToLow<br>• 4: UmainsToHigh<br>• 5: PowerSupplyTypeDetection | uint8_t | RO | 0x00 ($0_{dez}$) |

### 0x2C07 | PowerManagementAC3 standard parameters

This object shows the standard parameter of this module

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C07:0 | PowerManagementAC3 standard parameters | | uint8_t | RO | 0x60 ($96_{dez}$) |
| 0x2C07:01 | Mains type | This parameter configures the mains type.<br>allowed values:<br>• 0: AC 3 phase | uint8_t | RW | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 2: DC | | | |
| 0x2C07:03 | Mains voltage | Connected mains RMS-voltage.<br>Unit: 0,1 V<br>Min: 0x00B4 ($180_{dez}$)<br>Max: 0x12C0 ($4800_{dez}$) | uint16_t | RW | 0x0FA0 ($4000_{dez}$) |
| 0x2C07:04 | Mains voltage max tolerance | Positive tolerance of parametrized mains voltage.<br>Unit: %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x0032 ($50_{dez}$) | uint16_t | RW | 0x000A ($10_{dez}$) |
| 0x2C07:05 | Mains voltage min tolerance | Negative tolerance of parametrized mains voltage.<br>Unit: %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x0032 ($50_{dez}$) | uint16_t | RW | 0x0019 ($25_{dez}$) |
| 0x2C07:20 | DC link max voltage | Threshold for dc link overvoltage error.<br>Unit: 0,1 V<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x206C ($8300_{dez}$) | uint16_t | RW | 0x206C ($8300_{dez}$) |
| 0x2C07:21 | DC link min voltage | Threshold for dc link overvoltage error.<br>Unit: 0,1 V<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x206C ($8300_{dez}$) | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C07:30 | Brake resistor select mode | This parameter configures the brake resistor.<br>allowed values:<br>• 0: No brake resistor<br>• 1: Internal brake resistor<br>• 2: External brake resistor<br>• 5: Use internal brake resistor if available | uint8_t | RW | 0x05 ($5_{dez}$) |
| 0x2C07:32 | Brake resistor power warning threshold | Percentage value of the maximum brake resistor power.<br>Unit: %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x0064 ($100_{dez}$) | uint16_t | RW | 0x005A ($90_{dez}$) |
| 0x2C07:33 | External brake resistor value | Resistance value of external brake resistor.<br>Unit: 0,1 Ω<br>Min: 0x014A ($330_{dez}$)<br>Max: 0x07D0 ($2000_{dez}$) | uint16_t | RW | 0x014A ($330_{dez}$) |
| 0x2C07:34 | External brake resistor continuous power | Threshold of brake resistor continuous power, above an error is generated.<br>Unit: W<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x0640 ($1600_{dez}$) | uint16_t | RW | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C07:35 | External brake resistor time constant 1 | Unit: s<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C07:36 | External brake resistor time constant 2 | Unit: s<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C07:37 | External brake resistor partial fraction factor | Unit: %<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C07:60 | Controlword | Controlword for internal purpose.<br>allowed values:<br>• 0: For multiple selection, set integer value<br>• 2: Disable brake resistor check | uint16_t | RW | 0x0000 ($0_{dez}$) |

### 0x2C09 | PowerManagementAC3 calculated parameters

This object is an extension of the standard parameter

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C09:0 | PowerManagementAC3 calculated parameters | | uint8_t | RO | 0x31 ($49_{dez}$) |
| 0x2C09:01 | Mains voltage max threshold | Maximal RMS-value of mains voltage.<br>Unit: 0,1 V | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C09:02 | Mains voltage min threshold | Minimal RMS-value of mains voltage.<br>Unit: 0,1 V | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C09:20 | DC link min voltage | Minimal DC link voltage for device to be ready to operate.<br>Unit: 0,1 V | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C09:30 | Brake chopper switchOn voltage threshold | Voltage threshold, above which the brake chopper is switched on.<br>Unit: 0,1 V | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C09:31 | Brake chopper switchOff voltage threshold | Voltage threshold, below which the brake chopper is switched off.<br>Unit: 0,1 V | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x2C0A | PowerManagementAC3 device info

Information about operation of the module

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0A:0 | PowerManagementAC3 device info | | uint8_t | RO | 0x35 ($53_{dez}$) |
| 0x2C0A:22 | DC link max voltage | Maximal DC link voltage threshold supported by the device.<br>Unit: 0,1 V | uint16_t | RO | 0x206C ($8300_{dez}$) |
| 0x2C0A:30 | Internal brake resistor value | Resistance value of the internal brake resistor.<br>Unit: 0,1 Ω | uint16_t | RO | 0x014A ($330_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0A:31 | Internal brake resistor max power | Maximal continuous power of the internal brake resistor.<br>Unit: W | uint16_t | RO | 0x0050 ($80_{dez}$) |
| 0x2C0A:33 | Internal brake resistor time constant 1 | Unit: s<br>Min: 0.0<br>Max: 3.40282E+38 | float | RO | 0.315 |
| 0x2C0A:34 | Internal brake resistor time constant 2 | Unit: s<br>Min: 0.0<br>Max: 3.40282E+38 | float | RO | 61.9 |
| 0x2C0A:35 | Internal brake resistor partial fraction factor | Unit: %<br>Min: 0.0<br>Max: 3.40282E+38 | float | RO | 3.12 |

**0x6079 | DC link circuit voltage**

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x6079:0 | DC link circuit voltage | This object provides the actual value of the DC link voltage of the drive device.<br>Unit: mV | uint32_t | RO | 0x00000000 ($0_{dez}$) |

## 2.4 Objects of module AxisMainAX1

**Overview of Objects**

0x1600 | [SG] AxisMainAX1 RxPDO-Map Outputs [▶ 34]
0x1A00 | [SG] AxisMainAX1 TxPDO-Map Inputs [▶ 34]
0x2C00 | [SG] AxisMain parameters [▶ 34]
0x2C01 | [SG] AxisMain actual values [▶ 35]
0x2C02 | [SG] AxisMain parameters positive limit switch [▶ 36]
0x2C03 | [SG] AxisMain parameters negative limit switch [▶ 36]
0x2C04 | [SG] AxisMain parameters error manager [▶ 37]
0x2C05 | [SG] AxisMain scaling index [▶ 38]
0x2C06 | [SG] AxisMain command [▶ 41]
0x2C07 | [SG] AxisMain parameters position offset [▶ 41]
0x2C08 | [SG] AxisMain parameters encoder direction [▶ 42]
0x2C09 | [SG] AxisMain parameters hardware enable [▶ 42]
0x2C1E | [SG] AxisMain error counter [▶ 42]
0x2C1F | [SG] AxisMain info [▶ 44]
0x583E | [SG] TxPDO Data invalid [▶ 44]
0x583F | [SG] Error code [▶ 44]
0x5840 | [SG] Controlword [▶ 45]
0x5841 | [SG] Statusword [▶ 45]
0x585A | [SG] Quick stop option code [▶ 45]
0x585E | [SG] Fault reaction option code [▶ 46]
0x5860 | [SG] Modes of operation [▶ 46]
0x5861 | [SG] Modes of operation display [▶ 46]
0x5864 | [SG] Position actual value [▶ 47]
0x586C | [SG] Velocity actual value [▶ 47]
0x587B | [SG] Position range limit [▶ 47]
0x588F | [SG] Position encoder resolution [▶ 47]
0x5891 | [SG] Gear ratio [▶ 47]

0x5892 | [SG] Feed constant [▶ 48]
0x5896 | [SG] Velocity factor [▶ 48]
0x5897 | [SG] Acceleration factor [▶ 49]
0x58A2 | [SG] Jerk factor [▶ 49]
0x58FD | [SG] Digital inputs [▶ 49]
0x5D02 | [SG] Supported drive modes [▶ 49]

### 0x1600 | [SG] AxisMainAX1 RxPDO-Map Outputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1600:0 | [SG] AxisMainAX1 RxPDO-Map Outputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x1A00 | [SG] AxisMainAX1 TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | [SG] AxisMainAX1 TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C00 | [SG] AxisMain parameters

This object contains parameters to manage the automatic motor brake control.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:0 | [SG] AxisMain parameters | | uint8_t | RO | 0x14 ($20_{dez}$) |
| 0x2C00:01 | Motor brake type | Activates drive internal automatic brake control.<br>allowed values:<br>• 0: No_motor_brake<br>• 1: Currentless_locked_motor_brake | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C00:02 | Motor brake usage | Configures the error reaction behavior of the motor brake.<br>allowed values:<br>• 0: Standard_holding_brake<br>• 1: Holding_brake_Emergency_brake | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C00:03 | Drive on delay time | With the transition of the PDS state machine to "operation enabled" "drive on delay time" is started. The drive follows the command values after the "drive on delay time" has elapsed. The motor brake management uses this time to unlock the motor brake before motion is enabled.<br>Unit: ms<br>Min: 0x00000000 ($0_{dez}$)<br>Max: 0x00001388 ($5000_{dez}$) | uint32_t | RW | 0x00000064 ($100_{dez}$) |
| 0x2C00:04 | Drive off delay time | After "operation enabled" of the PDS state machine is removed and the axis is in the standstill window, the locking of the brake is initiated and the drive off | uint32_t | RW | 0x00000096 ($150_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | delay time is started. The torque/force remains activated in the drive until the configured drive off delay time is elapsed. The motor brake management uses this time to lock the motor brake before the torque/force is switched off..<br>Unit: ms<br>Min: 0x00000000 ($0_{dez}$)<br>Max: 0x00001388 ($5000_{dez}$) | | | |
| 0x2C00:07 | Motor brake force | Force drive internal brake.<br>allowed values:<br>• 0: Release_force<br>• 1: Force_lock<br>• 2: Force_unlock | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C00:14 | Statusword Bit 8 Assignment | This object defines the value signaled on bit 8 of the drive status word.<br>allowed values:<br>• 0: NotAssigned<br>• 1: SignalsNotReadyToEnable | int8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C01 | [SG] AxisMain actual values

This object contains manufacturer specific actual values from the module AxisMain.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:0 | [SG] AxisMain actual values | | uint8_t | RO | 0x09 ($9_{dez}$) |
| 0x2C01:02 | IGBT temperature | This object provides the actual power stage temperature of this channel.<br>Unit: °C | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C01:04 | Output stage safety state | This object provides a diagnosis info about the actual state of the output stage.<br>allowed values:<br>• 0: safe_state<br>• 1: ready_state | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:07 | Actual motor brake state | The actual motor brake state.<br>allowed values:<br>• 0: Motor_brake_locked<br>• 1: Motor_brake_unlocked | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:08 | Current error reaction | The actual processed error reaction.<br>allowed values:<br>• 0: Reaction_None<br>• 1: Reaction_NC_Handling<br>• 2: Reaction_Closed_loop_ramp<br>• 3: Reaction_Open_loop_ramp<br>• 4: Reaction_ShortedCoils_or_DC<br>• 5: Reaction_Torque_Off | uint32_t | RO | 0x00000000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:09 | Actual motor brake state with delay time | The actual motor brake state including the drive on/off delay time.<br>allowed values:<br>• 0: Motor_brake_locked<br>• 1: Motor_brake_unlocked | uint8_t | RO | 0x00 ($0_{dez}$) |

### 0x2C02 | [SG] AxisMain parameters positive limit switch

This object contains parameters to configure a positive limit switch.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:0 | [SG] AxisMain parameters positive limit switch | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x2C02:01 | Configuration | This object configures the type of the limit switch.<br>allowed values:<br>• 0: No_limit_switch<br>• 1: Normally_closed<br>• 2: Normally_open | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x2C02:02 | Input number | This object configures the digital input number of the limit switch.<br>allowed values:<br>• 0: Digital_input_1<br>• 1: Digital_input_2<br>• 2: Digital_input_3<br>• 3: Digital_input_4<br>• 4: Digital_input_5<br>• 5: Digital_input_6<br>• 6: Digital_input_7<br>• 7: Digital_input_8 | uint8_t | RW | 0x02 ($2_{dez}$) |
| 0x2C02:03 | Reaction | This object configures the drive reaction, if it detects a limit switch.<br>allowed values:<br>• 0: EStop_with_error<br>• 2: Axis_halt_with_warning | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C03 | [SG] AxisMain parameters negative limit switch

This object contains parameters to configure a negative limit switch.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:0 | [SG] AxisMain parameters negative limit switch | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x2C03:01 | Configuration | This object configures the type of the limit switch.<br>allowed values:<br>• 0: No_limit_switch<br>• 1: Normally_closed | uint8_t | RW | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 2: Normally_open | | | |
| 0x2C03:02 | Input number | This object configures the digital input number of the limit switch.<br>allowed values:<br>• 0: Digital_input_1<br>• 1: Digital_input_2<br>• 2: Digital_input_3<br>• 3: Digital_input_4<br>• 4: Digital_input_5<br>• 5: Digital_input_6<br>• 6: Digital_input_7<br>• 7: Digital_input_8 | uint8_t | RW | 0x03 ($3_{dez}$) |
| 0x2C03:03 | Reaction | This object configures the drive reaction, if it detects a limit switch.<br>allowed values:<br>• 0: EStop_with_error<br>• 2: Axis_halt_with_warning | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C04 | [SG] AxisMain parameters error manager

This object contains parameters to configure the error manager.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C04:0 | [SG] AxisMain parameters error manager | | uint8_t | RO | 0x12 ($18_{dez}$) |
| 0x2C04:01 | Error reaction delay time | This object shall indicate the delay time if an error reaction is performed in the PDS.<br>Unit: s<br>Min: 0.0<br>Max: 3000.0 | float | RW | 0.0 |
| 0x2C04:02 | Choose force reaction | This object shall indicate the forced error reaction.<br>allowed values:<br>• -2: ShortedCoils_or_DC<br>• -1: NC_Handling<br>• 0: Torque_Off<br>• 2: Closed_loop_ramp | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C04:03 | Force reaction | This object is to perform the forced error reaction.<br>Min: 0x00 ($0_{dez}$)<br>Max: 0x01 ($1_{dez}$) | BOOLEAN | RW | 0x00 ($0_{dez}$) |
| 0x2C04:12 | Maximum torque off delay time | After "torque off" error is thrown, the maximum torque off delay time is started. After the maximum torque off delay time is elapsed, the locking of the brake is initiated and the torque/force is disabled independend of the actual motor speed.<br>Unit: s | float | RW | 10.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Min: 0.0<br>Max: 100.0 | | | |

### 0x2C05 | [SG] AxisMain scaling index

This object contains scaling informations for objects with not fixed scaling.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C05:0 | [SG] AxisMain scaling index | | uint8_t | RO | 0x0B ($11_{dez}$) |
| 0x2C05:01 | Scaling index position NC | Scaling of DS402/integer position values.<br>allowed values:<br>• 4624: Scale_360Degree_as_2Pow16<br>• 4625: Scale_360Degree_as_2Pow17<br>• 4626: Scale_360Degree_as_2Pow18<br>• 4627: Scale_360Degree_as_2Pow19<br>• 4628: Scale_360Degree_as_2Pow20<br>• 4629: Scale_360Degree_as_2Pow21<br>• 4630: Scale_360Degree_as_2Pow22<br>• 4631: Scale_360Degree_as_2Pow23<br>• 4632: Scale_360Degree_as_2Pow24<br>• 4633: Scale_360Degree_as_2Pow25<br>• 4634: Scale_360Degree_as_2Pow26<br>• 4635: Scale_360Degree_as_2Pow27<br>• 4636: Scale_360Degree_as_2Pow28<br>• 4637: Scale_360Degree_as_2Pow29<br>• 4638: Scale_360Degree_as_2Pow30<br>• 4639: Scale_360Degree_as_2Pow31<br>• 4640: Scale_360Degree_as_2Pow32<br>• 6656: Scale_1_Micrometer<br>• 6657: Scale_100_Nanometer<br>• 6658: Scale_10_Nanometer<br>• 6659: Scale_1_Nanometer<br>• 6660: Scale_100_Picometer | uint32_t | RW | 0x00001214 ($4628_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 6661: Scale_10_Picometer<br>• 6662: Scale_1_Picometer | | | |
| 0x2C05:02 | Scaling index velocity NC | Scaling of DS402/integer velocity values.<br>allowed values:<br>• 8192: Scale_0dot0001_rpm<br>• 8448: Scale_0dot1_um_per_Second | uint32_t | RW | 0x00002000 ($8192_{dez}$) |
| 0x2C05:03 | Scaling index acceleration | Scaling of acceleration values.<br>allowed values:<br>• 12288: Scale_1_Degree_per_Second_squared<br>• 12544: Scale_1_mm_per_Second_squared | uint32_t | RW | 0x00003000 ($12288_{dez}$) |
| 0x2C05:04 | Scaling index jerk | Scaling of jerk values.<br>allowed values:<br>• 16384: Scale_100_Degree_per_Second_cubed<br>• 16640: Scale_100_mm_per_Second_cubed | uint32_t | RW | 0x00004000 ($16384_{dez}$) |
| 0x2C05:05 | Scaling index torque or force | Scaling of torque or force values.<br>allowed values:<br>• 20480: Scale_1_Nm<br>• 20736: Scale_1_N | uint32_t | RW | 0x00005000 ($20480_{dez}$) |
| 0x2C05:06 | Scaling index position NC per second | Scaling of derivative DS402/integer position values.<br>allowed values:<br>• 25104: Scale_360Degree_as_2Pow16_per_Second<br>• 25105: Scale_360Degree_as_2Pow17_per_Second<br>• 25106: Scale_360Degree_as_2Pow18_per_Second<br>• 25107: Scale_360Degree_as_2Pow19_per_Second<br>• 25108: Scale_360Degree_as_2Pow20_per_Second<br>• 25109: Scale_360Degree_as_2Pow21_per_Second<br>• 25110: Scale_360Degree_as_2Pow22_per_Second<br>• 25111: Scale_360Degree_as_2Pow23_per_Second | uint32_t | RW | 0x00006214 ($25108_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 25112: Scale_360Degree_as_2Pow24_per_Second<br>• 25113: Scale_360Degree_as_2Pow25_per_Second<br>• 25114: Scale_360Degree_as_2Pow26_per_Second<br>• 25115: Scale_360Degree_as_2Pow27_per_Second<br>• 25116: Scale_360Degree_as_2Pow28_per_Second<br>• 25117: Scale_360Degree_as_2Pow29_per_Second<br>• 25118: Scale_360Degree_as_2Pow30_per_Second<br>• 25119: Scale_360Degree_as_2Pow31_per_Second<br>• 25120: Scale_360Degree_as_2Pow32_per_Second<br>• 27136: Scale_1_Micrometer_per_Second<br>• 27137: Scale_100_Nanometer_per_Second<br>• 27138: Scale_10_Nanometer_per_Second<br>• 27139: Scale_1_Nanometer_per_Second<br>• 27140: Scale_100_Picometer_per_Second<br>• 27141: Scale_10_Picometer_per_Second<br>• 27142: Scale_1_Picometer_per_Second | | | |
| 0x2C05:07 | Scaling index velocity NC per second | Scaling of derivative DS402/integer velocity values.<br>allowed values:<br>• 28672: Scale_0dot0001_rpm_per_Second<br>• 28928: Scale_0dot1_um_per_Second_squared | uint32_t | RW | 0x00007000 ($28672_{dez}$) |
| 0x2C05:08 | Scaling index velocity native | Scaling of floating point velocity values.<br>allowed values:<br>• 32768: Scale_rpm<br>• 33024: Scale_m_per_Second | uint32_t | RW | 0x00008000 ($32768_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C05:09 | Scaling index velocity proportional gain | Scaling of velocity proportional gain.<br>allowed values:<br>• 36864: Scale_Nm_per_rad_per_Second<br>• 37120: Scale_N_per_rad_per_Second | uint32_t | RW | 0x00009000 ($36864_{dez}$) |
| 0x2C05:0A | Scaling index spring rate | Scaling of a spring rate.<br>allowed values:<br>• 40960: Scale_Nm_per_rad<br>• 41216: Scale_N_per_m | uint32_t | RW | 0x0000A000 ($40960_{dez}$) |
| 0x2C05:0B | Scaling index inertia | Scaling of (moment of) inertia.<br>allowed values:<br>• 45056: Scale_kg_m2<br>• 45312: Scale_kg | uint32_t | RW | 0x0000B000 ($45056_{dez}$) |

### 0x2C06 | [SG] AxisMain command

Execute Commands on AxisMain

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C06:0 | [SG] AxisMain command | | uint8_t | RO | 0x03 ($3_{dez}$) |

### 0x2C07 | [SG] AxisMain parameters position offset

This object contains parameters to manage the position offset configuration.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C07:0 | [SG] AxisMain parameters position offset | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C07:01 | Offset position actual value | This object provides the offset which will be added on the position actual value.<br>Unit: depends on value of Object (default = x * (360/1048576)°) 0x3005/01 (Ch A) | int32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C07:02 | Offset position actual value source | This object configures the memory source of the "Offset position actual value".<br>allowed values:<br>• 0: offset_disabled<br>• 1: encoder_memory<br>• 2: drive_memory | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C07:05 | Offset position actual value active source | This object displays the active source of the "Offset position actual value".<br>allowed values:<br>• 0: OffsetDisabled<br>• 1: EncoderMemory<br>• 2: DriveMemory<br>• 3: ManufacturerCalibration | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x2C08 | [SG] AxisMain parameters encoder direction

This object contains parameters to adjust the polarity of the connected encoders.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C08:0 | [SG] AxisMain parameters encoder direction | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x2C08:01 | Secondary encoder direction | This object contains parameters to adjust the polarity of the connected encoders.<br>allowed values:<br>• 0: not_inverted<br>• 1: inverted | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x2C08:02 | Primary encoder direction | allowed values:<br>• 0: not_inverted<br>• 1: inverted | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C09 | [SG] AxisMain parameters hardware enable

This object configures a digital input as hardware enable.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C09:0 | [SG] AxisMain parameters hardware enable | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x2C09:01 | Configuration | This object configures the type of the hardware enable.<br>allowed values:<br>• 0: No_hardware_enable<br>• 1: High_active | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x2C09:02 | Input number | This object configures the digital input number of the hardware enable.<br>allowed values:<br>• 0: Digital_input_1<br>• 1: Digital_input_2<br>• 2: Digital_input_3<br>• 3: Digital_input_4<br>• 4: Digital_input_5<br>• 5: Digital_input_6<br>• 6: Digital_input_7<br>• 7: Digital_input_8 | uint8_t | RW | 0x02 ($2_{dez}$) |
| 0x2C09:03 | Disable reaction | This object configures the reaction on a disable command through the hardware enable.<br>allowed values:<br>• 0: Disable_reaction_torque_off<br>• 1: Disable_reaction_closed_loop_ramp | uint8_t | RW | 0x01 ($1_{dez}$) |

### 0x2C1E | [SG] AxisMain error counter

This object contains internal diagnosis informations.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1E:0 | [SG] AxisMain error counter | | uint8_t | RO | 0x16 ($22_{dez}$) |
| 0x2C1E:01 | Motor overload shut down | This object is a counter, which increments each diagnosis message of type 'Motor overload shut down'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:02 | Motor overtemperature shut down | This object is a counter, which increments each diagnosis message of type 'Motor overtemperature shut down'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:03 | Drive overtemperature shut down | This object is a counter, which increments each diagnosis message of type 'Drive overtemperature shut down'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:04 | Control voltage error | This object is a counter, which increments each diagnosis message of type 'Control voltage error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:05 | Feedback error | This object is a counter, which increments each diagnosis message of type 'Feedback error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:06 | Commutation error | This object is a counter, which increments each diagnosis message of type 'Commutation error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:07 | Overcurrent error | This object is a counter, which increments each diagnosis message of type 'Overcurrent error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:08 | Overvoltage error | This object is a counter, which increments each diagnosis message of type 'Overvoltage error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:09 | Undervoltage error | This object is a counter, which increments each diagnosis message of type 'Undervoltage error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:0A | Power supply phase error | This object is a counter, which increments each diagnosis message of type 'Power supply phase error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:0B | Communication error | This object is a counter, which increments each diagnosis message of type 'Communication error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:0C | TorqueOff with emergency brake | This object is a counter, which increments each diagnosis message of type 'TorqueOff with emergency brake'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:0D | Motor connection error | This object is a counter, which increments each diagnosis message of type 'Motor connection error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:0E | Safety STO error | This object is a counter, which increments each diagnosis message of type 'Safety STO error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:0F | Overspeed error | This object is a counter, which increments each diagnosis message of type 'Overspeed error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:10 | Motor Brake connection error | This object is a counter, which increments each diagnosis message of type 'Motor Brake connection error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:11 | DC link connection overcurrent error | This object is a counter, which increments each diagnosis message of type 'DC link connection overcurrent error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1E:12 | Overvoltage with reaction torque off error | This object is a counter, which increments each diagnosis message of type 'Overvoltage with reaction torque off error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:13 | Mains overvoltage error | This object is a counter, which increments each diagnosis message of type 'Mains overvoltage error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:14 | Mains voltage over chopper threshold error | This object is a counter, which increments each diagnosis message of type 'Mains voltage over chopper threshold error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:15 | Brake resistor not found error | This object is a counter, which increments each diagnosis message of type 'Brake resistor not found error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1E:16 | Brake resistor overloaded error | This object is a counter, which increments each diagnosis message of type 'Brake resistor overloaded error'. | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x2C1F | [SG] AxisMain info

This object contains internal diagnosis informations.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1F:0 | [SG] AxisMain info | | uint8_t | RO | 0x01 ($1_{dez}$) |
| 0x2C1F:01 | Operating time power stage | This object contains the operating time of the power stage (power stage enabled time).<br>Unit: s | uint32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x583E | [SG] TxPDO Data invalid

This object shall indicate if the encoder measured values are in invalid state.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x583E:0 | [SG] TxPDO Data invalid | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x583E:01 | Velocity sensor actual value invalid | This object shall indicate if the velocity encoder measured value is in invalid State. | BOOLEAN | RO | 0x00 ($0_{dez}$) |
| 0x583E:02 | Position actual value invalid | This object shall indicate if the position encoder measured value is in invalid state. | BOOLEAN | RO | 0x00 ($0_{dez}$) |
| 0x583E:03 | 1st Additional position actual value invalid | This object shall indicate if the first position encoder measured value is in invalid state. | BOOLEAN | RO | 0x00 ($0_{dez}$) |
| 0x583E:04 | 2nd Additional position actual value invalid | This object shall indicate if the second position encoder measured value is in invalid state. | BOOLEAN | RO | 0x00 ($0_{dez}$) |

### 0x583F | [SG] Error code

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x583F:0 | [SG] Error code | This object shall provide the text id of the last DiagMessage of type error, which occurred in this axis. | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x5840 | [SG] Controlword

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5840:0 | [SG] Controlword | This object shall indicate the received command controlling the PDS FSA.<br>- Bit 0: Switch on<br>- Bit 1: Enable voltage<br>- Bit 2: Quick stop<br>- Bit 3: Enable operation<br>- Bit 4: reserved<br>- Bit 5-6: Output cycle counter (see also Object 0x60D9 and 0x60DA)<br>- Bit 7: Fault reset<br>- Bit 8: Halt<br>- Bit 9-15: reserved | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x5841 | [SG] Statusword

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5841:0 | [SG] Statusword | This object shall provide the status of the PDS FSA.<br>- Bit 0: Ready to switch on<br>- Bit 1: Switched on<br>- Bit 2: Operation enabled<br>- Bit 3: Fault<br>- Bit 4: Voltage enabled<br>- Bit 5: Quick stop<br>- Bit 6: Switch on disabled<br>- Bit 7: Warning<br>- Bit 8: reserved<br>- Bit 9: Remote<br>- Bit 10: Status toggle (see also Object 0x60D9 and 0x60DA)<br>- Bit 11: Internal limit active<br>- Bit 12: Drive follows the command value (cyclic modes of operation)<br>- Bit 13: Input cycle counter (see also Object 0x60D9 and 0x60DA)<br>- Bit 14: reserved<br>- Bit 15: reserved | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x585A | [SG] Quick stop option code

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x585A:0 | [SG] Quick stop option code | This object shall indicate what action is performed when the quick stop function is executed.<br>allowed values:<br>• -1: Disable_quick_stop<br>• 2: Slow_down_on_quick_stop_ramp_and_transit_into_switch_on_disabled<br>• 6: Slow_down_on_quick_stop_ramp_and_stay_in_quick_stop_active | int16_t | RW | 0x0002 ($2_{dez}$) |

### 0x585E | [SG] Fault reaction option code

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x585E:0 | [SG] Fault reaction option code | This object shall indicate which action is performed when fault is detected in the PDS.<br>allowed values:<br>• -2: ShortedCoils_or_DC<br>• -1: NC_Handling<br>• 0: Torque_Off<br>• 2: Closed_loop_ramp | int16_t | RW | 0x0002 ($2_{dez}$) |

### 0x5860 | [SG] Modes of operation

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5860:0 | [SG] Modes of operation | This object shall indicate the requested operation mode.<br>allowed values:<br>• 0: No_mode_change<br>• 8: Cyclic_synchronous_position_mode_CSP<br>• 9: Cyclic_synchronous_velocity_mode_CSV<br>• 10: Cyclic_synchronous_torque_mode_CST<br>• 11: Cyclic_synchronous_torque_mode_with_commutation_angle_CSTCA | int8_t | RW | 0x00 ($0_{dez}$) |

### 0x5861 | [SG] Modes of operation display

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5861:0 | [SG] Modes of operation display | This object shall provide the actual operation mode.<br>allowed values:<br>• 0: No_mode_change<br>• 8: Cyclic_synchronous_position_mode_CSP<br>• 9: Cyclic_synchronous_velocity_mode_CSV<br>• 10: Cyclic_synchronous_torque_mode_CST<br>• 11: Cyclic_synchronous_torque_mode_with_commutation_angle_CSTCA | int8_t | RO | 0x00 ($0_{dez}$) |

### 0x5864 | [SG] Position actual value

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5864:0 | [SG] Position actual value | This object shall provide the actual value of the position measurement device.<br>Unit: depends on value of Object (default = x * (360/1048576)°) 0x3005/01 (Ch A) | int32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x586C | [SG] Velocity actual value

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x586C:0 | [SG] Velocity actual value | This object shall provide the actual value of the velocity measurement device.<br>Unit: depends on value of Object (default = x * 0.0001 rpm) 0x3005/02 (Ch A) | int32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x587B | [SG] Position range limit

This object shall indicate the configured maximal and minimal position range limits. It shall limit the numerical range of the input value.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x587B:0 | [SG] Position range limit | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x587B:01 | Min position range limit | The minimum position range limit.<br>Unit: depends on value of Object (default = x * (360/1048576)°) 0x3005/01 (Ch A) | int32_t | RW | 0x80000000 (-2147483648$_{dez}$) |
| 0x587B:02 | Max position range limit | The maximum position range limit.<br>Unit: depends on value of Object (default = x * (360/1048576)°) 0x3005/01 (Ch A) | int32_t | RW | 0x7FFFFFFF (2147483647$_{dez}$) |

### 0x588F | [SG] Position encoder resolution

This object shall indicate the configured encoder increments and number of motor revolutions.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x588F:0 | [SG] Position encoder resolution | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x588F:01 | Encoder increments | Position encoder resolution numerator. | uint32_t | RW | 0x00040000 ($262144_{dez}$) |
| 0x588F:02 | Motor revolutions | Position encoder resolution denominator. | uint32_t | RW | 0x00000001 ($1_{dez}$) |

### 0x5891 | [SG] Gear ratio

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

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5891:0 | [SG] Gear ratio | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x5891:01 | Motor shaft revolutions | Gear ratio numerator. | uint32_t | RW | 0x00000001 ($1_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5891:02 | Driving shaft revolutions | Gear ratio denominator. | uint32_t | RW | 0x00000001 ($1_{dez}$) |

### 0x5892 | [SG] Feed constant

This object shall indicate the configured feed constant, this is the measurement distance per one revolution of the driving shaft of the gearbox.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5892:0 | [SG] Feed constant | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x5892:01 | Feed | Feed constant numerator.<br>allowed values:<br>• 1: eFeedConstant_10Pow0<br>• 10: eFeedConstant_10Pow1<br>• 100: eFeedConstant_10Pow2<br>• 1000: eFeedConstant_10Pow3<br>• 10000: eFeedConstant_10Pow4<br>• 100000: eFeedConstant_10Pow5<br>• 1000000: eFeedConstant_10Pow6<br>• 65536: eFeedConstant_2Pow16<br>• 131072: eFeedConstant_2Pow17<br>• 262144: eFeedConstant_2Pow18<br>• 524288: eFeedConstant_2Pow19<br>• 1048576: eFeedConstant_2Pow20<br>• 2097152: eFeedConstant_2Pow21<br>• 4194304: eFeedConstant_2Pow22<br>• 8388608: eFeedConstant_2Pow23<br>• 16777216: eFeedConstant_2Pow24<br>• 33554432: eFeedConstant_2Pow25<br>• 67108864: eFeedConstant_2Pow26<br>• 134217728: eFeedConstant_2Pow27<br>• 268435456: eFeedConstant_2Pow28<br>• 536870912: eFeedConstant_2Pow29<br>• 1073741824: eFeedConstant_2Pow30<br>• 2147483648: eFeedConstant_2Pow31<br>• 0: eFeedConstant_2Pow32 | uint32_t | RW | 0x00100000 ($1048576_{dez}$) |
| 0x5892:02 | Shaft revolutions | Feed constant denominator. | uint32_t | RW | 0x00000001 ($1_{dez}$) |

### 0x5896 | [SG] Velocity factor

The velocity factor can be used to match the velocity units to the user defined velocity units.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5896:0 | [SG] Velocity factor | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x5896:01 | Numerator | Velocity factor numerator. | uint32_t | RW | 0x000927C0 ($600000_{dez}$) |
| 0x5896:02 | Divisor | Velocity factor denominator. | uint32_t | RW | 0x00100000 ($1048576_{dez}$) |

### 0x5897 | [SG] Acceleration factor

The acceleration factor can be used to match the acceleration units to the user defined acceleration units.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5897:0 | [SG] Acceleration factor | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x5897:01 | Numerator | Acceleration factor numerator. | uint32_t | RW | 0x00000168 ($360_{dez}$) |
| 0x5897:02 | Divisor | Acceleration factor denominator. | uint32_t | RW | 0x000927C0 ($600000_{dez}$) |

### 0x58A2 | [SG] Jerk factor

The jerk factor can be used to match the jerk units to the user defined jerk units.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58A2:0 | [SG] Jerk factor | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x58A2:01 | Numerator | Jerk factor numerator. | uint32_t | RW | 0x00000001 ($1_{dez}$) |
| 0x58A2:02 | Divisor | Jerk factor denominator. | uint32_t | RW | 0x00000064 ($100_{dez}$) |

### 0x58FD | [SG] Digital inputs

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58FD:0 | [SG] Digital inputs | This object shall provide digital inputs. This object represents the physical input levels.<br>- Bit 0: negative limit switch<br>- Bit 1: positive limit switch<br>- Bit 16: digital input 1<br>- Bit 17: digital input 2<br>- Bit 18: digital input 3<br>- Bit 19: digital input 4<br>- Bit 31: STO active | uint32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x5D02 | [SG] Supported drive modes

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5D02:0 | [SG] Supported drive modes | This object shall provide information on the supported drive modes. | uint32_t | RO | 0x00000780 ($1920_{dez}$) |

## 2.5 Objects of module Interpolator

### Overview of Objects

0x1600 | [SG] Interpolator RxPDO-Map Outputs [▶ 50]
0x1A00 | [SG] Interpolator TxPDO-Map Inputs [▶ 50]
0x2C01 | [SG] Interpolator actual values [▶ 50]

0x2C02 | [SG] Interpolator parameters feed forward [▶ 50]
0x587A | [SG] Target position [▶ 51]
0x58B0 | [SG] Position offset [▶ 51]
0x58B1 | [SG] Velocity offset [▶ 51]
0x58C0 | [SG] Interpolation sub mode select [▶ 51]
0x58FF | [SG] Target velocity [▶ 52]

### 0x1600 | [SG] Interpolator RxPDO-Map Outputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1600:0 | [SG] Interpolator RxPDO-Map Outputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x1A00 | [SG] Interpolator TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | [SG] Interpolator TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C01 | [SG] Interpolator actual values

This object contains manufacturer specific actual values from the module Interpolator.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:0 | [SG] Interpolator actual values | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C01:01 | Interpolated position demand value | This object contains the position demand value of the interpolator.<br>Unit: depends on value of Object (default = x * (360/1048576)°) 0x3005/01 (Ch A) | int32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C01:02 | Interpolated velocity demand value | This object contains the velocity demand value of the interpolator.<br>Unit: depends on value of Object (default = x * 1 rpm) 0x3005/08 (Ch A) | float | RO | 0.0 |
| 0x2C01:03 | Interpolated acceleration demand value | This object indicates the torque/force controller demand value from the interpolator.<br>Unit: depends on value of Object (default = x * 1 °/s^2) 0x3005/03 (Ch A) | float | RO | 0.0 |
| 0x2C01:05 | Demandvalue extrapolation cycle counter | This object counts the number of cycles with an extrapolated position demand value. | uint32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x2C02 | [SG] Interpolator parameters feed forward

This object contains parameters to configure the feed forward control

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:0 | [SG] Interpolator parameters feed forward | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x2C02:01 | Velocity feed forward gain | This object contains the gain of the velocity feed forward signal.<br>Min: 0.0<br>Max: 1.2 | float | RW | 1.0 |
| 0x2C02:03 | Acceleration feed forward gain | This object contains the gain of the acceleration feed forward signal.<br>Min: 0.0<br>Max: 2.0 | float | RW | 0.0 |

### 0x587A | [SG] Target position

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x587A:0 | [SG] Target position | This object shall indicate the commanded position that the drive should move to in position profile mode using the current settings of motion control parameters such as velocity, acceleration, deceleration, motion profile type etc.<br>Unit: depends on value of Object (default = x * (360/1048576)°) 0x3005/01 (Ch A) | int32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x58B0 | [SG] Position offset

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58B0:0 | [SG] Position offset | This object shall provide the offset of the target position. The offset shall be given in userdefined position units.<br>Unit: depends on value of Object (default = x * (360/1048576)°) 0x3005/01 (Ch A) | int32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x58B1 | [SG] Velocity offset

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58B1:0 | [SG] Velocity offset | This object shall provide the offset for the velocity value. The offset shall be given in userdefined velocity units.<br>Unit: depends on value of Object (default = x * 0.0001 rpm) 0x3005/02 (Ch A) | int32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x58C0 | [SG] Interpolation sub mode select

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58C0:0 | [SG] Interpolation sub mode select | This object shall indicate the actually chosen interpolation mode for the cyclic synchronous position mode (CSP).<br>allowed values:<br>• -2: Cubic | int16_t | RW | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 0: Linear | | | |

### 0x58FF | [SG] Target velocity

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58FF:0 | [SG] Target velocity | This object shall indicate the configured target velocity and shall be used as input for the trajectory generator. The value shall be given in user-defined velocity units.<br>Unit: depends on value of Object (default = x * 0.0001 rpm)<br>0x3005/02 (Ch A) | int32_t | RO | 0x00000000 ($0_{dez}$) |

## 2.6 Objects of module PositionControl

### Overview of Objects

0x1600 | [SG] PositionControl RxPDO-Map Outputs [▶ 52]
0x1A00 | [SG] PositionControl TxPDO-Map Inputs [▶ 52]
0x2C00 | [SG] PositionControl parameters mappable [▶ 52]
0x5865 | [SG] Following error window [▶ 53]
0x5866 | [SG] Following error time out [▶ 53]
0x58F4 | [SG] Following error actual value [▶ 53]

### 0x1600 | [SG] PositionControl RxPDO-Map Outputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1600:0 | [SG] PositionControl RxPDO-Map Outputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x1A00 | [SG] PositionControl TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | [SG] PositionControl TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C00 | [SG] PositionControl parameters mappable

This record contains all mappable parameters of this module.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:0 | [SG] PositionControl parameters mappable | | uint8_t | RO | 0x01 ($1_{dez}$) |
| 0x2C00:01 | Position control proportional gain | This object contains the proportional gain of the position controller.<br>Unit: 1/s | float | RW | 1.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Min: 0.0<br>Max: 3.40282E+38 | | | |

### 0x5865 | [SG] Following error window

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5865:0 | [SG] Following error window | This object shall indicate the configured range of tolerated position values symmetrically to the position demand value. If the position actual value is out of the following error window, a following error occurs. A following error may occur when a drive is blocked, unreachable profile velocity occurs, or at wrong closed-loop coefficients. The value shall be given in userdefined position units. If the value of the following error window is FFFF FFFFh or 0000 0000h, the following control shall be switched off.<br>Unit: depends on value of Object (default = x * (360/1048576)°) 0x3005/01 (Ch A)<br>Min: 0x00000000 ($0_{dez}$)<br>Max: 0xFFFFFFFF ($4294967295_{dez}$) | uint32_t | RW | 0x00100000 ($1048576_{dez}$) |

### 0x5866 | [SG] Following error time out

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5866:0 | [SG] Following error time out | This object shall indicate the configured time for a following error condition.<br>Unit: ms<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0xFFFF ($65535_{dez}$) | uint16_t | RW | 0x0000 ($0_{dez}$) |

### 0x58F4 | [SG] Following error actual value

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58F4:0 | [SG] Following error actual value | This object shall provide the actual value of the following error. The value shall be given in user-defined position units.<br>Unit: depends on value of Object (default = x * (360/1048576)°) 0x3005/01 (Ch A) | int32_t | RO | 0x00000000 ($0_{dez}$) |

## 2.7 Objects of module VelocityControl

### Overview of Objects

0x1600 | [SG] VelocityControl RxPDO-Map Outputs [▶ 54]
0x1A00 | [SG] VelocityControl TxPDO-Map Inputs [▶ 54]
0x2C00 | [SG] VelocityControl parameters mappable [▶ 54]
0x2C01 | [SG] VelocityControl actual values [▶ 55]
0x2C02 | [SG] VelocityControl parameters [▶ 56]

0x2C03 | [SG] VelocityControl observer [▶ 57]
0x5885 | [SG] Quick stop deceleration [▶ 57]
0x58C5 | [SG] Max acceleration [▶ 58]
0x58C6 | [SG] Max deceleration [▶ 58]

### 0x1600 | [SG] VelocityControl RxPDO-Map Outputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1600:0 | [SG] VelocityControl RxPDO-Map Outputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x1A00 | [SG] VelocityControl TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | [SG] VelocityControl TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C00 | [SG] VelocityControl parameters mappable

This record contains all mappable parameters of this module.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:0 | [SG] VelocityControl parameters mappable | | uint8_t | RO | 0x07 ($7_{dez}$) |
| 0x2C00:01 | Velocity control proportional gain | This object contains the proportional gain of the velocity controller.<br>Unit: depends on value of Object (default = x * 1 Nm/rad/s) 0x3005/09 (Ch A)<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.01 |
| 0x2C00:02 | Velocity control integral action time | This object contains the integral action time of the velocity controller.<br>Unit: s<br>Min: 0.0<br>Max: 5.0 | float | RW | 0.01 |
| 0x2C00:03 | Bipolar velocity limit value | In this object you can configure the maximum velocity of this axis.<br>Unit: depends on value of Object (default = x * 1 rpm) 0x3005/08 (Ch A)<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:04 | Reserved | This object is reserved for further development<br>Min: -3.40282E+38 | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Max: 3.40282E+38 | | | |
| 0x2C00:05 | Weight counterbalance | In object you can configure the stationary torque/force of a vertical axis.<br>Unit: depends on value of Object (default = x * 1 Nm) 0x3005/05 (Ch A)<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:06 | Reserved 2 | This object is reserved for further development<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:07 | Load inertia/mass | This object is to configure the inertia of the application or load<br>Unit: depends on value of Object (default = x * 1 kg m^2) 0x3005/0B (Ch A)<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |

### 0x2C01 | [SG] VelocityControl actual values

This object contains manufacturer specific actual values from the module VelocityControl.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:0 | [SG] VelocityControl actual values | | uint8_t | RO | 0x07 ($7_{dez}$) |
| 0x2C01:01 | PosCtrl velocity demand value | This object contains the velocity demand value of the position controller.<br>Unit: depends on value of Object (default = x * 1 rpm) 0x3005/08 (Ch A) | float | RO | 0.0 |
| 0x2C01:02 | Limited velocity demand value | This object contains the velocity demand value inside the actual velocity limit range.<br>Unit: depends on value of Object (default = x * 1 rpm) 0x3005/08 (Ch A) | float | RO | 0.0 |
| 0x2C01:03 | Velocity actual value velocity observer | This object contains the velocity actual value of the configured velocity observer.<br>Unit: depends on value of Object (default = x * 1 rpm) 0x3005/08 (Ch A) | float | RO | 0.0 |
| 0x2C01:04 | Velocity error | This object contains the velocity error of the velocity controller.<br>Unit: depends on value of Object (default = x * 1 rpm) 0x3005/08 (Ch A) | float | RO | 0.0 |
| 0x2C01:05 | Velocity resulting from differentiation | This object contains the velocity actual value resulting from the position differentiation. | int32_t | RO | 0x00000000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Unit: depends on value of Object (default = x * 0.0001 rpm) 0x3005/02 (Ch A) | | | |
| 0x2C01:06 | Total inertia/force | This object contains the total inertia. Its summarized inertia application and j/m of motor, brake and encoder.<br>Unit: kg m^2 | float | RO | 0.0 |
| 0x2C01:07 | VeloCtrl statusword | This object contains the velocity control statusword.<br>- Bit 5, VeloLimitActive: The velocity demand value is limited internally.<br>- Bit 12, StandStill: Axis movement is inside the standstill window (Parameters Velocity threshold and Velocity threshold time)<br>- Bit 14, TorqueLimitActive: The velocity controller output (torque demand) is limited internally. | uint32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x2C02 | [SG] VelocityControl parameters

This object contains not mappable parameters of the velocity control module.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:0 | [SG] VelocityControl parameters | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C02:01 | Velocity error tolerance | This parameter is to relax/raise the level of the overspeed error. The default level is value of the object "Max motor speed". The value of this parameter will be added to the default level. The value shall be given per thousand of the object "Max motor speed".<br>Unit: 0,1 %<br>Min: 0x00000000 ($0_{dez}$)<br>Max: 0x00001388 ($5000_{dez}$) | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x2C02:02 | Quick stop jerk | This object shall indicate the configured jerk used to stop the motor with fault reaction slow down ramp. If the value is zero, the jerk is infinite.<br>Unit: depends on value of Object (default = x * 100 °/s^3) 0x3005/04 (Ch A)<br>Min: 0x00000000 ($0_{dez}$)<br>Max: 0x24AB572C ($615208748_{dez}$) | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x2C02:04 | Velocity threshold | This object shall indicate the configured velocity threshold. The value shall be given in user defined velocity units.<br>Unit: depends on value of Object (default = x * 0.0001 rpm) 0x3005/02 (Ch A)<br>Min: 0x00000000 ($0_{dez}$)<br>Max: 0xFFFFFFFF ($4294967295_{dez}$) | uint32_t | RW | 0x0000C350 ($50000_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:05 | Velocity threshold time | This object shall indicate the configured velocity threshold time.<br>Unit: ms<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0xFFFF ($65535_{dez}$) | uint16_t | RW | 0x0000 ($0_{dez}$) |

### 0x2C03 | [SG] VelocityControl observer

This object contains parameters to configure the velocity observer.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:0 | [SG] VelocityControl observer | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x2C03:01 | Damping | This object configures the damping coefficient of the observer.<br>Min: 0.2<br>Max: 1.0 | float | RW | 0.707 |
| 0x2C03:02 | Bandwidth | This object configures the bandwidth of the observer.<br>Unit: Hz<br>Min: 25.0<br>Max: 2000.0 | float | RW | 500.0 |
| 0x2C03:03 | Correction factor torque to acceleration | This object configures the torque/force actual to acceleration factor. It is to feed forward the observer with the actual torque/force to estimate the acceleration.<br>Min: 0.0<br>Max: 8.0 | float | RW | 1.0 |
| 0x2C03:04 | Observer type | This object indicates the observer type. Choose Off for differential calculation of Velocity actual value, choose Basic to enable third order observing.<br>allowed values:<br>• 0: Off<br>• 1: Basic_for_known_inertia<br>• 4: Basic_for_unknown_inertia | int16_t | RW | 0x0000 ($0_{dez}$) |

### 0x5885 | [SG] Quick stop deceleration

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5885:0 | [SG] Quick stop deceleration | This object shall indicate the configured deceleration used to stop the motor with fault reaction slow down ramp.<br>Unit: depends on value of Object (default = x * 1 °/s^2)<br>0x3005/03 (Ch A)<br>Min: 0x0000001E ($30_{dez}$)<br>Max: 0xFFFFFFFF ($4294967295_{dez}$) | uint32_t | RW | 0x00057E40 ($360000_{dez}$) |

### 0x58C5 | [SG] Max acceleration

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58C5:0 | [SG] Max acceleration | This object shall indicate the configured maximum acceleration.<br>Unit: depends on value of Object (default = x * 1 °/s^2) 0x3005/03 (Ch A)<br>Min: 0x00000000 ($0_{dez}$)<br>Max: 0xFFFFFFFF ($4294967295_{dez}$) | uint32_t | RW | 0xFFFFFFFF ($4294967295_{dez}$) |

### 0x58C6 | [SG] Max deceleration

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58C6:0 | [SG] Max deceleration | This object shall indicate the configured maximum deceleration.<br>Unit: depends on value of Object (default = x * 1 °/s^2) 0x3005/03 (Ch A)<br>Min: 0x00000000 ($0_{dez}$)<br>Max: 0xFFFFFFFF ($4294967295_{dez}$) | uint32_t | RW | 0xFFFFFFFF ($4294967295_{dez}$) |

## 2.8 Objects of module BiquadFilter

### Overview of Objects

0x1A00 | [SG] BiquadFilter TxPDO-Map Inputs [▶ 58]
0x2C00 | [SG] BiquadFilter parameters filter 1 [▶ 58]
0x2C01 | [SG] BiquadFilter parameters filter 2 [▶ 59]
0x2C02 | [SG] BiquadFilter parameters filter 3 [▶ 60]
0x2C03 | [SG] BiquadFilter parameters filter 4 [▶ 61]
0x2C04 | [SG] BiquadFilter parameters filter 5 [▶ 61]
0x2C05 | [SG] BiquadFilter parameters filter 6 [▶ 62]
0x2C06 | [SG] BiquadFilter parameters filter 7 [▶ 63]
0x2C07 | [SG] BiquadFilter parameters filter 8 [▶ 63]
0x2C10 | [SG] BiquadFilter actual values [▶ 64]

### 0x1A00 | [SG] BiquadFilter TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | [SG] BiquadFilter TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C00 | [SG] BiquadFilter parameters filter 1

This object contains parameters to configure a filter

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:0 | [SG] BiquadFilter parameters filter 1 | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C00:01 | Low pass frequency | This object is to configure the low pass frequency of the configured filter type.<br>Unit: Hz | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Min: 0.0<br>Max: 4000.0 | | | |
| 0x2C00:02 | Low pass damping | This object is to configure the low pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C00:03 | High pass frequency | This object is to configure the high pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C00:04 | High pass damping | This object is to configure the high pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C00:05 | Filter type | This object is to configure the required filter type.<br>allowed values:<br>• 0: No_Filter<br>• 1: Low_pass_filter_1_order<br>• 2: Phase_correction_filter_1_order<br>• 3: Low_pass_filter_2_order<br>• 4: Phase_correction_filter_2_order<br>• 5: Notch_filter | int16_t | RW | 0x0000 ($0_{dez}$) |

### 0x2C01 | [SG] BiquadFilter parameters filter 2

This object contains parameters to configure a filter

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:0 | [SG] BiquadFilter parameters filter 2 | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C01:01 | Low pass frequency | This object is to configure the low pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C01:02 | Low pass damping | This object is to configure the low pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C01:03 | High pass frequency | This object is to configure the high pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:04 | High pass damping | This object is to configure the high pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C01:05 | Filter type | This object is to configure the required filter type.<br>allowed values:<br>• 0: No_Filter<br>• 1: Low_pass_filter_1_order<br>• 2: Phase_correction_filter_1_order<br>• 3: Low_pass_filter_2_order<br>• 4: Phase_correction_filter_2_order<br>• 5: Notch_filter | int16_t | RW | 0x0000 ($0_{dez}$) |

### 0x2C02 | [SG] BiquadFilter parameters filter 3

This object contains parameters to configure a filter

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:0 | [SG] BiquadFilter parameters filter 3 | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C02:01 | Low pass frequency | This object is to configure the low pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C02:02 | Low pass damping | This object is to configure the low pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C02:03 | High pass frequency | This object is to configure the high pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C02:04 | High pass damping | This object is to configure the high pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C02:05 | Filter type | This object is to configure the required filter type.<br>allowed values:<br>• 0: No_Filter<br>• 1: Low_pass_filter_1_order<br>• 2: Phase_correction_filter_1_order<br>• 3: Low_pass_filter_2_order<br>• 4: Phase_correction_filter_2_order | int16_t | RW | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 5: Notch_filter | | | |

### 0x2C03 | [SG] BiquadFilter parameters filter 4

This object contains parameters to configure a filter

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:0 | [SG] BiquadFilter parameters filter 4 | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C03:01 | Low pass frequency | This object is to configure the low pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C03:02 | Low pass damping | This object is to configure the low pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C03:03 | High pass frequency | This object is to configure the high pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C03:04 | High pass damping | This object is to configure the high pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C03:05 | Filter type | This object is to configure the required filter type.<br>allowed values:<br>• 0: No_Filter<br>• 1: Low_pass_filter_1_order<br>• 2: Phase_correction_filter_1_order<br>• 3: Low_pass_filter_2_order<br>• 4: Phase_correction_filter_2_order<br>• 5: Notch_filter | int16_t | RW | 0x0000 ($0_{dez}$) |

### 0x2C04 | [SG] BiquadFilter parameters filter 5

This object contains parameters to configure a filter

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C04:0 | [SG] BiquadFilter parameters filter 5 | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C04:01 | Low pass frequency | This object is to configure the low pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C04:02 | Low pass damping | This object is to configure the low pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C04:03 | High pass frequency | This object is to configure the high pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C04:04 | High pass damping | This object is to configure the high pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C04:05 | Filter type | This object is to configure the required filter type.<br>allowed values:<br>• 0: No_Filter<br>• 1: Low_pass_filter_1_order<br>• 2: Phase_correction_filter_1_order<br>• 3: Low_pass_filter_2_order<br>• 4: Phase_correction_filter_2_order<br>• 5: Notch_filter | int16_t | RW | 0x0000 ($0_{dez}$) |

### 0x2C05 | [SG] BiquadFilter parameters filter 6

This object contains parameters to configure a filter

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C05:0 | [SG] BiquadFilter parameters filter 6 | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C05:01 | Low pass frequency | This object is to configure the low pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C05:02 | Low pass damping | This object is to configure the low pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C05:03 | High pass frequency | This object is to configure the high pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C05:04 | High pass damping | This object is to configure the high pass damping of the configured filter type.<br>Min: 0.0 | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Max: 1.0 | | | |
| 0x2C05:05 | Filter type | This object is to configure the required filter type.<br>allowed values:<br>• 0: No_Filter<br>• 1: Low_pass_filter_1_order<br>• 2: Phase_correction_filter_1_order<br>• 3: Low_pass_filter_2_order<br>• 4: Phase_correction_filter_2_order<br>• 5: Notch_filter | int16_t | RW | 0x0000 ($0_{dez}$) |

### 0x2C06 | [SG] BiquadFilter parameters filter 7

This object contains parameters to configure a filter

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C06:0 | [SG] BiquadFilter parameters filter 7 | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C06:01 | Low pass frequency | This object is to configure the low pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C06:02 | Low pass damping | This object is to configure the low pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C06:03 | High pass frequency | This object is to configure the high pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C06:04 | High pass damping | This object is to configure the high pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C06:05 | Filter type | This object is to configure the required filter type.<br>allowed values:<br>• 0: No_Filter<br>• 1: Low_pass_filter_1_order<br>• 2: Phase_correction_filter_1_order<br>• 3: Low_pass_filter_2_order<br>• 4: Phase_correction_filter_2_order<br>• 5: Notch_filter | int16_t | RW | 0x0000 ($0_{dez}$) |

### 0x2C07 | [SG] BiquadFilter parameters filter 8

This object contains parameters to configure a filter

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C07:0 | [SG] BiquadFilter parameters filter 8 | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C07:01 | Low pass frequency | This object is to configure the low pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C07:02 | Low pass damping | This object is to configure the low pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C07:03 | High pass frequency | This object is to configure the high pass frequency of the configured filter type.<br>Unit: Hz<br>Min: 0.0<br>Max: 4000.0 | float | RW | 0.0 |
| 0x2C07:04 | High pass damping | This object is to configure the high pass damping of the configured filter type.<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C07:05 | Filter type | This object is to configure the required filter type.<br>allowed values:<br>• 0: No_Filter<br>• 1: Low_pass_filter_1_order<br>• 2: Phase_correction_filter_1_order<br>• 3: Low_pass_filter_2_order<br>• 4: Phase_correction_filter_2_order<br>• 5: Notch_filter | int16_t | RW | 0x0000 ($0_{dez}$) |

### 0x2C10 | [SG] BiquadFilter actual values

This object contains the filter input signal.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C10:0 | [SG] BiquadFilter actual values | | float | RO | 2.80260E-45 |
| 0x2C10:01 | Input value | Unit: depends on value of Object (default = x * 1 Nm)<br>0x3005/05 (Ch A) | float | RO | 0.0 |
| 0x2C10:02 | Output value | Unit: depends on value of Object (default = x * 1 Nm)<br>0x3005/05 (Ch A) | float | RO | 0.0 |

# 2.9 Objects of module TorqueControl

### Overview of Objects

0x1600 | [SG] TorqueControl RxPDO-Map Outputs [▶ 65]
0x1A00 | [SG] TorqueControl TxPDO-Map Inputs [▶ 65]
0x2C00 | [SG] TorqueControl parameters mappable [▶ 65]
0x2C01 | [SG] TorqueControl actual values [▶ 66]
0x2C02 | [SG] TorqueControl actual values2 [▶ 67]
0x2C03 | [SG] TorqueControl parameters [▶ 68]
0x5871 | [SG] Target torque/force [▶ 70]
0x5872 | [SG] Bipolar torque/force limit value [▶ 70]
0x5877 | [SG] Torque/force actual value [▶ 70]
0x5887 | [SG] Torque/force slope [▶ 70]
0x58B2 | [SG] Torque/force offset [▶ 71]
0x58E0 | [SG] Positive torque/force limit value [▶ 71]
0x58E1 | [SG] Negative torque/force limit value [▶ 71]
0x58EA | [SG] Commutation angle [▶ 71]

### 0x1600 | [SG] TorqueControl RxPDO-Map Outputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1600:0 | [SG] TorqueControl RxPDO-Map Outputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x1A00 | [SG] TorqueControl TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | [SG] TorqueControl TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C00 | [SG] TorqueControl parameters mappable

This record contains all mappable parameters of this module.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:0 | [SG] TorqueControl parameters mappable | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x2C00:01 | Torque control proportional gain q | This object contains the proportional gain of the torque/force controller.<br>Unit: V/A<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 100.0 |
| 0x2C00:02 | Torque control integral action time q | This object contains the integral action time of the torque/force controller.<br>Unit: s<br>Min: 0.0001 | float | RW | 0.001 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Max: 0.01 | | | |
| 0x2C00:03 | Torque control proportional gain d | This object contains the second proportional gain of the torque/force controller.<br>Unit: V/A<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:04 | Torque control integral action time d | This object contains the second integral action time of the torque/force controller.<br>Unit: s<br>Min: 0.0001<br>Max: 0.01 | float | RW | 0.001 |

### 0x2C01 | [SG] TorqueControl actual values

This object contains manufacturer specific actual values from the module torque/force control.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:0 | [SG] TorqueControl actual values | | uint8_t | RO | 0x0E ($14_{dez}$) |
| 0x2C01:01 | VeloCtrl torque/ force demand value | This object indicates the torque/force controller demand value from the velocity controller.<br>Unit: depends on value of Object (default = x * 1 Nm) 0x3005/05 (Ch A) | float | RO | 0.0 |
| 0x2C01:02 | Feed forward torque/force demand value | This object indicates the torque/force controller feed forward value from the Interpolator.<br>Unit: depends on value of Object (default = x * 1 Nm) 0x3005/05 (Ch A) | float | RO | 0.0 |
| 0x2C01:03 | Limited torque/ force demand value | This object indicates the effective torque/force demand value.<br>Unit: depends on value of Object (default = x * 1 Nm) 0x3005/05 (Ch A) | float | RO | 0.0 |
| 0x2C01:05 | Reserved | This object is reserved for further development | float | RO | 0.0 |
| 0x2C01:07 | Pos torque/force limit effective | This object indicates the effective positive torque/force limit.<br>Unit: depends on value of Object (default = x * 1 Nm) 0x3005/05 (Ch A) | float | RO | 0.0 |
| 0x2C01:08 | Neg torque/force limit effective | This object indicates the effective negative torque/force limit.<br>Unit: depends on value of Object (default = x * 1 Nm) 0x3005/05 (Ch A) | float | RO | 0.0 |
| 0x2C01:0E | Average effective torque demand value | This object indicates the average effective torque/force demand value. | float | RO | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Unit: depends on value of Object (default = x * 1 Nm) 0x3005/05 (Ch A) | | | |

### 0x2C02 | [SG] TorqueControl actual values2

This object contains parameters to configure the torque/force controller.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:0 | [SG] TorqueControl actual values2 | | uint8_t | RO | 0x19 ($25_{dez}$) |
| 0x2C02:01 | Iq demand | internal current value Unit: A | float | RO | 0.0 |
| 0x2C02:02 | Id demand | internal current value Unit: A | float | RO | 0.0 |
| 0x2C02:03 | Reserved | internal current value Unit: A | float | RO | 0.0 |
| 0x2C02:04 | Iq actual | internal current value Unit: A | float | RO | 0.0 |
| 0x2C02:05 | Id actual | internal current value Unit: A | float | RO | 0.0 |
| 0x2C02:06 | Iu actual | internal current value Unit: A | float | RO | 0.0 |
| 0x2C02:07 | Iv actual | internal current value Unit: A | float | RO | 0.0 |
| 0x2C02:08 | Iw actual | internal current value Unit: A | float | RO | 0.0 |
| 0x2C02:09 | Ialpha actual | internal current value Unit: A | float | RO | 0.0 |
| 0x2C02:0A | Ibeta actual | internal current value Unit: A | float | RO | 0.0 |
| 0x2C02:0B | Irms actual | internal current value Unit: A | float | RO | 0.0 |
| 0x2C02:0C | Thermal channel nominal utilization | This object contains the actual nominal utilization. Unit: % | float | RO | 0.0 |
| 0x2C02:0D | Thermal channel overload utilization | This object contains the actual overload utilization. Unit: % | float | RO | 0.0 |
| 0x2C02:0F | Uq actual | internal voltage value Unit: V | float | RO | 0.0 |
| 0x2C02:10 | Ud actual | internal voltage value Unit: V | float | RO | 0.0 |
| 0x2C02:11 | Urms actual | internal voltage value Unit: V | float | RO | 0.0 |
| 0x2C02:12 | Electrical power | Internal active power value Unit: W | float | RO | 0.0 |
| 0x2C02:13 | Mechanical power | Internal mechanical power value Unit: W | float | RO | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:15 | Commutation angle actual | This object indicates the actual electrical commutation angle for the space vector modulation.<br>Unit: x * (360/65536)° | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:16 | Ualpha actual | internal current value<br>Unit: V | float | RO | 0.0 |
| 0x2C02:17 | Ubeta actual | internal current value<br>Unit: V | float | RO | 0.0 |
| 0x2C02:19 | Frequency actual value | | float | RO | 0.0 |

### 0x2C03 | [SG] TorqueControl parameters

This object contains not mappable parameters of the TorqueControl module.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:0 | [SG] TorqueControl parameters | | uint8_t | RO | 0x14 ($20_{dez}$) |
| 0x2C03:01 | Configured channel rated current | This object configures the channel rated current. The range of this object depends on 'Channel rated current' (0x3243:03) and the on the configuration of the optional other channel. The summation is limited.<br>Unit: A<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C03:02 | Configured channel peak current | This object configures the channel peak current. The range of this object depends on 'Channel peak current' (0x3243:04) and the on the configuration of the optional other channel. The summation is limited.<br>Unit: A<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C03:03 | Channel rated current | This read only object indicates the maximal channel rated current. This value dependents on the mains voltage and the PWM frequency.<br>Unit: A<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RO | 0.0 |
| 0x2C03:04 | Channel peak current | This read only object indicates the maximal channel peak current. This value dependents on the mains voltage and the PWM frequency.<br>Unit: A<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RO | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:05 | Configured channel peak torque/force | This read only object provides the configured channel peak torque/force. The value of this object depends on the motor and the configured peak current.<br>Unit: depends on value of Object (default = x * 1 Nm)<br>0x3005/05 (Ch A)<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RO | 0.0 |
| 0x2C03:06 | Max channel accepted velocity | This object contains maximum accepted velocity demand value to prevent high back EMF.<br>Unit: depends on value of Object (default = x * 1 rpm)<br>0x3005/08 (Ch A)<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RO | 0.0 |
| 0x2C03:0A | PWM mode | This object selects the PWM mode.<br>allowed values:<br>• 0: PWM_8kHz_adaptive<br>• 2: PWM_4kHz_permanent | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x2C03:0B | Configured channel thermal rated current | This object configures the channel thermal rated current. The value of this object depends on the 'Configured channel rated current' (0x3243:01) and the on the configuration of the optional other channel.<br>Unit: A<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RO | 0.0 |
| 0x2C03:0D | Voltage error compensation factor | This object might be used to scale the voltage error compensation magnitude.<br>Unit: %<br>Min: 0.0<br>Max: 200.0 | float | RW | 0.0 |
| 0x2C03:10 | Overload duration mode | This object might be used to select the channel overload configuration.<br>allowed values:<br>• 0: Overload 3s<br>• 1: Overload 1s<br>• 2: Overload 60s | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x2C03:11 | Voltage error compensation lower fade out velocity | This object might be used to adapt the voltage error compensation lower fade out velocity value. Reference quantity is the asynchronous motor nominal stator frequency.<br>Unit: %<br>Min: 0.0<br>Max: 100.0 | float | RW | 5.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:12 | Voltage error compensation upper fade out velocity | This object might be used to adapt the voltage error compensation upper fade out velocity value. Reference quantity is the asynchronous motor nominal stator frequency.<br>Unit: %<br>Min: 0.0<br>Max: 100.0 | float | RW | 90.0 |
| 0x2C03:14 | Current predictor mode | allowed values:<br>• 0: Current_predictor_disabled<br>• 1: Current_predictor_enabled | uint32_t | RW | 0x00000000 ($0_{dez}$) |

### 0x5871 | [SG] Target torque/force

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5871:0 | [SG] Target torque/force | This object shall indicate the configured input value for the torque/force controller. The value shall be given per thousand of motor standstill torque/ force (0x6076).<br>Unit: 0,1 % | int16_t | RO | 0x0000 ($0_{dez}$) |

### 0x5872 | [SG] Bipolar torque/force limit value

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5872:0 | [SG] Bipolar torque/force limit value | This object indicates the configured maximum bipolar permissible torque/ force in the motor. The value shall be given per thousand of standstill motor torque/force (0x6076).<br>Unit: 0,1 %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0xFFFF ($65535_{dez}$) | uint16_t | RW | 0x1388 ($5000_{dez}$) |

### 0x5877 | [SG] Torque/force actual value

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5877:0 | [SG] Torque/force actual value | This object shall indicate the configured input value for the torque/force controller. The value shall be given per thousand of motor standstill torque/ force (0x6076) $M_0$.<br>Unit: 0,1 % | int16_t | RO | 0x0000 ($0_{dez}$) |

### 0x5887 | [SG] Torque/force slope

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5887:0 | [SG] Torque/force slope | This object shall indicate the configured rate of change of torque/force. The value shall be given in units of per thousand of standstill torque/force per second. Value Zero will turn this function off.<br>Unit: 0,1 %/s | uint32_t | RW | 0x00000000 ($0_{dez}$) |

### 0x58B2 | [SG] Torque/force offset

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58B2:0 | [SG] Torque/force offset | This object shall provide the offset for the torque/force value. The offset shall be given in per thousand of motor standstill torque/force. In cyclic synchronous position mode and cyclic synchronous velocity mode, this object contains the input value for an external calculated torque/force feed forward. In cyclic synchronous torque mode it contains the commanded additive torque/force of the drive, which is added to the target torque/force value.<br>Unit: 0,1 % | int16_t | RO | 0x0000 ($0_{dez}$) |

### 0x58E0 | [SG] Positive torque/force limit value

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58E0:0 | [SG] Positive torque/force limit value | This object indicates the configured maximum positive torque/force in the motor. The value shall be given per thousand of standstill torque/force (0x6076). Positive torque/force takes effect in the case of motive operation is positive velocity or regenerative operation is negative velocity.<br>Unit: 0,1 %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0xFFFF ($65535_{dez}$) | uint16_t | RW | 0x1388 ($5000_{dez}$) |

### 0x58E1 | [SG] Negative torque/force limit value

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58E1:0 | [SG] Negative torque/force limit value | This object indicates the configured maximum negative torque/force in the motor. The value shall be given per thousand of standstill torque/force (0x6076). Negative torque/force takes effect in the case of motive operation is negative velocity or regenerative operation is positive velocity.<br>Unit: 0,1 %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0xFFFF ($65535_{dez}$) | uint16_t | RW | 0x1388 ($5000_{dez}$) |

### 0x58EA | [SG] Commutation angle

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x58EA:0 | [SG] Commutation angle | This object indicates the electrical commutation angle for the space vector modulation.<br>Unit: x * (360/65536)°<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0xFFFF ($65535_{dez}$) | uint16_t | RW | 0x0000 ($0_{dez}$) |

# 2.10 Objects of module SynchronousMotor

### Overview of Objects

0x1A00 | [SG] SynchronousMotor TxPDO-Map Inputs [▶ 72]
0x2C00 | [SG] SynchronousMotor parameters [▶ 72]
0x2C01 | [SG] SynchronousMotor actual values [▶ 75]
0x2C02 | [SG] SynchronousMotor torque characteristic [▶ 76]
0x2C06 | [SG] SynchronousMotor commutation monitoring parameters [▶ 78]
0x2C07 | [SG] SynchronousMotor temperature sensor characteristic [▶ 78]
0x2C08 | [SG] SynchronousMotor thermal model [▶ 81]
0x2C0C | [SG] SynchronousMotor inductance characteristic [▶ 82]
0x2C0D | [SG] SynchronousMotor commutation offset command [▶ 84]
0x2C0E | [SG] SynchronousMotor commutation offset command parameters [▶ 87]
0x2C0F | [SG] SynchronousMotor save cogging compensation data [▶ 89]
0x2C10 | [SG] SynchronousMotor sensorless control parameters [▶ 92]
0x2C11 | [SG] SynchronousMotor field weakening parameters [▶ 94]
0x2C1F | [SG] SynchronousMotor control mode [▶ 95]
0x5875 | [SG] Motor standstill current [▶ 95]
0x5876 | [SG] Motor standstill torque [▶ 95]
0x5880 | [SG] Max motor speed [▶ 95]

### 0x1A00 | [SG] SynchronousMotor TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | [SG] SynchronousMotor TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C00 | [SG] SynchronousMotor parameters

This object contains parameters to configure the connected motor.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:0 | [SG] SynchronousMotor parameters | | uint8_t | RO | 0x17 ($23_{dez}$) |
| 0x2C00:01 | Configured motor type | This object indicates the configured motor type. | STRING | RW | "not set" |
| 0x2C00:02 | Pole pairs | This object indicates the motor pole pairs.<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x00FF ($255_{dez}$) | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C00:03 | Motor peak current | This object configures the motor peak current. If the electronic datasheet of the motor is available take "Peak current".<br>Unit: A<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:04 | Motor nominal voltage | This object configures the motor nominal voltage. If the electronic datasheet is available take "Nominal voltage" according to the selected mains voltage.<br>Unit: V<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:05 | Motor max voltage | This object configures the motor max voltage. If the electronic datasheet is available take "Max voltage".<br>Unit: V<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:06 | Winding resistance R | This object configures the winding resistance R (phase to phase at 20°C). If the electronic datasheet is available take "Winding resistance Ph-Ph 20°C".<br>Unit: Ω<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:07 | Winding inductance Ld | This object configures the direct axis winding inductance Ld (phase to phase). If the electronic datasheet is available take "Ld Ph-Ph".<br>Unit: H<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:08 | Winding inductance Lq | This object configures the direct winding inductance Lq. If the electronic datasheet is available take "Lq Ph-Ph".<br>Unit: H<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:09 | Motor warning temperature | This object configures the motor temperature warning threshold. If the electronic datasheet is available take "T motor warn limit".<br>Unit: °C<br>Min: 0.0<br>Max: 150.0 | float | RW | 80.0 |
| 0x2C00:0A | Motor shut down temperature | This object configures the motor temperature error threshold. If the electronic datasheet is available take "T motor err limit".<br>Unit: °C<br>Min: 0.0<br>Max: 150.0 | float | RW | 100.0 |
| 0x2C00:0B | Motor moment of inertia | This object configures the inertia of rotor including brake and encoder. If the electronic datasheet is available take "J motor with brake". | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Unit: kg m^2<br>Min: 0.0<br>Max: 3.40282E+38 | | | |
| 0x2C00:0C | Motor rated speed | This object indicates the motor calculated speed. Its calculated from the motor parameters.<br>Unit: rpm<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:0D | Motor rated torque | This object configures the motor rated torque at rated speed. If the electronic datasheet is available take "Rated torque" according to the selected mains voltage.<br>Unit: Nm<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:0E | Commutation offset | This object configures the motor commutation offset. Beckhoff motors use the default value (0°).<br>Unit: x * (360/65536)° | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C00:0F | Motor temperature sensor connection | This object configures the motor temperature sensor type.<br>allowed values:<br>• 0: No_motor_temperature_switch_or_sensor<br>• 1: Via_feedback_process_data_and_characteristic<br>• 2: Via_motor_cable_and_charactereistic_table<br>• 3: Via_feedback_process_data_scaled_in_0_1K<br>• 4: Via_feedback_process_data_scaled_in_0_1degC | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C00:10 | Motor max voltage slope | This object configures the motor maximum winding voltage slope. If the electronic datasheet is available take "Max winding du/dt" according to the selected mains voltage.<br>Unit: V/s<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:16 | Commutation offset source | This object configures the memory source of the "Offset position actual value".<br>allowed values:<br>• 0: feedback_module | uint16_t | RW | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 1: motor_parameter_commutation_offset | | | |
| 0x2C00:17 | Motor peak torque | This object configures the motor peak torque. If the electronic datasheet of the motor is available take "Max Torque".<br>Unit: Nm<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |

### 0x2C01 | [SG] SynchronousMotor actual values

This object contains actual values from this module.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:0 | [SG] SynchronousMotor actual values | | uint8_t | RO | 0x0F ($15_{dez}$) |
| 0x2C01:01 | Actual motor I2T current limit | This object is to monitor the thermal motor $I^2T$ model current limitation. If the estimated $I^2T$ value exceeds the threshold value the current will be limited to motor $I_0$ (0x6075).<br>Unit: A | float | RO | 0.0 |
| 0x2C01:02 | Thermal motor utilization | This object is to indicate the actual motor utilization.<br>Unit: % | float | RO | 0.0 |
| 0x2C01:03 | Estimated motor copper losses | Internal value for estimated motor copper losses.<br>Unit: W | float | RO | 0.0 |
| 0x2C01:04 | Estimated motor iron losses | Internal value for estimated motor iron losses.<br>Unit: W | float | RO | 0.0 |
| 0x2C01:05 | Motor I2T limitation active | This internal state indicates a current reduction due to the thermal motor model.<br>allowed values:<br>• 0: limit_off<br>• 1: limit_active | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:06 | Actual motor temperature | This object provides the measured motor winding temperature. It is usually acquired via the motor internal temperature sensor.<br>Unit: °C | float | RO | 0.0 |
| 0x2C01:0B | Actual commutation offset | This object displays the actual motor commutation offset. Beckhoff motors use the default value (0°).<br>Unit: x * (360/65536)° | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C01:0C | Is commutation offset valid | This object displays if the actual motor commutation offset is valid.<br>allowed values:<br>• 0: False | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 1: True | | | |
| 0x2C01:0D | Voltage controller demand value | Voltage controller demand voltage value.<br>Unit: V | float | RO | 0.0 |
| 0x2C01:0E | Voltage controller actual value | Voltage controller actual voltage value.<br>Unit: V | float | RO | 0.0 |
| 0x2C01:0F | Sensorless control commutation angle error | Sensorless control estimated commutation error angle.<br>Unit: rad | float | RO | 0.0 |

### 0x2C02 | [SG] SynchronousMotor torque characteristic

This object describes the motor torque characteristic of a cold (40°C) motor. The torque as a function of current curve is approximated by a third order polynomial. Three pairs of values are required. Standstill current and torque, peak current and torque and a pair of values between standstill and peak. The values can be read from the motor electronic datasheet (XEDS file).

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:0 | [SG] SynchronousMotor torque characteristic | | uint8_t | RO | 0x14 ($20_{dez}$) |
| 0x2C02:01 | Current 0 | Current sampling point 1 of the M(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:02 | Current 1 | Current sampling point 2 of the M(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:03 | Current 2 | Current sampling point 3 of the M(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:04 | Current 3 | Current sampling point 4 of the M(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:05 | Current 4 | Current sampling point 5 of the M(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:06 | Current 5 | Current sampling point 6 of the M(i) curve of the motor.<br>Unit: A<br>Min: 0.0 | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Max: 10000.0 | | | |
| 0x2C02:07 | Current 6 | Current sampling point 7 of the M(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:08 | Current 7 | Current sampling point 8 of the M(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:09 | Current 8 | Current sampling point 9 of the M(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:0A | Current 9 | Current sampling point 10 of the M(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:0B | Torque 0 | Torque sampling point 1 of the M(i) curve of the motor.<br>Unit: Nm<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:0C | Torque 1 | Torque sampling point 2 of the M(i) curve of the motor.<br>Unit: Nm<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:0D | Torque 2 | Torque sampling point 3 of the M(i) curve of the motor.<br>Unit: Nm<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:0E | Torque 3 | Torque sampling point 4 of the M(i) curve of the motor.<br>Unit: Nm<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:0F | Torque 4 | Torque sampling point 5 of the M(i) curve of the motor.<br>Unit: Nm<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:10 | Torque 5 | Torque sampling point 6 of the M(i) curve of the motor. | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Unit: Nm<br>Min: 0.0<br>Max: 10000.0 | | | |
| 0x2C02:11 | Torque 6 | Torque sampling point 7 of the M(i) curve of the motor.<br>Unit: Nm<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:12 | Torque 7 | Torque sampling point 8 of the M(i) curve of the motor.<br>Unit: Nm<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:13 | Torque 8 | Torque sampling point 9 of the M(i) curve of the motor.<br>Unit: Nm<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |
| 0x2C02:14 | Torque 9 | Torque sampling point 10 of the M(i) curve of the motor.<br>Unit: Nm<br>Min: 0.0<br>Max: 10000.0 | float | RW | 0.0 |

### 0x2C06 | [SG] SynchronousMotor commutation monitoring parameters

This object contains parameters to configure the Motor commutation monitoring

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C06:0 | [SG] SynchronousMotor commutation monitoring parameters | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x2C06:01 | Speed threshold | The minimum speed for detecting a commutation error is 'Max motor speed' (0x6080) multiplied by 'Speed threshold'<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.1 |
| 0x2C06:02 | Voltage threshold | The BEMF level for detecting a commutation error is 'Motor nominal voltage' (0x32C0:04) multiplied by 'Voltage threshold'<br>Min: 0.0<br>Max: 2.0 | float | RW | 0.1 |

### 0x2C07 | [SG] SynchronousMotor temperature sensor characteristic

This object describes the R(T) curve of the motor winding temperature sensor.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C07:0 | [SG] SynchronousMotor temperature sensor characteristic | | uint8_t | RO | 0x15 ($21_{dez}$) |
| 0x2C07:01 | Temperature 0 | Temperature sampling point 1 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:02 | Temperature 1 | Temperature sampling point 2 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:03 | Temperature 2 | Temperature sampling point 3 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:04 | Temperature 3 | Temperature sampling point 4 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:05 | Temperature 4 | Temperature sampling point 5 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:06 | Temperature 5 | Temperature sampling point 6 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:07 | Temperature 6 | Temperature sampling point 7 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:08 | Temperature 7 | Temperature sampling point 8 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:09 | Temperature 8 | Temperature sampling point 9 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0 | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Max: 250.0 | | | |
| 0x2C07:0A | Temperature 9 | Temperature sampling point 10 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:0B | Resistance 0 | Resistance sampling point 1 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:0C | Resistance 1 | Resistance sampling point 2 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:0D | Resistance 2 | Resistance sampling point 3 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:0E | Resistance 3 | Resistance sampling point 4 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:0F | Resistance 4 | Resistance sampling point 5 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:10 | Resistance 5 | Resistance sampling point 6 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:11 | Resistance 6 | Resistance sampling point 7 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:12 | Resistance 7 | Resistance sampling point 8 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:13 | Resistance 8 | Resistance sampling point 9 of the R(T) curve of the motor. | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | | | |
| 0x2C07:14 | Resistance 9 | Resistance sampling point 10 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:15 | Temperature Sensor Id | Id of the temperature sensor.<br>allowed values:<br>• 0: TemperatureSensorId_NotDefined<br>• 1: TemperatureSensorId_KTY_84_130<br>• 2: TemperatureSensorId_PT1000<br>• 3: TemperatureSensorId_PT100<br>• 4: TemperatureSensorId_KTY_83_110 | int32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x2C08 | [SG] SynchronousMotor thermal model

These objects configure the motor thermal model.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C08:0 | [SG] SynchronousMotor thermal model | | uint8_t | RO | 0x06 ($6_{dez}$) |
| 0x2C08:01 | Motor thermal time constant | This object configures the time constant for the whole motor. If an electronic datasheet is available take "Motor thermal constant" and scale it to seconds.<br>Unit: s<br>Min: 0.0<br>Max: 200000.0 | float | RW | 540.0 |
| 0x2C08:02 | Winding thermal time constant | This object configures the time constant of the copper winding only. If an electronic datasheet is available take "Time constant $i^2T$".<br>Unit: s<br>Min: 0.0<br>Max: 3600.0 | float | RW | 20.0 |
| 0x2C08:03 | Warning limit | This object shall configure the thermal motor utilization warning limit.<br>Unit: %<br>Min: 0.0<br>Max: 100.0 | float | RW | 80.0 |
| 0x2C08:04 | Error limit | This object shall configure the thermal motor utilization error limit.<br>Unit: %<br>Min: 0.0 | float | RW | 100.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Max: 100.0 | | | |
| 0x2C08:05 | Reaction | This object configures the reaction in case reaching the thermal motor utilization error limit.<br>allowed values:<br>• 0: No_Reaction<br>• 1: Shut_down_on_error_level<br>• 2: Reduction | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C08:06 | Partial fraction factor | This object describes the thermal resistor fraction factor of the motor.<br>Unit: %<br>Min: 0.0<br>Max: 100.0 | float | RW | 25.0 |

### 0x2C0C | [SG] SynchronousMotor inductance characteristic

10 ordered pairs of numbers are describing the saturation of the differential inductance as a function of the torque/force producing current.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0C:0 | [SG] SynchronousMotor inductance characteristic | | uint8_t | RO | 0x14 ($20_{dez}$) |
| 0x2C0C:01 | Current 0 | Current sampling point 1 of the Lq(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:02 | Current 1 | Current sampling point 2 of the Lq(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:03 | Current 2 | Current sampling point 3 of the Lq(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:04 | Current 3 | Current sampling point 4 of the Lq(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:05 | Current 4 | Current sampling point 5 of the Lq(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:06 | Current 5 | Current sampling point 6 of the Lq(i) curve of the motor. | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Unit: A<br>Min: 0.0<br>Max: 8000.0 | | | |
| 0x2C0C:07 | Current 6 | Current sampling point 7 of the Lq(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:08 | Current 7 | Current sampling point 8 of the Lq(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:09 | Current 8 | Current sampling point 9 of the Lq(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:0A | Current 9 | Current sampling point 10 of the Lq(i) curve of the motor.<br>Unit: A<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:0B | Inductance 0 | Inductance sampling point 1 of the Lq(i) curve of the motor.<br>Unit: H<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:0C | Inductance 1 | Inductance sampling point 2 of the Lq(i) curve of the motor.<br>Unit: H<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:0D | Inductance 2 | Inductance sampling point 3 of the Lq(i) curve of the motor.<br>Unit: H<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:0E | Inductance 3 | Inductance sampling point 4 of the Lq(i) curve of the motor.<br>Unit: H<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:0F | Inductance 4 | Inductance sampling point 5 of the Lq(i) curve of the motor.<br>Unit: H<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0C:10 | Inductance 5 | Inductance sampling point 6 of the Lq(i) curve of the motor.<br>Unit: H<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:11 | Inductance 6 | Inductance sampling point 7 of the Lq(i) curve of the motor.<br>Unit: H<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:12 | Inductance 7 | Inductance sampling point 8 of the Lq(i) curve of the motor.<br>Unit: H<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:13 | Inductance 8 | Inductance sampling point 9 of the Lq(i) curve of the motor.<br>Unit: H<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |
| 0x2C0C:14 | Inductance 9 | Inductance sampling point 10 of the Lq(i) curve of the motor.<br>Unit: H<br>Min: 0.0<br>Max: 8000.0 | float | RW | 0.0 |

### 0x2C0D | [SG] SynchronousMotor commutation offset command

With this command object the commutation offset can be measured and feedback checks can be performed.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0D:0 | [SG] SynchronousMotor commutation offset command | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x2C0D:01 | Command | With this command object the commutation offset can be measured and feedback checks can be performed. | OCTET-STRING[4] | RW | {0} |
| 0x2C0D:02 | Status | allowed values:<br>• 0: eCoeCmdStatus_CmdCompletedNoErrorNoRespData<br>• 1: eCoeCmdStatus_CmdCompletedNoErrorRespDataAvailable<br>• 2: eCoeCmdStatus_CmdCompletedErrorNoRespData<br>• 3: eCoeCmdStatus_CmdCompletedErrorRespDataAvailable | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 100: eCoeCmdStatus_0_Percent<br>• 101: eCoeCmdStatus_1_Percent<br>• 102: eCoeCmdStatus_2_Percent<br>• 103: eCoeCmdStatus_3_Percent<br>• 104: eCoeCmdStatus_4_Percent<br>• 105: eCoeCmdStatus_5_Percent<br>• 106: eCoeCmdStatus_6_Percent<br>• 107: eCoeCmdStatus_7_Percent<br>• 108: eCoeCmdStatus_8_Percent<br>• 109: eCoeCmdStatus_9_Percent<br>• 110: eCoeCmdStatus_10_Percent<br>• 111: eCoeCmdStatus_11_Percent<br>• 112: eCoeCmdStatus_12_Percent<br>• 113: eCoeCmdStatus_13_Percent<br>• 114: eCoeCmdStatus_14_Percent<br>• 115: eCoeCmdStatus_15_Percent<br>• 116: eCoeCmdStatus_16_Percent<br>• 117: eCoeCmdStatus_17_Percent<br>• 118: eCoeCmdStatus_18_Percent<br>• 119: eCoeCmdStatus_19_Percent<br>• 120: eCoeCmdStatus_20_Percent<br>• 121: eCoeCmdStatus_21_Percent<br>• 122: eCoeCmdStatus_22_Percent<br>• 123: eCoeCmdStatus_23_Percent<br>• 124: eCoeCmdStatus_24_Percent<br>• 125: eCoeCmdStatus_25_Percent<br>• 126: eCoeCmdStatus_26_Percent<br>• 127: eCoeCmdStatus_27_Percent<br>• 128: eCoeCmdStatus_28_Percent<br>• 129: eCoeCmdStatus_29_Percent<br>• 130: eCoeCmdStatus_30_Percent<br>• 131: eCoeCmdStatus_31_Percent<br>• 132: eCoeCmdStatus_32_Percent<br>• 133: eCoeCmdStatus_33_Percent<br>• 134: eCoeCmdStatus_34_Percent<br>• 135: eCoeCmdStatus_35_Percent<br>• 136: eCoeCmdStatus_36_Percent<br>• 137: eCoeCmdStatus_37_Percent<br>• 138: eCoeCmdStatus_38_Percent<br>• 139: eCoeCmdStatus_39_Percent<br>• 140: eCoeCmdStatus_40_Percent<br>• 141: eCoeCmdStatus_41_Percent<br>• 142: eCoeCmdStatus_42_Percent<br>• 143: eCoeCmdStatus_43_Percent<br>• 144: eCoeCmdStatus_44_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 145: eCoeCmdStatus_45_Percent | | | |
| | | • 146: eCoeCmdStatus_46_Percent | | | |
| | | • 147: eCoeCmdStatus_47_Percent | | | |
| | | • 148: eCoeCmdStatus_48_Percent | | | |
| | | • 149: eCoeCmdStatus_49_Percent | | | |
| | | • 150: eCoeCmdStatus_50_Percent | | | |
| | | • 151: eCoeCmdStatus_51_Percent | | | |
| | | • 152: eCoeCmdStatus_52_Percent | | | |
| | | • 153: eCoeCmdStatus_53_Percent | | | |
| | | • 154: eCoeCmdStatus_54_Percent | | | |
| | | • 155: eCoeCmdStatus_55_Percent | | | |
| | | • 156: eCoeCmdStatus_56_Percent | | | |
| | | • 157: eCoeCmdStatus_57_Percent | | | |
| | | • 158: eCoeCmdStatus_58_Percent | | | |
| | | • 159: eCoeCmdStatus_59_Percent | | | |
| | | • 160: eCoeCmdStatus_60_Percent | | | |
| | | • 161: eCoeCmdStatus_61_Percent | | | |
| | | • 162: eCoeCmdStatus_62_Percent | | | |
| | | • 163: eCoeCmdStatus_63_Percent | | | |
| | | • 164: eCoeCmdStatus_64_Percent | | | |
| | | • 165: eCoeCmdStatus_65_Percent | | | |
| | | • 166: eCoeCmdStatus_66_Percent | | | |
| | | • 167: eCoeCmdStatus_67_Percent | | | |
| | | • 168: eCoeCmdStatus_68_Percent | | | |
| | | • 169: eCoeCmdStatus_69_Percent | | | |
| | | • 170: eCoeCmdStatus_70_Percent | | | |
| | | • 171: eCoeCmdStatus_71_Percent | | | |
| | | • 172: eCoeCmdStatus_72_Percent | | | |
| | | • 173: eCoeCmdStatus_73_Percent | | | |
| | | • 174: eCoeCmdStatus_74_Percent | | | |
| | | • 175: eCoeCmdStatus_75_Percent | | | |
| | | • 176: eCoeCmdStatus_76_Percent | | | |
| | | • 177: eCoeCmdStatus_77_Percent | | | |
| | | • 178: eCoeCmdStatus_78_Percent | | | |
| | | • 179: eCoeCmdStatus_79_Percent | | | |
| | | • 180: eCoeCmdStatus_80_Percent | | | |
| | | • 181: eCoeCmdStatus_81_Percent | | | |
| | | • 182: eCoeCmdStatus_82_Percent | | | |
| | | • 183: eCoeCmdStatus_83_Percent | | | |
| | | • 184: eCoeCmdStatus_84_Percent | | | |
| | | • 185: eCoeCmdStatus_85_Percent | | | |
| | | • 186: eCoeCmdStatus_86_Percent | | | |
| | | • 187: eCoeCmdStatus_87_Percent | | | |
| | | • 188: eCoeCmdStatus_88_Percent | | | |
| | | • 189: eCoeCmdStatus_89_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 190: eCoeCmdStatus_90_Percent<br>• 191: eCoeCmdStatus_91_Percent<br>• 192: eCoeCmdStatus_92_Percent<br>• 193: eCoeCmdStatus_93_Percent<br>• 194: eCoeCmdStatus_94_Percent<br>• 195: eCoeCmdStatus_95_Percent<br>• 196: eCoeCmdStatus_96_Percent<br>• 197: eCoeCmdStatus_97_Percent<br>• 198: eCoeCmdStatus_98_Percent<br>• 199: eCoeCmdStatus_99_Percent<br>• 200: eCoeCmdStatus_100_Percent<br>• 255: eCoeCmdStatus_CmdIsExecuting | | | |
| 0x2C0D:03 | Response | | OCTET-STRING[8] | RO | {0} |

### 0x2C0E | [SG] SynchronousMotor commutation offset command parameters

This object contains parameters for commuation offset command.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0E:0 | [SG] SynchronousMotor commutation offset command parameters | | uint8_t | RO | 0x19 ($25_{dez}$) |
| 0x2C0E:01 | Static current vector: Method | This object configures the static current vector method.<br>allowed values:<br>• 0: Measure_offset_with_free_movement_check_and_feedback_direction_check<br>• 1: Check_feedback_direction_and_relative_offset<br>• 2: Measure_offset_simple<br>• 3: Calibrate_offset_with_free_movement_check_and_feedback_direction_check<br>• 4: Calibrate_offset_simple | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C0E:02 | Static current vector: Current level | This object configures the static current vector current level per thousand of motor standstill current (0x6075).<br>Unit: 0,1 %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | uint16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0E:03 | Static current vector: Current slope | This object configures the static current vector current slope in percent per ms based on the motor standstill current (0x6075). | uint32_t | RW | 0x00002710 ($10000_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Unit: %/s<br>Min: 0x0000000A ($10_{dez}$)<br>Max: 0x000186A0 ($100000_{dez}$) | | | |
| 0x2C0E:04 | Static current vector: Duration | This object configures the time the constant current vector is applied before the commutation offset is calculated.<br>Unit: s<br>Min: 0.0<br>Max: 60.0 | float | RW | 3.0 |
| 0x2C0E:05 | Static current vector: Initial moving distance per pole pair | This object configures the static current vector moving distance per pole pair before commutation offset calibration.<br>Unit: °<br>Min: 0xFFFF7360 ($-36000_{dez}$)<br>Max: 0x00008CA0 ($36000_{dez}$) | int32_t | RW | 0x0000005A ($90_{dez}$) |
| 0x2C0E:06 | Static current vector: Test sequence moving distance per pole pair | This object configures the static current vector moving distance per pole pair for the test movement.<br>Unit: °<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x0168 ($360_{dez}$) | uint16_t | RW | 0x005A ($90_{dez}$) |
| 0x2C0E:07 | Static current vector: Velocity per pole pair | This object configures the static current vector velocity per pole pair for the test movement.<br>Unit: °/s<br>Min: 0x0006 ($6_{dez}$)<br>Max: 0x0E10 ($3600_{dez}$) | uint16_t | RW | 0x001E ($30_{dez}$) |
| 0x2C0E:10 | Wake and Shake: First phase current level | This object configures the wake and shake first phase current level in percent based on the motor standstill current (0x6075).<br>Unit: 0,1 %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | uint16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0E:11 | Wake and Shake: Second phase current level | This object configures the wake and shake second phase current level in percent based on the motor standstill current (0x6075).<br>Unit: 0,1 %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | uint16_t | RW | 0x03E8 ($1000_{dez}$) |
| 0x2C0E:12 | Wake and Shake: First phase current slope | This object configures the wake and shake first phase current level in percent per ms based on the motor standstill current (0x6075).<br>Unit: %/s<br>Min: 0x00000064 ($100_{dez}$)<br>Max: 0x00002710 ($10000_{dez}$) | uint32_t | RW | 0x000003E8 ($1000_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0E:13 | Wake and Shake: Second phase current slope | This object configures the wake and shake second phase current level in percent per ms based on the motor standstill current (0x6075).<br>Unit: %/s<br>Min: 0x00000064 ($100_{dez}$)<br>Max: 0x00002710 ($10000_{dez}$) | uint32_t | RW | 0x000000C8 ($200_{dez}$) |
| 0x2C0E:14 | Wake and Shake: First phase settling time | This object configures the wake and shake settling time between the current pulses during the first phase.<br>Unit: s<br>Min: 0.01<br>Max: 60.0 | float | RW | 0.15 |
| 0x2C0E:15 | Wake and Shake: Second phase duration | This object configures the time the second phase current is applied before the commutation offset is calculated.<br>Unit: s<br>Min: 0.01<br>Max: 60.0 | float | RW | 3.0 |
| 0x2C0E:17 | Wake and Shake: First phase position monitoring limit | This object configures the wake and shake first phase position monitoring limit.<br>Unit: 0,1 °<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x0708 ($1800_{dez}$) | uint16_t | RW | 0x0005 ($5_{dez}$) |
| 0x2C0E:18 | Wake and Shake: First phase step width | This object configures the wake and shake first phase step width.<br>Unit: 0,1 °<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x0384 ($900_{dez}$) | uint16_t | RW | 0x00E1 ($225_{dez}$) |
| 0x2C0E:19 | Wake and Shake: Error monitoring range of motion | This object configures the wake error monitoring range of motion.<br>Unit: °<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x0168 ($360_{dez}$) | uint16_t | RW | 0x005A ($90_{dez}$) |

### 0x2C0F | [SG] SynchronousMotor save cogging compensation data

With this command object the cogging compensation data can be saved.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0F:0 | [SG] SynchronousMotor save cogging compensation data | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x2C0F:01 | Command | With this command object the cogging compensation data can be saved. | OCTET-STRING[16] | RW | {0} |
| 0x2C0F:02 | Status | allowed values:<br>• 0: eCoeCmdStatus_CmdCompletedNoErrorNoRespData | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 1: eCoeCmdStatus_CmdCompletedNoErrorRespDataAvailable<br>• 2: eCoeCmdStatus_CmdCompletedErrorNoRespData<br>• 3: eCoeCmdStatus_CmdCompletedErrorRespDataAvailable<br>• 100: eCoeCmdStatus_0_Percent<br>• 101: eCoeCmdStatus_1_Percent<br>• 102: eCoeCmdStatus_2_Percent<br>• 103: eCoeCmdStatus_3_Percent<br>• 104: eCoeCmdStatus_4_Percent<br>• 105: eCoeCmdStatus_5_Percent<br>• 106: eCoeCmdStatus_6_Percent<br>• 107: eCoeCmdStatus_7_Percent<br>• 108: eCoeCmdStatus_8_Percent<br>• 109: eCoeCmdStatus_9_Percent<br>• 110: eCoeCmdStatus_10_Percent<br>• 111: eCoeCmdStatus_11_Percent<br>• 112: eCoeCmdStatus_12_Percent<br>• 113: eCoeCmdStatus_13_Percent<br>• 114: eCoeCmdStatus_14_Percent<br>• 115: eCoeCmdStatus_15_Percent<br>• 116: eCoeCmdStatus_16_Percent<br>• 117: eCoeCmdStatus_17_Percent<br>• 118: eCoeCmdStatus_18_Percent<br>• 119: eCoeCmdStatus_19_Percent<br>• 120: eCoeCmdStatus_20_Percent<br>• 121: eCoeCmdStatus_21_Percent<br>• 122: eCoeCmdStatus_22_Percent<br>• 123: eCoeCmdStatus_23_Percent<br>• 124: eCoeCmdStatus_24_Percent<br>• 125: eCoeCmdStatus_25_Percent<br>• 126: eCoeCmdStatus_26_Percent<br>• 127: eCoeCmdStatus_27_Percent<br>• 128: eCoeCmdStatus_28_Percent<br>• 129: eCoeCmdStatus_29_Percent<br>• 130: eCoeCmdStatus_30_Percent<br>• 131: eCoeCmdStatus_31_Percent<br>• 132: eCoeCmdStatus_32_Percent<br>• 133: eCoeCmdStatus_33_Percent<br>• 134: eCoeCmdStatus_34_Percent<br>• 135: eCoeCmdStatus_35_Percent<br>• 136: eCoeCmdStatus_36_Percent<br>• 137: eCoeCmdStatus_37_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 138: eCoeCmdStatus_38_Percent<br>• 139: eCoeCmdStatus_39_Percent<br>• 140: eCoeCmdStatus_40_Percent<br>• 141: eCoeCmdStatus_41_Percent<br>• 142: eCoeCmdStatus_42_Percent<br>• 143: eCoeCmdStatus_43_Percent<br>• 144: eCoeCmdStatus_44_Percent<br>• 145: eCoeCmdStatus_45_Percent<br>• 146: eCoeCmdStatus_46_Percent<br>• 147: eCoeCmdStatus_47_Percent<br>• 148: eCoeCmdStatus_48_Percent<br>• 149: eCoeCmdStatus_49_Percent<br>• 150: eCoeCmdStatus_50_Percent<br>• 151: eCoeCmdStatus_51_Percent<br>• 152: eCoeCmdStatus_52_Percent<br>• 153: eCoeCmdStatus_53_Percent<br>• 154: eCoeCmdStatus_54_Percent<br>• 155: eCoeCmdStatus_55_Percent<br>• 156: eCoeCmdStatus_56_Percent<br>• 157: eCoeCmdStatus_57_Percent<br>• 158: eCoeCmdStatus_58_Percent<br>• 159: eCoeCmdStatus_59_Percent<br>• 160: eCoeCmdStatus_60_Percent<br>• 161: eCoeCmdStatus_61_Percent<br>• 162: eCoeCmdStatus_62_Percent<br>• 163: eCoeCmdStatus_63_Percent<br>• 164: eCoeCmdStatus_64_Percent<br>• 165: eCoeCmdStatus_65_Percent<br>• 166: eCoeCmdStatus_66_Percent<br>• 167: eCoeCmdStatus_67_Percent<br>• 168: eCoeCmdStatus_68_Percent<br>• 169: eCoeCmdStatus_69_Percent<br>• 170: eCoeCmdStatus_70_Percent<br>• 171: eCoeCmdStatus_71_Percent<br>• 172: eCoeCmdStatus_72_Percent<br>• 173: eCoeCmdStatus_73_Percent<br>• 174: eCoeCmdStatus_74_Percent<br>• 175: eCoeCmdStatus_75_Percent<br>• 176: eCoeCmdStatus_76_Percent<br>• 177: eCoeCmdStatus_77_Percent<br>• 178: eCoeCmdStatus_78_Percent<br>• 179: eCoeCmdStatus_79_Percent<br>• 180: eCoeCmdStatus_80_Percent<br>• 181: eCoeCmdStatus_81_Percent<br>• 182: eCoeCmdStatus_82_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 183: eCoeCmdStatus_83_Percent<br>• 184: eCoeCmdStatus_84_Percent<br>• 185: eCoeCmdStatus_85_Percent<br>• 186: eCoeCmdStatus_86_Percent<br>• 187: eCoeCmdStatus_87_Percent<br>• 188: eCoeCmdStatus_88_Percent<br>• 189: eCoeCmdStatus_89_Percent<br>• 190: eCoeCmdStatus_90_Percent<br>• 191: eCoeCmdStatus_91_Percent<br>• 192: eCoeCmdStatus_92_Percent<br>• 193: eCoeCmdStatus_93_Percent<br>• 194: eCoeCmdStatus_94_Percent<br>• 195: eCoeCmdStatus_95_Percent<br>• 196: eCoeCmdStatus_96_Percent<br>• 197: eCoeCmdStatus_97_Percent<br>• 198: eCoeCmdStatus_98_Percent<br>• 199: eCoeCmdStatus_99_Percent<br>• 200: eCoeCmdStatus_100_Percent<br>• 255: eCoeCmdStatus_CmdIsExecuting | | | |
| 0x2C0F:03 | Response | | OCTET-STRING[8] | RO | {0} |

### 0x2C10 | [SG] SynchronousMotor sensorless control parameters

This object contains parameters for sensorless control operation.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C10:0 | [SG] SynchronousMotor sensorless control parameters | | uint8_t | RO | 0x10 ($16_{dez}$) |
| 0x2C10:01 | Emf observer: Internal torque command standstil | This object configures the internal torque command during standstill in percent based on the motor standstill current (0x6075).<br>Unit: 0,1 %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | uint16_t | RW | 0x00C8 ($200_{dez}$) |
| 0x2C10:02 | Emf observer: Internal torque command acceleration | This object configures the internal torque command during acceleration and decleration in percent based on the motor standstill current (0x6075).<br>Unit: 0,1 %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | uint16_t | RW | 0x0258 ($600_{dez}$) |
| 0x2C10:03 | Emf observer: Flux generating current slope 1 | This object configures the flux generating current slope 1 in percent per ms based on the motor standstill current (0x6075).<br>Unit: %/s | uint32_t | RW | 0x000000C8 ($200_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Min: 0x00000001 ($1_{dez}$)<br>Max: 0x000186A0 ($100000_{dez}$) | | | |
| 0x2C10:04 | Emf observer: Flux generating current slope 2 | This object configures the flux generating current slope 2 in percent per ms based on the motor standstill current (0x6075).<br>Unit: %/s<br>Min: 0x00000001 ($1_{dez}$)<br>Max: 0x000186A0 ($100000_{dez}$) | uint32_t | RW | 0x00002710 ($10000_{dez}$) |
| 0x2C10:05 | Emf observer: Flux generating current slope 3 | This object configures the flux generating current slope 3 in percent per ms based on the motor standstill current (0x6075).<br>Unit: %/s<br>Min: 0x00000001 ($1_{dez}$)<br>Max: 0x000186A0 ($100000_{dez}$) | uint32_t | RW | 0x000000C8 ($200_{dez}$) |
| 0x2C10:06 | Emf observer: Current control loop proportional gain | This object contains the proportional gain of the flux generating current control loop during startup.<br>Unit: V/A<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 30.0 |
| 0x2C10:07 | Emf observer: Threshold speed enable FOC | This object configures the speed threshold at which the field oriented control is enabled.<br>Unit: rpm | uint32_t | RW | 0x00000AF0 ($2800_{dez}$) |
| 0x2C10:08 | Emf observer: Threshold speed disable FOC | This object configures the speed threshold at which the field oriented control is disabled.<br>Unit: rpm | uint32_t | RW | 0x000007D0 ($2000_{dez}$) |
| 0x2C10:09 | Emf observer: Timeout | This object configures the commutation angle adjustment attempt timeout.<br>Unit: s<br>Min: 0.001<br>Max: 60.0 | float | RW | 10.0 |
| 0x2C10:0A | Emf observer: Commutation angle adjustment | This object configures the commutation angle adjustment.<br>Unit: rad/s<br>Min: 0.0<br>Max: 200.0 | float | RW | 5.0 |
| 0x2C10:0B | Emf observer: Commutation angle error limit | This object configures the commutation angle error limit.<br>Unit: rad<br>Min: 0.0<br>Max: 0.5 | float | RW | 0.5 |
| 0x2C10:0C | Emf observer: Low pass frequency | This object configures the low pass frequency.<br>Unit: Hz<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x0BB8 ($3000_{dez}$) | uint16_t | RW | 0x012C ($300_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C10:0D | Emf observer: Bandwidth | This object configures the sensorless control observer bandwidth.<br>Unit: Hz<br>Min: 0x0019 ($25_{dez}$)<br>Max: 0x03E8 ($1000_{dez}$) | uint16_t | RW | 0x0032 ($50_{dez}$) |
| 0x2C10:0E | Emf observer: Damping | This object configures the sensorless control observer damping factor.<br>Min: 0.2<br>Max: 1.0 | float | RW | 0.7 |

### 0x2C11 | [SG] SynchronousMotor field weakening parameters

This object contains parameters for field weakening operation.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C11:0 | [SG] SynchronousMotor field weakening parameters | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C11:01 | Mode | This object enables field weakening and configures the field weakening mode.<br>allowed values:<br>• 0: Field_weakening_disabled<br>• 1: Basic_field_weakening | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C11:02 | Current ratio | This object configures the maximal field weakening current based on the smaller value of motor and inverter rated current.<br>Unit: 0,01 %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x2710 ($10000_{dez}$) | uint16_t | RW | 0x1770 ($6000_{dez}$) |
| 0x2C11:03 | Voltage utilization | This object configures the voltage utilization set value in field weakening operation.<br>Unit: 0,01 %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x2710 ($10000_{dez}$) | uint16_t | RW | 0x251C ($9500_{dez}$) |
| 0x2C11:04 | Integral action time | This object configures the voltage controller integral action time.<br>Unit: s<br>Min: 0.0005<br>Max: 1.0 | float | RW | 0.005 |
| 0x2C11:05 | Max field weakening current | This object shows the maximal field weakening current.<br>Unit: 0,01 A | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x2C1F | [SG] SynchronousMotor control mode

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1F:0 | [SG] SynchronousMotor control mode | This object configures the control mode.<br>allowed values:<br>• 0: Sm_field_oriented_control_with_feedback<br>• 1: Sm_field_oriented_control_with_emf_observer | uint16_t | RW | 0x0000 ($0_{dez}$) |

### 0x5875 | [SG] Motor standstill current

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5875:0 | [SG] Motor standstill current | This object indicates the motor standstill current ($I_0$). If an electronic datasheet is available "Standstill current" will be read and scaled to mA.<br>Unit: mA | uint32_t | RW | 0x00000000 ($0_{dez}$) |

### 0x5876 | [SG] Motor standstill torque

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5876:0 | [SG] Motor standstill torque | This object indicates the motor standstill torque ($M_0$)/force ($F_c$). If an electronic datasheet of the motor is available "Standstill current" ($I_0$) will be multiplied by the torque constant ($K_t$)/($K_f$). The value is scaled to mNm/mN.<br>Unit: mNm | uint32_t | RW | 0x00000000 ($0_{dez}$) |

### 0x5880 | [SG] Max motor speed

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5880:0 | [SG] Max motor speed | This object shall indicate the configured maximal allowed speed for the motor in either direction. It is used to protect the motor and is taken from the motor data sheet.<br>Unit: rpm | uint32_t | RW | 0x00000BB8 ($3000_{dez}$) |

## 2.11 Objects of module AsynchronousMotor

### Overview of Objects

0x1A00 | [SG] AsynchronousMotor TxPDO-Map Inputs [▶ 96]
0x2C00 | [SG] AsynchronousMotor parameters [▶ 96]
0x2C01 | [SG] AsynchronousMotor actual values [▶ 98]
0x2C03 | [SG] AsynchronousMotor parameters mappable [▶ 99]
0x2C04 | [SG] AsynchronousMotor acceleration control parameters [▶ 100]
0x2C05 | [SG] AsynchronousMotor stall protection control parameters [▶ 101]
0x2C07 | [SG] AsynchronousMotor temperature sensor characteristic [▶ 101]
0x2C08 | [SG] AsynchronousMotor thermal model [▶ 103]
0x2C09 | [SG] AsynchronousMotor rotor slowdown procedure parameter [▶ 104]

0x2C17 | [SG] AsynchronousMotor extended parameters [▶ 106]
0x2C1F | [SG] AsynchronousMotor control mode [▶ 107]
0x5875 | [SG] Motor standstill current [▶ 107]
0x5876 | [SG] Motor standstill torque [▶ 107]
0x5880 | [SG] Max motor speed [▶ 107]

### 0x1A00 | [SG] AsynchronousMotor TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | [SG] AsynchronousMotor TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C00 | [SG] AsynchronousMotor parameters

This object contains parameters to configure the connected motor.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:0 | [SG] AsynchronousMotor parameters | | uint8_t | RO | 0x1E ($30_{dez}$) |
| 0x2C00:01 | Configured motor type | This object indicates the configured motor type. | STRING | RW | "not set" |
| 0x2C00:02 | Pole pairs | This object indicates the motor pole pairs.<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x00FF ($255_{dez}$) | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C00:03 | Motor peak current | This object configures the motor peak current. If the electronic datasheet of the motor is available take "Peak current".<br>Unit: A<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:04 | Motor nominal voltage | This object configures the motor nominal voltage. If the electronic datasheet is available take "Nominal voltage" according to the selected mains voltage.<br>Unit: V<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:05 | Motor max voltage | This object configures the motor max voltage. If the electronic datasheet is available take "Max voltage".<br>Unit: V<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:09 | Motor warning temperature | This object configures the motor temperature warning threshold. If the electronic datasheet is available take "T motor warn limit".<br>Unit: °C | float | RW | 80.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Min: 0.0<br>Max: 150.0 | | | |
| 0x2C00:0A | Motor shut down temperature | This object configures the motor temperature error threshold. If the electronic datasheet is available take "T motor err limit".<br>Unit: °C<br>Min: 0.0<br>Max: 150.0 | float | RW | 100.0 |
| 0x2C00:0B | Motor moment of inertia | This object configures the inertia of rotor including brake and encoder. If the electronic datasheet is available take "J motor with brake".<br>Unit: kg m^2<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:0C | Motor rated speed | This object indicates the motor calculated speed. Its calculated from the motor parameters.<br>Unit: rpm<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:0D | Motor rated torque | This object configures the motor rated torque at rated speed. If the electronic datasheet is available take "Rated torque" according to the selected mains voltage.<br>Unit: Nm<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C00:0F | Motor temperature sensor connection | This object configures the motor temperature sensor type.<br>allowed values:<br>• 0: No_motor_temperature_switch_or_sensor<br>• 1: Via_feedback_process_data_and_characteristic_table<br>• 2: Via_motor_cable_and_characteristic_table<br>• 3: Via_feedback_process_data_scaled_in_0_1K<br>• 4: Via_feedback_process_data_scaled_in_0_1degC | int16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C00:11 | Max motor speed with max torque | see Documentation of AX5000<br>Unit: rpm<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 3200.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:12 | Motor nominal frequency | This object configures the rated frequency of an induction motor.<br>Unit: Hz<br>Min: 15.0<br>Max: 3.40282E+38 | float | RW | 50.0 |
| 0x2C00:13 | Motor rotor time constant | This object configures the motor maximum winding voltage slope. If the electronic datasheet is available take "Max winding du/dt" according to the selected mains voltage.<br>Unit: s<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.0 |
| 0x2C00:14 | Motor power factor | This object This configures the power factor at rated power of an induction motor.<br>Min: 0.0<br>Max: 0.95 | float | RW | 0.8 |
| 0x2C00:18 | Uf control mode | This object configures the used voltage characteristic of the Uf open loop control mode.<br>allowed values:<br>• 0: Uf_MotorParameters_and_Boost<br>• 1: Uf_characteristic_curve | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C00:1C | Connection type | This object configures the stator winding connection type.<br>allowed values:<br>• 0: Star_connection<br>• 1: Delta_connection | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C00:1D | Premagnetization wait time | This is the waiting time between the acitvation of the axis and starting the start of the control process. During this time, the motor magnetization builds up.<br>Unit: s<br>Min: 0.0<br>Max: 20.0 | float | RW | 1.0 |
| 0x2C00:1E | Motor holding brake minimum frequency | Use this value to ensure the motor can hold a load before the brake mechanically engages.<br>Unit: Hz<br>Min: 0.0<br>Max: 10.0 | float | RW | 0.0 |

### 0x2C01 | [SG] AsynchronousMotor actual values

This object contains actual values from this module.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:0 | [SG] AsynchronousMotor actual values | | uint8_t | RO | 0x0F ($15_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:01 | Actual motor I2T current limit | This object is to monitor the thermal motor $I^2T$ model current limitation. If the estimated $I^2T$ value exceeds the threshold value the current will be limited to motor $I_0$ (0x6075).<br>Unit: A | float | RO | 0.0 |
| 0x2C01:02 | Thermal motor utilization | This object is to indicate the actual motor utilization.<br>Unit: % | float | RO | 0.0 |
| 0x2C01:05 | Motor I2T limitation active | This internal state indicates a current reduction due to the thermal motor model.<br>allowed values:<br>• 0: limit_off<br>• 1: limit_active | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:06 | Actual motor temperature | This object provides the measured motor winding temperature. It is usually acquired via the motor internal temperature sensor.<br>Unit: °C | float | RO | 0.0 |
| 0x2C01:08 | Stall protection controller output: Velocity reduction | This object provides the output value of the stall protection controller.<br>Unit: rpm | float | RO | 0.0 |
| 0x2C01:09 | Acceleration controller output: Acceleration/ Deceleration reduction limit | This object provides the output value of the acceleration protection controller.<br>Unit: x * 1 °/s^2 | float | RO | 0.0 |
| 0x2C01:0A | Slip actual value | This object provides the calculated slip at the actual velocity demand value.<br>Unit: rpm | float | RO | 0.0 |
| 0x2C01:0C | reserved_2 | This object displays if the actual motor commutation offset is valid.<br>allowed values:<br>• 0: False<br>• 1: True | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:0F | reserved_3 | Voltage controller actual voltage value. | float | RO | 0.0 |

### 0x2C03 | [SG] AsynchronousMotor parameters mappable

This object contains demand values to this module.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:0 | [SG] AsynchronousMotor parameters mappable | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x2C03:01 | Boost voltage | This object is used to configure the boost voltage at low speed operation of an induction motor.<br>Unit: V<br>Min: 0.0<br>Max: 100.0 | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:02 | Additional voltage scaling factor | This object might be used to reduce the frequency dependent voltage gain.<br>Min: 0.01<br>Max: 1.0 | float | RW | 1.0 |
| 0x2C03:03 | Voltage offset and gain adjustment | This object might be used to adjust the gain and the offset at standstill of the u/f-curve at the same time.<br>Unit: V<br>Min: 0.0<br>Max: 100.0 | float | RW | 10.0 |
| 0x2C03:04 | Uf curve shift | This object might be used to shift the Uf-curve.<br>Unit: V<br>Min: -100.0<br>Max: 100.0 | float | RW | 0.0 |

**0x2C04 | [SG] AsynchronousMotor acceleration control parameters**

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C04:0 | [SG] AsynchronousMotor acceleration control parameters | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C04:01 | Enable | This object enabled or disables the acceleration protection controller.<br>allowed values:<br>• 0: feature_disabled<br>• 1: feature_enabled | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x2C04:02 | Current limit value | This object configures the current limit value to control acceleration of an induction motor.<br>Unit: A<br>Min: 0.0 | float | RW | 0.0 |
| 0x2C04:03 | Proportional gain | This object configures the proportional gain of the induction motor acceleration control loop.<br>Unit: rad/s^2/A | float | RW | 0.0 |
| 0x2C04:04 | Integration time | This object configures the integral action time of the induction motor acceleration control loop.<br>Unit: s | float | RW | 0.0 |
| 0x2C04:05 | Limitation threshold: Lowest acceleration/ deceleration reduction limit | This object provides lower limit for the output value of the acceleration protection controller.<br>Unit: x * 1 °/s^2<br>Min: 0.0 | float | RW | 360.0 |

### 0x2C05 | [SG] AsynchronousMotor stall protection control parameters

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C05:0 | [SG] AsynchronousMotor stall protection control parameters | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x2C05:01 | Enable | This object enabled or disables the stall protection controller.<br>allowed values:<br>• 0: feature_disabled<br>• 1: feature_enabled | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x2C05:02 | Current limit value | This object configures the current limit value for the induction motor stall protection control loop.<br>Unit: A<br>Min: 0.0 | float | RW | 0.0 |
| 0x2C05:03 | Proportional gain | This object configures the proportional gain of the induction motor stall protection control loop.<br>Unit: rad/s/A | float | RW | 0.0 |
| 0x2C05:04 | Integration time | This object configures the integral action time of the induction motor stall protection control loop.<br>Unit: s | float | RW | 0.0 |

### 0x2C07 | [SG] AsynchronousMotor temperature sensor characteristic

This object describes the R(T) curve of the motor winding temperature sensor.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C07:0 | [SG] AsynchronousMotor temperature sensor characteristic | | uint8_t | RO | 0x15 ($21_{dez}$) |
| 0x2C07:01 | Temperature 0 | Temperature sampling point 1 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:02 | Temperature 1 | Temperature sampling point 2 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:03 | Temperature 2 | Temperature sampling point 3 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:04 | Temperature 3 | Temperature sampling point 4 of the R(T) curve of the motor.<br>Unit: °C | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Min: -250.0<br>Max: 250.0 | | | |
| 0x2C07:05 | Temperature 4 | Temperature sampling point 5 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:06 | Temperature 5 | Temperature sampling point 6 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:07 | Temperature 6 | Temperature sampling point 7 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:08 | Temperature 7 | Temperature sampling point 8 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:09 | Temperature 8 | Temperature sampling point 9 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:0A | Temperature 9 | Temperature sampling point 10 of the R(T) curve of the motor.<br>Unit: °C<br>Min: -250.0<br>Max: 250.0 | float | RW | 0.0 |
| 0x2C07:0B | Resistance 0 | Resistance sampling point 1 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:0C | Resistance 1 | Resistance sampling point 2 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:0D | Resistance 2 | Resistance sampling point 3 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C07:0E | Resistance 3 | Resistance sampling point 4 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:0F | Resistance 4 | Resistance sampling point 5 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:10 | Resistance 5 | Resistance sampling point 6 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:11 | Resistance 6 | Resistance sampling point 7 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:12 | Resistance 7 | Resistance sampling point 8 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:13 | Resistance 8 | Resistance sampling point 9 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:14 | Resistance 9 | Resistance sampling point 10 of the R(T) curve of the motor.<br>Unit: Ω<br>Min: 0.0<br>Max: 1.00000E+06 | float | RW | 0.0 |
| 0x2C07:15 | Temperature Sensor Id | Id of the temperature sensor.<br>allowed values:<br>• 0: TemperatureSensorId_NotDefined<br>• 1: TemperatureSensorId_KTY_84_130<br>• 2: TemperatureSensorId_PT1000<br>• 3: TemperatureSensorId_PT100<br>• 4: TemperatureSensorId_KTY_83_110 | int32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x2C08 | [SG] AsynchronousMotor thermal model

These objects configure the motor thermal model.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C08:0 | [SG] AsynchronousMotor thermal model | | uint8_t | RO | 0x05 ($5_{dez}$) |
| 0x2C08:01 | Motor thermal time constant | This object configures the time constant for the whole motor. If an electronic datasheet is available take "Motor thermal constant" and scale it to seconds.<br>Unit: s<br>Min: 0.0<br>Max: 200000.0 | float | RW | 540.0 |
| 0x2C08:03 | Warning limit | This object shall configure the thermal motor utilization warning limit.<br>Unit: %<br>Min: 0.0<br>Max: 100.0 | float | RW | 80.0 |
| 0x2C08:04 | Error limit | This object shall configure the thermal motor utilization error limit.<br>Unit: %<br>Min: 0.0<br>Max: 100.0 | float | RW | 100.0 |
| 0x2C08:05 | Reaction | This object configures the reaction in case reaching the thermal motor utilization error limit.<br>allowed values:<br>• 0: No_Reaction<br>• 1: Shut_down_on_error_level<br>• 2: Reduction | int16_t | RW | 0x0000 ($0_{dez}$) |

### 0x2C09 | [SG] AsynchronousMotor rotor slowdown procedure parameter

This object the parameters for the rotor slowdown procedure.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C09:0 | [SG] AsynchronousMotor rotor slowdown procedure parameter | | uint8_t | RO | 0x0B ($11_{dez}$) |
| 0x2C09:01 | Available for | This object configures the drive states in which this procedure shall be active.<br>allowed values:<br>• 0: Activate_for_error_reaction<br>• 1: Activate_for_error_reaction_and_Uf_control_during_standstill_with_time_limitation<br>• 2: Activate_for_error_reaction_and_Uf_control_during_standstill_without_time_limitation | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C09:02 | Command mode | This object selects the active current level. | uint16_t | RW | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | allowed values:<br>• 0: DC_Brake_with_configured_channel_current<br>• 1: DC_Brake_with_torque_command<br>• 2: DC_Brake_with_current_level_from_this_record | | | |
| 0x2C09:03 | Current level | This object configures the current level for the rotor slowdown procedure.<br>Unit: 0,1 %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x1388 ($5000_{dez}$) | uint16_t | RW | 0x01F4 ($500_{dez}$) |
| 0x2C09:04 | Current slope | This object configures the current slope for the rotor slowdown procedure.<br>Unit: A/s<br>Min: 0.0 | float | RW | 200.0 |
| 0x2C09:05 | Wait time before braking | This object configures the initial wait time for the rotor slowdown procedure.<br>Unit: s<br>Min: 0.0<br>Max: 60.0 | float | RW | 0.0 |
| 0x2C09:06 | First phase activation time with f=f1 | This object configures the first phase activation time for the rotor slowdown procedure.<br>Unit: s<br>Min: 0.0<br>Max: 60.0 | float | RW | 0.1 |
| 0x2C09:07 | Rotary field frequency f1 | This object configures the rotary field for the first phase of the rotor slowdown procedure.<br>Unit: Hz<br>Min: 0.0<br>Max: 10.0 | float | RW | 5.0 |
| 0x2C09:08 | Rotor slowdown mode | This object configures the rotor slowdown mode.<br>allowed values:<br>• 0: Slowdown_without_changing_the_direction_of_the_rotary_field<br>• 1: Slowdown_with_changing_the_direction_of_the_rotary_field | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C09:09 | Second phase activation time with f=0Hz | This object configures the second phase activation time for the rotor slowdown procedure.<br>Unit: s<br>Min: 0.0<br>Max: 60.0 | float | RW | 1.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C09:0A | Wait time after braking | This object configures the final wait time for the rotor slowdown procedure.<br>Unit: s<br>Min: 0.0<br>Max: 60.0 | float | RW | 0.0 |
| 0x2C09:0B | Standstill window time limitation | This object configures the final wait time for the rotor slowdown procedure.<br>Unit: s<br>Min: 0.0<br>Max: 60.0 | float | RW | 1.0 |

### 0x2C17 | [SG] AsynchronousMotor extended parameters

This object configures the parameters for the slip compensation.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C17:0 | [SG] AsynchronousMotor extended parameters | | uint8_t | RO | 0x06 ($6_{dez}$) |
| 0x2C17:01 | Slip compensation: Enable | This object enables the slip compensation.<br>allowed values:<br>• 0: feature_disabled<br>• 1: feature_enabled | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x2C17:02 | Slip compensation: Low pass filter time constant - Magnetizing current | This object configures the low pass filter time constant for the magnetizing current.<br>Unit: s<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.05 |
| 0x2C17:03 | Slip compensation: Low pass filter time constant - Torque generating current | This object configures the low pass filter time constant for the torque generating current.<br>Unit: s<br>Min: 0.0<br>Max: 1.0 | float | RW | 0.05 |
| 0x2C17:04 | Slip compensation: Compensation factor | This object configures the slip compensation factor related to the rated slip.<br>Unit: %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x03E8 ($1000_{dez}$) | uint16_t | RW | 0x0064 ($100_{dez}$) |
| 0x2C17:05 | Slip compensation: Limitation factor | This object configures the slip limitation factor related to the rated slip.<br>Unit: %<br>Min: 0x0064 ($100_{dez}$)<br>Max: 0x03E8 ($1000_{dez}$) | uint16_t | RW | 0x01F4 ($500_{dez}$) |
| 0x2C17:06 | Slip compensation: Fadeout velocity | This object configures the fadeout velocity for the slip compensation relative to the idle speed. | uint16_t | RW | 0x000A ($10_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | Unit: %<br>Min: 0x0000 ($0_{dez}$)<br>Max: 0x0064 ($100_{dez}$) | | | |

### 0x2C1F | [SG] AsynchronousMotor control mode

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1F:0 | [SG] AsynchronousMotor control mode | This object configures the control mode.<br>allowed values:<br>• 0: Asm_uf_control<br>• 1: Asm_field_oriented_control_with_feedback | uint16_t | RW | 0x0000 ($0_{dez}$) |

### 0x5875 | [SG] Motor standstill current

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5875:0 | [SG] Motor standstill current | This object indicates the motor standstill current ($I_0$). If an electronic datasheet is available "Standstill current" will be read and scaled to mA.<br>Unit: mA<br>Min: 0x00000000 ($0_{dez}$)<br>Max: 0xFFFFFFFF ($4294967295_{dez}$) | uint32_t | RW | 0x00000000 ($0_{dez}$) |

### 0x5876 | [SG] Motor standstill torque

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5876:0 | [SG] Motor standstill torque | This object indicates the motor standstill torque ($M_0$)/force ($F_c$). If an electronic datasheet of the motor is available "Standstill current" ($I_0$) will be multiplied by the torque constant ($K_t$)/($K_f$). The value is scaled to mNm/mN.<br>Unit: mNm<br>Min: 0x00000000 ($0_{dez}$)<br>Max: 0xFFFFFFFF ($4294967295_{dez}$) | uint32_t | RW | 0x00000000 ($0_{dez}$) |

### 0x5880 | [SG] Max motor speed

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x5880:0 | [SG] Max motor speed | This object shall indicate the configured maximal allowed speed for the motor in either direction. It is used to protect the motor and is taken from the motor data sheet.<br>Unit: rpm | uint32_t | RW | 0x00000BB8 ($3000_{dez}$) |

# 2.12 Objects of module HpfDslRotary

### Overview of Objects

0x1A00 | [SG] HpfDslRotary TxPDO-Map Inputs [▶ 108]
0x2C00 | [SG] [SL] HpfDslRotary actual values [▶ 108]
0x2C01 | [SG] [SL] HpfDslRotary encoder info [▶ 109]
0x2C02 | [SG] [SL] HpfDslRotary encoder status [▶ 112]
0x2C03 | [SG] [SL] HpfDslRotary temperature sensors [▶ 114]
0x2C04 | [SG] [SL] HpfDslRotary electronic data sheet [▶ 114]
0x2C05 | [SG] [SL] HpfDslRotary position offset data [▶ 115]
0x2C06 | [SG] [SL] HpfDslRotary user data [▶ 115]
0x2C07 | [SG] [SL] HpfDslRotary commutation offset data [▶ 115]
0x2C08 | [SG] [SL] HpfDslRotary direct encoder access [▶ 116]
0x2C0A | [SG] [SL] HpfDslRotary save user data [▶ 118]
0x2C0B | [SG] [SL] HpfDslRotary save commutation offset [▶ 121]
0x2C0C | [SG] [SL] HpfDslRotary scan connected encoder [▶ 124]
0x2C0D | [SG] [SL] HpfDslRotary save electronic data sheet [▶ 127]
0x2C0F | [SG] [SL] HpfDslRotary encoder parameters [▶ 130]
0x2C10 | [SG] [SL] HpfDslRotary cogging compensation data [▶ 131]
0x2C1D | [SG] [SL] HpfDslRotary sHub info and status [▶ 132]
0x2C1E | [SG] [SL] HpfDslRotary sHub actual values [▶ 134]

### 0x1A00 | [SG] HpfDslRotary TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | [SG] HpfDslRotary TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C00 | [SG] [SL] HpfDslRotary actual values

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:0 | [SG] [SL] HpfDslRotary actual values | | uint8_t | RO | 0x07 ($7_{dez}$) |
| 0x2C00:01 | Position | The actual position value of the motor feedback system with considered overflows and polarity settings.<br>Unit: inc | int64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C00:02 | Raw position | This object contains the raw position value from the encoder.<br>Unit: inc | int64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C00:03 | Actual position estimator deviation | The actual possible absolute position deviation calculated while the estimator is active.<br>Unit: x * (360/4294967296)° | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C00:04 | Status | Status register of the HpfDsl master IP core wrapper (troubleshooting only). | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C00:05 | rsvd1 | | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C00:06 | Valid | Valid flag for the position and the raw position value. | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:07 | rsvd2 | Unit: x * (360/4294967296)° | int64_t | RO | 0x00000000 00000000 ($0_{dez}$) |

### 0x2C01 | [SG] [SL] HpfDslRotary encoder info

This object contains a collection of information from the encoder system.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:0 | [SG] [SL] HpfDslRotary encoder info | | uint8_t | RO | 0x2D ($45_{dez}$) |
| 0x2C01:01 | Interface | Version and feature info of the HpfDsl master IP core wrapper. | uint64_t | RO | 0x00000000 00000000 ($0_{dez}$) |
| 0x2C01:02 | IpCore version | The version of the HpfDsl master IP core. [7..6]: Coding, [5..4]: Major release, [3..0]: Minor release | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:03 | Encoder identification part 0 | Byte 0 of the designation code of the motor feedback as defined in the HpfDSL protocol specification. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:04 | Encoder identification part 1 | Byte 1 of the designation code of the motor feedback as defined in the HpfDSL protocol specification. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:05 | Encoder identification part 2 | Byte 2 of the designation code of the motor feedback as defined in the HpfDSL protocol specification. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:06 | Encoder base type | The type of encoder describes the basic functionality of the motor feedback system.<br>allowed values:<br>• 0: Rotary_Encoder_bipolar_counting<br>• 1: Linear_Encoder_bipolar_counting<br>• 2: Rotary_Encoder_unipolar_counting<br>• 3: Linear_Encoder_unipolar_counting<br>• 4: HF2DSL_Rotary_Encoder_bipolar_counting<br>• 5: HF2DSL_Linear_Encoder_bipolar_counting<br>• 6: HF2DSL_Rotary_Encoder_unipolar_counting<br>• 7: HF2DSL_Linear_Encoder_unipolar_counting<br>• 8: HF2DSL_No_Encoder_connected | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C01:07 | Encoder hardware version | The DSL slave interface hardware version. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:08 | rsvd0 | | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:09 | Resolution | The resolution value defines the number of steps per rotation of the encoder. | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C01:0A | Range | The measurement range defines the number of coded rotations of the encoder. | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C01:0B | Base type code name | The type name of the encoder stored in ASCII. | STRING | RO | "0" |
| 0x2C01:0C | Serial number | The serial number of the encoder stored in ACSII. | STRING | RO | "0" |
| 0x2C01:0D | Firmware revision number | The firmware and hardware version of the encoder stored in ASCII. | STRING | RO | "0" |
| 0x2C01:0E | Firmware date | The firmware date of the encoder stored in ASCII. | STRING | RO | "0" |
| 0x2C01:0F | Eeprom size | The total size in byte of non-volatile memory in the encoder available for storage of user data. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C01:10 | Min permitted encoder temperature | The minimum permitted value for the temperature of the DSL motor feedback system.<br>Unit: 0,1 °C | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C01:11 | Max permitted encoder temperature | The maximum permitted value for the temperature of the DSL motor feedback system.<br>Unit: 0,1 °C | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C01:12 | Max permitted encoder speed | The permitted maximum shaft rotation speed for rotary DSL motor feedback system.<br>Unit: rpm | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C01:13 | Encoder internal position offset | The current position offset of the DSL motor feedback system stored by the manufacturer. The motor manufacturer usually uses this offset to adjust to commutation position.<br>Unit: inc | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C01:14 | Estimator acceleration | The acceleration value used for position estimation in case of invalid fast positions.<br>Unit: rad/s^2<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RO | 0.0 |
| 0x2C01:15 | Accepted estimator deviation | The maximum accepted position deviation of the estimator.<br>Unit: °<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RO | 0.0 |
| 0x2C01:16 | rsvd1 | Value of the 'Max sync jitter' register of the HpfDsl master IP core. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C01:17 | Encoder status 0 (addr 0x40) mask | Byte 0 (addr 0x40) of the encoder status is cyclically monitored to zero after applying this mask value. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:18 | Encoder status 1 (addr 0x41) mask | Byte 1 (addr 0x41) of the encoder status is cyclically monitored to zero after applying this mask value. | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:19 | Encoder status 2 (addr 0x42) mask | Byte 2 (addr 0x42) of the encoder status is cyclically monitored to zero after applying this mask value. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:1A | Encoder status 3 (addr 0x43) mask | Byte 3 (addr 0x43) of the encoder status is cyclically monitored to zero after applying this mask value. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:1B | Encoder status 4 (addr 0x44) mask | Byte 4 (addr 0x44) of the encoder status is cyclically monitored to zero after applying this mask value. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:1C | Encoder status 5 (addr 0x45) mask | Byte 5 (addr 0x45) of the encoder status is cyclically monitored to zero after applying this mask value. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:1D | Encoder status 6 (addr 0x46) mask | Byte 6 (addr 0x46) of the encoder status is cyclically monitored to zero after applying this mask value. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:1E | Encoder status 7 (addr 0x47) mask | Byte 7 (addr 0x47) of the encoder status is cyclically monitored to zero after applying this mask value. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:1F | Encoder status 0 (addr 0x40) after power up | Byte 0 (addr 0x40) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:20 | Encoder status 1 (addr 0x41) after power up | Byte 1 (addr 0x41) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:21 | Encoder status 2 (addr 0x42) after power up | Byte 2 (addr 0x40) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:22 | Encoder status 3 (addr 0x43) after power up | Byte 3 (addr 0x43) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:23 | Encoder status 4 (addr 0x44) after power up | Byte 4 (addr 0x44) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:24 | Encoder status 5 (addr 0x45) after power up | Byte 5 (addr 0x45) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:25 | Encoder status 6 (addr 0x46) after power up | Byte 6 (addr 0x46) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:26 | Encoder status 7 (addr 0x47) after power up | Byte 7 (addr 0x47) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C01:27 | Encoder index | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C01:28 | Encoder index status | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C01:29 | Error log filter | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C01:2A | Safe channel 2 resolution | The resolution value of the safe channel 2. | uint32_t | RO | 0x00000000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:2B | rsvd2 | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C01:2C | System periods and resolution | RID SPERIOS | uint64_t | RO | 0x00000000 00000000 ($0_{dez}$) |
| 0x2C01:2D | Code disk position range | RID AXPOSRNG | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x2C02 | [SG] [SL] HpfDslRotary encoder status

This object contains a collection of status values from the encoder system.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:0 | [SG] [SL] HpfDslRotary encoder status | | uint8_t | RO | 0x22 ($34_{dez}$) |
| 0x2C02:01 | Delay register | The run time delay of the system cable and the signal strength. [7..4] RSSI, Received signal strength, [3..0] Cable delay in 100ns | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:02 | Master quality monitor | The quality monitoring value for the data connection. [7] Link, [3..0] Quality monitoring value. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:03 | Slave received signal strength | Slave Received Signal Strength Indicator. [2..0] Indication of the strength of the signal arriving at the slave. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:04 | Edges register | The edge register contains the time control for the DSL cable bit sampling and can be used to monitor the connection quality. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:05 | Summary register | The summary register contains the summarized DSL Slave status information. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:06 | rsvd0 | | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:07 | Encoder temperature | The current temperature of the DSL motor feedback system.<br>Unit: 0,1 °C | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:08 | Sensor monitor eg LED current | The current value of the product-specific sensor monitoring. In case of optical encoders the LED current is displayed.<br>Unit: 0,1 mA | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:09 | Supply voltage | The measured supply voltage of the DSL motor feedback system.<br>Unit: mV | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:0A | Encoder status 0 (addr 0x40) | Byte 0 (addr 0x40) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:0B | Encoder status 1 (addr 0x41) | Byte 1 (addr 0x41) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:0C | Encoder status 2 (addr 0x42) | Byte 2 (addr 0x42) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:0D | Encoder status 3 (addr 0x43) | Byte 3 (addr 0x43) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:0E | Encoder status 4 (addr 0x44) | Byte 4 (addr 0x44) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:0F | Encoder status 5 (addr 0x45) | Byte 5 (addr 0x45) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:10 | Encoder status 6 (addr 0x46) | Byte 6 (addr 0x46) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:11 | Encoder status 7 (addr 0x47) | Byte 7 (addr 0x47) of the encoder status registers containing all slave system errors, events and warnings from the DSL encoder. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:12 | Operation time | The operating time of the DSL motor feedback system.<br>Unit: min | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C02:13 | Total shaft turns | The observed number of shaft rotations of the DSL motor feedback system. | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C02:14 | Max occurred position deviation | The maximum possible absolute position deviation calculated while the estimator is active.<br>Unit: °<br>Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RO | 0.0 |
| 0x2C02:15 | Position deviation limit exceeded | Signals if the absolute position deviation threshold is exceeded. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:16 | rsvd1 | | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C02:17 | Total VPOS errors | VPOS error counter. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:18 | Total ACC errors | ACC error counter. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:19 | Total VRT errors | VRT error counter. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:1A | Total POS errors | POS error counter. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:1B | Total LINK errors | LINK error counter. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:1C | Total encoding errors | 8b/10b encoding error counter. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:1D | rsvd2 | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:1E | Resistance measurement value | Resistance of the temperature sensor connected to the DSL motor feedback system.<br>Unit: Ω | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C02:1F | Parameter channel access counter | Count of the parameter channel read/ write requests. | int16_t | RO | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:20 | Parameter channel access error counter | Count of the failed parameter channel read/write requests. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C02:21 | Remaining life time | The remaining task lifetime of the DSL motor feedback system.<br>Unit: min | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C02:22 | Code disk position | The current value of the code disc position of bearing-less or kit encoders. | int16_t | RO | 0x0000 ($0_{dez}$) |

### 0x2C03 | [SG] [SL] HpfDslRotary temperature sensors

This object contains the temperature sensor values.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:0 | [SG] [SL] HpfDslRotary temperature sensors | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x2C03:01 | HpfDSL encoder connected sensor data state | This object contains the data state of the encoder connected temperature sensor value,<br>allowed values:<br>• 0: eDataState_Idle<br>• 1: eDataState_Valid<br>• 2: eDataState_Error | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C03:02 | HpfDSL encoder connected sensor resistance | This object contains the resistance of the encoder connected temperature sensor value,<br>Unit: Ω | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C03:03 | Drive connected sensor data state | This object contains the data state of the drive connected temperature sensor value,<br>allowed values:<br>• 0: eDataState_Idle<br>• 1: eDataState_Valid<br>• 2: eDataState_Error | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C03:04 | Drive connected sensor resistance | This object contains the resistance of the simulated temperature sensor value,<br>Unit: Ω | uint32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x2C04 | [SG] [SL] HpfDslRotary electronic data sheet

This object contains the content and the state of the electronic data sheet file stored in the encoder.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C04:0 | [SG] [SL] HpfDslRotary electronic data sheet | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x2C04:01 | Data state | Data state of the displayed 'Electronic Data Sheet' data.<br>allowed values:<br>• 0: eFileDataState_Invalid | int16_t | RO | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 1: eFileDataState_Valid<br>• 2: eFileDataState_Modified | | | |
| 0x2C04:02 | Electronic data sheet | The binary data of the electronic data sheet. | OCTET-STRING[4096] | RW | {0} |

### 0x2C05 | [SG] [SL] HpfDslRotary position offset data

This object contains the position offset and the state of the position offset file stored in the encoder.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C05:0 | [SG] [SL] HpfDslRotary position offset data | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x2C05:01 | Data state | Data state of the displayed 'Position Offset'.<br>allowed values:<br>• 0: eFileDataState_Invalid<br>• 1: eFileDataState_Valid<br>• 2: eFileDataState_Modified | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C05:02 | Position offset | The position offset stored in the encoder file system.<br>Unit: inc | int64_t | RO | 0x0000000000000000 ($0_{dez}$) |

### 0x2C06 | [SG] [SL] HpfDslRotary user data

This object contains the data string and the state of the user data file stored in the encoder.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C06:0 | [SG] [SL] HpfDslRotary user data | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x2C06:01 | Data state | Data state of the displayed 'User Data'.<br>allowed values:<br>• 0: eFileDataState_Invalid<br>• 1: eFileDataState_Valid<br>• 2: eFileDataState_Modified | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C06:02 | User data | The user data string stored in the encoder file system. | STRING | RO | "" |

### 0x2C07 | [SG] [SL] HpfDslRotary commutation offset data

This object contains the commutation offset and the state of the commutation offset file stored in the encoder.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C07:0 | [SG] [SL] HpfDslRotary commutation offset data | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x2C07:01 | Data state | Data state of the displayed 'Commutation Offset'.<br>allowed values:<br>• 0: eFileDataState_Invalid | int16_t | RO | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 1: eFileDataState_Valid<br>• 2: eFileDataState_Modified | | | |
| 0x2C07:02 | Commutation offset | Unit: 0,01 ° | uint32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x2C08 | [SG] [SL] HpfDslRotary direct encoder access

This object provides access to the OCT (Hiperface DSL) protocol layer.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C08:0 | [SG] [SL] HpfDslRotary direct encoder access | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x2C08:01 | Command | This object provides access to the OCT (Hiperface DSL) protocol layer. | OCTET-STRING[20] | RW | {0} |
| 0x2C08:02 | Status | allowed values:<br>• 0: eCoeCmdStatus_CmdCompletedNoErrorNoRespData<br>• 1: eCoeCmdStatus_CmdCompletedNoErrorRespDataAvailable<br>• 2: eCoeCmdStatus_CmdCompletedErrorNoRespData<br>• 3: eCoeCmdStatus_CmdCompletedErrorRespDataAvailable<br>• 100: eCoeCmdStatus_0_Percent<br>• 101: eCoeCmdStatus_1_Percent<br>• 102: eCoeCmdStatus_2_Percent<br>• 103: eCoeCmdStatus_3_Percent<br>• 104: eCoeCmdStatus_4_Percent<br>• 105: eCoeCmdStatus_5_Percent<br>• 106: eCoeCmdStatus_6_Percent<br>• 107: eCoeCmdStatus_7_Percent<br>• 108: eCoeCmdStatus_8_Percent<br>• 109: eCoeCmdStatus_9_Percent<br>• 110: eCoeCmdStatus_10_Percent<br>• 111: eCoeCmdStatus_11_Percent<br>• 112: eCoeCmdStatus_12_Percent<br>• 113: eCoeCmdStatus_13_Percent<br>• 114: eCoeCmdStatus_14_Percent<br>• 115: eCoeCmdStatus_15_Percent<br>• 116: eCoeCmdStatus_16_Percent<br>• 117: eCoeCmdStatus_17_Percent<br>• 118: eCoeCmdStatus_18_Percent<br>• 119: eCoeCmdStatus_19_Percent<br>• 120: eCoeCmdStatus_20_Percent | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 121: eCoeCmdStatus_21_Percent<br>• 122: eCoeCmdStatus_22_Percent<br>• 123: eCoeCmdStatus_23_Percent<br>• 124: eCoeCmdStatus_24_Percent<br>• 125: eCoeCmdStatus_25_Percent<br>• 126: eCoeCmdStatus_26_Percent<br>• 127: eCoeCmdStatus_27_Percent<br>• 128: eCoeCmdStatus_28_Percent<br>• 129: eCoeCmdStatus_29_Percent<br>• 130: eCoeCmdStatus_30_Percent<br>• 131: eCoeCmdStatus_31_Percent<br>• 132: eCoeCmdStatus_32_Percent<br>• 133: eCoeCmdStatus_33_Percent<br>• 134: eCoeCmdStatus_34_Percent<br>• 135: eCoeCmdStatus_35_Percent<br>• 136: eCoeCmdStatus_36_Percent<br>• 137: eCoeCmdStatus_37_Percent<br>• 138: eCoeCmdStatus_38_Percent<br>• 139: eCoeCmdStatus_39_Percent<br>• 140: eCoeCmdStatus_40_Percent<br>• 141: eCoeCmdStatus_41_Percent<br>• 142: eCoeCmdStatus_42_Percent<br>• 143: eCoeCmdStatus_43_Percent<br>• 144: eCoeCmdStatus_44_Percent<br>• 145: eCoeCmdStatus_45_Percent<br>• 146: eCoeCmdStatus_46_Percent<br>• 147: eCoeCmdStatus_47_Percent<br>• 148: eCoeCmdStatus_48_Percent<br>• 149: eCoeCmdStatus_49_Percent<br>• 150: eCoeCmdStatus_50_Percent<br>• 151: eCoeCmdStatus_51_Percent<br>• 152: eCoeCmdStatus_52_Percent<br>• 153: eCoeCmdStatus_53_Percent<br>• 154: eCoeCmdStatus_54_Percent<br>• 155: eCoeCmdStatus_55_Percent<br>• 156: eCoeCmdStatus_56_Percent<br>• 157: eCoeCmdStatus_57_Percent<br>• 158: eCoeCmdStatus_58_Percent<br>• 159: eCoeCmdStatus_59_Percent<br>• 160: eCoeCmdStatus_60_Percent<br>• 161: eCoeCmdStatus_61_Percent<br>• 162: eCoeCmdStatus_62_Percent<br>• 163: eCoeCmdStatus_63_Percent<br>• 164: eCoeCmdStatus_64_Percent<br>• 165: eCoeCmdStatus_65_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 166: eCoeCmdStatus_66_Percent<br>• 167: eCoeCmdStatus_67_Percent<br>• 168: eCoeCmdStatus_68_Percent<br>• 169: eCoeCmdStatus_69_Percent<br>• 170: eCoeCmdStatus_70_Percent<br>• 171: eCoeCmdStatus_71_Percent<br>• 172: eCoeCmdStatus_72_Percent<br>• 173: eCoeCmdStatus_73_Percent<br>• 174: eCoeCmdStatus_74_Percent<br>• 175: eCoeCmdStatus_75_Percent<br>• 176: eCoeCmdStatus_76_Percent<br>• 177: eCoeCmdStatus_77_Percent<br>• 178: eCoeCmdStatus_78_Percent<br>• 179: eCoeCmdStatus_79_Percent<br>• 180: eCoeCmdStatus_80_Percent<br>• 181: eCoeCmdStatus_81_Percent<br>• 182: eCoeCmdStatus_82_Percent<br>• 183: eCoeCmdStatus_83_Percent<br>• 184: eCoeCmdStatus_84_Percent<br>• 185: eCoeCmdStatus_85_Percent<br>• 186: eCoeCmdStatus_86_Percent<br>• 187: eCoeCmdStatus_87_Percent<br>• 188: eCoeCmdStatus_88_Percent<br>• 189: eCoeCmdStatus_89_Percent<br>• 190: eCoeCmdStatus_90_Percent<br>• 191: eCoeCmdStatus_91_Percent<br>• 192: eCoeCmdStatus_92_Percent<br>• 193: eCoeCmdStatus_93_Percent<br>• 194: eCoeCmdStatus_94_Percent<br>• 195: eCoeCmdStatus_95_Percent<br>• 196: eCoeCmdStatus_96_Percent<br>• 197: eCoeCmdStatus_97_Percent<br>• 198: eCoeCmdStatus_98_Percent<br>• 199: eCoeCmdStatus_99_Percent<br>• 200: eCoeCmdStatus_100_Percent<br>• 255: eCoeCmdStatus_CmdIsExecuting | | | |
| 0x2C08:03 | Response | | OCTET-STRING[12] | RO | {0} |

### 0x2C0A | [SG] [SL] HpfDslRotary save user data

With this command object the user data string can be saved in the encoder file system.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0A:0 | [SG] [SL] HpfDslRotary save user data | | uint8_t | RO | 0x03 ($3_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0A:01 | Command | With this command object the user data string can be saved in the encoder file system. | OCTET-STRING[72] | RW | {0} |
| 0x2C0A:02 | Status | allowed values:<br>• 0: eCoeCmdStatus_CmdCompletedNoErrorNoRespData<br>• 1: eCoeCmdStatus_CmdCompletedNoErrorRespDataAvailable<br>• 2: eCoeCmdStatus_CmdCompletedErrorNoRespData<br>• 3: eCoeCmdStatus_CmdCompletedErrorRespDataAvailable<br>• 100: eCoeCmdStatus_0_Percent<br>• 101: eCoeCmdStatus_1_Percent<br>• 102: eCoeCmdStatus_2_Percent<br>• 103: eCoeCmdStatus_3_Percent<br>• 104: eCoeCmdStatus_4_Percent<br>• 105: eCoeCmdStatus_5_Percent<br>• 106: eCoeCmdStatus_6_Percent<br>• 107: eCoeCmdStatus_7_Percent<br>• 108: eCoeCmdStatus_8_Percent<br>• 109: eCoeCmdStatus_9_Percent<br>• 110: eCoeCmdStatus_10_Percent<br>• 111: eCoeCmdStatus_11_Percent<br>• 112: eCoeCmdStatus_12_Percent<br>• 113: eCoeCmdStatus_13_Percent<br>• 114: eCoeCmdStatus_14_Percent<br>• 115: eCoeCmdStatus_15_Percent<br>• 116: eCoeCmdStatus_16_Percent<br>• 117: eCoeCmdStatus_17_Percent<br>• 118: eCoeCmdStatus_18_Percent<br>• 119: eCoeCmdStatus_19_Percent<br>• 120: eCoeCmdStatus_20_Percent<br>• 121: eCoeCmdStatus_21_Percent<br>• 122: eCoeCmdStatus_22_Percent<br>• 123: eCoeCmdStatus_23_Percent<br>• 124: eCoeCmdStatus_24_Percent<br>• 125: eCoeCmdStatus_25_Percent<br>• 126: eCoeCmdStatus_26_Percent<br>• 127: eCoeCmdStatus_27_Percent<br>• 128: eCoeCmdStatus_28_Percent<br>• 129: eCoeCmdStatus_29_Percent<br>• 130: eCoeCmdStatus_30_Percent<br>• 131: eCoeCmdStatus_31_Percent | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 132: eCoeCmdStatus_32_Percent | | | |
| | | • 133: eCoeCmdStatus_33_Percent | | | |
| | | • 134: eCoeCmdStatus_34_Percent | | | |
| | | • 135: eCoeCmdStatus_35_Percent | | | |
| | | • 136: eCoeCmdStatus_36_Percent | | | |
| | | • 137: eCoeCmdStatus_37_Percent | | | |
| | | • 138: eCoeCmdStatus_38_Percent | | | |
| | | • 139: eCoeCmdStatus_39_Percent | | | |
| | | • 140: eCoeCmdStatus_40_Percent | | | |
| | | • 141: eCoeCmdStatus_41_Percent | | | |
| | | • 142: eCoeCmdStatus_42_Percent | | | |
| | | • 143: eCoeCmdStatus_43_Percent | | | |
| | | • 144: eCoeCmdStatus_44_Percent | | | |
| | | • 145: eCoeCmdStatus_45_Percent | | | |
| | | • 146: eCoeCmdStatus_46_Percent | | | |
| | | • 147: eCoeCmdStatus_47_Percent | | | |
| | | • 148: eCoeCmdStatus_48_Percent | | | |
| | | • 149: eCoeCmdStatus_49_Percent | | | |
| | | • 150: eCoeCmdStatus_50_Percent | | | |
| | | • 151: eCoeCmdStatus_51_Percent | | | |
| | | • 152: eCoeCmdStatus_52_Percent | | | |
| | | • 153: eCoeCmdStatus_53_Percent | | | |
| | | • 154: eCoeCmdStatus_54_Percent | | | |
| | | • 155: eCoeCmdStatus_55_Percent | | | |
| | | • 156: eCoeCmdStatus_56_Percent | | | |
| | | • 157: eCoeCmdStatus_57_Percent | | | |
| | | • 158: eCoeCmdStatus_58_Percent | | | |
| | | • 159: eCoeCmdStatus_59_Percent | | | |
| | | • 160: eCoeCmdStatus_60_Percent | | | |
| | | • 161: eCoeCmdStatus_61_Percent | | | |
| | | • 162: eCoeCmdStatus_62_Percent | | | |
| | | • 163: eCoeCmdStatus_63_Percent | | | |
| | | • 164: eCoeCmdStatus_64_Percent | | | |
| | | • 165: eCoeCmdStatus_65_Percent | | | |
| | | • 166: eCoeCmdStatus_66_Percent | | | |
| | | • 167: eCoeCmdStatus_67_Percent | | | |
| | | • 168: eCoeCmdStatus_68_Percent | | | |
| | | • 169: eCoeCmdStatus_69_Percent | | | |
| | | • 170: eCoeCmdStatus_70_Percent | | | |
| | | • 171: eCoeCmdStatus_71_Percent | | | |
| | | • 172: eCoeCmdStatus_72_Percent | | | |
| | | • 173: eCoeCmdStatus_73_Percent | | | |
| | | • 174: eCoeCmdStatus_74_Percent | | | |
| | | • 175: eCoeCmdStatus_75_Percent | | | |
| | | • 176: eCoeCmdStatus_76_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 177: eCoeCmdStatus_77_Percent<br>• 178: eCoeCmdStatus_78_Percent<br>• 179: eCoeCmdStatus_79_Percent<br>• 180: eCoeCmdStatus_80_Percent<br>• 181: eCoeCmdStatus_81_Percent<br>• 182: eCoeCmdStatus_82_Percent<br>• 183: eCoeCmdStatus_83_Percent<br>• 184: eCoeCmdStatus_84_Percent<br>• 185: eCoeCmdStatus_85_Percent<br>• 186: eCoeCmdStatus_86_Percent<br>• 187: eCoeCmdStatus_87_Percent<br>• 188: eCoeCmdStatus_88_Percent<br>• 189: eCoeCmdStatus_89_Percent<br>• 190: eCoeCmdStatus_90_Percent<br>• 191: eCoeCmdStatus_91_Percent<br>• 192: eCoeCmdStatus_92_Percent<br>• 193: eCoeCmdStatus_93_Percent<br>• 194: eCoeCmdStatus_94_Percent<br>• 195: eCoeCmdStatus_95_Percent<br>• 196: eCoeCmdStatus_96_Percent<br>• 197: eCoeCmdStatus_97_Percent<br>• 198: eCoeCmdStatus_98_Percent<br>• 199: eCoeCmdStatus_99_Percent<br>• 200: eCoeCmdStatus_100_Percent<br>• 255: eCoeCmdStatus_CmdIsExecuting | | | |
| 0x2C0A:03 | Response | | OCTET-STRING[72] | RO | {0} |

### 0x2C0B | [SG] [SL] HpfDslRotary save commutation offset

With this command object the commutation offset can be saved in the encoder file system.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0B:0 | [SG] [SL] HpfDslRotary save commutation offset | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x2C0B:01 | Command | With this command object the commutation offset can be saved in the encoder file system. | OCTET-STRING[12] | RW | {0} |
| 0x2C0B:02 | Status | allowed values:<br>• 0: eCoeCmdStatus_CmdCompletedNoErrorNoRespData<br>• 1: eCoeCmdStatus_CmdCompletedNoErrorRespDataAvailable | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 2: eCoeCmdStatus_CmdCompletedErrorNoRespData<br>• 3: eCoeCmdStatus_CmdCompletedErrorRespDataAvailable<br>• 100: eCoeCmdStatus_0_Percent<br>• 101: eCoeCmdStatus_1_Percent<br>• 102: eCoeCmdStatus_2_Percent<br>• 103: eCoeCmdStatus_3_Percent<br>• 104: eCoeCmdStatus_4_Percent<br>• 105: eCoeCmdStatus_5_Percent<br>• 106: eCoeCmdStatus_6_Percent<br>• 107: eCoeCmdStatus_7_Percent<br>• 108: eCoeCmdStatus_8_Percent<br>• 109: eCoeCmdStatus_9_Percent<br>• 110: eCoeCmdStatus_10_Percent<br>• 111: eCoeCmdStatus_11_Percent<br>• 112: eCoeCmdStatus_12_Percent<br>• 113: eCoeCmdStatus_13_Percent<br>• 114: eCoeCmdStatus_14_Percent<br>• 115: eCoeCmdStatus_15_Percent<br>• 116: eCoeCmdStatus_16_Percent<br>• 117: eCoeCmdStatus_17_Percent<br>• 118: eCoeCmdStatus_18_Percent<br>• 119: eCoeCmdStatus_19_Percent<br>• 120: eCoeCmdStatus_20_Percent<br>• 121: eCoeCmdStatus_21_Percent<br>• 122: eCoeCmdStatus_22_Percent<br>• 123: eCoeCmdStatus_23_Percent<br>• 124: eCoeCmdStatus_24_Percent<br>• 125: eCoeCmdStatus_25_Percent<br>• 126: eCoeCmdStatus_26_Percent<br>• 127: eCoeCmdStatus_27_Percent<br>• 128: eCoeCmdStatus_28_Percent<br>• 129: eCoeCmdStatus_29_Percent<br>• 130: eCoeCmdStatus_30_Percent<br>• 131: eCoeCmdStatus_31_Percent<br>• 132: eCoeCmdStatus_32_Percent<br>• 133: eCoeCmdStatus_33_Percent<br>• 134: eCoeCmdStatus_34_Percent<br>• 135: eCoeCmdStatus_35_Percent<br>• 136: eCoeCmdStatus_36_Percent<br>• 137: eCoeCmdStatus_37_Percent<br>• 138: eCoeCmdStatus_38_Percent<br>• 139: eCoeCmdStatus_39_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 140: eCoeCmdStatus_40_Percent<br>• 141: eCoeCmdStatus_41_Percent<br>• 142: eCoeCmdStatus_42_Percent<br>• 143: eCoeCmdStatus_43_Percent<br>• 144: eCoeCmdStatus_44_Percent<br>• 145: eCoeCmdStatus_45_Percent<br>• 146: eCoeCmdStatus_46_Percent<br>• 147: eCoeCmdStatus_47_Percent<br>• 148: eCoeCmdStatus_48_Percent<br>• 149: eCoeCmdStatus_49_Percent<br>• 150: eCoeCmdStatus_50_Percent<br>• 151: eCoeCmdStatus_51_Percent<br>• 152: eCoeCmdStatus_52_Percent<br>• 153: eCoeCmdStatus_53_Percent<br>• 154: eCoeCmdStatus_54_Percent<br>• 155: eCoeCmdStatus_55_Percent<br>• 156: eCoeCmdStatus_56_Percent<br>• 157: eCoeCmdStatus_57_Percent<br>• 158: eCoeCmdStatus_58_Percent<br>• 159: eCoeCmdStatus_59_Percent<br>• 160: eCoeCmdStatus_60_Percent<br>• 161: eCoeCmdStatus_61_Percent<br>• 162: eCoeCmdStatus_62_Percent<br>• 163: eCoeCmdStatus_63_Percent<br>• 164: eCoeCmdStatus_64_Percent<br>• 165: eCoeCmdStatus_65_Percent<br>• 166: eCoeCmdStatus_66_Percent<br>• 167: eCoeCmdStatus_67_Percent<br>• 168: eCoeCmdStatus_68_Percent<br>• 169: eCoeCmdStatus_69_Percent<br>• 170: eCoeCmdStatus_70_Percent<br>• 171: eCoeCmdStatus_71_Percent<br>• 172: eCoeCmdStatus_72_Percent<br>• 173: eCoeCmdStatus_73_Percent<br>• 174: eCoeCmdStatus_74_Percent<br>• 175: eCoeCmdStatus_75_Percent<br>• 176: eCoeCmdStatus_76_Percent<br>• 177: eCoeCmdStatus_77_Percent<br>• 178: eCoeCmdStatus_78_Percent<br>• 179: eCoeCmdStatus_79_Percent<br>• 180: eCoeCmdStatus_80_Percent<br>• 181: eCoeCmdStatus_81_Percent<br>• 182: eCoeCmdStatus_82_Percent<br>• 183: eCoeCmdStatus_83_Percent<br>• 184: eCoeCmdStatus_84_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 185: eCoeCmdStatus_85_Percent<br>• 186: eCoeCmdStatus_86_Percent<br>• 187: eCoeCmdStatus_87_Percent<br>• 188: eCoeCmdStatus_88_Percent<br>• 189: eCoeCmdStatus_89_Percent<br>• 190: eCoeCmdStatus_90_Percent<br>• 191: eCoeCmdStatus_91_Percent<br>• 192: eCoeCmdStatus_92_Percent<br>• 193: eCoeCmdStatus_93_Percent<br>• 194: eCoeCmdStatus_94_Percent<br>• 195: eCoeCmdStatus_95_Percent<br>• 196: eCoeCmdStatus_96_Percent<br>• 197: eCoeCmdStatus_97_Percent<br>• 198: eCoeCmdStatus_98_Percent<br>• 199: eCoeCmdStatus_99_Percent<br>• 200: eCoeCmdStatus_100_Percent<br>• 255: eCoeCmdStatus_CmdIsExecuting | | | |
| 0x2C0B:03 | Response | | OCTET-STRING[12] | RO | {0} |

### 0x2C0C | [SG] [SL] HpfDslRotary scan connected encoder

With this command object the type of the connected encoder can be scanned.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0C:0 | [SG] [SL] HpfDslRotary scan connected encoder | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x2C0C:01 | Command | With this command object the type of the connected encoder can be scanned. | OCTET-STRING[8] | RW | {0} |
| 0x2C0C:02 | Status | allowed values:<br>• 0: eCoeCmdStatus_CmdCompletedNoErrorNoRespData<br>• 1: eCoeCmdStatus_CmdCompletedNoErrorRespDataAvailable<br>• 2: eCoeCmdStatus_CmdCompletedErrorNoRespData<br>• 3: eCoeCmdStatus_CmdCompletedErrorRespDataAvailable<br>• 100: eCoeCmdStatus_0_Percent<br>• 101: eCoeCmdStatus_1_Percent<br>• 102: eCoeCmdStatus_2_Percent<br>• 103: eCoeCmdStatus_3_Percent<br>• 104: eCoeCmdStatus_4_Percent | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 105: eCoeCmdStatus_5_Percent<br>• 106: eCoeCmdStatus_6_Percent<br>• 107: eCoeCmdStatus_7_Percent<br>• 108: eCoeCmdStatus_8_Percent<br>• 109: eCoeCmdStatus_9_Percent<br>• 110: eCoeCmdStatus_10_Percent<br>• 111: eCoeCmdStatus_11_Percent<br>• 112: eCoeCmdStatus_12_Percent<br>• 113: eCoeCmdStatus_13_Percent<br>• 114: eCoeCmdStatus_14_Percent<br>• 115: eCoeCmdStatus_15_Percent<br>• 116: eCoeCmdStatus_16_Percent<br>• 117: eCoeCmdStatus_17_Percent<br>• 118: eCoeCmdStatus_18_Percent<br>• 119: eCoeCmdStatus_19_Percent<br>• 120: eCoeCmdStatus_20_Percent<br>• 121: eCoeCmdStatus_21_Percent<br>• 122: eCoeCmdStatus_22_Percent<br>• 123: eCoeCmdStatus_23_Percent<br>• 124: eCoeCmdStatus_24_Percent<br>• 125: eCoeCmdStatus_25_Percent<br>• 126: eCoeCmdStatus_26_Percent<br>• 127: eCoeCmdStatus_27_Percent<br>• 128: eCoeCmdStatus_28_Percent<br>• 129: eCoeCmdStatus_29_Percent<br>• 130: eCoeCmdStatus_30_Percent<br>• 131: eCoeCmdStatus_31_Percent<br>• 132: eCoeCmdStatus_32_Percent<br>• 133: eCoeCmdStatus_33_Percent<br>• 134: eCoeCmdStatus_34_Percent<br>• 135: eCoeCmdStatus_35_Percent<br>• 136: eCoeCmdStatus_36_Percent<br>• 137: eCoeCmdStatus_37_Percent<br>• 138: eCoeCmdStatus_38_Percent<br>• 139: eCoeCmdStatus_39_Percent<br>• 140: eCoeCmdStatus_40_Percent<br>• 141: eCoeCmdStatus_41_Percent<br>• 142: eCoeCmdStatus_42_Percent<br>• 143: eCoeCmdStatus_43_Percent<br>• 144: eCoeCmdStatus_44_Percent<br>• 145: eCoeCmdStatus_45_Percent<br>• 146: eCoeCmdStatus_46_Percent<br>• 147: eCoeCmdStatus_47_Percent<br>• 148: eCoeCmdStatus_48_Percent<br>• 149: eCoeCmdStatus_49_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 150: eCoeCmdStatus_50_Percent<br>• 151: eCoeCmdStatus_51_Percent<br>• 152: eCoeCmdStatus_52_Percent<br>• 153: eCoeCmdStatus_53_Percent<br>• 154: eCoeCmdStatus_54_Percent<br>• 155: eCoeCmdStatus_55_Percent<br>• 156: eCoeCmdStatus_56_Percent<br>• 157: eCoeCmdStatus_57_Percent<br>• 158: eCoeCmdStatus_58_Percent<br>• 159: eCoeCmdStatus_59_Percent<br>• 160: eCoeCmdStatus_60_Percent<br>• 161: eCoeCmdStatus_61_Percent<br>• 162: eCoeCmdStatus_62_Percent<br>• 163: eCoeCmdStatus_63_Percent<br>• 164: eCoeCmdStatus_64_Percent<br>• 165: eCoeCmdStatus_65_Percent<br>• 166: eCoeCmdStatus_66_Percent<br>• 167: eCoeCmdStatus_67_Percent<br>• 168: eCoeCmdStatus_68_Percent<br>• 169: eCoeCmdStatus_69_Percent<br>• 170: eCoeCmdStatus_70_Percent<br>• 171: eCoeCmdStatus_71_Percent<br>• 172: eCoeCmdStatus_72_Percent<br>• 173: eCoeCmdStatus_73_Percent<br>• 174: eCoeCmdStatus_74_Percent<br>• 175: eCoeCmdStatus_75_Percent<br>• 176: eCoeCmdStatus_76_Percent<br>• 177: eCoeCmdStatus_77_Percent<br>• 178: eCoeCmdStatus_78_Percent<br>• 179: eCoeCmdStatus_79_Percent<br>• 180: eCoeCmdStatus_80_Percent<br>• 181: eCoeCmdStatus_81_Percent<br>• 182: eCoeCmdStatus_82_Percent<br>• 183: eCoeCmdStatus_83_Percent<br>• 184: eCoeCmdStatus_84_Percent<br>• 185: eCoeCmdStatus_85_Percent<br>• 186: eCoeCmdStatus_86_Percent<br>• 187: eCoeCmdStatus_87_Percent<br>• 188: eCoeCmdStatus_88_Percent<br>• 189: eCoeCmdStatus_89_Percent<br>• 190: eCoeCmdStatus_90_Percent<br>• 191: eCoeCmdStatus_91_Percent<br>• 192: eCoeCmdStatus_92_Percent<br>• 193: eCoeCmdStatus_93_Percent<br>• 194: eCoeCmdStatus_94_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 195: eCoeCmdStatus_95_Percent<br>• 196: eCoeCmdStatus_96_Percent<br>• 197: eCoeCmdStatus_97_Percent<br>• 198: eCoeCmdStatus_98_Percent<br>• 199: eCoeCmdStatus_99_Percent<br>• 200: eCoeCmdStatus_100_Percent<br>• 255: eCoeCmdStatus_CmdIsExecuting | | | |
| 0x2C0C:03 | Response | | OCTET-STRING[16] | RO | {0} |

### 0x2C0D | [SG] [SL] HpfDslRotary save electronic data sheet

With this command object the electronic data sheet can be saved in the encoder memory.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0D:0 | [SG] [SL] HpfDslRotary save electronic data sheet | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x2C0D:01 | Command | With this command object the electronic data sheet can be saved in the encoder memory. | OCTET-STRING[16] | RW | {0} |
| 0x2C0D:02 | Status | allowed values:<br>• 0: eCoeCmdStatus_CmdCompletedNoErrorNoRespData<br>• 1: eCoeCmdStatus_CmdCompletedNoErrorRespDataAvailable<br>• 2: eCoeCmdStatus_CmdCompletedErrorNoRespData<br>• 3: eCoeCmdStatus_CmdCompletedErrorRespDataAvailable<br>• 100: eCoeCmdStatus_0_Percent<br>• 101: eCoeCmdStatus_1_Percent<br>• 102: eCoeCmdStatus_2_Percent<br>• 103: eCoeCmdStatus_3_Percent<br>• 104: eCoeCmdStatus_4_Percent<br>• 105: eCoeCmdStatus_5_Percent<br>• 106: eCoeCmdStatus_6_Percent<br>• 107: eCoeCmdStatus_7_Percent<br>• 108: eCoeCmdStatus_8_Percent<br>• 109: eCoeCmdStatus_9_Percent<br>• 110: eCoeCmdStatus_10_Percent<br>• 111: eCoeCmdStatus_11_Percent<br>• 112: eCoeCmdStatus_12_Percent<br>• 113: eCoeCmdStatus_13_Percent<br>• 114: eCoeCmdStatus_14_Percent | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 115: eCoeCmdStatus_15_Percent | | | |
| | | • 116: eCoeCmdStatus_16_Percent | | | |
| | | • 117: eCoeCmdStatus_17_Percent | | | |
| | | • 118: eCoeCmdStatus_18_Percent | | | |
| | | • 119: eCoeCmdStatus_19_Percent | | | |
| | | • 120: eCoeCmdStatus_20_Percent | | | |
| | | • 121: eCoeCmdStatus_21_Percent | | | |
| | | • 122: eCoeCmdStatus_22_Percent | | | |
| | | • 123: eCoeCmdStatus_23_Percent | | | |
| | | • 124: eCoeCmdStatus_24_Percent | | | |
| | | • 125: eCoeCmdStatus_25_Percent | | | |
| | | • 126: eCoeCmdStatus_26_Percent | | | |
| | | • 127: eCoeCmdStatus_27_Percent | | | |
| | | • 128: eCoeCmdStatus_28_Percent | | | |
| | | • 129: eCoeCmdStatus_29_Percent | | | |
| | | • 130: eCoeCmdStatus_30_Percent | | | |
| | | • 131: eCoeCmdStatus_31_Percent | | | |
| | | • 132: eCoeCmdStatus_32_Percent | | | |
| | | • 133: eCoeCmdStatus_33_Percent | | | |
| | | • 134: eCoeCmdStatus_34_Percent | | | |
| | | • 135: eCoeCmdStatus_35_Percent | | | |
| | | • 136: eCoeCmdStatus_36_Percent | | | |
| | | • 137: eCoeCmdStatus_37_Percent | | | |
| | | • 138: eCoeCmdStatus_38_Percent | | | |
| | | • 139: eCoeCmdStatus_39_Percent | | | |
| | | • 140: eCoeCmdStatus_40_Percent | | | |
| | | • 141: eCoeCmdStatus_41_Percent | | | |
| | | • 142: eCoeCmdStatus_42_Percent | | | |
| | | • 143: eCoeCmdStatus_43_Percent | | | |
| | | • 144: eCoeCmdStatus_44_Percent | | | |
| | | • 145: eCoeCmdStatus_45_Percent | | | |
| | | • 146: eCoeCmdStatus_46_Percent | | | |
| | | • 147: eCoeCmdStatus_47_Percent | | | |
| | | • 148: eCoeCmdStatus_48_Percent | | | |
| | | • 149: eCoeCmdStatus_49_Percent | | | |
| | | • 150: eCoeCmdStatus_50_Percent | | | |
| | | • 151: eCoeCmdStatus_51_Percent | | | |
| | | • 152: eCoeCmdStatus_52_Percent | | | |
| | | • 153: eCoeCmdStatus_53_Percent | | | |
| | | • 154: eCoeCmdStatus_54_Percent | | | |
| | | • 155: eCoeCmdStatus_55_Percent | | | |
| | | • 156: eCoeCmdStatus_56_Percent | | | |
| | | • 157: eCoeCmdStatus_57_Percent | | | |
| | | • 158: eCoeCmdStatus_58_Percent | | | |
| | | • 159: eCoeCmdStatus_59_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 160: eCoeCmdStatus_60_Percent<br>• 161: eCoeCmdStatus_61_Percent<br>• 162: eCoeCmdStatus_62_Percent<br>• 163: eCoeCmdStatus_63_Percent<br>• 164: eCoeCmdStatus_64_Percent<br>• 165: eCoeCmdStatus_65_Percent<br>• 166: eCoeCmdStatus_66_Percent<br>• 167: eCoeCmdStatus_67_Percent<br>• 168: eCoeCmdStatus_68_Percent<br>• 169: eCoeCmdStatus_69_Percent<br>• 170: eCoeCmdStatus_70_Percent<br>• 171: eCoeCmdStatus_71_Percent<br>• 172: eCoeCmdStatus_72_Percent<br>• 173: eCoeCmdStatus_73_Percent<br>• 174: eCoeCmdStatus_74_Percent<br>• 175: eCoeCmdStatus_75_Percent<br>• 176: eCoeCmdStatus_76_Percent<br>• 177: eCoeCmdStatus_77_Percent<br>• 178: eCoeCmdStatus_78_Percent<br>• 179: eCoeCmdStatus_79_Percent<br>• 180: eCoeCmdStatus_80_Percent<br>• 181: eCoeCmdStatus_81_Percent<br>• 182: eCoeCmdStatus_82_Percent<br>• 183: eCoeCmdStatus_83_Percent<br>• 184: eCoeCmdStatus_84_Percent<br>• 185: eCoeCmdStatus_85_Percent<br>• 186: eCoeCmdStatus_86_Percent<br>• 187: eCoeCmdStatus_87_Percent<br>• 188: eCoeCmdStatus_88_Percent<br>• 189: eCoeCmdStatus_89_Percent<br>• 190: eCoeCmdStatus_90_Percent<br>• 191: eCoeCmdStatus_91_Percent<br>• 192: eCoeCmdStatus_92_Percent<br>• 193: eCoeCmdStatus_93_Percent<br>• 194: eCoeCmdStatus_94_Percent<br>• 195: eCoeCmdStatus_95_Percent<br>• 196: eCoeCmdStatus_96_Percent<br>• 197: eCoeCmdStatus_97_Percent<br>• 198: eCoeCmdStatus_98_Percent<br>• 199: eCoeCmdStatus_99_Percent<br>• 200: eCoeCmdStatus_100_Percent<br>• 255: eCoeCmdStatus_CmdIsExecuting | | | |
| 0x2C0D:03 | Response | | OCTET-STRING[8] | RO | {0} |

### 0x2C0F | [SG] [SL] HpfDslRotary encoder parameters

This object contains not mappable parameters of the OCT rotary (Hiperface DSL) module.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C0F:0 | [SG] [SL] HpfDslRotary encoder parameters | | uint8_t | RO | 0x0D ($13_{dez}$) |
| 0x2C0F:01 | Connector | This object contains not mappable parameters of the OCT rotary (Hiperface DSL) module.<br>allowed values:<br>• 0: ConnectorHpfDSL_CorrespondingToDriveChannel | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x2C0F:02 | Resolution policy | allowed values:<br>• 0: ParameterPolicy_UseEncoderValue<br>• 1: ParameterPolicy_ParameterIsMinRequirement<br>• 2: ParameterPolicy_ParameterMustMatch | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x2C0F:03 | Resolution | | uint64_t | RW | 0x0000000000000000 ($0_{dez}$) |
| 0x2C0F:04 | Range policy | allowed values:<br>• 0: ParameterPolicy_UseEncoderValue<br>• 1: ParameterPolicy_ParameterIsMinRequirement<br>• 2: ParameterPolicy_ParameterMustMatch | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x2C0F:05 | Range | | uint64_t | RW | 0x0000000000000000 ($0_{dez}$) |
| 0x2C0F:06 | Trace level | allowed values:<br>• 0: FbTraceLevel_Off<br>• 1: FbTraceLevel_Error<br>• 2: FbTraceLevel_Warning<br>• 3: FbTraceLevel_Info<br>• 4: FbTraceLevel_Verbose<br>• 10: FbTraceLevel_LineMonitoringEmcyMsg<br>• 11: FbTraceLevel_ErrorWithLineMonitoringEmcyMsg<br>• 12: FbTraceLevel_WarningWithLineMonitoringEmcyMsg | uint32_t | RW | 0x00000000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 13: FbTraceLevel_InfoWithLineMonitoringEmcyMsg<br>• 14: FbTraceLevel_VerboseWithLineMonitoringEmcyMsg | | | |
| 0x2C0F:07 | Settings | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x2C0F:08 | Status monitoring mask | | uint64_t | RW | 0x0000000000000000 ($0_{dez}$) |
| 0x2C0F:09 | Customized estimator acceleration | The acceleration value used for position estimation in case of invalid fast positions. If this value is set to 0.0 the internal default value is used. See 'Encoder info'.<br>Unit: rad/s^2<br>Min: 0.0<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C0F:0A | Use customized accepted estimator deviation | Set to 1 if the 'Customized accepted estimator deviation' value should be used. Otherwise the internal default value is used. See 'Encoder info'.<br>allowed values:<br>• 0: No_UseDefault<br>• 1: Yes_UseParameterValue | uint8_t | RW | 0x00 ($0_{dez}$) |
| 0x2C0F:0B | Customized accepted estimator deviation | The maximum accepted position deviation of the estimator. The value may be limited due to internal conditions. See 'Encoder info' for the active value.<br>Unit: °<br>Min: 0.0<br>Max: 10.0 | float | RW | 0.0 |
| 0x2C0F:0C | Virtual multiturn extension mode | Enables the virutal multiturn extension.<br>Unit: 1/°<br>allowed values:<br>• 0: Off<br>• 1: Continue encoder processing dring ECat restart | uint16_t | RW | 0x0000 ($0_{dez}$) |
| 0x2C0F:0D | Virtual multiturn extension action | Prepares the virutal multiturn extension.<br>allowed values:<br>• 0: Idle<br>• 1: Arm for next ECat restart | uint16_t | RW | 0x0000 ($0_{dez}$) |

### 0x2C10 | [SG] [SL] HpfDslRotary cogging compensation data

This object contains the content and the state of the cogging compensation data file stored in the encoder.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C10:0 | [SG] [SL] HpfDslRotary cogging compensation data | | uint8_t | RO | 0x02 ($2_{dez}$) |
| 0x2C10:01 | Data state | Data state of the displayed compensation data.<br>allowed values:<br>• 0: eFileDataState_Invalid<br>• 1: eFileDataState_Valid<br>• 2: eFileDataState_Modified | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C10:02 | Compensation data | The binary data of the electronic data sheet. | OCTET-STRING[4096] | RO | {0} |

### 0x2C1D | [SG] [SL] HpfDslRotary sHub info and status

This object contains a collection of information from the sHub.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1D:0 | [SG] [SL] HpfDslRotary sHub info and status | | uint8_t | RO | 0x1D ($29_{dez}$) |
| 0x2C1D:01 | ExtSHub: Identify IO, Amount of IOs | Version and feature info of the HpfDsl master IP core wrapper. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1D:02 | ExtSHub: Identify IO, Input 1 specification | Version and feature info of the HpfDsl master IP core wrapper. | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C1D:03 | ExtSHub: Identify IO, Input 2 specification | Version and feature info of the HpfDsl master IP core wrapper. | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C1D:04 | ExtSHub: Device Type | Version and feature info of the HpfDsl master IP core wrapper. | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1D:05 | ExtSHub: Base type code name | The type name of the encoder stored in ASCII. | STRING | RO | "" |
| 0x2C1D:06 | ExtSHub: Serial number | The serial number of the encoder stored in ACSII. | STRING | RO | "" |
| 0x2C1D:07 | ExtSHub: Firmware revision number | The firmware and hardware version of the encoder stored in ASCII. | STRING | RO | "" |
| 0x2C1D:08 | ExtSHub: Firmware date | The firmware date of the encoder stored in ASCII. | STRING | RO | "" |
| 0x2C1D:09 | ExtSHub: Min permitted temperature | The minimum permitted value for the temperature of the DSL motor feedback system.<br>Unit: 0,1 °C | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1D:0A | ExtSHub: Max permitted temperature | The maximum permitted value for the temperature of the DSL motor feedback system.<br>Unit: 0,1 °C | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C1D:0B | ExtSHub: Operation time | The operating time of the DSL motor feedback system.<br>Unit: min | uint32_t | RO | 0x00000000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1D:0C | IntSHub: Identify IO, Dictionary 1st page | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:0D | IntSHub: Identify IO, Dictionary 2nd page | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:0E | IntSHub: Identify IO, Sensor 0, Overview | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:0F | IntSHub: Identify IO, Sensor 0, Details | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:10 | IntSHub: Identify IO, Sensor 1, Overview | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:11 | IntSHub: Identify IO, Sensor 1, Details | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:12 | IntSHub: Identify IO, Sensor 2, Overview | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:13 | IntSHub: Identify IO, Sensor 2, Details | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:14 | IntSHub: Identify IO, Sensor 3, Overview | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:15 | IntSHub: Identify IO, Sensor 3, Details | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:16 | IntSHub: Identify IO, Sensor 4, Overview | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:17 | IntSHub: Identify IO, Sensor 4, Details | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:18 | IntSHub: Identify IO, Sensor 5, Overview | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:19 | IntSHub: Identify IO, Sensor 5, Details | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:1A | IntSHub: Identify IO, Sensor 6, Overview | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:1B | IntSHub: Identify IO, Sensor 6, Details | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:1C | IntSHub: Identify IO, Sensor 7, Overview | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1D:1D | IntSHub: Identify IO, Sensor 7, Details | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |

### 0x2C1E | [SG] [SL] HpfDslRotary sHub actual values

This object contains the actual sHub data.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1E:0 | [SG] [SL] HpfDslRotary sHub actual values | | uint8_t | RO | 0x0A ($10_{dez}$) |
| 0x2C1E:01 | sHubData | This object contains the actual sHub data. | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C1E:02 | IntSHub: Update counter | Sensor data update counter: Bit 0..7 update counter for Sensor 0, Bit 8..16 for Sensor1 ... | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1E:03 | IntSHub: Data Sensor 0 | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1E:04 | IntSHub: Data Sensor 1 | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1E:05 | IntSHub: Data Sensor 2 | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1E:06 | IntSHub: Data Sensor 3 | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1E:07 | IntSHub: Data Sensor 4 | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1E:08 | IntSHub: Data Sensor 5 | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1E:09 | IntSHub: Data Sensor 6 | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C1E:0A | IntSHub: Data Sensor 7 | | uint64_t | RO | 0x0000000000000000 ($0_{dez}$) |

## 2.13 Objects of module SimulationRotary

### Overview of Objects

0x1A00 | [SG] SimulationRotary TxPDO-Map Inputs [▶ 134]
0x2C00 | [SG] [SL] SimulationRotary actual values [▶ 135]
0x2C03 | [SG] [SL] SimulationRotary temperature sensors [▶ 135]

### 0x1A00 | [SG] SimulationRotary TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | [SG] SimulationRotary TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C00 | [SG] [SL] SimulationRotary actual values

This object contains the actual encoder values which are updated every Encoder cycle.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C00:0 | [SG] [SL] SimulationRotary actual values | | uint8_t | RO | 0x08 ($8_{dez}$) |
| 0x2C00:01 | Position | The actual right-aligned position value of the simulated motor feedback system.<br>Unit: inc | int64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C00:02 | Raw position | The raw position value of the DSL motor feedback system [63..32] Multi turns, [31..0] Single turn.<br>Unit: x * (360/4294967296)° | int64_t | RO | 0x0000000000000000 ($0_{dez}$) |
| 0x2C00:06 | Valid | Valid flag for the position and the raw position value. | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0x2C00:08 | Simulation mode | This object indicates the position calculation mode depending on motor and control mode settings.<br>allowed values:<br>• 0: Calc_position_from_velocity_command_value<br>• 1: Calc_position_from_estimated_commutation_angle | uint16_t | RO | 0x0000 ($0_{dez}$) |

### 0x2C03 | [SG] [SL] SimulationRotary temperature sensors

This object contains the temperature sensor values.

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:0 | [SG] [SL] SimulationRotary temperature sensors | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x2C03:01 | Simulation encoder connected sensor data state | This object contains the data state of the simulated temperature sensor value,<br>allowed values:<br>• 0: eDataState_Idle<br>• 1: eDataState_Valid<br>• 2: eDataState_Error | int16_t | RO | 0x0000 ($0_{dez}$) |
| 0x2C03:02 | Simulation encoder connected sensor resistance | This object contains the resistance of the simulated temperature sensor value,<br>Unit: Ω | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C03:03 | Drive connected sensor data state | This object contains the data state of the drive connected temperature sensor value,<br>allowed values:<br>• 0: eDataState_Idle<br>• 1: eDataState_Valid<br>• 2: eDataState_Error | int16_t | RO | 0x0000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:04 | Drive connected sensor resistance | This object contains the resistance of the simulated temperature sensor value,<br>Unit: Ω | uint32_t | RO | 0x00000000 ($0_{dez}$) |

# 2.14 Objects of module DeviceDebug

### Overview of Objects

0x1600 | DeviceDebug RxPDO-Map Outputs [▶ 136]
0x1A00 | DeviceDebug TxPDO-Map Inputs [▶ 136]
0x2C01 | DeviceDebug parameters [▶ 136]
0x2C02 | DeviceDebug inputs [▶ 136]
0x2C03 | DeviceDebug outputs [▶ 137]
0x2C1E | DeviceDebug command [▶ 137]

### 0x1600 | DeviceDebug RxPDO-Map Outputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1600:0 | DeviceDebug RxPDO-Map Outputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x1A00 | DeviceDebug TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | DeviceDebug TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C01 | DeviceDebug parameters

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C01:0 | DeviceDebug parameters | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x2C01:01 | Debug index | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x2C01:02 | Debug value uint32 | | uint32_t | RW | 0x00000000 ($0_{dez}$) |
| 0x2C01:03 | Debug value float | Min: -3.40282E+38<br>Max: 3.40282E+38 | float | RW | 0.0 |
| 0x2C01:04 | Debug value string | | STRING | RW | "" |

### 0x2C02 | DeviceDebug inputs

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:0 | DeviceDebug inputs | | uint8_t | RO | 0x0A ($10_{dez}$) |
| 0x2C02:01 | Input1 | | float | RO | 0.0 |
| 0x2C02:02 | Input2 | | float | RO | 0.0 |
| 0x2C02:03 | Input3 | | float | RO | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:04 | Input4 | | float | RO | 0.0 |
| 0x2C02:05 | Input5 | | float | RO | 0.0 |
| 0x2C02:06 | Input6 | | float | RO | 0.0 |
| 0x2C02:07 | Input7 | | float | RO | 0.0 |
| 0x2C02:08 | Input8 | | float | RO | 0.0 |
| 0x2C02:09 | Input9 | | int32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C02:0A | Input10 | | int32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x2C03 | DeviceDebug outputs

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:0 | DeviceDebug outputs | | uint8_t | RO | 0x0A ($10_{dez}$) |
| 0x2C03:01 | Output1 | | float | RO | 0.0 |
| 0x2C03:02 | Output2 | | float | RO | 0.0 |
| 0x2C03:03 | Output3 | | float | RO | 0.0 |
| 0x2C03:04 | Output4 | | float | RO | 0.0 |
| 0x2C03:05 | Output5 | | float | RO | 0.0 |
| 0x2C03:06 | Output6 | | float | RO | 0.0 |
| 0x2C03:07 | Output7 | | float | RO | 0.0 |
| 0x2C03:08 | Output8 | | float | RO | 0.0 |
| 0x2C03:09 | Output9 | | int32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C03:0A | Output10 | | int32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x2C1E | DeviceDebug command

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C1E:0 | DeviceDebug command | | uint8_t | RO | 0x03 ($3_{dez}$) |
| 0x2C1E:01 | Command | | OCTET-STRING[8] | RW | {0} |
| 0x2C1E:02 | Status | allowed values:<br>• 0: eCoeCmdStatus_CmdCompletedNoErrorNoRespData<br>• 1: eCoeCmdStatus_CmdCompletedNoErrorRespDataAvailable<br>• 2: eCoeCmdStatus_CmdCompletedErrorNoRespData<br>• 3: eCoeCmdStatus_CmdCompletedErrorRespDataAvailable<br>• 100: eCoeCmdStatus_0_Percent<br>• 101: eCoeCmdStatus_1_Percent<br>• 102: eCoeCmdStatus_2_Percent<br>• 103: eCoeCmdStatus_3_Percent | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 104: eCoeCmdStatus_4_Percent<br>• 105: eCoeCmdStatus_5_Percent<br>• 106: eCoeCmdStatus_6_Percent<br>• 107: eCoeCmdStatus_7_Percent<br>• 108: eCoeCmdStatus_8_Percent<br>• 109: eCoeCmdStatus_9_Percent<br>• 110: eCoeCmdStatus_10_Percent<br>• 111: eCoeCmdStatus_11_Percent<br>• 112: eCoeCmdStatus_12_Percent<br>• 113: eCoeCmdStatus_13_Percent<br>• 114: eCoeCmdStatus_14_Percent<br>• 115: eCoeCmdStatus_15_Percent<br>• 116: eCoeCmdStatus_16_Percent<br>• 117: eCoeCmdStatus_17_Percent<br>• 118: eCoeCmdStatus_18_Percent<br>• 119: eCoeCmdStatus_19_Percent<br>• 120: eCoeCmdStatus_20_Percent<br>• 121: eCoeCmdStatus_21_Percent<br>• 122: eCoeCmdStatus_22_Percent<br>• 123: eCoeCmdStatus_23_Percent<br>• 124: eCoeCmdStatus_24_Percent<br>• 125: eCoeCmdStatus_25_Percent<br>• 126: eCoeCmdStatus_26_Percent<br>• 127: eCoeCmdStatus_27_Percent<br>• 128: eCoeCmdStatus_28_Percent<br>• 129: eCoeCmdStatus_29_Percent<br>• 130: eCoeCmdStatus_30_Percent<br>• 131: eCoeCmdStatus_31_Percent<br>• 132: eCoeCmdStatus_32_Percent<br>• 133: eCoeCmdStatus_33_Percent<br>• 134: eCoeCmdStatus_34_Percent<br>• 135: eCoeCmdStatus_35_Percent<br>• 136: eCoeCmdStatus_36_Percent<br>• 137: eCoeCmdStatus_37_Percent<br>• 138: eCoeCmdStatus_38_Percent<br>• 139: eCoeCmdStatus_39_Percent<br>• 140: eCoeCmdStatus_40_Percent<br>• 141: eCoeCmdStatus_41_Percent<br>• 142: eCoeCmdStatus_42_Percent<br>• 143: eCoeCmdStatus_43_Percent<br>• 144: eCoeCmdStatus_44_Percent<br>• 145: eCoeCmdStatus_45_Percent<br>• 146: eCoeCmdStatus_46_Percent<br>• 147: eCoeCmdStatus_47_Percent<br>• 148: eCoeCmdStatus_48_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 149: eCoeCmdStatus_49_Percent<br>• 150: eCoeCmdStatus_50_Percent<br>• 151: eCoeCmdStatus_51_Percent<br>• 152: eCoeCmdStatus_52_Percent<br>• 153: eCoeCmdStatus_53_Percent<br>• 154: eCoeCmdStatus_54_Percent<br>• 155: eCoeCmdStatus_55_Percent<br>• 156: eCoeCmdStatus_56_Percent<br>• 157: eCoeCmdStatus_57_Percent<br>• 158: eCoeCmdStatus_58_Percent<br>• 159: eCoeCmdStatus_59_Percent<br>• 160: eCoeCmdStatus_60_Percent<br>• 161: eCoeCmdStatus_61_Percent<br>• 162: eCoeCmdStatus_62_Percent<br>• 163: eCoeCmdStatus_63_Percent<br>• 164: eCoeCmdStatus_64_Percent<br>• 165: eCoeCmdStatus_65_Percent<br>• 166: eCoeCmdStatus_66_Percent<br>• 167: eCoeCmdStatus_67_Percent<br>• 168: eCoeCmdStatus_68_Percent<br>• 169: eCoeCmdStatus_69_Percent<br>• 170: eCoeCmdStatus_70_Percent<br>• 171: eCoeCmdStatus_71_Percent<br>• 172: eCoeCmdStatus_72_Percent<br>• 173: eCoeCmdStatus_73_Percent<br>• 174: eCoeCmdStatus_74_Percent<br>• 175: eCoeCmdStatus_75_Percent<br>• 176: eCoeCmdStatus_76_Percent<br>• 177: eCoeCmdStatus_77_Percent<br>• 178: eCoeCmdStatus_78_Percent<br>• 179: eCoeCmdStatus_79_Percent<br>• 180: eCoeCmdStatus_80_Percent<br>• 181: eCoeCmdStatus_81_Percent<br>• 182: eCoeCmdStatus_82_Percent<br>• 183: eCoeCmdStatus_83_Percent<br>• 184: eCoeCmdStatus_84_Percent<br>• 185: eCoeCmdStatus_85_Percent<br>• 186: eCoeCmdStatus_86_Percent<br>• 187: eCoeCmdStatus_87_Percent<br>• 188: eCoeCmdStatus_88_Percent<br>• 189: eCoeCmdStatus_89_Percent<br>• 190: eCoeCmdStatus_90_Percent<br>• 191: eCoeCmdStatus_91_Percent<br>• 192: eCoeCmdStatus_92_Percent<br>• 193: eCoeCmdStatus_93_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 194: eCoeCmdStatus_94_Percent<br>• 195: eCoeCmdStatus_95_Percent<br>• 196: eCoeCmdStatus_96_Percent<br>• 197: eCoeCmdStatus_97_Percent<br>• 198: eCoeCmdStatus_98_Percent<br>• 199: eCoeCmdStatus_99_Percent<br>• 200: eCoeCmdStatus_100_Percent<br>• 255: eCoeCmdStatus_CmdIsExecuting | | | |
| 0x2C1E:03 | Response | | OCTET-STRING[12] | RO | {0} |

# 2.15 Objects of module AxisDebug

### Overview of Objects

0x1600 | [SG] AxisDebug RxPDO-Map Outputs [▶ 140]
0x1A00 | [SG] AxisDebug TxPDO-Map Inputs [▶ 140]
0x2C02 | [SG] AxisDebug inputs [▶ 140]
0x2C03 | [SG] AxisDebug outputs [▶ 141]
0x2C04 | [SG] AxisDebug Command [▶ 141]

### 0x1600 | [SG] AxisDebug RxPDO-Map Outputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1600:0 | [SG] AxisDebug RxPDO-Map Outputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x1A00 | [SG] AxisDebug TxPDO-Map Inputs

see ETG.1000.6 EtherCAT specification - CoE

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x1A00:0 | [SG] AxisDebug TxPDO-Map Inputs | | uint8_t | RW | 0x00 ($0_{dez}$) |

### 0x2C02 | [SG] AxisDebug inputs

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:0 | [SG] AxisDebug inputs | | uint8_t | RO | 0x0A ($10_{dez}$) |
| 0x2C02:01 | Input1 | | float | RO | 0.0 |
| 0x2C02:02 | Input2 | | float | RO | 0.0 |
| 0x2C02:03 | Input3 | | float | RO | 0.0 |
| 0x2C02:04 | Input4 | | float | RO | 0.0 |
| 0x2C02:05 | Input5 | | float | RO | 0.0 |
| 0x2C02:06 | Input6 | | float | RO | 0.0 |
| 0x2C02:07 | Input7 | | float | RO | 0.0 |
| 0x2C02:08 | Input8 | | float | RO | 0.0 |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C02:09 | Input9 | | int32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C02:0A | Input10 | | int32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x2C03 | [SG] AxisDebug outputs

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C03:0 | [SG] AxisDebug outputs | | uint8_t | RO | 0x0A ($10_{dez}$) |
| 0x2C03:01 | Output1 | | float | RO | 0.0 |
| 0x2C03:02 | Output2 | | float | RO | 0.0 |
| 0x2C03:03 | Output3 | | float | RO | 0.0 |
| 0x2C03:04 | Output4 | | float | RO | 0.0 |
| 0x2C03:05 | Output5 | | float | RO | 0.0 |
| 0x2C03:06 | Output6 | | float | RO | 0.0 |
| 0x2C03:07 | Output7 | | float | RO | 0.0 |
| 0x2C03:08 | Output8 | | float | RO | 0.0 |
| 0x2C03:09 | Output9 | | int32_t | RO | 0x00000000 ($0_{dez}$) |
| 0x2C03:0A | Output10 | | int32_t | RO | 0x00000000 ($0_{dez}$) |

### 0x2C04 | [SG] AxisDebug Command

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0x2C04:0 | [SG] AxisDebug Command | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0x2C04:01 | Command | | OCTET-STRING[8] | RW | {0} |
| 0x2C04:02 | Status | allowed values:<br>• 0: eCoeCmdStatus_CmdCompletedNoErrorNoRespData<br>• 1: eCoeCmdStatus_CmdCompletedNoErrorRespDataAvailable<br>• 2: eCoeCmdStatus_CmdCompletedErrorNoRespData<br>• 3: eCoeCmdStatus_CmdCompletedErrorRespDataAvailable<br>• 100: eCoeCmdStatus_0_Percent<br>• 101: eCoeCmdStatus_1_Percent<br>• 102: eCoeCmdStatus_2_Percent<br>• 103: eCoeCmdStatus_3_Percent<br>• 104: eCoeCmdStatus_4_Percent<br>• 105: eCoeCmdStatus_5_Percent<br>• 106: eCoeCmdStatus_6_Percent<br>• 107: eCoeCmdStatus_7_Percent<br>• 108: eCoeCmdStatus_8_Percent | uint8_t | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 109: eCoeCmdStatus_9_Percent | | | |
| | | • 110: eCoeCmdStatus_10_Percent | | | |
| | | • 111: eCoeCmdStatus_11_Percent | | | |
| | | • 112: eCoeCmdStatus_12_Percent | | | |
| | | • 113: eCoeCmdStatus_13_Percent | | | |
| | | • 114: eCoeCmdStatus_14_Percent | | | |
| | | • 115: eCoeCmdStatus_15_Percent | | | |
| | | • 116: eCoeCmdStatus_16_Percent | | | |
| | | • 117: eCoeCmdStatus_17_Percent | | | |
| | | • 118: eCoeCmdStatus_18_Percent | | | |
| | | • 119: eCoeCmdStatus_19_Percent | | | |
| | | • 120: eCoeCmdStatus_20_Percent | | | |
| | | • 121: eCoeCmdStatus_21_Percent | | | |
| | | • 122: eCoeCmdStatus_22_Percent | | | |
| | | • 123: eCoeCmdStatus_23_Percent | | | |
| | | • 124: eCoeCmdStatus_24_Percent | | | |
| | | • 125: eCoeCmdStatus_25_Percent | | | |
| | | • 126: eCoeCmdStatus_26_Percent | | | |
| | | • 127: eCoeCmdStatus_27_Percent | | | |
| | | • 128: eCoeCmdStatus_28_Percent | | | |
| | | • 129: eCoeCmdStatus_29_Percent | | | |
| | | • 130: eCoeCmdStatus_30_Percent | | | |
| | | • 131: eCoeCmdStatus_31_Percent | | | |
| | | • 132: eCoeCmdStatus_32_Percent | | | |
| | | • 133: eCoeCmdStatus_33_Percent | | | |
| | | • 134: eCoeCmdStatus_34_Percent | | | |
| | | • 135: eCoeCmdStatus_35_Percent | | | |
| | | • 136: eCoeCmdStatus_36_Percent | | | |
| | | • 137: eCoeCmdStatus_37_Percent | | | |
| | | • 138: eCoeCmdStatus_38_Percent | | | |
| | | • 139: eCoeCmdStatus_39_Percent | | | |
| | | • 140: eCoeCmdStatus_40_Percent | | | |
| | | • 141: eCoeCmdStatus_41_Percent | | | |
| | | • 142: eCoeCmdStatus_42_Percent | | | |
| | | • 143: eCoeCmdStatus_43_Percent | | | |
| | | • 144: eCoeCmdStatus_44_Percent | | | |
| | | • 145: eCoeCmdStatus_45_Percent | | | |
| | | • 146: eCoeCmdStatus_46_Percent | | | |
| | | • 147: eCoeCmdStatus_47_Percent | | | |
| | | • 148: eCoeCmdStatus_48_Percent | | | |
| | | • 149: eCoeCmdStatus_49_Percent | | | |
| | | • 150: eCoeCmdStatus_50_Percent | | | |
| | | • 151: eCoeCmdStatus_51_Percent | | | |
| | | • 152: eCoeCmdStatus_52_Percent | | | |
| | | • 153: eCoeCmdStatus_53_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 154: eCoeCmdStatus_54_Percent<br>• 155: eCoeCmdStatus_55_Percent<br>• 156: eCoeCmdStatus_56_Percent<br>• 157: eCoeCmdStatus_57_Percent<br>• 158: eCoeCmdStatus_58_Percent<br>• 159: eCoeCmdStatus_59_Percent<br>• 160: eCoeCmdStatus_60_Percent<br>• 161: eCoeCmdStatus_61_Percent<br>• 162: eCoeCmdStatus_62_Percent<br>• 163: eCoeCmdStatus_63_Percent<br>• 164: eCoeCmdStatus_64_Percent<br>• 165: eCoeCmdStatus_65_Percent<br>• 166: eCoeCmdStatus_66_Percent<br>• 167: eCoeCmdStatus_67_Percent<br>• 168: eCoeCmdStatus_68_Percent<br>• 169: eCoeCmdStatus_69_Percent<br>• 170: eCoeCmdStatus_70_Percent<br>• 171: eCoeCmdStatus_71_Percent<br>• 172: eCoeCmdStatus_72_Percent<br>• 173: eCoeCmdStatus_73_Percent<br>• 174: eCoeCmdStatus_74_Percent<br>• 175: eCoeCmdStatus_75_Percent<br>• 176: eCoeCmdStatus_76_Percent<br>• 177: eCoeCmdStatus_77_Percent<br>• 178: eCoeCmdStatus_78_Percent<br>• 179: eCoeCmdStatus_79_Percent<br>• 180: eCoeCmdStatus_80_Percent<br>• 181: eCoeCmdStatus_81_Percent<br>• 182: eCoeCmdStatus_82_Percent<br>• 183: eCoeCmdStatus_83_Percent<br>• 184: eCoeCmdStatus_84_Percent<br>• 185: eCoeCmdStatus_85_Percent<br>• 186: eCoeCmdStatus_86_Percent<br>• 187: eCoeCmdStatus_87_Percent<br>• 188: eCoeCmdStatus_88_Percent<br>• 189: eCoeCmdStatus_89_Percent<br>• 190: eCoeCmdStatus_90_Percent<br>• 191: eCoeCmdStatus_91_Percent<br>• 192: eCoeCmdStatus_92_Percent<br>• 193: eCoeCmdStatus_93_Percent<br>• 194: eCoeCmdStatus_94_Percent<br>• 195: eCoeCmdStatus_95_Percent<br>• 196: eCoeCmdStatus_96_Percent<br>• 197: eCoeCmdStatus_97_Percent<br>• 198: eCoeCmdStatus_98_Percent | | | |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| | | • 199: eCoeCmdStatus_99_Percent<br>• 200: eCoeCmdStatus_100_Percent<br>• 255: eCoeCmdStatus_CmdIsExecuting | | | |
| 0x2C04:04 | Response | | OCTET-STRING[12] | RO | {0} |

# 3 Basic information Safety applications

This document includes the following indexes from the "Objects of module Safety" group as basic information on handling safety applications:

0xF980 | Safe Address [▶ 145]

0xF9C0 | Safety Device Info [▶ 145]

0xFABB | SETSAFEADDRESS Diag Data [▶ 145]

0xFEA0 | CTRL Diag Data [▶ 146]

## 3.1 0xF980 | Safe Address

**0xF980 | Safe Address**

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xF980:0 | Safe Address | | uint8_t | RO | 0x04 ($4_{dez}$) |
| 0xF980:01 | FSoE Address | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0xF980:02 | Serial Number | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF980:03 | Project CRC | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0xF980:04 | Default Project CRC | | uint16_t | RO | 0x0000 ($0_{dez}$) |

## 3.2 0xF9C0 | Safety Device Info

**0xF9C0 | Safety Device Info**

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xF9C0:0 | Safety Device Info | | uint8_t | RO | 0x08 ($8_{dez}$) |
| 0xF9C0:01 | Device name | | STRING | RO | "" |
| 0xF9C0:02 | Software version | | STRING | RO | "" |
| 0xF9C0:03 | Bootloader version | | STRING | RO | "" |
| 0xF9C0:04 | Software checksum | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF9C0:05 | Bootmanager checksum | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF9C0:06 | Bootloader checksum | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF9C0:07 | TwinSAFE Logic Version | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xF9C0:08 | Feature Flags | | uint32_t | RO | 0x00000000 ($0_{dez}$) |

## 3.3 0xFABB | SETSAFEADDRESS Diag Data

**0xFABB | SETSAFEADDRESS Diag Data**

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xFABB:0 | SETSAFEADDRESS Diag Data | | uint8_t | RO | 0x11 ($17_{dez}$) |
| 0xFABB:01 | Button is One | | BOOLEAN | RO | 0x00 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xFABB:02 | Button is Zero | | BOOLEAN | RO | 0x00 ($0_{dez}$) |
| 0xFABB:04 | FSoE-Address mismatch | | BOOLEAN | RO | 0x00 ($0_{dez}$) |
| 0xFABB:05 | Pairing Mode enabled | | BOOLEAN | RO | 0x00 ($0_{dez}$) |
| 0xFABB:09 | State | | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0xFABB:11 | Error Code | | uint8_t | RO | 0x00 ($0_{dez}$) |

## 3.4 0xFEA0 | CTRL Diag Data

**0xFEA0 | CTRL Diag Data**

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xFEA0:0 | CTRL Diag Data | | uint8_t | RO | 0x1D ($29_{dez}$) |
| 0xFEA0:01 | CTRLC1 Module State | | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0xFEA0:02 | CTRLC2 Module State | | uint8_t | RO | 0x00 ($0_{dez}$) |
| 0xFEA0:03 | CTRLC1 Global Fault Code | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0xFEA0:04 | CTRLC1 Global Fault Additional Code | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0xFEA0:05 | CTRLC2 Global Fault Code | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0xFEA0:06 | CTRLC2 Global Fault Additional Code | | uint16_t | RO | 0x0000 ($0_{dez}$) |
| 0xFEA0:07 | Main Loop Task Exceeded Counter In Run | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:08 | Main Loop Task Exceeded Counter In Stop | | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:09 | Actual Safety Control Task Execution Time In Run | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:0A | Min Safety Control Task Execution Time In Run | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:0B | Max Safety Control Task Execution Time In Run | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:0C | Actual Safety Control Task Distance Time In Run | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:0D | Min Safety Control Task Distance Time In Run | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |

| Index | Name | Meaning | Data type | Flags | Default |
|---|---|---|---|---|---|
| 0xFEA0:0E | Max Safety Control Task Distance Time In Run | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:0F | Actual Main Loop Task Execution Time In Run | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:10 | Min Main Loop Task Execution Time In Run | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:11 | Max Main Loop Task Execution Time In Run | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:12 | Actual Monitoring Task Execution Time | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:13 | Min Monitoring Task Execution Time | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:14 | Max Monitoring Task Execution Time | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:15 | Actual Safety Control Task Execution Time In Stop | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:16 | Min Safety Control Task Execution Time In Stop | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:17 | Max Safety Control Task Execution Time In Stop | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:18 | Actual Safety Control Task Distance Time In Stop | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:19 | Min Safety Control Task Distance Time In Stop | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:1A | Max Safety Control Task Distance Time In Stop | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:1B | Actual Main Loop Task Execution Time In Stop | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:1C | Min Main Loop Task Execution Time In Stop | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |
| 0xFEA0:1D | Max Main Loop Task Execution Time In Stop | Unit: ns | uint32_t | RO | 0x00000000 ($0_{dez}$) |

## Trademark statements

Beckhoff®, ATRO®, EtherCAT®, EtherCAT G®, EtherCAT G10®, EtherCAT P®, MX-System®, Safety over EtherCAT®, TC/BSD®, TwinCAT®, TwinCAT/BSD®, TwinSAFE®, XFC®, XPlanar® and XTS® are registered and licensed trademarks of Beckhoff Automation GmbH.

MAX®, Stratix®, Cyclone®, Altera®, Agilex™, Arria®, Intel, the Intel logo, Intel Core, Xeon, Intel Atom, Celeron and Pentium are trademarks of Intel Corporation or its subsidiaries.

More Information:
**www.beckhoff.com/AX1000**

Beckhoff Automation GmbH & Co. KG
Hülshorstweg 20
33415 Verl
Germany
Phone: +49 5246 9630
info@beckhoff.com
www.beckhoff.com